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**TU KAKARIKI
THE NEW ZEALAND TREE PROGRAMME**

by

Philip Simpson and Ronda Cooper

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Head Office,
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**TU KAKARIKI
THE NEW ZEALAND TREE PROGRAMME¹**

by

Philip Simpson² and Ronda Cooper³

²Science and Research Division, Department of Conservation,
P O Box 10-420, Wellington

³Advocacy and Information Division, Department of Conservation,
P O Box 10-420, Wellington

ABSTRACT

Tu Kakariki, the New Zealand Tree Programme set up by the Department of Conservation in the sesquicentennial year 1990, is an umbrella which brings together a number of branches of tree conservation. The name "Tu Kakariki" means "stand strong and green", and refers to the physical task of restoring the forest and trees in a way that is compatible with human needs.

Its objectives are:

1. To promote co-ordinated action by community groups, individuals and official agencies to conserve and plant trees;
2. To undertake national advocacy and information campaigns to develop public awareness of the value of trees and associated vegetation;
3. To encourage the use and conservation of indigenous plants.

The Department of Conservation identifies a huge tree restoration need to protect basic resources, supply materials, and enhance the viability of species, ecosystems, and ourselves.

Tree croppers can help Tu Kakariki achieve its objectives on rural land by encouraging the planting of native species for sustainable harvest of products, for shelter, for soil and water protection and for enhancing habitats. The greatest value at this stage might be in talking to others about the programme.

1. THE IMPORTANCE OF TREES TO NEW ZEALANDERS

New Zealand is a tree country. Its origin as a fragment of Gondwanaland and then its slow drift over the millennia through the oceans have resulted in a wide diversity of

¹ A paper prepared for "Tree Crops for Conservation", New Zealand Tree Crops Association Conference, Pukekohe, May 11-14, 1990.

trees. Many of our trees are so ancient that their branches provided homes and perches for the flying dinosaurs long before mammals. But New Zealand's unbroken isolation from other land masses through 80 million years has allowed the undisturbed development of many unique ecosystems, protecting the islands' ancient cargo of primitive trees and their associated primitive animals.

Its people have always depended on trees. Many of the special qualities and characteristics of Maori culture developed from the trees - the inspirational unfolding of the tree fern leaf; the legends providing identity in the common origin of people and forests as children of Tane; and the wisdom of whakatauki or proverbs which equate the qualities of trees to the quality of society, as for example in: "He totara wahi rua, he kai na te ahi", literally "A totara split in two is food for the fire", figuratively "Unity is strength".

For a millennium Maori lived from the trees; the fruits and seeds were harvested for food, the leaves for medicines, ceremony and weaving, the flowers for reverence and beauty. Maori planted orchards of karaka and ti kouka. They used the unique timbers of the different forest trees to carve the most astonishingly beautiful meeting, sleeping and storage houses, implements and ornaments. They harvested the birds of the forest, carefully protecting key tree species like puriri and miro which provide food and habitat for the birds. Maori developed an acute ecological awareness of their dependence on the natural resources of the forest and of the complex ecological interrelationships between species.

Pakeha likewise, when they settled this land, depended on its trees - kauri and kahikatea were the first crop from the land, and extremely lucrative. The colonists built their houses and fences and water tanks and bridges from the forest of Tane. In many ways, though, the very abundance and great fecundity of New Zealand's trees created problems. To earlier inhabitants of this land, the grand expanses of rich forests gave no incentive to develop a sense of caution for the future. Just as early Maori had cleared large areas of land with fire, vast tracts of the country were burnt for the demands of the European pastoral ideal. About a third of our forests were destroyed in a frenzy of land development for agriculture and forestry by pakeha settlers, eagerly assisted by government and science. The bushmen acted as if the supply of timber was endless, and the abundance of trees, paradoxically, contributed to the forests' demise. And when the bush went, so did much of the extraordinary wildlife that had facilitated successful Maori settlement in this land.

