

ORPHAN CHILD, INVISIBLE GORILLA, DUNG BEETLE ...? THE POWER OF ENVIRONMENTAL SECTOR ASSOCIATIONS TO SAVE THE WORLD

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ABSTRACT (500 WORDS MAXIMUM)

We're in the throes of a decades-in-the-making shortage of the professional skills needed to deliver the nations' construction, infrastructure and environmental goals. Water New Zealand and other environmental sector associations are doing their best to address this.

The necessary skills are all intertwined, but there is no overarching strategy to tackle the skills gap or to avoid gaps or duplication of effort by the many players involved. ConCOVE, the Construction and infrastructure Centre of Vocational Excellence, funded a Phase 1 project to address this, with the first step being to assess the skills landscape across four core sector associations; Carbon and Energy Professionals (CEP), Civil Contractors New Zealand, WasteMINZ and Water New Zealand.

The project categorised the many government, business and not-for-profit players in the environmental space; analysed the skills comments in the four associations' recent submissions on government initiatives; and identified key training initiatives planned and under way.

The results show that sector associations are an active and vital player in sustainability skills identification, prioritisation, development and delivery to practitioners. However, while professionals in the workforce vastly outnumber the student populations, their CPD (continuing professional development) needs are overlooked – yet their needs are the agile and essential precursor to well-informed tertiary education. The key finding was that despite the high value government bodies place on their input, the power of these associations to spearhead the development of vital and economically important environmental skills goes unnoticed and untapped.

The amount of training already being done by overworked and under-resourced associations shows that a little money would go a long way towards enabling them to work together to deliver significantly more training. Phase 2 of the project is to prepare a business case for funding this.

This work adds to seminal thinking on industry training by business luminaries Michael Porter and Peter Senge; economic luminaries Lord Nicholas Stern and Joseph Stiglitz; and academics Martin Betts and Michael Rosemann on the massive disruption already affecting our tertiary learning institutions.

This is a call to action for Water New Zealand members to actively support their training programmes and help lift our profile as the place where environmental experts come together to make the biggest difference at the fastest speed.

KEY WORDS

Skills shortage, training, CPD, continuing professional development, sector associations, tertiary institutions, business case, funding

1 INTRODUCTION

We're in the throes of a decades-in-the-making shortage of the professional skills needed to deliver the nations' construction, infrastructure and environmental goals. Water New Zealand and other environmental sector associations are doing their best to address this.

Throughout my 30-odd years of delivering environmental training, I have been considering these matters at an increasingly strategic level. My observations are that the necessary skills are all intertwined, but there is no overarching strategy to tackle the skills gap or to avoid gaps or duplication of effort by the many players involved.

ConCOVE, the Construction and infrastructure Centre of Vocational Excellence, funded me to conduct a Phase 1 project to address this, with the first step being to assess the skills landscape across four core sector associations; Carbon and Energy Professionals (CEP), Civil Contractors New Zealand, WasteMINZ and Water New Zealand.

This paper sets out key findings of that Phase 1 report together with the results of my ongoing thinking, and maps out where we could go from here.

2 METHOD

My objectives were to:

1. test my belief that professional associations in the infrastructure, climate change and biodiversity sectors are the key to making cost-effective change at the scale and pace needed to address serious issues in such areas; and
2. build a business case across all wellbeings for government seed funding of continuing professional development (CPD) of core skills to deliver this.

To pave the way for building the business case, ConCOVE asked me to carry out a preliminary Phase 1 landscape scan of legislation, key stakeholders and their activities in these areas. I worked closely with all four associations and made sure that the funding enabled me to pay for their staff time, if they so wished, to help me carry out the following tasks:

1. categorise the many government, business and not-for-profit players in the climate change, infrastructure and biodiversity space;
2. analyse the four associations' recent submissions on government initiatives with respect to their capability and capacity to deliver on legislative and policy outcomes;
3. identify key training initiatives planned and under way; and
4. define the existing and potential role of professional associations in the workforce development field, preparatory to building the detailed business case.

Before describing the outcomes of the Phase 1 work, I set out my rationale for focusing on the infrastructure, climate change and biodiversity sectors.

