

IrrigationNZ submission on strengthening the resilience of Aotearoa New Zealand's critical infrastructure system.

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Address to:

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Please find below the Irrigation New Zealand (IrrigationNZ) submission to the National Security Group, Department of the Prime Minister and Cabinet, on the "Strengthening the resilience of Aotearoa New Zealand's critical infrastructure system" consultation.

[Disclosure and privacy](#)

The IrrigationNZ submission does not contain confidential information and no part needs to be withheld. IrrigationNZ is happy for its submission and name to be visible publicly as part of the consultation process.

[1. About IrrigationNZ](#)

IrrigationNZ represents over 3,800 members nationally, including irrigation water storage and distribution schemes, individual irrigators producing food, fibre and beverages, and the irrigation service sector across all regions of New Zealand.

Our irrigator members include a wide range of farmers and growers – meat, dairy and cropping farmers, horticulturalists, and winegrowers, as well as sports and recreational facilities and councils. We also represent over 120 irrigation service industry members – manufacturers, distributors, irrigation design and install companies, and irrigation decision support services for both freshwater and effluent irrigation. Many of these organisations also offer rural drinking water treatment, storage and distribution solutions as well as stock drinking water infrastructure.

We are a voluntary-membership, not-for-profit organisation whose mission is to create an environment for the responsible use of freshwater primarily as irrigation for food and fibre production for local and international consumers but also to sustain the wellbeing and resilience of communities through responsible use of the freshwater resource and well designed and operated infrastructure.

As an organisation, we actively take a technical leadership role in promoting best practice irrigation and carry out a range of training and education activities associated with general freshwater management. Over the last five years, we have provided informal training and formal qualifications to hundreds of people on various aspects of irrigation best practices to

improve water use efficiency (lowering consumption) and better manage environmental effects (improved soil moisture management and surface water outcomes). We deliver qualification courses on irrigation infrastructure design, performance assessment and operational management.

IrrigationNZ members share the same goals as many other New Zealanders:

- Reduce their environmental footprints and see improvements in the health of the natural environment,
- Contribute to the wellbeing of their communities, and
- Provide for a resilient future for New Zealand in the face of climate change.

2. Introduction:

We have considered the Department of the Prime Minister and Cabinet's (DPMC) consultation documentation and information presented at the online briefing on critical infrastructure (CI) legislation, and we have gained valuable insights into the proposed focused approach.

The irrigation sector has been actively engaged in improving freshwater management for several decades. It has worked towards minimizing the impact on freshwater bodies and meeting the expectations of food consumers, who impose numerous demands on the industry. These demands on the primary sector are already reflected in, not only industry led Codes of Practice, but also multiple layers of central government legislation, regional regulations within land and water plans, and specific water take and infrastructure consent conditions. Consequently, the rural sector has made significant progress in addressing both freshwater resource management and infrastructure asset management to support food production within communities.

IrrigationNZ is in principle supportive of initiatives led by the Ministry for Primary Industries (MPI) that aim to enhance freshwater utilization in accordance with the Fit for a Better World policies and the policies of the Ministry for the Environment (MfE) that underpin the Essential Freshwater program.

We are however concerned about the complexities of messaging to the primary sector arising from the involvement of multiple government agencies, to varying degrees, in the development of water-related legislation including those affecting long-term infrastructure management.

We identify a risk associated with the absence of a comprehensive, coordinated national strategic management approach to New Zealand's freshwater resources and infrastructure investment. This risk creates uncertainty for our communities' resilience and ability to adapt to global megatrends such as climate change over the next 30 to 40 years. A lack of policy and legislative coordination jeopardizes the investment needed in the maintenance and upgrade of irrigation infrastructure to the required levels necessary for addressing the interconnected challenges posed by climate change resilience and population growth driven demand for food.

However, although systemically linked to on-farm irrigation asset values, the key focus for DPMC in its consideration of critical infrastructure is the off-farm asset value. Irrigation water supply scheme infrastructure is a mixture of both storage and distribution. The following capital estimates account for consents, design and construction implementation for water intakes, races, pipes, pumps and electrical control systems from source to the farm gate. Many new irrigation schemes also incorporate some form of hydro energy production. It is assumed 70% of existing irrigated farms and 90% of future irrigation will be supplied by schemes, as opposed to individually operated farm bores or river intakes.

