

NZCEE News

NEWSLETTER OF THE NEW ZEALAND CENTRE FOR ECOLOGICAL ECONOMICS

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Directors Letter: Defining Ecological Economics

We are often asked: 'what is ecological economics' and 'how does it differ from resource economics or environmental economics'? Although there are areas where these two sub-branches of economics adopt very similar approaches—e.g., in the area of policy instruments—there are, however, distinct differences between ecological and neoclassical economics, as outlined in "Comparisons" on pages 2–3. Ecological economics is a relatively young discipline (the International Society for Ecological Economics was formed in 1989) that is still defining its 'niche', which is distinctive yet overlaps with conventional economics.

Put simply, ecological economics is 'economics that puts sustainability first'. If we accept this proposition and if we want to develop an economics that has real practical application, we need to go about the business of economics differently from how we have in the past. This doesn't mean we need to discard conventional (neoclassical) economics, which has dominated since the time of Alfred Marshall; rather, we need to develop an ecological economics that takes seriously ecological theory and what it means for sustainable development, as well as better understanding the social and institutional contexts in which we operate. All too often, economics tends to operate in a vacuum as if ecological, social and institutional contexts don't exist or are not important.

Conventional economics has provided powerful tools for analysing issues of economic efficiency, economic growth, technological development, and so forth. This is necessary, but not sufficient in a societal context, which is increasingly concerned with progress across a range of environmental and social goals, as well as economic goals. A more holistic, integrative approach is required.

Thinking about the 'complexity' and 'multidimensionality' of economy-and-environment relationships is at the heart of ecological economics practice. This is in contrast to conventional economics, which is methodologically 'reductionistic' and uses mechanical models of the economy often based on analogues drawn from mechanical physics and classical thermodynamics. Accepting complexity as the order of the day means that ecological economists draw on 'complex systems thinking' that emphasises ideas such as 'emergent properties' and interdisciplinary approaches to economics that attempt to be 'holistic' and 'systematic' rather than reductionistic.

*Professor Murray Patterson
Director, New Zealand Centre for Ecological Economics*

Ecological Economics	
Theoretical Perspective	Biophysical/ecological limits to economic and social behaviour.
Focus of Analysis	Sustainability.
Disciplinary View	Transdisciplinary—operating in the area between the biophysical sciences, economics, and the other social sciences.
Heritage	Some roots amongst the classical economists. Modern-day ecological economics dated from the late 1960's to the early 1970's, led by Daly, Georgescu-Roegen and Boulding.
Methodological Approach	Holistic. Complex Systems Thinking.
Indicators of Societal Progress	Indicators that measure all dimensions of sustainability (economic, environmental, social), either separately or collectively. For example, the 'Genuine Progress Indicator'.
Analytical Tools	Energy and material flows analysis, ecological footprinting, integrated economic-ecological modelling, thermodynamic and energy analysis, participatory and action research methods.
Methods of (E)valuation	Mixture of Methods. Some based on ecological (e)valuation, e.g., carrying capacity analysis and ecological pricing; some based on capturing all dimensions of sustainability (economic, ecological) e.g., multi-criteria analysis.
Scarcity and Economic Growth	Physical and ecological limits to economic growth. Limits to technological development.
Environment and Economic Growth	(Physical) economic growth necessarily has impacts on the environment. Therefore, there is usually a 'trade-off' between physically growing the economy and achieving environmental outcomes.
Dominant Theme	Anthropocentric, with attempts to open up more consideration of biocentrism.

Note 1: Two sub-branches of Neoclassical Economics deal with 'environmental/resource' issues. They are 'Resource Economics' and 'Environmental Economics'.
 Note 2: Ecological Economics and Neoclassical Economics do overlap and sometimes draw on the same concepts/methods. For example, ecological economists do use 'non-market valuation' methods, but this would usually be in the context of one input into a valuation study rather than the ONLY input.
 The above is adapted in part from Sahu and Nayak (1993) "Niche diversification in environmental/ecological economics." *Ecological Economics*, 11, 9–19.

Neoclassical Economics¹

Market mechanism, market forces.

**Theoretical
Perspective**

Mainly economic efficiency.

Focus of Analysis

Mono-disciplinary. Resource and environmental economics extend neoclassical economic ideas to include ‘the environment’.

Disciplinary View

Based on the marginal revolution in economics (1880–1900), led by Alfred Marshall’s development of the famous ‘supply and demand’ curve.

