OFFICE OF THE PRIME MINISTER'S CHIEF SCIENCE ADVISOR

Professor Sir Peter Gluckman, ONZ KNZM FRSNZ FMedSci FRS
Chief Science Advisor

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Rt Hon Jacinda Ardern
Prime Minister
Parliament Buildings
Wellington

Annual Report of the Office of the Chief Science Advisor 2016-2017

Dear Prime Minister

In keeping with my usual practice, I enclose herewith a report of my activities during 2016-17. In view of the change of government that occurred during the period of writing this report I have also made some comments related to that transition.

The past year has brought a number of new and rewarding challenges that continue to inspire and provide new insights at the interface of science and public policy. Both domestically and internationally, my Office has led or engaged in projects aimed at improving the production, brokering and application of policy-relevant knowledge. This year especially, there has been a focus on building systemic capacity for robust advisory processes, which is detailed in the report that follows.

I appreciate that, in taking office, you have had many priorities competing for your attention. However, I am pleased that you have given priority to the work of our Office and that you have clearly indicated that this work, and that of departmental science advisors, is a valued part of the iterative policy process. Your acknowledgement and respect for the independence of our work is noted with appreciation.

As I have indicated to you previously, my intention is to step down from the role of Chief Science Advisor at the end of my current term on June 30 2018.

Yours sincerely,

Sir Peter Gluckman ONZ KNZM FRS FRSNZ
Chief Science Advisor

Mail: PO Box 108-117, Symonds Street, Auckland 1150, New Zealand
Physical: Ground Floor, Boyle Building (505), 85 Park Road, Grafton, Auckland 1023
Telephone: +64 9 923 6318 **Email:** csa@pmcsa.org.nz **Website:** www.pmcsa.org.nz

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ANNUAL REPORT 2016 - 2017

Preamble

During 2016/17 there was change in Prime Minister following Prime Minister Key's resignation. The change in Prime Minister did not affect the role or brief of this Office and there continued to be a growing employment of the science advisory system to help policy development and broader related objectives. While the scope of the reporting period ends in June 2017, given that this report has been prepared following the September 2017 general election, some comments relevant to the transition in administration are included. A smooth transition has occurred and the general operational and strategic objectives of the Office and the advisory system remain unchanged.

The Office has continued to focus on pursuing its core mandate comprising the following work streams and in accord with our terms of reference, which have been attached to previous reports. Our work streams are:

- Advancing the use of science to benefit New Zealand through promoting the use of evidence to inform policy development and evaluation
- Providing advice as required to the Prime Minister, Ministers, central agencies and Ministries
- Supporting the work of the now-established network of departmental science advisors and extend this network to new Ministries coming on board
- Promoting New Zealand's interests through science diplomacy
- Promoting greater engagement between the public and the science community.

This report is divided into four themes that each demonstrate how science advice is promoting a future-focused perspective to benefit New Zealand. These themes are:

1. The science – public policy nexus
2. Addressing future knowledge needs
3. New perspectives and insights for the near and longer term
4. New Zealand in the world

In the report that follows, I highlight my Office's major activities from July 2016 to June 2017 with some additional comments on the transitional period as the new Government was formed.

1. The Science – Public Policy Nexus

In past reports, I have commented on the increasingly formalised network of departmental science advisors (DSA). The DSA mechanism is now an instrumental component in the machinery of government. All nine DSAs have reported that the transition to the new Government has been smooth.

The DSA network continued to develop through 2016/17. Dr David Wratt retired as DSA for MfE and was replaced by Dr Alison Collins (formerly of Landcare Research). Transport has advertised to create the post of DSA and an appointment is expected in early 2018. By agreement with the CE of MoD, Ms Hema Sridhar, Defence Chief Scientist is now invited as a member of the Committee of Science Advisors. A search is currently underway as Dr Ian Ferguson has indicated his wish to retire from MPI. Unfortunately TPK has yet to make an appointment. Since the change of government, several other Ministers are considering whether to appoint DSAs. I see particular value in further input in the areas of urban science, demographic science and

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particularly in digital and related matters, notwithstanding the decision to appoint a Chief Technology Officer.

