

***Environmental Education — The New Zealand  
Experience***

*Bruce W.J. Treeby*

The Open Polytechnic Working Papers are a series of peer-reviewed academic and professional papers published in order to stimulate discussion and comment. Many papers are works in progress and feedback is therefore welcomed.

This work may be cited as: Treeby, Bruce. *Environmental Education — The New Zealand Experience*. The Open Polytechnic of New Zealand, Working Paper, October 2001.

Further copies of this paper may be obtained from

The Coordinator, Working Papers Advisory Panel  
The Open Polytechnic of New Zealand  
Private Bag 31 914  
Lower Hutt  
Email: [WorkingPapers@topnz.ac.nz](mailto:WorkingPapers@topnz.ac.nz)

This paper is also available on The Open Polytechnic of New Zealand website:  
<http://www.topnz.ac.nz/>

Printed and published by The Open Polytechnic of New Zealand, Lower Hutt.

Copyright © 2001 The Open Polytechnic of New Zealand.

All rights reserved. No part of this work may be reproduced in any form by any means without the written permission of the CE of The Open Polytechnic.

ISSN — 1174 – 4103

ISBN — 0 – 909009 – 44 – 9

Working Paper No: 2-01

Manuscript submitted for publication in October 2001.

## *Abstract*

---

This paper discusses the main factors that have contributed to developments in environmental education in New Zealand in the latter part of the 20th Century. These include the changes brought about as a result of the passing of the Resource Management Act in 1991 and a series of consequent documents that stress the need for more effective environmental education, and the leadership role taken by providers of non-formal education, for example local government.

The paper looks at

- awareness and attitudinal change, but it questions the depth of public understanding of the environment
- the recognition at many levels of the need for better environmental education, especially so that communities can meet the requirements of the Resource Management Act
- the need to 'green the institutions' that deliver environmental education
- *The New Zealand Curriculum Framework* for primary and secondary schools and *Te Whāriki — Early Childhood Curriculum*), which contain the essential elements for effective environmental education
- *Guidelines for Environmental Education in New Zealand Schools*, published by the Ministry of Education to achieve a more effective delivery of environmental education across the curriculum, which also gives examples of how teachers can apply these guidelines to all areas of essential learning within the New Zealand Curriculum Framework
- the leadership role in environmental education by local government, in particular the example of Environment Waikato and the innovative 'Enviroschools Agenda 21 in Action' programme organised by the Hamilton City Council, New Zealand
- the need for continuing environmental education for resource managers, as part of lifelong learning
- the contribution and relevance of the inclusion of indigenous knowledge in the curriculum.



# Contents

---

<b>Acknowledgements</b>	<b>vii</b>
<b>Introduction</b>	<b>1</b>
Green Schools Fiji	2
New Zealand environmental awareness	2
<b>Foreword to Green Schools Fiji</b>	<b>3</b>
<b>The New Zealand situation</b>	<b>5</b>
Awareness and attitudinal change	6
Why has public interest in the environment increased?	6
Biodiversity loss — risk to national icons	7
Biodiversity loss — exotic monoculture risks and lack of balance	8
Solutions and encouragement	9
But how good is the public understanding?	10
<b>The need for environmental education</b>	<b>12</b>
The Resource Management Act (RMA) 1991	13
Local community environmental knowledge is required	14
Environment 2010 — a national strategy for change	14
<b>A national strategy on environmental education</b>	<b>16</b>
Environmental education and tertiary institutions	17
‘Greening’ the institutions	17
<b>The New Zealand Curriculum Framework for primary and secondary schools</b>	<b>19</b>
Science (published 1993)	19
Technology (published 1995)	20
Social studies (published 1997)	21
<b>Te Whāriki — Early Childhood Curriculum</b>	<b>23</b>

<b>Guidelines for Environmental Education in New Zealand Schools</b>	<b>24</b>
Guideline content	24
Steps in planning an environmental education programme	26
Professional development — training the trainers	27
<b>Non-formal environmental education</b>	<b>28</b>
<b>Lifelong learning and sustainability</b>	<b>29</b>
<b>Indigenous knowledge in the curriculum</b>	<b>30</b>
<b>References</b>	
<b>Appendix 1 : Two examples of non-formal environmental education</b>	<b>32</b>
Environment Waikato	32
Enviroschools - Agenda 21 in Action	33
What is an enviroschool?	33

## *Acknowledgements*

---

I am grateful to many people who assisted me in the preparation of this paper by contributing information, ideas, and constructive criticism. These include people from the following organisations and the following individuals in New Zealand: Department of Conservation; Environment Southland; Environment Waikato; Federated Farmers New Zealand; Forest Research; John Hutcheson; Ministry of Agriculture and Forestry; Ministry for the Environment; Ministry of Education; E Munjanganja, UNESCO, Bangkok; National Institute of Water and Atmospheric Research; New Zealand Association for Environmental Education; New Zealand Landcare Trust; Rowan Stenberg-Calder, Waste Minimisation Officer, Waitakere City Council; The Open Polytechnic of New Zealand; Organic Products Exporters Group; Queen Elizabeth the Second National Trust; Taranaki Regional Council; Topoclimate South; Rural Women New Zealand; and the World Wide Fund for Nature. A special thank you to Heidi Mardon, Enviroschools Coordinator Strategic Unit, Hamilton City Council, who generously shared her resource material with the Green Schools Fiji workshop.



# ***Environmental Education — The New Zealand Experience***

## ***Introduction***

---

This paper is part of an ongoing research interest in the more effective delivery of environmental education as part of lifelong learning. The author is also studying the part that traditional ecological knowledge can contribute to better environmental management today. The main content of this paper was prepared for the in-country training workshop under the Mobile Training Team (MTT) in Environmental Education and Education for Sustainable Development, which was organised by the Curriculum Development Unit, Ministry of Education in Fiji from 24–26 October 2000. The author was asked to act as a resource person and give a presentation on the New Zealand experience in environmental education. This was supported with a PowerPoint display. The author contributed to the rest of the programme, which was focused on launching Green Schools Fiji at the primary and secondary levels. He also gave a second presentation called 'Links with the community' as part of the section looking at education outside the classroom, demonstrating that a chosen topic could be used across the whole curriculum. He used a community planting project, and copies of this were left with the Ministry of Education and Technology in Fiji.

The United Nations Education Scientific and Cultural Organisation (UNESCO) Associated Centre of Asia-Pacific Programme of Educational Innovation for Development (APEID) MTT Programme has been a most successful means of delivery since 1972. It receives assistance from the government of Japan through Japanese Funds-in-Trust.

MTT aims to assist member states in enhancing their capacity for innovation in a particular educational field. It is involved in arranging for member states to benefit from the expertise and experience of other countries through activities such as inter-country study visits, in-country training workshops, internships, and training courses, and in organising workshops for specific groups of people.

## ***Green Schools Fiji***

The Green Schools Fiji project is a new environmental education initiative to address the environmental problems facing Fiji at this time. It involves the training of teachers in a workshop environment.

The goals of Green Schools Fiji are to

- assist teachers and students to identify environmental problems in their local school and community
- assist teachers and students to investigate these problems in relation to their personal lifestyle
- assist teachers and students to solve environmental problems through a self-reflective, action-based learning process
- establish a Green Schools Fiji network.

## ***New Zealand environmental awareness***

The workshop was informed about the major environmental issues facing New Zealand: the protection of indigenous biodiversity and the achievement of sustainable production. It was told that we now realise that we have to move from managing the environment for our own purposes only to also protecting indigenous ecosystems, and that it is in New Zealanders' own interests to do so. These issues also apply to Fiji. Education is essential to enable the general public to make decisions based on sound scientific facts. The cost of decisions made without adequate information and understanding can be very high, especially in a country that relies so much on tourism. The workshop was told that the last decade of the 20th century was a time of significant change in agricultural and environmental education in New Zealand.

## *Foreword to Green Schools Fiji*

---

Green Schools Fiji was launched at this workshop. It is a joint project between the Ministry of Education and Technology Curriculum Development Unit, the Fijian Teachers' Association, and Live and Learn Environmental Education, a non-government organisation. It is funded by UNESCO-ACEID and The Canada Fund.

Establishing a Green Schools Fiji network is seen as a central element for success in this programme. Being able to share experiences with other schools, including identifying ideas that worked well in practice, will be welcomed by teachers and be stimulating for children, especially younger children, as it will make them aware that environmental problems and issues go beyond their local school and community.

The goals of Green Schools Fiji are to

- increase environmental awareness
- recognise environmental problems
- understand how personal lifestyle impacts on the environment
- do what is needed to make things better, in other words, do better things.

