

***Comparative Study on Rural Education and Rural  
Enterprises Development: New Zealand Country  
Report and Case Study***

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## *Abstract*

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This *Comparative Study on Rural Education and Rural Enterprises Development* gives a brief account of rural development, rural education and rural enterprises in New Zealand. Modern rural development history is considered in terms of pre-1984 and post 1984 when the agricultural subsidies were removed. It outlines a general picture of rural development in New Zealand, describing the main features of rural New Zealand and rural-urban differences and describes four types of rural enterprise — farm forestry, deer farming, rural tourism, and a rural organic dairy enterprise. For each type of enterprise a case study description is given covering why and how they were set up and evolved, their impact on rural development and the role of education in the development of these rural enterprises. The last section presents an analysis of the case studies, looking at lessons that can be learnt and common elements that can be used to formulate strategies and recommendations covering policy, educational delivery, human, financial and natural resource development. The paper concludes by identifying and describing the main common elements of each case study description and suggesting some policy strategies for rural education and rural enterprise development.

## *Preface*

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This working paper results from a request from Mary Klaver of the New Zealand National Commission for UNESCO for Bruce Treeby to represent New Zealand at the Comparative Study on Rural Education and Rural Enterprises Development Workshop in Baoding, China in November 2002. Bruce was keen to participate in the project but unable to travel for medical reasons at the time. He suggested that a joint representation consisting of himself and Mike Burtenshaw be considered, with Mike travelling to the Baoding Workshop. This proposal and the CVs of both Bruce and Mike were dispatched to UNESCO China, and the idea of joint representation was accepted.

Bruce should be regarded as principal author of this paper, as he conducted most of the research for the initial country report and over half the case study descriptions. Mike was responsible for honing the country report to make it suitable for presentation and contributing to the case study descriptions and refining the case study component and their analysis. Mike presented the New Zealand Country Report at the 9–13 November 2002 Baoding Workshop on Rural Education and Rural Enterprise Development. The other countries participating in the comparative study were China, Philippines and Thailand. The main representative for China was Wang Qiang, Seri Phongphit for Thailand and Milagros Villas for the Philippines.

The proposal for the case study was discussed at the workshop, and Mike returned with a plan and contract with the Beijing Office of the Chinese National Commission for UNESCO for the preparation of the New Zealand case study for a Comparative Study on Rural Education and Rural Enterprises Development. The project was supported by the Beijing Office of the Chinese National Commission for UNESCO and coordinated by the International Research and Training Centre for Rural Education (INRULED) in Nanjing and Baoding.

The research and writing of the papers occurred between October 2002 and April 2003. This working paper combines the two papers prepared for the Comparative Study on Rural Education and Rural Enterprises Development, the Country Report and the Case Study. The Country Report covers the history of rural education and rural enterprise development in New Zealand, while the Case Study examines in more detail the development of four rural enterprises and the role of education in supporting enterprise development.

At the time of writing this preface we have not received news on progress in combining the comparative studies from the other participating countries to produce the international comparison. It is intended that an exchange programme between the Open Polytechnic of New Zealand and Nanjing Normal University will continue research into rural education and rural development. It should be remembered that both original papers were written for a non-New Zealand audience. Every effort has been to insure the accuracy of the information presented here but it should be considered a work in progress. The authors invite comment on this working paper.

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## ***Abbreviations***

Ag ITO	Agriculture Industry Training Organisation
CRI	Crown Research Institute
GE	Genetically engineered
ICT	Information and Communication Technology
IFOAM	International Federation of Organic Agriculture Movements
INRULED	The International Research and Training Centre for Rural Education
MAF	Ministry of Agriculture and Forestry
NQF	National Qualifications Framework
NZDFA	New Zealand Deer Farmers Association
NZFFA	New Zealand Farm Forestry Association
NZFOA	New Zealand Forest Owners Association
NZFS	New Zealand Forest Service
NZQA	New Zealand Qualifications Authority
OPENZ	Organic Products Exporters of New Zealand
REAP	Rural Education Activities Programme
RTH	Rural Tourism Holdings
SBEC	Small Business Enterprise Centre
SMEs	Small and Medium Sized Enterprises
STAR	School Tertiary Alignment Resource

## *Acknowledgements*

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The authors would like to thank Janet Reid, Lecturer, Institute of Natural Resources, Massey University in Palmerston North for peer reviewing the country report at short notice. We also thank our colleagues at the Open Polytechnic of New Zealand for providing information and support. We would also like to thank the Beijing Office of the Chinese National Commission for UNESCO for funding the research and writing of this case study and INRULED for overseeing the project. Thanks to Robbie Sutherland for proof reading the final draft of the case study.

# ***Comparative Study on Rural Education and Rural Enterprises Development: New Zealand Country Report and Case Study***

## ***Introduction***

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This working paper combines a New Zealand Country Report and Case Study prepared for the Comparative Study on Rural Education and Rural Enterprises Development organised by the Beijing Office of the Chinese National Commission for UNESCO and coordinated by the International Research and Training Centre for Rural Education (INRULED). For New Zealand, the paper

- reviews the past experiences in rural enterprises and business development
- outlines the role of rural education in local resource management and development focussing on human resource development for rural development
- describes the demand for rural education and training generated by rural enterprises and business development
- reviews the interrelationship between rural enterprises and businesses and rural development focusing on how this enhances quality of life in rural areas
- examines how rural education can function to cater for sound rural sustainable development.
- describes four types of rural enterprise, why and how they were set up and evolved, their impact on rural development and the role of education in the development of these rural enterprises
- presents an analysis of the case studies looking at lessons that can be learnt and common elements that can be used to formulate strategies and recommendations on rural education for rural enterprise covering policy, educational delivery, and human, financial and natural resource development.

## ***New Zealand background***

New Zealand has a population of 4 million. One in seven people live in rural areas<sup>1</sup>. New Zealand lies in the southwestern Pacific Ocean and comprises two main islands and a number of smaller islands<sup>2</sup>. Their combined area of 270 500 sq km is similar to the size of Japan or the British Isles. Mountain ranges and hill country dominate New Zealand's landscape. The climate is temperate and averages range from 8°C in July to 17°C in January, but summer temperatures occasionally reach 30°C or more in many inland and eastern regions. The mean average rainfall varies widely, from less than 400 mm in Central Otago to over 12 000 mm in the Southern Alps. For most of the North Island and the northern South Island, the driest season is summer. However, for the West Coast of the South Island and much of inland Canterbury, Otago and Southland, rainfall is lower over winter.

The long, narrow nature and relatively small size of New Zealand's two main islands, the North Island and the South Island, means that rural areas are commonly less than two hours drive from medium sized towns or cities where modern urban services and facilities are available. Well-developed rural roads and electricity supply networks allow most rural people to enjoy a similar living standard to urban dwellers. There are pockets of rural poverty associated with the loss of rural industries and services in some regions, but, overall, rural New Zealanders enjoy a high living standard when compared to most Asian and Pacific countries. The social welfare system in New Zealand provides entitlements that ensure that people unable to work for any reason receive a level of income that usually prevents homelessness or hunger.

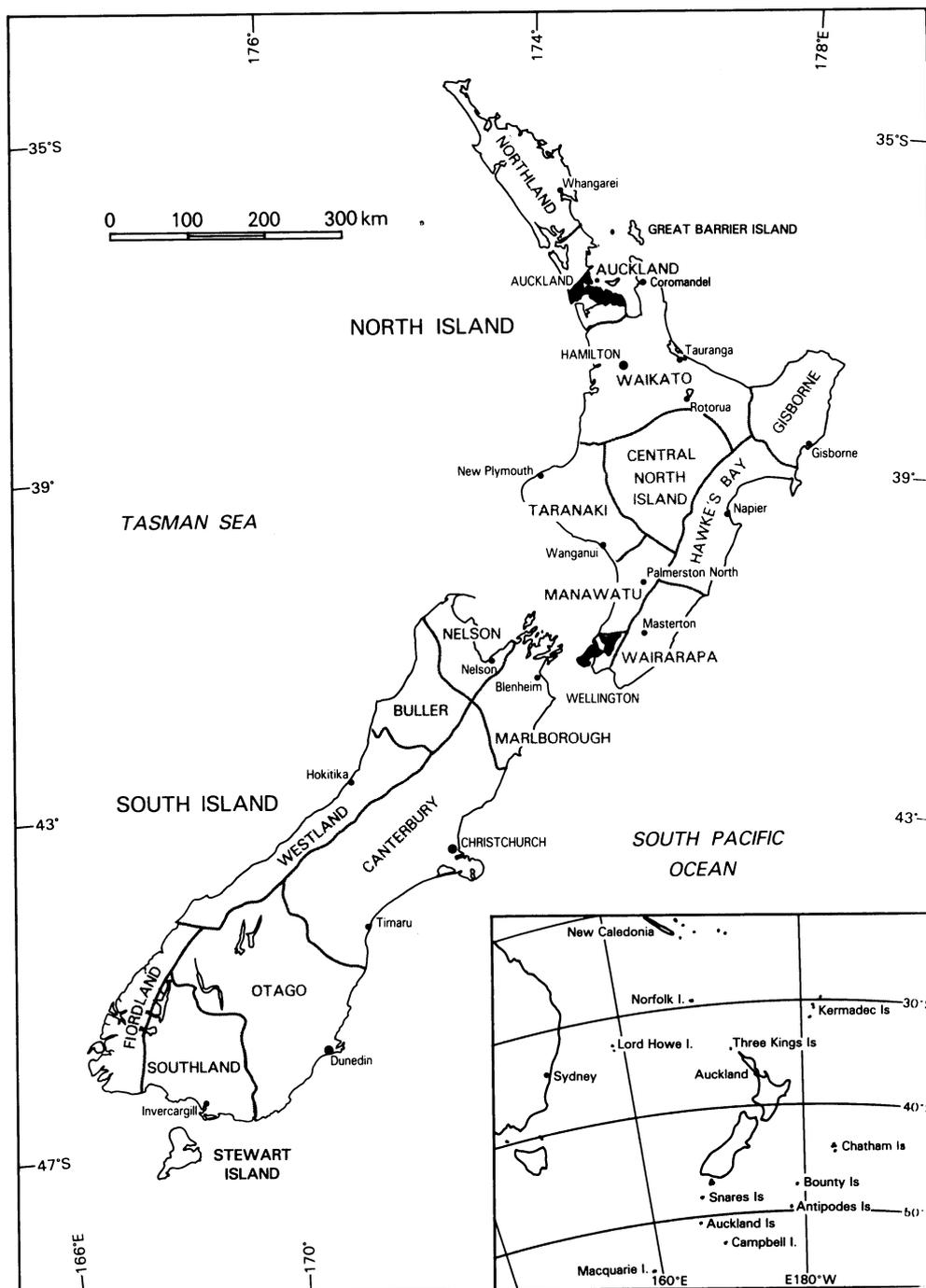
For many years, the telecommunications infrastructure based on copper wire networks was adequate for basic telephone communications, but it is now proving inadequate for providing fast and efficient Internet access. The New Zealand Government is currently addressing this problem with the installation of broadband wireless telecommunications networks into rural areas. This follows a government strategy for creating a knowledge-based society accessible to all.

Access to the Internet by rural schools and rural dwellers is a key component in rural development. Electronic banking, communications, information, marketing, education and other commercial services are minimising the divide between rural and urban people. The underlying philosophy is that, by providing rural people access to information and communication technology (ICT), entrepreneurial rural people will use these networks to create their own rural enterprises. An example of this can be seen in the wine industry, where many vineyards now market and sell the wine they produce direct to customers around the world.

New Zealand's small economy is heavily dependent on overseas trade. Traditionally, a large proportion of New Zealand's exports, mainly agricultural products, went to the United Kingdom. In the past 20 years, however, New Zealand has adapted to changing world trade patterns so that Asia is now an important trading block. Our largest merchandise export markets are Australia, USA and Japan. New Zealand has redeveloped its agriculture and manufacturing industries to suit the needs of niche markets. Dairy and meat exports still make a large contribution to New Zealand's economy. However, industries such as forestry, horticulture, fishing, manufacturing and tourism have become increasingly significant.

In New Zealand, nearly 97% of all private enterprises are small and medium sized enterprises (SMEs). SMEs are enterprises that employ 19 or fewer people<sup>3</sup>. New Zealand farms operate as private businesses, usually family-owned SMEs, producing a mix of products such as milk, meat and wool. Farming businesses in the last few years have generally been profitable, and most rural farmers receive an income that enables them to enjoy a high standard of living. In 2001 the median income was higher in rural areas (NZ\$19,100) than in urban places (NZ\$18,400)<sup>4</sup>. Dairy farming is the most profitable type of farming at the present time and average net trading profit in the 2001 – 02 season was NZ\$191,025<sup>5</sup>. However, this is expected to drop in the 2003 season. Sheep and beef farming net trading profit was NZ\$112,006<sup>6</sup>, and this is also expected to decline in the 2003 season.