However, the primeval forest also helped to foster a new identity for the colonists separate from their Englishness. The vast forest landscapes, in an infinite variety of green, bedecked with epiphytes, festooned with climbers, forced a new consciousness that was particularly New Zealand. The venerability and sublime wildness of the bush have been constant themes for both painters and writers for over 150 years, as well as being amongst the greatest assets of the tourist industry. From the early 1800s on, trees and forests lay at the heart of any awareness of ourselves as New Zealanders. And developing national consciousness has been matched through the 20th century by growing conservation awareness, from the early efforts of the scenery preservation groups through to the strong conservation campaigns of the last few decades. Trees and forests, naturally, are the focus for much of this history of environmental awareness.

The Pakeha settlers also brought with them trees from many other lands in a conscious effort to recreate something of the familiar landscapes of "home". Some of them, like redwoods, oaks and gums, graced the rural and urban landscapes. Some, like pine and

fir, formed the cornerstone of our forest industry. Some fed the horticultural industry, and others protected land and water and provided shelter for stock. Many of these introduced trees can be regarded as worthy additions to this land of trees.

But the colonists also introduced a whole range of new animals and birds, without sufficiently understanding the ecological impacts on indigenous plant species that had not developed the means of protection against browsing mammals. And the new trees that were introduced often had unforeseen results as well, swiftly overwhelming many indigenous ecosystems. Willows now clog our rivers, pines now spread across the high country, some landscapes lack any sense of New Zealand at all. And myths grew up equally swiftly about indigenous species - native trees are too slow, the evergreen forest is gloomy and depressing and has no colour, trees are a nuisance, they are not even living creatures but merely problematic objects which restrict the march of human development. This generation of New Zealanders is faced with stopping actions and reversing attitudes that have become deeply entrenched in our national psyche.

We have then a paradoxical combination of circumstances. There is the uniqueness and the ecological and cultural importance of our indigenous trees. Then there is an imported overlay of exotic plants which have radically modified New Zealand's landscapes with both positive and negative consequences. And there is an ongoing tradition of squandering and exploitation, the ignorance and active dislike of trees which is still evident in the arboriphobia of many New Zealanders today.

In this sesquicentennial year and the year of the centenary of Arbor Day in this country, the Department of Conservation is starting Tu Kakariki, the New Zealand Tree Programme, a programme that is very much within this multi-faceted background of history -the botanical, cultural, social and economic imperatives which have combined to shape the treescape of New Zealand today.

2. THE ROLE OF THE DEPARTMENT OF CONSERVATION

The Department of Conservation is not alone in its interests in trees. Indeed, it is a newcomer alongside numerous organisations which have achieved much over the years -the Tree Crops Association, the Association of Farm Foresters, the various Tree Councils and Societies, the Royal Institute of Horticulture, the Maruia Society, Forest and Bird Protection Society, Association of Soil Conservators and many others.

The Department of Conservation does have, however, a very broad range of interests each of which has relevance to trees. It manages the protected areas of New Zealand, a major proportion of which are tree covered. It has the responsibility of wild animal control in these areas - deer, goats and possums for instance, which are responsible for the demise of millions of our trees, as well as plant pests such as old man's beard which is likewise wreaking havoc. It manages the environment and some human uses of rivers and coastlines and the associated protected riparian land, much of which is devoid of trees and frequently eroded.

The Department has a major interest in threatened species, not only nationally endangered plants and animals, but locally depleted species as well, many of which are trees. Notable and historic trees come under its umbrella through its legislative requirement to manage the historic resources of New Zealand. Because of its

enlightened mandate to implement the principles of the Treaty of Waitangi, the Department is responsible for protecting taonga and for policies on harvesting trees and other materials for traditional Maori purposes.

Its responsibilities for tourism and recreation in the public estate mean that forest health, interpretation and landscaping around facilities, all involving an understanding and use of trees, is very important. And the Department grows trees to supply some of these needs, in specialist nurseries throughout the country.

Underlying all these operational interests is the Department's educational role. It has the mandate to advocate conservation generally, not only in relation to the conservation estate, but also in rural lands and in towns and cities.