The 40 teachers of year seven pupils who attended the MTT workshop were drawn from the Suva area. They are teaching at the upper level of the primary school system. In preparing this paper, I have taken the position that environmental education is part of lifelong learning. Accordingly I have covered pre-school and post-school education and the important role of non-formal education providers. Lifelong learning is a core focus of The Open Polytechnic of New Zealand.

In 1999 there was a new initiative to promote environmental education in New Zealand<sup>1</sup>, and it would thus be reasonable to assume that the current national curriculum framework must be deficient in the coverage of areas of study that require students to demonstrate knowledge and understanding of the environment. But that is not so. In my review for this paper I found that in at least three of the essential learning areas, social studies, science, and technology, there is a broad and detailed coverage of the environment and indigenous knowledge. The inclusion of indigenous knowledge in the curriculum was one of the main topics of the workshop. My findings corroborated the need for a new approach to delivery as promoted in *Guidelines for Environmental Education in New Zealand Schools*, published in late 1999.

From my review of environmental education in New Zealand carried out for the Fiji workshop, it became clear that a more holistic approach in the teaching of environmental issues is needed. There is still a strong sense of humans being separate from the environment, which is 'out there'. Studies in human relationships to natural resources suggest that indigenous attitudes and knowledge can contribute a great deal to developing a better human relationship to the environment in New Zealand. They can prompt us to conceptualise ourselves as being part of the environment, since we are closely related to and reliant on the plants and animals that share the world with us. We should, in our own best interests, act as kaitiaki or guardians of the environment to ensure a sustainable future for the generations to come.

In November 1999 I was the New Zealand UNESCO representative at the University of Tsukuba in Japan, where I presented a paper on changes in environmental and agricultural education in New Zealand over the 1990s<sup>2</sup>. Education of the individual is not complete with schooling, and the focus now in New Zealand society is on lifelong learning, where education includes the formal and informal transfer of knowledge and technical information throughout an individual's life.

In my presentation of New Zealand experiences I gave a general overview of some of the more significant recent events that have influenced attitudes to the environment, and the reasons that new initiatives have been put in place to find effective solutions involving the whole community.

*Kua rite te wa, e whakapuru ai tatou i nga kowhao o te waka.*

**The time has come when together we must plug the holes in the canoe.<sup>3</sup>**

## *The New Zealand situation*

---

Environmental education is concerned with building an environmentally responsible society, where people and communities are equipped with the skills, confidence and resourcefulness to address the complex questions inherent in sustaining the world's resources.<sup>4</sup>

Finding solutions to local, regional and global environmental problems is a complex task requiring focused approaches and considerable creativity. Environmental education is an increasingly important part of this task, but it does involve significant challenges. It is a rapidly evolving field where there are few precedents and no right way. It is heavily influenced by the local situation and by the values and perceptions of all involved. For each environmental issue there are many perspectives and much uncertainty.

Environmental education cultivates the ability to recognise uncertainty, plan different scenarios and adapt to changing conditions and information. It involves risk management. It requires educators to integrate and build upon different disciplines and organisational groups to reach a solution. This is the application of the holistic approach. Getting people to change how they see the world and to act differently is a real challenge.

The following poem was used by Dr Richard Bawden, Professor, Michigan State University, at the beginning of his introduction to a conference in New Zealand in August 2000, "Of Knowing 'Systems' and Change: Achieving Change through Improved Knowledge Systems".<sup>5</sup>

**If we always see as we've always seen,  
We will always be who we've always been.**

**If we always think as we've always thought,  
And always seek as we've always sought,  
We will always teach as we've always taught  
And always wreak what we've always wrought.**

**If we always know as we've always known,  
And always sow as we've always sown,  
We will always show what we've always shown,  
And always mow what we've always mown.**

**Unless we change how we construe,  
We'll never change the things we do!**

## ***Awareness and attitudinal change***

Awareness of the environment begins in our childhood. We grew up in the natural world, and we do not readily change our lifestyle in response to slow rates of change in the environment. We do not have the reference point, suggest to ourselves that small perturbations are within the normal, and continue as we have in the past. However, we do respond to larger, unexpected events, especially if they impact on us or have the potential to impact on us as individuals.

When we compare photographs of the New Zealand landscape in the 19th century with the landscape today, we can see the environmental change that has taken place: the loss of New Zealand's indigenous biodiversity, and the growing of exotics, which is in many places now considered unsustainable. On the positive side, we can see where there has been significant environmental improvement. It is important that positive stories are told.

## ***Why has public interest in the environment increased?***

One reason that public interest in the environment has increased over the past decade is that New Zealanders are now better informed about what is happening in the world environment.<sup>6</sup> Television and the Internet enable us to know what is happening anywhere in the world. For example, images of Earth from space showing the relatively thin layer of the biosphere make us reflect on our vulnerability to change in the universe.

The increase in perceived human health risks has had an impact. Safe disposal of waste is seen as a serious problem. Nobody wants a landfill near them. The leachate from older landfills pollutes waterways and kills the life in streams, and the content of the landfill is a health hazard of an unknown level of risk. In rural areas there are many local dumps of chemical containers, the location of many of which is unknown. The washing of animal faeces into waterways, especially in times of high rainfall, is a health risk, and the increased nitrogen content of the water encourages excessive weed growth and a significant change of stream ecology.

Farmers are using increasing amounts of nitrogenous fertilisers, which can leach down into the water table or wash directly into streams. While New Zealand has only 3.8 million people, the farm animal population produces bodily waste equivalent to the waste of 160 million people. Degrading of freshwater in New Zealand also has an impact on the trout population, which is important to our tourism industry.

On 23 June 2000, the Director General of Health issued a warning that the public should not collect or consume shellfish harvested from the coastline between Waipapakauri in Northland and the mouth of the Mokau River in the North Taranaki Region.<sup>7</sup> The shellfish had higher than acceptable levels of paralytic shellfish poison. The very poisonous algal bloom round the west coast of the North Island was caused by *Gymnodium catenatum*. Shellfish could not be taken, and commercial mussel farms further south were under threat. One of the reasons given for the build-up of the algae was the enrichment of estuaries caused by the run-off from surrounding farm lands.

There are risks to human health associated with new insect incursions, for example a new outbreak of the Australian Southern Salt Marsh mosquito in the Gisborne area of the North Island. The mosquito carries the Ross River virus and also Murray River encephalitis, threatening human health.<sup>8</sup>

New Zealanders have a strong anti-nuclear stance for environmental reasons. We have seen the environmental damage caused by mining waste getting into waterways (as recently happened in the Danube) and the environmental damage and loss of wildlife caused by oil spills. But food safety is the greatest concern. People are concerned about chemical residues in food and food that is not safe to eat for other reasons, for example because of mad cow disease (BSE) in Europe. There is a market-driven demand for eco-certification and quality assurance of food products.

Environmental education awareness overseas has a strong environmental educational impact in New Zealand. New Zealand's organic production of food is increasing to cater for the local health food market and, on a larger scale, to gain access to overseas markets with significant market premiums.

### ***Biodiversity loss — risk to national icons***

Protection and restoration of indigenous biodiversity has been identified as one of the major environmental issues today in New Zealand.<sup>9</sup>

New Zealand's flora and fauna evolved in the absence of mammals, apart from seals, sea lions and three species of bat.<sup>10</sup> The impact of human activity, grazing animals introduced by Europeans, a range of browsing animals such as the Australian brush tail possum, carnivores, and exotic plants resulted in rapid ecological change and extinctions, especially of bird species. Hence, we are aware today of the possibility of the extinction of our endangered species, including the kiwi, an important national icon.<sup>11 12 13 14</sup>

Because, in the past, the ecological importance of wetlands was not understood, most were drained, with loss of wetland habitat and an increase in flood damage. The draining of wetlands took place following the arrival of Europeans. Estuaries, now understood to be important nurseries for sea life, were once places where rubbish was dumped. In the north of New Zealand, many mangrove areas have been damaged by such human activity.

There is now a better environmental awareness of the importance of indigenous biodiversity, and New Zealand is a signatory to the Convention on Biodiversity 1992 and the 1992 Rio Earth Summit. Some wetland areas have management plans that recognise their important conservation values, and some are being restored with revegetation round their periphery. Some new wetlands are being created, encouraged by wetland interest groups such as Ducks Unlimited. New wetlands can have multiple outputs, for example the Limeburners Creek sewage treatment area created by Whangarei City Council, which is an attractive wetland wildlife habitat.

