

# **SUSTAINABLE DEVELOPMENT: HOW DO WE MEASURE IT?**

## **PART 2 – FOCUSING ON THE CULTURAL PILLAR**

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### **ABSTRACT**

The cultural pillar is not necessarily forefront with the perception of sustainable development in New Zealand, with the environmental, economical and social pillars often more prominent. However, we have the cultural aspect of our country's identity deeply entrenched in our history and legislation, for example with documents such as the Treaty of Waitangi and the Resource Management Act (RMA).

With Part 1 last year we took a look at sustainable development initiatives currently implemented in New Zealand, how these compare to progress made in the United Kingdom and how applicable various sustainable development tools were to the New Zealand water industry.

The matter of how to approach the cultural pillar was highlighted as an issue which increases the complexity of applying existing sustainable development tools within the New Zealand industry. In order to progress with the implementation of sustainable development metrics we need to specifically focus on the cultural pillar, which is completely unique to each culture. This makes it difficult to quantify and challenging to apply as a universal standard.

New Zealand is definitely not the only country to have strong cultural beliefs associated with water abstraction and discharge. This paper investigates a variety of cultures and their approaches and legislations towards sustainable and culturally sensitive use of water supplies and waste water outfalls.

In addition to this, the paper examines a tool New Zealand does have available at this point in time to provide a cultural metric, the Mauri Model, and assesses how it has been applied to date.

Overall, how does our current progress compare to other cultures' procedures and legislations? And how are we, as New Zealanders who have significant cultural beliefs associated with water abstraction and discharge, placed with incorporating a cultural metric in our sustainable development assessments?

### **KEYWORDS**

**Sustainable development, cultural pillar, RMA, water traditions, cultural impact assessments, Mauri Model**

# 1 INTRODUCTION

Sustainable development has been defined as “*development that meets the needs of the present without compromising the ability of future generations to meet their own needs*” (WCED, 1987).

Sustainable development in New Zealand consists of four pillars; economical, environmental, social and cultural.

In order to evaluate the sustainable development of projects/operations, there are a number of established metrics available in the infrastructure industry to holistically evaluate sustainability. The economical and environmental pillars are quantifiable and their impact commonly assessed. However, the social and cultural pillars are more difficult to approach and therefore, often less prominent in evaluations. The cultural pillar in particular is challenging to appraise, largely due to the huge variety of cultural beliefs. As each culture has its own individual principals, it is impossible to apply an international metric.

The most valuable resource on earth is water, and it is vital that our current and future generations have sufficient access to water fit for consumption. In addition to this, in New Zealand water has prominent cultural significance, which effects the way in which it is handled in the water and wastewater industries.

This paper investigates how the cultural aspect of sustainable development is being measured in New Zealand and around the world, with a particular focus on the water industry.

## 2 NEW ZEALAND’S CULTURAL HISTORY

New Zealand’s indigenous people, Māori, are central to New Zealand’s identity.

Māori refer to themselves as tangata whenua, which translates to ‘people of the land’. This expresses their relationship with the land and their strong ties to the natural world. Māori believe that the wellbeing of humans is tied to the wellbeing of the land.

In addition to Māori’s relationship with the land, they also have a strong affiliation with water. This is demonstrated by Māori having at least six different terms for fresh water (Merito, 2008), some of which are as follows:

- Waiora Pure water (water used in rituals)
- WaiMāori Freshwater
- Waikino Polluted water (water which the mauri of has been corrupted and is unsafe for use)
- Waimate or Waikawa Stagnant or back water (water which has lost its mauri and is considered polluted and unsafe or dangerous)

Mauri is the “binding force between the physical and the spiritual attributes, or the capacity to support life” (Nalder, 2006). Mauri can be used to describe the welfare of natural resources, such as rivers, harbors and forests.

As Tangata Tiaki or guardians of the land, Māori view themselves as responsible for looking after the land and its resources.

Preserving the mauri of a water source means not polluting it. Māori believe that water sources should not be mixed without first coming into contact with the land. This is why Māori oppose wastewater discharge directly to water, requiring it to first being treated on land.

