

AbacusBio Breeder



Options for farmers under the Emissions Trading Scheme

More and more farmers recognise the New Zealand Emissions Trading Scheme (NZETS) is here to stay and want to work out how it will affect their farming business.

AbacusBio consultant Jorit Nühs says the NZETS could offer farmers good returns, with some of the biggest opportunities in forestry and planting on currently unproductive land.

“We are working with farmers to make sure they are in a winning position economically and environmentally, by demonstrating some of the opportunities available to them. We have designed economic models to help farmers compare the costs and returns of their current land and farm practices to new scenarios incorporating the NZETS. The models also take into account potential risks associated with carbon credit pricing and market fluctuations”.

What can farmers do to reduce their liabilities?

The aim of the NZETS is to reduce outputs which contribute to climate change, such as greenhouse gases. This reduction is termed mitigation. Livestock are the biggest contributors of greenhouse gases in the farming sector, with more efficient livestock having lower methane outputs per unit of product. Therefore, standard measures farmers already use to improve livestock efficiency apply for green house gas mitigation. These include working towards higher lambing and survival percentages and faster growth rates. Fertiliser application can also affect a farm’s greenhouse gas output and this needs to be balanced against livestock efficiency. In the longer term, the Pastoral Greenhouse Gas Research Consortium (PGGRC) are aiming to have a product on the market which reduces methane production in ruminants. Their website is well worth a visit, see <http://www.pggrc.co.nz/>.



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Forestry as a tool to hedge against the impact of the Emissions Trading Scheme

Forestry is now part of the NZETS scheme and it is helpful for farmers to be aware of new regulations and opportunities in the sector.

The Government is currently providing incentives for afforestation alongside the NZETS. The Afforestation Grant Scheme (AFS) is a grant to cover forest establishment costs, to encourage landowners to plant trees where forestry is a good land use option. Under the scheme, farmers retain the value of the trees and the government owns the carbon credits created by the first 10 years growth. Each AFS application is judged on merit including other potential environmental benefits such as erosion control and improved water quality through riparian management. For more information, go to <http://www.maf.govt.nz/climatechange/forestry/initiatives/>.

Another scheme is The Permanent Forestry Sink Initiative (PFSI) which enables landowners to invest in establishment of native forests and use the credits earned to sell on carbon markets or offset emissions from their livestock operation. This scheme is appropriate where it is decided to change management practices on a piece of land to actively encourage its reversion to native forest, rather than continuing to maintain it in a marginally productive pastoral use.

For forest on land that is not designated as pre-1990 forest land, there is the option for landowners to become a participant of the NZETS scheme itself, and earn carbon credits to sell on carbon markets or offset emissions.

The NZETS will have no impact on the management of forests on land designated as pre-1990 forest land, so long as it is maintained as forestry. However, if this land is deforested and its land-use changed to a non forest land-use, the landowner will be liable to surrender carbon units to the crown, equivalent to the carbon lost due to the deforestation. This is a new liability for owners of pre-1990 forest land, and is triggered if more than two hectares of forest is deforested within a five year period.

This liability is moderated by two mechanisms as below.

1. Landowners who own less than 50 hectares of pre-1990 forest can apply for an exemption, which will enable them to change the use of the land without penalty. This is particularly relevant if there is some likelihood of the land-use changing in the future.
2. For those landowners with more than 50 hectares of pre-1990 forest land or those with less that see no land-use change for the forest they own, the crown is offering an allocation, free of charge, as part compensation for the partial alienation of land ownership rights resulting from the implementation of the NZETS.

The landowner must apply for either the exemption from the NZETS or the allocation of units for any given piece of forest land. If there is no application made for either, before the relevant cut off dates, the landowner will be left with the new ETS liability and no way of moderating the effects of the ETS.

Key Future Dates for Farmers

- The “Draft Forestry Allocation Plan” outlines the proposed approach to allocating New Zealand Units (NZUs) to pre-1990 forest owners under the ETS. Submissions on this plan are due by 28 February 2009, so make sure you read this and if you have concerns, have your say. For more information see <http://www.maf.govt.nz/sustainable-forestry/ets/information/>
- Farmers with forestry blocks less than 50 hectares who want exemptions from the NZETS need to apply by 30 June 2009. Exemptions are also available for other reasons but do not happen automatically
- We recommend farmers read the “MAF guide to Forestry in the Emissions Trading Scheme” at <http://www.maf.govt.nz/sustainable-forestry/ets/guide/>

Feed young stock well to reach production targets

Poor feeding of young stock is one of the main reasons dairy farms fail to reach production targets.