Irrigation scheme distribution infrastructure establishment capital “without storage” typically is modelled about \$5,000 / ha of area supplied. With a water storage component added, that improves supply reliability and operational flexibility, infrastructure establishment capital estimates would be closer to \$15-\$25,000 / ha including both the water storage and distribution components.

It should be noted that recent new irrigation schemes that supply only a few thousand hectares are less capital efficient and have been floated at up to \$40,000 / ha. This constrained scale is a result of the uncertainty and ambiguity resulting from continued regulatory limitations placed on potential land use change.

Therefore, the total future off-farm infrastructure asset value could be in the order of $(900,000 \text{ ha} \times 70\%) + (400,000 \text{ ha} \times 90\%) = 930,000 \text{ ha}$ scheme supplies \times avg capital value \$20,000 / ha thus an overall asset value in the order of \$18.6 billion in 2023 dollars.

Typical electromechanical system annual asset management cost is 2-5% of asset value and is typically this level for irrigation infrastructure. The annual spend on R&M elements poured into rural communities is in the order of \$0.934 billion in regional economic activity.

4. Irrigation infrastructure and its critical role in New Zealand’s resilience

New Zealand faces a slow-moving but significant impact of climate change, it therefore becomes essential to focus on strengthening critical infrastructure across all sectors, including irrigation for food production. This view is shared by the National Science Challenge – Our Land and Water with its findings published in the Growing Kai with Increasing Dry report, 2021. Issues directly related to lack of infrastructure preparedness were raised within this joint industry and scientific community research forum.

IrrigationNZ has had extensive discussions ahead of this DPMC consultation with Te Waihangā Infrastructure Commission on the irrigation sector’s role and have received acknowledgement that irrigation infrastructure is underrepresented in national level policies on resilience and climate change adaptation.

Irrigation plays a pivotal role in ensuring a reliable and sustainable food supply chain. By providing water to agricultural lands during ever increasing dry seasons, not just during extreme droughts, irrigation enables farmers to produce crops consistently. Resilient irrigation infrastructure ensures that communities have access to food, reducing the reliance on unpredictable weather patterns and disrupted imported food supply chains. During times of crisis or extreme weather events, a robust irrigation system can act as a lifeline, helping maintain food production and supply.

Irrigation is a significant driver of economic stability and growth in New Zealand. The agriculture sector heavily relies on irrigation to maintain its productivity and competitiveness. A secure water supply through resilient irrigation infrastructure fosters economic activities, generates employment opportunities, and contributes to the overall economic prosperity and stability of the country.

The report "Value of irrigation in New Zealand: An economy-wide assessment, NZIER, 2014" provided valuable insight to the importance irrigated agriculture delivers to the New Zealand economy in terms of GDP and FTE contribution, however it did not specifically focus on infrastructure value or asset management maturity risks. IrrigationNZ is working with MPI to develop a brief to update this report to reflect the role irrigated agriculture plays in the New Zealand economy. The report will better take into account the contribution to export earnings and to local economic activity of irrigation infrastructure development and management. IrrigationNZ have also recently contributed to a Te Waihanga project looking at the irrigation sector asset management maturity.

An earlier NZIER 2004 report estimated the net farm gate GDP contribution of irrigation at \$0.92 billion using 2002/03 figures. Using the same methodology in 2014, NZIER estimated this net contribution had risen to \$2.17 billion based on 2011/2012 data. This increased contribution resulted from improved farm gross margins and the expansion in irrigated land area (from 457,700 hectares to 721,400 hectares) during that decade.

StatsNZ presents a regional breakdown of irrigated activity in their 2017 survey data, and this is updated to correlate to MPI's 2020 data on total irrigated area. StatsNZ presents that in 2017, irrigated agricultural land covered 3% (747,000ha) of New Zealand's total land area of 28 million ha, however, the MPI 2020 irrigated area (930,000 ha) is 6.64% of New Zealand's productive land of 14 million ha.