There is increasing support for the restoration and protection of native forest remnants, especially on lowland areas of private land.<sup>15</sup> Most government-protected conservation areas are in mountain areas and there is a lack of lowland forest habitat. Many native birds migrate between lowland and highland areas depending on the seasons, so there is now a lack of habitat balance. There is currently a focus on ways that indigenous vegetation on lowland areas can be enhanced, including indigenous biodiversity on private land.<sup>16</sup>

### ***Biodiversity loss — exotic monoculture risks and lack of balance***

Protection of exotic biodiversity is also a major environmental issue that faces New Zealand, as most of our overseas exchange comes from the sale of commodities based on exotic plants and animals.

Much of the productive landscape of New Zealand has been converted to exotic plant forms. These plants grow very well because they lack the parasites that attack them in their place of origin. In many instances, as with forestry, the genetic base of the crop is narrowing as more clonal material is being used. Radiata pine is the main timber species grown in New Zealand and it is potentially vulnerable to diseases such as pine pitch canker, a fungal disease that would cause enormous damage.

Australian eucalypts grow well until a leaf-eating insect arrives, causing serious damage to the tree. The best biological control may not be known in Australia, where it is not of high importance as there is a natural balance in the environment. For eucalypts in New Zealand the biological control must be found in Australia, introduced at great expense and then tested for environmental impact prior to release. This must be done with great care, as past experience with new introductions has shown us.

There are numerous examples of animals introduced to control one problem that have in turn become pests. One example is rabbits. To control rabbits, several mustelids were introduced that have caused the rapid decline of many indigenous birds and other small animals.

### ***Solutions and encouragement***

It is important in any discussion of environmental problems that, where possible, the discouragement that is felt especially by children is counterbalanced by good news, that is, by examples where solutions have been found.

An example of good news with regard to endangered species is that New Zealand has been very successful in bringing back bird species from the brink of extinction. An example that caught the imagination of the public was the Chatham Islands black robin (*Petroica traversi*), whose population was down to only one female, affectionately called 'Old Blue'. Through skilled intervention there is now a thriving small population of the robins. We are currently increasing the number of other bird species, notably takahe (*Notornis mantelli*), kokako (*Callaeas cinerea*), and kakapo (*Strigops habroptilus*), the largest flightless parrot in the world. This is through intensive pest control and supplementary feeding to encourage the birds to breed. On some wildlife sanctuaries offshore, all brushtail possum (*Trichosurus vulpecula*) and rats (*Rattus* spp.) have been eradicated, and the increase in vigour and health of indigenous flora and fauna has been striking.

The establishment of wildlife restoration areas that encourage the involvement of the general public has proved to be a very successful initiative. This contributes to environmental education, and local schools in the areas make use of these initiatives.

One important new wildlife sanctuary is the Karori Sanctuary, funded by the Karori Wildlife Trust, in the middle of Wellington city. It is constructed round an old reservoir and is enclosed by a multimillion-dollar, specially designed

pest-proof fence. Pests have been removed from within the enclosed area, allowing rare and endangered birds to be introduced. Kiwi (*Apteryx* sp.) are now heard calling in Wellington at dawn and dusk for the first time in well over 100 years. The Karori Sanctuary also provides facilities for environmental education, research, recreation, and tourism activities.<sup>17</sup>

Even local initiatives make a difference. On the eastern side of Wellington Harbour a native forest park is being restored by mainly retired people who want to increase the indigenous biodiversity. They are trapping and poisoning the Australian brush-tail possum and ship's rat (*Rattus rattus*). In the spring of 2000 there were more kereru, the large wood pigeon, in the forest and around the margins, and there is an obvious annual increase in the number of birds. This is important for the forest because the kereru is the only spreader of large forest seeds. Without it, some trees in the forest could die out. This is a good example of the symbiotic relationship between a plant and an animal.

### ***But how good is the public understanding?***

Events in New Zealand in the last 5 years indicate that the New Zealand public lacks understanding of conservation and the second major issue facing New Zealand, sustainability. There can be strong emotional support for the environment without in-depth understanding. I will use the Timberlands West Coast (a state-owned company) beech scheme as an example.

At the end of 1999 there was a strong public debate about the new Labour Government's pledge to stop all wood extraction from state-owned land. This involved the beech forests managed by the state-owned company Timberlands on the West Coast of the South Island of New Zealand.

The forests were being managed to comply with the sustainable management of indigenous forests as required by the Forests Amendment Act 1993, which requires regulatory plans and permits, including ecological reserves. The management of the forests was heralded as an example that had application outside New Zealand.<sup>18</sup> New Zealand has developed the skills to be able to give leadership in the sustainable management of indigenous forests, and thus improve forest health and enhance the total ecology of forests using low impact systems. Tree extraction in Timberland's forests was by low impact helicopter logging.

Timberland's forest management plan<sup>19</sup> exhibited a new environmentalism that was sophisticated and was working towards environmental solutions with sustainable annual returns for the local community and national economy.

However, the preservationist view of the environment as a stand-alone entity outside society and the economy prevailed. What we need and lack is an environmental movement that is working towards solutions and integrating people and the economy, especially in the management of private land.

New Zealand's indigenous forests are currently deteriorating as a result of high levels of pest damage, with a continuous loss of biodiversity, owing to underfunding by the Department of Conservation. Consequently, the ex-Timberland forests transferred to the Department of Conservation will not be able to self-fund their continuing pest control, and the recorded increased bird count in the managed forest will decline. The ecological health of those forests will deteriorate, and the ecological gains under Timberland's management will be lost.

The hardwood resource, which could have been sustainably provided locally, will now be imported, probably from an unsustainably managed forest from another part of the world, such as South East Asia. In November 2000, 'Asian rimu' furniture was for sale in Wellington.<sup>20</sup> The abandoning of the beech scheme on the West Coast would thus appear to have lowered the ecological health of New Zealand's forests. As consumers of tropical rainforest hardwoods harvested unsustainably, we are contributing to the loss of biodiversity globally. We need environmental education that looks at the global issues as well as the local ones to better understand that everything is interconnected.

## *The need for environmental education*

---

Outside cities, agriculture (including forestry) has the main impact on the environment. The single principle that dominated agriculture and resource management generally in New Zealand until the late 1980s was: *Economic development is a good thing*. This principle had little consideration for the wider impact of associated environmental damage, for example soil erosion and the continued loss of indigenous biodiversity. In the late 1980s and early 1990s there was a change of attitude to: *Development is a good thing provided it is ecologically sound*. Issues of sustainability were beginning to surface. As the 1990s progressed, more people began thinking: *Development is not a good thing unless it is environmentally sound*<sup>21</sup> and recognised the need to rationalise a lot of separate legislation that related to the management of the environment.

In the post-1984 restructured New Zealand economy, local communities were encouraged to take responsibility for their local environment. A continuing problem is that farmers tend to make a clear distinction between production and sustainable/environmental advice.<sup>22</sup> Unsustainable land use continues. Farmers need to integrate both production and sustainable practices to be economically and ecologically sustainable. It is critical that the benefits of this integration are made clear if environmental improvement measures are to be adopted by land users.<sup>23</sup> It is equally important that the people advising farmers make that connection too. Environmental education plays a critical role here, and schools can play an important role in promoting a holistic view.

During the 1990s, leading rural producers became aware that a good environmental understanding was essential if they were to optimise sustainable production.<sup>24</sup> The range of reasons includes

- having to meet international, national and regional environmental regulations and standards, for example for biodiversity and food safety
- consumer demand for products to meet environmental quality assurance criteria
- better market access and the potential for products with a verifiable clean, green label to achieve a market premium
- diversification
- the desire to operate more efficiently and intelligently in order to reduce inputs, minimise waste and earn more profit.

## ***The Resource Management Act (RMA) 1991***

This awareness has led to a focus on the application of sustainable management to resource use. The meaning of sustainability and what it applies to is continually debated. The change of focus to sustainable management of resource use in New Zealand has been driven through the implementation of the innovative Resource Management Act 1991 (RMA), which helps promote environmental best practice.<sup>25</sup> The RMA has had a major impact on environmental education, both on formal education at a tertiary level and on non-formal education through local government and other agencies.

The RMA has a holistic ecosystem approach and consolidates most of New Zealand's resource management legislation in conjunction with two other principal pieces of environmental legislation: the Environment Act 1986 (environmental policy-making role), and the Conservation Act 1987 (conservation of protected Crown-owned lands). The Act includes discussions of definitions of environment, concern over how people are affected by various processes and the values that people ascribe to the world they live in.<sup>26</sup>

The RMA provides the legislative framework in which agriculture producers operate. The purpose of the Act is 'to promote the sustainable management of natural and physical resources'. This Act evolved from the concept of sustainable development promoted at the World Commission on Environment and Development 1987 and further developed at the 1992 Rio Earth Summit.