3 OBJECTIVE 1: WHY FOCUS ON INFRASTRUCTURE, CLIMATE CHANGE AND BIODIVERSITY?

It is widely acknowledged that we need change at scale and pace to remedy harms in the infrastructure, climate change and biodiversity sectors. In this section I provide evidence to support these sectors as a focus of industry training for professionals already in the workforce.

3.1 WORLD ECONOMIC FORUM RISK REPORTS

Since 2017, when I first read the World Economic Forum's annual risk report, environmental risks have consistently been near or in the top right hand quadrant of the risk chart, where they are already occurring and are most likely to intensify, while also causing the highest impact. While they were displaced in recent years by risks posed by the global pandemic and global uncertainty around artificial intelligence, this does not of course reduce their likelihood or their impact. **Figure 1** shows their current risk status.

Figure 1 The most severe risks over the next 2-10 years

Source: World Economic Forum Global Risks Report 2024



Figure 1 shows that fully half of the top ten global risks facing humanity over the next ten years are environmental. They also fall squarely within the infrastructure, climate change and biodiversity sectors – but we face a global shortage of the skills needed to adequately address these risks at the necessary pace.

3.2 INFRASTRUCTURE FOR CLIMATE CHANGE

A 2021 report by UNOPS (the United Nations Office for Project Services), the UN Environment Programme and the University of Oxford found that (p5) infrastructure is responsible for:

- 79% of total greenhouse gas emissions; and
- 88% of all [climate change] adaptation costs.

Moreover, a 2014 report (Milnes et al) found that 'The need for sustainable infrastructure has never been greater. By 2050, the amount of people living in cities will have doubled to 7 billion, and 75% of the infrastructure required by that time does not yet exist.' This makes it all the more urgent to develop a rapid and scaleable model of industry training.

While the term 'infrastructure' covers a diverse range of services that support our health and wellbeing, it does give us just one big environmentally influential sector to focus on.

3.3 UNITED NATIONS SUSTAINABLE DEVELOPMENT GOALS

New Zealand is a signatory to the UN Sustainable Development Goals, and the 2021 UNOPS report cited above supports its previous findings, that infrastructure heavily influences 92% of the targets associated with all 17 Goals. This reinforces the imperative to focus on the infrastructure, climate change and biodiversity sectors.

Together these three reports make a powerful justification for investing an appropriate proportion of our risk abatement investment into the capability and capacity of the professional workforce in those big three sectors.

4 PHASE 1 LANDSCAPE SCAN: KEY FINDINGS

4.1 STAKEHOLDERS: WHY CHOOSE JUST FOUR CORE ASSOCIATIONS?

Why did I choose just four associations (Carbon and Energy Professionals (CEP), Civil Contractors New Zealand, WasteMINZ and Water New Zealand) to work with? Because:

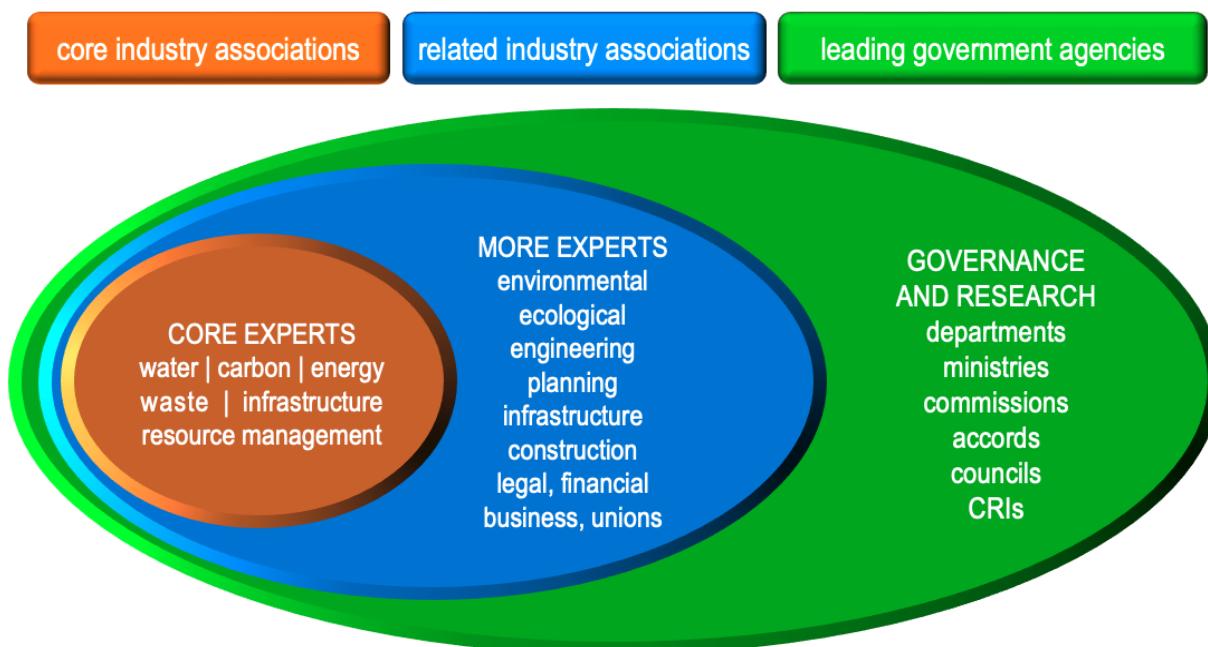
- I am a member of all those associations and was fortunate to be able to enlist willing participants in a short time;
- my membership gives me a good understanding of the work they are doing;
- four is a manageable number of participants to enlist and work with on a small project with a short (four months) timeframe, and;
- I believed they represented separate though highly interrelated sets of specialist skills core to the infrastructure, climate change and biodiversity sectors, noting that many of their members also belong to other professional associations, reflecting their other skills, such as engineering, geology, planning, ecology and the like.

As a testable decision, I therefore put those four associations at the core of the stakeholder groups in **Figure 2**, showing that just a few industry associations are home to the skills at the heart of infrastructure, climate change and biodiversity issues.

Surrounding the four core associations are many other professional associations which also illustrate a broader range of skills and interests around these big three issues. Surrounding them again is a very large number of Government bodies with responsibilities for infrastructure, climate change and biodiversity matters.

My vision for Phase 2 of my work is that 10-25 people from related industry associations form a Learning Group that observes, informs and critiques the work of the core group, while many other agencies can receive updates and briefings and give feedback.

Figure 2 Nested groups of environmental and infrastructure stakeholders



4.2 SUBMISSIONS ON SKILLS NEEDED TO DELIVER GOVERNMENT OUTCOMES

Industry associations have invested significant effort into submissions on Government environmental legislation and policies in recent years. Leading up to August 2023;

- CEP made 19 submissions in the preceding three years;
- CCNZ made 44 submissions in the preceding five years;
- WasteMINZ's eight sector groups made 65 submissions in the preceding five years on 26 consultations; and
- Water New Zealand made 91 submissions in the preceding eight years.

My analysis of the submissions identified that the skills commentary in these submissions on the Government's environmental and infrastructure goals focused on six core areas of skills. Listed these in the same order as the priorities in the World Economic Forum's 2023 global risk assessment, they are:

- climate change;
- biodiversity;
- water;
- natural and built environments;
- waste minimisation; and
- infrastructure.

