MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
HIKINA WHAKATUTUKI

National Science Challenges Request for Proposals

For the following Challenges:

- Resilience to Nature's Challenges
  Kia Manawaroa – Ngā Ākina o Te Ao Tūroa
- High-Value Nutrition
  Ko Ngā Kai Whai Painga
- The Deep South
  Te Kōmata o Te Tonga

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Quick reference guide

What are the National Science Challenges (NSCs)?

The NSCs are a new strategic approach to mission-led science investment. The Challenges respond to the most important, national-scale issues and opportunities identified by science stakeholders and the New Zealand public, promote collaboration across a number of research providers and involve a broad portfolio of multi-disciplinary research activity. They target objectives that, if achieved, will have a major and enduring benefit for New Zealand.

What Challenges are being funded and how much funding is available?

This request for proposals (RfP) invites proposals for a research collaboration representing New Zealand's best team to deliver each Challenge for the first three Challenges. The following amounts represent the allocation of funding available over the next ten years. These amounts represent new government funding and funding from maturing MBIE contracts directly linked to Challenge outcomes.

Resilience to Nature's Challenges *Kia Manawaroa – Ngā Ākina o Te Ao Tūroa*	up to $59.4 million
High-Value Nutrition *Ko Ngā Kai Whai Painga*	up to $83.8 million
The Deep South *Te Kōmata o Te Tonga*	up to $51.1 million

What can funding be used for?

Funding can be used for research, science, or technology or related activities for a Challenge specified in this RfP. Funding cannot be used for capital expenditure.

Who can apply?

Legal entities representing a comprehensive range of organisations and individuals with a track record in the research area of each Challenge can submit a proposal.

When are proposals due and what information must they contain?

The MBIE Portal will be opened for proposals in mid-October. Proposals are due by 12pm (noon) on Friday, 20 December 2013. Proposals must include a Research Plan (outline of research strategy and research work programme) and a Business Plan (governance, management, and financial arrangements) for up to ten years.

Assessment, decision-making, and contracting

An independent assessment panel will assess proposals. The Science Board will make funding decisions.

If your proposal is successful, MBIE will contract with a single legal entity (Challenge Contractor) for up to ten years. The Science Board may allocate funding for an initial period of up to five years (with potential for a further five years of funding). The NSC Investment Contract (NSCIC) template that MBIE will use to contract with the Challenger Contractor will be posted on the MBIE website shortly, outlining indicative terms and conditions. The final NSCIC will reflect each successful applicant's governance structure.

Further information

If you have questions on the NSC investment process, please e-mail contactNSC@mbie.govt.nz. MBIE will publish any questions received and answers on its website.

Reference documents

The *Gazette* notice *Criteria for Proposals for National Science Challenges Funding* dated 26 September 2013 outlines the criteria against which proposals will be assessed. It is a key reference document that should be read in conjunction with this RfP. It can be found on the DIA site (link to come). For other background documents about the NSCs refer to www.msi.govt.nz/update-me/major-projects/national-science-challenges/request-for-proposals/

GST - All financial figures in this document are GST exclusive.

Introduction

This RfP invites proposals for NSC funding for a research collaboration (Challenge collaboration) representing New Zealand's best team to deliver each of the following Challenges:

- Resilience to Nature's Challenges *Kia Manawaroa - Ngā Ākina o Te Ao Tūroa*
- High-Value Nutrition *Ko Ngā Kai Whai Painga*
- The Deep South *Te Kōmata o Te Tonga*.

In August 2012, the Government agreed to the creation of the National Science Challenges. The Challenges are a set of mission-led science investments that will help to address some of the most fundamental issues New Zealand faces for its future development. The process of identifying the Challenges involved significant public engagement and recommendations by an independent National Science Challenges Panel. The NSC funding is to fund research, science, or technology, or related activities that have the potential to:

- respond to the most important, national-scale issues and opportunities identified by science stakeholders and the New Zealand public
- promote collaboration across a number of research providers and involve a broad portfolio of multi-disciplinary research activity
- enable government to take a more long-term strategic approach to managing and coordinating mission-led science investments.

The NSCs will involve greater alignment and co-ordination of research to generate greater impact and value from the government's science investment.

Public outreach, communication, and education are important aspects of the NSCs. Public awareness as each Challenge proceeds will help to increase understanding of how science contributes to New Zealand's well-being and will encourage a more scientific approach to tackling the challenges facing us. The NSCs will also help lift the profile of science and other disciplines among young people and may encourage them into science- and technology-based careers.

This RfP covers the first three of ten Challenges approved by Cabinet. MBIE will call for proposals for the remaining seven Challenges in early 2014.

Eligibility

Who can submit a proposal for NSC funding?

A legal entity (based in New Zealand) representing a comprehensive range of organisations and individuals with a track record in the research area of the Challenge can submit a proposal under one Challenge.

Public service departments (as listed in Schedule 1 of the State Sector Act 1988) are not eligible to submit proposals.

Overseas organisations

Overseas organisations may take part in a Challenge collaboration. A Challenge collaboration may include the use of international research capability and infrastructure facilities if not available in New Zealand. However, MBIE expects that the majority of research will be carried out in New Zealand unless there are compelling reasons otherwise.

Not solely for the benefit of Challenge members

The Challenges are to address major national-scale issues and opportunities and are for the benefit of New Zealand. A proposal must not be solely for the benefit of the applicant including the

organisations or individuals it represents that are taking part in a Challenge collaboration (Challenge members).

Involvement in more than one Challenge

Research organisations or individuals that are part of one Challenge proposal may also be involved in another proposal for a separate Challenge in this RfP or in future RfPs.

Funding

What activities are eligible and ineligible for funding?

NSC funding can be applied to undertake research, science, or technology ('research') or related activities that are in a Challenge specified in this RfP. Related activities can include, for example, engagement with communities, schools, businesses, and end users of research, capability development, science communication and promotion, and providing for open data and re-use of data. Funding cannot be used for capital expenditure.

Funding amounts

Funding for each Challenge will come from two sources.

1. New funding: The government has made $316.5 million of new funding available for the NSCs over ten years (this includes $133.5 million over four years announced in the 2012 and 2013 Budgets and $30.5 million per annum thereafter). This new funding includes the following amounts allocated for the first three Challenges specified in this RfP:

- Resilience to Nature's Challenges
  Kia Manawaroa - Ngā Ākina o Te Ao Tūroa — up to $17.4 million
- High-Value Nutrition
  Ko Ngā Kai Whai Painga — up to $30.6 million
- The Deep South
  Te Kōmata o Te Tonga — up to $35.0 million

2. Funding from directly linked maturing contracts: In addition to new funding, funding from MBIE-managed maturing research contracts directly linked to Challenge outcomes will contribute to each Challenge's funding package. As those contracts mature, the annual amount will be transferred into the relevant Challenge.

The following table shows the combination of these two funding sources. Funding has been allocated into two five-year periods. Funding up to the total amount may be used within each five-year period from the date of contracting of a successful proposal. Funding is not intended to be transferred between the two five-year periods.

Total funding available for each Challenge (up to $ million)

Challenge	1 July 2013 – 30 June 2018	1 July 2018 – 30 June 2023	Total
Resilience to Nature's Challenges *Kia Manawaroa - Ngā Ākina o Te Ao Tūroa*	19.6	39.8	59.4
High-Value Nutrition *Ko Ngā Kai Whai Painga*	30.6	53.2	83.8
The Deep South *Te Kōmata o Te Tonga*	24.0	27.1	51.1

Relationship with CRI core funding

The role of the Crown research institutes (CRIs) is to undertake research for the benefit of New Zealand as outlined in the Crown Research Institutes Act 1992. The Statements of Core Purpose (SCPs), available on the CRIs' websites, outline each CRI's purpose and target outcomes. Where there is alignment between a Challenge and the SCP of a CRI that takes part in a Challenge, it is expected that the relevant portion of the CRI's core funding will be invested in the Challenge as co-funding. The following amounts per annum are relevant CRI core funding for the following Challenges:

Resilience to Nature's Challenges *Kia Manawaroa - Ngā Ākina o Te Ao Tūroa* (GNS Science, NIWA, Scion)	up to $11.1 million
High-Value Nutrition *Ko Ngā Kai Whai Painga* (AgResearch, ESR, Plant and Food Research)	up to $6.4 million
The Deep South *Te Kōmata o Te Tonga* (GNS Science, NIWA)	up to $2.9 million

These amounts are for 2013/14. The amounts available for future years may vary. In the meantime, the figures for 2013/14 should be used as a guide.