The RMA also requires consideration of the indigenous Maori cultural views of sustainable resource management, involving *kaitiakitanga* (guardianship), an ethic of stewardship. The Treaty of Waitangi (*Te Tiriti o Waitangi*) must also be taken into account. Indigenous knowledge is considered valuable to the development of a sound environmental ethic. This is discussed below.

The RMA did away with the old centrally planned approach of a 'recipe' that had to be followed without any need for an understanding of the knowledge that underlay the planning detail. The previous focus of resource planning was on the outcomes of land use for growth and economic development. The effects on environment and society were given less importance. The RMA introduced an environmental effects-based approach that provides incentives for resource users to come up with efficient and creative ways to achieve good environmental results that include social and cultural aspects as well. However, to do this the resource user has to be knowledgeable about the environmental effects of any actions. Since 1991, and the passing of the RMA, environmental education has increased in importance and relevance.

## ***Local community environmental knowledge is required***

While the central government still develops national policy statements and environmental standards to address issues affecting the whole nation, district and regional councils apply the RMA locally, and responsibility to do so lies with the local community through the implementation of the District Plan. The local community has to design their own plan to manage their local environment.

The RMA requires local authorities to monitor

- the state of the environment in their area
- whether their policy statements or plans are working as intended
- whether resource consents and related conditions are carried out properly.

The next most significant initiatives that impacted on environmental education are contained in *Environment 2010 Strategy*,<sup>27</sup> released in 1995 and developed for central government by the Ministry for the Environment (MfE). The MfE has responsibility for policy-making formula on environmental issues nationally and also manages the Sustainable Management Fund, which supports practical initiatives to help achieve sustainable management of resources. Environmental education is a central component of many of the projects that receive funding.

## ***Environment 2010 — A national strategy for change***

The objective of Environment 2010 was to coordinate, evaluate and monitor a range of environmental initiatives to meet a wide range of environmental goals. In 1996, central government funded a Green Package<sup>28</sup> to implement the medium-term goals of Environment 2010.

Goals and outcomes up to 2000 are

- **better environmental information and understanding and new education initiatives:** Outcome — publication of
  - *The State of New Zealand's Environment 1997*<sup>29</sup>
  - *The New Zealand Biodiversity Strategy: Our Chance to Turn the Tide — A Draft Strategy for Public Consultation, December 1998*<sup>30</sup>
  - *The New Zealand Biodiversity Strategy: Our Chance to Turn the Tide — Whakakōhukihukitia Te Tai Roroku Ki Te Tai Oranga, February 2000*<sup>31</sup>.

- **more sustainable resource use:** Outcome — development of the Sustainable Land Management Strategy, which resulted in the funding of the New Zealand Landcare Trust, established in 1996
- **less pollution:** Outcome — development of national standards under the RMA, voluntary domestic and municipal waste minimisation initiatives,<sup>32</sup> greenhouse gases reduction, Global Climate Change Treaty: Kyoto Protocol 1997<sup>33</sup>
- **reducing pest and disease risk:** Outcome — Hazardous Substances and New Organisms Act 1996, establishment of the associated Environmental Risk Management Authority (ERMA New Zealand),<sup>34</sup> and the Biosecurity Authority (established in 1999).<sup>35</sup>

While central government develops the overarching policy guidelines, the implementation and development is carried out by local authorities (district and regional councils). They recognise that they have a key role in educating their communities. Regional councils are innovative in agricultural and environmental informal education. Recent changes in formal education and the contribution of non-formal education are discussed below.

## *A National Strategy on Environmental Education*

---

From the 1996 Green Package, the Government adopted a national strategy on environmental education. In 1998, the MfE set up a project called 'Guidelines and Case Studies on the Development, Implementation and Evaluation of Environmental Education Programmes'. A major output was a manual, *Environmental Education: A Guide for Programme Providers — How to Develop, Implement and Evaluate Strategies and Programmes*.<sup>36</sup> The associated review of the literature has proved to be useful and valuable.<sup>37</sup> It is significant that the core principles of developing an effective environmental education programme and associated activities match the successful community-based rural initiatives. For rural initiatives to be effective they must

- respect the values, perspectives and rights of all those involved
- be developed as a partnership.

A supporting project, *Environmental Education Directory for New Zealand*, was published in 1999<sup>38</sup> and was designed for practical use by teachers, local government, community groups and individuals.

A discussion document, *Learning to Care for Our Environment*, was published in 1998 by the Ministry for the Environment in association with the Ministry of Education.<sup>39</sup> Education was clearly seen as the key to providing the knowledge, awareness, attitudes and values that would help people play their part in sustaining the environment throughout their lives. Environmental education was seen not just as a priority for school children, but also as a necessary lifetime commitment for all of us.

While some excellent environmental education work had been undertaken by a number of people and organisations in recent years, there was a clear need for a strategic approach to environmental education that clarified priorities, set directions for future activities and made effective use of the resources allocated to these activities.

We needed to develop partnerships between all sectors involved in environmental education. Examples of very successful regional initiatives that involve non-formal regional government (Environment Waikato) with EnviroSchools created by Hamilton City Council and formal schools are looked at in Appendix I.

To support the *Learning to Care for Our Environment* strategy in schools, the Ministry of Education produced *Guidelines for Environmental Education in New Zealand Schools* (1999).<sup>40</sup> It shows how environmental education can be undertaken within each of the essential learning areas of the curriculum at primary and secondary levels.

### ***Environmental education and tertiary institutions***

In response to the increased interest in and potential for employment in environmental management, universities and polytechnics are offering a range of environmental courses to diploma and degree levels. For example, in 1994 the Open Polytechnic of New Zealand started offering a Bachelor of Applied Science<sup>41</sup> and associated programmes that include the discipline area of the environment. Students can focus on environmental courses but also include programmes and courses from other disciplines. Similarly, the Bachelor of Business students can include environment courses. The purpose of the degree programmes is to enable the student to integrate a range of essential vocational skills and knowledge and to apply them, either as professional practice in a chosen field or as generic skills.

The applied science programme uses a problem-solving approach, promoting skills in effective thinking, communication, and relationship building and in using information relevant to the student's particular situation. Local relevance is central to course work.

Within the applied science programme there are currently two diploma courses in environmental management, a Diploma in Environmental Studies (Level 6) and the Diploma in Environmental Management (Level 7). In 2001 a Diploma in Sustainable Resource Use (Level 5) will be developed, including new courses in biodiversity, plants and people (ethnobotany) and eco-agriculture.

### ***'Greening' the institutions***

In 1995, 28 universities and polytechnics in New Zealand became signatories to a national programme called *Environmental Responsibility in Tertiary Institutions*, ERTI.<sup>42</sup> The three key areas are

- the sustainable management of the institution including annual environmental performance reporting
- the promotion of environmental education across all curricula

- the encouragement of sustainability in research programmes. (The programme for 1999–2000 includes a Web site to aid communication between institutions.)

The way the ERTI programme is implemented varies between the institutions. At the Open Polytechnic of New Zealand, the Natural Resources Centre believes that because we are promoting environmental education we should be demonstrating leadership in this area, just as some schools are, for example in the Enviroschools programme. The Open Polytechnic is now implementing The Natural Step (TNS) environmental management methodology and the principles that centre on the application of four system conditions.

The four system conditions can be used as criteria for guiding investment strategies by identifying areas that the polytechnic may consider changing. For example, general principles include

1. reducing our dependence on materials that are derived from mining and fossil fuels
2. reducing our dependence on persistent and unnatural substances that do not recycle without environmental damage, contributing to long-term waste problems
3. reducing our dependence on nature-consuming activities, for example by sustainable harvesting of resources
4. doing more with less, to assist human needs to be met fairly and equitably.

The changes will be gradual. TNS does not advocate rapid change. It is important that The Open Polytechnic begins to carry out activities that are increasingly in accordance with ecological demands. It is our intention to consider the outcomes of investment decisions in all strategic planning and to value each step towards future sustainability. The TNS methodology will be compatible with the content of *Environmental Responsibility in Tertiary Institutions* that was discussed earlier.

# *The New Zealand Curriculum Framework for primary and secondary schools*

---

*The New Zealand Curriculum Framework — Te Anga Marautanga o Aotearoa* details the essential learning areas, essential skills, and attitudes and values that will enable students to develop the qualities needed to successfully create, contribute to, and participate in, a sustainable future.<sup>43</sup>

The essential learning areas contain strands that promote knowledge and understanding in a wide range of areas that have direct relevance to environmental education and the importance of cultural knowledge. These topics were on the agenda for the Fiji MTT workshop. Examples of the content of the existing learning strands and their relevance to the Fiji workshop are discussed below.