Agricultural, forestry and horticultural products make up 69% of total exports. In the year ended March 2002, pastoral exports were \$13.78 billion, horticultural exports \$2.2 billion and forestry exports \$3.58 billion. Our reputation for 'quality products from a quality environment' depends on environmentally sustainable land use practices, but sustainable land management in some rural areas is threatened by unsustainable farming practices. The goal of the New Zealand government's Environment 2010 strategy is to maintain and enhance soil quality and to secure viable land use options and long-term productivity by preventing irreversible land degradation<sup>8</sup>.



*Fig. 1. New Zealand*

Source: Poole, A. L. & N. M. Adams. *Trees and Shrubs of New Zealand*.  
 Lincoln, Canterbury: Manaaki Whenua Press, 1994. p256

## ***Rural-urban differences in New Zealand***

The main characteristics of rural New Zealand reported in the *2001 Census Snapshot 10 (Rural New Zealand)*<sup>9</sup> are as follows:

Total rural population is 532 740 out of a total New Zealand population of 3.9 million. Of these 79 065 live in rural centres (settlements or villages of 300–999). The rest live in ‘other rural’ areas smaller than a rural centre.

Two-thirds of rural residents lived in the North Island. Rural centres in the North Island had more residents on average (628) than those in the South Island (546) and were more likely to have a surplus of females. Conversely, the South Island rural centres were more likely to have a surplus of males. Adults living in rural areas were far more likely than their urban counterparts to have lived at the same address all their lives.

The rural population grew by 7101, or 1% between 1996 and 2001. This was in contrast to growth of 7% between 1991 and 1996. In comparison, the total New Zealand population as a whole grew by 7% from 1991 to 1996, and 3% in the next five years. The proportion living in rural areas — 1 in 7 — was the same as in 1996 and 1991. The population of the rural centres dropped between 1996 and 2001, from 80 652 to 75 065. However, in the ‘other rural’ areas, there was an increase of 8685, to 453 675. The median age of rural residents (37 years) was higher than that of their urban counterparts (35 years).

One in 6 people of European ethnicity lived in a rural area. The proportion was the same for those of Māori ethnicity, while fewer than 1 in 50 people of Pacific or Asian ethnicity lived outside an urban area. Between 1991 and 2001 the Māori population of rural areas grew by 10 818, to 84 177. Most of the increase (9084) took place in the ‘other rural’ areas.

Almost one-third of adults in rural areas had no formal educational qualifications, compared to 27 out of 100 in urban areas. One in 14 rural adults had a tertiary qualification as their highest qualification, compared with 1 in 8 urban adults. Just over 1 in 3 rural adults were agriculture or fishery workers, compared with 1 in 26 of those living in urban areas. One in 10 rural adults worked as a professional, compared with 1 in 6 of those living in urban areas.

Twenty-four out of 25 rural households had access to at least one motor vehicle, compared with 22 out of 25 in urban households. The proportion of households in ‘other rural’ areas with Internet access (37%) was second only to that in the Main Urban Areas (40%).

In summary, there are not great differences between rural and urban New Zealanders. Rural and urban New Zealanders are remarkably similar in educational achievement as well as income and lifestyle indicators such as use of the Internet. Relatively high Internet access is a key difference distinguishing New Zealand, a developed country, from many developing countries in Asia and the Pacific region. All New Zealanders, rural and urban, receive an education based on the same national curriculum and attend school from the age of five through to 16, with many teenagers now staying on at secondary school until the age of 18.

As a factor affecting the development of rural enterprises in New Zealand, good rural education allows rural people access to information and ideas that can inspire and encourage entrepreneurial individuals to start up rural enterprises. In modern history, the main factor underpinning rural development was how a well-educated rural population reacted to the withdrawal of farm subsidies in the mid-1980s. This was a key historical driver in the diversification of rural enterprises as described in the initial New Zealand Country Report New Zealand is unique among her main trading partners in having eliminated farm subsidies, and this has helped create a highly efficient agricultural sector.

# ***Review of past experiences in rural enterprises and business development***

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Modern agricultural history in New Zealand can be divided into two periods, pre-1984 and post 1984. New Zealand presents a case study of a country that has moved from a highly regulated economy prior to 1984 to one of the most deregulated in the Western World.

## ***New Zealand agriculture prior to 1984***

Prior to 1974, agricultural production drove the New Zealand economy, through the sale of agricultural commodities mainly to the British market, with guaranteed access and prices<sup>10</sup>. In 1974, the United Kingdom joined the European Economic Community and New Zealand lost a guaranteed market. New markets were acquired, but they did not provide the same returns as the British market had and, correspondingly, returns to farmers and New Zealand declined. The policy response was to encourage farmers to increase production by subsidising farm inputs and guaranteeing minimum prices for products. Price support schemes were developed to stabilise incomes. Manufacturing in New Zealand was also protected by import quotas and tariffs. In addition, high levels of borrowing and investment in huge capital works led to an economically unsustainable situation.

By 1984, New Zealand had a highly protected manufacturing base that was very inefficient. The exporting sector based on agriculture was heavily subsidised. The government supplied many of the services that could be more efficiently provided by the private sector.

At the point of highest support of the rural sector, around 30% of total agricultural output was derived from government support in some kind. Around 40% of sheep and beef farm income came from the government<sup>11</sup>.

## ***New Zealand agriculture post 1984***

The new government in 1984 faced an economic crisis. It immediately devalued the currency by 20% and removed the controls over all lending and deposit rates. The thrust of the new government's agricultural policy was to make farming more efficient by removing subsidies and exposing the rural sector to international prices for outputs and inputs, including government services.

Most subsidies were removed immediately, and farmers were required to pay for previously free services such as product inspection and agricultural and horticultural extension. It became the agricultural industry's responsibility to be more responsive to the needs of buyers in overseas markets.

The new government also devolved many activities to regional local government. One important activity was the responsibility for resource management under a new Resource Management Act in 1991, which encouraged individual responsibility for sustainable resource use.

Another change related to rural education and training was a major shift in emphasis in training, particularly at the technical level. In the past, training had been the primary responsibility of government, but with the introduction of the Industry Training Act 1992, the rural industry has a much greater involvement and a requirement to partially fund industry-training schemes, such as the Agriculture Industry Training Organisation (AgITO).

### ***Impact of changes on the rural community***

The result of the economic changes brought about after 1984 was a rapid drop in income for the rural community. With the contraction of the rural economy, there was an associated reduction in demand for local services, leading to a reduction in quality of life for the rural population. There was a loss of rural employment. In some areas, the increased investment by companies in forestry led to more farms going out of agricultural production, leading to more rural depopulation.

With an increase in farm amalgamation and greater use of technology, there was less demand for rural workers and an increase in contract work and part-time employment. Other changes included the loss of local medical services. School rolls dropped, leading to closures and amalgamation, resulting in some children spending up to 2 hours per day travelling to and from school. Many of the services that the rural community depended on were only available at larger urban centres, and this meant that there were increased travel costs.

Farmers responded to the reduction in farm income by retrenching, not spending, and by seeking off-farm work to earn supplementary income. This was necessary in order to keep the farm enterprise viable. Many rural women had tertiary education and worked off farm, commonly in education or health. Rural males also took up off-farm work. But some farmers who had the resources diversified by developing new on-farm enterprises.

A range of new on-farm alternative enterprises emerged.<sup>12</sup> Diversification of farm activities gave improved economic risk management. Research has shown that farmers are undertaking a wide variety of enterprises on farms across a wide range of sectors. The survey data and an analysis of enterprises from public literature showed that the following were represented:

- farm tourism
- specialist horticulture/nurseries
- agricultural processing (non-traditional and organic)
- food processing
- viticulture and wineries
- agricultural services and consultancy
- general services
- light manufacturing
- handcrafts, including pottery
- artwork
- fashion.

Tourism is a major growth area and contributor to the New Zealand economy<sup>13</sup>. Consistent with this growth has been an expansion in rural tourism initiatives. Some farms provide rural life experience,<sup>14</sup> others provide ecotourism to take advantage of a local situation,<sup>15</sup> walk ways,<sup>16</sup> wildlife, hunting, water adventures, skiing and other outdoor pursuits, along with bed and breakfast accommodation. Garden development round the farm homestead has for some properties become a feature that is advertised in tourism brochures and can be part of a larger horticultural tourist package. Some properties have also got their own nurseries and have plants for sale to local visitors.

The Ministry of Agriculture and Forestry (MAF) has played an important role in facilitating new rural initiatives. MAF's work in rural tourism is an example where a facilitation programme aimed at reinforcing the goals of sustainable agriculture has identified another commercial land use.<sup>17</sup>

The diversification of land use includes farmers creating new horticultural developments, such as kiwifruit, cut flowers for export, plant nurseries and vineyards. There has been an increase in the planting of forests by forestry companies, usually on land that is marginal for unsubsidised agriculture. This has given a better environmental outcome, as the steeper lands are best left in forest.

While New Zealand farmers do not come from a background that included forest ownership, there has been some diversification into agroforestry (farm forestry). Other farmers have also built on their existing animal management skills and have diversified into deer farming (for meat and velvet), goats for fibre and milk, milking sheep breeds for new dairy products, and new exotic ventures such as ostrich farming.

With an increasing demand locally and internationally for safe food, there is an increased interest in organic food production for local consumption and export. Organic farming methods fit well within the goal of sustainable rural development<sup>18</sup>.

Some farmers have expanded their rural enterprise into processing their own produce to create the final retail product. In several cases, small marginal traditional farming enterprises have become economic by adding value through processing. Some smaller collective dairy producers have combined and are producing products for niche markets. An example is Tatua Cooperative Company Ltd of Morrinsville, which produces a range of nutritional ingredients as well as a number of specialised dairy products<sup>19</sup>.

### ***Current situation***

Rural enterprises are now directly influenced by the market place both domestically and internationally. Farmers now demand more market information and accept the need to produce products to meet consumer demands. The level of government support of New Zealand agriculture in 1998 was estimated to be around 1% compared with 11% in 1986–88<sup>20</sup>.

Today, while total agricultural output is not as high as it was in 1984, the quality is significantly better, the mix is different and broader, and farm profit is generally once again reasonable. The prospects for most products look good, particularly if WTO discussions succeed in delivering freer world trade in agricultural products. Land values have recovered significantly, farm financial structures are better, and farmers have less debt. Personal costs have, however, increased as New Zealand farmers now face higher living costs in rural areas with no government support to compensate for the greater costs of goods and services in more remote areas.

Overall, New Zealand farmers are now more confident of their future, and they do not wish to go back to government supported farming. There is strong demand for skilled workers, particularly in the dairy industry, and wages paid to skilled labour have risen.

A further feature in New Zealand has been the more diversified development of rural communities. Traditionally, most people in rural areas were directly involved in farming or farm service activities. Now, however, around one-third of the people living in rural communities now are not directly involved in farming activities. They are working in tourism, small businesses, recreational activities and community services, adding to the diversity and strength of rural communities in New Zealand<sup>21</sup>.

# *Roles of rural education in local resource management and development and human resource development for rural enterprises*

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In New Zealand, all primary and secondary school children receive education based on the same national curriculum. Children start primary school at age five and generally finish secondary school between 16 and 18 years of age. Schools in rural areas draw much more heavily on rural aspects of this curriculum than urban schools. Some rural schools have a farm associated with the school.

*Table 1: Category of attainment for highest existing qualification by sex for the agriculture, forestry and fishing industry.*

<b>Agriculture, Forestry and Fishing Industry by Sex and Highest qualification.</b>				
<b>Category of Attainment</b>	<b>Male</b>	<b>Female</b>	<b>Total</b>	<b>% in categories</b>
No Qualification	38,919	15,687	54,606	37
School Certificate	14,997	9,564	24,561	16
Sixth Form Certificate	9,162	6,210	15,372	10
Higher School Certificate	3,792	1,893	5,685	4
Overseas School Qualification	861	948	1,809	1
School Qualification Not Specified	3,165	1,800	4,965	3
Basic Vocational Qualification	3,198	1,944	5,142	3
Skilled Vocational Qualification	7,413	2,154	9,567	6
Intermediate Vocational Qualification	1,260	282	1,542	1
Advanced Vocational Qualification	5,562	5,817	11,379	8
Bachelors Degree	3,267	1,764	5,031	3
Higher Degree	1,083	600	1,683	1
Post-school Qualifications Not Specified	5,379	2,760	8,139	5
<b>Total</b>	<b>98,058</b>	<b>51,423</b>	<b>149,481</b>	

(Adapted from Statistics New Zealand, 1998, Table 12)

Table 1 shows the highest qualifications by broad field of study for the agriculture, forestry and fishing sector based on the 1996 Census. 6% of people with qualifications in this industry sector had completed a university or higher degree, and 24% have a skilled vocational qualification or higher.