3. OBJECTIVES OF TU KAKARIKI

Tu Kakariki is an attempt to bring together a number of branches of tree conservation under one healthy and fruitful canopy. Keeping this canopy healthy and fruitful is a major challenge, which is the significance of the name which has been chosen for the programme. "Tu Kakariki" means simply "Stand strong and green". The simplicity is deceptive: the physical task, of bringing the bush back in a manner which is ecologically meaningful yet compatible with human needs, is huge. The task of changing and redressing past attitudes is daunting, not to mention the building up of the necessary skills, such as tree care.

The simple truth is, of course, that Tu Kakariki can not achieve the required results on its own. The real work of growing, planting and maintaining trees, of protecting and monitoring tree plantings, of contributing time, money and resources for all that is required, resides in the hands and hearts of individuals, of communities, of organisations. It is in this spirit of necessity that Tu Kakariki has been set up to promote community-based tree activities. Its specific objectives are three-fold:

1. To promote co-ordinated action by community groups, individuals and official agencies to conserve and plant trees.
2. To undertake national advocacy and information campaigns to develop public awareness of the value of trees and associated vegetation.
3. To encourage the use and conservation of indigenous plants.

4. PROMOTING THE CONSERVATION AND PLANTING OF TREES

It is not possible in this paper to treat all relevant aspects of promoting tree planting, so we will focus on some key issues and on some of the practical requirements for tree work in New Zealand.

Conservation is largely a social issue. The problems are generally caused by people, although there are exceptions of course - losses caused by storms, fire or disease might lack a human factor. Strangely though, it seems that greater human endeavour is generated by natural events than by human-induced ones. Dramatic natural disasters

provoke an immediate and often heroic response, while the slowly accruing consequences of some of the decisions of our ancestors receive little attention, often being explained away as somehow part of the natural processes and characteristics of the land itself. Often there seems to be an undercurrent of hesitancy to acknowledge and correct a former human mistake. Many New Zealanders seem more comfortable with a philosophy which confirms that nature and society are separate, and antagonistic.

Unless related to a business ethic in farming and forestry, most tree planting in New Zealand has been specimen and cosmetic related. Little serious ecological restoration has taken place. An interesting exception to this is the scrupulously careful restoration of a number of near-shore islands. The fundamental importance of these islands as pest-free refuges for birds, lizards and plants is now widely recognised. But elsewhere, on farmland, peri-urban wasteland and even city streets, it can often be extremely difficult to get trees in the ground - the right trees in the right places, at the right time and for the right reasons.

There are - and have been - many different tree schemes in New Zealand. Some have been notable successes, which have achieved excellent results, due largely to the efforts of committed and knowledgeable individuals. But often, projects can seem amateurish and wasteful - many of the trees planted die because they are inappropriate for the site or conditions, or through subsequent neglect leading to dryness, weed encroachment or stock grazing. Often, positive new ideas have been wasted caused by a lack of careful planning and sustained support.

Tu Kakariki offers one mechanism for improving this success rate. Through its central and regional co-ordinators, Tu Kakariki will be able to give a focus and provide a network to link together "tree people", the public, projects, policies and priorities. By knowing who the local tree people and organisations are, and what projects are being planned or undertaken, the public will be able to connect with a substantial resource of knowledge and skills. Tu Kakariki will also maintain an active media campaign to ensure that tree projects and tree issues are kept prominently visible. Education and public awareness programmes will help to energise the increasing numbers of ordinary New Zealanders who want to do something to improve their environment.

Tu Kakariki will also be able to assist in a small way with financing tree planting, not necessarily directly, but through maintaining information on funding organisations and helping to facilitate sponsorship. Corporate support for environmental projects is becoming increasingly important as market trends reflect the growing public concern for "green" issues.

Several conferences on trees were convened in New Zealand this year. Conferences are excellent for sharing understanding and for meeting like-minded people. But there is also a need for training, particularly of those without skills in trees yet who work in areas which have particular impacts on trees - local government staff, electrical supply authorities, road maintenance teams and so on. The New Zealand Conservation Corps, jointly co-ordinated by the Department of Conservation and the Office of Youth Affairs, is one good example of a youth development programme that has already achieved considerable success and growing support. Many of its projects have involved extensive tree planting and the development of a wide range of skills in tree and nursery work.