With the growth of the DSA network, the science advisory system is well-positioned to support government decision-making whether it is related to short-term issues or to the growing importance of longer-term policy formation. The DSAs in the social sector have been especially active this year in developing a series of science-based policy narratives on early child development and mental health. Using the latest scientific understandings in these sectors, these policy narratives provide the evidential framework on which better policy and program responses can be built. This work by social sector DSAs draws increasingly from new data analytics techniques. Thus, building greater government capacity for their use is an important investment in developing public service capacity.

Related to this, in 2017 my Office brokered a significant partnership between New Zealand and European data scientists via the European Commission. The aim is to build and test social policy models using citizen-based analytics techniques made possible through New Zealand's world-leading Integrated Data Infrastructure (IDI). After developing ethical and privacy protocols and ensuring an appropriate data-access environment, we launched a research collaboration that will not only help prepare NZ data scientists for provision of better policy advice, it will generate immediate insights for policy makers by linking areas pertaining to education, housing, justice, and social development in a holistic and person-centred way.

My Office, working with the European Commission, has produced an extensive discussion paper on the opportunities and issues related to citizen-based analytics[1]. In turn this led me to provide advice to government on those issues related to data governance and oversight.
Related to this, I led a mission to the UK along with the CE of Statistics NZ to explore ways we can encourage better sharing of techniques, policies and lessons in the application of administrative data to policy development. This work continues.

Earlier this year, I published a third report in my series on evidence-informed policy-making in New Zealand[2]. This report was based on extensive qualitative data gathering conducted by my office. Interviews with ministerial officials, staff, DSAs, clients and other stakeholders gave important insight into how well the science advisory mechanism is operating, and how it can be improved and made resilient for the future.

In addressing the capacity issues identified in that report, I have sought to address the issue of diversity of views. To this end, my Office launched the Science Policy Exchange (SPE) in late 2016, completing the first full year of operation in 2017. The SPE is a competitively selected group of early career policy and science professionals who are balanced by expertise, gender and discipline. They bring a much-needed emergent perspective to the interface between science and public policy. In doing so, they are helping to bridge what could be – to an older generation perhaps – incommensurate cultures. The groups (Wellington and Auckland cohorts for now) have met six times in 2017 and worked on real-world policy issues. These ranged from the potential impact and social license related to the use of synthetic meats to the challenge posed by New Zealand's high prison population. In each project, the SPE members were mentored and encouraged to step outside the comfort of their own areas of expertise. In doing

[1] http://www.pmcsa.org.nz/wp-content/uploads/17-06-19-Citizen-based-analytics.pdf
[2] http://www.pmcsa.org.nz/wp-content/uploads/17-07-07-Enhancing-evidence-informed-policy-making.pdf

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so they were asked to help frame the associated problems and questions and identify and mobilise what expertise should be obtained to address the issues. Where appropriate, we plan to bring the SPE work to the attention to relevant ministers and CEs.

The Office has continued to administer the Participatory Science Platform, a crosscutting initiative of the government's Science in Society Programme known as 'A Nation of Curious Minds'. This initiative, which is now widely lauded, having attracted extensive international interest, is a modification of the citizen science concept. It is aimed at enhancing teacher, student, public and scientist capacities to bridge the divide between science and communities and thus provide a more inclusive form of science education. The project descriptions and the transformative stories of young participants certainly make for inspiring reading[3]. There is considerable demand for this programme to be expanded from its three pilot regions, which are in South Auckland, Taranaki and Otago.

A significant component of the Office's work was in association with Treasury. We have provided input into their long-term fiscal forecast and in particular in assessing the evidence base for some of their assessments in the social sector. We provided input into the reappraisal of the better public service targets. The PMCSA and social sector DSAs were heavily involved in the evidence reviews of social sector budget bids, through the Social Investment Panel. It is clear from the progressive involvement of the DSAs in reviewing budget bids from the social sector agencies over the past three years that the use of evidence in preparing bids has increased greatly. It has also led to a far greater integration of proposals between agencies.