## **Science (published 1993)**

Science involves people investigating the living, physical, material and technological components of their environment. In New Zealand, Maori science is highlighted and the inclusion of Maori knowledge about the natural and physical worlds is seen as enriching the curriculum for all students.

**Making sense of the living world:** In this strand there are many environmental education learning examples to do with understanding ecosystems: the interdependence of living organisms including humans. Topics such as how people apply biological principles to plant and animal management show how environmental education is a central component of agricultural knowledge.

**Making sense of planet Earth and beyond:** This strand looks at the processes on planet Earth, and the relationship to the solar system, galaxy and universe. Students investigate how people make decisions on activities that change Earth's physical environment, and develop a responsibility for the guardianship of Earth and its resources. Some issues included here are man-induced erosion, use of water, tree removal and tree planting, and waste.

## ***Technology (published 1995)***

The technology programme includes the impact of technology on the environment. One area is the problem of synthetic materials within the pollution waste stream. Students should be able to appraise the appropriateness of technological solutions to environmental problems. Technology includes ideas, ways of knowing, and applying technology to a system. The safe use of technology, specifications and quality standards is relevant to modern production systems, especially those relating to agriculture.

The technology programme recognises that it encompasses more than one area of learning, suggesting that a more holistic emphasis to education is developing. There is a greater emphasis on links with other essential learning areas. One technological area of special interest is biotechnology, the manipulation of natural processes including composting, waste management and water purification. A contentious area is genetic engineering, including issues of ethics and values. A particular issue for New Zealand is the cultural perspective of Maori tikanga, the correct way of living, in regard to technology education.

It is recognised that *all human actions have an environmental effect*, and some larger effects involve industry.

**Technology and society:** This strand has particular relevance to environmental education. At junior primary level it includes recycling and waste disposal, at senior primary level food, containers, packaging, materials design and disposability. Animal environments are studied, including bird sanctuaries, a wetland reserve, habitat and endangered species (environmental restoration).

Harvesting and storing food, studied at junior secondary level, looks at cultural differences, including traditional Maori methods of food-gathering, preservation and storage. The study of plant propagation has direct relevance to environmental restoration.

At the senior secondary level, students study waste disposal systems on the larger, local government scale, including industrial waste and how this integrates with home-based systems.

## ***Social studies (published 1997)***

It is significant that this more recently developed essential learning area begins with a holistic approach to the interaction and importance of people and the environment, and with the indigenous context. A Maori proverb about the flax plant, 'Where will the komako (bell bird) sing?' is used to pose questions about the important issues of family (whānau) and protection, and can also apply to the management of natural resources.

Hutia te rito o te harakeke  
Kei hea te kōmako e ko?  
Rere ki uta  
Rere ki tai.  
Ki mai koe ki au,  
'He aha te mea nui o te Ao?'  
Māku e ki, 'He tāngata, he tāngata, he tāngata.'

If the centre shoot of the flax bush were plucked,  
Where would the bellbird sing?  
You fly inland  
You fly to sea.  
You ask me,  
'What is most important in the world?'  
I would say, "Tis people, 'tis people, 'tis people." <sup>44</sup>

The harakeke grows from the centre of the fan, where the new shoot (rito) emerges between two predecessors, mātua.<sup>45</sup> The analogy can be that the rito is the child (tamaiti), the protecting two leaves on either side the parents (mātua), and the rest of the leaves the supporting family (whānau). Maori harvest the harakeke leaves to make such items as woven mats (te whāriki) and baskets (kete). When the leaves are harvested, the central three leaves are left.

Social studies helps students to understand their world and gives them the skills and knowledge to play their part in society.

**Culture and heritage:** This strand includes much material on values and beliefs that have relevance to the environment. For example, students look at how knowledge is passed on and sustained through myths, legends, stories and songs.

**Place and environment:** This strand considers the importance of places, special features, human use of the environment, cultural attitudes, a sense of belonging, past interactions, and values and ethics, and how resource use is regulated by conservation of resources and the resolution of different resource uses.

**Resources and economic activities:** This strand looks at the different ways people use resources, the different types of resources, their harvesting and resource management, their products and the associated management and conservation practices, and the different spiritual and equity values attached to resource use.

## *Te Whāriki — Early Childhood Curriculum*

---

*Guidelines for Environmental Education in New Zealand Schools* does not cover *Te Whāriki — Early Childhood Curriculum*, New Zealand's first bicultural curriculum statement, published in 1996. Early childhood is a time in our development when we form conceptions about our relationship with the world around us. The *Te Whāriki* curriculum covers the time from birth to school entry age.<sup>46</sup>

The curriculum is envisaged as a whāriki, or mat, woven from the principles, strands and goals. The curriculum documents for formal schooling use the same mat analogy. It can also be used to represent our relationship with the rest of the environment.

Some of the major elements having an impact on early environmental education are the focus on 'holistic development — kotahitanga', and the strands of 'well-being — mana atua', and 'belonging — mana whenua', which include goals on how to maintain a healthy environment, skills for caring for the environment and the people in it, respect for 'Papatūānuku — Earth Mother', and spiritual development, especially Māori.

Importance is given to the effectiveness of repeated favourite stories, especially under the communication strand — mana reo, including the importance of symbols.

Children are encouraged to learn by active exploration of the environment under the exploration strand — mana aotūroa. '... they develop working theories for making sense of the natural, social, physical, and material worlds ... (including) all aspects of the environment ... learn **from** and make sense of the natural world ... implicit in the concept of the child as explorer is the importance of **respect** for the environment' (pp16, 82) (my emphases).

The *Te Whāriki* curriculum also includes 'recognition of Maori ethics in relation to the environment', an aspect that was relevant to the MTT workshop in Fiji, where indigenous knowledge in the curriculum was a topic for discussion.

The implementation of *Te Whāriki* is likely to make a significant contribution to environmental education in New Zealand.

# ***Guidelines for Environmental Education in New Zealand Schools***

---

To ensure that the school curriculum responded to the commitment made by the Government in *Learning to Care for Our Environment — Me Ako te Tiaki Taiao*,<sup>47</sup> the Ministry of Education sent *Guidelines for Environmental Education in New Zealand Schools*<sup>48</sup> to all schools in September 1999. These guidelines link with *Learning to Care for Our Environment* and show how the aims of environmental education can be achieved through the seven learning areas of The New Zealand Curriculum Framework. They also include ideas and suggestions to assist schools in planning and presenting programmes.

The guidelines do not add to the curriculum requirements of schools but are designed to assist teachers, where opportunities exist within the existing national curriculum statements, to plan and provide education about, for and within the environment. The extent of environmental education within the individual school curriculum continues to be determined by the school and Board of Trustees.

In approaching how environmental education was to be managed, the option that it be a subject in itself was dismissed because it was seen as a multidisciplinary concern, and an approach across the existing curriculum was decided on.<sup>49</sup> A review of the current curriculum content by the author of this working paper shows that all major issues relevant to environmental education are already included.

## ***Guideline content***

The guidelines review New Zealand's situation, relevant legislation, international agreements, and strategy statements relevant to the environment.

### **Aims**

The guidelines state that the aims of environmental education are that students develop

1. awareness of and sensitivity to the environment and related issues
2. knowledge and understanding of the environment and people's impact on it
3. attitudes and values that reflect concern for the environment

4. skills involving identifying, investigating, and problem solving that are associated with environmental issues
5. a sense of responsibility in addressing environmental issues through participation and action as individuals, or members of groups, including whānau, hapu or iwi.

### **Key concepts**

The guidelines identify four key concepts in environmental education:

1. interdependence
2. sustainability
3. biodiversity
4. personal and social responsibility for action.

### **Key dimensions**

The guidelines show that environmental education involves the integration of three key dimensions:

1. **Education about the environment** is concerned with providing information on the workings of the environment, that is, natural systems, and the interactions between humans and the environment. This informative approach is concerned with developing awareness, knowledge and understanding of the environment.
2. **Education in the environment** is experiential; it is activity-based and outside the classroom setting, and encourages growth through contact with the environment.
3. **Education for the environment** has environmental improvement as a goal. It can create a sense of responsibility and empower people to feel that they can make a difference by being actively involved.

Sometimes this three-fold approach is called education with the head, hand and heart. It is an experience, an involvement, through which people have the opportunity not only to gain a theoretical understanding of the environment, but also to form an emotional attachment with the world around them of which they are part. In addition it enables people to become motivated to personally take action to increase the quality of all life on Earth, to exercise kaitiakitanga — guardianship.

