GROWING A BETTER, HEALTHIER FUTURE

2011 UPDATE

www.zespri.eu
The purpose of this section is to explain ZESPRI’s commitment to sustainability; what sustainability means at ZESPRI. Highlight the components and progress.

“ZESPRI is the world’s leading marketer of kiwifruit and is proud to be making commendable progress in the sustainability journey.”

Lain Jager, ZESPRI Chief Executive Officer
Sustainability
The ZESPRI Way

ZESPRI has a long history of innovation and continuous improvement across the lifecycle of its products. It makes ZESPRI the acknowledged leaders in delivering premium quality, healthy and nutritious kiwifruit to consumers all around the world.

The quality of our natural environment; the efficiency and sophistication of our specialist supply chain system; and the skills and commitment of our people are all critical factors underpinning our premium brand.

ZESPRI has an absolute commitment to research and development of new technology to continue enhancing the way we operate across our integrated supply chain – the ZESPRI® System.

We work with leading research institutes and partners to understand and improve our environmental position, while a cross-functional team spanning our industry assesses the feasibility of new sustainability initiatives and supports their implementation.

ZESPRI is committed to growing a better, healthier future.

ZESPRI Sustainability Progress to 2011

<table>
<thead>
<tr>
<th>Environmental Indicator</th>
<th>Quantify your footprint</th>
<th>Assess our risks and opportunities</th>
<th>Developing new tools and technology</th>
<th>Enhancing our business</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greenhouse Gas Emissions</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>●</td>
</tr>
<tr>
<td>Water</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>●</td>
</tr>
<tr>
<td>Waste</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Packaging Materials</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>●</td>
</tr>
<tr>
<td>Orchard / Plant Material</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>●</td>
</tr>
<tr>
<td>Non-renewable Resources</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>●</td>
</tr>
<tr>
<td>Biodiversity</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>●</td>
</tr>
</tbody>
</table>

✓ = implemented  ● = work in progress  = 2011 Focus
Managing Carbon and Greenhouse Gas Emissions

ZESPRI led the way in the world’s horticultural sector, working in collaboration with the New Zealand Ministry for Agriculture and Forestry to create a comprehensive carbon footprint across the lifecycle of New Zealand kiwifruit. The study identifies the pattern of emissions across the lifecycle from the orchard to consumption in the market as a basis for prioritising emission reduction initiatives.

The study provides a basis for research investment to develop new knowledge and tools to adapt our business and reduce emissions, ultimately driving positive reductions in environmental impacts.

ZESPRI utilised global best practice, applying the PAS 20/50 methodology to develop a full product lifecycle carbon footprint for each of our products; ZESPRI® GREEN, GOLD and ORGANIC Kiwifruit.

Consumer demand for healthy and nutritious products, such as premium quality kiwifruit, continues to grow across the world and ZESPRI is focussed on meeting this growing demand while applying best practice production and supply chain systems to be environmentally responsible.

2011 Status/Actions:

- ZESPRI carbon footprint methodology has now been adopted as the international product rule for the lifecycle measurement in kiwifruit.
- Development of information technology systems is underway to record and monitor changes in the carbon/greenhouse gas footprint of our products.
- Ongoing research to identify and prioritise initiatives to reduce emissions across the product lifecycle.
“Sustainability is a passion – it’s about leaving our property in better condition for the future generations, including our children and grandchildren.”

Graham Dyer, ZESPRI® Kiwifruit grower
BayPark Orchard, Tauranga
ZESPRI® Growers Graham and Mavis Dyer epitomise the sustainability culture as they strive to produce the best quality, superior tasting kiwifruit.

As supreme winners of the 2011 Bay of Plenty Ballance Farm Environment Awards, Graham and Mavis were recently recognised for their passion and commitment to sustainability as leaders across a number of industry’s.

Graham and Mavis Dyer have a 12.5 hectare orchard and together with sons Gavin, Colin and Stephen, the family grow 37 hectares of ZESPRI® GREEN and GOLD Kiwifruit as well as future new ZESPRI varieties.

BayPark Orchard is at a higher altitude than most New Zealand orchards and has its challenges with twice the annual rainfall and lower sunshine hours.

The orchard includes a pond linked to a hydroelectric power scheme, providing high quality renewable water for frost protection and irrigating young vines.

Around the lake and across the property the Dyers have extensive plantings of native and exotic plant species which they have been nurturing for decades.

The orchards are managed with a strong sustainable philosophy, with crop protection and nutritional inputs minimised with natural birdlife and biodiversity flourishing. A focus on innovation and drive to refine the growing techniques has produced excellent fruit quality and yields, underpinning the financial sustainability.