Canterbury still has the greatest area of irrigated agricultural land in the country (64% of irrigated land), followed by Otago (13%). Close to 90% of all fruit and vegetable crops are irrigated whereas only 26% of the overall dairy industry is irrigated.

5. What is meant by critical infrastructure and does irrigation fit this definition?

From our understanding of the DPMC consultation documents, IrrigationNZ supports the general use of terms to discuss what critical infrastructure includes.

It is apparent to IrrigationNZ that the government's current definition of and approach to delivering resilient critical infrastructure, differs even across government departments let alone across regulated sectors.

A coordinated approach is somewhat invisible in sectors that are not regulated such as irrigation infrastructure, and it is therefore inconsistently identified as being critical.

There is arguably no sector more obviously impacted by the first of the four global megatrends in the DPMC consultation document, that is climate change. Climate change adaptation is a core element of Te Waihanga's National Adaptation Plan commentary on infrastructure. The acknowledgement and provisioning within risk assessments of New Zealand's critical

infrastructure justifies the consideration of a regulatory approach that better supports irrigation infrastructure.

Irrigation infrastructure, particularly water storage and distribution schemes, includes assets, systems networks, and services that are essential to the business activity for growing and supplying food and fibre to our communities, that take into account safety, security, and economic stability. If these infrastructure assets were to fail catastrophically or even fail to adapt to climate change this would impact New Zealand's resilience, which as DPMC states, "does not just measure an entity's ability to absorb a stress or shock – like an earthquake – but also accounts for an entity's ability to recover" and in IrrigationNZ's opinion, adapt.

It is clear to IrrigationNZ there are parallels in considering irrigation infrastructure and society's interests in a resilient critical infrastructure system, where stability of the food production and supply chain is essential to protecting New Zealanders' lives and livelihoods, but also is important for economic growth. As can be seen in recent extreme weather events that affected the rural primary production sector the costs of meeting community food supply impacts the amount that government must spend on recovery from events particularly if that involves reliance on imported food goods or being unable to continue land use activities as they were.

In IrrigationNZ's view, critical irrigation infrastructures provide direct support of locally produced nutritious and safe food services that are essential to the functioning of our society, the economy, public wellbeing and health. Loss, damage or disruption to irrigation water storage and distribution entities may severely prejudice the provision of essential food supply services to the public, national agriculture trading positions, public food safety, the maintenance of law and order in the event of food shortages and may threaten rural social fabric and livelihoods.

6. Our understanding of the DPMC Consultation on Critical Infrastructure Legislation

1) Asset-Based Approach to Resilience:

DPMC is advocating for an asset-based approach to resilience, centred around identifying and addressing key risk vectors. This approach seeks to assess and enhance the resilience of critical infrastructure assets to various hazards and threats, ensuring a robust and proactive response to potential disruptions.

This is consistent with IrrigationNZ's view on the role infrastructure plays in societal resilience. However, we believe the role of critical irrigation infrastructure is not dealt with consistently across government legislation. IrrigationNZ believes the status of irrigation infrastructure especially related to large scale water storage and distribution requires an elevated recognition of its status and consistency in government policy and legislative tools. IrrigationNZ believes based on the definition being used in the DPMC and previous Te Waihanga documentation that irrigation infrastructure should hold the same critical infrastructure status as other urban water utilities. IrrigationNZ believes having this critical infrastructure status would ensure more consistent treatment across government legislation when making other policy decisions, such as in the MfE management of freshwater resources and MBIE Dam safety assurance program, that can both negatively and positively affect the long-term management of related infrastructure assets.

2) Defining Minimum Enforceable Standard of Resilience:

As part of the proposed legislative and regulatory approach, DPMC aims to define a minimum enforceable set of standards of resilience for critical infrastructure entities. These standards will set a baseline for the level of preparedness and response capabilities required, with the goal of ensuring a consistent and effective approach across all sectors.

IrrigationNZ agrees in principle with setting minimum standards, which is in alignment with its own approach to setting industry led Codes of Practice and Design Standards.

We are however concerned that infrastructure classes (such as transport, energy, communication, and urban water utilities) that nominally already hold critical infrastructure status in the eye of government, and the asset owners themselves, will be at a greater level of maturity in asset management planning, reporting and funding of resilience actions.