Dairy farmer of 15 years and now AbacusBio consultant Peter O'Neill says young stock performance is often compromised to feed milking cows better.

“Young stock are just as important as any other stock and it is really important to set target weights for them and to monitor their progress.” Feeding young stock well will ensure they deliver high milk yields throughout their life and rear healthy calves.



Some key questions to ask are:

- What percentage of your heifers are starting their second lactation and how many of them are late calving or need to be induced in that season? Aim to have at least 90% of your heifers calving the following year (as three year olds).
- Are your six week in-calf percentages and empty percentages for rising second calving cows similar to the herd average or industry targets? Industry targets are a six week in-calf rate of 78% and a nine week in-calf rate of 90% or more.
- If you are not reaching in-calf targets, are you reaching target weight and condition scores? Target condition scores are 5.5 for rising 2-3 year olds. Peter recommends the table below as an incredibly useful guide to the recommended liveweights for maturing stock.

Recommended liveweights for young stock according to their expected mature weight

(reproduced from the DairyNZ website <http://www.dairynz.co.nz/file/fileid/6358>)

6 months		16 months		22 months		Mature Liveweight (kg)
Liveweight (kg) 30% mature LW	Pasture Intake (kgDM/day)	Liveweight (kg) 60% mature LW	Pasture Intake (kgDM/day)	Liveweight (kg) 90% mature LW	Pasture Intake (kgDM/day)	
120	2.8	240	4.7	360	6.7	400
135	3.1	270	5.3	405	7.6	450
150	3.5	300	5.8	450	8.5	500
165	3.8	330	6.4	495	9.4	550
180	4.2	360	7.1	540	10.4	600

Note: pasture intake should increase by 5% if heifers are grazing rolling or steep land to achieve liveweight targets. Condition score targets for young cows, are 5.5, at calving for all rising two and three year old cows.

Sheep genetic gain rate tripled since 1999

This article was co-authored with Dr Mark Young (SIL)

The rate of genetic gain in New Zealand's sheep industry has tripled since 1999 according to a recent study. AbacusBio consultant Peter Amer, who conducted the Ovita funded study, said it had previously been difficult to measure genetic gain across the industry, but that has changed. In the study Peter analysed data from the SIL ACE December 2007 run. ACE (Advanced Central Evaluation) is a Sheep Improvement Ltd (SIL) initiative that allows across-flock and across and between-breed genetic evaluations to be made for a number of key production traits in sheep.

"These increases highlight how successfully breeders and industry groups can work together to improve New Zealand sheep genetics," says Peter. "Rates of genetic gain were low and static prior to the introduction of SIL. The rates of genetic progress are now three times the level they were when it was introduced in 1999."

SIL's introduction led to the rates of genetic gain doubling for both fast-growing, wool producing and highly reproductive Dual Purpose Sire Flocks and fast-growing, high meat yielding Terminal Sire flocks. SIL ACE was started in 2004 and led to another spike in genetic progress. It uses data collected through the Meat & Wool NZ Central Progeny Test (CPT) about the industry leading sires to assist in creating linkages between flocks for analyses.

Which factors affect genetic gains?

The main factors that affect genetic trends as analysed in this study are:

- Using older sires and longer generation intervals can slow genetic progress
- The choice of outside sires typically increases genetic gain
- In general, the use of link sires increases genetic gain
- Flocks which recorded FE or FEC made about 50% higher genetic progress across all of the main sub-indexes. However, the actual contribution of FE and FEC to genetic progress was low, so it is assumed these breeders made greater genetic progress because they were more advanced in their techniques.

Improving poorer flocks an opportunity to grow industry

There are huge opportunities across the New Zealand sheep industry to improve on already substantial rates of genetic progress, according to Peter.

Wide variations in average flock merit and genetic progress mean there is potential economic gain if poor performing

flocks take advantage of the quality genetics available. A spread of \$5.00 per ewe in the Dual Purpose index would be worth \$150 million to the industry per year. Similarly, a spread of \$5 in the Terminal Sire index over 10 million terminal lambs would be worth approximately \$25 million to the industry per year.