Other funding

Research funded by other government agencies and research providers, including universities and the Health Research Council, may be aligned to a Challenge where the research also contributes to the Challenge objective and outcomes.

Co-funding

You are strongly encouraged to seek co-funding from external partners, including the private sector. Co-funding indicates support from end users. In the Business Plan section of your proposal you must outline your efforts to secure co-funding from other sources (including from international sources) and plans to leverage private sector investment.

Governance

A governance structure will be required for each Challenge. Its responsibilities will include strategic direction and responsibility for the implementation and delivery of the Challenge work programme and outcomes. This will include oversight of allocating and managing funding, planning, performance monitoring and review of progress, skills development, ensuring the impact of delivery, communicating and reporting, and, if relevant, resolving disputes between Challenge members.

The governance structure should be appropriate for the complexity of the proposed activities and the number of parties involved including Challenge members. We strongly recommend that the governance structure include end users (including Māori) who can provide strategic input into shaping and delivering the Challenge work programme. Where appropriate, for example to reduce transaction costs, the Challenge collaboration may leverage or build on an existing governance structure.

If the governance structure has not been formed at proposal stage, proposals must include details on the proposed governance arrangements. If your proposal is successful, there will be a pre-contractual condition to ensure that the governance arrangements outlined in the proposal are implemented before contracting.

MBIE reserves the right to appoint an observer to the governance structure (board or equivalent body).

Structural options

For the avoidance of doubt:

- The entity that contracts with MBIE (Challenge Contractor) must be a legal entity based in New Zealand.

- The entity can be a separate, stand-alone entity established for the purpose or it may be one of the Challenge members.

- A proposal may propose a single entity that 1) contracts with MBIE and receives funding, 2) forms the governance structure of the Challenge and relationship between Challenge members and other parties involved, and 3) manages the Challenge's day-by-day activities. There can be separate entities with different functions in the Challenge, but only one Challenge Contractor.

- Your Business Plan must outline your proposed governance, management, and financial arrangements and relationships between the various parties involved in the Challenge.

Governance, management, and financial arrangements are up to each applicant and can differ across Challenges. The Science Board will decide whether the proposed arrangements and structures are appropriate.

Application process

Only one legal entity (Challenge Contractor) may submit a proposal for a Challenge collaboration.

You must submit your proposal through the MBIE Portal by 12pm (noon) on Friday, 20 December 2013. The MBIE Portal is a secure, online space where you apply for funding. The MBIE Portal is accessed at https://ims.msi.govt.nz/myfrst/. MBIE will not accept proposals received after the closing deadline.

If you have not previously applied for MBIE funding through the MBIE Portal in the name of the Challenge Contractor, you need to register. Refer **Appendix C: How to use the MBIE Portal**.

What information is required?

In the MBIE Portal you will be asked to provide certain information to identify and summarise your proposal. Refer **Appendix C: How to use the MBIE Portal**.

You will be required to upload a Research Plan that outlines a 10-year research strategy and detailed research programmes for the first five years and a Business Plan that outlines your governance, management, and financial arrangements.

For the Research and Business Plans combined there is a limit of 50 pages, to ensure that the information that you provide is concise and succinct, and covers key points. Font sizes should be legible (at least 11 point) and margins and spacing should be reasonable. The only additional information that should appear in appendices are the CVs of key personnel only. Provide CVs using MBIE's standard CV template (available at www.msi.govt.nz/update-me/major-projects/national-science-challenges/request-for-proposals). Your proposal should contain adequate information for assessment purposes but there is no requirement to go up to the page limit. All financial figures in your proposal must be GST exclusive.

Note:

- Your Research and Business Plans must outline your intended approach and arrangements as a whole for a period of up to ten years.
- Your Research Plan must also provide a detailed description of your proposed work programme for the first five years.
- If your proposal is successful, the Science Board may allocate funding for an initial period of up to five years (with potential for a further five years of funding). The description of your proposed work programme will form the basis of a Challenge Programme Agreement attached to the NSC Investment Contract. You will be required to report to MBIE on your progress each year.

Research Plan

Provide a Research Plan that sets out clearly over a period of up to ten years your proposed research and related activities and how you will carry out these activities to achieve the Challenge objective and outcomes. The Research Plan should take into account all funding available to the Challenge and should demonstrate how other relevant funding (eg CRI core funding as co-funding, and other co-funding from end users) will be integrated and aligned to achieve Challenge objectives and outcomes.

Address each outcome under each theme. However, propose different theme(s) and/or outcome(s) if you consider that they can better meet the Challenge objective, and provide an explanation.

Your Research Plan must include the following information.

Part 1 Research Plan - overall approach

1.1 10-year research plan

Provide an integrated up to 10-year research plan to achieve the Challenge objective and outcomes. The plan should outline your proposed research and related activities and how these will meet the Challenge objective and outcomes. The plan should provide a detailed description of your proposed work programme for the first five years (or up to five years) with a high-level outline of the proposed research for the rest of the 10-year period. You may propose a research plan for fewer than ten years if you consider that you can achieve the Challenge outcomes in a shorter time.

Your research plan should refer in general terms to items such as, but not limited to, the proposed research approach, portfolio of research programmes, sequencing of research programmes, performance monitoring including key performance indicators (KPIs), role of each Challenge member, and the key capabilities applied.

Research organisations: Demonstrate how the research plan establishes the best team of research organisations for the research and makes best use of existing capabilities, competencies, and infrastructure of key New Zealand research organisations. Show that the organisations involved in the Challenge have the capability, capacity, track record, skills, and experience to carry out the research.

Show how collaboration within the Challenge and with other research organisations will be promoted and used where this will make the best use of existing skills across the New Zealand science system and will avoid duplication. Show how you will leverage the capabilities of international research organisations. Show how Māori researchers/research organisations will participate in the Challenge.

If relevant, advise why you have not included any research organisation that would otherwise be considered a leading provider of research capability/infrastructure in the area of research covered by your proposal.

End users: Your research plan must show how it will meet the needs of end users. It should reflect the engagement and support of the public and end users (including Māori) in its development. Demonstrate how you involved potential end users in designing your research plan, how you will continue to involve potential end users in any modifications, and how end users will be involved in the research and/or in using the results of the research. This information could be provided in the form of a stakeholder engagement plan.

1.2 Research landscape (national and international)

Provide information on the context of existing research relevant to the Challenge.

Build on existing research: Show how the proposed research will build on, contribute to, and interact with other relevant current research in New Zealand and internationally that contributes

directly or indirectly to the Challenge but is funded from other sources. Show how your proposed research will complement and not duplicate other research. Show how you will address gaps and opportunities in the overall research landscape.

Relevant New Zealand research may include other research funded by MBIE and other government agencies (eg Primary Growth Partnership funding from the Ministry for Primary Industries), centres of research excellence, universities, independent research organisations, and businesses.

Co-funding: Outline the sources of any co-funding, their nature (cash or in kind), and the proposed research that it will support. Show how relevant CRI core funding will be embedded in the Challenge as co-funding.

Linkages to international research: Describe how you will use international expertise to augment your research, to enhance knowledge creation by linking with world-class international research groups in relevant fields, and to create enhanced and enduring international research partnerships for New Zealand by linking with relevant international initiatives.

Fit with sector and research strategies: Show how your proposed research fits with the overall strategic direction of the relevant industry sector(s). Refer to sector strategy documents if they exist. Show how your proposed research fits with any relevant research strategies.

Linkages to other Challenges: Explain any linkages between your proposal and other relevant Challenges (based on currently available information on the other Challenges). Show how you will work with other relevant Challenges and share relevant information and identify opportunities between researchers, end users, and other parties involved in them.

1.3 Research team and skills

Composition of research team: Provide evidence that you have established the best team for your research and proactively promoted and incorporated collaboration with other research organisations and individuals where this will make the best use of existing skills across the New Zealand science system and will avoid duplication.

Provide information about the research team involved in your proposal and identify key researchers. Information about team members should include their role, track record and experience, and evidence of peer recognition (eg awards and prizes).

