OFFICE OF THE PRIME MINISTER'S SCIENCE ADVISORY COMMITTEE

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'Science, diplomacy and trade: a view from a small OECD agricultural economy'

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Thank you for the opportunity to contribute to this session discussing science diplomacy and trade. The obvious caveat I must make is that I am not a diplomat and there are definitely people here who know more about this stuff than I do. Irrespective however, I hope to be able to stimulate some discussion around the interaction between New Zealand science and diplomacy.

In writing this talk it has finished up in three parts. Firstly I am going to talk about New Zealand's need for biosecurity, food safety and trade, and then about the need for this country to contribute to agricultural greenhouse gas abatement. That done I will conclude by talking a bit further about how science in these areas has been and is, essential to informing and often empowering our various diplomatic priorities.

I think that this presentation highlights some of the differences between New Zealand as a small and remote, albeit successful, agricultural economy and a large advanced economy like the United States. Personally as someone who lives in New Zealand I always worry that we are seen as a windswept sheep farm with pretty good scenery that does not rock the boat much. I suspect that if we are not careful we can still be the butt of various sheep jokes and all this stuff about Shrek the sheep doesn't help at all. Indeed about 8 years ago I was at a meeting on the relationship between biotechnology and terrorism where issues like malevolent use of weaponised anthrax were being discussed. I mentioned the dangers of ill-intended release of foot and mouth disease and what it could do to our sheep industry and got the response I probably deserved. But jokes aside the potential for agricultural bioterrorism is now very much on the agenda.

Obviously New Zealand being the size it is has to be tactical in how it applies its diplomacy and its intersection with science. By way of illustration I will focus on the apparently diverse issues of biosecurity and food safety one hand and ruminant methane eructation – otherwise known as burping on the other.

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As noted my research background has been in the biological control of exotic pests in New Zealand pasture and more latterly, leading research to improve biosecurity by keeping pests and diseases out at the border. Both areas of endeavour have been about helping New Zealand's pastoral sector to support its 32.4 million sheep and 10 million cattle in order to sustain and develop further our essential $20 billion pastoral sector.

Fundamental to this is the maintenance of ecosystems that are demonstrably clean and sustainable and I think there is growing international interest in our claims about environmental purity. As I hope to demonstrate, there is actually a strong resonance between biosecurity and food safety and ruminant farming in the New Zealand diplomatic imperative. With these I hope to illuminate some aspects of New Zealand's diplomatic mission and its inevitable connection to science.

Biosecurity and Trade

I will first discuss New Zealand's involvement in biosecurity and trade and then move on to the management of ruminant greenhouse gases. Associated with these examples I will refer to the diplomatic context.

Primary industries are essential to New Zealand economic well-being and pastoral industries alone are currently contributing 50% of our merchandisable exports. Closely linked to this is tourism which brings in about $10 billion of external earning and more-or-less depends on pristine productive landscapes and increasingly, high quality classy food. Tourism is also about intact indigenous ecosystems that are not raddled by the impacts of exotic invasive species; people trout fishing don't want to be slithering around on didymo. Yet maintaining these environmental qualities is not particularly easy. New Zealand trade and travel are growing at a very high rate, both nearly doubling in the last 10 years and our markets are diversifying all of the time. As a result of such traffic New Zealand is open to invasion by unwanted and destructive exotic organisms.

Furthermore, our pastoral farming ecosystem represents a partial transplant of European farming systems comprising pastures of far less biodiversity than the original habitats; many being little more than a mixture of ryegrass and nitrogen-fixing clover. Such a simplified environment, with its exceptionally low biodiversity, is very susceptible to those invasive plants and animals that get here. This is because there are few if any natural enemies, few competing species and lots of unfilled ecological niches. Trying to do something about this has been the focus of most of my career. Indeed over the last 30 years a team of us has been devoted to trying to suppress three weevil species, one from Argentina that ruins our improved grasses, another from northern Europe that destroys our white clover and another from Morocco that damages our lucerne crops. Our growing horticultural economy faces similar threats as the recent *Psa* discovery in kiwifruit.