Using more rams from the best genetic flocks rather than rams from poor flocks could also create considerable economic gains. An increase of 50 cents/year in the Dual Purpose index across the national flock would be worth about \$15 million and \$2.5 million in Terminal indexes to the industry in the first year and cumulating.

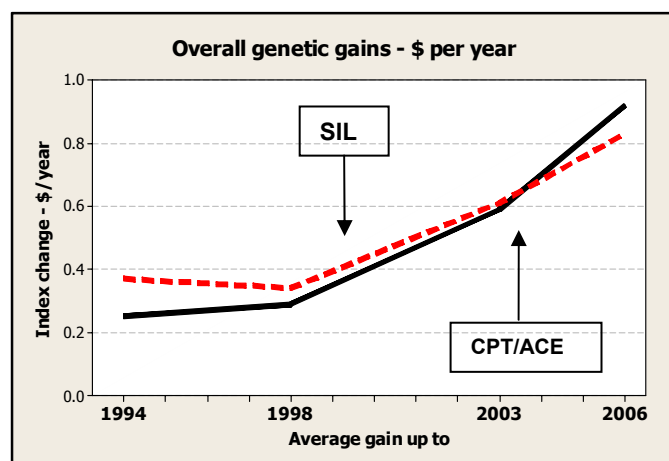
SIL, CPT and ACE will continue to be vital tools in improving genetics in the New Zealand sheep industry. To maintain genetic improvement rates and remain competitive with other livestock industries, it is vital to continue educating sheep breeders and commercial farmers about current genetic tools and to develop new methods such as DNA-based selection techniques.

How does this research affect breeders' ram buying decisions?

SIL and the large-scale SIL ACE evaluation are powerful tools because they allow breeders to find the ideal sheep genetics for their farming business. SIL breeders are increasingly participating in the SIL ACE scheme because it makes it easier to compare the genetic merit of their sheep against other flocks.

By buying from SIL breeders and using SIL figures to select the ideal rams, farmers and breeders are maximising cumulative genetic improvements in their flocks.

Peter says when buying a ram it is crucial to focus on these cumulating benefits of good selection rather than on purchase price.



AbacusBio consultants developing new sheep breeding strategy for Ireland



AbacusBio consultants Tim Byrne, Peter Amer and Peter Fennessy are working with Sheep Ireland to develop and implement a new sheep breeding strategy for their country.

Tim, who is currently in Ireland working on the project, says the idea is to increase maternal efficiency and reduce costs in order to improve industry profitability.

“There has been a steady decline in the number of breeding ewes in Ireland over the last 10 years due to poor profitability. Numbers are now at 2.7 million, down from 4.3 million in 1997. We need to rebuild the sheep industry and this is a great start point”.

Traditionally Irish breeders used visual appraisal to select for terminal traits within their breeds, with a small proportion of breeders using performance recording for a limited range of traits. The project aims to use new technology and Irish Cattle Breeding Federation (who run Sheep Ireland) systems to integrate sheep breeding with electronic identification and national identification systems.

“Increased recording to include more economically relevant traits together with a big effort to convince the industry of the gains to be made from genetic improvement will increase uptake of performance recording by breeders and the use of these improved rams by commercial farms .”

To improve commercial ewe performance, the emphasis

must be on maternal traits that will lead to lower cost and easy care sheep. The team are currently developing a national central progeny test and a number of maternal lamb producer (MALP) groups to use the more accurate data generated from the breeding strategy.

The MALP involves commercial farmers recording data to identify which rams deliver gains in ewe performance in their flocks and which ones do not. Data will feed back into the central database and evaluation systems to help participating pedigree breeders identify superior rams. Participating farmers swap animals to create so-called “genetic links” that allow genetic comparisons between rams from different flocks. DNA matching will be used to link lamb performance data to their sires.

Ireland already has a national identification scheme for individual sheep and AbacusBio consultants are working with them to link that with the new performance recording schemes. Tim is currently working with commercial farmers to implement the MALP as well as developing protocols and systems to manage data recording and capture.