Heritage

Reductionistic. Logical Positivism. Mechanistic, based on models and analogues drawn from 19th Century Physics.

**Methodological
Approach**

GDP – despite widespread criticism of this indicator by Neoclassical Economists.

**Indicators of
Societal Progress**

Static equilibrium analysis, based on the Marshallian Scissors. General Equilibrium analysis. Non-market valuation approaches that extend ‘marginal’ value ideas to environmental ‘externalities’.²

Analytical Tools

Hegemony of Cost: Benefit Analysis, with Non-Market Valuation methods used to ‘value’ non-market environmental assets and processes.

**Methods of
(E)valuation**

More optimistic about the role of technology and the market mechanism in overcoming resource scarcity problems.

**Scarcity and
Economic Growth**

Economic growth and environmental impacts can be ‘decoupled’. Therefore ‘win-win’ situations frequently exist, where we can simultaneously achieve beneficial environmental and economic outcomes.

**Environment and
Economic Growth**

Anthropocentric.

Dominant Theme

Further reading on Ecological Economics that may interest our readers include the paper by Herman E. Daly (2005) “Economics in a Full World” in *Scientific American*, pp 100–107; and Murray Patterson’s 2006 article in *Ecological Economics* 56(3) “Development of ecological economics in Australia and New Zealand”.

The 9th International Society for Ecological Economics (ISEE) “Ecological Sustainability and Human Well-being” Conference 16–18 December 2006, New Delhi, India.

The biennial ISEE conference provided a good opportunity for meetings between leading ecological economists from developed and developing countries. Increased concern and awareness of environmental issues resulting from climate change has meant many of the new frontiers opened up by ecological economics in the past are now more main stream. Despite this, acceptable solutions remain elusive and this is where future efforts need to be directed. The impressive list of speakers included: Amartya Sen (winner of the 1998 Nobel

Prize for economics), Simon Levin (regarded as one of the world’s leading ecologists), and Sunita Narain, an Indian activist in the environmental area who gave a passionate and riveting address on water issues in India. She has already been effective in reducing New Delhi’s air pollution levels by convincing the authorities to convert from diesel to LPG-fuelled buses. However, as visitors to Delhi could appreciate, the challenges for Sunita and others with both air and water quality issues remain enormous.



L-R: Robbie Andrew, Phil Lawn, Charlotte Sunde, Murray Patterson, Vicky Forgie, Nigel Jollands

The 10th Biennial ISEE Conference

“ISEE2008 Nairobi: Applying Ecological Economics for Social and Environmental Sustainability”, will be held in Nairobi, Kenya from 7–11 August, 2008. The conference is a joint undertaking by ISEE, African Society for Ecological Economics (ASEE) and the United Nations Environment Programme (UNEP).

Iwi Ecosystem Services

Natural and managed landscapes provide ecosystem services that support both human society and ecological integrity. Ecosystem services offer a powerful framework for defining the goals, objectives, and justification for ecosystem management and conservation endeavours. In partnership with Ngati Raukawa, NZCEE is undertaking a FRST project entitled, “Ecosystem Services Benefits in Terrestrial Ecosystems for Iwi”, which seeks to understand ecosystem services in biophysical, socioeconomic, and cultural contexts. The research programme has two objectives:

- (1) assessing natural resources by quantifying and valuing the ecosystem services located within natural and managed landscapes; and
- (2) working in conjunction with the iwi so that both western ecological and traditional Maori knowledge can be used to improve natural resource management and to identify ecological restoration options.

Researchers at NZCEE, Landcare Research, Massey University, and Te Wananga-O-Raukawa



are working together to explore ecological processes and economic values in natural and managed ecosystems. The multi-phase project seeks to understand the nature of present-day ecosystem services and their change through time. By creating a current portfolio of ecosystem services and reconstructing historical landscapes, we can understand how the area has altered with changing settlement patterns and land-use activities. Future phases of the project will use these results to explore the opportunities for ecological restoration projects for the iwi.

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Ecological Economics: Want to find out more?