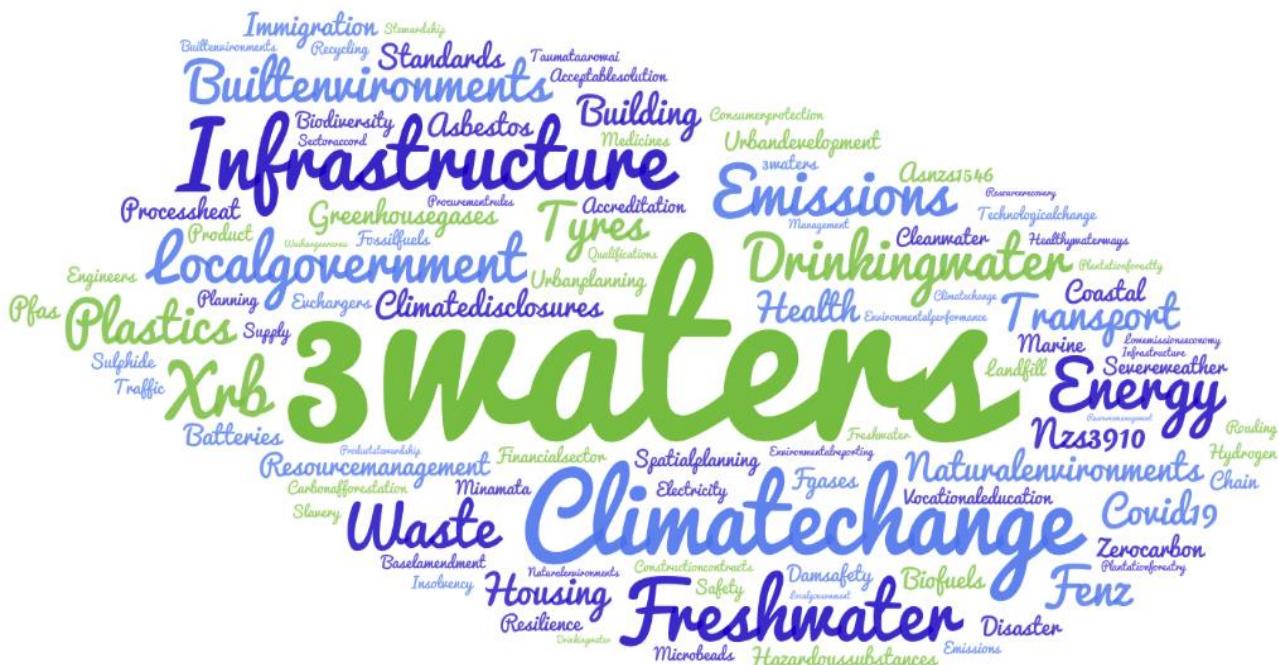
4.3 INDUSTRY CAPABILITY OVERVIEW

All four industry associations identified many important gaps in the skills required to deliver these outcomes. All acknowledged that the six outcomes listed above are also guided and informed by the te ao Māori world view and Mātauranga Māori knowledge, some of these explicitly in legislation (e.g. te mana o te wai) and others by way of integration into 'how we do things these days'. The water, waste and infrastructure sectors are well aware of the lack of capacity and resourcing for Māori to engage in the consultation, policy development, working groups and more now being asked of them. Non-Māori professionals are also conscious of their lack of capability in these areas and wish to address this.

The four megatrends that pose a risk to critical infrastructure are climate change, national security risks, fragmented global economy, and rapid technological change (DPMC). Water New Zealand acknowledges the risks these pose, and notes that 'a missing trend is capability and capacity of the workforce to deliver – it has been recognised the water sector needs 5,849 to 9,260 staff – an~80% increase in the size of the water workforce over 30 years across multiple disciplines.' Water New Zealand

The word cloud in **Figure 3** reveals the diverse specialist areas of these four industry associations, as well as a large core of interests in common.

Figure 3 The focus and spread of legislative submissions



4.4 TESTING MY ASSUMPTIONS ABOUT THE FOUR CORE ASSOCIATIONS

In **Section 4.1**, I chose to work with just four sector associations on the assumption that they pretty much directly covered off infrastructure and climate change, and also, through the environmental requirements of this work, biodiversity.

While this remains correct, when I summarised the skills focus of their submissions, the importance of two additional groups was highlighted, indicating the need to engage with at least two more core sector associations, as shown in **Table 1**.

The table is both subjective and qualitative, but suggests two key things:

- looking across the biodiversity row: while stormwater and planning professionals work with terrestrial and aquatic biodiversity experts, biodiversity definitely needs better representation, especially given its extreme importance and vulnerability. The Government's just-released National Policy Statement on Indigenous Biodiversity (Ministry for the Environment, 2023) may go some way towards creating a core home or contact point for it. This will be extremely important for cost-effective workforce planning; and
- looking across the built and natural environments row: planning and resource management professionals are similarly under-represented in my analysis thus far, despite having several industry associations of their own, including the New Zealand Planning Institute, the Resource Management Law Association and Local Government New Zealand. While there is not the overlap of skills, especially engineering skills, with the disciplines of the four industry associations participating in this project, they have a major role to play in delivering the outcomes of all seven Government outcome focus areas.