Similarly, but for very different reasons our much-admired but very fragile indigenous ecosystems are also open to invasion. This time there is plenty of biodiversity but this has evolved over 80 million years of geographical isolation and as a result, its species are very

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poorly adapted to deal with invaders. This general defencelessness is epitomised by bumbling flightless and often nocturnal birds that are extremely vulnerable to aggressive invasive mammalian predator species such as stoats, cats, dogs, weasels and people. Indeed it is estimated that 40% of our native avifauna have become extinct since humans arrived 800 years ago.

Adding to the problem it turns out that, New Zealand's indigenous animal and plant population is hugely important in terms of international biodiversity. For example, 95% of all of the insect species found in New Zealand are peculiar to this country. New Zealand has signed up to the 1993 International Convention on Biological Diversity and therefore has major obligations to preserve its unique indigenous biodiversity. Thus biosecurity is of paramount importance to New Zealand both from the basis of our productive economy and our biodiversity.

With this comes a sort of irony. While New Zealand is almost uniquely concerned about biosecurity, it is also utterly dependent on free trade. The country's internal economy is small and there is huge dependency on exports. Ninety percent of our primary industry products are exported and we are constantly watching fluctuating foreign currency exchange rates. Loss of access to markets through diplomatic mishaps, tariff barriers, non-tariff barriers and currency fluctuations alike can be catastrophic to New Zealand. For this reason New Zealand unswervingly supports WTO-based free trade, FTAs, regional trade initiatives etc., yet at the same time must get its trading partners to adhere to potentially misunderstood biosecurity compliance requirements and to what may be seen as inconvenient, New Zealand-slanted, biosecurity red tape.

Domestically and internationally serious arguments can break out about biosecurity being wrongly, ineptly or cynically applied often along with thinly-veiled accusation of nontariff barriers. Two examples in full song at the moment are about the importation into New Zealand of uncooked pig meat and honey imports. The New Zealand domestic industries are saying that their resistance to such imports is about protecting the disease-free nature of their enterprise and New Zealand. Conversely, overseas exporters claim that it is all about New Zealand industry not wanting competition from more efficient producers elsewhere and that the risks really are minimal. The exact reverse went on around the export of New Zealand apples to Australia that was precluded for decades because of New Zealand's alleged fire-blight 'problem'. Such trade/biosecurity issues can lead to long and embarrassing disputes. If trade is to go on, such ultimately disagreements have to be resolved using agreed-upon scientific and technical guidelines as negotiated in international agreements.

Amongst all of this, it is also obvious that New Zealand must also ensure a comparative trade advantage to accommodate its small size and remoteness. A key element in this must be New Zealand's integrity and trust-worthiness as a quality food producer. Indeed it was our reputation for high-quality and safe food that allowed us to survive the Sanlu catastrophe in China. That said, there is no doubt about growing health and environmental demand for supply chain integrity. This can cut two ways for New Zealand. It can be a valuable marketing

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tool with which to try to secure an edge in high end consumer markets, or it can apply in markets where there are worries about local regulatory systems (like China). However, this development can also be used as a tool of green protectionism.

The trick is to know more than anyone else about how claims are mounted and the metrics behind them. In this way New Zealand can benefit from the impregnability of its own claims and call into question potentially shonky claims of others. Assertions around integrity and trust-worthiness cannot be based on rhetoric and ego, otherwise just about everyone would be claiming the same. Rather assurance must be firmly based on objective and scientific verification. Usefully the sort of supply chain data gathering and management that is require are not a country mile away from the sort of data management involved in more sophisticated approaches to biosecurity. This area where biosecurity, trade and food safety intersect, is the first example of an area of intense New Zealand scientific and diplomatic interaction.

