

AN EVALUATION OF THE LANDCARE FOR TEACHERS PROGRAM IN  
THE CONTEXT OF ENVIRONMENTAL EDUCATION

by

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## DECLARATION

This Thesis contains no material which has been accepted for the award of any other higher degree or graduate diploma in any tertiary institution and, to the best of the candidate's knowledge and belief, contains no material previously published or written by another person, except when due reference is made.

Signed.....

## ABSTRACT

Landcare education is part of environmental education and unique to Australia. This paper examines Landcare as an approach to Australian environmental education experience and looks at the practice of environmental education in Australia from the perspective of a Chinese student from Taiwan. This study should therefore benefit both Australia and the Republic of China (Taiwan).

The study focuses on the Landcare for Teachers Program which is a promising teacher training course which will help educators to start or enhance their teaching in Landcare. The skills acquired by participants are also applicable to other subject areas and non-teaching activities.

Evaluation is necessary before the program can successfully be extended from Tasmania to other Australian States and Territories, and be considered for use in other countries. An evaluation of the Landcare for Teachers Program was made using a questionnaire survey along with interviews of some of the participants and key persons including seminar leaders.

Findings are based upon the questionnaire, interviews, and related documentary and statistical analysis. The results of the evaluation have allowed recommendations to be made for the Landcare for Teachers program and the potential for developing a similar program in the Republic of China to be assessed.

The major findings are that the Landcare for Teachers Program has a very positive response from participants, more than 90% satisfaction rate, which is an indication of its success; however, the course content lacks a clear philosophical direction, such as might be derived from the environmental ethic of, for example, the Australian Aboriginal culture. In addition, some course topics need more careful design to cater for the differing needs of primary and secondary school teachers, taking account of their different training backgrounds and teaching subject areas.

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## FOREWORD

While working as a National Park ranger and interpreter in Taipei, the author contacted a number of primary and secondary school teachers who were interested in environmental education and were demanding more training in the field. At the same time, the author attended seminars relating to environmental education held by different government organisations such as the Ministry of Education and the Taipei Municipal Department of Environment Protection, and joined workshops organised by non-government organisations such as the National Geology Education Association and the Baha'i Office of the Environment for Taiwan.

In addition, working with a public kindergarten for six months, the author participated in a joint pilot project which is an environmental education correspondence course developed by the Council of Agriculture and the Baha'i Office of the Environment for Taiwan. Out of this experience grew the realisation that there is an urgent requirement for an efficient teacher training program on environmental education for teachers in the Republic of China (Taiwan).

In-service teacher training is an important way of providing teachers with a systematic training in the environmental education area while they are working (Loubser and Ferreira, 1992:33; UNESCO, 1983a:20). Thus the author came to Australia to seek a good teacher training program on which to model an effective program for teachers in Taiwan. The author found the Tasmanian Landcare for Teachers Program worthy of further investigation. This program is the first and only program of its type at the time of writing. The study focuses on participants of the Landcare for Teachers Program and key people in the program.

During the research period, the author faced the great difficulty of communicating with Taiwan's agencies about relevant aspects of environmental education.

Although some related government environmental education policies and documents were obtained, no agencies could give accurate translations of official terms from Chinese into English. Thus details of the background, and development of environmental education, along with the educational environment and design of actual teacher training programs in Taiwan, are left for a later study.

This study presents the opinions of the survey respondents for this region, at this time; and it is expected that the information collected, analysed, interpreted and concluded can be utilised both in Australia and the Republic of China (Taiwan) and therefore should make a positive contribution to the under environmental education community.

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## CHAPTER 1: INTRODUCTION

### 1.1 Environmental Education - What is it?

The Australian Association for Environmental Education (AAEE) defines environmental education as follows:

Environmental education is an across-the-curriculum approach to learning which helps individuals and groups to understand the environment with the ultimate aim of developing caring and committed attitudes that will foster the desire and ability to act responsibly in the environment. Environmental education is concerned not only with knowledge, but also with feelings attitudes, skills and social action (Fien, 1993a:1.12).

Howe and Disinger (1991) indicate that the basic purpose of environmental education is, in the view of most of its supporters and many of its practitioners, the development of responsible individual and societal environmental behaviour (Howe and Disinger, 1991:5). Baines (1986) states that the ultimate purpose of environmental education is to give people a proper environmental ethic (Baines, 1986:12).

Some writers (Calder and Wildy, 1990:188; Dyer, 1994:6; Greenall, 1988:55; Radbone, 1990:148; Spork, 1992:147; Wals, 1992:46) argue that environmental education should involve three aspects: the first, teaching knowledge about the environment; the second, teaching 'real life' in the environment; and the third, teaching an ethic for the environment so that students can live an environmentally responsible lifestyle. Most educators (Baines, 1986:10; Greenall, 1988:55,57; Hunwick, 1990:134; Tilbury, 1994:17; Traynor, 1990:174) emphasise the importance of educating for the environment.

In the author's view, it would be easier to adopt an ethic of harmonious behaviour with the environment if people could become convinced that humans are part of the environment rather than its managers or stewards. If they held this conviction, they would not believe they have to 'help' the environment but would have already realised that human beings rely on, not 'use' the environment; then greedy practices would stop. So the point should shift from educating 'for the environment' to 'oneness with the environment' (Tilbury, 1994:5,9; Hunwick, 1990:134,136). This concept is commonly lacking in modern societies but has existed in indigenous cultures such as Australian Aboriginal culture (Tilbury, 1994:17; Schmiechen, 1994:13), and Chinese culture e.g. Taoism (UNESCO, 1988:3) for a long time.

People perhaps need to learn this old wisdom through environmental education. The Aboriginal land ethic and experience, for example, can be found in the South Australian educational package called 'Kids for Landcare' (Golding, 1990:159).

## 1.2 Environmental Education in Australia

### 1.2.1 Background

Fien (1993b) considers Australian environmental education can be traced back over the 40,000 years of Aboriginal history. He argues that the Aboriginal people developed systems for their knowledge of the land, its cycles, the need to respect it, and the management practices that would allow them to use the land as a resource in a sustainable way. This knowledge was passed down through the generations by means of stories, dance, ceremonies and the establishment of a network of sacred places. An Australian Aborigine, Nelson (1983), says in a video *Through Aboriginal Eyes*:

"Land means more than just possession to Aboriginal people. In fact we never ever possess the land, in actual fact the land owned Aboriginal people and it doesn't make any difference from what part of Australia, where the Aboriginal people come from or where they live, the land that they live in is so important to them ... and the reason why it is so important because the land was given to them by the spiritual ancestors. They taught Aboriginal people how to survive and live on the land, how to ensure when that live in it, you will realise that Aboriginal people and the land are one" (Nelson, 1983).

The Aboriginal system of environmental education continues today through family relationships and through special programs in Aboriginal community schools and even in some progressive non-Aboriginal schools (Fien, 1993b:2). Mainstream school education still does not employ the Aboriginal environmental view. There is still a long way to go.

Greenall (1988) traces the 'contemporary' Australian history of environmental education prior to the 1970s when environmental education existed in the form of nature and outdoor education. In her view environmental education had its first formal recognition in Australia in 1970 at the Australian Academy of

Science Conference on Education and the Environmental Crisis held in Canberra (Greenall, 1988:59).

Five years later in 1975, a conference was held in Melbourne as part of the lead-up to the UNESCO Inter Governmental Conference on Environmental Education in Tbilisi in 1977. Fien (1993b) considers those two conferences were catalysts for the modern environmental education movement in Australia since those conferences, and the curriculum and professional development programs that followed them, led to an acceptance by the Departments of Education in all states of the definitions and prescriptions for environmental education developed by the UNESCO-UNEP International Environmental Education Program (Fien, 1993b:4). Parry (1987) indicates that the Curriculum Development Centre (CDC) played a very important role in supporting school based curriculum projects in addition to developing a limited range of curriculum materials in environmental education at the national level in Australia from 1973 to 1983 (Parry, 1987:10).

Greenall (1988) believes that the release of the World Conservation Strategy in 1980 provided a new focus, a new phase and a new challenge for environmental education to foster or reinforce attitudes and behaviour compatible with a new conservation ethic. She also concludes that the subsequent development and endorsement of the National Conservation Strategy for Australia (NCSA) provided a new direction and a hope for a 'new beginning' for environmental education in Australia (Greenall, 1988:59).

Within the NCSA, Greenall (1988) explains, education and training are identified as the first-priority national action for improving the capacity to manage the environment for sustainable development. Education is given the task of promoting an awareness of the interrelationships between the elements of the life support systems and of encouraging the practice of living resource conservation for sustainable development. The role of environmental education is thus the accomplishment of the objectives of the NCSA which has provided a new stimulus for environmental education in Australia (Greenall, 1988:59).

In 1980, the Curriculum Development Centre circulated to all Australian schools information about the aims of environmental education:

- \* To help students acquire an awareness of and sensitivity to the total environment.
- \* To help students develop a basic understanding of the total environment and the interrelationships of man and the environment.

- \* To help students develop the skills necessary for investigating the total environment and for identifying and solving environmental problems.
  - \* To help students acquire social values and strong feelings of concern for the environment.
  - \* To help students acquire the motivation for actively participating in environmental improvement and protection.
  - \* To help students identify alternative approaches and make informed decisions about the environment based on ecological, political, economic, social and aesthetic factors.
  - \* To provide students with opportunities to be actively involved at all levels in working towards the resolution of environmental problems.
- (Greenall, 1980:4).

In 1987 the Third National Environmental Education Seminar, 'Environmental Education - Past, Present and Future' was organised by the Department of Arts, Heritage and Environment primarily to review the 1980s status of environmental education in Australia as part of an Australian report to the UNESCO-UNEP International Congress on Environmental Education and Training which was held in Moscow in August 1987 (Greenall, 1988:55).

The Australian Education Council (AEC) met in Hobart in 1989, and agreed on national goals for schooling in Australia, which have come to be known as the Hobart Declaration (Fien, 1993b:5). In the same year, the Commonwealth, State and Territory Ministers for Education agreed on the Hobart Declaration of ten "Common and Agreed National Goals for Schooling in Australia". Goal 6 includes "the need to develop in students an understanding of, and concern for, balanced development and the global environment" (Fien, 1993b:8).

In 1992, all states endorsed the National Strategy for Ecologically Sustainable Development. Fien (1993b) uses Queensland as an example of the key role that the Education Department has been assigned in its implementation. An objective of particular relevance in Queensland proposes the incorporation of the principles of ecologically sustainable development into curriculum, assessment and teaching programs of schools and higher education (Fien, 1993b:5).

### 1.2.2 General environmental education community

Many different groups in Australian society are involved in environmental education (Commonwealth of Australia, 1987:1). Greenall (1988) lists primary and secondary schools, field study centres, TAFE institutions, tertiary education institutions including teacher education departments, the media, such as newspapers (environmental issues report), magazines (environmental

column comment), radio (environmental events broadcasts) and television (environmental programs and drama), which are more conscious about environmental message (even commercial advertisements emphasise environmentally friendly products), government agencies, voluntary conservation organisations, environment centres, community groups e.g. guides and scouts, professional organisations, industry groups, local councils, informal groups, and families who are or can be involved in environmental education. This shows environmental education happens within both formal and non-formal education in Australia (Commonwealth of Australia, 1987:1; Greenall, 1988:55).

In the course of research on a wider environmental education training program, the author attended a Ranger Naturalist training course for the 1994 Summer Program which was held by the Parks and Wildlife Service of Tasmania, and investigated the public environmental education activities around different National Parks in Tasmania. It is worth noting that the training course invited two representatives from the Tasmanian Aboriginal Land Council to provide Aboriginal views on the environment. The Landcare for Teachers Program or other teacher training programs could also include a similar session in the training course.

Environmental education helps to raise public awareness of environmental issues and ways of finding solutions to environmental problems through both formal and non-formal education (Greenall, 1988:55). Of these, formal education is likely to be more effective and more structured, although both are probably equally important.

### 1.2.3 Formal education system

Due to the diversity of the formal education system in Australia, and the strong tradition of school-based curriculum development in which schools and teachers are responsible for student learning, the position of environmental education in Australian schools varies from state to state, school to school, and from teacher to teacher. This makes it difficult to provide a detailed picture of environmental education in Australia (Fien, 1993b:4; Greenall, 1988:56).

According to Greenall (1988), the school curriculum contains many areas which relate to environmental education in Australia. Originally, ecology was the subject most closely associated with environmental education. Geography and social studies later became involved in environmental education. Currently

language studies, music, media studies, history and social education may also have objectives relating to environmental education (Greenall, 1988:57).

#### 1.2.4 Problems of environmental education

Despite the fact that environmental education is beginning to permeate the curriculum in Australian schools, problems still remain. Hickey (1987) reports on a 'Conference for Earth Education' held by the Institute of Earth Education at Scotts Creek Field Centre, South Australia on August 22-24th, 1986. The Conference pointed out that one of the problems of environmental education programs was "lack of focussed, sequential, instructional programs as a regular, integral part of the whole curriculum" (Hickey, 1987:3).

Cooper and Smith (1989:76) point out that the failure of environmental education today is the insufficiency of urban-based environmental education programs. As nearly 80% of our population lives in urban areas and global society is becoming increasingly urban, the starting point should be urban environmental issues (Baines, 1986:10; UNESCO, 1983b:5). Urban growth and land use, transportation, air and water quality, noise and energy problems should be investigated (UNESCO, 1983b:i-ii).

Hickey (1987) mentions that environmental education has largely failed due to the fact that educators do not help learners understand the processes of the environment but focus on knowledge. She also indicates that a successful environmental education program should offer a "carefully crafted, focussed, sequential, cumulative series of learning experiences designed with specific outcomes in mind" (Hickey, 1987:3). The Landcare for Teachers Program provides a most efficient tool for the realisation of the objectives mentioned above.