Environmental education has a central role in rural education in local resource management. Local resource management in New Zealand is controlled by the Resource Management Act<sup>22</sup>, and this is managed at the local level by the regional authority (local government). The staff of the regional authority include people who have tertiary qualifications in rural education and resource management gained from a course of study at a university or a polytechnic.

The regional authorities carry out a resource management educational role, with published material that is available to rural people in their area, and run field days and commonly give publicity and bestow environmental awards on properties that achieve a high level of sustainable resource management. Regional authorities have Internet web sites where farmers can access resource management information. This assists the land manager to make investment decisions based on, for example, longer-term climate predictions. A very good example of a regional authority that is very involved in rural education on resource management is Environment Waikato<sup>23</sup>.

Rural land managers gain much of their information from agricultural publications, but also from radio and TV programmes<sup>24</sup>. In the last five years the Internet has become an important source for providing farm services and information. Educational material relating to product use is provided by the agribusiness employees. The NZ Agrichemical Education Trust<sup>25</sup> was formed in 1992 by primary producer groups and aims to develop and maintain good practice standards of agrichemical use, through the Growsafe training programme<sup>26</sup>.

In New Zealand, the rural human resource development for new rural enterprises is catered for by a range of community organisations and includes local regional polytechnics that offer a range of business start up courses.

### ***Demand for rural education and training***

Demand for rural education and training is greatest in areas of rural enterprise that are seen as being sustainable and are growing with good export income. Dairying is a good current example in New Zealand. Managers of larger dairy farming enterprises (milking 600 plus cows) are receiving high salaries, and this has created a strong demand for rural workers skilled in the dairy industry.

Whereas in the past, rural males received their agriculture education by example on the family farm, there is now a trend for more males and females to receive a tertiary education at universities such as Massey and Lincoln University that provide specialist agricultural education. Ironically, the strong demand for agricultural employees in the last few years has resulted in school leavers choosing to enter the workforce immediately, leading to a drop in people studying fulltime agricultural papers at university.

Farming leaders recognised that, if New Zealand was to continue to be competitive in world markets, farm workers needed to have a sound grounding in rural skills and achieve a tertiary level of education. In the 1990s, the Federated Farmers of New Zealand farm cadet scheme was passed over to the new Agriculture Industry Training Organisation (Ag ITO), an organisation along with other industry training organisations that are separate from central government. They are funded by the agriculture industry and a government training subsidy.

On-job education and training was based on the newly introduced industry Unit Standards. Each Unit Standard addresses an aspect of an agricultural enterprise and sets down a standard that must be achieved for a person to gain credits for each unit. Each unit carries a number of credits towards a national qualification, supervised by the New Zealand Qualifications Authority<sup>27</sup>. Students can study towards National Certificates in, for example, Agriculture, Horticulture, and Deer Farming. Students commonly study with polytechnics or other private providers.

Farm workers can study by distance while still working. For example, the Open Polytechnic of New Zealand offers Unit Standard study material by distance learning. Practical application assessment of Unit Standards is carried out in the field by registered assessors, commonly the farm owner who has been registered with the Ag ITO<sup>28</sup>.

A good example of an agriculture industry educational initiative is the Monitor Farm Programme managed by Meat & Wool Innovation Limited, a joint venture of Meat New Zealand and the New Zealand Wool Board. It provides technology and services needed to foster the long-term prosperity of sheep, beef and goat farming. Monitor Farm Programme is a practical initiative designed to build the business strength of the New Zealand pastoral industry. In the 2000 – 01 year, there were 26 monitor farms running throughout New Zealand. Around 80 farms are benefiting from the programme in each region. A monitor farm is usually an individual farm, chosen by the local community, which a community group advises and monitors over a set period<sup>29</sup>.

The central government also wishes to assist senior secondary school students in finding suitable pathways into work or further study at secondary or tertiary level. This is done through the Secondary Tertiary Alignment Resource, STAR programme<sup>30</sup>. Secondary schools are given an allowance from the Ministry of Education to buy educational services from tertiary institutions, enabling secondary students to study agricultural Unit Standards before going on to tertiary studies.

Post 1984, rural communities have become more self-reliant. As they diversify into new enterprises, they realise that, collectively, they have a lot of knowledge, and they have formed local farm study groups, often facilitated by a rural consultant. Some have formed larger groups around a particular enterprise, enabling them to be involved in research and in publication of information for members. An annual conference allows members to get together from throughout the country for educational and training purposes. A good example is the New Zealand Farm Forestry Association<sup>31</sup>.

Another community based educational initiative is the Rural Education Activities Programme (REAP)<sup>32</sup>. They are funded by central government and provide educational services to the local rural community in early childhood, primary and secondary schools, and to adults. REAPs provide support and assistance that does not duplicate other work in the districts they serve. REAP is based on the belief that local communities are best able to identify and direct resources to meet their own needs. They can play an important role in giving rural people the business skills to undertake a new rural initiative.

Provision of small business education is in demand with the development of new rural enterprises. A major contributor in this field is the Small Business Enterprise Centres (SBEC)<sup>33</sup>. They are community-based organisations located in city and rural areas, providing independent, confidential, competent and practical assistance to foster viable local enterprises and businesses in order to boost sustainable economic development and employment. SBEC is funded by a partnership of central government, local government and local industry.

## *Quality of rural life as a result of change brought about by development of new rural enterprises*

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Following the changes of the mid 1980s, quality of rural life declined as export-based incomes declined. However, in the last few years, the situation has been reversed, largely as a result of strong world commodity prices and a relatively weak New Zealand dollar. The 2001–02 inflation-adjusted sheep and beef farm profitability was highest since 1973–74, and more than two and a half times the average inflation-adjusted farm profit level of the 1990s<sup>34</sup>.

The post 1984 economic changes impacted very hard on rural communities. There was a reduction in the demand for rural services, with associated loss of employment. The need for farming families to work longer hours on or off-farm meant that they had less time to carry out the voluntary community work that is very important in maintaining a sense of a rural community. With a reduction in the ability of farmers to pay full-time wages, there was a shift to more contract and part-time work over multiple properties. Many farmers found that they were working most of the time in isolation, and increased stress levels caused by economic hardship had a serious impact on the rural community. There was also the problem of financing farm succession and the ability of the farm to fund the retirement situation for the current owner.

As rural services downsized and retreated to larger centres, rural people had higher transport costs associated with day-to-day business transactions that now had to be carried out in more remote centres. The amalgamation of schools meant that children spent more time each day in travel. The remoteness from secondary schools meant that many rural families had to send their children to board at a school in a larger centre. This put more stress on the farm economy. Farming as a way of life has changed, and many farming families now encourage their children to get good tertiary qualifications so that they have another option that they can elect to take rather than have to take up farming.

Rural women took off-farm work to support the farming enterprise. This was commonly in the health or education work areas, which often required long daily travel and increased family stress. Farms that were based on sheep and cattle are the most remote and also had the lower incomes. It is only over the past year that rural incomes have increased significantly as a result of increased overseas demand for our rural products and the relatively low New Zealand dollar value. However, commodity prices fluctuate from year to year, and incomes will drop back again.

There has been an amalgamation of medium-sized farms, further reducing the rural population. The recent increase in dairy conversion from sheep and cattle farms has increased rural incomes and rural populations in such areas, giving the community a more positive view of the future with an improvement in quality of life. Farmers have also capitalised on the demand for land round larger urban centres for small life style blocks, and have subdivided off rural blocks of about 4 hectares. This increases the demand for rural services and improves the local economy. Some new rural enterprises have developed in these small rural holdings.

In recent years, the quality of rural life associated with new rural developments has improved for many rural persons with more income and diversity in the new fields of enterprise. Diversification linking into the existing expanding tourism market has had very positive outcomes for the farming family. It has widened their social interaction and created more employment possibilities for the family or local community. Family farms have created facilities for people to come and stay and enjoy a rural New Zealand experience. Some have joined up with Rural Tourism Holding (RTH)<sup>35</sup>, that arrange rural tours, accommodation and bed and breakfast options. RTH is New Zealand's largest farm stay, home stay and bed and breakfast specialist provider.

Another enterprise worthy of consideration is aquaculture, particularly the production of green-lipped mussels. Some farmers and rural people living near the coast have diversified into mussel farming businesses.

## *Education for sound rural sustainable development*

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How will rural education function to cater for a sound rural sustainable development? Prior to 1984, the subsidised agriculture in New Zealand was economically and environmentally unsustainable. Subsidies encouraged the clearing of steeper lands to grow more grass, and this just added to erosion problems. There was also overuse of fertilisers, with little regard for the environmental impact on the quality of ground water and general waterways. The restructuring of the New Zealand economy since 1984 has resulted in the rural economy being more market-focused and becoming much more sound economically. But there are more changes that need to be made to maintain a sound sustainable rural economy in New Zealand.

To be sustainable, we need to address the current environmental problems where resources are being used unsustainably. There will need to be a much greater focus on environmental education and sustainable development. 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.

There is a better awareness of the importance of indigenous ecological knowledge and the contribution that it can make to sustainable resource management. The 1991 Resource Management Act requires that, for sustainable development, there be consideration of indigenous Māori cultural views of sustainable resource management, involving kaitiakitanga (guardianship), an ethic of stewardship. There is recognition that traditional knowledge of sustainable resource use is still relevant today.

Research in New Zealand has shown that the environmental component of sustainable agriculture is a low priority in tough times compared to economic or social considerations unless it is coupled with more immediately tangible benefits<sup>36</sup>. Farmers are prepared to adopt sustainable farming practices provided they can afford it. As they have said, 'it is hard to be green if you are in the red'.

However, New Zealand farming is also becoming much more aware of environmental and animal welfare issues as these affect consumer preferences. New Zealand is concerned to 'produce quality products from a quality environment'.

Outside of cities, agriculture (including forestry) has the main impact on the environment. The single principle that dominated agriculture and resource management generally in New Zealand up until the late 1980s was that economic development is a good thing. This had little consideration for the wider impact of associated environmental damage, for example, the continued loss of indigenous biodiversity and soil erosion. In the late 1980s and early 1990s, there was a growing 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>37</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>38</sup>. Unsustainable land use continues in places. 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>39</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 is essential if they are to optimise sustainable production.<sup>40</sup> Reasons for this include

- having to meet international, national and regional environmental regulations and standards, for example, for biodiversity and food safety
- consumer demand for products that 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 into rural tourism
- the desire to operate more efficiently and intelligently in order to reduce inputs, minimise waste and make more profit.

Market-forces will encourage rural production to operate in a sustainable manner in order to access the more attractive markets overseas where consumers demand good sustainable performance.

The availability of good case study examples of successful new rural enterprises that have created a more sound sustainable rural operation will assist others to do likewise. For example, New Zealand Landcare groups are having a significant impact on encouraging farmers to manage their farms so that they are sustainable in the longer term.

The New Zealand Landcare Trust was established in 1996 with representation from Federated Farmers of NZ and five non-government organisations. The objective was to encourage sustainable land management practices and help communities become more involved in land management issues. Sustainable land management means caring for the land in ways that create ecological, economic and social benefits for present and future generations. The objective is to enhance or improve the quality of natural resources and not to deplete these resources. The community involvement ensures that people with the greatest knowledge and responsibility for the land, the landowners and users, can come together collectively to deal with land management issues and find their own solutions. They also publish a newsletter for the New Zealand Landcare Groups. There are now 103 landcare groups operating in New Zealand<sup>41</sup>.

There is a wide range of sources of information that can assist rural resource managers to diversify their economic base. It is important that rural people are made aware of the assistance that is currently available. Many useful sources of information are to be found on the Internet.

The Internet will increasingly become a major source of sound rural sustainable development information. Major sources of information about rural development and sustainability already exist via the Internet. Many farmers and other rural business enterprises are already using the Internet for electronic banking services, as an electronic marketplace for marketing product and buying and selling stock, machinery and other services, to access latest research information from universities and Crown Research Institutes, to link to technical and management decision making programmes, to communicate with similar businesses, associations and cooperatives, to access discussions groups, and online education courses and to communicate with friends and family no matter where they are in the world. A key feature of the Internet is that it allows rural people to keep up with worldwide business trends from a computer in their rural home.

The problem up until now has been the poor performance of telecommunication networks in many rural areas. This is being corrected through Project PROBE (Regional Broadband Extension), being developed jointly by the Ministry of Education and the Ministry of Economic Development to deliver high speed Internet access, or broadband, to all schools and

provincial rural communities. The southern part New Zealand, Southland, was first with the Internet project, and it involves the use of wireless technology<sup>42</sup>. In the Otago region, schools are now using video-conferencing to allow smaller schools to access teachers in other schools who have specialist knowledge in subjects areas not available locally. Schools in other regions are also developing video conferencing.

Improved information and communication technology (ICT) will allow rural education to function more effectively through on-line delivery via the Internet for formal education and informal education. Much of the information that is relevant for rural resource management is contained in a wide range of websites. Some key sites include Ministry for Environment, Ministry of Agriculture and Forestry, educational institutions and local government that have taken a leadership role as a providers of non-formal education to the rural community<sup>43</sup>.