If relevant, advise why you have not included any researcher who would otherwise be considered a leading investigator in the area of research covered by your proposal.

International linkages: Explain how you will leverage international knowledge, skills, and experience. Provide information about the international researchers who will be part of the Challenge and how and to what extent they will be involved in the Challenge.

Skills development: Show how the skills and expertise of researchers will be built over the life of the Challenge. Outline processes for the training and career development of researchers involved, particularly for PhDs, post-docs, and researchers in the early or mid stage of their careers.

Infrastructure: Outline arrangements for ensuring access to significant research infrastructure, including how Challenge members will share infrastructure and avoid duplication of existing investment in infrastructure.

Collaboration: Outline how your proposed collaboration arrangements are fit for purpose and will support the achievement of the Challenge objective and outcomes. Outline the formal and informal mechanisms by which researchers from the same or different disciplines, organisations (in New Zealand and internationally), and/or teams will work together in the Challenge. Describe the connections and collaborations between Māori organisations and researchers who undertake to deliver Vision Mātauranga objectives. Outline how researchers and end users will develop a shared understanding of objectives and outcomes. Outline the systems that will be used to enable multi-disciplinary research. Show how research results, data, tools, and infrastructure will be shared across teams and organisations.

1.4 Research portfolio and quality

Prioritisation: Describe the processes used to identify, assess, prioritise, and select research programmes to address the Challenge. This could include, for example, the use of a contestable process within the Challenge.

Quality: Outline methods for ensuring on-going quality assurance in delivering the research. This could include, for example, the use of an international science advisory panel. Outline any other activities that will contribute to outstanding science quality.

Portfolio: Describe the portfolio of research and how it includes both high-risk/high-return programmes as well as incremental research. Describe how the Challenge provides researchers with the opportunity to pursue innovative, extraordinary, or unconventional research that will push the boundaries of science in a Challenge. For example, you may wish to fund investigators, rather than programmes, to undertake research that contributes to achieving Challenge outcomes.

Dynamism: Describe the methods that will be used to allow the dynamic introduction of new capability, research, and researchers into the Challenge.

You must allocate a portion of total Challenge funding (excluding CRI core funding) to a separate pool from which you will allocate funding through a contestable process open to existing Challenge members and to other researchers/research organisations outside the Challenge. The amount of contestable funding is not defined, but the amount and timing of allocation should be sufficient to achieve the objective of refreshment.

Describe your approach to contestable funding, including:

- how much you will set aside for contestable allocation (eg fixed $ amount or a % of total funding) and how you have decided on this amount
- the regularity of contestable allocation rounds
- the research questions or investment priorities for which you will call for funding, and how the questions and priorities will be set
- the process to call for proposals for funding
- assessment and decision-making criteria and processes and how you will incorporate independent peer review and/or assessment panel
- contracting, monitoring, and reporting.

For guidance, you may wish to consider the way in which MBIE allocates science-led funding through its annual contestable rounds.

1.5 Vision Mātauranga (VM)

The NSCs are to give effect to the VM policy. The VM policy aims to unlock the science and innovation potential of Māori knowledge, resources, and people for the benefit of New Zealand. It focuses on four themes:

(a) indigenous innovation – contributing to economic growth through distinctive science and innovation

(b) taiao/environment – achieving environmental sustainability through iwi and hapū relationships with land and sea

(c) hauora/health – improving health and social wellbeing

(d) mātauranga – exploring indigenous knowledge and science and innovation.

Proposals are to give effect to the VM policy. It is expected that, where relevant, Māori researchers/research organisations, end users, and/or stakeholders will play a vital role in the delivery of the Challenge at all levels. Giving effect to the VM policy is not only about how the

research responds to distinctive issues and needs of Māori and Māori communities, but also about how Māori, both individually and collectively, can participate in research initiatives to achieve the outcomes sought.

To achieve this it is important to assess VM-related research opportunities and methodologies in the early stages of research planning for the Challenge. This will require strong leadership of VM initiatives in an integrated manner within the Challenge collaboration, not in an isolated manner.

Show how your proposed research plan will give effect to the objectives of the VM policy. Outcomes relevant to VM may include the following, depending on the Challenge:

- distinctive products, services, or systems derived from Māori knowledge
- approaches and solutions to Māori health and social well being
- assistance to Māori businesses to increase productivity.

1.6 Impact

Benefits: Outline the nature and size of the benefits the proposed research plan is expected to have for New Zealand. Include the benefits of the proposed research plan to New Zealand science. Outline the additional value the Challenge will deliver, including by addressing gaps and opportunities.

Costs: Provide an analysis of the expected balance of the benefits and costs of the proposed research.

Pathway to impact: Demonstrate a credible and convincing pathway from research to the achievement of Challenge outcomes. Show all steps involved from research to impact (up to and including technology transfer and further commercialisation). Specify:

- the nature of your research outputs, how they will be used, adopted, applied, or implemented by end users, and who the end users will be (eg sectors, government, businesses, Māori organisations, communities, and individuals)
- the nature and magnitude of the expected impact of the research
- how you will identify and address barriers to successful implementation.

Risks: Outline the key risks associated with your proposed research and your proposed risk mitigation actions. Justify investment in activities that entail particularly high risk by outlining potential benefits.

1.7 Open data

MBIE is committed to ensuring that all science data generated through its investments meets minimum expectations of good data management and availability to the public. MBIE requires parties receiving funding to comply with the New Zealand Government Open Access and Licensing Framework (refer http://ict.govt.nz/guidance-and-resources/information-and-data/nzgoal/). Explain how you will meet this requirement and seek to maximise benefit to New Zealand by providing for the access and re-use of data generated.

1.8 IP management

Provide a copy of the proposed IP management agreement between Challenge members. The nature of IP agreements is up to Challenge members. However, experience indicates that IP agreements should address:

- the declaration, valuation, and use of existing confidential information and registered IP
- the ownership of new IP

- selling or licensing rights to access and use new IP (including to third parties)
- rights to represent the IP for sale or licence
- lodgement, maintenance, and protection of new IP
- the apportionment of revenues
- any restrictions on publishing research results
- a process for the resolution of disputes
- arrangements for the payment of costs and cost recovery
- exit and entry arrangements, eg on-going IP access for members who leave or for new members, and for when the partnership terminates.

1.9 Related activities - public outreach, communication, and education activities

The NSCs are important, national-scale initiatives that, if the objectives are achieved, will have a major and enduring benefit for all New Zealanders. They will make an important contribution to the leadership challenge set by the NSC panel for the Science and Society initiative, ie to improve public awareness and engagement with science and innovation, skills, and evidence-based decision-making.

Public outreach, communication, public engagement, and education activities are an important and required component of NSC activity and NSC funding can be used for such activities.

Outline how you will involve the public in your proposed research, how you intend to engage the public with your proposed research, and the outreach, communication, and education activities you intend to undertake.

1.10 Monitoring of performance, evaluation of impact

Devolution of management and control to collaborative parties under the NSC approach will be balanced with increased performance monitoring and evaluation, but without excessive transaction costs. MBIE requires adequate, regular monitoring of Challenge performance to ensure demonstrable and measureable progress towards achieving the Challenge objective and outcomes. Challenge performance is subject to monitoring and review and MBIE may undertake a review in the first five years.

Outline your proposed performance monitoring and evaluation processes for:

- monitoring on-going performance of research programmes and related activities, including against measureable KPIs
- monitoring progress towards the outputs and outcomes in the pathway to impact
- reporting on VM outcomes
- reporting to the governance structure
- reporting and feedback to Challenge members and co-funders
- reporting to MBIE
- assessing the overall performance of the Challenge activities to achieve Challenge outcomes, including value for money.

List the KPIs that you intend to use, including measures and go/no go points. KPIs should as far as possible reflect the following principles:

a) be capable of independently verifiable measurement and assessment

b) enable monitoring and evaluation of how well the Challenge is performing in relation to meeting its objective and outcomes

c) focus on the material factors likely to determine success by identifying a credible pathway to achieving the Challenge objective and outcomes and impact

d) be of a nature that reflects the significance of the Crown funding and responsibility for financial management over the term of the relevant Challenge Programme Agreement.

MBIE intends to measure and evaluate the impact of each Challenge and may request access to evaluation information that you hold. Outline the process that you will use to measure and evaluate the impact of your research.