## ***Steps in planning an environmental education programme***

The guidelines give advice on how to use the existing curriculum framework under eight headings:

1. **Identify students' needs:** The plan must be meaningful and relevant for students.
2. **Review current programmes:** Identify what needs to be added to make the programme complete.
3. **Provide new opportunities:** Encourage students to look for new initiatives that could be applied.
4. **Make links with non-formal education providers:** Make contact with regional and local councils, and other community agencies and environmental groups that are active in education. Some non-formal environmental education initiatives in New Zealand are of a high standard and relevant locally.
5. **Decide how the environmental education will be managed within the curriculum:** This may be organised around a subject in one curriculum area, by an integrated approach based on cross-curricular themes, or by using an action-oriented approach to give a broader coverage.
6. **Develop programmes based on effective teaching and learning approaches:** This involves the application of purposeful learning activities in relevant situations, to enable the student to gain first-hand practical experience.
7. **Select appropriate resources to support teaching and learning programmes:** *The Environmental Education Directory New Zealand*<sup>50</sup> has been developed by the Ministry for the Environment ([www.eednz.org.nz](http://www.eednz.org.nz)). When selecting resources for programmes the following criteria should be considered: content relevance, skill development suitability, language level, student interest relevance, currency, importance, cultural and gender perspectives, whether it presents a balanced perspective, and whether the material fits in with other resources.
8. **Plan how the evaluation will be carried out:** Ask whether the outcomes have been met and what changes need to be put in place for the next application.

## ***Professional development — training the trainers***

To support the implementation of the environmental education initiative, the Ministry of Education has funded a professional development programme for primary and secondary school teachers for 2000 and 2001, to help schools produce locally appropriate resources.

The train the trainers programme recognises that people outside schools have a significant role in environmental education in New Zealand. It was a requirement that regional consortia of environmental educators from schools, colleges of education and local and regional authorities attend the workshops, one in the North Island in August 2000, and one in Christchurch in October 2000.

Following the workshops, the consortia members are required to run teacher workshops on environmental education in their areas in terms three and four in 2000, and terms one and two in 2001. There is also a pilot school programme that is funded to enable regional consortia to select primary and secondary schools across the eight regions to pilot whole school environmental programmes. It is obviously too soon to see if the new initiatives will make a significant impact on environmental awareness that will be reflected in changes in values and behaviours by New Zealanders. In the opinion of a person who has had a long association with the New Zealand Association of Environmental Education and who attended the Auckland workshop, what was lacking in many schools was the application of a holistic approach.<sup>51</sup> The cross-curricular themes in *Guidelines for Environmental Education in New Zealand Schools* will assist teachers to achieve a holistic presentation.

## *Non-formal environmental education*

---

A wide range of environmental groups are taking an active role in environmental education in New Zealand. Organisations like Queen Elizabeth the Second National Trust are involved in protecting the environment and, along with other organisations, publish material that carries an environmental education message.

Local city councils commonly have an involvement in promoting better environmental performance by their ratepayers, especially in the area of waste management options. Waitakere City Council (WCC), Auckland area, operate a Waste Minimisation Learning Centre at their Waitakere Waste Unit. Since April 1999, Waitakere school children have been given the opportunity to visit the city's Recycling and Refuse Transfer Station. The staff at the waste unit have difficulty in satisfying the demand for the environmental education tour. The children are given a practical demonstration encouraging them to reduce, reuse and recycle waste. Children learn the art of compost-making, worm-farming and paper-making while getting the waste management message. The children then influence the behaviour of adults. Waste management was a topic that was covered in the Fiji workshop.

Some city councils are active in promoting environmental education in schools, for example, Enviroschools. Enviroschools is a model example of a whole school approach to environmental education in New Zealand. The Enviroschools Programme is a partnership between individual schools and the Hamilton City Council (HCC). The aim is to integrate environmental education into the whole of school life and to create learning opportunities by working towards a healthy, peaceful and sustainable environment. See Appendix 1.

A very good example of leadership in non-formal education is Environment Waikato, (EW), a major local government organisation that is the regional authority responsible for the Waikato area in the North Island. EW has taken a leadership role in environmental education in New Zealand. Within the Waikato region, Hamilton City Council has been innovative in promoting Enviroschools. There is good cooperation between EW and Enviroschools. See Appendix 1.

## *Lifelong learning and sustainability*

---

While the Fiji MTT workshop concentrated on the greening of Fiji schools, to be effective environmental education needs to be seen as part of lifelong learning, and for better environmental performance in the future it is important that resources are managed in a sustainable manner.

There is an increasing awareness that the present concentration on maximum production in New Zealand has resulted in the implementation of unsustainable systems that require a high subsidy from the natural capital of the environment. We have drawn down on natural capital. This is like eating your seed crop. There is an optimum level of production that the environment can sustain.

The imperative now is to work in balance with the environment. This involves being more aware of the working of natural systems and the interaction of all elements (of which we are but one) that make up the environment.

It is important to be able to interpret the world around us, to read the signs and patterns, to receive the message and to be able to act on it. We have examples in New Zealand where land managers are being educated to reduce the environmental risk by being given better information about soils and climate and weather trends. Some of this environmental education will come from new data analysis, and some of it will come from the traditional ecological knowledge of the past.

Eco-certification is increasingly influencing the management of parts of land use in New Zealand. There is more use of organic systems, and land managers have to relearn the ecological knowledge that was applied prior to the use of synthetic fertilisers and pesticides. Management of the environment to encourage a balanced system is essential. For example, insects make up approximately 65 per cent of the known life forms in the world. One entomologist refers to them as 'Tane's gardeners' because they do the pruning, thinning and composting and keep the garden of Tane going, in modern terms, sustaining the system that we rely on. (Tane Mahutu is the Māori god of the forest.)

While an intelligent interpretation of the environment is important for land managers, it is also a vocational skill that is needed and expected in the tourism industry, an important component of the economy of New Zealand and Fiji. Visitors to our countries want to be able to understand the landscape and to visit a landscape that is environmentally healthy. This involves an investment in environmental restoration and a population that is educated to understand the environment, so that they can act in an informed manner and have an intelligent input into resource management to promote a sustainable future.

## *Indigenous knowledge in the curriculum*

---

Indigenous knowledge in the curriculum was an item on the agenda for the Fiji workshop. In New Zealand the Treaty of Waitangi drives the requirement for Māori knowledge in the curriculum. The other element that drives it is a growing interest in New Zealand heritage values. As was mentioned earlier, indigenous knowledge is also known as traditional ecological knowledge (TEK). It has involved the acquiring of new environmental knowledge by Maori to survive in a colder climate than they were used to, and with a flora and fauna that was over 80 per cent endemic. New Zealand environmental education began with the arrival of the Maori.

It is important locally to involve the elders in TEK initiatives and to record local knowledge. An understanding of TEK promotes the holistic interpretation of the environment and supports the view that socio-economic and cultural considerations are inseparable from ecological and environmental concerns, helping us to arrive at a sustainable management goal.

In Maori creation myths, other plants and animals are seen as our cousins. We are closely related, closer than we may realise! For example, modern science has shown that for every 100 human genes, 97 or more have counterparts in the mouse, and mouse genes, in the language of DNA, are spelled very similarly to human genes.<sup>52</sup> And while we may feel that we are individuals, a human holds millions of bacterial cells; we have over 400 species of gut bacteria alone. We may well have more non-human cells than human cells.<sup>53</sup>

Knowing more about TEK and understanding seasonal indicators gives us the ability to read the current environment better than relying on a calendar that really makes sense only in the Northern Hemisphere. For example, in the past, for Maori, the singing of the grey warbler or riroriro was the sign for the ground to be dug in readiness for the kumara seed planting. The time to plant the kumara was signalled by the arrival of the shining cuckoo. The nest of the greywarbler is where the cuckoo lays its eggs:

*Ka tangi te wharaurao, ko nga karere a Mahuru.*

**When the shining cuckoo calls it is the messenger of spring.**

Being able to predict the likelihood of El Nino (colder) and La Nina (warmer) weather patterns has important economic implications, especially for agriculturists. The Rakiura Maori harvest the migratory mutton bird, titi, on the southern islands of New Zealand. The birds breed in southern New Zealand and then begin a trans-equatorial migration around the Pacific Rim by way of

Japan, Alaska, Canada and the United States, returning to the south to breed in October. Records of titi numbers give a clear indication whether the following year will be an El Nino or a La Nina and the intensity of the weather. Scientists say that there is a tight predictive correlation between the mutton-birders' harvest rate and the southern oscillation index, the large-scale shift of atmospheric pressure that alerts scientists to the developing patterns.