Demonstrating their commitment to biodiversity and environmental preservation, the Dyers have established an internationally significant collection of Agathis (Kauri trees) and are actively supporting the establishment of a public Kauri grove for the wider community to enjoy.
2011 Status/Actions:

- Fertiliser use has been minimised with new optimisation tools and naturally derived composts and nutrition products increasingly applied.
- Reduced application of crop protection products with softer, more advanced products supporting biological controls.
- Extensive grower education on best practice growing techniques.

8 percent of kiwifruit orchard land title is in ecological refuge, supporting biodiversity and carbon sequestration potential. (ARGOS, 2010)
“Sourcing renewable supplies of water and preserving the water quality is critical to our sustainable production.”

Graham Dyer,
ZESPRI® Kiwifruit grower
BayPark Orchard, Tauranga
Governments and environmental agencies (NGO’s) along with some retailers are wanting to understand more about the virtual water management associated with consumer products.

Water footprint research is in its infancy. The study provides ZESPRI with a better understanding of its production and supply chain systems as well as making a contribution to global knowledge on water use.

The study was completed by Landcare Research, Plant & Food Research Limited and AgriLink and co-funded by ZESPRI and the Ministry of Agriculture and Forestry (MAF).

The deep roots of kiwifruit vines are very effective at seeking out water naturally with extracted water primarily used for the irrigation of younger vines and for frost protection.

More growers are establishing offline water storage to meet their needs while minimising the pressure on resources.

The research assesses the three types of available water:
- ‘Green’ water – rainwater that naturally replenishes the soil for plant growth.
- ‘Blue’ water – renewable surface or groundwater that requires energy to extract and apply.
- ‘Grey’ water – the water needed to dilute any impurities leached from the soil to drinking water standard.

**COMPONENTS OF ZESPRI WATER FOOTPRINT**

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green</td>
<td>85%</td>
</tr>
<tr>
<td>Blue</td>
<td>5%</td>
</tr>
<tr>
<td>Grey</td>
<td>10%</td>
</tr>
</tbody>
</table>

**2011 Status/Actions:**

- 100 percent of ZESPRI® Kiwifruit water use in New Zealand is from naturally replenished sources, including rainfall and underground aquifers.
- ‘Blue’ water that is applied for irrigation and frost protection accounts for only 5 percent of the total water footprint.
- ‘Grey’ water has been minimised by the trend of reducing orchard crop protection and fertiliser inputs.
- Research to better define best practice water use is underway to further optimise water use and support future new planting decisions.

This research is being conducted by Landcare Research and funded by the Ministry of Agriculture and Forestry’s Sustainable Farming Fund.
“Kiwifruit vines actively absorb CO₂ and store it in the soil.”

Dr Hasinur Rahman, Soil Scientist, Plus Group

Benefits of soils rich in carbon

✓ Improved soil fertility and productivity.
✓ Improved nutrient holding capacity and reduced risk of nutrient leaching.
✓ Improved water retention.
✓ Removes greenhouse gas emissions.
✓ Increased resilience to climate change.
✓ Secures the supply of healthy and nutritious food.
Kiwifruit Soil Carbon Storage

Soil is a key global resource for removing and storing carbon emissions from the atmosphere and ZESPRI is investing in a major three-year study to understand carbon storage in our 13,500 hectares of kiwifruit soils.

Kiwifruit vines are quite unique with their extensive root systems reaching over 9 metres deep in search of water and nutrients. Through the seasonal growth cycle the roots continuously incorporate organic material deep into the soil. This process of building soil carbon is supported by earthworm activity.

The three-year study was funded by the Ministry of Agriculture and Forestry’s Sustainable Farming Fund and conducted by the Plus Group and Plant & Food Research Limited.

The project aims to develop the methodologies to answer:
- How do we measure soil carbon?
- What are the environmental and economic benefits of maximising carbon storage?
- What are the best practices for growers to economically and environmentally manage soil carbon?

To date, the research study has involved 40 kiwifruit orchards ranging from newly established sites through to those over 30 years old. Previous studies have focussed on the top 300 millimetres of soil while this study involves comprehensive analysis to depths down to 9 metres.

2011 Status/Actions:
- Kiwifruit vines actively build soil carbon over time at a rate of 3 tonnes of CO₂ equivalents per hectare per annum while the soil carbon levels in many other crops are reducing.
- Soils rich in carbon are a major driver of vine health and productivity.
- Up to half of the 3.9 percent per annum best practice carbon emission reduction emerging from leading companies involved in the Carbon Disclosure Project could be offset by soil carbon sequestration.
- The next phase will understand how changes in growing techniques influence soil carbon.

STORED SOIL CARBON COMPARISONS

<table>
<thead>
<tr>
<th></th>
<th>Above Ground</th>
<th>0-10cm</th>
<th>10-30cm</th>
<th>30-50cm</th>
<th>50-100cm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kiwifruit</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pastoral</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arable Crops</td>
<td></td>
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</table>
“Implementing new technology to further optimise fruit performance and minimise the environmental footprint of storage losses is a key 2011 focus.”