Table 1 Depth and breadth: core and common skills for delivering outcomes

Outcome focus area	Industry association			
	CEP	CCNZ	WasteMINZ	Water NZ
CLIMATE CHANGE		↑	□	↑
BIODIVERSITY	↑	↑	↑	□
WATER	□	□	□	
NATURAL AND BUILT ENVIRONMENTS	□	□	□	□
WASTE MINIMISATION	□	□		□
INFRASTRUCTURE	□		□	□

KEYS:



The main home of the experts whose work progresses the Government outcome in that row



An important component of experts' work for which they need those skills



An important beneficial outcome of experts' work, though not a direct focus

The skills needs listed by all parties show how carbon, water and waste flow throughout the nation's entire economy and ecology. The effects of the associated environmental skills gaps likewise flow throughout the economy, in the form of reduced productivity and the creation of more problems than we are solving.

Put another way, every sector of the economy needs all of these skills to a greater or lesser degree. An urgent and sustained commitment to ongoing workforce development is needed to deliver them. Whose job is it?

4.5 ORPHAN CHILD, INVISIBLE GORILLA, DUNG BEETLE, OR...? THE POWER OF ENVIRONMENTAL SECTOR ASSOCIATIONS

In the last section I summarised the elements of the four sector associations' submissions that highlighted the need for industry training for professionals already in the workforce (as opposed to vocational and academic education). In this section I examine the role of professional associations in providing this workforce training (continuing professional development, or CPD).

The overarching finding of my Phase 1 report is that sector associations play a pivotal role in workforce planning for a sustainable future.

They are a vital contributor to the skills development work being done by government agencies. They are also an active and vital player in sustainability skills identification, prioritisation, development and delivery to practitioners.

However, while professionals in the workforce vastly outnumber the vocational and academic student populations, their CPD needs are overlooked – yet these needs are the essential precursor to well-informed tertiary education.

Despite the high value government bodies place on their input, the power of these associations to spearhead the development of vital and economically important skills goes unsupported, so their agility and effectiveness as nimble and skilled environmental change agents is significantly under-leveraged.

Environmental science, technology and management tools are fast-moving, both proactively and in response to external drivers such as emerging issues and legislative change. This will continue to be the case. This means there will always be a need for continuing development of everyone in the environmental workforce.

At present there is a big gap in both professional and vocational workforce skills between what we have and what we need to deliver on government infrastructure and environmental outcomes. According to the ASB, if New Zealand 'doesn't get more efficient at building and maintaining infrastructure, it faces up to a \$1 trillion bill over the next 30 years to bring NZ's infrastructure up to scratch and to be able to meet NZ's climate change commitments.' The report goes on to note that we are also 'short on infrastructure-related capacity, including labour, capital and expertise.' This builds on 2021 research by Deloitte, which estimated that an additional 5,849 to 9,260 FTE jobs would be needed (p4) and noted 'likely issues with finding skilled labour' (p11). Throughout the report are comments on skills shortages and gaps and the need for workforce upskilling in the face of new technologies and requirements. The report notes

(p53) that 'access to a workforce at scale and with the skills necessary to deliver the investment programme is critical.'

Several surveys of Water New Zealand members have also identified (2022) specific skills that practitioners want for which no training is available.

Practitioner-driven industry associations can be more nimble in meeting their own urgent professional training needs than tertiary educators working with formal qualifications on the New Zealand Qualification Framework (NZQF). Their highly specialised training topics may never become university or vocational courses. However, when accessible to the tertiary sector, they will play a leading role in informing their future development.

Industry experts are well able to define their training needs. This is especially important with rapidly developing and urgently needed technical knowledge that cannot be readily introduced into the formal processes of the Qualifications Framework. Clearly defining the professional skills necessary to deliver Government legislative and policy outcomes will:

- in the short term, inform the prioritisation of CPD training needs and the development and delivery of the training to the existing professional workforce for urgent delivery; and
- in the medium and longer term, inform the relevant audiences of the:
 - vocational skills and qualifications necessary to accompany the identified professional skills; and
 - the need for university qualifications that may subsequently be developed.

