SCIENCE & DIPLOMACY

A quarterly publication from the AAAS Center for Science Diplomacy

Peter D. Gluckman, Stephen L. Goldson, and Alan S. Beedle, "How a Small Country Can Use Science Diplomacy: A View from New Zealand," *Science & Diplomacy*, Vol. 1, No. 2 (June 2012*). http://www.sciencediplomacy.org/perspective/2012/how-small-country-can-use-science-diplomacy.

*The complete issue will be posted in June 2012.

How a Small Country Can Use Science Diplomacy: A View from New Zealand

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MUCH of the recent discussion on science diplomacy has focused on consideration of the strategic interests of the larger advanced nations, such as the UK and the U.S. This is understandable at one level, as these nations have well-established international roles and at the same time are giants in the production of new knowledge. However, there is also now a rapidly growing interest among small advanced nations in the role of science within diplomacy.

The small advanced nations are typified by Israel, New Zealand, Singapore, and the Nordic countries. They have shown flexibility and nimbleness in restructuring their economies and their broader policy settings in comparison to the pace of change in many of the larger nations. Their smaller size allows them to engage relatively directly with stakeholders, including the public, and thereby they can be more agile. Furthermore, because their economies are small, they are more alert to—and able to engage more fully in—international trends and opportunities. Such countries are generally typified by well-developed science and innovation systems and, in a scientific sense, their contributions are disproportionately large

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compared to their small size. In addition, because of the lack of inertia, many have become early adopters of emerging technologies. They have thus become pilots for change and technological innovation on one hand and, on the other, exemplars for both larger nations and developing nations in how to use science and technology for economic advancement and therefore social advancement.

These advancements are critical, as there is an emerging cohort of common scientific and technologically based issues that countries in general face. These include climate change, synthetic biology, water recycling, and biosecurity. Solutions to these concerns, and related requirements of technology assessment and regulation, go beyond national boundaries because these problems and opportunities often have cross-jurisdictional impacts. In this context, the smaller nations are no less concerned than the larger nations.

Although the combined economic output of the twenty or so small industrialized nations with a population of less than 20 million exceeds that of China (1.3 billion people), they are afforded little weight in international forums. At G20 meetings, their perspectives are incorporated only if they are members of the European Union. Moreover, at the arguably most significant forum of science policy makers and strategists, the Carnegie Group, small nations are not specifically represented except via their EU involvement. The national interests of the small advanced economies require that they give significant effort to projecting their capacities and capabilities alongside those of the larger nations. This paper reflects on the challenges of science and diplomacy from the perspective of one of these small countries, New Zealand.

New Zealand has a population of about 4.5 million. Over the last thirty years, it has expanded its focus from exporting food primarily to Europe to also being deeply engaged in exporting food to Asia. New Zealand's economy, while diversifying, remains very much based on the export of high quality and safe food products. This is accompanied by heavy investment in agricultural and food sciences and a commitment to related areas, such as biosecurity science and food safety science. In addition, services exports, particularly in education and engineering, are growing parts of the economy. In the last decade there has also been the rapid emergence of the knowledge economy in areas ranging from digitally based filmmaking to pharmaceuticals. These higher-value technology-based products are the most rapidly growing part of the export sector.

Despite New Zealand's challenges of size and distance, it has played a significant role in world affairs. One example has been through leadership in agricultural trade negotiations. Nearly two decades ago, New Zealand removed all agricultural subsidies and has been a strident negotiator for the removal of artificial barriers that limit agricultural access. Indeed it has been at the forefront of free trade agreements—it was the first western country to have a free trade agreement with China. The Trans-Pacific Partnership Agreement, a free trade agreement initially between New Zealand, Singapore, Chile, and Brunei, is now at the core of a hoped-for major Pacific Rim free trade agreement.

Recently, New Zealand has started to reconstruct its science and innovation system and is paying considerable attention to defining the intervention logic for State investment in research. In contrast to larger economies, when small countries shift from commodity to higher-value exports, they often lack the capital markets to rapidly develop innovation as well as the skill sets required for marketing technology, as opposed to other commodities. Any success depends on early internationalization of the country's science, through both the public and private sectors. Therefore, there is a need to identify synergistic relationships with foreign partners who can address some of the domestic deficiencies; thus mutually advantageous international partnerships can be created and, as such, they cannot be separated from the broader diplomatic agenda.