Greenhouse gas production and methane

The second, typically New Zealand example is around greenhouse gas emissions and those contributed by pastoral agriculture. Indeed, 48% of New Zealand's greenhouse gases come from agriculture which is the same as the amount resulting from energy generation and transport. This ratio is unique by international standards and reflects the relatively large size of our pastoral sector and renewable (hydro and geothermal) energy production. It is worth noting that although New Zealand's actual contribution to global greenhouse gas production is miniscule at 0.17% it is however, a relatively heavy greenhouse gas emitter, second only to Australia among OECD countries in the amount of emissions produced per unit of GDP. Again this reflects the role of agriculture.

These agricultural emissions comprise mainly nitrous oxide and methane, the latter being produced by the already-mentioned 32.4 million burping sheep and 10 million burping cattle. This is not trivial; every day each dairy cow produces 400 litres of methane and New Zealand's huge animal bioreactor largely turning pastoral forage into meat or milk amounts to 700 million litres of microbe-filled rumen fluid. Methane is a potent greenhouse gas, as on a molecule-to-molecule basis, it is 25 times more forcing of heat retention than carbon dioxide. Each New Zealander is responsible for five times more methane production per capita than the global average and thus New Zealand has its own unique 'interest' in ruminant production of methane.

Again as a remote trading nation New Zealand must be seen to be doing something about emissions and this comes back to trade and trade-diplomacy as well as the reality that climate change simply cannot be ignored. Hence all the recent defensive position-taking New Zealand has had to develop around food-miles etc. and our current commitment to emission- trading schemes.

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Consistent with all of this, the OECD has suggested that New Zealand should look to becoming the leading exporter of technology that mitigates greenhouse gas emissions from agriculture, given that agriculture everywhere is facing significant challenges in meeting a dramatic rise in world food demand while cutting greenhouse gas emissions.

The role of science in New Zealand diplomacy

Clearly from a New Zealand perspective, a very large part of its concern about international relations in the end boils down to protecting its relevance in the global arena, not being a member of G20 and to thus protecting its trade in its broadest sense. New Zealand needs a high level of diplomatic vigilance. It was not really a coincidence that one of our former Prime Ministers, Mike Moore, became the Director General of the WTO. In short, our international relations are in no small part trade-driven and even apparently non-trade decisions are often made through the lens of how decisions may affect trade as, without it, New Zealand would rapidly become a scenic slum.

The areas of New Zealand leadership in biosecurity and trade and the abatement of ruminant-derived green house gases are two clear examples of where New Zealand has had to be diplomatically resourceful and inventive to achieve what is required and maintain the country's profile and recognition of needs internationally. In order to do this, science has maintained a critical role in these niche areas to inform these imperatives. As a result New Zealand diplomats and officials are particularly adroit when it comes to international trade agreements; in these areas we suddenly become watchful, articulate and diplomatically forceful.

As mentioned earlier, excellent science and science interpretation have been essential to New Zealand leadership in the development of biosecurity conventions. These agreements have for many years demanded that diplomats and trade negotiators work together to provide effective advocacy. A significant example of this, which had major New Zealand input, was the 16 pages of carefully-crafted prose that makes up the *Application of Sanitary and Phytosanitary Measures* (known as SPS) negotiated during the Uruguay Round of the General Agreement on Tariffs and Trade signed in early 1995.

This was one of the final documents approved and applies to all sanitary (relating to animals and humans) and phytosanitary (relating to plants) measures that may have a direct or indirect impact on international trade. The SPS agreement includes a series of understandings (trade disciplines) on how SPS measures will be established and used by countries when they establish, revise, or apply their domestic laws and regulations. Countries agree to base their SPS standards on science and as guidance for their actions, the agreement encourages countries to use standards set by international standard-setting organizations. The SPS agreement seeks to ensure that SPS measures will not arbitrarily or unjustifiably discriminate against trade of certain other members nor be used to disguise trade restrictions.

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In this SPS agreement, countries maintain the sovereign right to provide the level of health protection they deem appropriate, but agree that this right will not be misused for protectionist purposes nor result in unnecessary trade barriers.

