

15 March 2019

Hon Dr Megan Woods
Minister of Research, Science and Innovation
Parliament Buildings
Wellington

Dear Minister

ESR's strategic issues

ESR's scientific work is critical to addressing challenges facing New Zealanders such as disease outbreaks, antimicrobial resistance, the proliferation of synthetic cannabinoids, violent crime, and increasing threats to New Zealand's environment and waterways.

This is a broad mandate. And it is a vital one.

But we are facing some very real issues. Our research capability is critical to the impact we make for New Zealand. However, we are finding it challenging to maintain the critical mass of research we need with the fixed SSIF funding we receive. The other major issue we are facing is the sustainability of science contracts with government agencies, which are operating under tight fiscal constraints. These two things together create significant challenges for ESR.

If we can resolve both of these issues, we see a bright future for ESR and the contribution we can make to New Zealand. We would like to meet with you to discuss how we could deliver much greater value for New Zealand.

Future research funding is critical to assist in national events

Scientific research is fundamental to help us respond more effectively to events of national significance.

When responding to the milk powder 1080 contamination threat we used our previous research into Low Copy Number DNA to find minute traces of DNA left by the person responsible for the threat. After the offender was identified, MPI were able to give consumers of milk products in New Zealand and overseas assurance that the products were safe. If not for ESR's actions, the economic costs of the threat to industry and government would have been between \$35m and \$40m higher.

During the Havelock North campylobacter outbreak, we used a new rapid method for campylobacter typing, previously developed using SSIF funding, to swiftly identify the organism responsible for the outbreak. ESR identified ruminants as the likely source of the organism, which helped to narrow down the source of the contamination.

ESR has a track record of turning research into commercial success

We have been very successful in commercialising STRmix™, our innovative forensic software. STRmix™ was developed with SSIF funding to help New Zealand Police solve serious crimes in New Zealand. The software was then commercialised and is now used by forensic laboratories around the world, generating international revenue of s 9(2)(b)(ii), s 9(2)(i)

STRmix is a New Zealand innovation success story which was recently awarded the Prime Minister's Science Prize. It is a great example which shows that if we can resolve both the sustainability of our core contracts and the level of research funding, ESR can deliver much greater value for NZ Inc.

We see further potential to grow STRmix™ s 9(2)(b)(ii), s 9(2)(b)(i)
s 9(2)(b)(i), s 9(2)(b)(ii)

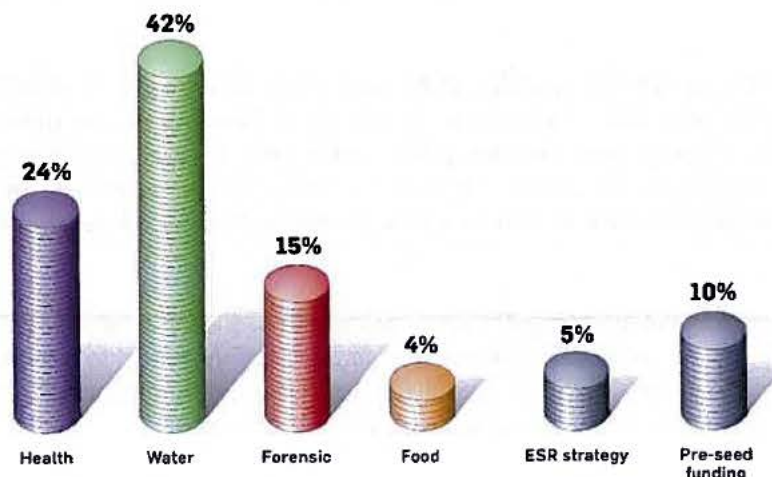
More ESR research can improve the wellbeing of New Zealanders and their families

ESR researches international developments in science and adapts them to the New Zealand context to improve the health and wellbeing of New Zealanders. We have undertaken a lot of work in looking at how we develop new research and capability to expand our contribution to government's wellbeing priorities. Specific areas where we have already made a real difference are groundwater nitrate mitigation, micro-plastics, influenza surveillance and commercialisation of forensic technologies.

Current investment in SSIF-funded research

Investment in SSIF-funded research has remained unchanged at ESR since 2013/14, with the exception of a funding transfer in 2016/17 to retain ESR's groundwater capability. ESR receives \$9.2m of SSIF funding per year which it allocates to the following research areas.