As a small country, New Zealand faces the fundamental problem of knowing that it cannot have the capabilities or capacities to undertake all domains of research in depth and the challenges of where to apply limited funds. One tension concerns the balance between research where the primary outcome is enhanced economic growth and research for other possible public-good outcomes. These other outcomes are very important—they range from those of a defensive nature (e.g., ensuring agricultural biosecurity) to enhancing social sciences to allow the Government to address the complex issues associated with being a young multicultural society. Promotion of public understanding of risk is an urgent requirement, as there is an inevitable and understandable tension between the demand for greater resources extraction and the desire to limit environmental damage. Similar to other countries, but perhaps somewhat more intensively, New Zealand is very conscious of its role as an environmental guardian, with environmental issues being reflected in intense public and political discourse and strong regulations.

In an attempt to give greater weight to the role of science in areas, including international relations, beyond policy relating to the support and funding of science, the position of Chief Science Advisor (CSA) to the Prime Minister was created in 2009. This was followed by the formation of an International Science and Innovation Coordination Committee (ISICC), which is now co-chaired by the CSA and the head of the Ministry of Science and Innovation (MSI). ISICC brings together the heads of the relevant agencies, including Foreign Affairs and Trade, to maximize the diplomatic and trade advantages associated with science and, conversely, to explore how diplomatic interests can assist the science and science-based innovation community. It is clear that there is considerable interplay and overlap between the three major types of interaction—namely science for diplomacy, science in diplomacy, and diplomacy for science—and that these take on a particular flavor in a small country such as New Zealand.

As New Zealand explores closer relationships with a number of nations, small and large, its disproportionate scientific output in certain key areas, such as agricultural, biosecurity, and biomedical science, helps build close and meaningful

relationships more rapidly than otherwise would be achieved. Further, science diplomacy broadens the relationship beyond simple economic considerations. This is particularly evident when staff or students are exchanged, resulting in closer cultural understandings. Again, this is important to small countries that have real limitations in their capacity to project their identity. New Zealand has already witnessed the advantages of science diplomacy in international dealings, as the following cases will demonstrate.

New Zealand, the United States, and Nuclear Policy

In the 1980s, New Zealand introduced a total ban on nuclear power and nuclear weapons, which led to tension with the United States. The policy effectively precluded visits of the U.S. Navy, with nuclear-powered vessels in its fleet, and in turn led to suspension of the ANZUS (Australia, New Zealand, and the United States) security treaty as far as New Zealand is concerned. Two decades of some uncertainty in the relationship followed, when the word "ally" was studiously avoided in describing the U.S.-New Zealand relationship. Only in the last three years has real equanimity been restored, although New Zealand had previously committed troops to both Iraq and Afghanistan.

What is notable, however, is that during this time of relative distancing, science was used as a very effective diplomatic tool. Joint U.S.-New Zealand activities in support of Antarctic scientific operations continued on an amicable basis while differences elsewhere were being worked through. The main point of entry to the U.S. Antarctic activities is via McMurdo Station, which is only three kilometers from New Zealand's Scott Base. Both bases are supported by a joint logistics facility located in Christchurch, New Zealand's second largest city. This was home to U.S. military personnel supporting the Antarctic mission throughout the two decades. The science activities always remained well coordinated, and both countries worked closely throughout to protect the spirit of the Antarctic treaty and create a solid basis for rebuilding trust.

Greenhouse Gases—International Research Efforts at Mitigation

Because small nations have a differing geopolitical status, they can be catalysts for important multi-jurisdictional research and technological initiatives. The Global Research Alliance on Agricultural Greenhouse Gases (GRA) was a New Zealand initiative that was announced in relationship to the 2009 UN Climate Change conference in Copenhagen. It is now a formal alliance of thirty-three countries, including all the large economies and food producers, with the secretariat based in New Zealand. Its mission is very specific—to focus on research, development, and the extension of technologies and practices that will help deliver ways to grow more food (and more climate-resilient food systems) without growing greenhouse

gas emissions. Globally these emissions are similar in volume to those from transport, and in developing countries they may make up more than 50 percent of emissions. New Zealand, because of its high dependence on agriculture on one hand and its non-transport energy supplies being already primarily renewable on the other, has a similar profile.

