



Speech to the National Council of Federated Farmers

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Introduction

'First of all I wish to acknowledge the presence of the Prime Minister, the Rt Hon John Key, Don Nicolson (President of Federated Farmers), Donald Aubrey (newly elected Vice-President of Federated Farmers), Conor English (CEO of Federated Farmers) and the Provincial Presidents and Industry Group Leaders of Federated Farmers.

I also thank the Federated Farmers very much for this opportunity to speak on the subject of ideas for the future of New Zealand agriculture and what agriculture can do to assist in the economic transformation of New Zealand. I am Stephen Goldson, and I have been invited here in my capacity as the recently-appointed part-time Strategy Advisor to the Office of the Prime Minister's Science Advisory Committee, headed by Professor Sir Peter Gluckman as Chief Science Advisor.

I also work as AgResearch's Chief Scientist. Having said all of that, I would like to emphasise that the views in this paper are very much my own and these are inevitably heavily influenced by the time I have had in AgResearch and before that, MAF Technology. What I am talking about is certainly not official policy. Actually, I have spent most of my 35 years career as an entomologist working on the biological control of the lucerne weevil, the Argentine stem weevil and most recently the clover root weevil.

This presentation is about research, ideas and innovation. Indeed, New Zealand is quite good at such stuff. Maybe, it is partly because New Zealand has a culture that tolerates non-conformity and other vaguely 'inventive' behaviour. This culture and freedom does in fact spawn ideas... not necessarily all good, but by the same token, sometimes useful. This can and does find its way into science and innovation. New Zealand's farmers are educated, typically inventive and independent. Our pastoral researchers are similar. Ideas often come from farmers; science formalises and systematically investigates these. More fundamentally, discovery science makes its own very important contribution. Indeed science is the major source of new information for industry, our environment and ourselves.

In this presentation I wish to emphasise the vital importance of science and innovation for New Zealand. I will then describe, by way of example, some of the ideas and science now being pursued that I believe could reinforce the central role of the pastoral sector in New Zealand's economic revitalisation.

The need for a sound science system

I have no doubt that macroeconomic optimization is essential to growth but science, innovation and ideas are equally as important. There are numerous (verified) international studies that show a very strong correlation between the number of scientists and engineers per capita population and wealth creation via

innovation. But there are other benefits as well. A scientifically literate society is better able to make individual choices (nutrition, health), so increasing individual responsibility and wellbeing and a scientifically literate business sector is better able to exploit advances in knowledge. A knowledge-based society will be more ambitious and productive, more prepared for facing the challenges ahead and more able and willing to address issues of social development and environmental protection. Indeed Sir Peter Gluckman has underscored this by noting that... *'Science is at the heart of almost everything we must do to meet the collective ambition of virtually every New Zealander - a healthy, socially connected community in a good environment enjoying a very high standard of living'*.

The state of New Zealand science and its future

The argument put up by Sir Peter for a greater emphasis on science and technology in New Zealand is compelling. So what have we got as a basis for a scientific renaissance? Very importantly, we have stable, honest government (indeed we have just been judged the least corrupt country in the world). We also have a beautiful physical environment that is still relatively pristine. New Zealand has a good education system that can generate outstanding graduates in agriculture, science and engineering. There is also a sound practical economic base on which to further develop the 'cultures' - agriculture, aquaculture and so forth (but here we must have a bold strategy).

Conversely, though, right now we have a fragile and battered science system that is over-managed, splintered, subjected to excessive competition and lacking in clear direction. It is also very focused on institutional survival rather than science-for-New Zealand and quite wrongly, revenue generation has for a long time been seen to be a proxy for science value. All of this has led to constrained and erroneous thinking.

One unavoidable consequence of such malaise has been an appallingly low recruitment rate of suitably trained graduates into New Zealand's primary industries. In 2006 there were 355 agriculture and environment graduates compared with 8102 in 'creative arts, society and culture'. The idea that science is some kind of nice-to-have *cost* rather than a serious *investment* must now be buried. Likewise, the science system is now not resilient enough to undergo any faddish or ideological flip-flops in direction, particularly when such changes are attempted in a zero-sum environment. This has happened before and experience has shown how damaging it can be to scientific productivity and capability.

Further, New Zealand science must become far more international in its thinking and intent. There needs to be a coordinated international strategy based on clear goals rather than leaving international science to *ad hoc* connections between academics and off-shore science groups. New Zealand needs to connect its research efforts to big science going on elsewhere (both government and private sector), particularly in Asia, and in doing so refrain from immediate parochial considerations.

From here on, this country's science must be planned and consistently pursued given that New Zealand does less than 1% of the world's research.

However, even with the best run science system, New Zealand's science commitment of only 1.2% of GDP means that we will remain hobbled compared to our competitors, who are investing two to three times more and show every intention of stepping it up further. Such is the nature of international competition. In short, New Zealand's science effort, funding and organisation must seek to take on an appearance similar to that of Denmark or other small but technically-advanced countries.

More optimistically, there is no doubt that there is now clear recognition of this situation at the highest level of government and I believe that there is the determination to do something about it. Three obvious indications of this have been (i) the appointment of Sir Peter Gluckman as Science Advisor to the Prime Minister, (ii) a review of the expectations of the CRIs and (iii) the beginnings of the formulation of a national science strategy. Work is also going on in the area of internationalisation of science and business uptake of RS&T.