#### 1.2.5 Outdoor education

Eagles and Richardson (1992:11) define outdoor education as the practice of teaching students in and about the natural environment. Furthermore, outdoor education provides first-hand experience of the environment and this is important in education on the environment (Baines, 1986:10).

Excursions and field trips are the most common and easy forms of outdoor education but the venue is not always 'nature' and should include 'artificial'

human influenced environments such as farms, parks, field study centres and so on.

James (1987) notes that outdoor education has been a growth activity over the past decade or so. Principals, teachers and parents are increasingly appreciating the value of outdoor education in enhancing classroom learning and in providing the skills which are not possible to acquire in the classroom. He points out that the need for detailed planning, the importance of supervision over extended hours and the concern for the safety of students are critical areas of responsibility for the teachers; thus, thorough organisation, strict adherence to guidelines, careful instruction of students and carefully considered decisions on matters such as the organisation of outdoor program are important (James, 1987:10). However, the lack of flexibility of school programs due to their timetabling and the shortage of funds are problems which still need to be addressed (UNESCO, 1983a:5).

James (1987) believes that although outdoor education makes added demands on teachers, it is worthwhile because the students and teachers both profit. This is not simply from cognitive benefits such as the blend of theory with practice and the "realism" which enters the curriculum, but the student-teacher relationship frequently enjoys a new domain of understanding and trust, and often results in growth in confidence, resourcefulness and self esteem (James, 1987:10-11). Thus the excursions and field trips are very important in environmental education as well as valuable in self development (Fensham, 1986:235).

### 1.3 Environmental Education in the Republic of China (Taiwan)

#### 1.3.1 The education system in the Republic of China (Taiwan)

The formal educational system in the Republic of China (ROC) is very centralised, with all decisions on curriculum and the allocation of resources to individual schools being taken by the Ministry of Education which Brady suggests is very similar to the Irish education system (Brady, 1991:78-79).

According to the *Yearbook of the Republic of China 1994*, the current school system in the ROC is broken into four stages: preschool education, followed by nine years of compulsory primary and junior secondary education, then senior secondary education, and finally higher education (GIO, 1993:320).



Primary and secondary levels are the core of general education (UNESCO, 1983a:14). This study researches an initiative in Australian teacher environmental education at both the primary and secondary school levels only; it excludes tertiary education teachers. The following section indicates the student population of schools to senior secondary level in the ROC.

### 1.3.2 Student population up to senior secondary level in the Republic of China (Taiwan)

Table 1.1 is compiled from statistics provided by the Ministry of Education in the ROC (GIO, 1993:320-323).

Table 1.1

#### School and Student Numbers in the Republic of China (Taiwan)

Level	No. of schools	No. of students
Preschool	2,400	231,124
Primary school	2,522	2,200,968
Junior High	709	1,179,028
Senior High	177	229,876
Vocational school	211	500,721

As is evident from the above, environmental education up to secondary level in the Republic of China (Taiwan) potentially involves a large number of students (in total 4,341,717). Therefore, environmental education faces an enormous challenge.

### 1.3.3 Profile of environmental education in the Republic of China (Taiwan)

Chen (1993) indicates that there are four major environmental education programs in Taiwan. They are: recycling education, outdoor education, enrichment reading materials for pupils, and the infusion model (i.e. environmental education across the curriculum). However lack of environmental education curriculum planning and inadequate teacher training in environmental education results in an inefficient outcome and may lead to conflicting practices within environmental education in Taiwan (Chen, 1993:1, 6-10).

Outside the formal educational system there are different government and non-government organisations and religious groups who hold seminars or correspondence programs in environmental education. For example, since 1990,

the Baha'i Office of the Environment for Taiwan has launched joint projects with the Council of Agriculture to promote environmental education amongst kindergarten and primary school teachers around the country. Baha'i environmental education teams visit schools all over Taiwan, organising simulation games designed to teach basic environmental principles. The Baha'i community has also produced about 30 radio programs on environmental issues and published a book on environmental education in collaboration with a non government organisation, the Home Makers Union, which is a union for people occupied in the home (GIO, 1993:493).

Insufficient teacher training is one of the most obvious problems of environmental education in the world (UNESCO, 1983a:36). In Taiwan, only student teachers of science have some environmental education content in their course. In the past four years more than 5000 teachers and administrators have received limited in-service training in environmental education through a variety of very short activities such as one day seminars (Chen, 1993:4).

#### 1.4 Landcare

Teacher professional development is a continuing need in environmental education (Commonwealth of Australia, 1987:149), therefore there is a great need for a more comprehensive teacher training program in environmental education. The Landcare for Teachers Program provides a model for other teacher environmental education training programs and this will be examined later, but first the author reviews the development of Landcare in Australia.

There are many definitions of Landcare used by different needs and interest groups. The Department of Primary Industry and Fisheries, Tasmania (1992) uses the following definition: "Landcare is about people working together to ensure that the use and management of the land resource is sustainable, both ecologically and socio-economically" (Department of Primary Industry and Fisheries, 1992:1).

##### 1.4.1 Development of Landcare

Australian aborigines had inhabited Australia for some 40,000 years before the European settlers arrived at Sydney Cove in 1788. The Aboriginal way of living is generally in harmony with the environment; their lifestyle is managed by the land rather than the other way around (Roberts, R., 1989:4).

Roberts (1989) points out that when the first European settlers arrived, they immediately reduced the ground cover by clearing, grazing and cultivation. Compared with the Aborigines, Europeans have made many mistakes in land use which has caused a large scale land degradation. After 200 years of European development, Australians are still coming to terms with the environment (Roberts, R., 1989:13).

From the mid-1940s the Australians became aware of serious environmental problems. Since 1945, South Australia has operated Soil Boards in several regions. Other states developed various forms of advisory groups in the 1960s in response to the more serious land degradation. In Victoria, a group of farmers tackling local land degradation and management problems through an integrated approach formed the beginning of 'Landcare', and community support for the popular farmer-led organisation has been building since the 1970s (Department of Primary Industry and Fisheries, 1992:3).

In the late 1970s, as signatory to an international agreement through the United Nations Organisation, the Federal Government adopted a National Conservation Strategy (NCS). This was followed by a Soil Conservation Strategy (SCS) in the mid-1980s plus State Conservation Strategies (SCS). The National Soil Conservation Program (NSCP) was established by the Federal Government in 1983 and in 1985 the Soil Conservation Act allowed the Federal government to grant funds to each state government for land conservation (Roberts, B., 1991a:2; 1991b:1).

Victoria first registered 'Landcare' as a government program to assist voluntary community land conservation groups in 1986. In the same year, the rural communities of many other states began informally establishing groups to tackle their local land degradation problems. The term 'Landcare' came to be used to describe these groups and the land conservation activities they undertook (Commonwealth of Australia, 1993:5).

In 1989, the Australian Soil Conservation Council with the endorsement of the Australia Conservation Foundation (ACF) and the National Farmers' Federation (NFF) initiated the Decade of Landcare. The year 1989 also saw the Prime Minister Mr. R. Hawke declare in his statement "Our Country, Our Future" that the 1990s would be the Decade of Landcare beginning in 1990 with the Year of Landcare. He also outlined a plan costing more than \$320 million

for Landcare and associated conservation programs (Commonwealth of Australia, 1993:5).

According to the Federal Government, the main objective of the Decade of Landcare was to achieve ecologically sustainable use of Australia's lands by the year 2000. The former Soil Conservation Advisory Committee (SCAC) recommended to the Commonwealth Minister in early 1990 that the Federal Government should develop a plan for the Decade of Landcare to coordinate action by the community and all levels of government, to combat land degradation across Australia (Commonwealth of Australia, 1993:5-6).

#### 1.4.2 Decade of Landcare Plan

In 1990, the Australian Soil Conservation Ministerial Council directed that all government agencies - the Commonwealth, States, and Territories prepare plans for the Decade of Landcare. These plans were to be based on consultation with all persons responsible for land management including individual land holders, community groups, States, Territory and Commonwealth agencies, local government and peak national bodies. Draft plans were submitted for community consultation. Late 1991 and early 1992 saw the release of plans for the Decade of Landcare (Commonwealth of Australia, 1993:6).

A National Overview was also prepared in which National Goals were to:

- \* raise the awareness of the whole community about the problem of land degradation and the benefits of sustainable land use;
- \* continue the development and implementation of sustainable land use principles and practices;
- \* allow all Australians to work together in partnership for sustainable land use; and
- \* put into place effective and appropriate economic, legislative and policy mechanisms to facilitate the achievement of sustainable land use (Commonwealth of Australia, 1993:6).

The combination of different government agencies' plans and the National Overview has produced the National Decade of Landcare Plan. Integrated land, water, vegetation and other natural resources management were to be addressed concurrently with a major emphasis on total catchment management rather than the original Decade Plan which earlier focused on land degradation and land conservation. (Commonwealth of Australia, 1993:6).

In 1993 Prime Minister Mr. P. Keating indicated that there had been a dramatic increase in the participation rate of people in Landcare groups, from 600 Landcare groups in 1990 to approximately 1600 in 1993. He recommended that the whole community make the sustainable use of natural resources a reality. The Federal Government has increased and diversified its support of Landcare programs in order to complement the Commonwealth commitment to ecologically sustainable policy (Commonwealth of Australia, 1993:foreword).

Since 1993 The National Landcare Program (NLP) has been the Commonwealth's main natural resource management program to encourage a 'whole systems' approach. This approach is evident in the variety of Commonwealth agencies now involved in Landcare. The Landcare and Environment Action Program (LEAP) was established as a labour market program aimed at supporting Landcare related activities (Commonwealth of Australia, 1993:foreword).

In December 1992, Prime Minister Keating announced in his Statement on the Environment several initiatives to complement the Landcare effort including:

- \* \$2.9 million for a nationally coordinated program of water quality monitoring activities designed to raise community awareness of total catchment management;
- \* an additional \$7.6 million to enhance the Save the Bush program and to support a Corridors of Green project along the River Murray;
- \* an additional \$46 million over 4 years for improved water management in rural and urban catchments to tackle the key sources of nutrients, such as sewage plants, that contribute to algal blooms in the Murray Darling Basin; and
- \* \$15 million over the next four years for the control of feral animals and weeds, including \$5 million for the control of *Mimosa pigra*, \$2 million for a program to address the nature conservation threat posed by cane toads, and \$8 million for programs to reduce the impact of feral animals and to encourage greater community involvement in their control (Commonwealth of Australia, 1993:foreword).

The national importance of Landcare was recognised with the issue of the Landcare series of 45 cent stamps on 11th of June, 1992, and a 1993 commemorative one-dollar coin.

#### 1.4.3 Environmental education through Landcare

Roberts (1989) claims that the most important avenue for raising the community's awareness of the land degradation problem is the education system (Roberts, R., 1989:29). According to Hobson and Stadler (1992), the aim

of Landcare education is to guide students through three phases of awareness, understanding and action but not necessarily in a linear sequence. They are also committed to the positive and holistic approach that Landcare education takes in its presentation.

"One major approach can be characterised as (being) based on appreciation rather than apprehension. A second approach focuses on systems not symptoms. Both of these approaches contribute to the third major thrust of Landcare education, the concept of 'land literacy'. This involves teaching students how to learn to 'read' the land, that is, to understand the processes and interactions between various elements" (Hobson and Stadler, 1992:76).

Clacherty also refers to this concept, which he calls 'environmental literacy' (Clacherty, 1993:177).

Buxton (1989) considers that the inclusion of Landcare in the school curriculum reflects current educational principles, as listed below:

- \* relevance
- \* access for all
- \* participation in community processes
- \* learning in a variety of ways
- \* relating learning to action
- \* developing confidence and self-esteem
- \* developing a sense of purpose
- \* developing cooperation and team work
- \* developing decision-making and problem-solving abilities
- \* developing respect for different viewpoints
- \* involvement in real (rather than solely theoretical) experiences
- \* developing creativity
- \* developing adaptability
- \* understanding connections between subject areas
- \* relating school subjects to society
- \* developing strategies and skills for conflict resolution
- \* developing environmentally responsible attitudes (Buxton, 1989:43).

Buxton, in writing of Landcare programs for upper primary schools, has identified many of the ideas common to the Landcare for Teachers Program. This suggests some common goals in Landcare, spanning primary to in-service teacher education.

Hobson and Stadler (1991) describe Australian Landcare education as incorporating the concepts and principles outlined above and being underpinned by major educational processes, as follows:

- \* Integrated (cross-curriculum) learning

- \* Infusion into Existing Curricula
- \* Experiential Learning
- \* Action Research

(Hobson and Stadler, 1992:76-77).

Throughout Australia many different types of Landcare education programs are being developed and implemented with a number of agencies involved, and the underlying concepts and principles of all Landcare education programs are similar (Hobson and Stadler, 1992:77), as illustrated by the example of Buxton's ideas above.

#### 1.4.4 Elements of Landcare education

In the paper *Landcare: Educating the Caretakers of Tomorrow's World*, Hobson and Stadler (1992:88-90) identify several issues as being of national importance, particularly to those involved in the development and delivery of Landcare education. The "Five C's" of Landcare Education are concluded as:

##### 1) Communication

Students, teachers, Landcare educators, facilitators and agencies should have communication networks.

##### 2) Cooperation

One of the major themes of Landcare education is the concept of "links". Links are very important at the grass-roots level as there is a real need for complementary government departments to work together within a state, between people.

##### 3) Continuity

Any form of education is a long term process. The following factors contributing to the maintenance of momentum of Landcare have been identified as:

- \* the continuity of the recently established network of Landcare educators at the natural level
- \* the development of mechanisms to ensure that successful and effective programs continue after the first flush of funding
- \* the ploughing back of money from sales of kits and other resources into programs to provide teacher professional development and/or the cost of reprinting materials.