IrrigationNZ believes any implementation of minimum enforceable standards that affect primary sector irrigation infrastructure will need to consider a pragmatic implementation and support timeline to address any gap in maturity across other critical infrastructure.

IrrigationNZ points DPMC to the pragmatic example being taken in a legislative process by Taumata Arowai in relation to drinking water safety and infrastructure upgrades. In this instance the legislative response from Taumata Arowai (and DIA) is in proportion to the identified risk to the population which has largely been an unregulated area for many decades. The Taumata Arowai implementation timeframe takes into account the highest risks and target populations first but still holds all to account, in due course.

IrrigationNZ also points DPMC to the example of an inconsistent approach being taken by MBIE in applying unreasonably short timeframes to Dam Safety regulations that is likely to lead to a significant non-compliance in the rural sector due to poorly informed legislative design. As a result, the regulatory impact is underestimated and the rural sector most impacted by lack of resourcing capacity is the sector likely to pose the least actual risk.

3) Additional/Enhanced Government Powers:

DPMC is considering granting additional/enhanced government powers to provide direction and intervention in critical infrastructure entities under certain circumstances. These powers would enable swift and coordinated action in response to crises or threats that could potentially impact critical infrastructure.

We note DPMC recognizes that the regulatory costs may vary significantly between businesses and sectors, and funding may therefore need to come from a combination of shareholder, customer, and government contributions.

IrrigationNZ requests that the cost implications of implementation inequity of any new regulatory framework for critical infrastructure be flagged as a key consideration. Understanding the potential impact on affected rural businesses and irrigation infrastructure asset owners, in particular, is essential to ensure a balanced and sustainable approach to funding of any resilience and long-term adaptation programs.

IrrigationNZ understands that DPMC is actively pursuing this legislative/regulatory approach to critical infrastructure reform and is planning to move relatively quickly. We understand a second round of consultation on the proposed implementation format will be scheduled early in the new year.

We understand that there is a high level of bipartisan support among the major parties regarding the critical infrastructure uplift process and therefore progress of this critical infrastructure reform is expected to be ongoing and potentially rapid.

This signals to our sector the government's urgency in expediting this regulatory framework and whilst it does flag the objective of enhancing critical infrastructure resilience it also presents the real risk that haste may lead to poorly informed policy design, implementation planning and regulatory impact assessments.

While IrrigationNZ advocates for the inclusion of irrigation infrastructure in the critical infrastructure regulatory reform process, we urge DPMC to further engage with us directly to ensure that the specific considerations of the irrigation sector are taken into account within this broader framework of critical infrastructure reform.

4) Transition to System-Wide Regulatory Approach:

In light of the challenges posed by climate change and other threats, IrrigationNZ disagrees with the proposed transition from sector-level regulations to a system-wide approach in regulatory design and funding.

Including irrigation water storage and distribution infrastructure in this approach, applies the same standards to all critical infrastructures where they are held to similar standards. While this may at face value reduce systemic weaknesses and interdependencies the differing levels of regulatory burden and misaligned public sector funding support and policies would mean implementing uniform resilience standards would be inequitable for the irrigation sector.

The inconsistency in defining resilience minimum standards would mean until the government acknowledges the benefit of irrigation infrastructure in all policy decisions, and until these are funded accordingly, the irrigation sector while critical to society is disadvantaged in its ability to contribute to the overall resilience of the critical infrastructure system.

5) Balancing Regulatory Costs and Investment Confidence:

While the introduction of tighter policies to support irrigation infrastructure may entail some regulatory reporting costs, subject to better understanding how this applies to the role irrigation plays in societies' food security systems, the long-term benefits would seem to outweigh these initial expenses.

The upfront investment in infrastructure resilience by the public and private sector is likely more cost-effective than the extensive recovery costs during and after a disruptive event. Moreover, a resilient irrigation system will instil confidence in public sector contribution and private sector investment, encouraging improvements in irrigation infrastructure capacity without fear of potential vulnerabilities or instability.

6) The need to be better informed in integrating irrigation water storage and distribution infrastructure in critical infrastructure reform:

To strengthen the resilience of irrigation water storage and distribution infrastructure, IrrigationNZ suggests that more information is needed to better inform any policy design that could impact irrigation infrastructure.