## ***Case study descriptions***

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This case study looks at four types of rural enterprise in New Zealand. They were selected to illustrate some of the ways that rural people have sought to diversify the rural economy and to add value to basic agricultural production. Three of the examples, farm forestry, deer farming and organics are agriculturally related, while the fourth, rural tourism, is only indirectly agricultural in that, while it utilises the rural landscape as an attraction as well as existing farm buildings and facilities, income does not directly depend on agricultural production.

Each type of rural enterprise can be described as a case study in its own right. For the purposes of this report we retain the term *case study* for the whole study and refer to the four types of enterprise as case study descriptions. The methodology used is descriptive, and the information is based on literature reviews of each enterprise type. The organic enterprise example differs from the others in that it describes a specific farm business. The focus is on an individual rural enterprise typical of organic enterprise development. The other case study descriptions describe the general development of three types of rural enterprise.

### ***Farm forestry case study description***

#### ***Type and size***

Farm forestry in New Zealand involves the introduction of trees into a pastoral land use system. The trees can benefit the agricultural system by giving shade and shelter for crops and animals, soil conservation benefits, animal fodder for use in drought periods, and a timber crop that can be used to compensate for falls in commodity prices for other agricultural crops. Farm forestry has the potential to give greater economic and ecological stability to rural communities. It operates within the existing New Zealand family farm business (SME) model and thus generally avoids the concerns about corporate blanket planting of forestry within an existing agricultural setting.

New Zealand forestry as a whole has focused its forest production on exotic tree species, predominantly *Pinus radiata* and *Pseudotsuga menziesii*, and there is 1.8 million hectares of plantation forestry. Farm forestry makes up

approximately 11% of this, or 200 000 ha, and the balance is in larger corporate forest ownership. Farm foresters are also interested in a wider range of tree species, especially hardwoods and also the management of natural forests<sup>44</sup>.

The organisation representing farm forestry in New Zealand is the New Zealand Farm Forestry Association, NZFFA<sup>45</sup>.

### ***Why farm forestry was set up***

During the early development of New Zealand, forest products came from existing natural forests, and much forested land was cleared for pastoral farming. As the country developed, it became obvious that there needed to be promotion of new forestry plantings to meet the predicted future shortfall in timber supply, both for internal consumption and for export.

The New Zealand government in the early 1950s perceived that there would be a timber shortage of over 1 million cubic metres of wood by the year 2000, and the New Zealand Forest Service (NZFS) recommended that there should be a further 214 500 ha of exotic forest planted to meet the future needs. There had been earlier large plantings of forests in the 1930s on government-owned land, but by 1950s there was limited government land available, and existing farmland was seen as the potential site for new plantings<sup>46</sup>.

In the early 1950s, a small group of farmers saw that there were benefits to be had from investing in farm forestry on their lands and that it would be good for the rural community. Initially, the emphasis was on the provision of shelter and timber for on-farm use and for sale. There was an early interest in on-farm timber treatment to ensure that the wood products were resistant to fungi and insects. This was very important as the wood was from softwood species and not hardwoods.

The NZFS saw that the newly developing farm forestry organisation would be a good vehicle through which to promote the planting of timber species on agricultural land. Accordingly, during the 1950s, the NZFS strongly supported the farm forestry movement, and financially assisted with getting leaders of the movement to speak to farming groups around the country, and assisted in the establishing of a countrywide branch structure. In 1959, the New Zealand Farm Forestry Association was formed. Direct and indirect assistance continued up until the mid 1980s.

### ***How farm forestry was set up and evolved***

The New Zealand farm forestry movement was set up by the coming together of agriculturists who wanted to diversify into forestry and a government organisation that was given the task of increasing the area of plantation forestry in New Zealand to meet future shortfalls in timber production.

While the NZFFA was an independent organisation that ran its own affairs, it did receive a lot of support and assistance from government from the 1950s to the mid 1980s, in particular from the free advice from the Extension Service that NZFS set up and also the free information from the Forest Research Institute. It could be said that, although it was an independent organisation, it did develop a strong relationship with and reliance on the NZFS.

Apart from encouragement from free government advisory services, over the period up to 1986, a series of financial inducements was set up for farmers to invest in forestry, using loan and grant schemes. These were not as successful as the government would have liked, but they did result in an additional 100 000 ha of trees being planted. There was also a range of taxation benefits that the farm forester could receive. The value of standing timber was exempt death duties, and the profit from the sale of forest products could be spread over 5 years for taxation purposes. Taxation rules changed over time.

In the restructured economic environment of the mid 1980s, the government ceased all direct inducements to assist farm forestry. Instead of being able to claim 45% of the forestry costs back in the year, forest costs were deducted against annual income tax. If farmers were not making a profit, the costs had to be carried forward and claimed when the forest was harvested. Many farm foresters were caught out in the rapid changes and, as the cost of silvicultural work increased, some was not done or was delayed. As a consequence, they produced a lower value forest product. This highlighted to farm foresters the vulnerability of being involved in a subsidised system. If the rules suddenly change, the farm enterprise is economically at risk. Farm foresters now much prefer the non-subsidised market-driven system.

The evolution of farm forestry from the 1950s to the 1980s was one of increasing confidence on the part of the farm forester as he or she realised that they had achieved a good understanding of the silvicultural skills and knowledge required to grow a timber crop. The organisation also was increasingly becoming more independent of the NZFS Extension Service.

The NZFFA today has about 3000 members spread over 29 local branches. There is a branch levy and a national levy per member. Over time, the membership became more differentiated into different levels of scale and interest. This led to a three-tier levy system based on forest area. There would appear to be a core of about 3000 members, with increases when forest products are at a high point in the economic cycle, as occurred around 1993, and numbers peaked at 4700 in 1995.

### ***Impact of farm forestry on rural development***

Farm forestry has had a positive impact on rural development. Farmers have learned new rural skills involving the management and siting of trees for a wide range of purposes. Farm forestry has introduced more economic security into the farm economy. Some well established farm foresters now gain a significant proportion of their annual income from forestry. The forest resource has the advantage that it does not have to be used on an annual basis and can be used when other agricultural product prices are low.

The inclusion of a timber crop that does not need to be harvested like an annual crop or animals, especially in drought times when feed is scarce, meant that the tree crop can be utilised at a time that is most convenient for the farmer, giving greater economic security.

The introduction of the forest crop was often on less productive land that was quite suitable to grow a timber crop. In some sites there was an improvement in soil protection so that there was less soil erosion and degradation of waterways. The improvement in water quality encouraged an improvement in riparian biodiversity.

To grow forests there is an increased need for rural employment to prepare the planting sites, plant the trees, thin out trees and prune them to grow knot-free timber. In some cases, the farming family provides the labour. In other situations, there is increased work for local forest contractors. The silvicultural work provides work for surplus farm labour. This can result in an increase in rural services, as the greater employment brings more money into the local community. This can result in retention or renewal of rural services in the local area.

The increased tree cover gives additional shelter for animals that can result in lower death rates in cold, windy weather when there are newly born animals on farms. Tree species planted for conservation purposes, such as willows and poplars, are an additional valuable source of fodder for livestock in dry spells.

In contrast to farm forestry, any increases in corporate forestry are generally not welcomed by rural communities. While farm forestry takes place within a multiple-use agricultural environment, corporate forestry results in blanket planting of the total site. The income from the sale of farms to corporate forestry usually goes out of the local community as the seller moves to another location. Corporate ownership also makes the decisions in terms of land use off site, and there is not the local community interest. Corporate forestry uses work-gangs, often composed of single males, who live outside the forest area in a local town, so there is a reduction in local employment. Also, as farms are bought up by forest companies, remaining farmers feel threatened. As a result, some areas of local government have legislation that reduces the ability of forestry to dominate the agricultural landscape. In farm forestry, the financial benefits remain in the rural community. Corporate forest profits go out of the local area and in many cases go overseas<sup>47</sup>.

### ***Role of education in promotion of farm forestry***

Most of the education that relates to farm forestry has been largely informal. In the early years up to the mid-1980s, the Extension Service of the NZFS gave a free advisory service to farm foresters. This mainly involved practical demonstrations and discussions to do with practical work in the field. Local branches of farm forestry ran field days in which practical issues were discussed. In addition to the Extension Service, there were inputs from the research side of the NZFS, from the Forest Research Institute. Scientists would present up-to-date information about research into all aspects of silviculture.

Educational material was published by NZFS for use by farm foresters. The NZFFA also produced its own journal for members, and four copies were produced each year. Initially, it was called the *Farm Forestry Journal* and after 1980, *The New Zealand Tree Grower*.

Each year, the NZFFA has an annual conference alternately in the North or South Island. This conference has an important educational function, and is a mix of inside presentations and outside field trips to look at local examples of farm forestry. For many of the 300 people present, the discussions that take place in the field are the most useful. Much useful networking also takes place.

From the 1950s to the mid-1980s, there were a series of short training courses, usually given by NZFS staff, throughout New Zealand. Undoubtedly, the most successful and long-lasting course on farm forestry has been the distance-learning course provided by the Open Polytechnic of New Zealand, available since 1973. All aspects of woodlot, shelter, soil conservation and amenity planting are covered, as well as legal and financial matters. Successful course members receive an Open Polytechnic Certificate of Achievement in Farm Forestry. Over 2500 students have received this tuition since 1973.

With the change of government policy that came in 1984, with the move to a more market-driven economy and the state withdrawing from services that could be offered by the private sector, the free educational services that were supplied by the state ceased. In 1987 the NZFS was dismantled and was combined with the Ministry of Agriculture into the Ministry of Agriculture and Forestry. Most services that were on offer had a charge, and many farmers who had been used to free educational services were reluctant to pay, and demand decreased. Many of the extension advisors of the old NZFS became forestry consultants.

Initially, many farm foresters felt unsettled by the ending of the free state forest educational resource. At the same time, the research organisations became Crown Research Institutes (CRIs) and were also run on market-driven lines. However, many key members of the NZFFA welcomed the freedom from direct government involvement, and they realised that over the years since the 1950s, the association had developed a great resource of local knowledge and silvicultural expertise.

Local branches continued to send out their local newsletters, generally financed in part if not wholly by advertising revenue. The association also joined with others to take part in new forest research cooperatives that made information available to those who contributed to the research budget.

For farm foresters who have a special interest in a particular tree genus or species, there are self-funded special interest groups. Currently, such groups cover *Acacia melanoxylon*, cypresses, eucalypts, redwoods (*Sequoia*) and an indigenous forest group.

In 1991, a new Resource Management Act came into effect and local resource management was placed under the control of local government. These regional authorities are responsible for the local environment and have a local educational role to inform their ratepayers on better environmental performance. Consequently, they are involved in aspects of farm forestry education and the introduction of trees and their management in the rural environment. Other groups that are involved to some degree are the Land Care

Groups, the Queen Elizabeth National Trust that is involved in landscape protection including forests on private lands and the NZ Tree Crops Association that is closely allied to the NZFFA but has more emphasis on the annual cropping of trees, a more horticultural emphasis. All these groups are involved in field days and also produce regular newsletters for their members, and have web sites<sup>48</sup>.

The NZFFA currently has a central head office facility that operates out of the same offices as the New Zealand Forest Owner's Association (NZFOA) in Wellington, New Zealand. NZFOA represents the larger scale plantation growers, but both organisations have a lot in common.

NZFFA is also making use of the Internet for communication and dispersal of educational information. They operate their own web site [www.nzffa.org.nz](http://www.nzffa.org.nz).

## ***Deer farming case study description***

### ***Type and size***

Deer were introduced to New Zealand about 150 years ago. They quickly adapted to the new environment, and their numbers rapidly increased to the point where they were causing serious environmental damage. They were introduced as a sport animal for shooters. However, recreational hunters were not having a big enough culling impact on the deer numbers.

Initially, to protect the environment, deer were hunted by government-funded cullers. Then a market developed for feral venison on overseas markets, in particular, Germany.

The most efficient method of harvesting in the wild was through the use of helicopters to ferry the shooters, who shot from the helicopters. The shot deer were then airlifted by helicopter to collection points, and the deer were taken for processing. The method was so efficient that deer numbers fell rapidly and the supply of deer products for export was not sustainable. Deer were being killed at a faster rate than they could regenerate. It became uneconomic for the helicopters to fly.

To ensure a sustainable industry, the obvious thing was to farm deer, adapting the existing rural knowledge on farming sheep and cattle. Focusing on mainly red deer and wapiti, this has proved successful. Today, New Zealand leads the world in the development of intensive husbandry systems for farming deer. This was the first case of a new livestock introduction to modern western agriculture for several hundred years.

In 2000, the Game Industry Board figures were 1.9 million deer on 4000 deer farms. The total export receipts from the deer industry was \$194.3 million. The Deer Farmer's Association has a membership of around 3000<sup>49</sup>.