#### 4) Community

Lubczenko (1991) claims that the whole community should benefit from the inclusion of Landcare into school curriculum as it:

- \* promotes a conservation ethic
  - \* integrates the principles of conservation and sustainable development
  - \* promotes and strengthens education programs
  - \* provides a range of teaching and learning experiences :
    - a)the solving of real problems
    - b)the clarification of values
    - c)direct experience
    - d)cooperative learning experiences
    - e)working together in groups
    - f)the opportunity for success
  - \* provides opportunities for hands-on activities and development of skills ( problem solving, manual, social)
  - \* increases community awareness and involvement
  - \* encourages the adoption of environmentally responsible attitudes and behaviours
  - \* relates learning to the immediate real life environment
- (Lubczenko, 1991:98).

#### 5) Commitment

All of the above points are very important, but the most essential element of Landcare is the visible commitment of everybody involved, without which it will not succeed (Hobson and Stadler, 1992:88-90).

##### 1.4.5 The role of teachers in Landcare education

Teachers are in a special position to pass an understanding of the Landcare ethic to their students while putting positive steps or approaches to remedy Landcare problems into practice. Teachers also have a multiplier effect in terms of the number of students with whom they come into contact (Hobson and Stadler, 1992:84).

##### 1.4.6 Landcare training for student teachers in Australia

Hobson and Stadler (1992) argue that the inclusion of Landcare principles into teacher training programs is very important. So far, very few teacher training courses have included Landcare principles, except incidentally within science, social studies or environmental studies streams (Hobson and Stadler, 1992:84).

There are however some exceptions, for example some student teachers in the University College of Southern Queensland can choose to learn Landcare from



Dr. Brian Roberts at the Land Use Study Centre; and in Western Australia, Mr. Frits Droge, the Landcare Education Officer, presented a Landcare unit to student teachers as part of their training program (Hobson and Stadler, 1991:84-85).

## CHAPTER 2: THE LANDCARE FOR TEACHERS PROGRAM

In all countries teachers play a critical role in the actual implementation of environmental education in the school system (Ballantyne and Tooth-Aston, 1989:3; UNESCO, 1988:preface). Through environmental education, teachers help students to understand the interrelationship of all parts of the environment. Students can gain this understanding by learning about the environment, by learning the skills involved in investigating questions and issues in the environment and by acquiring attitudes of care and concern for the environment which should be a holistic concept (Fensham, 1986:244). The Landcare for Teachers Program purports to be a potentially good example of a holistic approach to environmental education.

### 2.1 Introduction

The Landcare for Teachers Program is a teacher training program which has been developed by Stadler in 1990 at the Centre for Environmental Studies, University of Tasmania. It was the first University-accredited Landcare course aimed specifically for the Bachelor of Education (in-service) teacher education program where it comprises one unit in the subject 'Topics in Science'. The unit 'Soil Conservation', otherwise known as 'Landcare for Teachers', also represents 5% of the full Diploma of Education in the pre-service teacher education program at the University of Tasmania (Stadler, 1991:4).

Participants have to pay the Higher Education Contribution Scheme (HECS) fees if they want accreditation, but the course is free for participants who take it out of interest (Stadler, 1993:3).

Importantly, the program uses an integrated approach to Landcare Education which enables teachers to help their students move from an awareness of Landcare issues to take action for the environment in a very practical way (Traynor, 1990:175).

It is important that the Landcare for Teachers course provides an insight into the various kinds of land degradation facing Australia. It is also important to have a positive message to transmit in that some damage has been repaired or land degradation improved by the commitment of individuals through Landcare by minimising their impact on the land (Wilson, 1993:16). Developing

a positive attitude is a key feature of the course and teachers can follow up by introducing Landcare into their teaching curriculum in a practical way.

Reference to the course coordinator reveals that the thirty six hour course includes a series of seminars, practical activities and field trips to farms, school and other places of Landcare interest (Stadler, T., 1994; personal communication). The emphasis of the course is on linking all the separate elements of Landcare together into a holistic framework and is intended to be an enjoyable, accessible and an interesting way to learn, especially for teachers without a science background (Robottom, Markowitz and Wright, 1985:37; Simmons, 1989:17).

The coordinator of the course indicates that the seminar and excursion leaders are specialists in their own field of Landcare (such as soils, vegetation, catchment management and recycling) who transmit knowledge of their subject in a non-technical way to teachers, many of whom do not have a background in science. The enthusiasm of the leaders and their commitment to Landcare education are major factors in making the program a success (Stadler, T., 1994; personal communication).

Landcare education is a good example of environmental education because Landcare is suited to the curriculum at all age levels and it can be integrated into all subject areas from language and art to social studies and the sciences. It is important that school students can become involved in diverse Landcare activities including (for example) the rehabilitation of degraded bush areas in their school, planning their school grounds or organising Junior Landcare conferences (Traynor, 1990:174; UNESCO, 1983c:8).

Most teachers so far have taken the course for interest and professional development, but a growing number of trainee teachers choose to take it as part of their teaching degree. Their participation is important as is the participation of some non-teaching educators such as local council officers and non-government organisation leaders, since this enables interaction amongst people with different experience and backgrounds. Similar courses have run as an intensive Summer School program at the University of Technology, Sydney, and Vacation Schools at Griffith University as part of a Masters qualification (Stadler, T., 1994; personal communication).

## 2.2 Goal of the Landcare for Teachers Program

Reference to the course coordinator shows that the program aims to make teachers who have completed the course better equipped at incorporating Landcare as school adaptable elements into their teaching. It provides them with greater knowledge and skills as well as confidence in teaching about Landcare which is very important for a good environmental education program (Traynor, 1990:175).

The participants also make contact with a number of additional resource people who can visit them at their schools and help get a Landcare program working. The ultimate goal of the program is to get school students involved in doing something positive and practical for the environment.

### 2.3 Formation of the Landcare for Teachers Program

Stadler, the program coordinator was trained as a secondary language teacher before she studied environmental studies. While finishing her PhD research, she began to recognise the need for teachers to understand and teach about soil conservation. In 1988 ground work started, including talks to the Education Department and the Centre for Environmental Studies at the University of Tasmania, the Tasmanian Agriculture Department (now the Department of Primary Industry and Fisheries), and the Education Department to discuss the possibility of setting up a course for teachers (Stadler, T., 1994; personal communication).

The replies from different departments were very supportive and Stadler made a grant application in 1989-1990 to the National Soil Conservation Program to develop the Landcare for Teachers Program at the University of Tasmania (Stadler, T., 1994; personal communication).

When the proposal was approved, assistance was sought starting with the Tasmania State Government Technical Committee for Soil Conservation. It was suggested that help could be forthcoming from different government departments such as the Department of Primary Industry and Fisheries and the Forestry Commission. Support also came from non-government organisations such as the Tasmanian Environment Centre Inc. and Greening Australia, Tasmania, based in Hobart (Stadler, T., 1994; personal communication).

Topics for the course and the type of course to be offered were decided by talking to teachers and finding out what their needs were. Finding leaders was the next important step. Characteristics considered when employing leaders were: a passion for their subject, a willingness to lead sessions, and the ability to pass on their knowledge in an easy way making it as accessible and practical as possible. The ability to communicate was considered more important than formal qualifications since it is not always the most highly qualified person who is good at passing on their experience (Stadler, T., 1994; personal communication).

## 2.4 Course Development

According to Stadler, the course must be accessible and the knowledge assimilable so that teachers with a non-science background can also enjoy and understand the course and obtain a comprehensive grasp of Landcare. The course was intended to be available to any teacher regardless of whether they have a science background or not (Robottom, Markowitz and Wright, 1985:37).

The basic topics for the course are soil, vegetation and water. Other related topics were added as leaders become available. The topics change from time to time depending on new demand or local needs and the availability of leaders.

The Landcare for Teachers Program was initially funded by the National Soil Conservation Program (NSCP) but it is now funded under the National Landcare Program (NLP) and annual applications to continue funding are necessary. Total NLP funding for the four years of the project was AUS\$ 203,000. This covered the operating costs of the project as well as the salary and travel costs of the coordinator whose primary task was the development of the Landcare for Teachers Program in Tasmania and other states. The position of coordinator also included other tasks related to the promotion of Landcare education in Tasmania and elsewhere. The contribution to the project by State government agencies, such as the Department of Primary Industry and Fisheries, included the provision of technical expertise and seminar leadership (Stadler, T., 1994; personal communication).

The budget plan of a successful in-service teacher training program is vital (UNESCO, 1983a:20). Actual operating costs of the Landcare for Teachers Program in Tasmania included payment for some seminar leaders, course notes, teaching kits and other resources and the cost of hiring buses for field

trips. They also included expenses incurred in course promotion and publicity. A number of shorter Landcare education seminars and workshops were also organised but they do not fall within the parameters of the present research (Stadler, T., 1994; personal communication).

## 2.5 Some Difficulties Faced in the Program

According to the program coordinator, publicity is sometimes difficult, as some early courses were not very successful due to low numbers. It was especially difficult to start courses at the Launceston Campus, University of Tasmania. This may have been caused by lack of an equivalent information centre such as the Tasmanian Environment Centre in Hobart. This shows that creating networks is very crucial for passing on information. Also it is sometimes difficult to find suitable leaders.

## 2.6 Future of the Program

The coordinator of the Landcare for Teachers Program, Dr. Stadler, says that she would like to see the course continue as part of the teacher education system and for the course to reach interested teachers all over Tasmania as well as other States and Territories. She estimates that more than twenty percent of all schools in Tasmania are involved in Landcare and this could be boosted in the future.

Ongoing work on the Landcare teaching scheme is critical as it should not stop half way. More teachers need Landcare education training and they need to be able to build on previously learned skills. There is a concern that before the end of the Decade of Landcare, program funding from the Federal Government will be stopped. Marketing the course as a teacher professional development program might allow it to become self-funding rather than relying on government funding.

## 2.7 Content of the Landcare for Teachers Program

From 1990 to 1993 inclusive there have been seven term time courses and five Summer School courses at the University of Tasmania (two in Launceston, and ten in Hobart). So far, about 150 participants (including the 1994 Summer

School) have completed various Landcare courses in Tasmania which have changed from time to time to adapt to teachers' needs.

### 2.7.1 Researcher participation and observation

Most social research begins with a period of informal observation - generally participant observation (Wadsworth, 1984:40). The author has sat in on term time courses in 1992 and 1993 on such topics as 'The Living Soil - Earthworms', and 'Landcare from a Global Perspective', and has taken part in the 'Whole Farm Planning Excursion' and 'An Erosion Example - Green Valley' field trips to observe the term time courses in progress.

In addition, the author participated in the Landcare for Teachers Summer School 1994 at Hytten Hall, University of Tasmania, 10-14 January, which included a follow-up day excursion on 14th May to Bangor on the Forestier Peninsula, Tasmania.

### 2.7.2 Record of 1994 Summer School

Part of the Summer School course was recorded by means of video, slides and photographs with the agreement of seminar leaders and all participants. This technique was considered to be the most appropriate first-hand record for demonstration in other places such as Taiwan. In addition, using video and photography cameras as the media for recording the course directly generates material that stands as evidence in itself (Wadsworth, 1984:41).

The structure of the course is the result of refining past courses. For example, the balance between theory and practical activities, and the variety of topics and resources have been taken into consideration (see Appendix 1 - 1994 Summer School Time Table). What follows are some brief notes on the topics covered.

There are good links between classroom seminars and excursions. For example in the 1994 Summer School, the first excursion 'Everyone lives in a Catchment' was led by two seminar leaders and was directly connected to their seminar topics 'The Living Soil' and 'Water Cycle'. Another excursion 'Visit to a successful Landcare School at Sorell' was an excellent illustration of the topics 'Landcare in the Curriculum' and 'Reduce, Re-use, Recycle: Waste Minimisation in your School'. The field trip 'Waverley Flora Park: a Landcare Education Resource' was a good demonstration of the topics 'Greening Australia' and 'Weeds'.



Each seminar contained comprehensive information about the topic. For example, the topic 'Introduction to Soils' began with four reasons to conserve soil and then explained soil formation, followed by soil components and horizon development, along with some soil properties important to plant growth.

To understand soil behaviour when disturbed, a hands-on demonstration was held outside the classroom to show how to conduct soil activities suitable for students such as soil absorption and the importance of soil cover.

The topic 'Water Cycle' started with a catchment model in which water was poured on sloping ground outside the classroom. This was followed by a lecture, using the overhead projector and slides to show the interaction between rocks, soil and water in shaping the land.

This included the relationship between soils and water, water on Earth, and the hydrological cycle. A video tape *Fresh Water* produced by the 'Stream Watch' program of Water Board, New South Wales, 1991, was also used as an example of a water-related resource.

The topic 'Landcare in the Curriculum' opened with a discussion of Landcare and school with teachers and the leader's own experience with developing school-based Landcare activities such as local area historical research and the Worm Watch program with school children. This was followed by taking the whole class outside the classroom, the nearby university yard, to demonstrate two activities: 'My Patch - A story based on shared discoveries of the land' and 'The Story of the Great Brown Land'.

In the first activity a rope was placed around a square metre patch of ground by each participant who then had to:

- \* think about why they chose one area and not another;
- \* get to know their "patch" and discover how their "patch" fitted into the surrounding catchment;
- \* think about the most interesting elements about their "patch";
- \* sit in their "patch" and write non-stop about their "patch" for two minutes;
- \* describe their "patch" to other people in the class; and
- \* visit other people's "patches".

The second activity was designed to be interactive, to encourage children to relate to the problem of Landcare in Australia. The story, *The Great Brown Land* (Smit, 1933), is told about the Australian land use history using cloth (shape of Australia and ocean), natural materials such as seeds, leaves, grass (vegetation), and toys such as aeroplane, sheep and cattle models (human influence). This illustrated abstract concepts, such as what is wrong with our environment and what can we do about it, making them visible and easy to understand.