“I’m enjoying gaining more experience in different production systems and aim to bring back some new ideas for the New Zealand sheep industry. New moves are afoot within the European Union for electronic identification to become a compulsory part of national identification systems, with potential positive spinoffs for information management and data capture for breeding purposes”.

AbacusBio consultants Peter Amer and Peter Fennessy have extensive experience in breeding programme development. The pair were in Ireland in August to assist in the sheep strategy development. Amer has been involved in the Irish national beef breeding strategy and development over the past 10 years, while Fennessy has extensive experience developing industry strategies for genetic improvement of plants and animals in New Zealand and Australia.

For more information about Sheep Ireland see <http://www.sheep.ie/>

Meat quality vital for our international markets

A new study of lamb meat quality found higher yielding, faster growing lambs produce meat with poorer colour which could have implications for New Zealand's sheep breeders.

Alliance Group Ltd conducted the study with AbacusBio consultants, Anna Campbell and Neville Jopson, to evaluate the effects of genetics and pasture on lamb meat quality. The study found high yielding, fast growing animals produce paler meat that is more brown than red. In international studies, selection for yield and growth has been found to adversely affect meat quality in pigs, beef cattle and poultry.

Anna says breeding programmes currently emphasise growth rates and meat yields, but the emphasis may need to be re-balanced to ensure meat quality remains high. Meat quality is increasingly important to New Zealand's lamb meat markets and is comprised of several traits. These include meat and fat colour, pH, tenderness and factors affecting the eating experience such as taste, juiciness and smell. Nutritional qualities of meat, such as vitamin levels, essential minerals (e.g. iron) and the types of fatty acids (e.g. omega 3) have become increasingly important to consumers.

Anna and Neville have worked with Alliance to evaluate progeny from the Meat & Wool NZ Central Progeny Test (CPT). CPT sires were used because they are the best in the industry across a range of breeds and the resultant database is an excellent resource for evaluating previously unselected traits, such as meat quality.

Anna says another important finding was that colour stability traits had relatively high heritabilities, which means they could be improved rapidly if included in a selection programme. The speed at which meat deteriorates (goes from red to brown) had a heritability of around 0.4, that is, about 40 percent of variation in this trait is genetic.

Tenderness of meat which was frozen after 24 hours was variable with a number of samples exceeding 8kgF (which is considered tough). The heritability of tenderness of frozen meat was moderate (at about 0.2) and reasonable progress in selection could be made. However, there was little variation in tenderness of meat which had been aged for eight weeks and none of the aged meat was tough (averaging 3kgF). Anna says while this finding is not surprising, it is good to have these data to show the Alliance international markets that tenderness is not an issue for our chilled products.

Selection for pH levels in meat is not necessary, because

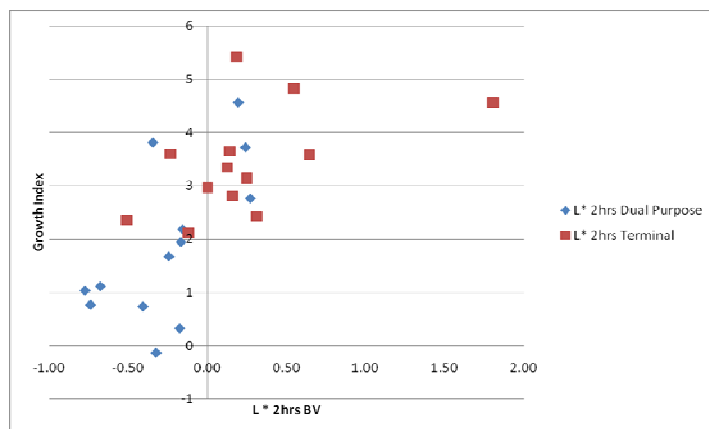
variation is minimal and few sires had breeding values which exceeded the optimal ceiling of pH 5.8. pH had a moderate heritability of about 0.2. The heritability of traits rated by the taste panel (aroma, flavour, texture, succulence and acceptability) were low. This was to be expected as taste panel measurements are subjective, and there are usually diverse results even with a panel of expert tasters, as in this trial.

This work, fully funded by Alliance, is very important for our export markets and ensuring New Zealand lamb is viewed as high quality. Anna says with increased international consumption of pork and chicken, we need to differentiate our New Zealand lamb as being a reliable high quality product with high nutritive value.