5. ENGINEERING WITH TREES

Indications are growing that important interrelationships exist between people, other living things, and climate. The "greenhouse effect" has become household knowledge; trees and forests are now being appreciated as important in countering the effects of atmospheric warming by absorbing greenhouse gases such as carbon dioxide. At a broader level, the interrelationships between living things and their physical environment is being described as the "Gaia hypothesis". This philosophy sees the Earth as a living system, each component - including people and trees - working through complex feedback systems to maintain a world suited for life. Ecological science is strongly suggesting that new approaches to resource use - new paradigms - are needed if the relative harmony that presently exists is to be maintained.

At a much smaller scale there is increasing research on the use of trees and other plants to mitigate the effects of pollutants at their source. Trees are useful absorbers of CO₂ and other toxic gases and material from motorways and factories; living ecosystems can be an efficient way to absorb nutrients from urban and industrial effluents. UNESCO has initiated a worldwide research programme to understand the importance of riverbank and lake edge forest for maintaining the water table and preventing eutrophication, both of which are significant problems in New Zealand. Of course we are well aware of the value of trees in stabilising soil: if storminess and unreliable, extreme weather patterns increase within a process of climate change, as expected, the need for knowledge about this value of trees will increase.

These are just a few of the types of tree-related issues that are coming to the fore at present. Young and old need to be informed about these, and Tu Kakariki will work to foster awareness and understanding with schools, seminars, and maintaining media coverage of current issues.

6. IMPORTANCE OF LOCAL RESPONSIBILITY

Tu Kakariki will be closely involved in the administration of a few special projects, such as Whakaruruhau, the marae tree planting scheme, but the decision-making and co-ordination of most tree-related activities will rest in the hands of local tree people and local communities. Tu Kakariki will not take over the roles of community groups, but will assist them to achieve their goals. To work well, projects must be designed to address local requirements and priorities, and must be carried through in locally appropriate ways. Active communities are the best way to achieve the outcomes of tree conservation projects. While government programmes can provide an important framework, conservation ultimately rests in the hands of people. As the first Director-General of Conservation, Ken Piddington, once said:

"We will succeed or fail only to the extent that New Zealand has a culture which is in sympathy with the concept of conservation."

7. SUPPLYING THE TREES FOR PLANTING

It is axiomatic that we cannot have a tree planting programme unless we have trees to plant. We need the right species in large numbers and of high quality. How can this be achieved?

In the past, trees for planting on crown land have been grown in government nurseries - the Ministry of Works grew trees for road and dam landscaping and catchment management, Lands and Survey grew trees for protected areas and tourism facilities, New Zealand Forest Service grew trees to restore forests damaged by logging. These nurseries had a national perspective and sent trees all over the country. Often the same species were used repeatedly and often there was little effort to protect the natural character of a local area, but this system did enable a large number of trees to be grown at low outright cost and surplus trees were often given away. Today, these nurseries have to function as commercially-oriented businesses, even the Conservation nurseries, and it is harder to locate supplies of free or cheap trees for community work.

Private nurseries have played an important role too. Again, however, the need for nurseries to cater for the market has meant that species appropriate for a particular restoration project have not always been available. It is difficult for private nurseries to plan the necessary minimum of two years in advance and difficult for community groups to achieve the necessary financing. Often the perceived need for trees is immediate and the necessary planning and financing too daunting.

Tu Kakariki will work to develop longer-term strategies for the planning and co-ordination of planting and landscape rehabilitation projects, so that local planting groups and nursery suppliers can work together constructively to overcome some of the difficulties of the past. There are good potentials too with community-based projects for the collection of native tree seed -projects which could also help to educate the public and raise awareness of the importance of local genetic purity for indigenous plants.