### ***How deer farming was set up and evolved***

Deer farming had been done in China for more than 2000 years, and a New Zealand delegation to China witnessed this practice, where deer were farmed under a variety of intensive and extensive conditions for provision of products that were used in a wide range of traditional remedies<sup>50</sup>.

Contractors who were initially involved in deer control on government lands were selling the carcass products on overseas markets through processors such as Consolidated Traders. The investors in the wild venison market saw the opportunities for farmed deer and lobbied for deer farming to be a legal investment. The problem to overcome was the fact that deer were looked on as a serious pest species, and they had to lobby for a change of thinking by government and conservation groups to allow deer farming, which was a completely new venture in New Zealand.

In 1963, the government received submissions on the idea of farming deer. The final breakthrough came with the Deer Farming Regulations in 1969. In 1970, the first licenses to farm deer were issued and the first official slaughter of farmed deer took place in 1970.

Since then, there has been a constant increase in the setting up of deer farms. The external fences have to be two metres high to prevent escape into the local environment.

For deer farming to start, there had to be capture of wild deer. Farmers adjacent to areas of native forest that contained deer used a range of methods, such as growing crops that attracted the deer out of the forest, enabling them to be shut into an enclosure. A 'jump-in' trap system was used to good effect that allowed deer to jump down into the paddock that contained a herd of deer, but they could not get out. Many hundreds of wild deer were captured by the early deer farmers.

However, the demand for deer exceeded the passive trapping techniques, at which stage, the capture of live adult deer by firing a net from helicopters became a good economic solution.

The New Zealand example of deer farming development achieved importance internationally in that it showed that a wild animal could be successfully introduced into the intensive grassland farming system adopted by developed nations. New Zealand showed how deer could adapt to the intensive grassland farming conditions under which sheep and cattle were raised. One successful early promoter of deer farming runs a successful operation on irrigated pastures on a plain.

Deer farming allowed not only a better venison harvest but also more velvet for the Asian market. The best velvet can only be obtained when the velvet is harvested under controlled conditions at the critical time to meet the quality standards of the overseas markets and, in particular, Korea.

As the industry developed, deer farmers, exporters and processors collectively developed an infrastructure that suited the industry. The Deer Farmer's Association was involved in the development of the systems that enabled the industry to create a sound basis for future development<sup>51</sup>.

One attractive feature of farming deer is that they have a much lower range of disease problems than sheep and cattle. The high health status of deer was a major attraction among traditional pastoral farmers, as they saw that deer required much less handling and day-to-day management. There were lower labour costs.

As deer farming became more common, the earlier perceived problems did not eventuate, and in 1979 the licensing of deer farms was replaced by a simpler system of notification.

Research into deer farming had an important impact on the evolution of the enterprise. In 1973, a special deer-research unit was set up at Invermay Agricultural Research Station<sup>52</sup> south of Dunedin in the South Island. Here, the best methods of handling of deer were devised. About the same time, deer diseases were being researched by Massey University's Faculty of Veterinary Science.

Deer breeding and the advantages of a hybrid between red deer and the much larger wapiti were researched by Invermay Agricultural Research Station. The result was larger progeny but, more importantly, it gave more rapid growth rates so that hybrid stags were at the optimum weight in November to meet the peak demand for the German market. Pure red deer stags, in contrast, took two years to achieve the desired carcass weight.

The lower labour requirement of deer farming and potential high returns are highlighted in a comparison carried out in 1987. Based on current agricultural returns at the time, the comparison between different live stock systems was as follows. To produce a net income of \$100,000 would require three men running 9000 sheep on 750 ha, or two men running 2000 cattle on 834 ha, or three men running 600 milking cows on 250 ha, or one man running 600 deer on 83 ha<sup>53</sup>.

As the number of deer built up, the industry evolved. With high prices for deer products, there were a lot of deer farms set up by syndicates, many involving urban finance. In part this was driven by demand and also by taxation advantages. Modification of taxation write-offs in 1982 restricted farm investment write-down and, in 1985, further alterations with the new market-driven government policy saw the taxation subsidy removed. From then on, deer farming grew on the basis of market returns, not tax credits.

Information and education was done through the networks of those involved in the industry. It was a totally new evolving industry, and everybody was learning as they went. Deer farmers organised field days to discuss their common interests, and solutions were published in *The Deer Farmer*, a magazine published by the New Zealand Deer Farmer Association (NZDFA) that was formed in 1975.

One of the issues addressed by the NZDFA was the processing of deer to meet international standards. Special deer slaughter premises were set up, and these were usually small units specially designed for deer.

Some deer farmers imported stags from overseas to improve the quality of carcass size and also velvet production. New imports of wapiti bulls took place in 1981, to introduce the larger wapiti characteristics into the red deer herds.

By the mid 1990s, the farmed deer numbers had reached a level where the market was more stable and farmers were culling out their poorer hinds for slaughter, as they were more valuable as meat than as a sale animal for breeding purposes.

Today, the companies that are exporting venison and velvet have been in the business since the earliest days of the wild venison trade. Now they are largely dependent on deer farmers. The processors and marketers came together to form the Deer Industry Association, and this organisation then formed the Game Industry Board<sup>54</sup> in association with the Deer Farmers Association.

The 1980s was the period when deer farming organised its management priorities, developed an integrated marketing system, promoted research into the remaining problems, and set forward upon stock improvement through selection and importation of red deer stags and wapiti bulls from overseas. Valuable research work was also carried out.

Now the deer farming industry is recognised as another important contributor to the New Zealand economy. In 2000, it was worth \$194.3 million<sup>55</sup>.

### ***Impact of deer farming on rural development***

Deer farming has had a major impact on many areas of New Zealand. Deer farms are spread throughout the country. Initially, deer farms were in the higher country and adjacent to areas of native forest. Many people thought that deer needed to have an environment with more woody browse species, but that has been proved to be not necessary and they are doing well on fertile pastureland.

While some deer farms are all deer, many deer farmers operate other agricultural activities as well as deer farming. The deer have been introduced into their existing farming operation, and farmers have learned new management skills to farm deer.

Some parts of New Zealand have very large investments in deer. The Southland province at the south of the South Island is a high performance region for meat (cattle and sheep) wool, dairying and deer. With massive growth in deer numbers, Southland is now the deer capital of New Zealand. On the plains and down lands, more than 2000 intensively farmed properties include deer. Southland farmers have adapted to the worldwide shift in consumer tastes to leaner meats. Many sheep and beef farmers have significantly improved their viability and financial strength by converting up to a third of their livestock to deer<sup>56</sup>.

Apart from the physical changes of deer being run in the rural landscape, (now no longer a novelty), the major impact of deer farming has been to give the rural community another range of products. In so doing, they gain more economic stability. Agricultural commodities tend to fluctuate in price from year to year so that, while sheep prices may be down, the velvet or venison market may be up. At the time of writing this report (December 2002) the opposite applies, where dairy and deer farming prices are down while sheep farming returns are up<sup>57</sup>.

### ***Role of education in the promotion of deer farming***

Initially, when deer farming was in the early stages of development, there was no formal education available. While there was some information from overseas, most of the education arose as a result of observation and trial and error, with farmers sharing their experiences. As the industry developed, local groups ran field days, and finally a national organisation, New Zealand Deer Farmers Association, was formed. This association organised annual conferences and set up the publication of a deer farmer's magazine, *The Deer Farmer*<sup>58</sup>.

Another important source of educational material came from the publication of research findings by the special deer-research unit at the Invermay Agricultural Research Station from 1973 onwards.

The New Zealand Qualifications Authority (NZQA)<sup>59</sup> was established in 1990 to provide an overarching role in quality assured qualifications and to coordinate national qualifications in New Zealand. The NZQA deals with the provision and quality of qualifications. It works in partnership with all education providers and national groups representing education and training in industry and business. The NZQA currently offers a range of unit standards in the agricultural sub-field in deer farming. These unit standards that prescribe the standard to be achieved by students, were written in conjunction with a deer farming advisory group. Persons working in the industry can study the unit standards through accredited providers and gain credits for successful completions that are registered in a national database.

In addition, accredited educational providers, both state-funded and private providers, offer NZQA approved National Certificates that contain education in deer farming. Some educational institutions also offer education in deer farming that is not part of a national programme and the certificate is granted by the provider<sup>60</sup>.

Since May 2002, deer farmers in New Zealand can get Internet access to a specially set-up electronic library of scientific and technical information as a result of the government-funded MAF Sustainable Farming Fund set up to provide assistance to projects, which will benefit the country's agricultural and forestry communities. The electronic library initially had up to 2000 scientific and technical articles on deer farming in New Zealand. The deer industry library is modelled on and incorporates a number of existing specific library databases and search engines that exist within research and tertiary institutes that were widened to encompass a broader range of technical material relevant to the needs of deer farmers. It is acknowledged that deer farmers as a group

are entrepreneurial, keen to access knowledge and willing participants in many research projects. The transfer of this knowledge to farmers at grass roots level will be of major benefit to the entire industry<sup>61</sup>.

The library is administered from the New Zealand Deer Farmers Association, NZDFA, and is available online to all deer farmers. All members of the NZDFA have remote password access to the library via the Internet and it is anticipated that such a facility will revolutionise information availability within the New Zealand deer farming industry.

## ***Rural tourism case study description***

### ***Type and size***

Tourism plays a key role in the growth of the New Zealand economy through employment, foreign exchange earnings, investment and regional development. In the year ended March 2000, tourists spent an estimated \$13.2 billion in the New Zealand economy. An estimated 94 000 full-time equivalent employees were directly engaged in tourism over this period. The number of people involved in rural tourism is not known, but it is significant in terms of overall rural employment.

Tourism is a potentially important enterprise option for some farm households. Just under 40% of the respondents in a Ministry of Agriculture and Forestry (MAF)<sup>62</sup> survey had enterprises that were either all or in part based on the tourism industry. Just over half of these enterprises provided accommodation, which ranged from bed and breakfast to fully catered. Respondents who offered farm accommodation discriminated between 'home hosting' (being dinner, bed and breakfast) and 'farm stays' (which involved more active observation of the farm). The most common attractions on the farms, apart from accommodation and meals, were the homestead gardens, the 'farm yard' animals and associated activities such as shearing and watching the dogs working, or simply enjoying the ambience of the farm and countryside. Also offered are a variety of activities on and off farms, including fishing, hunting, jet boating, golf, skiing, and handicrafts. In many cases, these are associated with farm stays.

Rural tourism is a form of special interest tourism that derives its appeal from the contrast between the rural activities or attractions that the tourist sees and the tourist's day-to-day urban life. Its appeal relates to the relative sparseness of

the rural population, dominance of agriculture as a land use and landscape and the retention of older ways of life (buildings, values, practices) which might not be present in urban life. These qualities translate into a number of selling points that characterise the rural tourism market:

- closeness to nature
- absence of crowds
- quietness
- personal attention
- a sense of continuity with the past and of stability
- smallness of scale
- focusing on the improvement of the person — body, health, intellect.

Rural tourism applies to a great range of activities that are taking place in the countryside on farms, lifestyle blocks, rural towns and settlements. These include ecotourism (attractions and activities involving birds and other wildlife, marine, river, wetland and estuary life, forest and plant ecology, organic farming, geology, mountains, glaciers, caves, and other landforms), adventure tourism (bungy jumping, heli and Nordic skiing, guided walks, horse treks, hunting trips, rafting, paragliding), garden tours, cultural heritage trails, and the provision of accommodation (farmstays, countrystays, homestays in rural towns, camp and caravan sites, self-catering and back-packing accommodation)<sup>63</sup>.

Rural tourism requires careful planning, a lot of hard work, commitment, and specialised skills. It is a people-oriented industry requiring personal skills that may need developing in farming people. Rural tourism requires considerable co-operation with other people within the tourist industry because it is made up of a wide range of specialists. The specialist skills approach is also essential for marketing a rural tourism product and illustrates the point that tourism is a 'team game'<sup>64</sup>. It is much more difficult to go-it-alone. This is because tourism draws on so many industries — the hospitality, entertainment, transport, catering, education, accommodation, retailing, hiring, as well as marketing, and because you cannot be expected to be an expert in all of these.

The team approach is also essential for marketing purposes. Because it is unlikely that one farm property alone will be able to satisfy all the requirements of an overseas visitor, the property will have more opportunity to attract

visitors if the venture is marketed along with other attractions in the surrounding area collectively. The result is that visitors will stay longer in the area to the benefit of the different rural tourism enterprises and the local community generally.

### ***Why rural tourism was set up***

While there was an increasing interest in rural tourism developing, it received a much stronger focus as a result of the market restructuring in New Zealand in the mid-1980s, and the removal of agricultural subsidies. Rural families were faced with looking at economic alternatives that they could add onto their current agricultural operations.

The key to dealing with service problems and economic development issues in rural areas is to ensure that rural people have the information and skills they need to define the problems, find solutions, and act on them (or take the appropriate action to ensure that whoever is responsible for creating the problem works to resolve it).