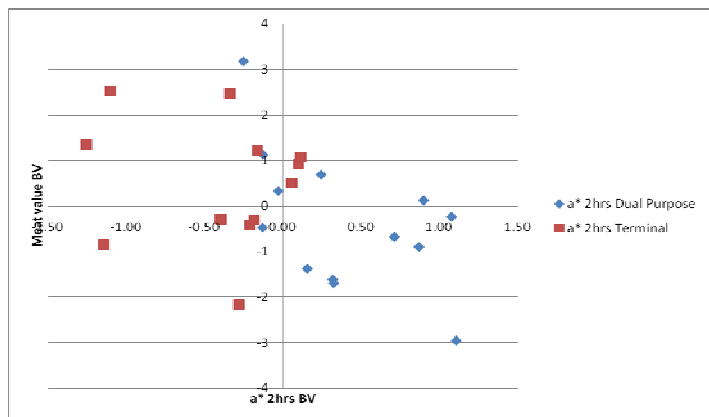
Alliance is working with AbacusBio again next year to increase understanding of the relationship between meat quality, growth and yield.

A summary of this report can be viewed at http://www.alliance.co.nz/media_releases.html

Graph showing the relationship of breeding values of CPT rams (2007-2008 trial) for colour stability L* (darkness/paleness) measured at two hours with the CPT Growth Index.



Graph showing the relationship of breeding values of CPT rams (2007-2008 trial) for colour stability a* (redness/brownness) measured at two hours with the CPT Yield Index.



New Staff join AbacusBio Team



Peter O'Neill

Peter joined AbacusBio in 2008 after 20 years in the dairy industry. His experience in dairy farming ranges from equity partnerships to share-milking to dairy farm ownership. This experience gives him an insight into the industry's complexity from the farm to the national level. A career

highlight was winning Otago Sharemilker of the Year in 2003 with his wife Ginny.

Peter works for AbacusBio as a dairy agribusiness consultant with clients and projects in Otago and Southland. His experience and strong understanding of the technical side of dairying mean he can help clients achieve the mantle of increased production and reduced costs. Peter also helps clients with other important aspects of their farm business, including staff management, business growth, profitability, strategic planning and sustainability.



Jorit Nöhs

Jorit brings his passion for the environment and a broad range of business skills to AbacusBio. He joined us in 2008 after finishing an MBA at the University of Otago. Jorit hails from Hamburg in Germany and studied business and computing in Berlin. After completing his degree

in 2003, Jorit worked at and co-owned a speech recognition software development company "8hertz" in Berlin. As the director for professional services and consulting Jorit was responsible for project management, implementation of speech recognition software and client relationships. In 2007, he moved to Dunedin to do an MBA. As part of the MBA he worked as a consultant for Wenita Forest Products Ltd on climate change and the impact of the NZ emission trading scheme on the forestry

industry. At AbacusBio he continues to work in the area of climate change, advising our farm clients on the threats and potential opportunities of the ETS by combining farming and forestry and bringing the NZ ETS into a global context. In addition, he recently visited clients in Scotland, where he is involved in the valuation of some new dairy technologies and the economic evaluation of genome wide selection scheme options for the UK sheep industry.

Gemma Payne



Gemma specialises in bioinformatics and genome sequencing processes, along with researching DNA tests for livestock improvement programmes. She has also processed large datasets produced by new sequencing technologies.

Gemma gained a BSc (Genetics) from the University of Otago, before moving to Brisbane to complete an MSc in Genetic Counseling at Griffith University. She then did a summer internship on a bioinformatic project at AgResearch, Invermay, before becoming a research associate there. She has been involved in the Ovine Genome Project, where her work has included sequencing Romney, Texel and Scottish Blackface ewes using the 454FLX technology and validating sequence data and associated bioinformatic processes. She was also involved in developing the WormStar parasite resistance DNA test.

Gemma joined AbacusBio in 2008 and has been involved in mathematical modelling work (Mathcad programme writing and running), feasibility studies for patent applications, statistical analyses (ASReml), meat quality trial analyses and validation of automated bioinformatic processes. She has also upgraded the AbacusBio website and is responsible for website maintenance.

New Offices for AbacusBio

We have shifted into bigger and brighter offices in the Public Trust Building on Moray Place, Dunedin. Our telephone, fax and email contacts all remain the same.