“Adbusters” is a topical magazine that may be of interest to our readers. Volume 12(5) published in Sep/Oct 2004 focused on issues of Sustainable Development, with a particular emphasis on Ecological Economics. More information about this interesting and thought-provoking publication can be found at: http://www.adbusters.org/the_magazine/

“EnviroNZ - the Magazine of the Ministry for the Environment - showcases many practical ways in which New Zealanders are embracing sustainability. See: <http://www.mfe.govt.nz/publications/about/environz/>

Documentaries, reports and international events that have made an impact worldwide in advancing the debate about sustainable development, highlighting the importance of Ecological Economics research, include: An Inconvenient Truth, presented by Al Gore (<http://www.climatecrisis.net/>); and the Stern Report on the economics of climate change (http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/sternreview_index.cfm)

EF+

New Zealand's primary produce industry transforms natural resources (e.g., grass, animals, wool, milk, trees, water and energy) into products and waste. The "Ecological Footprint Plus" programme aims to quantify the "eco-efficiencies" (ratio of useful products to resource inputs and waste) within New Zealand's primary processing value chain. Driving this effort is a government aim to reduce the environmental impacts of economic growth in the food and fibre sectors. This work provides a way of identifying the environmental impacts of a sector in the economy – measured in terms of land, energy and global warming potential (GWP). By providing an understanding of where in the supply chain (as the analysis looks at both the direct and indirect contributions) environmental impacts occur, a sector is in a better position to determine how to minimise their environmental resource use and production of wastes.

For example, we have quantified the GWP of the forestry and logging sector to identify what the direct contribution of the sector is, and the sectors from which forestry and logging appropriate GWP as a result of the goods and services they purchase.

This project is funded by the Public Good Science Fund over the 2004–2009 period. It focuses on the dairy, meat, wool and forestry industries. The project is a collaboration between AgResearch, Environmental Science & Research, Scion, Massey University and the New Zealand Centre for Ecological Economics (a joint venture between Landcare Research and Massey University).

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The Genuine Progress Indicator

Economic growth, expressed in terms of percentage increase in Gross Domestic Product (GDP), is often reported by governments and the media on the basis of the 'bigger the better'. There is little diagnosis of what sectors contribute to this growth and whether income is from well-managed renewable sources or from the degradation of natural assets that will not be available to produce benefits in the future. Any monetary transaction increases GDP regardless of whether the transaction has a positive or negative influence on the nation's welfare. However, to improve the well-being of a nation, economic growth must produce more beneficial than negative effects. The Genuine Progress Indicator (GPI) adjusts for the negative social and environmental effects that occur when producing the economic throughput that equates with GDP. While the GPI may lack the precision of the GDP because of the subjective

nature of valuing environmental and social goods and services not traded in the market place, GPI is a more accurate indicator because it does not arbitrarily place a zero value on factors essential for a nation's well-being. While the absence of social and environmental data is an obstacle to rigorous GPI calculations, the System of National Accounts from which GDP is extracted has developed over more than 50 years, with accounting systems being improved along the way. Nations generally manage what they measure; thus, recognising the importance of non-economic contributions to welfare is an essential first step, and systems can then be put in place to improve data collection over time. The GPI study is nearing completion and will be released by the end of the year.

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Futures Modelling – Motueka Catchment

‘Futures modelling’ addresses the unease and uncertainty around long-term issues regarding landscape usage, energy sources, biodiversity, water resources, population changes, etc. The basic idea behind this concept is to build on existing knowledge to explore the future with the aim of shifting to more sustainable forms of development. Different modelling techniques are used across a wide range of stakeholders to develop and explore future scenarios, building on biophysical capability, models and datasets. Landcare Research’s futures modelling research in the Motueka Catchment has focused on building participatory modelling approaches and on building a wide range of land and marine biophysical, economic and social tools (<http://icm.landcareresearch.co.nz/>). The independent development and use of these tools is providing understanding about how scientists, planners, policy makers, businesses and communities can work together using a shared modelling language to build a sustainable future for New Zealand, its regions and its catchments.

Currently, we are using existing biophysical, economic, social and cultural knowledge to

define and model human behaviour on land use-land change (LULC) decision making through a multi-agent simulation (MAS) model for the Motueka Catchment. We are collaborating with the Department of Biological and Ecological Engineering, Oregon State University to adapt their decision support system (EVOLAND) to the catchment. EVOLAND complements existing ICM modelling developments, namely, spatial biophysical models (IDEAS) and economic and environmental systems dynamics models. The main feature of EVOLAND is its ability to define a structure in which scarcities in the landscape influence decisions on LULC (Figure 1).