Part 2 Research Plan - detailed description of initial work programme

Part 1 describes your overall approach and arrangements over ten years. In Part 2 provide detailed information on your proposed research programmes and related activities for the first five years.

Research programmes: A research programme involves different activities, trials, and experiments aimed at gaining understanding and answering research questions. List and describe in detail your proposed research programmes for the first five years. Provide sufficient information about each research programme to enable the quality of the overall plan to be assessed and to give confidence that the work can be implemented. This information should include (but is not limited to):

- purpose and approach of each research programme
- who will undertake each research programme (research providers, principal researchers, research team size/skill mix, and international collaborators)
- start and end dates of each research programme and cost per annum
- how the various research programmes fit with each other in a coherent manner (important interdependencies) and fit within the broad 10-year research plan
- research outputs, eg what knowledge will change, what new technologies or materials or products could be developed, what new information will be generated, how research outputs will be communicated and to whom
- impact in terms of advancing knowledge and contributing to achieving the Challenge objective and outcomes
- how the research in each research programme builds on and contributes to other research in New Zealand or internationally that contributes to the Challenge
- how the research builds on existing capabilities and the competencies of the key organisations and researchers and infrastructure
- how the research gives effect to the VM policy
- how new ideas, approaches, technologies, and higher-risk research will form part of each research programme
- elements of the work programme that will be subject to a specific contestable funding allocation process
- alternative avenues of investigation in pursuit of Challenge outcomes if the proposed research does not yield the intended results
- subcontractors for significant items of work and information on your IP arrangements with subcontractors.

Business Plan

Provide a Business Plan that outlines your governance, management, and financial arrangements. Your Business Plan must include the following information.

Governance arrangements

Each Challenge must have a strong and competent governance structure that oversees strategic direction and delivery of the research work programme and the relationship between parties involved in the Challenge. Outline the nature and structure of your proposed governance arrangements, ie form, participants/members/shareholders, and members of the board or equivalent governance body.

Explain how you will give effect to the objectives of the Vision Mātauranga (VM) policy. This may include, for example, involving Māori organisations or individuals in the governance of your proposal or in an advisory role, if relevant.

Provide a copy of the governance agreement(s) between Challenge members (if finalised by the time you submit your proposal) or, if not, an outline of the proposed arrangements and your plan/timeline for finalisation of the agreement(s). The agreement(s) may include the following:

- role and responsibilities of the governance structure
- provisions for Challenge members to leave
- how new members can join
- how resources will be allocated (and reallocated during the life of the Challenge if members change)
- how conflicts of interest and disputes between Challenge members will be managed
- provision for changes to the governance agreement(s) and termination.

Provide information on external groups that you intend to establish, for example to provide advice.

Management arrangements

Appropriate management arrangements need to be in place to enable multiple researchers, research organisations, and end users to work together to achieve Challenge outcomes. Provide information on:

- proposed management arrangements and resources (people involved in the management team and their skills and experience)
- project management processes used to co-ordinate multiple research providers, reporting timelines, and performance monitoring
- how research direction, results, and information will be shared between researchers
- a communication and engagement strategy to enable the Challenge to maximise impact with end users and the wider community
- the process for stopping/starting/stage-gating/scaling and prioritising research and funding
- risk management plan.

Financial management

Provide sufficient evidence to demonstrate the financial stability of the research organisations in the Challenge.

Appropriate financial management systems need to be in place to manage the Challenge. Outline processes, resourcing, and capability for financial management, reporting, audit, and oversight. Show the following per annum in sufficient detail:

- income sought from MBIE
- income/co-funding expected from other sources
- cash flow
- expenditure broken down into the following cost categories:
  - direct research costs (personnel, subcontracting, and other operating costs)
  - governance and management costs

- costs of related activities, eg communication, engagement, skills development
- overheads (eg rent)
- other costs (describe).

Co-funding: You are strongly encouraged to seek co-funding from external partners for your research programme. Outline the efforts that you have made and will continue to make during the life of the Challenge to secure co-funding from other sources (including from overseas sources) and plans to leverage private sector investment.

Outline the sources of your co-funding, their nature (cash or in kind), and status (eg confirmed, letter of intent, under negotiation etc).

Assessment process

Step 1 Assessment by independent assessment panel

MBIE will provide your proposal to an independent assessment panel that it will appoint for each Challenge. The panel will assess proposals against the criteria in the *Criteria for proposals for National Science Challenges Funding* notice in the *New Zealand Gazette*. The panel will include experts in the relevant area of science (including international experts), Vision Mātauranga, and governance, management, and financial arrangements.

MBIE will publish on its website the names of assessment panel members before proposals are due. When submitting your proposal through the MBIE Portal you will have the opportunity to identify any potential conflicts of interest.

At this stage MBIE reserves the right to carry out due diligence on any Challenge member if MBIE considers this necessary to confirm the financial stability of a Challenge member or any other matter material to a proposal.

Step 2 Science Board decision-making

Once the assessment panel has assessed proposals, MBIE will provide to the Science Board information from the assessment process on each proposal and any other relevant information required under the criteria for assessing proposals or that the Science Board may request.

The Science Board will make decisions on proposals for funding against the criteria in the *Gazette* notice. The Science Board may:

- approve your proposal
- decline your proposal
- set pre-contractual conditions
- set special conditions in addition to the general terms and conditions set out in the NSCIC template or vary those terms and conditions
- set terms and conditions that reflect the approved governance, management, and financial arrangements
- vary the proposed duration by setting a different term to that proposed or by stage-gating the investment i.e. by requiring certain conditions to be met at a point in the term of funding
- vary the funding allocated from that proposed, such as by funding only some themes, a reduced number of research programmes, or by providing a reduced amount of total funding.

The Science Board may decide to fund one proposal only per Challenge. The Science Board may choose to fund no proposal. If the Science Board decides not to fund any proposal, it may ask applicants to revise and resubmit their proposal.

Contracting

If the Science Board approves your proposal, MBIE will enter into an investment contract with you in line with the Science Board's decision and the terms and conditions of funding set by the Science Board.

MBIE will use a National Science Challenge Investment Contract (NSCIC) template and will customise it for each Challenge to reflect governance arrangements. By submitting a proposal, you are agreeing to adhere to the terms and conditions of the NSCIC, if the Science Board approves your proposal for funding. In addition, you agree to adhere to those terms and conditions set by the Science Board that incorporate the approved governance, management, and financial arrangements and contracting entity.

If the Science Board approves your proposal for funding the process will be as follows.

1. The Challenge Contractor and MBIE will sign an NSCIC that reflects the Science Board's terms of funding. That contract contains:
    a. the standard terms and conditions on which the Science Board has agreed to provide funding. The contract provides that the terms and conditions will apply each time the Science Board approves a proposal for funding for a new Challenge Programme
    b. an appendix containing a template Challenge Programme Agreement
    c. template schedules for each Challenge Programme Agreement. These are not populated in the NSCIC itself as the Challenge Programme Agreement appended to that contract is only a template.

2. The Challenge Contractor and MBIE will also sign a Challenge Programme Agreement that contains:
    a. a two-page cover sheet to be signed, which acknowledges that the parties have entered into an NSCIC and that the terms set out in that contract apply in respect of the Challenge Programme Agreement
    b. schedules that set out the details of the Challenge Programme. The content of those schedules will be extracted directly from information that you provide in your proposal, in particular in Part 2 of the Research Plan.

3. The Challenge Contractor and the Challenge members will comply with the terms stipulated by the Science Board which may include adopting all constitutional documents and executing a collaboration agreement as applicable or such other contracts to give effect to the Challenge Contractor's governance, management, and financial arrangements.

Where the Challenge collaboration, or some or all of its members, have existing contractual arrangements with MBIE or existing collaborative structures relevant to the Challenge, it may be appropriate to build on these existing arrangements. You may set out in the proposal how you could build on these existing arrangements. Any such proposal must at a minimum include the terms of the NSCIC template. The Science Board will set the terms and conditions of funding as part of its funding decision.

Period of funding

The Challenge Programme Agreement(s) will cover funding for the first five years. At its discretion, the Science Board may choose to fund you for a period that is shorter or longer than this period.

