

Delivering a sustainable future for freshwater resources

13th - 18th March 2011
Rotorua, New Zealand

This is a 'Call for Participants' to take part in a five-day "Sandpit"¹ to look for new ways to characterise groundwater resources, and sustainably allocate freshwater in today's society.

Closing Date for applications: 6 January 2011 (5pm in applicant's country)

Introduction

The Europe-New Zealand bilateral project FRENZ², in conjunction with the New Zealand Foundation for Research Science and Technology (the Foundation) invite expressions of interest to participate in an interactive workshop (Sandpit) to be held in Rotorua, New Zealand from 13 to 18 March 2011.

The aim of the Sandpit is to identify best practice models to characterise and map groundwater resources, and identify methods for freshwater allocation that take account of the environmental, socio-economic and cultural aspects of water use.

The Foundation plans to allocate \$2.26 million³ (€1.28 million⁴) per year for up to 6 years to support genuinely novel and potentially transformative research arising from the Sandpit.

Participants will be expected to engage constructively in dialogue with each other, the facilitators, and the Directors and Mentors to develop collaborative research proposals.

Research projects identified during the Sandpit process may be funded by the Foundation. Projects should have a New Zealand lead, be trans-disciplinary in their nature, and may include European partners, as appropriate.

A representative of the European Commission's DG Research and Innovation will be invited to attend the Sandpit, with a view toward developing formal mechanisms (e.g., twinning, IRSES) to strengthen EU-New Zealand collaborative research partnerships in this area in the future.

Background to the challenge

Managing and allocating increasingly scarce water resources in an integrated way that accommodates different, often competing, uses is a major challenge. Most accessible water – an estimated 70 to 80% worldwide – is being used for food production. Water for domestic

¹ The Sandpit mechanism has been adapted from that utilised by the UK's Engineering and Physical Sciences Research Council (EPSRC), where it has been successfully used to build a number of strategic research partnerships.

² The FRENZ (Facilitating Research cooperation between Europe and New Zealand) project is funded under the European Community's Seventh Framework Programme [FP7/2007-2013] under grant agreement n° 22665; and from the New Zealand Ministry of Research, Science and Technology..

³ Inclusive of Goods and Services Tax, where required.

⁴ Exchange rate on 19 November 2010.

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and industrial purposes accounts for between 10 and 15% respectively in the overall balance.

What choices do our societies make to find a balance between various direct human uses of water, the myriad of values that humans have in respect of freshwater, and the needs of the environment? Are ecosystems services being considered as essential goods and service-providers for sustainable livelihoods and wellbeing? These choices are influenced by economic considerations, and social and cultural preferences, as much as by the growing body of scientific knowledge. All have an impact. However engrained social preferences may make new scientific knowledge difficult to incorporate into water policies and management.

On the other hand, the impact of these choices is not always easy to measure, particularly as they make themselves known according to very different timescales, and it is difficult to make trade-offs between the short and long term. Having an improved and consistent understanding of the water resource, and how it is changing over time, will enhance understanding of the environmental limits of the resource, and the impacts on the resource of various management choices.

This Sandpit aims to address these challenges through identifying models to characterise groundwater resources; and promote sustainable freshwater allocation that engages with the end-users and meets their information needs. The Sandpit also aligns well with the intent of the UNESCO Wai Ora programme⁵ which aims to raise awareness, facilitate dialogue and support strategies for the promotion of sustainable freshwater management in New Zealand and the Pacific.

The New Zealand picture

New Zealand has an abundance of freshwater. However, not all of the renewable resource is actually available to be used – much of it needs to be retained in the rivers, lakes and aquifers to maintain the ecological, recreational, or cultural values of these water bodies. Furthermore, water is not always in the right place at the right time for users. A large proportion of New Zealand's annual rainfall occurs in winter, when demand is relatively low. In addition, water availability and demand vary regionally⁶. Eastern regions of the country tend to have less rainfall than western regions and have a high demand for water for irrigation. Irrigation now uses almost 80 per cent of all water allocated in New Zealand.

It is estimated that total water use in New Zealand currently equates to 2-3 times more water per person than in most other OECD countries. Demand for water is increasing, particularly in areas that are already short of water. National weekly water allocation has increased by a third between 1999 and 2010, largely as a result of an increase in irrigation. Around two-thirds of consents relate to water from groundwater sources. The amount of land irrigated by consented water has increased by 82 per cent between 1999 and 2010⁷.