2. Addressing Future Knowledge Needs

Much of the effort of my office in over 2016/17 has been focused on addressing future knowledge needs and ensuring that science-policy interface could be well-informed. The work programme was approved by Prime Ministers Key and English.

Together with the DoC and MfE, my Office developed the Environment and Conservation Science Roadmap[4]. Following extensive public and stakeholder consultation, the aim was to help guide researcher and funder decisions about where they might want to put their efforts to have the most impact on New Zealand's most pressing problems. The Roadmap is not intended to be prescriptive but simply to provide a framework for integrated investment and priority setting. The scientific priorities and knowledge gaps that it identifies are the product of considerable expert and community consultation. One of the most difficult challenges for policy makers is not knowing what they don't know, and the Roadmap is designed to identify these knowledge gaps and suggest how they could be filled.

A parallel a roadmap focused on the primary sector[5] was developed using a similar process by the DSA of MPI assisted by my Office.

Both of these documents will help to ensure that at least part of New Zealand's future knowledge production efforts will directly address the challenges and problems that most need new thinking. Preliminary work was also started on a more specific roadmap addressing issues of protecting our biodiversity and this work has continued under the new administration.

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[3] .(https://www.curiousminds.nz/)

[4] http://www.mfe.govt.nz/about-us/our-policy-and-evidence-focus/conservation-and-environment-science-roadmap

[5] https://www.mpi.govt.nz/news-and-resources/science-and-research/primary-sector-science-roadmap-te-ao-turoa/

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Scoping and framing future knowledge needs for New Zealand was also at the centre of my Office's work with regard to understanding, identification, mitigation, and preparedness regarding risk. This year, I published the second[6] in my series of three papers on *Risk and Uncertainty*, which had a particular focus on decision-making in a quickly changing environment. We continue work towards a third paper on how societal decisions involving risk assessment are made.

My Office also continued work in collaboration with DPMC and the Ministry of Civil Defence to help to identify the types of risks that New Zealand may expect to face in the coming years. We have been assisting with the preparation of a formal risk register. In my role as a member of ODESC, I have been involved, in dealing with a number of events, most particularly the Havelock North water contamination event and the Kaikoura Earthquake and aftermath. In this work, I have been well supported by Dr Anne Bardsley of my Office. The Kaikoura event in particular demonstrated the importance of the brokerage role of OPMCSA in ensuring clear understanding between scientific input and policy responses.

The Office also represents NZ on the Global Science Forum's (OECD) working party on international cooperation in science advice relevant to crisis management.

While risk preparedness in the New Zealand context may – somewhat unsurprisingly – be most concerned with natural hazards or economic threats to our small open economy, a less understood area of global risk is emerging in the digital space. I am a member of the OECD's Digital Futures Working Group. The Office has taken a particular role in considering the issues of individual and social impacts of digitalisation.

3. New Perspectives and Insights for the Near and Longer Term

Much of my work is about supporting Government and Society to face challenges and opportunities that require a scientific perspective. In order to clarify options, a role of my Office has been to generate research reports on specific topics. The aim is not only to provide information about the state of the science, but also to provide a framework that helps evaluate the implications of the various options based on what the evidence says (or does not say) about them. Such an exercise provides the foundational work on which future government and societal decisions can be made. To this end, in the past year, my Office produced four reports that provided perspectives and insights to assist future decision-making.

The first of these, in late 2016, was on the psychological consequences of the Kaikoura earthquake. The report drew heavily on lessons learned in the Canterbury perspective earthquakes of 2010-11 and identified ways to respond proactively to the mental health challenges that can arise with major civic emergencies[7].