There are technologies already used in the water and wastewater industry which align with this belief. Installing rock filter outfalls, constructed wetlands, and disposing of treated effluent to land for irrigation are just some of the ways that incorporate this ‘used water to land’ philosophy.

### 3 THE BOTTOM LINES

As mentioned in Section 1, sustainable development consists of a number of pillars, which are frequently referred to as the triple or quadruple bottom line.

- The triple bottom line consists of the economic, environmental and social aspects of sustainable.
- The quadruple bottom line consists of the economic, environmental, social and cultural aspects of sustainable.

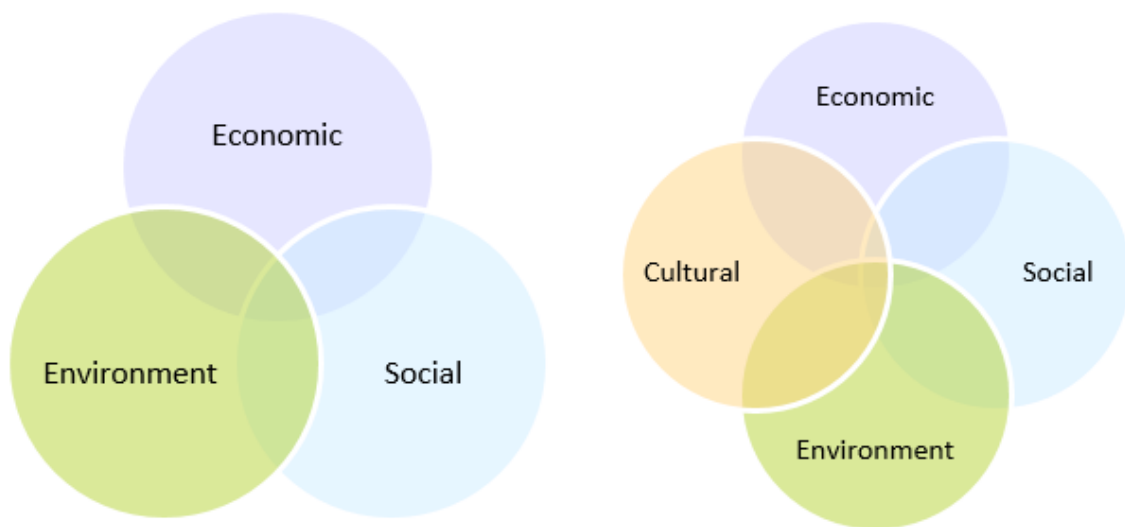


Figure 1: Triple Bottom Line (left) and the Quadruple Bottom Line (right)

Overseas it is more common to work with the triple bottom line and consider cultural impacts as part of social sustainability. Given New Zealand’s rich cultural history, with Māori tradition and beliefs at its back bone, it is extremely important for New Zealanders to work with the quadruple bottom line and consider this pillar of sustainability separately.

### 4 APPLYING THE CULTURAL PILLAR

Culture varies immensely between different communities and countries. This makes it extremely difficult to develop a standardized metric or evaluation tool.

Some cultures have already developed systems and legislation to ensure the cultural pillar is considered during decision making, such as those established in Hawaii (refer to Section 4.1 below). Whereas other cultures purely prioritise cultural traditions and beliefs, such as with the Indian Himalaya region’s approach to water supply (refer to Section 4.2 below).

#### 4.1 HAWAII

The Hawaiian culture has many comparisons with the Māori culture. It is believed that if you take care of the land, the land will take care of you (Bryant, 2011). This is similar to the Māori belief that Māori are the guardians of the land and are there to look after it.

Hawaiian laws and the National Historic Preservation Act enforce that government agencies and private developers must assess the impacts of their developments on the Hawaiian culture (Environmental Council, State of Hawaii, 1997). This must be completed in terms of traditional practices, cultural resources and beliefs.

The Hawaii Environmental Policy Act (HEPA) was enacted to “establish a system of environmental review which will ensure that environmental concerns are given appropriate consideration in decision making along with the economic and technical considerations”. This Act applies the quadruple bottom line stance, as opposed to the typical triple bottom line approach. This leads to a more rounded assessment, in which the environmental, economic, social, and cultural effects caused by a proposed action are all considered before a decision is made.