Freshwater used for irrigation in New Zealand is expected to add around \$1.58 billion (€0.9 billion) in annual value to the economy by 2013⁸. This figure is more than the revenue from

⁵ <http://www.unesco.org.nz/index.php/priority-areas/waiora>

⁶ <http://www.mfe.govt.nz/environmental-reporting/freshwater/demand/resource.html>

⁷ <http://www.mfe.govt.nz/environmental-reporting/freshwater/demand/land-irrigated-trends.html>

⁸ MAF Technical Paper: The economic value of irrigation in New Zealand (2004).

New Zealand's aquaculture⁹ and wine sector¹⁰ combined. In addition, New Zealand's rivers and lakes underpin significant tourism activity. However, in some regions, competing demands for freshwater are putting pressure on the environmental sustainability of the resource. Reflecting the urgency of the issue, the Government has identified freshwater as one of two top environmental priorities¹¹.

An independent report to the New Zealand Government by the Land and Water Forum¹² in September 2010 identified a number of key issues for consideration in future policy making, such as the sustainable allocation of the freshwater resource, water trading in some at-risk areas, recognising the environmental limits of the resource, new national standards and policy statements, and monitoring and science regimes. These issues are also under active consideration through the New Zealand government's New Start for Freshwater policy programme¹³.

Additionally, the need for the development of environmental statistics, including environmental accounting for freshwater, was recognised as an important measure of water use to be considered alongside the more traditional economic statistics. Early work in this area has identified a critical need to understand freshwater stocks and flows.

The European picture

In Europe, like New Zealand, water is high on the political agenda, with the increasing demand for cleaner rivers and lakes, groundwater and coastal beaches. Over the last decade European water policy has undergone a major restructuring with the introduction of the Water Framework Directive¹⁴ of 2000, which set objectives for water protection. For the first time at the European level, there was a framework and operational tool for integrated management of ground and surface water to address problems coherently.

As part of the Water Framework Directive, the European Groundwater Directive (2006/118/EC)¹⁵ established a regime for water quality standards and introduced measures to prevent or limit inputs of pollutants into groundwater. The Directive established quality criteria that takes account of local characteristics and allows for further improvements to be made based on monitoring data and new scientific knowledge. There will be a review of the European Groundwater Directive in 2013.

The European Commission has historically taken, and continues to take, a significant role in setting the agenda for action and research on water. Through successive Framework Programmes a significant body of research has been supported, of which a large portion aimed to provide an evidence base for water policies in developing countries as part of the EU Water initiative.^{16 & 17}

With the recent release of the Europe 2020 Strategy¹⁸ and Innovation Union Communication¹⁹, there is an increase in focus on the coordination and translation of research into added value, and these strategies will have a role in shaping the future of

⁹ <http://www.fish.govt.nz/en-nz/Fisheries+at+a+glance/default.htm>

¹⁰ <http://www.maf.govt.nz/statistics/international-trade/>

¹¹ Statements of Intent for The Treasury, Ministry for the Environment, Ministry of Agriculture and Forestry (2009-2012)

¹² http://www.landandwater.org.nz/land_and_water_forum_report.pdf

¹³ <http://www.mfe.govt.nz/issues/water/freshwater/new-start-fresh-water.html>

¹⁴ http://ec.europa.eu/environment/water/water-framework/index_en.html

¹⁵ http://ec.europa.eu/environment/water/water-framework/groundwater/policy/current_framework/new_directive_en.htm

¹⁶ <http://www.euwi.net/about-euwi>

¹⁷ http://ec.europa.eu/research/water-initiative/pdf/incowater_fp4fp6_rapport_technique_en.pdf

¹⁸ http://ec.europa.eu/europe2020/index_en.htm

¹⁹ http://ec.europa.eu/research/innovation-union/index_en.cfm?pg=home

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research supported through the rest of the Seventh Framework Programme (FP7) and future Framework Programmes.

Through FP7, the European Commission, in association with Member States, will also aim to strengthen the coordination and integration of research and knowledge transfer in Europe related to water management. Challenges to be addressed include: water management in the context of climate change; water cycle; water technologies; water scarcity and droughts; water and agriculture; floods; sanitation; water and energy; water governance; and management and financing. This will build on programmes already supported through FP7 such as GENESIS²⁰.