It's more than static pieces in a jigsaw puzzle. There will always be a dynamic upskilling of the workforce with a mix of NZQF qualifications and off-Framework training, including for work visa holders; and planning for the skills and knowledge of future graduates by embedding new knowledge and skills into the relevant qualifications.

It's an ongoing demographic dance with professional, vocational and university learners taking their turns on the dancefloor, coming off it with formal qualifications, ISO-standard training or informal job-related training – and with the music always playing the continuing professional development tune to keep everyone taking to the dance floor periodically throughout their working life. Line dancers, square dancers, circle dancers, solo performers, flash mobs – we all hit the floor when our turn comes.

5 OBJECTIVE 2: SEED FUNDING OF PROFESSIONAL ENVIRONMENTAL TRAINING

5.1 BUILDING THE BUSINESS CASE

The amount of training already being done by small, overworked and under-resourced associations shows that a little money would go a long way towards enabling them to deliver significantly more training. Being supported to work together would also inform the development of ways to share expertise and avoid gaps and overlaps. The scale of the skills gaps and the reframing of core content to meet the needs of diverse specialist groups means that there would be more than enough training to go round many sector associations, easing fears that these small bodies would lose valuable training income streams.

Phase 2 of my project is to prepare a business case for government seed funding the CPD of core skills. I use the term seed-funding because many of the training topics will be able to recover the costs of their development; but there may always be a small number of highly specialised but vital topics which only a few people will need, and which will not be able to recover their costs.

The business case must demonstrate how the change-leading role of these agile, responsive and proactive industry associations could be supported, enabling them to make a difference at the pace and scale now required.

My prior research and industry training experience shows that a strong business case for environmental training can be built by calculating the return on investment across all wellbeings, of investing in training at the:

- individual level, e.g. higher wages and salary as a result of people's improved skills;
- company level, e.g. by increased productivity and competitive advantage in tendering and other processes;
- project level e.g. by monetising the benefits of a project across its broader outcomes as defined in the New Zealand Government's Procurement Rules;
- regional level, e.g. where a council may decide to invest in the region's workforce skills for a particular reason;
- sector level, e.g. the site efficiencies and cost-savings gained from good erosion and sediment control training in the horizontal construction sector; and
- macro-economic level, where government investment in industry capability delivers measurable dollar returns to the wellbeing of the country's population and its overall economic performance.

How well does such green investment work at the macroeconomic level? After the Global Financial Crisis, Nobel Prize-winning economist Joseph Stiglitz and renowned climate economist Lord Nicholas Stern analysed the success of the recovery investments of 50 nations using the following criteria:

- the speed of the recovery the investment triggered;
- the return on the investment (ROI) – dollar return per dollar invested;
- how long the stimulus effect lasted for in the economy; and
- how much it contributed to reducing carbon emissions.

Stiglitz and Stern's findings (*ibid*) showed that 'massive investment in green technologies are the best way to both revive virus-hit economies and shift the dial on climate change'. Despite fears that green investment would make for a slower economic recovery and a more difficult path to recovery, green investments outperformed the others in every respect.

5.2 FINDING THE FUNDING

The statistics in Section 3.2 are economic. Painfully closer to heart and home are the uncountable human costs and the asset-related costs of Auckland's Anniversary Weekend floods in January 2023 and of Cyclone Gabrielle in February 2023:

- Auckland's Anniversary Weekend floods resulted in four deaths and insurance payouts of about \$3.5 billion, with an additional cost-sharing deal between Auckland

- Council and the Crown to fund more than \$2 billion of flood recovery and resilience works (Almeida, 2023 and Stock 2023); and
- Cyclone Gabrielle caused 11 people to lose their lives, with an additional cost to the country estimated at up to \$14.5 billion (Wilson et al, 2023).

Investment of at least some moneys into identified industry training needs to avoid and minimise such costs in a climate change future would seem to be justified.

I have identified four funding options, and various guesstimates of acceptable percentages in the range of 0.0001 to 1% delivered a range of budgets that could reasonably fund a pilot study of the return on investment in professional environmental training.