In EVOLAND, policies provide the fundamental framework guiding and constraining land use and land management decision making. Policies capture rules, regulations, and incentives promulgated by public agencies in response to demands for ecological and social goods, as well as factors used by private landowners and land managers to make decisions about land and water use.

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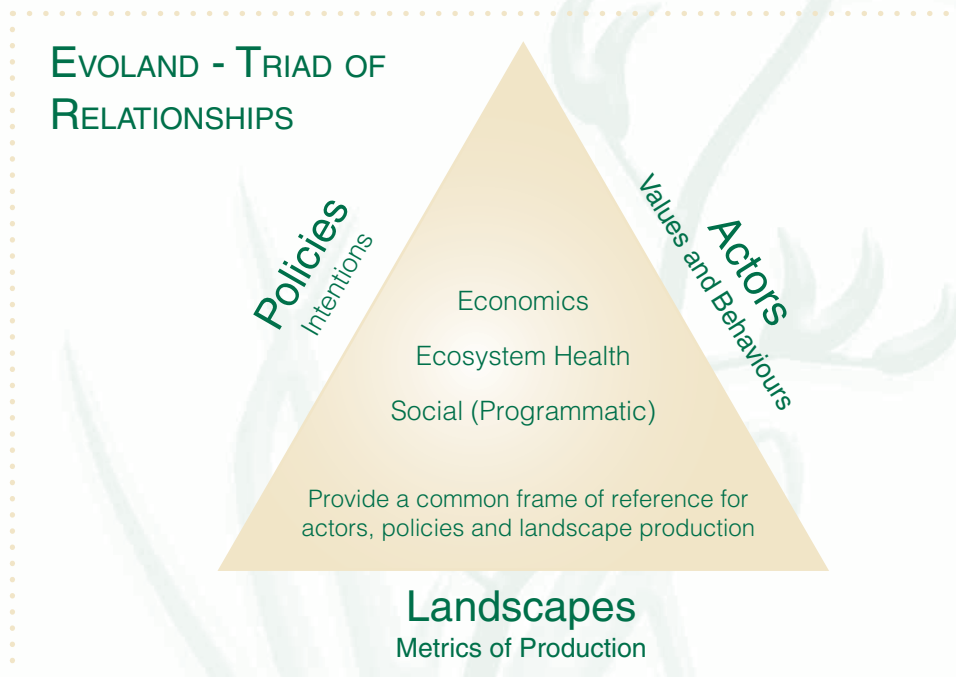


Figure 1. Evoland’s frame of reference.

NZCEE Staff

NZCEE has seen a number of staffing changes since the last newsletter. In 2006, Dr Anthony Cole took up a position with the Te Wānanga-o-Raukawa, but he continues to work with NZCEE on the Iwi Ecoservices project featured in this newsletter. Later in 2006, Dr Nigel Jollands moved to Paris to take up a position with the International Energy Agency. Over the last year, new staff have joined the NZCEE team: Dr James Lennox, Oscar Montes de Oca Munguia, Derrylea Hardy and Raewyn Edmonds, as well as new staff at Market Economics Limited – Nicola Smith and Jenna Zhang. We also have several new PhD students.

Dr James Lennox

James is the Research Leader in ecological economics at Landcare Research and NZCEE. His research focuses on the development and application of environmental input-output (EIO) and computable general equilibrium (CGE) models to link and evaluate environmental and economic policy issues in New Zealand.

Oscar Montes de Oca Munguia

Oscar started working as an ecological economist for Landcare Research and NZCEE in November 2006. Oscar has experience as a modeller and business analyst in agricultural systems, financial systems, logistics of the criminal justice system, and national and regional economic and environmental models. His current area of interest is integrating social systems within economic and environmental models. Oscar moved to New Zealand from Mexico in 1997 to do a Masters Degree in Agricultural Systems at Massey University. His wife is a New Zealander, they have three small children, and they live in Wellington.

Derrylea Hardy

Derrylea joined NZCEE almost a year ago, having spent the previous five years working primarily on health services management and mental health-related research. She has also conducted research on the casualisation of the workforce, and the New Zealand tourism sector. She is producing publications from recent NZCEE projects, an Edward Elgar book on the ecological economics of the oceans and coasts, and is researching issues surrounding the uptake of sustainability indicators and transfer of research knowledge in ecological economics. She has a BBS(Hons) Degree in Management.