My Office also released an extensive public paper on freshwater *New Zealand's fresh waters; Values, state, trends and human impacts,* which received high profile[8]. This was an extensive piece of work greatly assisted by NIWA staff with input from numerous scientists from NIWA and academia. Its purpose was to give the NZ public and policy makers a much more holistic and comprehensive view of the issues associated with freshwater quality than was then generally

[6] http://www.pmcsa.org.nz/wp-content/uploads/PMCSA-Risk-paper-2-Nov-2016-.pdf
[7] http://www.pmcsa.org.nz/wp-content/uploads/Briefing-paper-the-psychosocial-consequences-of-the-Kaikoura-earthquakes_1.12.16.pdf
[8] http://www.pmcsa.org.nz/wp-content/uploads/PMCSA-Freshwater-Report.pdf

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available. The situation was shown to be much more complex and multidimensional than often portrayed. In short the work necessitated a holistic and joined-up approach, which we were able to convene.

Following a request from Prime Minister English, the PMCSA, together with the social sector departmental science advisors, the Office prepared an evidence-based narrative aimed at taking a fresh approach to mental health in New Zealand[9]. Much of the work was led by the DSA for MOH, Dr John Potter. Rather than focusing solely on the service capacity issues, the importance of a life-course approach was pointed out. Here, it was highlighted that much of the mental health burden originates in childhood and adolescence, and with this knowledge, much can be done to promote mental wellness in young people. However it was pointed out that the context of modern living (urbanisation, digitilisation, changed social and family structures) is such that the needs for mental health services will continue to rise. The report also highlighted the potential use of a broader range of therapeutic approaches.

This was followed by a report specifically on the issues of youth suicide for which the evidence indicated that there is a need for a broader suite of preventative strategies that extend beyond a simple mental health focus into areas of promoting resilience in young people[10].
As discussed earlier I published a discussion paper on citizen-based analytics and the use of big data to support social sector decisions.

4. New Zealand in the World

In early 2017 the Science and Technology Agreement was signed between Australia and New Zealand. Subsequently I attended the semi-annual Federal Association of Chief Scientists (FACS) meetings in Australia, which provide an opportunity to lay the groundwork not only for research partnerships but, importantly, for sharing intelligence and lessons in science advice for public policy. Australia's capacity to generate knowledge that is largely applicable to the New Zealand context is incomparable, and we can benefit greatly from its judicious use here. I have worked with the Royal Society of New Zealand so that they can partake in the horizon scanning work which is coordinated by the Australian Commonwealth Science Council chaired by the Australian Prime Minister and which is supported by the Office of my counterpart.

Just as New Zealand can benefit from establishing such relationships at the interface between science and policy internationally, so too we can be of service. This year, my Office consulted the government of Canada in re-establishing the office of Chief Science Advisor. We welcomed the Canadian deputy minister of science, Mr John Knubley and the Minister of Justice, the Rt Honourable Jody Wilson-Raybould on their enquiry missions to New Zealand in this regard. We have had ongoing dialogue with the Office of the Canadian Minister of Science. Several other countries have also sought our input.

The APEC Chief Science Advisors and Equivalents (CSAE) grouping is now a standard meeting of the APEC calendar. The 2016 meeting was held in Lima, Peru and co-chaired by myself and my Peruvian counterpart. The program[11] offered members an opportunity to report on progress regarding science advice in emergencies. This was an assignment agreed upon in the previous year. More importantly, this meeting kicked off a new thematic discussion on the Global

[9] http://www.pmcsa.org.nz/wp-content/uploads/17-08-14-Mental-health-long.pdf
[10] http://www.pmcsa.org.nz/wp-content/uploads/17-07-26-Youth-suicide-in-New-Zealand-a-Discussion-Paper.pdf
[11] http://mddb.apec.org/Documents/2016/SOM/CSA/16_som_csa_011rev1.pdf

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Sustainable Development Goals (SDGs) and the role of science and science advice in helping countries and the international community to achieve these.