Toward the end of this first funding period, the Science Board will ask Challenge collaborations to submit a further detailed work programme for the next five years. The Science Board will make a further funding decision for up to five more years based on the new detailed work programme and demonstrated measurable performance in achieving the Challenge objective and

outcomes. Performance is subject to monitoring and review and MBIE may undertake a review in the first five years. The Science Board may decide not to renew funding for the next five years.

Description of Challenges

NSC funding is available for research, science, or technology or related activities to achieve the following objective and outcomes for each Challenge.

Your proposal must state how you intend to meet the Challenge objective and all outcomes. If you consider that you can better meet the Challenge objective with different theme(s) and/or outcome(s), you should propose this in your proposal and provide a reason.

The Science Board will decide whether your proposed change will better enable the Challenge objective and outcomes to be met.

Challenge 1: Resilience to Nature's Challenges
Kia Manawaroa – Ngā Ākina o Te Ao Tūroa

Objective: To enhance New Zealand's resilience to natural disasters

Themes

1. Resilient society

Outcome sought: Natural hazard risks are better understood and managed, reducing vulnerability and improving response and recovery.

Research topics

Topics may include, but are not limited to:

- communities' ability to reduce their own vulnerability
- development of robust social and economic impact models
- synergies between science and mātauranga Māori - for example in land use planning
- development of improved hazard management approaches
- pre- and post-event management, governance, and decision-making
- safety and effectiveness of response
- equity between population groups
- long-term recovery and opportunities after disaster, including responses to past events.

2. Resilient buildings and infrastructure

Outcome sought: Losses due to building and infrastructure damage or failure are avoided and minimised.

Research topics

Topics may include, but are not limited to:

- performance of buildings, bridges, dams, systems for water and energy supply, wastewater, energy, transport, and communications including interconnections
- resilience of coastal infrastructure
- role of Māori infrastructure, such as marae, in improving resilience
- development of technologies to enable continuation of function after a disaster event – for example low-damage, low-cost approaches
- development of mitigation and strengthening options for existing buildings and infrastructure
- post-disaster functioning of cities and towns
- rapid restoration of full function following damage

3. Risk assessment

Outcome sought: Cost-effective mitigation measures are in place across all natural hazards, and residual risk is managed effectively.

Research topics

Topics may include, but are not limited to:

- development of quantitative risk assessment models
- assessment of risk to Māori communities
- provision of decision-support systems to decision-makers
- development of risk-rating systems
- provision of near real-time estimates of hazard event impacts
- risk transfer mechanisms
- tolerable level of risk and identification of residual risk
- future hazards, risks, and vulnerability

4. Geological hazards

Outcome sought: The ability to avoid and minimise losses due to geological hazards is improved.

Research topics

Topics may include, but are not limited to:

- understanding New Zealand's volcano, earthquake, tsunami, landslide, rockfall, and liquefaction risk (magnitude, frequency, variation)
- precursors, thresholds, extent, cascade, and cumulative effects
- modelling and forecasting, reducing uncertainty
- synergies between science and mātauranga Māori
- understanding impacts of geological hazards
- real-time monitoring technologies

5. Weather hazards

Outcome sought: The ability to avoid and minimise losses due to weather hazards is improved.

Research topics

Topics may include, but are not limited to:

- understanding New Zealand's flood, wind, storm, snow, avalanche, hail, landslide, ash-fall, drought, marine, and coastal risk (magnitude, frequency, variation)
- implications of climate change
- thresholds, extent, cascade, and cumulative effects
- modelling and forecasting, reducing uncertainty
- synergies between science and mātauranga Māori
- understanding impacts of weather-related hazards
- real-time monitoring technologies

6. Fire hazards

Outcome sought: The ability to avoid and minimise losses due to fire hazards is improved.

Research topics

Topics may include, but are not limited to:

- understanding fire behaviour and New Zealand's rural fire risk (magnitude, frequency, variation)
- implications of climate and land cover change
- thresholds and extremes, modelling, forecasting

- use of fire as a land management tool
- synergies between science and mātauranga Māori
- understanding impacts of fire hazards
- real-time monitoring technologies

Note: the extent to which fire in buildings is addressed in this Challenge is to be determined by the applicant. This may be limited to fire following natural disaster, or could include broader urban fire research.

Challenge 2: High-Value Nutrition
Ko Ngā Kai Whai Painga

Objective: To develop high-value foods with validated health benefits to drive economic growth

Important note: establishment of a virtual centre

A key component of this Challenge is the establishment of a virtual centre that will carry out all activity under this Challenge to become an internationally recognised and preferred authoritative voice on food for health claims. Governance and management arrangements for the centre will, therefore, represent arrangements for the Challenge as a whole.

- Establishment of the centre will be one of the first activities of the Challenge (although the centre's capability is likely to grow over time).
- The centre should integrate New Zealand capability across all four themes in this Challenge and access international capability.
- The centre should be virtual as it will be spread across research providers in New Zealand and internationally. Effective integration of national and international networks will be important.
- The parties involved in the centre should have world-class capability in biomarkers of disease risk or health status, to scientifically validate unambiguous links between foods and the risk of developing disease or status of health.
- The centre should have a viable and sustainable business model. It can incorporate other activities that are not covered by this Challenge (eg provision of commercial services – for example the creation of a group/club of associates to receive information about biomarkers).
- Unique New Zealand positioning and clear identification of the centre's global competitive advantages will be required to provide authoritative leadership and capability, as well as a differentiation strategy to enable New Zealand to build a world-leading position. This will require a communication strategy to build international credibility and to demonstrate the centre's 'authoritative voice' on food for health claims.
- The output of the centre must meet the requirements of the New Zealand regulatory regime for food health claims (including the Australia New Zealand Food Standards Code – Standard 1.2.7 – Nutrition, Health and Related Claims (www.comlaw.gov.au/Details/F2013L00054)).
- It is recommended that:
    - the governance body be skills-based (rather than representational)
    - an independent scientific advisory board be established
    - an independent industry advisory board be established
    - the centre's management office be located in a significant credible institute 'host organisation'
    - the centre's CEO (likely to be a near full-time role) have appropriate managerial skills along with broad knowledge of the relevant scientific and clinical context and a successful track record of working with industry
    - the centre's business plan include a strategy for on-going quality linkages and engagement with companies of all sizes, including a plan of where to concentrate effort
    - the centre's research plan identify the most important international groups with which to collaborate
    - a description be provided of the centre's first exemplar/spearhead project.

Themes

This Challenge reflects an evidence-based approach to the health potential of foods. Wherever possible, a proposal should integrate activity and connect existing capability across all four themes described below. The proposal will need to demonstrate clearly how inter-relationships between all four themes will be achieved.

1. Clinical application (what food to do what)

Outcome sought: Health targets are identified that are amenable to a science evidence-based food solution to drive economic growth.

Research topics

- Understand which health targets across the life span could benefit from a food solution.
    - Health targets are likely to include reducing the risk of developing disease and maintaining homeostasis and wellness (optimal growth and maintenance). Research may include defining health and developing markers to indicate when health deviates from the optimal growth pattern.
    - Health targets may be specific to stages of life, including from maternal through baby, infant, childhood, and ageing.
    - Research will require clinical expertise.
    - Illustrative examples of health targets and stages of life include but are not limited to the following:
        - risk of developing obesity, metabolic syndrome, diabetes and cardiovascular disease
        - brain function - cognitive development in the young and decline with ageing
        - musculoskeletal development and progression through ageing towards degeneration of bones/joints and muscle loss, recovery from trauma
        - differences in market subpopulations, eg Asia
        - infant and maternal nutrition for cognitive development, allergy and obesity prevention, and health during growth and development.
- Prioritise targets/biomarker development and describe the criteria used for prioritisation, for example alignment with scientifically and medically valid intervention points, industry priorities, available capabilities, available funding, consumer preferences and health values, market demographics, and clear research questions.

2. Biomarkers (measuring impact, clarifying risk)

Outcome sought: New Zealand science provides authoritative leadership and capability on validated biomarkers for human health

Research topics

- Biomarkers must achieve acceptance by markets and by regulatory regimes for health claims.
- Each biomarker has to be proven to be predictive of risk of a disease or health condition.
- Research will include demonstrating that food changes the biomarker status to validate the food-biomarker relationship.
- Research may involve understanding the mechanism of action on a case-by-case basis when required by markets and their regulatory regimes.
- Potential impacts of processing and food structures/matrices on health impacts (Theme 4) need to be taken into account.
- Research will require clinical and biochemical expertise.
- Capability focus should be on clinical expertise, biomarkers, meta-analysis, and bioinformatics/statistics/mathematics.