Maori TEK is rich in environmental education. The application of environmental awareness is superior to environmental management by blind regulation. Regulation does not promote an environmental ethic. Indigenous knowledge can make a valuable contribution to current environmental education and create a better understanding of world systems.

It is appropriate that I finish this paper on the New Zealand environmental education experience with a Maori proverb:

*Te manu e kai to miro, nona te ngahere;  
Te manu e kai I te mataauranga, nona te ao.*

**The bird that feeds on the miro fruit, owns the forest;  
The bird that feeds on education, owns the world.**

# References

---

These notes refer to sources used in compiling the original presentation to the UNESCO MTT Workshop on Environmental Education, Suva, Fiji, 24–26 October 2000. They also contain supplementary notes as appropriate.

- 1 *Guidelines for Environmental Education in New Zealand Schools*. Wellington: Ministry of Education, Learning Media, 1999.
- 2 Treeby, Bruce. *Factors Influencing Change: Agricultural and Environmental Education in New Zealand — A Review of the 1990s*. Lower Hutt, New Zealand: The Open Polytechnic of New Zealand, 2000.
- 3 Metge, Joan. *New Growth From Old: The Whānau in the Modern World*. Wellington: Victoria University Press, Wellington, 1995.
- 4 Blakeley, Jo, et al. *Environmental Education: A Guide for Programme Providers — How to Develop, Implement and Evaluate Strategies and Programmes*. Wellington: Ministry for the Environment, Sustainable Management Fund, 1999.
- 5 Bawden, Richard. *Of Knowing 'Systems' and Change: Achieving Change Through Improved Knowledge Systems*. 2000 Conference Proceedings, Massey University, Palmerston North, 2000.
- 6 Tong, Richard, and G Cox. *Clean and Green? The New Zealand Environment*. Auckland: David Bateman, 2000.
- 7 [www.cawthron.org.nz/news\\_catenatum\\_bloom](http://www.cawthron.org.nz/news_catenatum_bloom)
- 8 [www.medicalpost.com/mdlink/english/members/medpost/data/3509/55B.HTM](http://www.medicalpost.com/mdlink/english/members/medpost/data/3509/55B.HTM)
- 9 Ministry for the Environment, and Department of Conservation. *New Zealand Biodiversity Strategy: Our Chance to Turn the Tide — Whakakohukihukitia Te Tai Roroku Ki Te Tai Oranga*. Wellington: Ministry for the Environment, Department of Conservation, 2000.
- 10 King, Carolyn, and Mammal Society, New Zealand Branch. *The Handbook of New Zealand Mammals*. Auckland: Oxford University Press in association with the Mammal Society, New Zealand Branch, 1990.
- 11 Ministry for the Environment. *The State of New Zealand's Environment 1997*. Wellington: Ministry for the Environment, 1997.
- 12 New Zealand. Ministry for the Environment, and Department of Conservation. *New Zealand Biodiversity Strategy: Our Chance to Turn the Tide*. Wellington: Ministry for the Environment, Department of Conservation, 1998.
- 13 Ministry for the Environment, and Department of Conservation. *New Zealand Biodiversity Strategy: Our Chance to turn the Tide — Whakakohukihukitia Te Tai Roroku Ki Te Tai Oranga*. Wellington: Ministry for the Environment, Department of Conservation, 2000.
- 14 Tong, Richard, and G Cox. *Clean and Green? the New Zealand Environment*. Auckland: David Bateman, 2000.
- 15 Queen Elizabeth the Second National Trust, Wellington.
- 16 Ministry for the Environment. *Bio-What? Addressing the Effects of Private Land Management on Indigenous Biodiversity*. Wellington: Ministry for the Environment, 2000.
- 17 [www.sanctuary.org.nz](http://www.sanctuary.org.nz)

- 18 The Forests Act 1949 was amended in 1993 'to promote the sustainable forest management of indigenous forest land'.
- 19 *West Coast Beech Plan: Overview*, September 22 1998.  
[www.timberlands.co.nz/forest/sustforestry/mgtplans/behoverview/preface.html](http://www.timberlands.co.nz/forest/sustforestry/mgtplans/behoverview/preface.html)
- 20 *The Evening Post TV Week*, 27 November, 2000.
- 21 Cocks, Doug. *Future Makers, Future Takers*. Adelaide: UNSW Press, 1999.
- 22 Bradshaw, K, and P Williams. 'Information and Communication Needs to Assist the Adoption of Sustainable Land Management Practices in North Island Hill Country.' *MAF Policy Technical Paper 99/5*. Wellington: Ministry of Agriculture and Forestry, 1998.
- 23 Nimmo-Bell. 'Evaluation of Sustainability Behaviour Change Projects.' *MAF Policy Technical Paper 99/6*. Wellington: Ministry of Agriculture and Forestry, 1999.
- 24 'The Role of On-farm Quality Assurance and Environmental Management Systems (QA/EMS) in Achieving Sustainable Agriculture and Sustainable Land Management Outcomes.' *MAF Policy Technical Paper 98/2*. Wellington: Ministry of Agriculture and Forestry, 1998.
- 25 Resource Management Act 1991.
- 26 Ministry for the Environment. *Proposals for Amendment to the Resource Management Act*. Wellington: Ministry for the Environment, 1998.
- 27 Ministry for the Environment. *Environment 2010 Strategy: A Statement of the Government's Strategy on the Environment*. Wellington: Ministry for the Environment, 1995.
- 28 Green Package. *1996 Government Budget*. Wellington: Published under the authority of the New Zealand Government, 1996.
- 29 Ministry for the Environment. *The State of New Zealand's Environment 1997*. Wellington: Ministry for the Environment, 1997.
- 30 Ministry for the Environment, and Department of Conservation. *The New Zealand Biodiversity Strategy: Our Chance to Turn the Tide*. Wellington: Ministry for the Environment, Department of Conservation, 1998.
- 31 Ministry for the Environment, and Department of Conservation. *The New Zealand Biodiversity Strategy: Our Chance to Turn the Tide — Whakakohukihukitia Te Tai Roroku Ki Te Tai Oranga*. Wellington: Ministry for the Environment, Department of Conservation, 2000.
- 32 Target Zero, a waste minimisation and recycling scheme for business and industry adopted by a range of New Zealand businesses, which encourages them to cut down on waste and emissions and save money through industrial auditing or processes.
- 33 [www.cnie.org/nle/clim-3](http://www.cnie.org/nle/clim-3).
- 34 ERMA assesses the risks of and makes decisions on the use of hazardous substances or the importing, development or release of new organisms, including genetically modified organisms.  
[www.mfe.govt.nz](http://www.mfe.govt.nz)
- 35 [www.maf.govt.nz](http://www.maf.govt.nz)
- 36 Blakeley, J, M Rush, and R Callaghan. *Environmental Education: A Guide for Programme Providers*. Wellington: Ministry for the Environment, 1999.
- 37 The Open Polytechnic of New Zealand, and Agriculture New Zealand. *Towards a Set of Principles for Effective Environmental Education Strategies and Programmes and their Evaluation: A Review of the Literature*. Wellington: Ministry for the Environment, 1999.

- 38 Ministry for the Environment. *Environmental Education Directory: New Zealand*. Wellington: Ministry for the Environment, 1999.  
[www.eednz.org.nz](http://www.eednz.org.nz)
- 39 Ministry for the Environment. *Learning to Care for our Environment: A National Strategy for Environmental Education*. Wellington: Ministry for the Environment, 1998.
- 40 Ministry of Education. *Guidelines for Environmental Education in New Zealand Schools*. Wellington: Ministry of Education, 1999.
- 41 Bachelor of Applied Science and Associated Programmes, The Open Polytechnic of New Zealand, Lower Hutt, 2000.
- 42 *Environmental Responsibility in Tertiary Institutions*. Programme coordinated by the New Zealand Natural Heritage Foundation, Massey University, Palmerston North.
- 43 Ministry of Education. *The New Zealand Curriculum Framework*. Wellington: Learning Media, Ministry of Education, 1993.
- 44 Metge, Joan. *New Growth From Old: The Whānau in the Modern World*. Wellington: Victoria University Press, Wellington, 1995.
- 45 Metge, Joan. *New Growth From Old: The Whānau in the Modern World*. Wellington: Victoria University Press, Wellington, 1995.
- 46 Ministry of Education, *Te Whāriki: He Whāriki Mātauranga mō ngā Mokopuna o Aotearoa — Early Childhood Curriculum*. Wellington: Learning Media, 1996.
- 47 Ministry for the Environment, *Learning to Care for our Environment: A National Strategy for Environmental Education*. Wellington: Ministry for the Environment, 1998.
- 48 Ministry of Education. *Guidelines for Environmental Education in New Zealand Schools*. Wellington: Ministry of Education, 1999.
- 49 Ministry of Education. *Guidelines for Environmental Education in New Zealand Schools*. Wellington: Ministry of Education, 1999.
- 50 Ministry for the Environment. *Environmental Education Directory New Zealand*. Wellington: Ministry for the Environment, 1999.
- 51 Williams, Pam. Discussion with the author, 11 October 2000.
- 52 Wade, Nicholas. 'Of Men and Mice: Here They Come to Save the Day.' *New York Times*, May 1998.
- 53 Hutchison, John. Discussion with the author, Forest Research Associates, Rotorua, October 2000.
- 54 Mardon, Heidi. *Enviroschools Handbook: Enviroschools — A Whole School Approach to Environmental Education, Agenda 21 in Action*. Hamilton: Hamilton City Council, 1999.