Raewyn Edmonds

Raewyn joined the support staff at Landcare Research NZ Ltd in April 1999. In November 2005, Landcare Research contracted Raewyn's services to the NZCEE team from 9–3pm daily to assist with administration matters and provide secretarial support to the Director of NZCEE.

Jenna Zhang

A recent graduate from Auckland University, Jenna is a researcher contracted by Market Economics Ltd to work on NZCEE projects such as the New Zealand genuine progress indicator, and general equilibrium modelling of NZ economy-environment interactions.

Further details about all NZCEE staff, including photos and information about our projects can be found on our website: http://www.nzcee.org.nz/pages/contact_us/.

Students

Several students are doing Ph.D. research in association with NZCEE. A monthly seminar series is currently underway during which students present their research. This opportunity enables them to get feedback and to exchange ideas and information with Landcare Research staff, NZCEE staff, and other Ph.D. students.

Nicky Smith

Nicky is a researcher contracted by Market Economics Ltd to work on projects such as Auckland scenario modeling. She has a FRST Enterprise scholarship for her Ph.D. on modelling the global biogeochemical cycles and their interaction with the global economy.

Rosmini Ismail

For the last six years, Rose has been an accounting lecturer in the Business and Economics Faculty at University Pendidikan Sultan Idris (Sultan Idris Education University) in Malaysia. Her Ph.D., "Accounting for sustainability in the Malaysian Tourism Industry: Theory, Methods and Application", is sponsored by the Malaysian Government.

Estelle Dominati

Estelle arrived recently from France to do her AgResearch-sponsored Ph.D. conjointly through NZCEE, at Massey University, and the University of Versailles in France. For her Ph.D., Estelle will research the valuation of soil ecosystems and their contribution to natural capital.

Scott Bremer

Scott is a resource planner by profession who has returned to academia after a 'rigorous' three years in local government. Scott's Ph.D. is also through both Massey University and the University of Versailles. This will see him studying in Versailles for a year, from September 2007. He has a Ryochi Sasakawa scholarship that will be supplemented by an Eiffel scholarship while in France. Scott will be looking at the science-policy interface in participatory planning for the coast.

Ian Luxmoore

Ian is a tutor at the School of People, Environment and Planning at Massey University, teaching planning analysis techniques. In his "free" time, Ian works on his Ph.D., which is concerned with policy modelling of the New Zealand energy system.



(L-R) Ian Luxmoore,
Scott Bremer,
Estelle Dominati and
Rosmini Ismail

Key Publications

- “Ecological Economics of the Oceans and Coasts” will soon be published by Edward Elgar in the U.K. Edited by Professor Patterson and Associate Professor Glavovic of Massey University, with contributions by 15 authors from around the world, the book covers four fundamental questions of importance to establishing an ecological economics of the oceans and coasts. (1) How do ecological processes underpin coastal and oceanic systems? (2) How can ecological economists deal with ‘value conflicts’ that result from human interactions with these coastal and oceanic processes and systems? (3) How can ecological economists ‘integrate’ our understanding of the economic, ecological and social dimensions of these coastal and oceanic systems? (4) How can we implement the ideas that emerge from this analysis in the real world to achieve sustainability goals? The book should be available for purchase later this year.
- NZCEE contributions are also included in a book edited by Philip Lawn, “Sustainable Development Indicators in Ecological Economics”. Dr Nigel Jollands wrote Chapter 15, “Getting the most out of eco-efficiency indicators for policy”; and Professor Murray Patterson authored the concluding chapter of the book, “Selecting headline indicators for tracking progress to sustainability in a nation state”.
- “Smart Growth and Climate Change: Regional Development, Infrastructure and Adaptation”, edited by Matthias Ruth, included a chapter by Patterson, McDonald, Golubiewski, Forgie and Jollands: “Climate change impacts on regional development and sustainability: an analysis of New Zealand regions”.
- Special Issue of Ecological Economics 56(3), 309–454. NZCEE edited the March 2006 special issue of this ISEE journal, which comprised articles from the Ecological Economics Think Tank held in Auckland, NZ in 2003.
- The Hamilton and Wellington CLINZI (Climate Change Impacts on New Zealand Infrastructure) reports are available for purchase. Contact nzcee@landcareresearch.co.nz for further information.
- Many other book chapters, reports, articles and conference proceedings have been published by NZCEE over the past few years. The full list can be found on our website: http://www.nzcee.org.nz/pages/publications/recent_publications.asp