After the activities, the whole class went back to the classroom to discuss the practicalities of improving school grounds, and watched a British video tape *Learning Through Landscapes*. The use of school grounds is more effective and easier than excursions as the form of education in the environment (Baines, 1986:10). The class then divided into primary and secondary school groups to discuss their different needs in the school curriculum.

Finally the leader showed participants how to make a "soil sundae" to increase their awareness of the different types, textures and colours of soils in a given area. Participants were shown how to use a tall clear container or parfait glass, plastic bags to collect different soil samples and large spoons or trowels to collect soil to make layers with different colours and textures of soil.

The leader of the topic 'Greening Australia' provided "Tree Growing Kit Instructions" and demonstrated actual techniques such as filling punnets with soil and sowing the seeds, preparing the germination mix and special treatments, pricking out and preparing the potting mix, and looking after the seedlings.

The topic 'Weeds' started by discussing definitions of weeds with some reinforcement of plant biochemistry. The group also discussed the usage and control of weeds. This session ended by showing how teachers could collect and press their own samples of weeds.

The topic leader for 'Reduce, Re-use, Recycle: Waste Minimisation in your School' brought a recycling education kit including recyclable resource examples, an audio tape of recycling songs and stickers to promote recycling. At the end every participant was asked to fill out a school recycling questionnaire for the leader's survey.

The topic 'Earthworms/Composting' was led by an organic gardener who brought different earthworms and a worm farming kit to show how to breed and identify earthworms. The leader also demonstrated how to make one's own compost bin effective and economical.

The leader of the topic 'Endangered Species' started by giving definitions and detailing the importance of endangered species. This was followed by slides and some examples. The Endangered Species Network in Tasmania was also introduced.

The excursion 'Everyone lives in a Catchment' was led by the Soils Officer at the Department of Primary Industry and Fisheries, and a geologist formerly from the Mines Department. A university bus was used to transport the class to a stream of Mt. Wellington to look at soil profiles. The trip travelled through South Hobart to see the different landforms and geology of two catchments.

The field trip 'Waverley Flora Park: a Landcare education resource' was led by a botanist who is a trained secondary school biology teacher. Participants were shown different vegetation types and asked to collect leaves of different shapes as an observation activity. Fire management in the park was also discussed. This trip required own transportation and some participants were absent.

The excursion 'Visit to a successful Landcare School at Sorell' was led by a teacher. A University bus was used to transport participants to the location. The session started by discussing Landcare teaching at school and the recycling project link with the community in a "recycling and Landcare centre" which is located in Sorell District High School. This was followed by visiting the school farm and viewing the school ground as concrete examples of Landcare education in school.

'Landcare Activities at the Tasmanian Botanical Gardens' were led by the garden's education officer. He showed the facilities of a 'Green Food Factory' in the Garden Education Centre as an easy way to explain plants' use of sunlight with water and carbon dioxide to produce food. Outdoor games such as 'Food Web' and 'Tree Function' were also included to demonstrate some educational and enjoyable activities can be held in gardens.

A visit to the Tasmanian Environment Centre was a great experience for teachers who were not aware of the rich collection of environmental education materials and particularly those Landcare resources available, including books, video tapes, audio tapes, slides and human resources.

About four months after the five-day intensive course, a follow-up day excursion which took participants to Bangor was held to complete the 1994 Landcare Summer School on Saturday, 14th of May. A University bus was used to transport the group to a private farm at Bangor on the Forestier Peninsula. Some participants were absent due to various reasons but some participants attended from Launceston and other distant areas.

This session was started with a introduction by the owner of the property who had funds from the National Landcare Program to develop the Landcare project "Sustainable Agriculture at Bangor, Dunalley".

This was followed by the project educator (a person employed at Bangor as an educational officer), who was also one of the Summer School participants, to show other participants the Landcare Education Programs she had developed for schools. Those included, for example, vegetation, animals, landform and history. Because this was the first year, the guide on information and activities for both students and teachers were not yet finished and will be expanded so that they are more specific and detailed.

After the tour of different areas of the farm with regard to possible Landcare excursions for classes, a brief discussion about every participant's work in Landcare teaching was held to exchange their own experience and to share their ideas. Due to time constraints all participants expressed the need for another follow-up meeting at the end of the year.

### 2.7.3 Data of Summer School survey

Twenty-two persons applied for the 1994 Landcare Summer School. Of these, two people did not attend the course, and one participant was enrolled for the second time and completed a postal questionnaire. Excluding the author and the person who had completed a questionnaire, the other eighteen participants were asked to complete a questionnaire (see Appendix 2a) immediately after the course. This approach is different from the postal questionnaire survey (see Chapter 3) because the participants of the postal survey had used the knowledge gained from the course in their teaching.

The Summer School group excluding the author and one participant who was repeating the course, comprised two men and sixteen women (see Table 2.1); five participants aged under thirty, six from thirty to forty, five from forty one to fifty and two over fifty (see Table 2.2); nine primary, six secondary school teachers and three university students (see Table 2.3); seven had science and eleven non-science backgrounds (see Table 2.4). Five out of eighteen participants would like to be informed of the results of the survey .

Table 2.1

Participants of the Landcare for Teachers Summer School 1994 by Gender

Gender	Male	Female
Number	2	16

Table 2.2

Participants of the Landcare for Teachers Summer School 1994 by Age group

Age group	< 30	30-40	41-50	> 50
Number	5	6	5	2

Table 2.3

Participants of the Landcare for Teachers Summer School 1994 by Work place

Work place	Primary school	Secondary school	University student
Number	9	6	3

Table 2.4

Participants of the Landcare for Teachers Summer School 1994 by Subject

Subject	Science	Non-science
Number	7	11

All of the responses were very positive (100% of satisfactory) and the answers (see Appendix 3) were similar to those from the postal questionnaire survey. A suggestion (and this was a supportive one) was that the course could have been given more time. In addition, during the course, the question of a land ethic was raised in discussion, and it was suggested that environmental values should be part of the course since it is important to teach "for" the environment.

Recommendations were made, such as inviting Aboriginal people to share their attitudes towards the land and to learn to live in harmony with the environment. It was also suggested that the course should point out that a critical environmental problem is consumerism, and that humanity must stop the desire for material development by moving from a "wasteful" lifestyle as a starting point.

### CHAPTER 3: POSTAL QUESTIONNAIRE SURVEY

Over an approximate one month period from 29th October to 23rd November 1993, a questionnaire with a covering letter (see Appendices 2a, 2b), and a survey reminder (see Appendix 2c) was sent to all participants (132) of the Landcare for Teachers program between 1990 to 1993. These included primary and secondary school teachers and other educators in the environmental education field, such as government Landcare officers and non-government organisation instructors.

#### 3.1 Aims of the Postal Questionnaire

The purpose was to evaluate the program for its educational outcomes for teachers and for school practices. The aims of the questionnaire were:

1. to ascertain the participants' motivations for undertaking the course and to assess the degree to which their expectations were satisfied (cf. UNESCO, 1983c:9);
2. to find out which aspects of the program were most helpful and particularly which topics were most useful for developing the teachers' skills and knowledge and for classroom use (cf. Niedermeyer, 1992:48; UNESCO, 1983a:36);
3. to compare differences due to participants' personal background;
4. to investigate the attitudes and opinions of educators about Landcare teaching and identify possible obstacles to the implementation of Landcare activities (as part of environmental education) in schools;
5. to recommend improvements to the program in Tasmania and similar programs elsewhere in Australia; and
6. to examine the potential to introduce such a course to the Republic of China (Taiwan).

#### 3.2 The Postal Questionnaire Method

Given the constraints of time and money, a postal questionnaire was used as the most practicable method of obtaining information from Tasmania and interstate. Pre-survey publicity was given by one article in the Landcare for Teachers newsletter (No 8, October, 1993, University of Tasmania), explaining the survey and requesting the help of all participants (see Appendix 2d).

On 29th October, 1993, the participants' addresses were updated and the participants were sent the questionnaire with a covering letter (see Appendices 2a, 2b), and a prepaid self-addressed envelope.

Three weeks later, a survey reminder (see Appendix 2c) was sent to stimulate the response rate. The author found that this improved the level of responses. Four envelopes were sent back marked "unknown at this address", and the author had to delete these participants from the files for the purposes of this survey.

A small number of others had to be excluded from the survey for the reasons set out in table 3.1 below. Ultimately 74 completed questionnaires were received, which represents 56.1% of all the course participants. Included in this total were returns received from persons who are now working interstate or who have changed their addresses. A summary of the returns is presented in Table 3.1 below, and the representativeness of these is discussed later.

Table 3.1  
Response for the Postal Questionnaire

Returns	No.	%
Deceased	1	0.7
Moved overseas	2	1.5
No address	4	3.0
Uncompleted	1	0.7
No response	50	38.0
Effective response	74	56.1
Total	132	100.0

The data were entered into an IBM microcomputer using the package Microsoft Excel Version 4.0 for Windows™ Series (see Appendix 4) and the data later was transferred onto a Macintosh Apple computer and StatView<sup>512+</sup> statistic package software was used in the analysis.

Space was left both within the questionnaire, and at the end, for comments on particular issues. Most respondents took advantage of this to express their views, sometimes at great length. Whilst a detailed and systematic analysis of these comments took some time, the author has used some of the respondents' own words as an illustration of points made in each answer category.



All those who were non respondents for whatever reasons including those with no current address have been grouped together, and telephone interviews were conducted in an attempt to clarify positions held by non-responding participants.

### 3.3 The Postal Questionnaire Results

#### 3.3.1 Respondent profile

A higher proportion of respondents (64%) were females than males (36%), which reflects the ratio of females to males who did the course. There are 49 (37%) male and 83 (63%) female participants in this survey, thus the distribution is closely representative of the whole sample (see Table 3.2).

Table 3.2  
Postal Questionnaire Responses by Gender

Gender	Male	Female
Response rate	36%	64%

Table 3.3 shows that the highest response rate came from the age group 41-50 (42%), followed by age group 31-40 (30%), 30 or younger (16%) and lastly over 50 (12%).

Table 3.3  
Postal Questionnaire Responses by Age group

Age group	< 30	30-40	41-50	> 50
Response rate	16%	30%	42%	12%

Forty five percent of respondents were primary school teachers, 34% were secondary school teachers and 17% were non teachers. 4% did not reveal their work place (see Table 3.4).

Table 3.4  
Postal Questionnaire Responses by Work place

Work place	Primary school	Secondary school	Other	No answer
Response rate	45%	34%	17%	4%

Table 3.5 shows that respondents who taught science subjects made up 46% of the group, 31% did not teach science subjects and 23% did not indicate whether they taught science or not.

Table 3.5  
Postal Questionnaire Response by Subject

Subject	Science	Non-science	No answer
Response rate	46%	31%	23%

Forty six percent respondents requested the results of this survey and 54% did not request results of this survey (see Table 3.6).

Table 3.6  
Postal Questionnaire Responses by Request result

Request result	Yes	No
Response rate	46%	54%

*Question 1. When did you participate in the Landcare for Teachers program?*

There are two courses available in the Landcare for Teachers program. Forty five percent of responses were from summer school participants and 54% responses were from school term participants, 1% of responses did not specify which course the person attended (see Table 3.7).

Table 3.7  
Postal Questionnaire Responses by Course

Course	Summer school	School term	No answer
Response rate	45%	54%	1%

Responses were gathered from people who attended the course over a range of years 1990 (18%), 1991 (28%), 1992 (31%), 1993 (16%), 7% of respondents did not indicate which year they attended the course (see Table 3.8).

Table 3.8

Postal Questionnaire Responses by Year

Year	1990	1991	1992	1993	No answer
Response rate	18%	28%	31%	16%	7%

### 3.3.2 Respondent motives for attending the course

*Question 2. What made you decide to participate in the Landcare for Teachers program?*

Participants were able to give more than one reason for participating in the course, thus the results add up to more than 100%.

89% wanted to find out more about Landcare,  
 73% were concerned about the environment,  
 64% wanted to increase their confidence in teaching Landcare issues,  
 41% wanted to update their scientific knowledge,  
 36% wanted to develop their teaching skills,  
 34% wanted to include more science teaching in their classes,  
 20% wanted to gain qualifications / accreditation (e.g. Dip.Ed.),

5% gave other reasons, such as:

"personal interest only",

"To link with an Environmental recycling program and to link with a green house set up in school over years",

"I have a particular interest in the land",

"To establish a new course of study for Red Cross Youth nationally and internationally",

"I have a very keen interest in earth related topics",

"It fulfilled a requirement for professional development",

"It was free - I would not have been able to do it otherwise",

"To get ideas for interesting ways to get the message to kids".

### 3.3.3 Respondent satisfaction with the course

#### *Question 3. Were your expectations realised?*

Ninety three percent gave a positive response whilst for 7% the course did not fulfil their expectations. Many participants gave extra information. Fifty four respondents provided a comment in the open ended component of this question. For the purpose of analysing these open responses, nine broad categories were adopted with the number of answers shown in brackets:

Those who answered yes,

1. (21) Informative
2. (14) Learning experience
3. (12) Increased knowledge of Landcare
4. ( 3) Practical use in teaching

Those who answered no,

5. ( 3) Need more hands-on practical activities
6. ( 1) Further development of topics would be useful
7. ( 1) Not enough to enhance teaching skills
8. ( 1) Forced to close the course early due to lack of takers
9. ( 1) Had no expectations

The need expressed for hands-on practical activities indicates that environmental education should include more reality-based and action-based approaches (UNESCO, 1983a:13).

Obviously the categorisation of these written comments is somewhat subjective. The total of the number in brackets exceeds 54 because some mentioned more than one reason.