The government took an active role in expanding rural enterprise by using the MAF in a facilitation role. MAF worked with a range of agencies that were involved in the rural communities and, in this case, various tourism agencies and rural training organisations including Rural Educational Activity Programme co-ordinators. In terms of setting up new rural enterprises, they initially focused on three areas:

- improving access by rural people to leadership skills, business, management and interpersonal and social skills;
- enabling local identification of infrastructural needs and innovative ways of supplying these; and
- enabling local identification of local and export market niches, opportunities for agricultural innovation, adding value and utilising social and cultural diversity and leveraging local resources and amenities to generate local enterprise<sup>65</sup>.

People on farms realised that they had a resource that had high appeal to many tourists who wished to enjoy a real rural experience. On some farms, there were surplus buildings that could be remodelled into different levels of guest accommodation, for example, servicing the cheaper backpackers end of the tourism market through to the luxurious farm stay where a wide range of

facilities were on offer. Some tourists just want bed and breakfast facilities, while others want to enjoy being involved and present on a real farming operation, being present when dogs are being used to move animals, and all the other daily activities that take place on a New Zealand farm.

Some farm homesteads have developed extensive gardens that are of interest to the tourist, and they are included in rural tourism tours. Some farms have a gallery where local crafts are on sale.

Many farms have ventured into rural tourism to capitalise on the ambience of where the property is located. Some coastal sites have special appeal, with a range of coastal activities on offer. There are an increasing number of farmers owning coastal sites who are grouping together to offer special coastal trekking experiences. One in the South Island is on Banks Peninsula, the Banks Peninsula Track<sup>66</sup>. The unique four-day tramp across farmland and environmental reserves covers 35 kilometres of spectacular volcanic coastline, fringing a marine mammal sanctuary around the South East bays of Banks Peninsula previously inaccessible to the public, across several farming properties. The farms involved receive an income from the track fees, in addition to their other farming operations.

Other properties located in the South Island high country give a mountain experience, with opportunities to go skiing and other winter sports. In the summer there are opportunities to go trekking. Some farming properties are located in sites that are well sought after for hunting of deer and other large animals, and for fishing. Some farms have developed wilderness areas where they manage a deer herd for trophy hunting for a stag with a large set of antlers.

Native wildlife that are endangered and being managed to assist their survival are also keenly sought after rural tourism locations. A good example of this is the coastal farm that operates Penguin Place<sup>67</sup>, the Yellow Eyed Penguin Reserve that has won several Eco-tourism awards. The conservation project was established in 1984 by two farmers when there were just 8 breeding pairs. In the 2002 – 2003 summer, there were 36 pairs breeding in the colony, making this the biggest one in the South Island.

Visitors are taken on a guided tour through the colony for some close-up viewing of these beautiful birds. Covered trenches and observation huts hide the tourist so the penguins will not be frightened and the viewer can observe them going about their daily business unperturbed by human presence. The nature reserve is part of a sheep farm, and the owners have attempted to create maximum breeding opportunity for the penguins while minimizing the loss of grazing land. In the colony, the penguins are offered nest boxes that provide them the shelter, shade and privacy they require for successful breeding. Predator control is also carried out. Nest boxes also provide shade during hot summer days.

### ***How rural tourism was set up and evolved***

Ten years ago, most people in government considered agriculture, forestry and, to a lesser extent, mining to be the key rural industries, supported by health and education services and some business services such as property, finance, legal and technical advice. There were also petrol stations and tea-rooms to meet the needs of the travelling public.

The importance of tourism and local manufacture of food products, clothing, craft goods, farm and other equipment in rural areas was overlooked because there is little data on these activities, and they are often the second occupation or enterprise carried out by people whose first occupation is farming. Many people were surprised to find that less than half of the population of rural New Zealand is involved in agricultural or primary industry production.

MAF's work in rural tourism is an example where a facilitation programme aimed at reinforcing the goals of sustainable agriculture has identified another commercial land use. The initiating framework was the former Minister of Agriculture's Rural Strategy Groups, set up to assist farmers to overcome the malaise of adverse climatic events, low commodity prices and economic restructuring. The groups were organised by MAF regional staff to assist farmers and other landowners identify local economic opportunities. Diversification into rural tourism has emerged as a useful risk management strategy and alternative income source.

MAF's work has achieved four outcomes. MAF has

- assisted local communities and farmers to identify an economic opportunity
- brought the needs of rural tourism operators to the attention of the tourism industry
- facilitated the flow of information on rural tourism to potential operators communities, local government and other agencies
- acted as a catalyst in developing support and commercial networks between operators.

The outcome has had a positive impact on the economic sustainability of farms. Rural tourism provides a mechanism for broadening the economic base of rural communities, which in turn sustains the service base on which agriculture depends. It is a powerful influence for building the social wellbeing of farmers. Alternative land uses that emphasise aesthetic and recreational values lift morale, and the increased social contacts from meeting new people reduce

insularity and provide exposure to new ideas and different attitudes and values. The supplementary income also enables the introduction of more ecologically sound land management practices.

MAF is now stepping back from its work in rural tourism. Other agencies such as the Department of Labour's Community Employment Group have greater resources and the service delivery capacity to take over the enterprise development facilitation activity.

As the rural tourism market developed, economic opportunities arose and, for example, publications were produced that listed the range of rural tourism experiences that are now on offer. Farmers with rural tourism facilities made use of larger tourism operators to promote their business. Initially, there were two large farmstay operators, Rural Tours, and Accomodata Farm and Countryhome stays. These two companies have now formed Rural Tourism Holdings (RTH)<sup>68</sup>. RTH offers a wide range of different farm types, accommodation, farm activities, group tours, student tours, independent travel, bed and breakfast, home-hosted dinners, and technical visits to rural tourist destinations.

A more recent development in New Zealand is the development of wine trails associated with the rapidly developing wine industry in the country. People go on organised tours or individually to wineries and dine at the on-site restaurant, and they may stay at facilities on the property or in accommodation on offer in the surrounding countryside or nearby rural township.

### ***Impact of rural tourism on rural development***

Rural tourism has had a very beneficial effect on rural development. It is a relatively low impact enterprise and utilises features of the rural community that were not previously highly valued. It has allowed rural infrastructure to be more fully utilised, and has given greater economic security to rural areas. It has spread the risk of the impact of the fluctuations in the rural commodity markets.

The money spent by international and domestic visitors is a significant driver of regional development throughout New Zealand and, as a result, every region benefits. Some small townships that were stagnating with the decline in the rural economy in the mid 1980s are being revitalised by new rural enterprises, and rural tourism is for some communities a major contributor to fuller employment and local services.

The New Zealand tourism industry is made up of 10 major public-listed companies and between 13 500 and 18 000 small to medium enterprises.

Tourism is a major employer and currently supports one in ten jobs in New Zealand in a wide variety of jobs and skill levels, with over 94 000 full-time equivalent jobs provided directly through tourism and an estimated 69 000 indirectly.

### ***Role of education in the promotion of rural tourism***

Initially, there was no formal structured education for rural tourism. Getting involved in tourism was not just a case of supplying some accommodation for tourists. A high level of service is required. As a general rule, tourists demand a high quality of service in their tourism experience. The government, through MAF, played an important early facilitation role in promoting the potential that existed for rural tourism to be another source of rural enterprise, and it had considerable appeal to farmers in the later 1980s in rural New Zealand when they considered diversification options.

As a general comment, the requirement of the provision of a very high quality service meant that it was the financially better off sector of the rural economy that could most easily invest in rural tourism. Such properties had, for example, the existing well-established homestead gardens and surplus buildings that could be modified for rural tourist business.

As rural tourism has developed, the related aspects of rural tourism that have shown the greatest growth are those associated with eco-tourism and adventure tourism<sup>69</sup>.

The whole tourism industry has now become very much more sophisticated, and the people operating in the industry have to have a good knowledge of the services that are required and the high standards that are necessary. On top of this are all the safety standards that need to be addressed, including occupational safety and health aspects.

As the industry developed, in order to get the quality of service that was required, educational unit standards were developed in relation to tourism, so that people could study and gain certification of competence. For example, the National Qualifications Framework (NQF) contains a National Certificate in Adventure Tourism and a National Certificate in Tour Guiding.

The final goal in any new rural enterprise must be to create a sustainable business. To achieve sustainable rural tourism, it is important that the individual rural tourist enterprises provide a high quality, people-focused service. On the whole, the tourists are well educated and discriminating, and they expect high standards. If they are well satisfied with what they experience, they will recommend it to others. It is also important that the local rural community is educated to accept that the benefits that rural tourism can bring are in the interest of the wider community and can potentially create the conditions that can make possible the creation of other supporting rural enterprises.

## ***An organics enterprise case study description***

### ***Type and size***

This case study description focuses specifically on one organic rural enterprise, Biofarm Products Limited, a market leader in the production of pure, natural dairy products in New Zealand. This case differs from the previous three case study descriptions presented, in that it describes a specific rural enterprise. This rural enterprise is typical of a rural organic agricultural enterprise, albeit a particularly successful one, supplying a niche market and adding value to its products. In New Zealand, there are many other kinds of organic rural enterprise, including market gardens supplying vegetables, chicken farms supplying poultry and eggs, cropping farms supplying wholemeal organic wheat and other grains, orchards supplying a range of organic fruit, with a large organic kiwi fruit production sector, vineyards and wineries supplying organic wine, as well as some beef and sheep farms supplying organic meat. More information about organic enterprises in New Zealand, particularly those involved in exporting, can be found on the Organic Products Exporters of New Zealand Inc (OPENZ) website<sup>70</sup>.

While we have selected an enterprise that began as a dairy farm, many of the reasons for setting up the business, and particularly the motivation for doing so, apply equally well to other organic rural enterprises. It is also typical of a rural enterprise that utilises a website to promote and market its products. The information about Biofarm Products Limited comes from the public domain. Most of this information can be found on their website,<sup>71</sup> along with photos and product information.

Biofarm Products Limited has been Certified organic since 1986. Biofarm uses both Certenz and BIO-GRO certifiers for independent verification of organic farming practices and products. Biofarm is also unique in that it produces both the raw material (milk) and the finished product on the one farm.

Biofarm's yoghurt products which include acidophilus yoghurt, low fat yoghurt, bush honey yoghurt, natural yoghurt and pet food yoghurt are sold in supermarkets and health food stores throughout New Zealand. They also sell organic pasteurised milk products that are available principally in Nelson, Christchurch and Wellington.

The Biofarm, main farm is the 227 hectare home farm, on the outskirts of Palmerston North overlooking the Manawatu River. The Manawatu Region is renowned for its rich soils and temperate but sometimes windy climate. The farm has had no chemicals or poisons on it for 18 years. Instead, it is farmed in keeping with the laws of nature in a holistic manner.

Two lease blocks complement the home farm. The largest of these is a 118ha property at Colyton, which is leased from the Waiata Land Company. A fully organic certified sheep and beef farm, it is home to calves and heifers until they are due to calve.

The other is Durslade, located in Hopelands Valley near Woodville, which has been biodynamic (a specific type of organic production system) for nearly a century. The 27.2 ha farm, which is bordered by 68 ha of native bush, was gifted to the nation by its original owner, Terrance Rhodes-Jackson, and is leased from the QEII National Trust. With a different microclimate from the two other properties farmed by Biofarm, it can produce top quality feed at different times of the year.

The cows retain their tails and their horns, graze a natural herbal ley and produce just under 1 million litres of milk per year. All milk produced is processed into a branded product in premises on the home farm.

### ***Why the enterprise was set up***

Biofarm is the second oldest commercial organic farm still operating and is still run by its original owners, Jamie and Cathy Tait-Jamieson. They began share milking for Jamie's family trust, on what was his grandfather's dairy farm, in 1977 and first adopted biodynamic farming methods on the farm in 1980. The first yoghurt marketed under the Biofarm label was produced in 1987.

Biodynamic farming is based on the on the ideas and philosophy of Rudolf Steiner who in 1924 gave six lectures on agriculture, which led to the development of biodynamic agriculture. Steiner's agricultural system placed primary emphasis on biology and ecology and emphasised that a farm must be managed as a holistic entity.

Biofarm was set up to add value to the organic milk being produced on the original farm and to ensure the product sold is authentically organic. By making and marketing organic yoghurt to a niche market, the business is able to increase the income by three to four times beyond what could earned just from the production of milk for processing by someone else. When they had first converted to a biodynamic production system in the 1980s, there were few processors and retail outlets prepared to process and market organic milk.

Originally, the yoghurt was produced by a local milk processor, but this was not entirely satisfactory. There was concern that the producer lost control over the product in the final processing stage and that it might have been possible to have non-organic milk mistakenly mixed with the organic milk. After they obtained some yoghurt-making equipment from assorted sales of redundant dairy factory equipment, the Tait-Jameisons produced yoghurt on the farm. They developed their own MAF-approved processing facility on the farm in 1987.