Dr David Tanner, General Manager Quality and Innovation, ZESPRI
The supply chain for packing ZESPRI® Kiwifruit is highly integrated and focussed on optimising efficiency and performance in packing, cooling and supply chain logistics to deliver excellent quality fruit to our customers. Our packaging is 100 percent recyclable and configured to protect and enhance the fruit performance with several research projects underway to deliver new environmentally responsible options for the future.

### 2011 Environmental Packaging Advances:

- **Next generation fruit labels.**
  ZESPRI is on the leading edge in the pursuit of new fruit label materials that naturally break down when the fruit skin is discarded. Despite significant technical challenges further advances in compostable materials have taken place with trials underway in 2011 to ensure the labels perform through the supply chain.

- **Biohybrid™ plastic polyliners.**
  Alternative bio-plastic materials are being investigated to replace the polyethylene (PE) plastic bags that protect and reduce hydration in packs of ZESPRI® Kiwifruit. The new high renewable content material has the potential to reduce greenhouse gas emissions by up to 6.6 percent without compromising the primary function of supporting fruit quality.

- **Bio-plastic pocket packs.**
  Pocket packs protect the fruit in layered packs during transport. Trials of renewable sourced bio-plastics are underway with significant carbon footprint reduction potential.

### Enhanced Fruit Quality Performance

ZESPRI fruit performance is a critical component of our premium brand and a multipoint strategy is underway to further enhance the fruit performance and reduce costly fruit loss.

Initiatives to enhance fruit performance:

- **Commercial trial of ‘Whole of Chain’ temperature monitoring utilising X-Sense, Radio Frequency Identification (RFID) technology.**

- **Implementation of lean manufacturing concepts, already successful in several facilities.**

- **Enhanced quality focussed information systems to enhance inventory management.**

- **Modified atmosphere packaging trials.**

### Other Sustainability Initiatives at Packing and Cooling:

- **100 percent renewable energy sourced to power ZESPRI’s packing and cooling hub in Zeebrugge, Belgium.**

- **Best practice coolstore efficiency systems implemented.**

- **Kiwifruit waste increasingly applied to processing initiatives, biofuel research, input to bio plastics, and vermicomposting.**
ZESPRI uses highly efficient direct shipping to reach consumers across the world. Shipping is responsible for the greatest contribution to the carbon output in the ZESPRI supply chain, providing the greatest opportunity for reductions in emissions.

Very Efficient Direct Shipping

Bulk reefer shipping is 27 percent more carbon efficient than container shipping and when onshore logistics are included, reefer shipping is 36 percent more carbon efficient.¹

Across our global supply chain, 70 percent of our shipping utilises chartered bulk reefer vessels with the balance on container lines. 100 percent of our European business is supplied direct to strategic hubs in northern and southern Europe with efficient direct reefer shipping.

To maximise efficiencies further, deck space is increasingly filled with containers to further increase the efficiency of each voyage, while ZESPRI packaging innovations also target optimal use of shipping space.

Optimal Vessel Speed

ZESPRI’s shipping partners utilise slow steaming, a technique which involves slowing vessels to minimise emissions and fuel use. A 10 percent reduction in vessel speed lowers fuel consumption and CO₂ emissions by 17 percent.

Other Shipping Initiatives:

- ZESPRI® Kiwifruit is increasingly carried on larger and more efficient vessels.
- New vessel design initiatives have the potential with available technology to reduce overall CO₂ emission reductions from 5 to 30 percent, with combined design and operational optimisation of over 40 percent by 2020.²
- Modern engines are being designed and trialed with modified fuels and biofuels targeting emissions reduction.
- Optimisation of refrigeration technology and changes to refrigerants are also driving positive change.

2011 Logistics Review

As part of our culture of improvement, in 2011 ZESPRI is conducting a comprehensive review of its logistics systems across its supply chain from coolstore to customer. The ZESPRI business continues to grow, creating opportunities to enhance the design and efficiency of our logistics systems and reduce emissions.

¹ Study commissioned by the 360 quality association and conducted by the Agribusiness and Economics Research Unit of Lincoln.
² Organisation for Economic Cooperation and Development (OECD) and International Transport Forum indicates the overall potential CO₂ emission reductions from new vessel design.
GROWING A BETTER, HEALTHIER FUTURE

ZESPRI is dedicated to understanding our impacts on the environment and developing new tools and technology to positively enhance our business.

The quality of our natural environment; the efficiency and sophistication of our supply chain systems; and the skills and commitment of our people are all critical factors underpinning our premium brand.

We have a strong tradition of sustainable production and our culture of innovation and continuous improvement have us well placed to continue marketing the highest quality kiwifruit while protecting the natural environment for future generations.