Innovation in PPE – multi-hazards early warning system in the Pacific

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Agenda

• Innovation in PPE- early warning system
• Introduction to Tonkin + Taylor International
• Project examples on PPE
• Lessons learned
• Way forward
Innovation in PPE

Five ways of private sector engagement in DRR

- Direct assistance to communities (emergency distribution, search and rescue, etc.)
- Disaster preparedness for own business (BCP/BCM, response and recovery plans, etc.)
- Developing innovative products based on business, technology, and expertise (insurance, communication, infrastructure, etc.)
- Joint projects with NGOs, governments, and international organizations as implementer, not donor
- Establishment of private foundations, NGOs, and trusts
Economic Benefits

- USD 1 investment, a return of USD 6 in benefits in the Pacific cyclone early warning system. Case study from Samoa (Fakhruddin, 2019)
- Experiment showed that every USD 1 invested, a return of USD 40.85 in benefits over a ten-year period may be realized. Case study from Bangladesh (World Bank, 2012).
- Willingness to pay improved EWS was estimated US$ 5.57 per year (Ahsan et al., 2020)
About Tonkin + Taylor International
About Tonkin + Taylor

• Founded in 1959
• Proudly 100% employee owned and operated
• New Zealand’s leading environmental and engineering consultancy, with offices in New Zealand, Australia and Malaysia

Over 900 staff in the T+T Group
Our services

- Geotechnical
- Civil
- Water
- Environmental
- Natural Hazard Resilience
- Transport
- Planning
- Ecology
- Transport
- Hydrogeology
- Waste and contaminated land
- Data and digital solutions
- Stakeholder engagement

We shape the interface between people and the environment - earth, water and air - using science and engineering.
Recent examples of client and peer recognition

• Beaton Client Choice Award: Best consulting engineer in Australasia in A$50-A$200M category (2019 and 2016)
• Resource Management Law Association Award (2018): NCTIR planning
• ACENZ Innovate Awards of Excellence (2018): Canterbury Earthquakes complex land damage (Gold)
• Civil Contractors NZ Excellence Awards (2018): Waitangi Wharf upgrade
• Beaton Client Choice Award: Best provider to construction and industry (2018)
• ACENZ Innovate Awards of Excellence (2017): Taumana Reserve (Gold and Community Award)
Project examples- Innovation in PPE
System Based Thinking - Total Warning Concept (Multi-Hazards Impact Based EWS): Fiji, Tonga, Samoa
Coastal Inundation Forecasting – Fiji

• The innovative forecasting project is unique, for the first time in Pacific history bringing together the hydrological, oceanographic, and meteorological communities to create enhanced capability for accessible, understandable, and actionable warnings.
The Canterbury Geotechnical Database (CGD) is an online database that Tonkin + Taylor developed to assist in the rebuild of Christchurch following the 2010-2011 Canterbury Earthquake Sequence (CES).

It was designed as a searchable repository for sharing existing and new geotechnical information.

The shared data concept is a unique and innovative feature of this database.
Loss modelling for TLA’s

Three waters network T+T and AON Probable Maximum Loss estimates

Asset value

Damage Ratio

Loss value (Mean value)

Value of assets ($millions)
- 10 - 30
- 31 - 100
- 101 - 300
- 301 - 1,000
- 1,001 - 3,000
- 3,001 - 10,000
- 10,001 - 20,000

Damage Ratio
- < 0.05
- 0.05 - 0.1
- 0.1 - 0.2
- 0.2 - 0.3
- 0.3 - 0.4
- 0.4 - 0.5
- 0.5 - 0.6

Loss value ($millions)
- 10 - 30
- 31 - 100
- 101 - 300
- 301 - 1,000
- 1,001 - 3,000
- 3,001 - 10,000
- 10,001 - 50,000
NZ Government - The Kaikoura Earthquake Viewer

An interactive web map enabling EQC, Private insurance, response and recovery agencies, engineers and researcher users a tailored, secure view of insurer claims for our customers, alongside geospatial event data.
National Disaster Loss Database
UNOCHA - Cyclone Winston response viewer
World Food Program (Pacific)
Pre-positioned Stock
Adventist Relief Agency - SAFE n REDI Phone APP
ESUPS – Welthungerhilfe – STOCKHOLM Prepositioned stock
Sit up and listen: NZ risks losing billions from rising sea levels

New Zealand sea level rise: Councils' $8b climate change warning

Up to $14b in council infrastructure at risk from rising seas - report

Sea level rise could affect $14bn NZ council infrastructure

Sea level rise to cost billions in public service adaptation
Clifton to Tangoio 2120
Coastal Hazard Strategy

- No changes
- Coastal inundation mapping
- Develop appropriate planning policy *
- Education programs in emergency flood management
- Raise height of land in residential development further above sea level
- Soft structural options e.g. dunes
- Hard structural options e.g. sea walls, storm barriers
- Upgrade drainage
- Relocation of existing infrastructure and housing

* includes revising mandatory planning provisions in development plans, reviewing the building code and strictly regulating hazard zones
Lessons learned
Sectoral balance and maturity for hydromet value chain - NZ
Enhancing corporate social responsibility

Objectives of CSR (Policy Document)
- Eradicating Poverty
- Promoting Education
- Gender Equality
- Environmental Sustainability
- Protecting National Heritage
- Contribution to Prime Minister’s Relief Fund
- Technology Development Fund for academia

Strengthening physical infrastructure, human resource and equipment inventories for disaster response
- Technology Development
- Heritage Conservation
- Mainstream of DRR through planning, policy development and implementation
- Promoting Disaster Education
- Training and Awareness Generation

GRAF Framework

Sustainable Development Goal (SDG)
Wat forward
Way forwards

- Good understanding of the benefits of reinforcing EWS by all stakeholders may serve as an incentive in investing and improving technologies.
- Economic assessment and scenario modelling are efficient tools for decision making in respect of investment and technology improvement for preparedness and actions during response.
- Economic assessment of EWS may help in quantifying pre-impact assessment to demonstrate to policy makers the economic benefit of disaster risk reduction.
- Cross-sectoral engagement can be vital for ensuring consistency in the skills and knowledge to carry out forecasting, monitoring and warnings.
- By collaboration and cooperation from local, national and global authorities, increased capabilities and capacities of the National and Hydrological services may lead to cost-effective DRR.
- To strengthen DRR capacity, it is crucial to involve the private sector as major actors in DRR.
- The private sector can contribute enormously to DRR by developing business continuity plans, innovating technology for EWS, and providing and sharing technical knowledge, skills, and resources in the field of disaster preparedness.