Our new address is:

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Our postal address is:

AbacusBio Limited
PO Box 5585
Dunedin 9058



AbacusBio consultants win awards for groundbreaking sheep gene research

AbacusBio consultants Jude Sise and Tim Byrne won major awards at the New Zealand Society of Animal Production conference held in Brisbane in June.



Jude's paper, with the catchy title "*SNP and cut: Quantifying the potential benefits of genomic selection tools for genetic fault elimination in sheep*" is about the potential to use genetic SNP markers in sheep breeding. Jude won the Innovation Award for the conference paper showing the greatest advance in science and technology. By identifying SNP markers associated with common genetic faults, testing for carriers before mating means the incidence of these faults could be greatly reduced.

"Stud breeders routinely cull up to 30% of lambs due to a variety of faults," says the abstract for her paper. Despite this culling pressure faults continue to occur, suggesting recessive inheritance or insufficient identification of fault causing genes.

"This would improve their [stud breeders] efficiency by

reducing lamb losses and increasing numbers of saleable ram lambs and ewe lambs suitable for selection as breeding ewes."

In her paper, Jude and co-authors Ken Dodds, Benoit Auvray (AgResearch) and Peter Amer, showed how the use of the SNP technology could have major benefits for both breeders and commercial farmers.



Discovering that dwarfism in some flocks of sheep was caused by recessive genes won AbacusBio consultant Tim Byrne the NZSAP Young Members Award.

Tim's finding, published as his Masters thesis at Massey University, means the disease can reappear after being hidden for generations when a carrier ram is used. Little is known about the disease. However, dwarf lambs and sheep are unproductive because they usually die young or are culled.

Currently, Massey researchers are working to develop a diagnostic test for the gene responsible.



Above all maintain a positive attitude!



It is widely acknowledged that the world economy is in for a tough next 12–18 months and the New Zealand economy will certainly not be immune. While there are signs the credit markets may return to some sense of normality in early to mid 2009, the timing of the recovery of the real economy is open to wide speculation, some opinions and many unknowns.

AbacusBio farm consultant Jack Cocks maintains key actions for managing farming businesses in these uncertain times are to “concentrate on cashflow, be flexible and quick on your feet and operate low cost farming systems that are robust under both high and low product prices.”

The commodity price falls we’ve seen over recent months have been a result of job losses and recessions in our major export markets combined with increasing worldwide supply of some commodities. The lowering kiwi dollar against the US, yen, and euro has provided some relief to these falls. Continued commodity price falls and less willingness of foreign lenders and investors to fund New

Zealand’s current account deficit may drive further currency weakness.

Jack says that despite the challenges facing the agricultural sector there is still a general feeling of optimism amongst our client base. Solid fundamentals of increasing global wealth and a growing world population driving up real food prices still remain. However, what this current crisis has reinforced is that, in this environment of increasing demand for food and low global food reserves, the one certainty is extreme volatility. Businesses must be structured well and prepared to manage tightly through these volatile times.

When we look back at New Zealand agriculture’s history, out of adversity comes productivity growth, innovation, and often an export led recovery. “Businesses with strong balance sheets can look forward to opportunities to grow over the next 12–18 months” says Jack, “especially if they focus on cashflow, flexibility and maintaining a positive attitude!”



BRIDGING SCIENCE & BUSINESS

AbacusBio are Australasian market leaders in agribusiness consulting and associated new business development. The firm's internationally recognised scientific expertise in agricultural technology and biotechnology is backed by specialised economic modelling, financial analysis and business management capabilities.

AbacusBio is focussed on growing its consulting business through its relationships with its clients, and growing its involvement in new ventures. Our vision is to bridge the gap between scientific possibilities and practical application in business.

AbacusBio develops new business opportunities, and provides consultancy services to businesses in several areas of technology based on expertise in:

- strategic planning and technical consultancy to
- the agribusiness sector (including the farm production, product processing and marketing sectors),
- the biotechnology sector,
- technology-based business and investment opportunities especially in biotechnology and agribusiness;
- scientific consultancy (especially in genetic improvement of livestock, fish and plants);
- agribusiness and farm consultancy;
- evaluation and development of new technologies including specialist software; *and in*
- the management of technology-based development projects