To this end IrrigationNZ proposes that DPMC along with MPI and Te Waihanga support a case study 'all hazards' assessment conducted on a small, selected set of irrigation infrastructure entities. This assessment will improve available knowledge for all related government agencies as well as support irrigation schemes in their governance decisions on provisioning for resilience.

The case study would apply an asset-based framework, similar to the Australian Security of Critical Infrastructure Act, to two to three large irrigation schemes, assess their current practices, vulnerabilities and risks, and define a target state for resilience within a food security systemic approach.

The outcomes of this case study would improve knowledge on how to include resilience improvement for irrigation schemes and showcase the benefits of an 'all hazards' framework, as well as enhancing the government's understanding of the value of an all hazards, asset-based approach applied to the irrigation industry.

7) Need for a centralised coordination on water policy:

It is apparent there is no regulatory body with the authority to monitor and enforce minimum standards across critical infrastructure sectors. This lack of centralized oversight and accountability leaves the country vulnerable and unable to ensure that critical infrastructure meets the expectations of the New Zealand public and our global customers.

This is particularly apparent with regard to water infrastructure resilience. To address these shortcomings and bolster the resilience of critical water infrastructure, IrrigationNZ is proposing the government establishes a Minister of Water to include input to the likes of critical water infrastructure policy design. This dedicated ministerial position would have the responsibility of coordinating and overseeing all aspects related to water-related critical infrastructure, including irrigation water storage and distribution systems. The Minister of Water would play a pivotal role in developing comprehensive policies and regulations that apply to the entire water infrastructure network, ensuring it is resilient and prepared for various threats, including those associated with climate change.

By having a Minister of Water, New Zealand can centralize accountability, effectively manage risks, and set enforceable minimum resilience standards for water-related critical infrastructure. This approach would facilitate a more coherent and well-understood framework for strengthening the resilience of the nation's water systems, including irrigation, and ensure that they can withstand various challenges, such as extreme weather events, droughts, and other potential disruptions.

Moreover, having a dedicated Minister of Water would signal a strong commitment from the government to address water-related challenges proactively. It would allow for better coordination among agencies and stakeholders, foster knowledge sharing, and streamline decision-making processes to enhance the overall resilience of water infrastructure.

8) Overall Concluding Remarks:

The critical infrastructure reform in Aotearoa New Zealand presents a significant opportunity to strengthen the resilience of our essential systems, including irrigation water storage and distribution infrastructure. While the proposed approach for CI standards and risk

management shows promise, it is essential to consider the potential costs and regulatory complexities associated with integration. Striking the right balance between resilience accountability and recognition of irrigation's positive contributions is paramount.

DPMC's approach to critical infrastructure consultation underscores the government's track record of swiftly enacting legislative reform albeit in this case with apparent bipartisan support that could strengthen the prospects of meaningful reforms.

By taking the time to apply an asset-based framework case study, assessing current practices, and defining a target state for resilience, we suggest this will improve our joint knowledge base on the preparedness for hazards and disruptions in the irrigation sector. A case study 'all hazards' assessment for selected IrrigationNZ member irrigation schemes would serve as a valuable knowledge creation and sharing exercise and promote a more informed and strategic approach to engaging with the government on critical infrastructure regulatory reform.

The journey towards a more resilient Aotearoa New Zealand depends on the collective efforts of industry members, government, and stakeholders. Together, we can strengthen critical infrastructure, including irrigation, to withstand the impacts of climate change and other hazards, ensuring a prosperous and secure future for our nation.

Ensuring DPMC engages with other government departments and stakeholders will be crucial in shaping a future where irrigation plays a central role in New Zealand's sustainable and resilient food supply chains, contributing to economic stability and prosperity. With a Minister of Water and proper representation, irrigation infrastructure can rightfully contribute to New Zealand's resilience, community food supply chain reliance, and economic stability.

IrrigationNZ advocates for the inclusion of irrigation infrastructure in the identification of critical infrastructure. We are available for specific engagement to consider the cost implications, funding mechanisms, and sector-specific needs while aligning with the broader framework of critical infrastructure reform.

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