A likely future focus of research will be to develop new integrated approaches to managing terrestrial ecosystems and to develop models that maximise the benefit society can gain from ecosystems, of which groundwater is a part, in a sustainable way. Investigation of different scales and models and testing theoretical models in the real world is also anticipated.

This increased coordination is likely to support the establishment of a joint programming initiative (JPI) in the area of *Water Challenges for a changing world*²¹, and a possible European Innovation Partnership has been suggested on *Ensuring higher quality and efficiency of our supply use of water*²².

The Research Challenge

Overall, the research challenge is to **obtain the 'best value' for society from our freshwater resources**, now and for the future²³, through allocation processes that will recognise the multiple values of all stakeholders. The concept of 'best value' should be determined by considering the broad spectrum of environmental, socio-cultural and intrinsic dimensions, as well as economic values; and by weighing up both local, national, and wider interests.

However, in order to fully meet the expectations of the various end-users, and given the national significance of the freshwater resource, it is critical that tools, methods and indices are well developed, nationally consistent, and comparable across catchments and other relevant borders at the national scale.

The desired outcomes should be realised by considering and achieving a balance across values, within a fully understood hydrological system that is allocated through a decision-making framework that sets limits and bottom lines.

Such an approach presupposes accurate and consistent characterisation and understanding of the freshwater resource, specifically the groundwater resource from where the large majority of freshwater is allocated.

We therefore propose to address two specific freshwater questions that will be refined through a Sandpit investment process.

Question 1: How can freshwater resources be sustainably allocated between competing interests and uses in a way that integrates environmental, economic, cultural and other non-

²⁰ <http://www.genesis-fp7.eu/>

²¹ http://ec.europa.eu/research/evaluations/pdf/archive/other_reports_studies_and_documents/fp7_interim_evaluation_expert_group_report.pdf

²² http://ec.europa.eu/research/innovation-union/pdf/innovation-union-communication_en.pdf#view=fit&pagemode=none

²³ <http://www.mfe.govt.nz/issues/water/freshwater/new-start-for-fresh-water-paper.pdf>

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market values?

Question 2: How might groundwater resources be consistently characterised and mapped at the national and regional scales:

- to determine the spatial and temporal nature of the resource and its capacity (limits),
- to take into account the interconnectedness and closed nature of the hydrological system, and its stocks and flows,
- to identify the expected natural condition and current status,
- to ensure sustainable use of the resource.

The FRENZ Sandpit

The FRENZ Sandpit concept is to organise intensive, interactive workshops (Sandpits) on particular topics, within the context of the EU-New Zealand Science and Technology Cooperation Agreement. The coordination of these Sandpit activities is supported by the European Commission and the New Zealand Ministry of Research, Science and Technology through the FRENZ project. Each Sandpit will involve 16-22 participants from Europe and New Zealand, with the research proposal outcomes being fed into the relevant policy making processes, and a view toward establishing closer EU-New Zealand collaborative research relationships in the future.

The aim of this Sandpit is to identify opportunities for collaboration in the frame of ‘Delivering a sustainable future for freshwater resources’. Additionally, this Sandpit is sponsored by the Foundation, which seeks to invest directly in the research outcomes of this Sandpit process. Up to \$2.26m²⁴ (€1.28 million) in annual investment for up to six years may be allocated to proposal(s) developed during the Sandpit. These proposals will be subject to usual Board approval processes, which may require a final review, before funding is awarded.

Those selected to participate will receive additional information prior to attending the event.

Attendance at the Sandpit does not guarantee funding will be obtained.

How will the Sandpit work?

The Sandpit is an intensive, interactive and free-thinking environment, where a diverse group of participants from a range of disciplines and backgrounds get together for five days – away from their everyday worlds – to immerse themselves in collaborative thinking processes, in order to construct innovative approaches. Owing to the group dynamics, and the continual evaluation, it is not possible to dip in and out of the process and participants are expected to stay for the whole duration of the Sandpit.

²⁴ Inclusive of Goods and Services Tax – where appropriate.

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The nature of the Sandpit requires a high degree of trust between participants in order to gain breakthroughs in scientific thinking. This trust extends to allowing the free and frank exchange of scientific ideas, some being in the very early stages of development. The aim of the Sandpit is not to discuss ideas that are already well-developed, but not yet published. Rather, the goal is to bring individuals from different disciplines together to interact and engage in free thinking on first principles, to learn from one another and create an integrated vision for future research projects. It is expected that the sharing of these ideas would be encouraged within the Sandpit, but their confidentiality would be respected outside the Sandpit.