Of those who felt their expectations were realised most felt this was because the course was informative. For example, some comments were :

"Very informative at a personal and teaching level",

"It helped with my environmental knowledge",

"It increased my knowledge and continued my interest",

"The course answered all of these concerns but as much in terms of starting the process as in fulfilling those expectations (reasonable considering the short time involved)",

"My increased knowledge and the information to find help in the essential places certainly helped",

"I felt I learnt a great deal about aspects of the environment and felt qualified enough to teach young students about some important issues",

"It was a very informative, practical course",

"1. Access to suitable aids and other materials, books etc.

2. Access to specialist people.

3. Access to program already in operation",

"The course was comprehensive and practical both in personal information and in teaching curriculum".

The second reason respondents' expectations were realised was because of its value as a learning experience. For example, some comments were:

"A good range of environmental topics",

"A balanced view point was given which was a pleasant change from other environmental seminars",

"The course provided a broad spectrum of issues which gave impetus to further inquiry and investigation on an individual basis",

"A practical approach : enthusiastic tutors",

"A well planned unit which gave lots of inspiration for classroom activities",

"A well organised broad based overview of the problems and some indication of remedies",

"Varied topics covered, excellent activities trialed",

"Most interesting and varied course",

"Provided a structure to develop Landcare in school within science curriculum",

"Well qualified people taking course, length of course gave time to learn a lot",

"Applied nature of course was excellent",

"Good lectures, really good and stimulating fellow students",

"There was a good tie of practical and expertise from people working in related fields",

"Learnt heaps that I didn't know - about things happening in the local area and why, and more important, what is being done about it"

*Question 4. Were there any unexpected benefits?*

Sixty one percent of responses indicated that unexpected benefits were gained from the program, 38% did not get any unexpected benefits and 1% did not answer. Forty seven respondents gave extra information. As in question 3, nine broad categories were adopted with the number of answers shown in brackets:

1. (15) Sharing ideas professionally
2. ( 8) Resource materials available
3. ( 7) Enthusiasm for course
4. ( 6) Knowledge gained and used
5. ( 4) Learnt a lot about practical skills
6. ( 3) Optimism for the future
7. ( 2) Field trip benefits
8. ( 1) Landcare group values realised
9. ( 1) Follow up support available

The most commonly reported benefit was sharing ideas professionally. For example:

"Friendships; professional networking",  
"Networking with other interested people",  
"Opportunity to contact other teachers in similar situations",  
"Professional contact/interchange",  
"Good to make contacts with other Landcare professionals and teachers associated with Landcare",  
"Contact with teacher in similar position. I learnt as much from the other participants as from the lecturers",  
"Getting to meet with like-minded teachers and hearing about what others have done in their schools has certainly spurred me on",  
"Networking other schools"

The second unexpected benefit was availability of resource material. For example:

"Some teaching aids (e.g. slide kits) which I was not aware of",  
"The availability of other resources and resources centres",  
"Materials to use at school",  
"The various resources made available".

*Question 5. What aspects of the course were most helpful in developing your own skills and knowledge?*

Sixty-five respondents provided a comment in the open ended component of this question. Eight broad categories were adopted with the number of answers shown in brackets:

1. (17) Field trips and excursions
2. (15) Practical sessions
3. (14) Resource materials available
4. ( 9) Other aspects of course e.g. theory
5. ( 7) Contacts
6. ( 7) Diverse approaches to subject
7. ( 6) Lecturers in different areas
8. ( 2) Visit to other schools

Of these answers, field trips and excursions were cited as most helpful in developing their own skills and knowledge. For example:

"Greening Australia Program, actual trips e.g. Liffey Valley scheme, soil testing - field work and links back at TSIT (Tasmanian State Institute of Technology).",

"Seeing real life examples of damage",

"Theory session followed by excursions which demonstrated knowledge learnt",

"Field trips",

"Whole farm planning",

"Slides of land erosion and trip to Midlands property to view solutions",

"Demonstrations and soil identification excursion",

"Field work",

"a) Excursion e.g. to roadside revegetation and soil profile;

b) Practice soil tests",

"Field trips - hands on and first hand experience of what had been discussed in lectures"

This result shows that when teachers and students are out of the classroom, the constraint of the disciplines much reduced (Fensham, 1986:234); this is conducive to a holistic approach and confirms the importance of outdoor education.

### 3.3.4 Classroom Application

*Question 6a. How useful did you find the following topics for classroom use?*

This question attempted to find out the degree of usefulness of the units offered for teaching purposes, by giving each a scaled score. Because there is some variation in the courses due to different locations (ten in Hobart and only two in Launceston) and instructors, the author asked participants to give scores only to topics covered in their particular course.

An average score for each topic was generated by adding all scores and then dividing by the number of the people who responded for the topic. Score 4 means most useful. The results in numerical order are shown below:

{mean score}	[topics]
{3.48}	[Your general view of excursions]
{3.41}	[The living soil - Earthworms]
{3.37}	[Vegetation]
{3.36}	[Land management issues and problems]
{3.35}	[Landcare in the curriculum]
{3.33}	[The living soil - composting]
{3.32}	[Introduction to soils]
{3.25}	[Whole farm planning excursion]
{3.22}	[Visit to a community Landcare group]
{3.21}	[Landcare resources]
{3.21}	[Rehabilitation of disturbed areas]
{3.09}	[Soils and water (geology)]
{3.06}	[Coastal Landcare]
{3.03}	[Wetlands as a Landcare resource]
{2.97}	[Final session - presentation of participants' projects]
{2.97}	[Historical, social and political aspects of land degradation]
{2.83}	[Fauna - impact of grazing animals]
{2.68}	[Landcare from a global perspective]

The reasons given by respondents are clarified in questions 6b. and 6c.



*Question 6b. For topics you have chosen as 'not useful' for classroom use, please explain why.*

According to the results from Question 6a, the least useful topic was 'Landcare from a global perspective' followed by 'Fauna - impact of grazing animals'. This shows that if the topics are less or not directly related to or exemplified in a local environment due to the various school locations, it is difficult for a teacher to put it into a meaningful classroom/school teaching context.

Nineteen respondents answered this question, four broad categories were adopted with the number of answers shown in brackets:

1. (14) Not related to teaching
2. ( 3) No time to include Landcare in the teaching curriculum
3. ( 2) Not stimulating
4. ( 1) Topics already in curriculum

Of those reasons, 'not related to teaching' is the most frequently indicated by participants. For example:

"Difficult to utilise in the high school situation",

"Not applicable (in great depth) to the four and five year olds I teach",

"I have not been able to find a use for these topics as they didn't apply in my situation".

*Question 6c. For topics you have chosen as 'very useful' for classroom use, please explain why.*

Most responses showed that excursions were the most useful session for teaching while earthworms was the most useful topic for the classroom (the second most useful of all topics).

Fifty-seven respondents gave their comments, and eight broad categories were adopted with the number of answers shown in brackets:

1. (30) Satisfactory use of topics in classroom
2. ( 9) Knowledge expanded
3. ( 8) Practical activities could be adopted

4. ( 6) Excursions provided hands-on experience
5. ( 5) Provided important aspects of Landcare
6. ( 4) Most satisfactory and stimulating
7. ( 2) Update of new issues
8. ( 1) More relevant to life

Of those reasons, 'Satisfactory use of topics in class' is the most frequently indicated response by participants. For example:

"Have been able to use topics in classroom on both infant and primary level",  
"I have included all of these in a Grade 10 Landcare course and teach them",  
"These practical topics have been used in the classroom and children take from their experiences to be built on in later school experiences",  
"Able to be used in the classroom, interesting and relevant",  
"These topics gave me concrete material/ideas that could be used directly in course development and provided the information I needed to be confident in teaching the subject",  
"Most of these topics were able to be translated easily into the classroom",  
"I have used these directly in the course planning",  
"These have been appropriate for lower infant area. Also they are very practical",  
"Easy to explain the basics to young children and also to demonstrate within the confines of classroom and immediate environment"  
"I thought that most topics could be directly used in my teaching program at TAFE ie they were useful in a practical sense".

### 3.3.5 Respondent suggestions

*Question 7. How might this course be improved? Please give your comments.*

Fifty-two people gave comments on [Balance between theory and practical activities], and eleven broad categories were adopted with the number of answers shown in brackets:

1. (12) Satisfactory
2. (12) Should be more balanced
3. ( 7) Inclusion of practical activities in every session

4. ( 6) More practical activities
5. ( 5) Application of more activities suitable for classroom
6. ( 2) Theoretical base essential
7. ( 2) Separate into primary and secondary school use
8. ( 1) Shorter activities but more
9. ( 1) Add one day excursions
- 10.( 1) Problem solving by students after the course had finished
- 11.( 1) More urban themes required

Thirty-nine people gave comments on [Seminars (delivery/content)]; eight broad categories were adopted with the number of answers shows in brackets:

1. (24) Satisfactory
2. ( 4) Some seminars disappointing
3. ( 3) Too much theory
4. ( 3) Separate into primary and secondary school use
5. ( 2) Need more organisation
6. ( 1) Need the link between primary and secondary course
7. ( 1) Timing poor
8. ( 1) Maintain diversity of visiting experts

McPhail (1994) points out a significant difference between environmental education in primary and high schools. High schools emphasise the understanding of environmental concepts, while primary schools emphasise participation in environmental projects (McPhail, 1994:4). This shows that the emphases of primary and secondary schools differ.

Forty-seven people gave comments on [Course material provided]; and four broad categories were adopted with the number of answers shown in brackets:

1. (37) Satisfactory
2. ( 6) Need more specific curriculum material
3. ( 2) Should be provided for all ages
4. ( 1) More Landcare introduction

The need for more specific curriculum material also is a major concern throughout the world (UNESCO, 1983a:31).

Forty-seven people gave comments on [Field trips/excursions]; and eleven broad categories were adopted with the number of answers shown in brackets:

1. (16) Satisfactory
2. (12) Most useful in teaching
3. ( 6) Felt they were inadequate
4. ( 3) Some tended to be superficial
5. ( 2) Shorter trips
6. ( 2) Should be relevant to indoor topics
7. ( 2) Essential to this type of course
8. ( 1) Need pre-excursion information
9. ( 1) Relevance to age group
- 10.( 1) Visit community Landcare group
- 11.( 1) Should consider weather

Thirty-three people gave comments on [Assessment]; and five broad categories were adopted with the number of answers shown in brackets:

1. (14) Satisfactory
2. ( 7) Test could be useful
3. ( 3) More help could have been given
4. ( 1) Keep the different choice of qualifications
5. ( 1) Continuous assessment of components

Thirty-six people gave comments on [Pre-course publicity / information]; and four categories were adopted with the number of answers shown in brackets:

1. (20) Satisfactory
2. (12) Poor, more needed
3. ( 2) Newsletter needed
4. ( 1) Too oriented to secondary schools

Fourteen people gave comments on [Other]; and seven broad categories were adopted with number of answers shown in brackets:

1. ( 4) Separate primary and secondary school courses
2. ( 3) Follow up courses to keep up and/or advanced course
3. ( 1) Use case studies of local areas
4. ( 1) More emphasis on Landcare in/ across the curriculum
5. ( 1) Upgrade the course
6. ( 1) Bad timing, should be held at regular times in school term
7. ( 1) Remain free of charge

The recommendation to separate primary and secondary school courses reflects the different needs of primary and secondary teachers (Hickey, 1987:4).

### 3.3.6 Respondent attitudes towards Landcare

*Question 8. Please indicate your level of agreement with each of the following statements:*

The participants were asked about their own attitudes and the attitudes of their students' parents , colleagues, and school authorities toward Landcare. These were scored : 1=strongly agree; 2=agree; 3=no opinion; 4=disagree; 5=strongly disagree.

The mean scores of each statement in numerical order are as below:

{mean score}	[statements]
{3.47}	[Parents do not support Landcare activities at school]
{3.41}	[School authorities do not encourage Landcare activities]
{3.15}	[Fellow teachers have not become involved in Landcare]
{2.45}	[Landcare has enabled useful networking with other teachers]
{2.41}	[I would like more help/resources to teach Landcare]
{2.08}	[Students' enthusiasm for Landcare activities has increased]
{2.01}	[Landcare has helped local environmental initiatives]
{1.80}	[I feel more confident with teaching Landcare now]
{1.47}	[Landcare should be part of the school curriculum]

According to the mean scores shown above, most participants did not agree that parents, school authorities and fellow teachers were obstacles to teaching Landcare in school, and very few teachers claimed that the principal did not support Landcare teaching in school.

On the other hand, most participants strongly agreed that Landcare should be part of the school curriculum and they felt more confident with teaching Landcare after the course.

In addition, participants' observations indicated that Landcare has helped local environmental initiatives and that their students' enthusiasm for Landcare activities has increased.

Participants would still like more help or resources to teach Landcare even though the Landcare for Teachers Program has enabled useful networking with other teachers.

### 3.3.7 Additional Comments

On the final page of the questionnaire, respondents were asked for additional comments:

*Any other comments on your experience of the Landcare for Teachers program are welcomed. Please use the space on the back of this questionnaire.*

Twenty-three respondents provided extra comments in the additional space on the back page. Sixteen broad categories were adopted with the number of answers shown in brackets:

1. ( 6) Satisfactory
2. ( 3) Need more courses throughout Tasmania
3. ( 2) Inclusion of Landcare in outside-school youth groups, e.g. Red Cross Society
4. ( 2) Add a session on how to access funding agencies
5. ( 2) Students need encouragement and training through practical activities
6. ( 2) Course could be included in teacher training
7. ( 2) Set up survey to find out teachers' needs before arranging course
8. ( 1) Change to three longer hours days (i.e. condense) in Summer School
9. ( 1) Ask other in-service teachers to lead seminars

- 10.( 1) Not enough time
- 11.( 1) More flexible study hours
- 12.( 1) Link primary and secondary school Landcare subjects
- 13.( 1) List updated new resources
- 14.( 1) Produce videos would be useful for schools short of money for  
excursions
- 15.( 1) Refresher days needed
- 16.( 1) Include Landcare in teacher development days

Generally speaking, most aspects of the Landcare for Teachers course were satisfactory to most participants.