- A strategy and approach to clinical trials needs to be outlined, eg development and discovery in New Zealand, validation in target overseas markets, along with expertise in clinical trials and trial design.
- An understanding of the regulatory regimes in New Zealand and key international markets and an ability to interact with regulators are essential.
- A biomarker technical group should be established with world-leading and internationally credible expertise to support validation of biomarkers (determining weight/sufficiency of evidence) for international acceptance.

3. Meeting consumer preferences and health values

Outcome sought: Profitable high-value food products are produced and marketed, backed by scientifically validated health claims.

Research topics

- Understand consumer preferences for foods with validated health claims
    - Company linkages will be an important means to access information on relevant consumer preferences.
    - Research will involve understanding the regulatory, cultural, social, and individual values of consumers, specifically as they relate to foods with health claims in target markets.
    - Research may include understanding how consumers define health and develop preferences in different markets.
    - Research should drive the selection of clinical targets (Theme 1) and biomarkers (Theme 2).

4. Science of food

Outcome sought: The biological delivery of safe, efficacious, and acceptable food products to consumers is enabled, regardless of target export market.

Research topics

- Understand the effect that food processing and food structures/matrices have on the safety, stability, and efficacy of foods with health impacts.
    - Knowledge of potential impacts of processing and food structures/matrices on health impacts needs to be incorporated into research under the other themes.
    - Factors that may need to be understood include:
        - retaining safety, stability, and efficacy through production, the supply chain, and over time
        - bioavailability and delivery from mouth to the site of biological action (including digestibility and absorption)
        - possible negative effects of consuming bioactive foods over long periods
        - possible deleterious health effects generated through production, the supply chain, and over time.
- Understand how to make and deliver safe and effective foods attractive to consumers.
    - Technologies specifically for foods with health claims that:
        - preserve safety, stability, and eliminate negative effects
        - deliver health attributes, for example preserving bioavailability, efficacy, controlling rate of delivery
        - enable product features, in addition to health and safety, that are valued by consumers, such as flavour, cost, product form, sensory and sustainability attributes.
- Understand how supply, robustness, repeatability of manufacture, quality control, and consumption parameters may impact specifically on the safety and efficacy of bioactive high-value nutrition products.

Further notes and definitions

- **High-value nutrition** products for this challenge are food and beverage products (final products or ingredients) for human consumption with scientifically validated health benefits (also known as 'foods for health'). Examples might include but are not limited to:
    - a food or ingredient having an approved health claim such as product X "reduces the risk of heart disease associated with high cholesterol" or "….contributes to a reduction in the loss of cognitive ability in those with early-onset Alzheimer's"
    - a food ingredient with a health impact proven by a scientific body of evidence and marketed to customers on the basis of the proven health impact, such as product Y "contains high levels of calcium which support optimal bone health".
- A **biomarker** is defined here as anything that can be used as an indicator of a particular disease, risk of disease, or other physiological state. Biomarkers can be specific cells, molecules, genes, enzymes, hormones, or measurable indicators such as respiratory state. Complex organ functions or general characteristic changes in biological structures can also serve as biomarkers.
- This Challenge aims to increase the value of New Zealand raw materials and food exports (including but not restricted to dairy, seafood, meat, fruit products etc) by improving the value proposition to customers and consumers through a health claim on the food, leading to increased premiums and/or increased sales volume. Research under all themes must be relevant to the health targets, regulatory needs, consumer preferences/values, and the food types that offer the greatest economic opportunity to New Zealand through food exports. Challenges should consider how New Zealand raw materials can be used to secure a competitive IP advantage.
- Where appropriate, consider opportunities to undertake research informed by mātauranga Māori in relation to traditional foods and medicines. Where appropriate, identify opportunities for Māori food producers to participate in the Challenge.
- Food education and healthy eating are important topics but are not part of this Challenge. This Challenge is focused on developing high-value foods for export. However, there will be additional benefits to the health of New Zealanders through healthier food.
- General food safety, product traceability, and supply chain security are important for all food, not just high-value nutrition, and are not specifically research topics of this Challenge.
- General food science and technology is an important aspect of all food, not just high-value nutrition products and is not specifically a research topic of this Challenge. However, aspects of food science and technology that relate specifically to the bioactivity of high-value nutrition products will be important under this Challenge.

Challenge 3: The Deep South
Te Kōmata o Te Tonga

Objective: To understand the role of the Antarctic and southern ocean in determining our climate and our future environment

This Challenge aims to:

- increase the knowledge and reduce uncertainty of how the Antarctic influences the oceanic-climate interfaces in the southern ocean, atmosphere, and biosphere. This will support the building of models (incorporating mātauranga Māori as appropriate) that predict potential changes to our climate and ocean system and the risks and impacts on our resources
- understand the critical role of the Antarctic and the southern ocean on our social, cultural, and economic wellbeing, and active kaitiakitanga. This will enable New Zealanders to effectively respond and adapt to change (refer Glossary for definition of 'change') that impacts New Zealand, and sustainably manage New Zealand's natural resources accordingly
- allow New Zealand to take advantage of its unique geographic location to develop a global hub for Antarctic and southern ocean research, to build international scientific collaborations that contribute to addressing climate change issues for research in Antarctic and the southern ocean, and to leverage benefits from this for New Zealand
- make a New Zealand contribution to national and international decision-making on global change.

Themes

1. Processes, uncertainties, and tipping points, including detection and attribution

Outcome sought: The fundamental science, essential for robust 'predictions/projections of change', is identified and prioritised to fill current knowledge gaps.

Research topics

- Determine how, and at what rate and magnitude, the Antarctic and the southern ocean will respond to, modulate, or affect a changing global climate.
- Reducing uncertainty around rates of change and critical thresholds (processes and tipping points) in physical, chemical, and biological systems that have implications for New Zealand and the world.

Focus

- **Observation gaps** in the earth/climate system. Using the observations we have to contribute to global and New Zealand observation networks, for example continuous plankton recorder information, Argo floats, and satellite remote sensing
- **Interactions** between the southern ocean, atmospheric circulation, sea ice/shelf, and ecosystems (the response of southern high latitudes), implications of warming for polar amplification, drivers (eg ozone and GHGs), and feedback to the New Zealand climate system
- **Trends and dynamics** between the westerly wind circulation, the Antarctic circumpolar current, the southern annular mode, ocean fronts, biological productivity and ocean biogeochemistry
- **Reducing the uncertainty** of our understanding of thresholds, limits, and tipping points of biological systems.

2. Predictions/projections of change

Outcome sought: Predictions/projections for the 'consequences of change' are improved.

Research topics

- Develop improved predictive models through combined observations (a range of temporal and spatial scales) and knowledge of processes of Antarctic and southern ocean change, in the global context.

Focus

- Modelling interactions within and between ocean, land, atmosphere, cryosphere, and associated biological systems, for example:
  - initialised models for near-term prediction and their validation
  - longer-term projections of regional change and their validation
  - strengthening ocean component and ocean/atmosphere coupling (cross-cutting)
  - modelling abrupt changes and feedbacks in the climate system
  - ocean acidification.

3. Consequences of change: adaptable, responsive, and resilient New Zealand

Outcomes sought:

- The critical role that the Antarctic and southern ocean have in our social, cultural, and economic well-being and implications for active kaitiakitanga are well understood by New Zealanders.
- Knowledge of how our environment will change (incorporating risk and uncertainty) contributes to the development of appropriate policy and adaptation plans and is implemented through our decisions as New Zealanders.

Research topics

- Informing appropriate responses to the implications of Antarctic and southern ocean change on New Zealand's marine and terrestrial environments and associated resources.
- Reducing uncertainty related to Antarctic and southern ocean change for New Zealand's primary sector including Māori business.