Allocation of current SSIF funding



ESR is an effective platform for lifting the wellbeing of New Zealanders

Not only does ESR have the potential to undertake more research, New Zealand needs ESR to do much more research in areas that can significantly improve wellbeing. There are many areas where ESR could undertake more bold and innovative research:

Improving water quality

ESR is developing innovative treatment methods for nitrogen run-off from farms, including a woodchip based denitrification wall that could rapidly improve the quality of New Zealand's groundwater. The speed in which we do this is limited only by lack of resources. Additional SSIF funding would assist us in speeding up the process.

Antimicrobial resistance - one of the top ten threats to wellbeing globally

ESR has the necessary skills to undertake research into antimicrobial resistance to reduce the impact on hospital patients and to extend the effective life of antibiotics in New Zealand. This work has huge potential benefits but we have only limited funding to progress its development. The ability of bacteria, parasites, viruses and fungi to resist antibiotics threatens to send us back to a time when we were unable to easily treat infections such as pneumonia, tuberculosis, gonorrhoea, and salmonellosis. In fact, the World Health Organisation has identified antimicrobial resistance as one of the top ten threats to global health.

Understanding the effect of climate change on human health

The effect of climate change on the physical world is well recognised (rising seas, melting ice, etc) but the impact on the wellbeing of humans is not. Increasing temperatures will have an impact on the presence and growth rates of the organisms that cause human disease. Changing temperatures will also affect the prevalence and spread of diseases. ESR believes it is urgent to undertake further research into the impact of climate change on New Zealanders to help guide policy in the near future.

Wastewater epidemiology – accessing real time intelligence on health risks to New Zealanders

Our work on illicit drugs in wastewater has informed our understanding of threats to health in specific communities and the consequent response and prevention activities of government agencies. There is enormous potential in expanding wastewater based epidemiology which can act as a 'community canary' for communities.

Genomic database for personalised medicine

Whole genome sequencing is providing an increasingly effective means of identifying an individual's health risks, which puts health professionals in a much better position to manage those risks. ESR aims to work with DHBs, the Ministry of Health and universities to examine the feasibility of providing genomic testing and developing a human genome database for the purposes of personalised medicine. Whole genome sequencing can also identify whether specific medications will be effective for an individual based on the presence or absence of specific biomarkers. 'Personalised medicine' will ensure patients are prescribed more effective medication that will work best for them.

Sustainability of our core contracts

Most of the vital work we do for New Zealand is purchased commercially by the Ministry of Health, New Zealand Police, other government and commercial customers. However, we are facing financial challenges meeting the needs of our key government contracts.

Ministry of Health contract

The contract is for **s 9(2)(b)(ii), s 9(2)(f)(iv)** which covers infectious disease surveillance and monitoring, environmental health including drinking water safety, radiation safety, drug and alcohol testing. Our deep expertise in health science is at the forefront of protecting New Zealanders against known and emerging diseases. This involves sophisticated and complex analysis, such as our work on developing an Antimicrobial Resistance Action Plan for New Zealand.

s 9(2)(f)(iv), s 9(2)(g)(i)

New Zealand Police contract

We have a new **s 9(2)(b)(ii), s 9(2)(f)(iv)** contract with Police for the delivery of advanced forensic science capabilities to resolve crime. We undertake sophisticated and complex investigations for the Police and in support of Coronial inquiries, such as the recent spate of deaths linked to synthetic cannabinoids. **s 9(2)(b)(ii), s 9(2)(i)**

s 9(2)(b)(ii), s 9(2)(i)

Investment is required to replace ageing infrastructure

MBIE has briefed you separately on the Indicative Business Case for replacement of the facilities at Kenepuru which are no longer suitable, require significant maintenance and represent an increased risk of operational failure.

s 9(2)(f)(iv), s 9(2)(j)

In summary

ESR is a Crown Research Institute that provides trusted and independent advice underpinned by research to keep New Zealanders safe and healthy.

s 9(2)(g)(i)

We would like to meet with you at your earliest convenience to discuss the issues raised above.

Yours sincerely



Quentin Hix

Deputy Chair