The Sandpit will be led by a Director(s) whose role will be to assist in defining the topics and aid facilitated discussions at the event. The Director(s) will be joined by a small number of Mentors, selected on the basis of their intellectual standing, their impartiality and objectivity, and their broad understanding of, and enthusiasm for, the broad topics of freshwater allocation and groundwater characterisation. The Director(s) and Mentors will take full part in the Sandpit, but will not be eligible to receive research funding under this collaborative activity, and so will help act as impartial peer reviewers in the process, providing a function analogous to that of a Foundation review panel. The Director(s) is expected to be from the end user community in New Zealand and will have a high degree of technical expertise and/or experience in applying research outcomes to real-world situations.

The process can be broken down into several stages:

- Defining the scope of the challenges
- Evolving common languages and terminologies amongst people from a diverse range of backgrounds and disciplines
- Sharing understandings of the challenges, and the expertise brought by the participants to the Sandpit
- Taking part in break-out sessions focused on the challenges, using creative thinking techniques
- Capturing the outputs in the form of highly innovative research projects
- Using “real-time” peer review on those projects at the Sandpit to determine their eligibility for funding

The proposed structure for the event is to run the Sandpit over five days, with the involvement of a wide group of end-user stakeholders on the first day, to build common understandings, and develop a strong foundation for uptake of the research solutions developed in the remaining four days. During the Sandpit process, project ideas will be developed, reviewed and refined. Successful project proposal(s) will be developed to a near final draft. Within two working weeks of the Sandpit, the Foundation will expect any successful research teams to report back to key end-users on their proposal(s), and submit their final proposal for Board approval.

Who should attend the Sandpit?

Having the right mix of participants influences the success or failure of such an event. Those attending will need enthusiasm and appropriate personal attributes to engage in

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collaborative research as well as demonstrate an enthusiasm for working at the interface between disciplines.

Applications are encouraged from diverse research areas across the natural sciences, physical sciences, life sciences, engineering, social sciences, and the humanities. Examples of disciplines and research areas include:

- *freshwater biophysical sciences, with a particular focus on ground water*
- *spatial and predictive modelling sciences*
- *economics of natural resources*
- *ecological economics*
- *sustainable allocation of natural resources*
- *identification of environmental limits*
- *integration of social, cultural and other non-market values in decision-making*

Whilst there is a need for specific water-related research expertise, we actively encourage applications from a broad range of disciplines, and applicants should not feel limited by conventional perceptions: the Sandpit approach is about bringing people together who would not normally interact. However, in all cases, applicants must indicate how their expertise might contribute toward addressing the challenges facing groundwater characterisation and allocation.

Whilst participants may come from any stage of their research career, we would particularly welcome experienced researchers with an understanding of trans-disciplinary approaches. A similar number of researchers from Europe will join the New Zealand researchers at this event.

Location and Date

The date for this Sandpit is 13 to 18 March, 2011 at the Wai Ora Hotel, Rotorua, New Zealand.

Submission of an application to attend will be taken to mean you are available for the whole duration of the dates specified - not including any additional time you may require to recover from travel - and will constitute a commitment to attend if selected.

Full details of the venue, how to get there and the accommodation arrangements will be sent to participants on selection.

All accommodation, refreshments, breakfast, lunch and dinner costs will be met by FRENZ. Reasonable travel expenses²⁵ will also be reimbursed through the FRENZ project (or the Foundation for New Zealand participants). All other travel expenses, and incidental costs (such as sundries and bar bill) while at the event, must be met by the participant.

If you have any specific requirements with regard to the venue, then please let us know in your application form.

²⁵ Up to €3000 for European based participants, with travel bookings for NZ based participants made through the Foundation.

Applying to Participate in the Sandpit

Applications are invited from individual researchers who can contribute to the Sandpit and resulting research projects. **16 to 22 participants** will be selected to take part in the Sandpit. Participants will be chosen to allow representation from both New Zealand and Europe.

Applicants must complete the Expression of Interest (EoI) form (maximum five sides) which includes both Sandpit specific criteria, and related track record. The form may be submitted either [online](#) or downloaded [here](#) and emailed to sandpits@frenz.org.nz, indicating **Freshwater Sandpit** in the subject line, by the deadline date: **6 January 2011 (5pm in the applicant's country)**.