The role of science and the pastoral sector

Science will be essential to any economic transformation of New Zealand and in this the pastoral sector is well positioned to play a very significant part. It is now at last widely recognised that in recent years the pastoral sector has been outstanding in its economic contribution to New Zealand and there is every reason to believe that there is still much more potential. New Zealand has exceptionally well-educated farmers with great capacity to absorb new technology. Their ability to grow forages and ruminants is peerless and we have clean and available water. New Zealand is well located near Australia and the emerging Asian markets. Moreover, that New Zealand is a small country has its advantages; for example, science and agriculture know each other well. Indeed the strength of New Zealand farming is not only based on patented products and processes. Rather, precise knowledge of breeds, husbandry, agronomy, pest control etc, has been garnered from interaction with the science community for decades. Much of this has been about research and knowledge for the common good leading to know-how. That said though, there are now yawning gaps in capability successional planning. More than ever, there is a need to stabilise agricultural training and the supply of technical skills by paying due attention to the true and full cost of undergraduate and graduate training and by fully funding the tertiary institutions for such work.

Taking a view beyond New Zealand science and the pastoral sector, some extraordinary things have been happening internationally. The most obvious of these is human population (predicted to grow to 8 billion by 2030) with the attendant demands for food production, new concerns about food security and the spectre of climate change. In many ways, recognition of these factors has hit home particularly hard in the last five years, causing commentators to point out that it would seem that the world has been caught off-guard having more-or-less ignored agricultural science for the last 25 years. I would say that New Zealand is not exempt from such an accusation.

However, from the perspective of this country, being a food producer with a low population base, the current circumstances (while worrying) do present opportunities. The population growth in the relatively close Asian markets is coinciding with rapid economic development. This has led to the emergence of a large middle class with a concomitant demand for many of New Zealand's high-end agricultural products. Such a development presents definite opportunity for transformational changes for New Zealand's trade and economic growth, but as discussed, a corollary of this must be effective research and innovation.

Examples of large initiatives related to the pastoral sector

It is beyond the scope of this presentation (and the speaker) to map out what should happen next, but a couple of as yet unimplemented examples may help to illustrate the thinking and the potential for major science initiatives in the pastoral area. These interrelated topics are (i) on-farm and off-farm food research driving for food-for-health and (ii) ruminant greenhouse gas research. Both of these are areas where huge returns could accrue to New Zealand from appropriate investments.

Imagine how New Zealand could benefit from a vastly expanded array of new high-value meat and milk products of peerless quality. That quality would need to be demonstrated by safety, traceability and

reliable appellation. Likewise, these products would be consistently acquired from audited sustainable sources where production systems are demonstrably humane. This initiative would also develop the enormous potential for deep research into the health benefits of various New Zealand-produced foods, including entirely new types of products. There is a huge and ever-growing market segment of ageing, health-conscious and wealthy people who would be prepared to pay for such products should they convey unequivocally-demonstrated health benefits. Through the benefit of good science, these products would be in marked contrast to the ever-expanding plethora of 'food supplements' that merely assert benefits.

Red meat production has been getting bad press lately. Lord Stern has extolled people to stop eating red meat and more-or-less revert to vegetarianism. This comment is somewhat understandable when it is recognised in an increasingly hungry world that 60-70% of the grain grown in the advanced economies is fed to livestock. However, I don't need to tell you that New Zealand is different; not much grain is used in this way. Instead this country's pasture production systems remain (largely) based on low-energy, outdoor, rain-fed grassland ecosystems.

However, neither do I need to remind the Federated Farmers of the spoiler in the form of high levels of methane eructation from our ruminant livestock that is now causing such concern nationally and internationally. Indeed, climate change is a huge issue. New Zealand is the only annex one country with the major part of its emissions being pastoral; we and the developing world have to address this challenge. Clearly science is vital to helping with this issue but it is a very challenging role. Typically, the task is not at all easy with all kinds of interactions going on between the rumen's varying populations of microorganisms (and their genetics) and these in turn interact with the genetics of the livestock which is affected by the feed quality and even its grazing patterns.

It is therefore most significant that the Prime Minister has announced his desire to see a New Zealand-led Global Alliance to address the issue of ruminant emissions. The form and shape of the Global Alliance is yet to emerge, but for this country to take the lead in the area would be of immense scientific and diplomatic value, hugely expanding our involvement and capability. The spin-offs for science and industry would be immense and varied. For example, should significantly lower amounts of methane emissions be attained then our low energy pasture-based products would have the virtue of being 'guilt-free'. Through such work on the rumen, New Zealand is likely to gain 'first-mover' advantage and appeal to a very similar market segment as the food-for-health segment. This of course says nothing of the imperative to do something about climate change.

Ongoing Research

I certainly don't want to give the impression that pastoral science is merely resting on its pumps waiting for suitable international science initiatives to show up. For example, AgResearch is continuing to pursue its 2020 Science strategy which seeks to increase the productivity of the New Zealand pastoral sector, in part through more yield per hectare and by adding value to New Zealand's range of pastoral products. At the same time, there is the intention to continue with research that seeks to reduce the environmental impacts of such increased productivity, as well as to protect the environment and animal health through intensified biosecurity research. A considerable part of our work is based on biotechnology, and the eventual application of some aspects of this research in New Zealand remains uncertain, depending on what is acceptable to the sector and to the public. Examples of this are transgenic forages and the cloning of livestock.

Conclusion

New Zealand has an outstanding base for agricultural science to work within its pursuit of transformational industry. This will however take vision, courage and trust at several levels, both in government and in science.

Indeed, I believe that this process has started already which is just as well. If not, the bus will certainly go without us.

Thank you.