If in future you would like to receive the newsletter as a pdf by email, or wish to be removed from our mailing list, please advise nzcee@landcareresearch.co.nz



Vice-Chancellor Professor Judith Kinnear and her counterpart Professor Sylvie Faucheux from Versailles University toast the signing a memorandum of understanding for future academic co-operation in ecological economics and sustainability sciences

News in Brief

A Memorandum of Understanding was signed by the Vice Chancellors of the University of Versailles and Massey University in 2006, formalising an ongoing relationship for collaboration and co-operation in ecological economics and sustainability sciences (see picture opposite). This facilitates the exchange of staff and students, joint research and teaching activities, participation in seminars and academic meetings, and joint quality assurance benchmarking. To this end, Professor Murray Patterson is currently in Paris on sabbatical, working with Professor Martin O'Connor at the University of Versailles. Professor Martin O'Connor has also visited NZCEE several times as part of his Hayward Fellowship that has provided funding to explore the application of his 'deliberation process' in NZ. This essentially guides decision makers through a process that explicitly addresses multiple competing objectives.

Dr Garry McDonald completed his Ph.D. at Massey University and graduated in 2006. His thesis, "Integrating Economics and Ecology: A Systems Approach to Sustainability in the Auckland Region", is shortly to be published in report form by NZCEE.

Dr Nancy Golubiewski was invited by noted ecologist Steward Pickett to participate in the 12th biennial Cary Conference hosted by the Institute of Ecosystem Studies (IES) in Millbrook, New York (1-3 May 2007): "Resilience in Ecology and Urban Design: New Theory and Practice for the Urban Century". Cary Conferences are designed to focus on emerging issues and cross-disciplinary themes to guide the development and application of ecology, and are important international milestones in the advancement and use of ecological science. Dr. Golubiewski also gave a seminar as part of IES' Spring 2007 scientific seminar series: "Postcards from the edge: Exploring ecological research in interdisciplinary and international contexts".

After taking maternity leave from mid-March

through to August 2006, Nancy Golubiewski returned to work part-time in September, resuming full-time duties in December 2006.

In March 2007, Vicky Forgie and Derrylea Hardy attended the Parliamentary Commissioner for the Environment's PCE20 Forum: Advancing environmental sustainability, in Wellington.

Vicky, Nancy, Oscar and Estelle attended the July 2007 Australia New Zealand Society for Ecological Economics conference in Noosa, Australia. The theme of the conference was 'Re-inventing Sustainability: A Climate for Change'.

Robbie Andrew and James Lennox recently attended the 16th International Input-Output Association conference in Istanbul, Turkey. They both also attended the advanced CGE modelling course in Brussels. Robbie then spent time working with Glen Peters at Trondheim, Norway.

John Bolte, Head of the Department of Biological and Ecological Engineering, Oregon State University, visited NZCEE this year to produce a basic version of Evoland for the Motueka Catchment project.

NZCEE has been contracted to update the eco-footprint on the Ministry for the Environment website. Dr Garry McDonald is currently completing this project.

Horizons Regional Council contracted Robbie Andrew to develop a user-friendly, interactive eco-footprint for use in schools.

NZCEE was selected to represent the College of Humanities and Social Sciences at Massey University as one of its "Featured Research Units" during its 2006 Alumni Evening.

The Auckland Scenario Workshops have now been completed in the Auckland region by Dr Richard Le Heron.

You don't have to be extreme to be green!

The WA\$TED television series was this year the winner of the 'Sustainable Business and Households' category of the Green Ribbon Awards sponsored by the Ministry for the Environment. This award acknowledges the outstanding contribution made by New Zealanders to sustaining, protecting and enhancing our environment. The WA\$TED programme worked with 10 different types of New Zealand households to see how they could reduce their overall resource use and lower their impact on the

planet. It was viewed by approximately 2.6 million New Zealanders and showed the gains you can make, both financially and environmentally, by making small lifestyle changes. NZCEE produced the household eco-calculator that showed the initial size of each household's footprint and how it reduced after changes were made in the household throughout the programme. The calculator was also placed on the www.wastedtv.co.nz website to show how small changes in lifestyle can have an impact on the environment.



Robbie Andrew (far left) and Vicky Forgie (far right) pictured with Carthew Neal (creator and producer of the WA\$TED TV series) and Francesca Price (presenter).

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