Focus

- Modelling and related research - including mātauranga Māori - to connect the changes in Antarctic and the southern ocean to New Zealand to identify impacts for incorporation into decision-making and adaptive mechanisms
  - **Identification** of the most effective knowledge channels and adaptive mechanisms to ensure knowledge flows between researchers involved in the Deep South Challenge, decision makers, other New Zealanders, and the international community. Research needs to support transformative, adaptive, responsive and resilient outcomes.
  - **Integration** with aligned New Zealand research programmes and consideration of the relationship and implications for other Challenges to ensure that results and projections from the Deep South Challenge research (themes 1 and 2) are picked up in impact and adaptation (which applies to the economy, environment, society, cultural, iwi/Māori, community, and individuals).
  - **Projecting impacts** of potential changes to Antarctic and the southern ocean's physical and chemical systems (identifying associated risks and uncertainty) that have implications on the integrity and sustainability of New Zealand's biological system and its resources.

Further notes

In scope

- Increased confidence in and reduced uncertainty of the interactions between the Antarctic cryosphere, southern ocean, and atmosphere with wider ocean-climate systems to improve our knowledge of potential

climatic impacts on the New Zealand region, to effectively respond - with the incorporation of the Vision Mātauranga policy - and adapt to change, and sustainably manage natural resources accordingly.
- The interdependency of the regional climate system; atmosphere, ocean, biosphere, cryosphere applied to each theme in a New Zealand and global context, including observations at a range of temporal and spatial scales.

Out of scope

- Terrestrial ecosystems, ecology, and biota research on Antarctica and sub Antarctic islands other than as an indicator/metric of change. The study of Antarctica and sub Antarctic islands' terrestrial ecosystems, ecology, and biota is aligned to the New Zealand's Biological Heritage Challenge. The Deep South Challenge is expected to contribute underlying change research to inform that Challenge.
- Marine ecosystems and their resilience, other than as an indicator/metric of change. The study of marine ecosystems falls under the Life in a Changing Ocean Challenge. The Deep South Challenge is expected to contribute underlying change research to inform that Challenge.

Context issues

- Each theme's outcome is linked from 1-3 (fundamental science, projection of change, consequence) so that each one feeds into the following theme which then seeks to meet the Challenge objective.
- In summary, the outcome benefits to New Zealand could be realised by, for example:
    - improving research and stakeholder collaborations (national and international) that increase knowledge of Antarctic and the southern ocean's role in the climate system and future change
    - recognising the importance of multidisciplinary approaches to improving the knowledge of the processes that are important in driving change
    - better use of existing data sets
    - improving modelling coordination (Theme 2), process, and outputs to consider:
        - time series and transects
        - days to decadal time scales.

Examples of modelling topics could include the pattern of surface temperature response, volume and variability of sea ice, changes in the southern annular mode, westerly winds and storm tracks, changes in ocean circulation, ice sheet dynamics - can the Antarctic contribution to global sea level change be constrained; greenhouse gas concentrations, role of CO_2 in predicting carbon uptake, changes in stratospheric ozone depletion, and paleoclimate interpretation.

Glossary

- Change: change in the Antarctic, southern ocean, and atmosphere including wider ocean-climate systems that impact New Zealand.
- The southern ocean: it is intentional that the southern ocean has not been defined by current international agreements, latitudinal boundaries, or Antarctic Convergence. This is to allow the southern ocean limits to be defined within the proposal by the research context.
- Resources: the term is used in the broadest context relevant to the benefit of New Zealand whether it is resources in the marine or terrestrial environment, the primary productive sector, or in terms of ecosystem services and/or their resilience/integrity.

Timeline

Key steps	Date
MBIE Portal closes for submission of proposals.	20 December 2013 (12.00 pm, noon)
An independent assessment panel appointed by MBIE assesses proposals.	February 2014
MBIE provides to the Science Board information from the assessment process on each proposal and any other information required under the criteria for proposals. The Science Board makes funding decisions. The Science Board's decisions are announced. MBIE and the successful applicant(s) commence the contracting process. If required, the successful applicant meets pre-contractual conditions.	March 2014

Appendix A: Glossary

Assessment panel

The assessment panel is a panel of independent experts in the relevant area of science (including international experts), Vision Mātauranga, and governance/management/financial arrangements convened to assess proposals submitted for NSC funding.

Challenge Contractor

The Challenge Contractor is a legal entity based in New Zealand that submits a proposal for NSC funding for a specific Challenge and, if successful, will sign an NSC Investment Contract with MBIE.

Challenge members

Challenge members are the organisations or individuals with a track record in the research area of the Challenge who come together to develop a national-scale collaborative proposal for NSC funding for that specific Challenge.

Challenge Programme

The Challenge Programme is your detailed work programme for the first five years.

If your proposal is successful, your NSC Investment Contract with MBIE will contain a Challenge Programme Agreement that outlines the approved Challenge Programme that MBIE will fund you to carry out. The information for the Challenge Programme will be taken from the description of your detailed work programme for the first five years in the Research Plan in your proposal.

Governance structure

The governance structure is the body that will have responsibility to oversee the strategy development, implementation, management, and delivery of the Challenge Programme.

***New Zealand Gazette* notice**

The *New Zealand Gazette* is the Government's official newspaper. Items in the *Gazette* are *Gazette* notices. The Minister of Science and Innovation issues *Gazette* notices to, amongst other things, instruct the Science Board regarding the assessment of proposals for allocation of funding.

Science Board

The Science Board was established by the Minister of Science and Innovation under the Research, Science, and Technology Act 2010 to make funding decisions in respect of research, science, or technology or related activities.

Vision Mātauranga (VM)

MBIE's VM policy aims to unlock the science and innovation potential of Māori knowledge, resources and people for the benefit of New Zealand. It has four themes:

- indigenous innovation - contributing to economic growth through distinctive science and innovation
- taiao/environment - achieving environmental sustainability through iwi and hapu relationships with land and sea
- hauora/health - improving health and social wellbeing
- mātauranga - exploring indigenous knowledge and science and innovation

Further info is available at www.msi.govt.nz/get-connected/unlocking-maori-potential/.

Appendix B: Further terms that apply to this RfP

1. General

The terms of this RfP are set out below. The terms and conditions are non-negotiable and do not require a response. Each applicant that submits a proposal will be deemed to have agreed to these RfP terms and conditions without reservation or variation.

2. Investigations and reliance on information

Applicants must examine this RfP and any documents referenced by this RfP and carry out all necessary investigations before submitting a proposal. If you are in doubt as to the meaning of any part of this RfP, you must set out in your proposal the interpretation and any assumptions you used.

Neither MBIE nor the Science Board will be liable (in contract or tort, including negligence, or otherwise) to anyone who relies on any information provided by or on behalf of MBIE or the Science Board in connection with this RfP.

3. Reliance by applicants

All information contained in this RfP or given to any applicant by MBIE is for the purpose of allowing that applicant to prepare its proposal. MBIE has endeavoured to ensure the integrity of such information. However, it has not been independently verified and may not be updated.

4. Reliance by MBIE

MBIE may rely upon all statements made by any applicant in its proposal and in correspondence or negotiations with MBIE or its representatives. If an applicant's proposal is approved by the Science Board, any such statements may be included within a Challenge Programme Agreement.

Each applicant must ensure all information provided to MBIE is complete and accurate. MBIE is under no obligation to check any proposal for errors, omissions, or inaccuracies. Each applicant will notify MBIE promptly upon becoming aware of any errors, omissions, or inaccuracies in its proposal or in any additional information provided by the applicant.

5. Inducements

You must not directly or indirectly provide any form of inducement or reward to any assessment panel member, officer, employee, advisor, or other representative of MBIE or any member of the Science Board in connection with this RfP process.

Business-as-usual communications (relating to funding under existing arrangements between MBIE and the applicant) will be maintained with the usual contacts. However, during the RfP process, applicants must not use business-as-usual contacts to solicit or discuss details of this RfP with any person at MBIE or its agents, including the assessment panel members.

6. Ownership and intellectual property

This RfP and any other documents supplied by MBIE to any applicant remain the property of MBIE. All copyright and other intellectual property rights in this RfP and any documentation and other information provided to any applicant or any other person by or on behalf of MBIE in connection with this RfP will remain with, and belong at all times to, MBIE or its licensors. MBIE may request the immediate return of all documents supplied and any copies made of them at any time. Applicants must comply with any such request in a timely manner.