Related to this, other international agreements have been developed such as the International Plant Protection Convention (IPPC) that aims to secure coordinated, effective action to prevent and to control the introduction and spread of pests of plants and plant products. The Convention extends beyond the protection of cultivated plants to the protection of natural flora and plant products. It takes into consideration both direct and indirect damage by pests, so it includes weeds. The IPPC's primary focus is on plants and plant products moving in international trade.

It goes on; from this was spawned over 30 very detailed *'International standards for phytosanitary measures'* co-ordinated by the Secretariat of the International Plant Protection Convention as part of the United Nations Food and Agriculture Organization's global programme of policy and technical assistance in plant quarantine. This programme makes available to FAO Members and other interested parties standards, guidelines and recommendations to achieve international harmonisation of phytosanitary measures, with the aim to facilitate trade and avoid the use of unjustifiable measures as barriers to trade. The range of subjects covered is quite vast such as *Guidelines for Pest Risk Analysis, A Code Of Conduct for The Import And Release Of Exotic Biological Control Agents* and *An Export Certification System.*

New Zealand science and scientists of all stripes contributed very significantly to the development of this now internationally-recognised set of biosecurity and trade rules by working with science-savvy officials, largely from the Ministry of Agriculture and Forestry.

Of course exactly the same process has gone on with animal health and trade etc. but for reasons of brevity, I will not trawl through the details except to say that once again our researchers and vets have contributed very significantly to the international deliberation. Similar processes are also going on around food safety, value chains and the vexed question of what exactly constitutes environmental sustainability.

Co-ordinated international activity around greenhouse gases commenced somewhat later than the biosecurity and trade initiatives when it became widely recognised that agricultural emissions are expected to rise by about 30-40 percent above 2005 levels in line with the projected dramatic need for increase in food production by 2050.

Accordingly, and largely as a result of New Zealand exhortation, the Global Research Alliance on Agricultural Greenhouse Gases was launched in December 2009 in the margins of the UN climate change conference in Copenhagen. In this New Zealand was again at diplomatically the forefront with the International Climate Change Negotiations Minister Tim Groser and Agriculture Minister David Carter hosting the inaugural three day meeting of the Global Research Alliance in Wellington in April 2010.

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This comprised more than 80 senior science and policy representatives from 29 participating nations – there are now 34 members and the charter will be formally signed in Rome this weekend. New Zealand also leads the livestock research group and has committed many millions of dollars both to the domestic and international research effort.

In keeping with this, the New Zealand Government made and is making, a significant effort to resolve the greenhouse gas issue with investment in the Global Research Alliance itself, its own Agricultural Greenhouse Gas Research Centre and the New Zealand's Greenhouse Gas Footprinting Strategy. These initiatives were able to be readily and immediately supported by extant New Zealand scientific expertise, particularly in rumen function.

With respect to the Global Alliance then, if New Zealand diplomacy and science had not done their homework in taking a lead in the area where we are big contributors, namely agricultural gases, no-one was going to listen to us on why fossil carbon is so hard for us to deal with. To reiterate, while this has clear moral imperatives, such a contribution can also be seen to relate to New Zealand trade. Namely that New Zealand is taking responsibility for how its primary products are being produced and working to reduce any global impacts that may be arising from their production.

Conclusion

What I have tried to do in this contribution is to show how New Zealand's largely trade-based diplomacy is deeply rooted in the country's science capability which is needed to support many of the initiatives. In the end this has a lot to do with market-access as well as being a responsible global citizen. No one doubts that New Zealand production systems have to be of unimpeachable quality if they are to retain their premium price advantage.

Additionally, New Zealand's international leadership in areas such as enteric green house gas abatement, ensures that its representatives can sit with the leaders of the global community as vital contributors at the international decision-making tables, rather than being seen merely as affable representatives from a remote wind-swept farm.

Thank you.

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