### ***How Biofarm Products Limited was set up and evolved***

The company, Biofarm Products Limited, was formed in September 1993 when another person joined as a partner. The factory has gradually been expanded to include a large cool store and packing area.

Biofarm Products Limited became the first company in New Zealand to supply organic dairy products to mainstream supermarkets. In 1997, Cathy Tait-Jamieson won the Overall Excellence in Business Award in the Māori Women's Business Awards. This award reflects the professionalism with which Biofarm Products Limited is run and the care and attention given to their customers. Biofarm Products Limited was also a finalist in the Manawatu Business Awards in 2001.

The Tait-Jamiesons manage the farm and produce dairy products the way they want to eat them, ensuring all along that the products have 100% traceability right back to the soil.

Biofarm's cows calve all year round except in spring, when the weather is too unsettled and, as the days get longer and warmer, the grass grows faster and can be too watery to sustain the needs of a freshly calved cow.

The major calving period occurs in November and December. Hay and silage are made during November and December.

Sheep are also run on the property, and they lamb in early spring. Biofarm has not experienced internal parasite problems because of the balance and diversity of its animals. Grazing rotation is particularly important. The sheep eat what the cows don't eat. They eat pasture that contains cow parasite worm eggs, which do not affect sheep, as a result, leaving clean parasite-free pasture for the calves.

At Durslade, goats used to control weeds have eradicated blackberry and are keeping thistles under control.

Organics requires a new approach to farm management. An animal that has required a medicine such as a worm or bloat drench or an antibiotic during its lifetime cannot be sold as organic. Pasture growth cannot be promoted with artificial non-organic fertilizers, and to treat weeds, pests or disease with herbicides, fungicides or pesticides would mean the loss of organic certification.

The Biofarm directors see themselves predominantly as marketers who enjoy the challenge of undertaking farming practices that meet the organic food demands of consumers and thereby grasping the opportunity created by the growing global trend towards organic food.

There is an increasing world demand for organic food as well as a trend toward organic production. Denmark has declared that it will be totally organic by 2010. In Argentina, a land mass the size of New Zealand is in conversion to organic growing. High quality food products will be exported from that country to markets that want organic products and are prepared to pay a premium for them.

And other major global markets such as Japan, the UK and USA are recording remarkable growth predictions in the consumption of organic food.

Many governments in developed countries are offering incentives or subsidies for organic production as a strategy for sustainable growth. There are no subsidies for conversion to organic production in New Zealand, even though New Zealand trades heavily on a 'clean green image'. Much conventional New Zealand agriculture is not sustainable in the longer term, and increasingly the industry is emphasising the shift from commodities towards value-added products and niche markets. This is exactly what Biofarm did, 13 years ago.

Organic businesses, such as Biofarm, make good business sense because they provide sustainable profits, a preferred food type for many affluent world consumers, and a production base that is sustainable indefinitely. They generate stable social structures because organic rural enterprises are usually family-based or small business units that employ local people and are more closely linked to the local communities. Organic production is also more in tune with the indigenous Māori philosophy with its holistic approach to the land (whenua) and its society (whānau, hapū and iwi).

In 1986, Biofarm entered the market with Biofarm Acidophilus Yoghurt and shared the growth of the specialty yoghurt segment for the following 12 years. For the 2 years ending April 2002, growth in domestic sales has been 60% for that period. Biofarm Products Limited is now enjoying growth because it is organic.

To help meet the new demand for organic dairy products, it may be necessary to buy in extra certified organic milk. Increasing cow numbers is another option and is expected to be achieved, not by intensifying production on the home farm, but by co-operating with organic cropping farms that need animals in their rotation. This opportunity, which wasn't there ten years ago, has been a spin-off of the demand created by export organic crop production companies such as Heinz Wattie. Those cows not being milked can be grazed elsewhere as part of the organic cropping rotation, while the number of cows on the home farm will be gradually increased.

### ***Impact of organics on rural development***

As illustrated by the Biofarm case study description, organic production is growing in New Zealand. There are, however, no official statistics on the total number of certified organic growers or on the total area of land under organic production. In 1997, there were 8880 ha of BIO-GRO NZ certified properties. BIO-GRO NZ is the largest organic certifying agency in New Zealand and is likely to have the greatest area of organic production under its certification scheme.

Production figures indicate that the area of rural land in organic production is expanding. The organics industry's total production in 2002 was around \$140m, with an estimated \$70m coming from exports, about the same as the previous year. It is estimated this will grow to \$500m in the next four years. In addition, the domestic organics market is growing at a rapid rate. In 2000, an Otago

University study showed the domestic market to be \$32m, and this more than doubled to \$71m the following year<sup>72</sup>. There are fewer risks and costs in supplying locally, and it appears that some small to medium sized growers are choosing this option rather than exporting.

The conversion to organic production is likely to have a significant impact on rural development. Organics requires a different approach to agricultural production and is usually a more intensive production system, requiring more labour, and it tends to bring different kinds of people into rural communities. These are generally higher educated people with a genuine concern for environmental issues and belief in the need for sustainable production systems.

In cases like Biofarm, where growers are processing product on the farm for niche markets in order to add value to organic product, this is bringing new enterprises and income into rural communities and is adding to employment opportunities.

### ***Role of education in the promotion of organic production***

As an illustration of the kind of people involved in organic enterprises, consider the educational background and achievements of the Tait-Jamiesons. In 1997, Cathy won the Overall Excellence in Business Award in the Māori Women's Business Awards. After initially studying science at Victoria University in Wellington, Jamie graduated from Massey University in Palmerston North with a BA (Psychology) and a Diploma in Dairy Technology.

The formal education system that provides universal secondary schooling based on a national curriculum to secondary level until at least the age of sixteen in all rural areas provides a sound base for all New Zealand citizens. In New Zealand, it is the norm that everybody can read and write, although there are instances, particularly with recent immigrants, where some people are unable to read or write English. It is the tertiary education system and informal education that is most important in fostering an interest in organic production.

Informal education occurs mainly via newsletters, magazines, journals and websites of certifying agencies and other organics organisations. BIO-GRO NZ<sup>73</sup>, The Biodynamic Farming and Gardening Association in New Zealand<sup>74</sup>, Agriquality<sup>75</sup>, The Soil and Health Association of New Zealand<sup>76</sup> and Organics New Zealand<sup>77</sup> are five organics organisations that provide a considerable amount of information on their websites. Other organisations that provide information about organic production include Maanaki Whenua Landcare Research<sup>78</sup>, Ministry of Agriculture and Forestry (MAF)<sup>79</sup> and the Crown

Research Institutes (CRIs) HortResearch<sup>80</sup> and AgResearch<sup>81</sup>. There are also many international organic websites that can be accessed by people wanting information about organic production. Most important is the International Federation of Organic Agriculture Movements (IFOAM) site<sup>82</sup>.

In the field of formal tertiary education, both Massey and Lincoln Universities provide some organics or sustainable land management papers. The Open Polytechnic of New Zealand provides nationally available distance-learning courses and has had a course on organic growing since the 1980s. It also provides tuition in, and assesses a number of, organic horticulture unit standards.

Organic horticulture unit standards are registered on the New Zealand National Qualifications Framework (NQF). These unit standards are available from any polytechnic or private provider accredited to teach and assess them.

As well as this formal and informal education, the organics movement received a boost in 1999 when The Green Party, a political party with a strong environmental platform, held the balance of power in the newly elected Labour Government. Under this government, money was made available for work on the introduction of a National Organic Standard.

In the last few years in New Zealand there has been considerable debate about the introduction of GE (genetically engineered) organisms. At the time of writing this paper a moratorium is in place to prevent the release of GE organisms for commercial production. The organics movement is strongly opposed to the lifting of this moratorium and the introduction of any GE crops as this may compromise the integrity of organic produce. This very public debate has further intensified interest in organic production. The pro-GE and anti-GE camps have assumed very polarised positions, and it remains a major political issue, likely to feature prominently in the next general election in New Zealand.

## *Analysis of the New Zealand case study*

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In this section we analyse the New Zealand case study descriptions to see what lessons can be learnt, to note emerging issues and to draw out common themes that might be used to formulate strategies and recommendations about rural education for rural enterprise development. Specifically, we examine the case study descriptions to see what common elements could be incorporated in rural development policies relating to educational delivery models and human, financial and natural resource management and any other salient features.

New Zealand is a learning-centred society with a robust formal education system. As a generalisation, rural enterprises in New Zealand can be described as being operated by individuals, families or small companies composed of people often with some tertiary education, who have access to information and ideas about new opportunities for new rural enterprises, who are entrepreneurial (prepared to take a risk starting a new enterprise), who can communicate with other people engaged in similar enterprises and who can access start-up capital either from their existing capital, government seeding fund or from a bank loan. These people are motivated by the need to ensure the economic diversity and viability of an existing farm property, a lifestyle choice or environmental concern relating to sustainable agriculture as well as the desire to create a profitable business to support themselves and their families.

Rural education in its broadest sense includes a number of educating and informative processes, ranging from formal schooling based on a national curriculum to the provision of information via interest group (association) meetings, newsletter and magazine publications through to the Internet. Such rural education assists these people by

- providing universal secondary schooling based on a national curriculum to secondary level until at least the age of sixteen
- providing access to tertiary education as a choice financially supported by a student loan scheme
- providing access to information about possible new kinds of rural enterprise via newspapers, general and specialised publications, associations, meetings, Crown Research Institutes and university research publications and in the last decade increasingly via rural based websites and other ICT
- providing managerial and business skills necessary to run a successful rural enterprise.

Characteristics of rural enterprises described in this case study are summarised in Table 1. While acknowledging the dangers inherent in over-generalising, we can say with some degree of certainty that many of these characteristics apply to other rural enterprises operating in New Zealand.

*Table 1: Characteristics of New Zealand case study descriptions — present situation*

<b>Characteristic</b>	<b>Farm Forestry</b>	<b>Deer Farming</b>	<b>Rural Tourism</b>	<b>Organic Dairy Farm</b>
Education to secondary level	Common	Common	Common	Common
Tertiary level education	Helpful but not essential	Helpful but not essential	Helpful but not essential	Helpful but not essential
Specific information on the set up and operation of the enterprise	Must be accessible in some medium	Must be accessible in some medium	Must be accessible in some medium	Must be accessible in some medium
Communication via Internet	Increasingly essential	Increasingly essential	Increasingly essential	Increasingly essential
Marketing via Internet	Becoming more common	Becoming more common	Becoming more common	Essential
Small to medium size enterprise	Yes	Yes	Yes	Yes
Agricultural background or training	Yes	Yes	Helpful but not essential	Yes
Enterprise supports or expands existing farm operation	Always	Often	Often	Organic production sometimes incompatible with conventional farming
Start up capital requirement	Medium to high	High	Low to medium	Medium to high during conversion
Ongoing capital and labour requirements	Low to medium until harvest (mainly contract)	Low farm labour	Low farm labour	Low to medium farm labour
Entrepreneurial spirit and freedom of choice	Essential	Essential	Essential	Essential
Motivation — to ensure economic diversification and viability of existing farm	Yes	Yes	Yes but not always	Yes but more environmental
Motivation — environmental concern	Sometimes	Sometimes	Sometimes	Definitely
Motivation — to increase sustainability	Yes	Yes	Yes	Yes
Timeframe for economic return	Long	Short — medium	Short — medium	Medium
Supported and managed by self-funding NGO or association	Yes	Yes	Yes	Yes
Non-financial government support	Management and market information	Management and market information	Management and market information	Management and market information
Ongoing government subsidies	No	No	No	No

New Zealand is unique as a small, developed country with a small population whose economy is reliant on agricultural exports produced by an efficient modern agricultural sector. As such, it is difficult to describe in terms of traditional developmental theory that emphasises the need to develop heavy industry as part of the process of development<sup>83</sup>. The structural changes of the mid-1980s when agricultural subsidies were withdrawn rapidly can be seen as equating to aspects of the fourth stage of Rostow's<sup>84</sup> five-stage model but New Zealand now firmly sits in fifth and final stage, where all sectors use modern technology. It's the relative small scale of the industrial sector that sets New Zealand apart from many other developed countries.

As an efficient producer of agricultural produce, New Zealand is dependent on exports and stands to benefit greatly from the current WTO drive to reduce agricultural subsidies and price supports in world markets. If and when such subsidies are reduced, particularly in Europe, Japan and America, New Zealand's agricultural production should continue to expand. New Zealand has gone well beyond an autarkic (self-sufficient) stage of development and is now absolutely dependent on the existence of global trade networks. In a broad sense New Zealand's niche in the global market place is agricultural produce. This allows the country to maintain its developed economy while remaining relatively 'underpopulated'.

Any comparison between New Zealand and the other countries participating in the comparative case study, namely, China, Thailand and the Philippines is difficult until all the national case studies are brought together. Factors such as culture, history, and stage of economic development obviously produce a unique situation for rural enterprise development and the rural education system that underpins it in each country. Nevertheless, it should be possible to identify some common themes.