Any proposal or information supplied by you to MBIE will become the property of MBIE and may not be returned to you. Ownership of the intellectual property rights in a proposal does not pass to MBIE. However, in submitting a proposal, each applicant grants MBIE a non-exclusive, non-transferable, perpetual licence to use, disclose, and copy its proposal for any purpose related to this RfP process.

By submitting a proposal, each applicant warrants that the provision of that information to MBIE, and the use of it by MBIE for the evaluation of its proposal and for any resulting negotiation, will not breach any third-party intellectual property rights.

7. Confidentiality

MBIE will treat your proposal as confidential, but you should be aware that MBIE is subject to the Official Information Act 1982 and may be required to release information supplied in your proposal in accordance with that Act, or as otherwise required by law.

You should also be aware that the information in your proposal will be stored by MBIE, and may be used by MBIE, a Minister, any of MBIE's advisors (including relevant third parties) or any other government agency (including any Crown entity), NZTE, and the regional business partner organisations that MBIE and NZTE work with to support growth and innovation.

8. The proposal process

You should be aware that the following rights are reserved.

- Your proposal may not be approved.
- All or any proposal(s) may be rejected.
- This RfP may be suspended or cancelled, or replaced with a new RfP, at any time.
- Any date in the RfP process may be amended or extended.
- This RfP or any associated documents may be amended.
- Any irregularities or informalities in the RfP process may be waived.
- Part of a proposal from any applicant(s) may be accepted.
- This RfP may be reissued.
- This RfP process may be suspended and/or cancelled (in whole or part) if a material or significant issue emerges during the process.
- Any information provided with a proposal may be retained or destroyed.
- Clarification may be sought from any applicant(s) in relation to any matter in connection with this RfP process.

- Any applicant(s) may be contacted, which may be to the exclusion of any other applicant(s), at any time before or after the approval (if any) of proposal(s).
- MBIE or the Science Board may reject or not consider further any documentation related to your proposal that may be received from you, unless it is specifically requested.
- This RfP process may be run in such manner as MBIE may see fit.

9. No contractual obligations created

No contract or other legal obligations arise between MBIE and/or the Science Board and any applicant out of, or in relation to, this RfP or RfP process, until a formal written contract (if any) is signed by both MBIE and the successful applicant.

This RfP does not constitute an offer by MBIE or the Science Board to provide funding or to enter into any agreement with any applicant. The request for and receipt of proposals does not imply any obligation on MBIE to contract for any funding requested in any proposal. MBIE will not be bound in any way until the National Science Challenges Investment Contract is executed.

Neither MBIE nor the Science Board make any representations nor give any warranties in this RfP.

Any verbal communications made during the RfP process will not be binding on MBIE or the Science Board and are subject to the terms of this RfP.

10. No process contract

Despite any other provision in this RfP or any other document relating to this RfP, the issue of this RfP does not legally oblige or otherwise commit MBIE and/or the Science Board to proceed with or follow the process outlined in this RfP or to assess any particular applicant's proposal or enter into any negotiations or contractual arrangements with any applicant.

For the avoidance of doubt, this RfP process does not give rise to a process contract.

11. Exclusion of liability

Neither MBIE, the Science Board, nor any assessment panel members, officers, employees, advisers or other representatives will be liable (in contract or tort, including negligence, or otherwise) for any direct or indirect damage, expense, loss or cost (including legal costs) incurred or suffered by any applicant, its affiliates or other person in connection with this RfP process, including without limitation:

a) the assessment process

b) the preparation of any proposal

c) any investigations of or by any applicant, its affiliates, and Challenge members

d) concluding any contract

e) the acceptance or rejection of any proposal

f) the suspension or cancellation of the process contemplated in this RfP

g) any information given or not given to any applicant, its affiliates, and Challenge members.

By participating in this RfP process, each applicant waives any rights that it may have to make any claim against MBIE and/or the Science Board. To the extent that legal relations between MBIE and/or the Science Board and any applicant cannot be excluded as a matter of law, the liability of MBIE and/or the Science Board is limited to $1.

Nothing contained or implied in or arising out of this RfP or any other communications to any applicant shall be construed as legal, financial, or other advice of any kind.

12. Costs and expenses

MBIE is not responsible for any costs or expenses incurred by you in the preparation of a proposal.

13. Governing law and jurisdiction

This RfP will be construed according to, and governed by, New Zealand law and you agree to submit to the exclusive jurisdiction of New Zealand courts in any dispute concerning this RfP or any proposal.

14. Public statements

MBIE may make public the following information:

- the name of any applicant
- the title of the Challenge proposal
- the public statement
- the total amount of funding
- the period of time for which funding has been approved.

Applicants are requested not to release any media statement or other information relating to the process outlined in this RfP and the submission or approval of any proposal in any public medium without providing sufficient advance notice to MBIE.

Appendix C: How to use the MBIE Portal

Using the MBIE Portal

The proposal process consists of three stages:

1 registering in the MBIE Portal

2 preparing your proposal

3 submitting your proposal via the MBIE Portal.

1. Registering in the MBIE Portal

The MBIE Portal is a secure, online space where you apply for funding. If the Challenge Contractor has not applied for MBIE funding through the MBIE Portal before, you need to register and receive a username and password and instructions for registration by return email. To register please contact your research office in the first instance (if your organisation has a research office) or e-mail contactNSC@mbie.govt.nz and provide the following information:

- name of the Challenge Contractor
- name of contact person
- phone number, postal and physical address, e-mail address

If you have technical problems or questions about the Portal, please e-mail contactNSC@mbie.govt.nz or phone our support staff on 0800 693 778 who are available Monday to Friday, from 8.30am to 4.30pm.

2. Preparing your proposal

To submit a proposal, you must provide certain information. You must ensure that it is accurate and complete. We recommend that you familiarise yourself with the Portal and the information you need to provide, before starting your proposal.

3. Submitting your proposal

When you have completed all sections you can print and submit your proposal in the 'Print and manage' section. Other options for actions in the 'Available actions' section depend on your role and on the status of your proposal. The actions are:

- Print/preview this proposal
- Submit to MBIE: submits the completed proposal.
- Manage users for this proposal: super users can manage access to a proposal by other users in their organisation. Super users have full access to any proposal from their organisation. Other users can be assigned different levels of access such as view or edit. Users who create a new proposal will automatically be assigned edit access.

Tips to help you complete your proposal in the MBIE Portal

Once you have familiarised yourself with the information you need to provide, log into the MBIE Portal to enter your proposal information.

Icons and help text

Coloured icons beside each section of the proposal form indicate your progress.

 You have not started and saved the section yet, or validation of the section was unsuccessful

 You have started and saved progress in the section

 Validation of the section was successful

- The  icon is a link to 'help text'.
- A red asterisk * indicates a compulsory section that must be completed before you save that section. You will receive an error message if you do not do so.
- A black asterisk * indicates a compulsory section that must be completed before you submit your proposal. Unlike sections marked with a red asterisk, you can leave these sections without entering any data and return to them later, before submitting your proposal.

The Portal also features 'help text' guidelines throughout the proposal process.

Text boxes

You will be required to enter information into a text box in some sections. Many text boxes contain character limits that are stated in each section. To help you, a character count is displayed. You cannot add pictures, tables, or graphs to the text boxes, but can attach these in the upload section in the proposal form.

Submitting content through the MBIE Portal

The following shows, for your reference, the information that you will need to provide in your proposal through the MBIE Portal.

Application summary
Enter your total funding requested for the duration of the Challenge, the title of your proposal, start and end dates, and the Challenge to which you are applying for funding.

Contact details
Enter the name and details of a person who can be contacted about your proposal.

Executive and public summaries
Enter your executive and public summaries. The limit for each summary is 2,500 characters. MBIE will use your public summary for its communication to the public.

Research Plan
Upload the documents that make up your Research Plan (including CVs). Preferably these documents should not be in PDF format (so that MBIE can cut and paste content for assessment and contracting purposes).

Business Plan
Upload the documents that make up your Business Plan (including CVs). Preferably these documents should not be in PDF format (so that MBIE can cut and paste content for assessment and contracting purposes). There is a limit of 50 pages for the Research and Business Plans combined (excluding CVs).

Profiling
Enter profiling data on your proposal under the categories provided.

Conflicts of interest
Identify any individuals that may have a conflict of interest with your proposal. Include any Science Board member, assessment panel member, or MBIE staff member.

Formal declaration
Agree to the declaration.