Your responses to these questions will be used to assess your expertise in relation to the research questions, and convince us that you have the right skills and attitude to participate in this Sandpit. No further documentation will be accepted. Please note that late submissions will not be considered.

Please note that in the EoI we are looking for:

- evidence of how you might approach multi disciplinary problems to deliver novel research solutions,
- your experience of working in trans-disciplinary research teams,
- your track record in delivering research tailored to end user information needs,
- your ability to transfer knowledge and tools to end users.

In order to satisfy the procedural requirements of the Foundation, applicants are invited to include a brief CV in the final field of the EoI form, to provide additional evidence of relevant research track record that specifically addresses the Sandpit research discipline(s) and question(s). This information may be used by the Foundation to ensure that the selected candidates adequately cover the spread of research priorities and disciplines sought.

The deadline for applications is **6 January 2011, 5pm in the applicant's country**.

Applicants will be informed of their selection for the Sandpit event by **31 January 2011**.

Assessing Applications to Attend

Applications to attend will be considered by a multiparty Selection Panel (Foundation, FRENZ and Facilitator) in order to ensure a mix of disciplines and experience. Overall, the Selection Panel will seek to ensure that a balance of expertise is present at the Sandpit.

The assessment will be based on the specific criteria outlined below:

- The relevant experience and research background to address the research priorities
- The ability to develop new, adventurous and highly original research ideas

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- The potential to contribute to research at the interface between disciplines
- The ability to work collaboratively in a team
- The ability to explain research to non experts

Applicants should show an appreciation of the challenges, the latest research and the current and future issues relating to sustainable water use.

Please ensure you fully complete the EoI form, as this is the **only** information on which potential Sandpit attendees will be selected. It is therefore important to give evidence of your experience against these criteria in your application.

Please note that because of the large number of applications expected, we will not be able to give individual feedback to unsuccessful applicants.

Assessment of Research Proposals arising from the Sandpit

It is expected that participants will be provided with in-principle funding decisions prior to departure from the Sandpit. The final funding decision will be conditional upon the subsequent receipt, and possible additional review, of the full, worked-up proposal documentation; and usual Board approval processes.

Researchers involved in those projects recommended for funding will be tasked with writing a full proposal covering their intended activities as identified during the Sandpit. This proposal will need to be in the format of the Foundation's proposal template. The deadline for submission of full proposals is expected to be within two working weeks of the end of the Sandpit. Proposals will be submitted directly to the Foundation. Final funding decisions are expected to be made by **30 April 2011**. Further guidance on this part of the process will be made available during the Sandpit event.

The primary criteria used throughout the process of developing and assessing the final proposals will be how well proposals address the vision of the call.

The Foundation will also seek to support those research project proposals that show:

- Novel highly multidisciplinary research activities, clearly reflecting the distinctive opportunity for creating such projects that the Sandpit provides
- Clear evidence that the identified team have the capability to deliver their project
- Clear relevance to, and the potential to make, a distinctive and novel contribution to addressing the research challenges in this area
- Ability to deliver research outcomes in ways that meet the needs of end user communities
- Commitment to open-data principles and approaches with a view to ensuring the research outputs from the Sandpit are made publicly available within specified timelines to be negotiated as part of any research contract

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Any collaborative project funded through this programme must have a signed collaborative agreement between the partners before the start of any grant. The Sponsors of the Programme attach great importance to the dissemination of research findings and the publishing of information about the research they support in the public domain. However, all dissemination and publication must be carried out in the manner agreed in the project's collaboration agreement.

Expected Timetable

Call launched	6 December 2010
Call close (expressions of interest)	6 January 2011, 5pm in applicant's country.
Participant Selection panel:	24 January 2011
Sandpit:	13-18 March 2011
Funding Announcement:	By 30 April 2011 (tbc)

Equal Opportunities

FRENZ is committed to a policy of equal opportunities for our applicants. No eligible applicant should receive less favourable treatment on the grounds of disability, sex or gender re-assignment, marital status, sexual orientation, pregnancy, race, colour, nationality, ethnic or national origin, religion or belief, or contractual and work roles.

For Further Information

For further information, advice or queries regarding the format of the event, application procedure and other operational matters please contact:

For topic-related issues:

Ian TURNEY: ian.turney@frst.govt.nz

Sarah McDERMOTT: sarah.mcdermott@frst.govt.nz

For logistical or administrative issues:

Gina DEERNESS-PLESNER: gina.deerness-plesner@canterbury.ac.nz

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