## ***Appendix 1 : Two examples of non-formal environmental education***

---

### ***Environment Waikato***

An example of leadership in non-formal education is Environment Waikato (EW), a major local government organisation that is the regional authority responsible for the Waikato area in the North Island. EW has taken a leadership role in environmental education in New Zealand. Within the Waikato region, Hamilton City Council has been innovative in promoting Enviroschools. There is good cooperation between EW and Enviroschools.

Earlier in this paper I discussed how local government is legally responsible for the implementation of the Resource Management Act in New Zealand. EW sees environmental education as 'necessary to raise public awareness and increase involvement in environmental management, and to influence community attitudes and behaviour towards the environment. Environment Waikato uses environmental education as one of the means of achieving sustainable resource management.'

EW targets the formal education sector, gives practical support promoting a cross-curricula approach, is involved in the development, trialling and dissemination of environmental education, and promotes environmental education nationally. Approximately \$200,000 is spent by EW annually on environmental education.

EW publishes *Schools' Environmental Education Newsletter, S.E.E.N.*, and a series of fact sheets. EW is involved in producing environmental education resource kits and providing professional development for teachers, covering 'Seaweek', 'Conservation Week', 'Rivers and Us' and 'Stream Sense'. EW is actively involved in landcare education in Waikato schools, including the 'Trees for Survival' programme.

For information about the resources that are available visit the EW website, [www.ew.govt.nz](http://www.ew.govt.nz). It is a most valuable environmental educational resource.

## ***Enviroschools - Agenda 21 in Action***

Enviroschools is a model example of a whole school approach to environmental education in New Zealand. The Enviroschools Programme is a partnership between individual schools and the Hamilton City Council (HCC). The aim is to integrate environmental education into the whole of school life and to create learning opportunities by working towards a healthy, peaceful and sustainable environment. HCC supports an Enviroschools Co-ordinator Strategic Unit, and Heidi Mardon is the innovative Enviroschools co-ordinator. Heidi has been responsible for the production of an Enviroschools handbook and other support materials.<sup>54</sup>

### ***What is an enviroschool?***

An enviroschool has a sense of

- **Place — where nature and people are nurtured and the whole school environment is a learning resource.** Creating a sustainable physical environment is a continuing learning exercise that fosters a greater understanding of the relationship between all living things.
- **Participation — a process involving the whole school community.** Students, teachers, caretakers, Boards of Trustees, families and the wider community work together to actively create their school. They take responsibility for it by adopting behaviours and approaches to work and life that create a more sustainable environment.
- **Purpose — learning is living and reinforced at school.** Teachers reshape and refocus everyday activities so that the potential for environmentally friendly practices is maximised. Students are inspired to be creative and develop responsible attitudes and behaviours within the formal, informal and hidden curriculum. Adults act responsibly on behalf of the environment and serve as role models for young people.

**An enviroschool is only limited by imagination and quality of thinking.**

Mardon, *Enviroschools Handbook*.

This next section is a copy of some of the environmental educational information and guidance that has been developed by the HCC Strategic Unit.

## ***Enviroschools Programme Learning Cycle***

### **1. Identify the current situation — where are we now?**

*Observe, audit/record/monitor, focus, investigate*

What's up? What do we feel? What do we know? How did it come to be this way?

### **2. Explore alternative — how else could it be?**

*Challenge, envision, reconceptualise, experiment, critique, consult, choose*

Do we want to change the current situation? Why? What could happen? What other scenarios can we imagine? What are the possible outcomes? What is the best course of action?

### **3. Take action — how will we participate in the change?**

*Organise, publicise/inform, create, document*

What design? Who will do what? When will we do it? What help do we need? What resources can we find? How will we document the process? How will we know we are succeeding? Who will monitor and maintain the project?

### **4. Reflect — how did it go?**

*Evaluate, record, document, celebrate*

What did we achieve? Did we achieve our purpose? Did we achieve other things that we hadn't thought through? What did we learn?

### Identify the current situation

Key Question	Possible Methods	Output
<b>What do we know now?</b> <i>What, where, why, how, feelings</i>	Mapping brainstorming, mind mapping, quizzes	Determines current level of knowledge
<b>What can we observe?</b> <i>Things, processes, types, movement, relationships</i>	Experiential games (smell, feel, touch), treasure hunts	Builds on current knowledge
<b>What do we not know?</b> <i>Ecological processes, Maori concepts, human impacts, links to regional, national and global issues, politics</i>	Games, stories, case studies, models, maps, transects	Explores key concepts in greater depth
<b>How much is there?</b> <i>Amount, type, source, use/waste</i>	Auditing, surveying, transects, interviews, measuring, calculating	Conducts a detailed audit of current situation
<b>Do we want to change our current situation and if so why?</b> <i>Reflect on what we know, link key concepts and school situations</i>	Venn diagramming, historical timelines, bean ranking, stories, debates, exhibitions	Provides a summary of learning in this stage and the motivation to proceed to the next stage

Mardon, *Enviroschools Handbook*.

### Exploring alternatives

Key Question	Possible Methods	Output
<b>What other situation can we envisage?</b> <i>Visioning, brainstorming and generating ideas</i>	Brainstorming, drawing, mapping, stories	Uses knowledge from previous stage to generate ideas for alternatives
<b>How do we decide what to do?</b> <i>Purpose, consequences, effects, achievability, consultation, maintenance, opportunities for learning</i>	Problem solving guide	Provides tools for making choices and analysing consequences
<b>What are the best choices?</b> <i>Discussion, debating, voting</i>	Matrix ranking, H forms, case studies, debates	Provides a list of actions
<b>How will we take action?</b> <i>Programming, prioritising, forming project teams, identifying resources, allocating roles, gaining commitment, defining indicators</i>	Guide to planning process, timelines and so on	Produces an action plan

Mardon, *Enviroschools Handbook*.

## Taking action

Key Question	Possible Methods	Output
<b>What do we need to consider when carrying out our project?</b> <i>Obstacles, resources, permission</i>	H forms, fish and rocks, research, budgeting	Works out the logistics of implementing the action plan
<b>How will we tell people about what we are doing?</b> <i>Who, what, where, when, what mechanisms</i>	Notice boards, presentations, newsletters, exhibition, envirofare	Produces and implements a communications plan
<b>What designs will we need to make?</b> <i>Landscape designs, recycling devices, structures and so on</i>	Mapping, modelling, drawing	Produces detailed designs for specific actions

Mardon, *Enviroschools Handbook*.

## Reflecting/Documenting

Key Question	Possible Methods	Output
<b>How are we progressing and what have we achieved?</b> <i>Original purpose, achievements under action plan, obstacles overcome, remaining obstacles, what we would do differently, feelings, perceptions, what has been learned</i>	Self-questioning, reviewing action plan goals, reviewing documentation, storytelling, matrix ranking, stepping stones and stumbling blocks, quizzes	Measures progress and guides future actions
<b>How will we measure long-term progress?</b> <i>Collection and storage of information, continuing observation, measuring indicators, recording feelings and perceptions</i>	Monitoring (the monitoring game), observing	Produces a monitoring programme
<b>Where to from here?</b> <i>Updating information, deciding who will keep things going/maintained, future actions, further improvements</i>	Updating all plans, communication to next generations of students	Determines the process for continuing learning and environmental improvement
<b>How will we celebrate our success?</b> <i>Thanking, inviting, displaying, opening, presenting</i>	Blessing, party, envirofare	Acknowledges people's involvement and reinforces feelings of achievement

Mardon, *Enviroschools Handbook*.

For further information about Enviroschools, contact Heidi Mardon, Enviroschools co-ordinator at

<heidi.mardon@hcc.govt.nz>