The GRA initially undertook a stock-take of relevant research under several headings with working parties chaired by different countries and is now encouraging coordinated research. The areas in which effort is focused are greenhouse gas production associated with paddy rice cultivation (co-chaired by Japan and Uruguay), with livestock farming (co-chaired by the Netherlands and New Zealand), and with croplands (co-chaired by the United States and Brazil) and two cross-cutting groups focused on soil carbon and nitrogen cycling and inventories and measurement, respectively. To accelerate progress, the New Zealand government provided funds to the GRA for it to issue Grand Challenges to support research in strategic areas to reduce emissions associated with pastoral farming in temperate conditions. In turn, this has encouraged some highly innovative transnational partnerships.

New Zealand's role demonstrated that small nation leadership can promote international research. It shows how New Zealand can create sustained research projects of value to the developing world and how international research can, in turn, assist New Zealand.

Science and Trade

Ninety percent of New Zealand's primary industry products are exported and, as mentioned above, there is an absolute commitment to free trade in agriculture. At the same time, the country must maintain the very highest levels of biosecurity for imported products. For example, a foot and mouth epidemic would destroy a core component of the economy, and recently there has been an incursion of a bacterium that has devastated part of the important kiwifruit export industry.

New Zealand's high level of vigilance to protect its borders is not only about keeping out agricultural threats; there is also a need to protect the country's unique flora and fauna, which have evolved after eighty million years of geographical isolation. Such an obligation has been codified via New Zealand's signing of the 1992 Convention on Biological Diversity. It is recognized that 40 percent of the endemic bird species have become extinct since the arrival of humans eight hundred years ago.

Thus there is an inherent conflict between unhindered trade and biosecurity compliance requirements that requires good use of science to resolve. Domestically and internationally, serious arguments occur about biosecurity being wrongly, ineptly, or cynically applied, often along with thinly veiled accusations of nontariff barriers. Even in a relationship as close as that between Australia and New

Zealand, local politics and trade protectionism can converge to influence outcomes. The export of apples to Australia had been effectively blocked on the basis of a biosecurity argument for some eighty years and was only recently resolved in New Zealand's favor at the World Trade Organization (WTO). Conversely, New Zealand is debating restrictions on the importation of some pig products and honey on the basis of possible biosecurity risks. The process of resolution is complex in dissecting out science from vested interests and biosecurity restrictions from protectionism, and has to be resolved using agreed-upon scientific and technical guidelines as negotiated in international agreements.

New Zealand has worked hard to ensure that science and science-based interpretation are central to international biosecurity conventions associated with international trading arrangements. For example, in the WTO *Agreement on the Application of Sanitary and Phytosanitary Measures* (known as the SPS Agreement), countries agree to ensure that any SPS measures are applied only to the extent necessary to protect human, animal, or plant life or health, and are not maintained without scientific evidence. For New Zealand, its trade-based diplomacy is thus deeply rooted in the country's science.

New Zealand and the Developing World

As a small nation, New Zealand has a limited capacity to have diplomatic representation in countries beyond our trading partners. Certainly New Zealand has particular obligations to the small island states of the Pacific. Such countries have a common set of issues where science is important, including the provision of sustainable energy, maintaining management of fish stocks, responding to natural disasters, protecting biodiversity, addressing rising sea levels, and coping with high levels of noncommunicable disease. Donor nations increasingly need to work collectively to assist these small states. A further challenge for New Zealand and other donor countries is how to best help these nations—which have limited capacities to absorb and use technologies—to achieve greater robustness in a technological age, which is central to their future viability.

Beyond these Pacific states, a recent survey has shown that where New Zealand does not have significant trade exchange, the most intensive interactions are based on science. In a survey of our academic and research institutions, more than fifty of the less developed countries were identified where there are active research interactions involving New Zealand scientists. In none of those countries did we have resident diplomatic staff, making science perhaps the most visible part of New Zealand's profile. This suggests that science is indeed a very important component of maintaining a global profile for small countries.

Conclusion

This paper has demonstrated that for a country such as New Zealand, the interplay between science and diplomacy has a different focus from that of larger nations, and in some ways it is even more important in projecting a small nation's profile. With limited domestic resources, science frequently has an international dimension. Exploring opportunities to work jointly with other nations is a necessary part of building capabilities and relationships. In this respect, the lack of an effective and inclusive global science forum is limiting. As science becomes more global in its presentation, it is vital that small advanced nations are integrated into the processes that link science to innovation, economic growth, and environmental protection. Indeed, it is argued that small nations can play a disproportionately valuable role. SD

The opinions and characterizations in this article are those of the authors and do not necessarily represent official positions of the New Zealand Government.