For example, the Thai experience described by Seri Phongphit in *People's Development: A Community Governance Tool*<sup>85</sup> has some themes common to the New Zealand and Thai experience. Firstly, people living in the rural community play the key role in any rural development enterprise. In New Zealand, it is usually individuals or family groups that establish successful rural enterprises, while in Thailand, it can also be a village community. Secondly, in New Zealand, often a government or NGO facilitated the initial rural enterprise development, withdrawing once the rural enterprise was up and running. Likewise in Thailand, the process is facilitated by community leaders or outsiders accepted by the community until the rural enterprise is established. The salient point is that successful rural enterprise development is dependent

on the initiative and enterprise of individuals, families or small village groups. Rural enterprise development is better facilitated at this level rather than being imposed by a central government agency, although a central government agency can play an important role by making management and current market information available.

## Conclusion

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In conclusion, in terms of education for sound rural sustainable development in New Zealand we need to look at the following:

- Awareness and attitudinal change in rural communities' understanding of environment and sustainable development. The *New Zealand Curriculum Framework* for primary and secondary schools and *Te Whāriki — Early Childhood Curriculum* contain the essential elements for effective environmental education. The *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, gives examples of how teachers can apply it to all areas of Essential Learning within the New Zealand Curriculum Framework<sup>86</sup>.
- Tertiary and non-formal education of land managers. Local government will play an increasingly important role in promoting sustainable development. A good example of the leadership role in environmental education by local government is that of Environment Waikato.
- The need for better resource management education, especially so that rural communities can meet the requirements of the Resource Management Act.
- The need to 'green the institutions' that provide services to the rural community so that they have a positive influence in achieving sustainable development. For example, fertiliser and pesticide companies will need to consider environmental impacts of their products.
- The need for continuing environmental education of resource managers, as part of 'lifelong learning'.
- The contribution and relevance of the inclusion of indigenous knowledge in sustainable resource management, acknowledging that traditional knowledge of sustainable resource use still is relevant today.
- Maintaining and enhancing the acquisition of computer skills by rural people and improving their access to high speed Internet networks.
- Over the longer term (the next 20 years), the need to increase the percentage of energy derived from renewable resources such as wind, solar energy and biogases and reducing dependence on imported oil for fuel. Increasing fuel costs have more impact on the rural community who must travel further and agricultural producers whose agricultural production is heavily dependent on agricultural machinery.

In spite of a period of disillusionment over the past 20 years, New Zealand farming families have shown that they are a resilient and determined group of people who have a proven and admirable ability to survive through tough times and adapt to difficult circumstances. The provision of good relevant rural education assists them to reach the goal of sound rural sustainable development. The future of rural education and rural enterprise development in New Zealand will rely more and more on services and information provided via the Internet. This will minimise any disadvantages that rural people face when compared to urban dwellers.

Common elements that are present in successful rural enterprises in New Zealand include the existence of incentives to invest in new rural enterprise to gain economic rewards, enterprising and educated individuals prepared to take calculated risks, open access to information about possibilities and how to manage them, availability of financial resources, advanced technology and potential markets for produce or services. Historical factors, in particular the withdrawal of agricultural subsidies after 1984, were also an important stimulus for the establishment and expansion of rural enterprises and economic diversification.

Incentives and rewards require that people can see some advantage for themselves or their families either, in the intermediate or long term, in setting up a rural enterprise. Of primary importance is the opportunity for financial reward or profit, but this is not necessarily the only incentive sought. Economic diversification to protect an existing property is a common incentive for rural enterprise development. Sometimes, it is a desire to create an ecologically more sustainable farming enterprise that acts as an incentive.

Rural people in New Zealand are traditionally self-reliant and independent and consequently this has produced a pool of enterprising individuals. This fact coupled with a sound education based on a national curriculum to secondary level as well as relatively easy access to tertiary level education, and training means that such people are able to calculate the risks involved in setting up a rural enterprise. These people also have access to organisations that can assist in the business development of a new enterprise.

Open access to information is co-dependent on an educational level that allows people to easily access information about possibilities for rural enterprise development and subsequently be able to understand the basics of business management.

Increasingly, this information is quickly and easily accessed via the Internet and skills in utilising ICT are becoming more important.

Financial resources and business advice must be available through banks, small business advisory groups and in some cases government seeding funds. A key requirement is a sympathetic attitude to smallscale businesses.

Based on the New Zealand experience, we can conclude that the primary aim of strategies and policies on rural education for rural enterprise development should be to empower individuals, families and small groups to establish and manage rural enterprises. Given appropriate education, information access, incentives and ownership, these people will ensure the survival of existing and growth of new rural enterprises.

Our general recommendations to the Baoding Workshop on strategies and policies for rural education for rural enterprise development were that they should aim to

- promote and maintain universal gender-equal education to secondary school level
- provide easy access to information about rural enterprise possibilities
- facilitate the provision of small business management skills in the set up phase of rural enterprises
- provide start-up incentives that allow individuals and groups to create new enterprises that are self funding and economically sustainable
- promote investment in ICT to facilitate fast and efficient formal education such as distance or e-learning courses and informal education via enterprise associations supplying research, management and marketing information
- promote enterprises that are environmentally sustainable and are least likely to impact negatively on the existing rural social structures and culture.

These strategies reflect some of the strategies proposed in the INRULED publication *Education for Rural Transformation*<sup>87</sup>. In particular, we agree that ICT can only be a means and not an end in itself but that ICT is important for fostering interactions and experiences and sharing resources. In New Zealand, the Internet has gone beyond these goals by providing a marketing vehicle to the global marketplace.

New Zealand has long had good gender equal early childhood care and education services, a national learner-centred curriculum and safe and caring school environments. We also support the other strategies formulated to promote education for all. These are important strategies to pursue in improving rural education.

It will be up to each country to decide the actions required to achieve rural education goals but, based on our analysis of New Zealand, human-needs centred or people-centred development is more likely to create the conditions necessary for rural enterprise development. The role of central or regional government and developmental NGOs should be to assist people to participate in identifying available resources and establishing and managing locally self-sustaining rural enterprises. Central agencies should not seek to impose rural enterprise development on rural people without involving them in the decision making.

## Notes and references

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- <sup>2</sup> <http://www.stats.govt.nz/domino/external/Web/nzstories.nsf/092edeb76ed5aa6bcc256afe0081d84e/54e50d25aff60a7bcc256b1e007adcb6?OpenDocument> [Retrieved 26/10/02]
- <sup>3</sup> *SMEs in New Zealand: Structure and Dynamics*. Wellington: Industry & Regional Development Branch, Ministry of Economic Development, June 2001.
- <sup>4</sup> <http://www.stats.govt.nz/domino/external/pasfull.nsf/web/Media+Release+2001+Census+snapshot+10+Rural+New+Zealand?open> [Retrieved 26/10/02]
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- <sup>6</sup> <http://www.maf.govt.nz/mafnet/press/301002farm.htm> [Retrieved 3/11/02]
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- <sup>9</sup> <http://www.stats.govt.nz/domino/external/pasfull/pasfull.nsf/web/Media+Release+2001+Census+Snapshot+10+Rural+New+Zealand?open> [Retrieved 26/10/02]
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- <sup>11</sup> <http://www.maf.govt.nz/mafnet/rural-nz/profitability-and-economics/structural-change/reform-of-nz-agriculture/reform03.htm> [Retrieved 26/10/02]
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- <sup>13</sup> *The New Zealand Official Yearbook 2000*. Wellington: David Bateman, 2000. In 1999 there were 1.5 million tourists, 1980, 400 000, 1990, 900 000. Trends would point to 2 million in 2002. Value 1999 to the New Zealand economy \$3.6 billion.
- <sup>14</sup> Rural farmstays [www.ruraltours.co.nz](http://www.ruraltours.co.nz) [Retrieved 26/10/02]
- <sup>15</sup> Penguin Place, home of the Yellow Eyed Penguin Reserve, winner of several Eco-tourism awards, [www.penguin-place.co.nz](http://www.penguin-place.co.nz) [Retrieved 26/10/02]
- <sup>16</sup> The Banks Peninsula Track, 35 km, privately owned and managed by the families who have lived for generations in this remote area of New Zealand. A lot of coastal wildlife is to be seen on this track. [www.webnz.co.nz/bbnz/bankstrk](http://www.webnz.co.nz/bbnz/bankstrk) [Retrieved 26/10/02]
- <sup>17</sup> <http://www.maf.govt.nz/mafnet/rural-nz/people-and-their-issues/demographics/sustainable-agriculture-and-regional-development/socsus04.htm> [Retrieved 26/10/02]
- <sup>18</sup> OPENZ — Organic Products Exporters of NZ Inc. was formed to encourage and support companies and organisations who have an interest in the New Zealand organic export industry. <http://www.organicnewzealand.org.nz/index.htm> [Retrieved 26/10/02]
- <sup>19</sup> Tatua Cooperative Dairy Ltd. <http://www.tatua.com/> [Retrieved 8/7/03]
- <sup>20</sup> OECD cited in MAF 1999.

<sup>21</sup> <http://www.maf.govt.nz/mafnet/rural-nz/profitability-and-economics/structural-change/reform-of-nz-agriculture/reform08.htm>. [Retrieved 26/10/02] Once the agricultural industry started taking its own initiatives, the NZ government began to facilitate support to encourage these initiatives. A Rural Affairs Unit was set up in MAF Policy, and there were good information flows through a comprehensive information brokering system through a Rural Bulletin available freely to rural people.

<sup>22</sup> New Zealand Resource Management Act 1991.

<sup>22</sup> <http://www.ew.govt.nz/> [Retrieved 26/10/02] Environment Waikato is a regional council which manages natural and physical resources in the Waikato region — including pest control and natural hazard management.

<sup>24</sup> <http://www.maf.govt.nz/mafnet/rural-nz/people-and-their-issues/social-research-and-welfare/social-factors-influence-on-primary-production/scfcprp.htm#Forward> [Retrieved 26/10/02]

<sup>25</sup> The Trust's Mission Statement is : 'To facilitate the approved and safe use of agrichemicals in NZ consistent with effective sustainable land management and environmental protection'.

<sup>26</sup> <http://www.growsafe.co.nz/> [Retrieved 26/10/02] The Code of Practice is the core training document for the GROWSAFE® Training Programme, which aims to improve users' understanding of

- the role of agrichemicals in the management of pests and diseases
- properties and mode of action of commonly used agrichemicals
- principles of agrichemical application
- potential impact of agrichemicals
- obligations of agrichemical users.

<sup>27</sup> <http://www.nzqa.govt.nz/about/#1> [Retrieved 26/10/02] The New Zealand Qualifications Authority was established in 1990 to provide an overarching role in quality assured qualifications and to coordinate national qualifications in New Zealand.

The Qualifications Authority deals with the provision and quality of qualifications. It works in partnership with all education providers and national groups representing education and training in industry and business. The Authority does not deal with the school curriculum or funding for education and training.

The New Zealand Qualifications Authority is a Crown Entity established under the Education Act 1989. The Authority is appointed by the Minister of Education, and is accountable through the Minister to Parliament.

<sup>28</sup> <http://www.agricultureito.ac.nz/intro.asp> [Retrieved 26/10/02] Agriculture ITO (Industry Training Organisation) organise earn-as-you learn training courses for farm employees in the New Zealand agricultural industry. Funded by government and industry It helps coordinate and deliver high quality training and education at a regional level. All training courses are nationally recognised and registered with the New Zealand Qualifications Authority.

<sup>29</sup> [http://www.woolpro.co.nz/farm\\_tech/monitor.html](http://www.woolpro.co.nz/farm_tech/monitor.html) [Retrieved 26/10/02]

<sup>30</sup> <http://www.nzcer.org.nz/research/transition.htm> [Retrieved 26/10/02] Secondary Tertiary Alignment Resource (STAR) — funding for schools to offer a wider range of courses to their senior students. These help students to undertake courses of study and/or workplace experience and gain skills and qualifications which lead to either employment or further education and training.

<sup>31</sup> <http://www.nzffa.org.nz/> [Retrieved 26/10/02]

<sup>32</sup> <http://www.reap.org.nz/> [Retrieved 26/10/02]

<sup>33</sup> <http://canterbury.cyberplace.org.nz/community/sbec.html> [Retrieved 26/10/02]

<sup>34</sup> The Economic Service. *Annual Review of the New Zealand Sheep and Beef Industry 2001-02*. Wellington: The Service, 2002.

<sup>35</sup> <http://www.ruraltours.co.nz/> [Retrieved 26/10/02]

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- <sup>52</sup> [www.rsnz.govt.nz/publish/nzjar/2000/21.php](http://www.rsnz.govt.nz/publish/nzjar/2000/21.php)
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- <sup>59</sup> [www.nzqa.govt.nz/](http://www.nzqa.govt.nz/)
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