Of these options, **Table 2** shows that only one has any chance at all of persuading the relevant stakeholders that there is a good business case for funding environmental CPD training for the infrastructure workforce.

Table 2 Options for funding environmental CPD training for the infrastructure workforce.

Option	Success rating	Reasoning
1. 1% levy on wages and salaries as is done in Malaysia, in order to fund workforce development (Teoh, 2023)	👎	No New Zealand government is likely to impose a new tax on earners.
2. Vote Education: the 2023-24 budget is \$2.1 billion (Bealing, 2024), which does not fund CPD	👎	Given the pressure on the educational sector, we are unlikely in the extreme to win any funding for environmental CPD.
3. Research & Development: the 2022 budget was \$5.2 billion (Statistics New Zealand, 2022 and World Bank, 2024)	👎	Our R&D budget is under pressure and is underfunded by world standards. 'Development' does not seem to apply to workforce development.
4. Our national infrastructure needs an estimated \$100 billion investment (Bishop, 2024)	😐	There is a capability and capacity gap in the infrastructure sector to deliver on the identified deficit and work pipeline (New Zealand Infrastructure Commission, ND).

Identifying and persuading the relevant players of the merits of industry training will be a tall order. However, Option 4 is worth pursuing.

Next, I provide a larger context to strengthen the business case for seed-funding.

6 INDUSTRY TRAINING AS A MACRO-ECONOMIC FORCE: THE LEARNING SOCIETY AND WHY WE NEED TO EMBRACE IT

In his keynote presentation at the 2023 Stormwater Conference, Professor Iain White tracked the failure of government and other bodies to adequately address the disastrous Stormwater Conference & Expo 2024

effects of climate change-induced flooding. He noted that in his research in the UK, the only case where real change was effected resulted from the concerted action of CIWEM, the Chartered Institute of Water and Environmental Managers – a professional association.

What further evidence is needed to justify the release of even a tiny percentage of infrastructure funding to a small number of sector associations? Enter the learning society.

In their 2014 book *Creating a Learning Society*, Nobel Prize-winning economist Joseph Stiglitz and his co-author Bruce Greenwald found that industry training is the vehicle for creating a learning society, and this delivers measurable economic benefits.

Here's what they say:

- 'Creating a learning society should be one of the major objectives of economic policy.' (p6); and
- 'The transformation to "learning societies" ... appears to have had a greater impact on human well-being than improvements in allocative efficiency or resource accumulation.' (p18).

This work adds to seminal thinking on industry training by business luminaries Michael Porter and Peter Senge; but these thought leaders do not set out a strategic approach to industry training: essentially they rely on market forces for individual firms to pick up staff training as a source of competitive advantage. This mechanism will never reach market saturation and is thus unable to make the difference we need in the time we have.

Given the massive economic, social and environmental harms already being caused by climate change alone, I propose that funding a small number of sector associations would:

- directly address these harms;
- become a pilot project whose outcomes can be monitored and monetised by the participants and a Learning Group of interested parties and critical expert reviewers; and
- field test the practical application of Stiglitz and Greenwald's economic analysis of the macroeconomic benefits of Aotearoa New Zealand becoming a learning society.

Yes, it's a BHAG – a Big, Hairy, Audacious Goal – but why should that stop us?

7 CONCLUSIONS AND CALL TO ACTION

My first objective in producing this paper was to test my belief that professional associations in the infrastructure, climate change and biodiversity sectors are the key to making cost-effective change at the scale and pace we need in those areas. I believe that with the addition of representatives from the biodiversity and land use planning sectors, this belief is substantiated.

My second objective was to demonstrate the need for and the broader context of the business case that I have been building for some years now, and to place it in the context of other work to show that a robust case can indeed be built to request government seed funding of environmental CPD of core skills relation to climate change, infrastructure and biodiversity.

This is a call to action for Water New Zealand members. Let's actively support the training programmes in place and under development, and explore funding options to extend them. This can only lift our profile as the place where environmental experts come together to make the biggest difference at the fastest speed.

ACKNOWLEDGEMENTS

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