### 3.3.8 Survey of non-respondents

From the list of 132 participants in the survey provided by the coordinator of the Landcare for Teachers program, 74 replies were received. Of these replies, 59 out of 74 had signed their names, and the remaining 15 were sent back unsigned. Therefore, of the total 132 participants there were 73 people who had either not returned their questionnaires or had remained anonymous. Those two were grouped together for further investigation.

The author set out to determine if the results collected from the questionnaires were biased and selected thirteen people from the list for further investigation. About half of this group were primary and half secondary teachers from different areas of Tasmania. The aim was to test whether the non-respondents had the same level of satisfaction with the course as the postal questionnaire respondents.

For straightforward questioning, telephone interviews can be less expensive and less time consuming than written questionnaires and can have quite high response (Wadsworth, 1984:30). A question was formulated to be answered by each person when they acknowledged the telephone call. This was preceded by the request for information as to whether the questionnaire had been received and sent back to the Centre for Environmental Studies, University of Tasmania. One person had received and returned the questionnaire. She was thanked for her help and was not asked any further question.

The remaining twelve people who had not responded to the questionnaire were asked the following question: "As you did not return the questionnaire, I would like to ask you if your expectations of the course were realised? Could you please give any reasons why or why not." This question was chosen because it was possible that people who were dissatisfied with the course may have decided not to return the questionnaire. This would have strongly biased the overall results.

One person (one out of twelve, or approximately 8% of the sample) stated that the course was not stimulating enough for her particular needs, and was therefore dissatisfied with the course.

Eleven interviewees (92%) stated that their expectations were realised compared with 93% of questionnaire respondents. This suggests that the result of the satisfactory level from the questionnaire survey was not significantly biased.

Various reasons were given as to the realised expectations of the course such as "Hands on activities, field trips and excursions were excellent"; "Suitability of materials for classroom"; "Participants co-operated well together"; "General organisation of course". Participants who had not replied said they were too busy or had forgotten to reply. Three had not received the questionnaire.

It was concluded from this survey of twelve of fifty eight people who did not return the questionnaire (about 20% of this group sampled) that dissatisfaction with the course was not a factor in non-response. This increases confidence in the overall survey outcomes.



## CHAPTER 4: DISCUSSION

In assessing the strength of the relationship between the questions on the postal questionnaire, this study used 'Chi-Square', 'Mann-Whitney U' and 'Kruskal-Wallis' tests to find out any correlations. The correlation coefficient between every two variables was calculated. According to the tests there were no significant differences between the term time courses and summer schools, or the year in which the courses were held; where some significant differences (see Appendix 5) were found; they are discussed below.

### 4.1 Age Group Factor

Sixty seven percent of the under thirty year-old participants wanted to gain qualifications/accreditation, followed by 23% in the thirty-one to forty age group, compared to only six percent in the forty one to fifty age group, and none in the age group over fifty (see Table 4.1). This implies that earning qualifications or accreditation is a very strong motive for younger teachers and it is essential to keep offering qualifications/accreditation, and even upgrade the course.

Table 4.1  
Age Group X Qualification Seeking

Age group	Not to get qualification	To get qualification
<30	33%	67%
30-40	77%	23%
41-50	94%	6%
>50	100%	0%

There is a trend showing that younger teachers agree that fellow teachers have not become involved in Landcare teaching at school (see Table 4.2). The lower mean rank figure indicates strong agreement with the Question 8f. *Fellow teachers have not become involved in Landcare*. The 'Sum of Rank' column is simply the sum of individual ranking from the range (1-5) for each age group. The 'Mean Rank' column is the sum divided by the number of cases. Older teachers may have better communication skills with other teachers. Perhaps it is a good idea to enhance sharing skills within the different age ranges of teachers (Commonwealth of Australia, 1987:139).

Table 4.2  
Age group X Question 8f.

Age group	No. of Cases	Sum of Rank	Mean Rank
<30	12	291	24.292
30-40	22	790	35.909
41-50	31	1262	40.726
>50	9	431	47.889

The higher mean rank figure indicates strong agreement with the Question 8h: *Landcare has helped local environmental initiatives*. It is reasonable to conclude that teachers in age group 30-40 are the most involved in the Landcare movement and thus believe that Landcare has helped local environmental initiatives (see Table 4.3).

Table 4.3  
Age group X Question 8h.

Age group	No. of Cases	Sum of Rank	Mean Rank
<30	12	436	36.333
30-40	22	1045	47.523
41-50	31	1064	34.339
>50	9	229	25.444

## 4.2 Work Place Factor

Fifty two percent of the primary school teachers expressed the view that they wanted to include more science teaching in their classes in contrast with just 20% of secondary school teachers (see Table 4.4). Secondary school teachers may have already taught more science than primary school teachers or have less time flexibility than primary school teachers, therefore, if the Landcare for Teachers program was to be separated into different courses, it should be possible to include more science in the primary school teachers' course.

**Table 4.4**  
**Work Place X Science Teaching Seeking**

Work place	Want more science teaching	Do not want more science teaching
Primary	52%	48%
Secondary	20%	80%
Other	23%	77%

Sixty seven percent of the primary school teachers gained some unexpected benefits, such as "sharing ideas professionally" and "resource materials available" (see Chapter 3), compared with only 56% of secondary school teachers (see Table 4.5). This implies that primary school teachers enjoy and need more opportunities to share ideas professionally and be provided with resource materials.

**Table 4.5**  
**Work Place X Unexpected Benefits**

Work place	Has unexpected benefits	Does not have unexpected benefits
Primary	67%	33%
Secondary	56%	44%
Other	62%	38%
No answer	50%	50%

Secondary school teachers regard the Question 6a. topic 'f': '*Rehabilitation of Disturbed Areas*' as more useful for classroom use than primary school teachers. The higher mean rank shows a perception of the topic as more useful (see Table 4.6). This is probably because the topic is easier to be adapted at a secondary level. Therefore if the Landcare for Teachers program were separated into different courses, it would be better to put '*Rehabilitation of Disturbed Areas*' in the secondary school teachers' course; alternatively this topic could be redesigned to cater for both primary and secondary school teachers.

Table 4.6  
Work Place X Question 6a. topic 'f'

Work place	No. of Cases	Sum of Rank	Mean Rank
Primary	33	1012	30.667
Secondary	25	1158	46.34
Other	13	518	39.846
No answer	3	86	28.833

More primary schools agree that Landcare should be part of the school curriculum than secondary school teachers (see Table 4.7). The lower mean rank figure indicates strong agreement with the Question 8d. *Landcare should be part of the school curriculum*. Perhaps this is because primary schools have more flexibility in designing curricula than secondary schools.

Table 4.7  
Work Place X Question 8d.

Work place	No. of Cases	Sum of Rank	Mean Rank
Primary	33	1101	33.379
Secondary	25	980	39.2
Other	13	623	47.923
No answer	3	70	23.5

Primary school teachers agreed that parents' support for Landcare teaching is probably stronger in primary schools than secondary schools (see Table 4.8). The lower mean rank figure indicates strong agreement with the Question 8e. *Parents do not support Landcare activities at school.* This suggests that the sooner Landcare teaching is introduced to schools (e.g. from kindergarten onwards) the greater is the likely support from parents. On the other hand, future courses could advise secondary school teachers how to get students' parents involved in Landcare teaching.

Table 4.8  
Work Place X Question 8e.

Work place	No. of Cases	Sum of Rank	Mean Rank
Primary	33	1588	48.121
Secondary	25	773	30.94
Other	13	341	26.269
No answer	3	72	24

#### 4.3 Subject Factor

More science teachers indicated that Question 6a. topic 'b': '*Land Management Issues and Problems*' was useful than did non-science teachers. The higher mean rank indicates the topic was considered to be more useful (see Table 4.9). This topic should therefore be designed with more relation to non-science subjects to suit teachers in both areas.

Table 4.9  
Subject X Question 6a. topic 'b'

Subject	No. of Cases	Sum of Rank	Mean Rank
Science	34	1509	44.382
Non-science	23	647	28.13
Do not indicate	17	619	36.412

More science teachers found the Question 6a. topic 'c' '*Soils and Water (geology)*' was useful than non-science teachers. The higher the mean rank, the more useful the topic (see Table 4.10). This topic should therefore be designed more carefully to suit non-science teachers.

Table 4.10  
Subject X Question 6a. topic 'c'

Subject	No. of Cases	Sum of Rank	Mean Rank
Science	34	1501	44.147
Non-science	23	632	27.5
Do not indicate	17	641	37.735

Science teachers found that Question 6a. topic 'e': '*Vegetation*' was more useful to them than it was to non-science teachers. The higher the mean rank, the more useful the topic (see Table 4.11). Again it may be better to design this topic for non-science teachers, or it could be better to modify this topic to make it more suitable for all teachers.

Table 4.11  
Subject X Question 6a. topic 'e'

Subject	No. of Cases	Sum of Rank	Mean Rank
Science	34	1509	44.382
Non-science	23	687	29.87
Not indicated	17	579	34.059

Science teachers found that the Question 6a. topic 'f': '*Rehabilitation of Disturbed Areas*' was more helpful for teachers with a science background than non-science background teachers. The higher the mean rank, the more useful the topic (see Table 4.12). This indicates that these topics could be designed to suit teachers of non-science background. The Question 6a. topic 'g': '*Coastal Landcare*' could also be designed along the same lines to suit all teachers (see Table 4.13).

Table 4.12  
Subject X Question 6a. topic 'f'

Subject	No. of Cases	Sum of Rank	Mean Rank
Science	34	1539	45.265
Non-science	23	634	27.565
Not indicated	17	602	35.412

Table 4.13  
Subject X Question 6a. topic 'g'

Subject	No. of Cases	Sum of Rank	Mean Rank
Science	34	1461	42.985
Non-science	23	831	36.13
Not indicated	17	482	28.382

4.4 Gender Factor

More male science teachers than female found that Question 6a. topic 'f': *'Rehabilitation of Disturbed Areas'* was helpful. The higher mean rank shows the topic is perceived as more useful (see Table 4.14).

Table 4.14  
Gender X Question 6a. topic 'f'

Gender	No. of Cases	Sum of Rank	Mean Rank
Male	27	1210	44.833
Female	47	1564	33.287

It is interesting that the author expected that Summer Schools would be more popular than term time courses, but the results show that both courses met the different needs of participants.



## CHAPTER 5: KEY PEOPLE INTERVIEWS - RESULTS AND DISCUSSION

A structured interview was used when five key people were interviewed personally, i.e. a written list of questions with individual appointments (Wadsworth, 1984:31). These interviews were conducted after the questionnaire and telephone interviews to gain further information about the Landcare for Teachers program.

The five people interviewed included a 'theory' seminar and field trip leader, a 'hands-on activity' seminar leader, an excursion leader, a former course participant who is now a 'theory' seminar and practical activity leader, and a course participant who responded enthusiastically to the questionnaire survey.

### 5.1 Interview Questions

According to Wadsworth (1984:31), interview questions should be simple and clear. The author set out four simple and clear questions for different categories of key people involved in the Landcare for Teachers Program. The questions for leaders were as follows:

- 1. Why and how did you get involved in the Landcare for Teachers program? (the motive, circumstances) What expertise can you contribute to the program?*
- 2. On the course itself, what were your observations about participants' enthusiasm, interaction amongst themselves and the interaction between you and them?*
- 3. Have you had any contact with participants since the course, such as requests for help or information? If so, what kind of assistance has been requested?*
- 4. Do you have any suggestions as to how the Landcare for Teachers program could be improved, e.g. course time, structure, topics, etc?*

The questions for participants were as follows:

- 1. How did you find out about the Landcare for Teachers course?*
- 2. Have you any suggestions on which topics could be added or cut back to suit your teaching needs better?*

3. *Since you finished the course have you had any contact with other teachers or leaders who participated in the course?*

4. *Have you found any problems with teaching Landcare?*

It is worth noting that one interviewee was a participant and then became a leader, thus both groups of questions were applied to her. This is a very good example of how course participants can expand the pool of skilled and experienced leaders for the program.

## 5.2 Results and Discussion

Every interview was recorded with the permission of interviewees by means of audio tape recordings and transcribed notes. The following results are shown in order of the questions asked.

### 5.2.1 'Theory' seminar and field trip leader

This interviewee was involved from the start of the program and has taken part in most of the courses since. He gave a seminar on 'introduction to soils' and led field trips to look at landforms and soil profiles.

As a soils officer in the Tasmanian Department of Primary Industry and Fisheries, he was motivated to become involved in the Landcare for Teachers program because he had found in the past that teachers had generally not been aware of what materials were available.

His expertise is in teaching a basic introduction to soils, how soils are developed and why soil is important. His objective was to explain how and why soils 'behave' as they do, including the composition of soils and their chemical properties.

In his view the interaction between participants depends on having varied groups, but he believes there is less opportunity during the short course (Summer School) for participants to interact with each other, and that interest in school term time courses is higher.

The requests for information came to him as a resource provider, especially during course project writing. He found there was very good discussion throughout the courses.

He is concerned that the time available for field trips may decrease if new seminars are added leading to a difficulty in arranging time for excursions. This needs careful consideration to avoid any unbalancing of the course.

#### 5.2.2 'Hands-on activity' seminar leader

The interviewee was involved from the start of the Landcare for Teachers program and throughout most of the courses. He provided practical demonstrations of tree planting, including seed collection and seedling preparation.

As a school education officer for Greening Australia, he expressed the view that participating in the program is part of his job and he was very willing to advance knowledge through teachers to children. He sees his primary role as an information source.