Another approach to resolving the problems of tree supply could perhaps lie in the establishment of community nurseries. Such nurseries would only need to be small in scale; they should be non-profit-making, and clearly project-orientated. They could link in with education, employment and training projects and could be funded from community, sponsor or public sources. Notwithstanding the skill, dedication and resources needed to maintain a consistently high quality product in a commercial nursery, the propagation of trees is not an inherently difficult task for most species. The resources needed to grow sufficient plants for a defined local project are not necessarily great. Clear goals, good advice and dedicated staff are the key ingredients. Very cheap techniques have been developed by many nurseries. For instance the Forest Service pioneered the development of litter beds, whereby forest-floor litter containing seeds of most species in a forest remnant is collected, simply treated and spread into a shade-covered bed. Most New Zealand trees produce enormous quantities of seed which when collected at the right time and treated appropriately, germinate readily. A few simple steps will produce in two years a large number of trees ready for planting out.

Obvious possibilities exist for this kind of small-scale nursery under Whakaruruhau, the Marae tree planting scheme. The need for trees at marae is considerable, varying from firewood for hangi, to high quality timber for carving. The cultural renaissance that marae are undergoing means that trees and other plant materials for education, weaving, traditional medicines, carving and building are in demand, and marae communities often have to travel considerable distances to obtain them or pay substantial sums to buy them. It seems an obvious solution to grow their own trees, and many marae have areas of adjacent land that would be suitable for a forest of traditionally useful species. Marae-based nurseries could not only supply the needed plants, but could help to educate young Maori in aspects of bush lore, and provide an opportunity for employment.

8. INDIGENOUS TREES AND ECOSYSTEMS

We are all aware of the invaluable role that introduced species of trees play in New Zealand, not only their aesthetic and scientific role, but also in producing the enormous quantity of reliable goods needed for our daily livelihood. Given the immediate urgent needs for rapid plant growth, firewood and wildlife habitat, introduced species are now essential. For instance, in many parts of the country, kereru (the native pigeon) would be hard pressed to survive without the leaves and buds of plums, willows and tree lucerne supplying their food needs in spring.

Likewise the instability and infertility of large areas of eroded hill country might best be improved by planting easily established, fast growing exotics managed as a nurse crop for native trees which will develop later. After all, our skills at handling exotics are far greater at present than our skills with native species. And the industry which supplies trees is better equipped to produce exotics than native species.

Nevertheless, there is an urgent need for the restoration of our indigenous ecosystems, and Tu Kakariki will encourage those ecological and social principles regarding the planting of native trees, that will for example preserve local genetic characteristics and which will in turn ensure that the scientific value of a newly planted area is maintained. This is particularly important, of course, in or near protected natural areas and other ecologically sensitive sites. It must be remembered that a planted tree could survive for hundreds of years, much longer than any memory of where it came from.

Many New Zealand tree species are highly variable from region to region - kowhai, manuka, kohuhu, lancewood, ti kouka (cabbage tree), and taupata are examples. Because local and introduced forms would eventually breed, botanical distinctiveness can only be maintained if plants are propagated from local sources. Variation of this kind adapts the plant to local conditions so that local forms are more likely to grow successfully. Moreover, adaptation along any ecological sequence (e.g. to altitude or to salt-laden winds) means that plants should be propagated from parents as near as possible to the restoration site. Biochemical variation is also protected by local propagation with regard to a tree's palatability to native insects (which are also part of the ecosystem).

The ecological district framework, which recognises 268 districts throughout New Zealand is the most appropriate guideline for genetic variation, but even this can be too broad for species which adapt to narrow ecological conditions. The most obvious practical consequence is that serious restoration projects need to be planned preferably two years in advance, so that appropriate species can be propagated in time.

Every tree planting activity should have an ecological perspective in addition to other purposes that may, on the surface, seem more important. In other words projects should be based on an ecosystem approach rather than on a species approach. New Zealand forest is usually an association of several tree species as well as of shrubs and herbaceous species. The best guide to what a restored ecosystem should contain is what species are present in the nearest remnants growing on similar soils. Often a surprisingly comprehensive list of species can be identified even if only scattered individuals remain, although expert advice will be needed in some cases.