If the SDGs are to be achieved, new and shared knowledge is essential. But because many of the goals will require countries to adapt their policy regimes, they can be quite controversial. Too often, the science becomes a convenient platform for argument and disagreement, where what is really in dispute are policy choices and trade-offs. We have seen this behaviour most clearly in the area of climate change. For this reason, we have identified the role of scientific dialogue and science diplomacy around the SDGs as a key component in building not just the required knowledge base, but also global support for that knowledge. The APEC CSAE group will continue to play an important part in this process.

The Small Advanced Economies Initiative (SAEI), which I chair, held its working meeting in Geneva hosted by Switzerland in association with the World Economic Forum in April 2017. The OECD and European Commission also participated in some of the discussions. This followed the Principals meeting held in Dublin in September 2016. The SAEI comprises Finland, Denmark, Ireland, Israel Singapore, Switzerland and New Zealand. A core focus of the working group meeting was on the impact of the '4th Industrial Revolution' on small countries. This covered how our economy and society are moving towards an almost entirely networked and digital way of relating and doing business and what are the concomitant risks and opportunities.

Discussions included how will we cope with jobless growth, zero marginal costs, new educational models and disrupted social institutions? These are questions for all countries and indeed, the OECD project on 'Going Global' to which I am an advisor is looking at precisely these questions. But the impact on and reaction from small countries is likely to be quite distinct and merits particular attention. The SAEI dialogue has laid the foundation for productive future collaboration in this regard. This NZ-led initiative, begun in 2012, continues to produce important and frank dialogue between senior level policy-makers in the areas of science and innovation policy, economics, trade, and ensuring a voice for small countries in the changing global social and political architecture.

I continue to Chair the International Network for Government Science Advice and, in my role of science envoy for MFAT, I have taken over chairmanship of the Foreign Ministers Science and Technology Advisors' Network (FMSTAN) which was previously chaired by the USA. Both these roles have assisted greatly in New Zealand's science diplomacy objectives.
I also chair the re-established International Science and Innovation Coordination Committee among relevant New Zealand agencies.

Other Activities: Science System and Policy for Science
My office plays a sounding board function in the science policy and science funding system. MBIE has sought our input and that of the Committee of Science Advisors on a number of matters. I am a member of the steering committee along with the DCEs of MBIE and the ministry of Education for the 'Nation of Curious Minds' programme. This programme is filling a critical strategic need as we move to be a more innovation-focused society.

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Looking Ahead

With the new administration taking over after September 2018, I am pleased to note a continuation of strong support for the general approach and work programme of my Office. The new Government approved continuation of the various projects underway at the time of the transition.

Administration of the OPMCSA

There has been no change in arrangements from previous years and the Office functions within budget that is provided in the form of a contract to the University of Auckland.

The Office publishes most of the speeches and commentary as well as formal reports at www.pmcsa.org.nz.

Acknowledgements

The Office has had the ongoing support of successive Prime Ministers and Ministers, the Prime Ministers' Chiefs of Staff, Chief Executives of many Ministries. In particular, I wish to thank Mr Andrew Kibblewhite, Dr Arati Waldegrave, Mr Paul O'Connell, and Mr John Scott of DPMC. I also acknowledge the work of Ms Kristiann Allen, my Chief of Staff, Professor Stephen Goldson, my strategic advisor and deputy (part-time), Dr Anne Bardsley, my principal research analyst. Mr Julian Tollestrup and Mr Andrew Sweet have been instrumental in supporting both strategic and operational matters for the Small Advanced Economies Initiative. Dr Victoria Metcalf ensures that the Participatory Science Platform continues to inspire.

The work of the Office is highly interdependent with that of the Departmental Science Advisors. I thank the DSAs for their support and them and the other members of the Committee of Science Advisors (CE of Statistics NZ, Chief Scientists of MBIE and MOD, Chief Economist of Treasury) for their inputs, advice and peer review of my work. I also thank the staff at MFAT and MBIE, and Ms Megan Stünzner in my Office for their assistance throughout the year.

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