His contribution to the course is giving teachers confidence in recognising trees, seeds, soils, etc, and to cultivate interest in using their own school grounds or surrounding areas for replanting native trees. Because tree planting is restricted by seasonal factors, practical tree cultivating demonstrations are confined to certain courses.

His general observation of course participants after the start of program was that cooperation and enthusiasm built as the course proceeded. Questions were encouraged to get feedback from participants all the time. Participants who did react well were very interested in improving the Landcare curriculum in schools.

About twenty percent of participants had returned to him for further information. Ongoing support is offered for anyone who has problems, and, if not resolved through telephone or mail, he is available to visit the school.

He also saw a need to improve the coordination of the course through pre-service teacher education, and the need for more time to follow up the progress of tree planting since this is most important for passing on complete knowledge.

### 5.2.3 Excursion leader

The interviewee was asked to join the program to replace her husband who is a botanist with the Forestry Commission and was too busy to remain involved. She was trained as a secondary science teacher in biology, but had stopped teaching several years before the program. Her specialisation is botany.

She took 'vegetation' excursions and found good interaction amongst participants during the activities. She considers that learning about Landcare is much easier with on-site experience.

After the course she met several participants and sent them information on activities involving the local council. There is a good potential for linking schools and the community through Landcare projects.

She thinks that it is very important to have a knowledge of sites in different areas for school Landcare teaching, so the course could be improved if local site examples were provided. Also there should be a follow-up after courses so that classroom experiences can be shared and information refreshed and updated. In addition, it is vital for more interaction between primary and secondary school teachers to fill up the gap between the two stages of the education system.

### 5.2.4 'Theory' seminar and practical activity leader (ex-participant)

The interviewee attended the first course through one of the leader's suggestions and later was invited to become involved in the Landcare for Teachers program as a seminar leader. She was trained as a primary school teacher but has also been a field centre educator, and a Landcare curriculum officer. She is now the Landcare curriculum officer for Education Department in Tasmania.

She took the job to inspire and stimulate enthusiasm in teachers teaching Landcare to students, and to explore Landcare problems with confidence through easy ways like story telling and games. She gives teachers ideas on how to develop teaching strategies, and also discusses with them the implementation of Landcare in the curriculum.

She feels that the dynamics between the leader and participants depends on each group, just as with school pupils of different kinds. But she found that practical activities and excursions/field trips were good for interaction between people. She has had a lot of interaction with other teachers.

She suggests that the course needs to provide more practical ideas for teachers and the presentation of workshops should have plenty of hands-on work. It is important that the course format keeps changing to suit new needs. In addition, to enjoy and understand are very important in teacher training although it is not always easy to make Landcare fun.

It is difficult for teachers to find time to include Landcare teaching within the curriculum structure, and also to involve other teachers. However, the course provided an opportunity for teachers to network with others in a similar position, and get support from each other.

#### 5.2.5 Participant from the questionnaire survey

The interviewee was enrolled in the first course through pre-course publicity and had been very active in Environmental Education through a field centre and the museum. She is now a primary school teacher and is conducting Landcare projects in school.

She has taken students to visit the Hmong people's community garden to study land use and has combined this with social studies lessons. She sees this concrete example of a self sufficient society as having a very positive educational value. (There is a small community of Hmong refugees from Laos who have settled near Hobart. They have established a market garden.)

There has been a lot of contact with different teachers and leaders who participated in the course. This has helped networking through different channels to exchange Landcare education experiences and information, which is a good resource for teaching.

She thinks enthusiastic teachers are essential for spreading interest in Landcare teaching, but this depends on the support of school principals. She sees very little encouragement from the Education Department especially regarding financial support for project budgets. This is an example of Government policies having a very important influence on Environmental Education.

### 5.3 Summary

From the responses of the five key people interviewed we can see a similar enthusiasm for Environmental Education. All believe that it is vital to keep Landcare education in the school curriculum. Although each individual has a different background and expertise, they have all devoted their time, energy, knowledge and skill to pass information to the Landcare for Teachers course participants.

They also have similar ideas about the importance of flexibility in the course to strike a balance between theory and practice in the course structure and to suit different participants' needs. Furthermore, Landcare education is a long term process which needs more support from everyone, including the Education Department, school principals, other teachers, parents and the wider community.

It is interesting that some interviewees considered the school term courses were preferable to a Summer School because some teachers prefer a summer holiday uninterrupted by professional development of any kind. A term time course also has longer periods for participants to interact with each other. But school term courses make it difficult for teachers who have young children to care for.

## CHAPTER 6: RECOMMENDATIONS

### 6.1 Tasmania and Elsewhere in Australia

From previous chapters, it is clear that there is still room for improvement in the Landcare for Teachers Program. The author recommends that future courses should:

- 1) provide more publicity and pre-course information to teachers through different media such as professional publications, newspapers, television and radio;
- 2) retain the important excursions/field trips and make connections with theory (indoor seminar), also provide enough information beforehand and discussion afterward.;
- 3) invite more seminar leaders with classroom teaching experience and excursion/field trip instructors, e.g. ex-teacher or practising teacher, and visit schools as practical examples (Robottom, 1987:79);
- 4) separate primary and secondary school teacher courses or design specific subgroups to meet different needs in the same topic/activity (UNESCO, 1983c:8);
- 5) extend courses to North-West Tasmania or hold more courses in Launceston to meet the demand of northern school teachers. Perhaps consider holding a correspondence course for rural areas and producing a handbook and/or video for teachers who are unable to attend organised courses;
- 6) keep the course free of charge for those who do not need accreditation or qualification, and upgrade the course and extend the accredited area (Bowden, 1990:202,203);
- 7) have follow up seminars/activities to enhance effect of the course and update new information to inform participants, and create a strong ongoing network;

- 8) have ongoing assessment of the course planning taking into account feedback from participants;
- 9) be offered in other States/Territories with similar environmental education programs, and expand informal education areas e.g. professional training courses. This would require thorough surveys of the need of target group; and
- 10) invite representatives from the Aboriginal community to lead an environmental value seminar and/or a field trip to Aboriginal historical sites to provide experience of their culture of human oneness with the natural environment.

In relation to recommendation 10 above, there was general agreement among the participants at the 1994 Landcare for Teachers Program Summer School that an environmental values component should be included in the course as in page 28.

## 6.2 The Republic of China (Taiwan)

Due to differences in the social, cultural and educational environment the Landcare for Teachers program cannot be used directly in Taiwan. But the program provides a very good model (i.e. hands-on activities and excursions/field trips) for an in-service teacher training program that teachers urgently need in Taiwan.

Several aspects that could be considered in Taiwan are to:

- 1) seek funding from government organisations eg the National Science Council (NSC), the Council of Agriculture, the Environmental Protection Administration (EPA) and the Ministry of Education to research and start a similar program;
- 2) design and develop a teacher training course based on local environmental issues (Chelliah, 1990:335; Kerr, 1987:108; UNESCO, 1983c:7; 1988:16). As Australia faces land degradation and related problems, so Landcare is very important; Taiwan has more serious pollution and garbage problems that need to be focused upon (Baines, 1986:10; UNESCO, 1983a:5);



- 3) conduct a broad survey to find teachers' perceived needs and time constraints before setting up the teacher training program
- 4) have on-going evaluation and improvement of courses;
- 5) design courses carefully to cater for both science and non-science, primary and secondary school teachers (Hickey, 1987:4). Non-science trained teachers should be encouraged to participate (Simmons, 1989:17);
- 6) balance theory with practical teaching i.e. develop hands-on activities (UNESCO, 1983a:13; Robottom, 1987:80), and adopt basic topics (i.e. soil, water, etc.) for environmental education.
- 7) select course leaders by their ability rather than formal qualifications, i.e. people who have more practical experience and good communication skills (Robottom, 1987:79);
- 8) build the network and link resources within school, community and government related organisations, and reinforce this process by establishing an information centre to coordinate environmental data and produce an environmental education newsletter;
- 9) give accreditation for environmental education training to in-service teachers in professional development and as part of student teacher's certification (Bowden, 1990:202,203);
- 10) use a similar course structure to the Landcare for Teachers Program i.e. small class size (about 20 people) and an equal time allocation to both indoor and outdoor sessions; and
- 11) adopt the fundamental environmental ethic of Taoism (ie human beings oneness with the environment) in teacher training courses (UNESCO, 1988:3).

## CHAPTER 7: CONCLUSION

This study evaluates the Landcare for Teachers Program from a point of view not only of an outside observer, but also from a value system outside western culture. It has identified ways in which the program might be improved. Of the recommendations made, two in particular would enhance the program if implemented. Firstly, a major need of the program is that it should include an environmental ethic in the course, either learning from Australian Aboriginal experience (Tilbury, 1994:17) or other accumulated wisdom such as the teachings of Taoism and Buddhism (UNESCO, 1988:3). Secondly, this study has recommended that the design of some topics could be reconsidered to cater for the different needs or perceptions of both primary and secondary school teachers (Hickey, 1987:4).

The Landcare for Teachers Program provides a very good example of a teacher training program in its establishment and development, its structure, its organisation and its outcome. Once the problems of finding suitable leaders, identifying regional environmental issues, and obtaining funding have been overcome, it should not be difficult to develop new teacher environmental education training programs elsewhere based on the Landcare for Teachers Program model.

There is a great potential to export the program from Tasmania to other States and Territories in Australia. In 1993 and 1994, the Vacation Schools using a similar format to the Tasmanian Landcare for Teachers Program was offered in Masters of Education courses at Griffith University in Queensland and at B.Ed. level in New South Wales at the University of Technology, Sydney.

With careful research and design of a course taking into account local cultural, environmental and educational conditions (UNESCO, 1983a:5), there is clearly a potential for a program similar to the Landcare for Teachers Program to be successfully run in the Republic of China (Taiwan).

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## APPENDIXES

Appendix 1. 1994 Landcare for Teachers Summer School Time Table

<p style="text-align: center;"><b>LANDCARE FOR TEACHERS</b> University of Tasmania, Hobart</p> <p style="text-align: center;"><b>SUMMER SCHOOL TIMETABLE</b> 10-14 January 1994</p>		
	9:00 am-12:30 pm	1:30 pm-4:30 pm
<b>Monday</b> 10	<p>Course Overview <i>Tania Stadler , Course Co-ordinator, Centre for Environmental Studies</i></p> <p>The Living Soil - <i>Lindsay Richley (Soils Officer, Dept Primary Industry)</i></p>	<p>Excursion Everyone lives in a Catchment -<i>Lindsay Richley and Peter Stevenson (geologist, formerly Mines Dept)</i></p> <p>Bus booked</p>
<b>Tuesday</b> 11	<p>Water Cycle <i>Peter Stevenson</i></p>	<p>Landcare in the Curriculum <i>Nel Smit, Landcare Curriculum Officer, 1993</i></p>
<b>Wednesday</b> 12	<p>Greening Australia <i>Alan Gray (Greening Australia)</i></p> <p>Weeds - <i>Rob Burtscher</i></p>	<p>Waverley Flora Park: a Landcare education resource <i>Di Duncan, botanist</i></p>
<b>Thursday</b> 13	<p>Excursion Visit to a successful Landcare School at Sorell <i>Moya Sharpe, teacher</i></p> <p>Bus booked</p>	<p>Reduce, Re-use, Recycle: Waste Minimisation in your School <i>Sarah Dick , education officer (DELM)</i></p> <p>Landcare Resources Tasmanian Env Centre</p>
<b>Friday</b> 14	<p>Earthworms/ Composting <i>David. Stephen ,organic gardener</i></p> <p>Endangered Species - <i>Peter McGlone</i></p> <p>Travel to Botanical Gardens</p>	<p>Lunch at Gardens with discussion of possible Landcare projects in schools</p> <p>Landcare Activities at the Tasmanian Botanical Gardens - <i>Andrew Smith</i></p> <p>• Course Evaluation</p>
<p><b>Summer School Follow up:</b></p> <ul style="list-style-type: none"> <li>• Saturday morning Excursion to Bangor (by end of Term 1).</li> <li>• Assignment Presentation</li> </ul> <p><i>Date/s to be negotiated.</i></p>		

Appendix 2. Questionnaire survey

Appendix 2a. Questionnaire

Landcare for Teachers Survey

Please answer all the questions that apply to you and return the completed questionnaire in the enclosed reply-paid envelope by 15th Nov. 1993. Thank you very much.

Please tick the boxes ☒ and/or write in the spaces provided. There is additional space on page 4 if you require it.

1. When did you participate in the Landcare for Teachers program ?  
Summer School ☐ School Term ☐ Year 199....
2. What made you decide to participate in the Landcare for Teachers Program?  
Please tick all relevant boxes
- I was concerned about the environment ..... ☐
- I wanted to include more science teaching in my classes ..... ☐
- I wanted to develop my teaching skills ..... ☐
- I wanted to find out more about Landcare ..... ☐
- I wanted to increase my confidence in teaching Landcare issues ..... ☐
- I wanted to update my scientific knowledge..... ☐
- I wanted to gain qualifications/accreditation (please specify ..... ) ☐
- Other (please specify ..... ) ☐
3. Were your expectations realised? yes ☐ no ☐  
Please give your reasons .....  
.....
4. Were there any unexpected benefits? yes ☐ no ☐  
If yes, please explain.....  
.....
5. What aspects of the course were most helpful in developing your own skills and knowledge? .....  
.....
- 6a. How useful did you find the following topics for classroom use? (Note: Not all of the following topics would have been covered in your course. Please tick all items, and tick 5=not applicable if a topic was not covered.)
- 1=not useful; 2=slightly useful; 3=moderately useful; 4=very useful; 5=not applicable.
- |  | 1                        | 2                        | 3                        | 4                        | 5                        |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Introduction to Soils .....              | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Land Management Issues and Problems..... | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Soils and Water (geology).....           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Catchment Management.....                | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Vegetation .....                         | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Rehabilitation of Disturbed Areas.....   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

6a. (continued)

1=not useful; 2=slightly useful; 3=moderately useful; 4=very useful; 5=not applicable.