There is ample evidence to indicate that the diversity of wildlife is related to the size of

the habitat available: more species are present in larger habitats. This is particularly so if a range of environments is included, for example an altitudinal sequence from coastline to mountain top. This means that to ensure protection of genetic diversity the area of natural habitat needs to be increased. In New Zealand at present, one-third of the original forest area remains, covering about 23% of the land surface. Given the large number of threatened species in New Zealand and the fragmented distribution of natural remnants, it seems logical to try to increase the area of habitat. The priority places for this increase are coastal and lowland areas particularly in corridors (usually along rivers) linking existing natural areas. Regenerating marginal lands of seral species (pioneers) are extremely important and may serve as sites for enhancement with species characteristic of mature forest. In some cases seed sources of tall forest trees such as rimu are not close enough to enable natural colonisation.

Nationally and locally threatened species are a priority. At a local level numerous tree species are threatened - for instance swamp maire, white maire and ribbonwood all are almost extinct in Marlborough, and the original forest species in Central Otago are virtually all endangered there. The Department of Conservation has begun to prepare inventories of locally threatened species.

Conservancies, local conservation groups, the Threatened Species Unit and Tu Kakariki all need to work closely together to identify priority species for restoration. In dealing with individual species, the ecosystem to which they belong should not be forgotten. In some cases it is a particular ecosystem itself that is threatened and needs restoration; for example the tall podocarp forests characteristic of Whirinaki and Pureora.

Restoration projects on the conservation estate will not be sufficient. Private land plays an important role, particularly farmland and to a lesser extent exotic forestland. Wherever possible indigenous species should be established which serve functions supporting farming or forestry - shelter systems, fuel breaks, soil and water conservation planting and landscape amenity planting - should be consistent with local conservation priorities and should attempt to restore to land areas a role in ecological viability.

9. TU KAKARIKI AND THE TREE CROPS ASSOCIATION

The principle that restoration needs to take place on productive as well as on conservation land, serves as a lead-in to examine the specific ways that people interested in tree crops can assist in the ecological restoration of New Zealand. The particular value that tree croppers have is that they are not only enthusiastic about trees, the use of trees and the growing of trees, but they are usually landowners as well: the ideas have a chance to be put into practice, and serve as demonstrations for others to see.

Tree croppers will assist the objectives of Tu Kakariki if they grow indigenous trees on their land, and if they explore practical uses of indigenous trees. The value of indigenous timbers is well known but seldom catered for: totara, kowhai, mangeao, tawhai (beech), kanuka. The list of potential timber trees is substantial and in some cases a lot is known about how to grow these trees. Silviculture of totara for instance has been explored by Ministry of Forestry in Rotorua. Kanuka firewood is renowned. Honey, chemicals for manufacturing and medicinal uses are other potential products.

Tu Kakariki is perhaps more interested in the living tree than its products. The use of native trees in shelter systems is one obvious direction, and some good work has been done on this, with tarata, kohuhu, kowhai, ti kouka, makomako, karamu, and many others as potentials. The list is open to anyone with the interest to try. Imagine the bare, eroded land restored to forest, with dual or multiple systems of land use, river banks fenced and reforested, forming corridors through farmland linking coasts and hills and existing remnants of protected forest. If these actions became commonplace, New Zealand farms would improve the health of the environment and the indigenous landscape - not like the present agricultural patterns which impose a heavy foreign hand.

Tree croppers can help achieve the goals of Tu Kakariki by growing trees in ecologically sound systems and in communicating to others. There could perhaps be useful opportunities for demonstration projects to help spread the message in a practical way. Tree croppers are one of many important groups in this regard and they do have a special role to play. The conference title "Tree Crops for Conservation" shows the depth of interest. We well remember the fantastic enthusiasm that was expressed at early conferences of the Association. It was as if a flood of hidden knowledge and ideas, built up for years under agricultural dominance, was suddenly released. Now we are going further, beyond the mere products, to the processes -bringing conservation out of the mountains and the parks and making a place for it where we live.

Conservation is not just the responsibility of those in one government department, but of everyone, especially the producers and the landowners. We hope that Tu Kakariki will be able to help.