	1	2	3	4	5
Coastal Landcare.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wetlands as a Landcare Resource .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The Living Soil - Earthworms .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The Living Soil - Composting .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fauna-Impact of Grazing Animals .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Whole Farm Planning (Excursion) .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Your general view of Excursions .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Landcare in the Curriculum (Primary/Secondary) .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Historical, Social and Political Aspects of Land Degradation.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Landcare Resources - TEC (Hobart) and DPI (Launceston) ....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Landcare from a Global Perspective (Tasdec) .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Visit to a Community Landcare Group .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Final Session - Presentation of Participants' Projects.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6b. For those topics you have chosen as 'not useful' for classroom, please explain why.

.....

.....

.....

.....

.....

6c. For those topics you have chosen as 'very useful' for classroom, please explain why.

.....

.....

.....

.....

.....

7. How might this course be improved? Please give your comments.

Balance between theory and practical activities .....

.....

.....

Seminars (delivery/content).....

.....

.....

Course material provided .....

.....

.....

Field trips/excursions.....

.....

.....

7. (continued)  
 Assessment.....  
 .....  
 .....  
 Pre-course publicity/information.....  
 .....  
 .....  
 Other.....  
 .....  
 .....

8. Please indicate your level of agreement with each of the following statements:  
 1=strongly agree; 2=agree; 3=no opinion; 4=disagree; 5=strongly disagree

	1	2	3	4	5
I feel more confident with teaching Landcare now .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I would like more help/resources to teach Landcare.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Landcare has enabled useful networking with other teachers.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Landcare should be part of the school curriculum .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Parents do not support Landcare activities at school .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other teachers have not become involved in Landcare .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
School authority does not encourage Landcare activities.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Landcare has helped local environmental initiatives .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Students' enthusiasm for Landcare activities has increased....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Personal Background**

Sex: ..... male ☐ female ☐

Age group: .....<30 ☐ 31-40 ☐ 41-50 ☐ >50 ☐

Present school/college: .....

Subject(s) you teach and/or grade(s):.....  
 .....

Your name and position (optional): .....

Any other comments on your experience of the Landcare for Teachers program are welcomed. Please use the space on the back of this questionnaire.

*Your opinions are very valuable to this survey. Again, thank you for your time.*

[illegible]

Postcode \_\_\_\_\_

## Appendix 2. Questionnaire survey

### Appendix 2b. Covering letter



## Centre for Environmental Studies University of Tasmania

29 October 1993

Dear Course Participant,

### Landcare for Teachers Survey

In the enclosed form, Henry Chen, a student from the University of Tasmania's post-graduate Centre for Environmental Studies is asking you to participate in a special survey on the Landcare for Teachers program which has been operating since 1990. Henry is undertaking this survey of all participants in the Landcare for Teachers program as part of the requirements for his Masters thesis.

The purpose of the survey is twofold:

- to assist in improving future Landcare for Teachers courses in Tasmania and elsewhere in Australia, and
- to examine the potential to introduce such a course into teacher-training programs in Henry's native Taiwan.

The survey has been kept as brief as possible with all information obtained to be treated in the strictest confidence. A copy of the results may be obtained by writing your name and address in the space provided on the form. Please complete the questionnaire and return it in the reply-paid addressed envelope provided. Your co-operation and prompt response will be greatly appreciated.

If you have any questions about the survey, or you need a new form, please contact me at the address below or telephone (002)-202 834.

Yours faithfully,

Associate Professor John Todd,  
Acting Head of Department



Centre for Environmental Studies  
Department of Geography & Environmental Studies,  
University of Tasmania,  
GPO Box 252C, Hobart, Tasmania, Australia 7001

Telephone: (002) 20 2834  
Facsimile: (002) 20 2989  
International fax: 61 02 20 2989  
Email address: Nita.Saunders@geog.utas.edu.au

## Appendix 2. Questionnaire survey

### Appendix 2c. Survey reminder



## Centre for Environmental Studies University of Tasmania

23 November 1993

Dear Course Participant,

### Landcare for Teachers

#### Survey Reminder

Earlier this month, you received a questionnaire asking you to participate in a survey on the Landcare for Teachers program. If you have already posted your response, please consider this letter as a personal "thank you".

The response rate so far has been disappointingly low. I realise that it is a very busy time of year for you, but I hope that you will take a few minutes now to complete the questionnaire and return it to Henry in the reply-paid addressed envelope provided. As you would appreciate, in a survey of this type, it is important to obtain as many responses as possible.

Henry is carrying this survey of all participants in the Landcare for Teachers program as part of the requirements for his Masters thesis. The purpose of the survey is twofold:

- to assist in improving future Landcare for Teachers courses in Tasmania and elsewhere in Australia; and
- to examine the potential to introduce such a course into teacher-training programs in Henry's native Taiwan.

All information provided is treated in strict confidence. If you would like another questionnaire or if you have any questions about the survey, please contact me at the address below or telephone (002)-202 834.

Yours faithfully,

Associate Professor John Todd  
Acting Head of Department



Centre for Environmental Studies  
Department of Geography & Environmental Studies,  
University of Tasmania,  
GPO Box 252C, Hobart, Tasmania, Australia 7001

Telephone: (002) 20 2834  
Facsimile: (002) 20 2989  
International fax: 61 02 20 2989  
Email address: Nita.Saunders@geog.utas.edu.au

Appendix 2. Questionnaire survey  
Appendix 2d. Survey advertisement

# LANDCARE FOR TEACHERS



**newsletter**

number 8 October 1993

**Landcare for Teachers goes Interstate**  
Some of you may be aware that the Tasmania Landcare for Teachers program has been the only one of its type in Australia - that is, until now. In June - July this year, Griffith University in Brisbane trialled a vacation Landcare for Educators course based on the Tasmanian model. It is intended to include the course as part of the Masters Environmental Education program. Universities in other states are looking at developing similar programs.

**Who's Who in Landcare Term 3?**  
Nel Smit, formerly the Landcare Primary Curriculum Officer is now teaching at South Hobart Primary School. For advice on Landcare in schools for the remainder of 1993, call Ross Jones (33 7825) or Jackie Brown (33 7725). Jackie has been teaching Science and Agriculture at Bridgewater High School since 1990.

### **Change of Address**

It is difficult keeping track of everyone who has done a Landcare course and receives this Newsletter, so if you have moved or know of others who have changed address (home or school), would you please drop me a line or ask them to let me know by calling Tania on (002) 202 838? Thanks.

### **Landcare for Teachers Survey**

Later this month, a short questionnaire will be sent out to all teachers in Tasmania who have completed a Landcare for Teachers course. The survey is part of a Masters degree by Taiwanese student, Henry Chen. Henry is particularly interested in the impact of the Landcare for Teachers course on your teaching practices and the potential for a similar program to be developed for Taiwan. Your response to the short questionnaire will be of real assistance in Henry's research and would be greatly appreciated.

### **Junior Landcare Conference 1993**

Sorell District High School hosted a successful two-day Junior Landcare Conference 26-27 August at the Girl Guides Orana Camp near Lauderdale.

The Conference was opened by the Warden of Sorell, Mr Theo Casimaty who spoke of land degradation caused by poor farming practices over the years and our need to respect the land and use it responsibly to ensure a sustainable future.

## **Landcare Summer School 1994**

**10-14 January, Hobart**

**A week of practical and interesting landcare ideas, activities and resources for teachers at all levels and subjects. Please tell other teachers about the course.**

**For a brochure with more details, contact Tania Stadler on 002-202 838.**



### Appendix 3. Summer School questionnaire data

#### Key of spread sheet (applies also to Appendix 4)

No.=sample number

Question 1.

Tn=course; 1=Summer School, 2=School Term; Yr.=Year; 0=1990, 1=1991, 2=1992, 3=1993

Question 2.

1=Tick, 0=Not tick

2a=I was concerned about the environment

2b=I wanted to include more science teaching in my classes

2c=I wanted to develop my teaching skills

2d=I wanted to find out more about Landcare

2e=I wanted to increase my confidence in teaching Landcare issues

2f=I wanted to update my scientific knowledge

2g=I wanted to gain qualification/accreditation

2h=Other

Question 3.

1=Yes, 0=No

Question 4.

1=Yes, 0=No

Question 6a.

1=not useful, 2=slightly useful, 3=moderately useful, 4=very useful, 5=not applicable

6a=Introduction to Soils

6b=Land Management Issues and Problems

6c=Soils and Water (geology)

6d= Catchment Management

6e=Vegetation

6f=Rehabilitation of Disturbed Areas

6g=Coastal Landcare

6h=Wetlands as a Landcare Resource

6i=The Living Soil - Earthworms

6j=The Living Soil - Composting

6k=Fauna-Impact of Grazing Animals

6l=Whole Farm Planning (Excursion)

6m=Your general view of Excursions

6n=Landcare in the Curriculum (Primary/Secondary)

6o=Historical, Social and Political Aspects of :Land Degradation

6p=Landcare Resources - TEC (Hobart) and DPI (Launceston)

6q=Landcare from a Global Perspective (Tasdec)

6r=Visit to a Community Landcare Group

6s=Final Session - Presentation of Participants' Projects

Question 8.

1=strongly agree, 2=agree, 3=no opinion, 4=disagree, 5=strongly disagree

8a=I feel more confident with teaching Landcare now

8b=I would like more help/resources to teach Landcare

8c=Landcare has enabled useful networking with other teachers

8d=Landcare should be part of the school curriculum

8e=Parents do not support Landcare activities at school

8f=Fellow teachers have not become involved in Landcare

8g=School authorities do not encourage Landcare activities

8h=Landcare has helped local environmental initiatives

8i=Students' enthusiasm for Landcare activities has increased

Personal Background

Ge.=Sex, 1=male, 2=female

Ag.=Age group , 1=(<30), 2=(30-40), 3=(41-50), 4=(>50)

Wo.=Work place, 1=primary school, 2=secondary school, 3=other, 4= no answer

Sc.=Subject, 1=science, 2=non-science, 3=other; Re.=Result reply, 1=Yes, 0=No

### Appendix 3. Summer School survey data

[illegible]

## Appendix 4. Questionnaire data

[illegible]

## Appendix 5. Statistical tests

Only the most significant test results are reported in this thesis. For further information on the statistical tests used, see StatView<sup>512+</sup> statistic computer software package (BRAIN POWER Inc., 1986; StatView<sup>512+</sup>, Abacus Concept, Inc., California, USA), (PAGANO, R.R., 1990; *Understanding Statistics in the Behavioural Sciences*, West Publishing Company, St. Paul, MN, USA).

Table 5.1 Coded Chi-Square X: Age group Y: Question 2g. (refer to Table 4.1)

DF:	3
Total Chi-Square:	22.017 p=.0001
G Statistic:	*
Contingency Coefficient:	.479
Cramer's V:	.545

Table 5.2 Kruskal-Wallis X: Age group Y: Question 8f. (refer to Table 4.2)

DF	3
# Groups	4
# Cases	74
H	7.445
H corrected for ties	8.005
# tied groups	5

Table 5.3 Kruskal-Wallis X: Age group Y: Question 8h. (refer to Table 4.3)

DF	3
# Groups	4
# Cases	74
H	8.312
H corrected for ties	9.406
# tied groups	5

Table 5.4 Coded Chi-Square X: School Y Question 2b. (refer to Table 4.4)

DF:	3
Total Chi-Square:	8.958 p=.0299
G Statistic:	*
Contingency Coefficient:	.329
Cramer's V:	.348

Table 5.5 Coded Chi-Square X: School Y Question 4 (refer to Table 4.5)

DF:	6
Total Chi-Square:	24.767 p=.0004
G Statistic:	*
Contingency Coefficient:	.501
Cramer's V:	.409

Table 5.6 Kruskal-Wallis X: School Y: Question 6f. (refer to Table 4.6)

DF	3
# Groups	4
# Cases	74
H	8.198
H corrected for ties	8.877
# tied groups	4

Table 5.7 Kruskal-Wallis X: School Y: Question 8d. (refer to Table 4.7)

DF	3
# Groups	4
# Cases	74
H	5.693
H corrected for ties	7.801
# tied groups	4

Table 5.8 Kruskal-Wallis X: School Y: Question 8e. (refer to Table 4.8)

DF	3
# Groups	4
# Cases	74
H	15.103
H corrected for ties	17.845
# tied groups	5

Table 5.9 Kruskal-Wallis X: Subject Y: Question 6b. (refer to Table 4.9)

DF	2
# Groups	3
# Cases	74
H	7.891
H corrected for ties	8.816
# tied groups	4

Table 5.10 Kruskal-Wallis X: Subject Y: Question 6c. (refer to Table 4.10)

DF	2
# Groups	3
# Cases	74
H	8.223
H corrected for ties	8.901
# tied groups	5

Table 5.11 Kruskal-Wallis X: Subject Y: Question 6e. (refer to Table 4.11)

DF	2
# Groups	3
# Cases	74
H	6.813
H corrected for ties	7.611
# tied groups	5

Table 5.12 Kruskal-Wallis X: Subject Y: Question 6f. (refer to Table 4.12)

DF	2
# Groups	3
# Cases	74
H	9.501
H corrected for ties	10.288
# tied groups	4

Table 5.13 Kruskal-Wallis X: Subject Y: Question 6g. (refer to Table 4.13)

DF	2
# Groups	3
# Cases	74
H	5.361
H corrected for ties	6.41
# tied groups	4

Table 5.14 Mann-Whitney U X: Gender Y: Question 6d. (refer to Table 4.14)

Gender	Number	Sum. of Rank	Mean Rank
Male	27	1145	42.407
Female	47	1630	34.681
U		502	
U-prime		767	
Z		-1.488	
Z corrected for ties		-1.602	
# tied groups		4	