The State of Hawaii’s policy under the Hawaii Revised Statutes (HRS) Chapter 343 encourages an environmental assessment of cultural resources (referred to as a Cultural Impact Assessment) to be completed as part of the decision making process. This policy aims to promote responsible decision making by including the requirement for a Cultural Impact Assessment.

The Environmental Council of the State of Hawaii recommends that Cultural Impact Assessment follow the protocol listed below (Environmental Council, State of Hawaii, 1997):

- 1) “Identify and consult with individuals and organisations with expertise concerning the types of cultural resources, practices and beliefs found within the broad geographical area, e.g. district or ahupua’a;
- 2) Identify and consult with individuals and organisations with knowledge of the area potentially affected by the proposed action;
- 3) Receive information from or conduct ethnographic interviews and oral histories with persons having knowledge of the potentially affected area;
- 4) Conduct ethnographic, historical, anthropological, sociological, and other culturally related documentary research;
- 5) Identify and describe the cultural resources, practices and beliefs located within the potentially affected area; and
- 6) Assess the impact of the proposed action, alternatives to the proposed action, and mitigation measures, on the cultural resources, practices and beliefs identified.”

Through HEPA and HRS Chapter 343, developing parties are forced to consider the cultural impacts of their proposed project. A Cultural Impact Assessment not only brings to light the cultural impacts, it also promotes responsible decision making in Hawaii. This enables projects to be developed in a culturally sustainable manner.

## **4.2 INDIAN HIMALAYA**

The Indian Himalaya region is located on the Indian side of the Himalayan mountain range.

Due to the remoteness and the inaccessibility of some of the villages, modern water and wastewater technology is uncommon (Chapman, 2014). Many villages have access to natural groundwater springs and building bawdis around these springs. A bawdi is a traditional stepwell formed by laying bricks to make steps. Water for human consumption, livestock consumption and crop irrigation is gathered from these bawdis.

While annual rainfall is high, it falls mostly in the monsoon season, which places stress on the local water resources.

Water is very important in the Hindu religion. Hindu’s believe that you should not alter water from its natural state. Due to this belief, local people are reluctant to engineer the bawdis so that they are protected from contamination.

Respecting the cultural and religious values surrounding water in this region is more significant than supplying good quality water. Change cannot be implemented successfully unless the religious component is respected and not compromised.

## **5 NZ TOOLS AVAILABLE**

Due to New Zealand's cultural background we already has access to a number of tools to assist in evaluating the cultural component of sustainable development. These include to Resource Management Act (RMA) and the Mauri Model, both of which are not purely cultural assessment based and are discussed in the following subsections.

### **5.1 RESOURCE MANAGEMENT ACT (RMA)**

The RMA, implemented in 1991, collated resource management regimes from various agencies at the time. The purpose of the Act is for sustainable management of resources by enabling social, economic, and cultural needs while protecting the longevity of the resources and avoiding, remedying or mitigating any adverse effects on the environment. The RMA also outlines matters of national importance which should be protected, and the aspects which require particular regard.

Along with the Local Government Act (LGA) 2002, the Acts give local government the right to approve or deny resource applications. The LGA includes an emphasis on sustainable development while encouraging and enabling the public to have an input into the development of their community. Under the LGA, local government is also required to have long term plans outlining how they are managing their resources to meet matters of national importance.

Resource applications must address social and cultural impacts through consultation with affected parties. The affected parties should be identified pre-application, and consulted with before and during the application process.

The RMA does not provide quantitative guidelines on how to evaluate the applications, and it is the responsibility of the Council officer to determine the associated effects and make a recommendation (whether the application is approved, denied or further action required).

Although the RMA provides a framework for evaluating the cultural pillar, there are only 14 specific references in the Act of "cultural" aspects.

One of the specific cultural mentions is with regard to water conservation orders, which includes the following cultural related specifications:

- Protection of any body of water which is used for recreational, historical, spiritual or cultural purposes, and;
- Protection of characteristics which any water body has or contributes to, and which are considered to be of outstanding significance in accordance with tikanga Maori.

A schedule on water quality classes is included, which includes a class for water managed for cultural purposes (Class C Water). Under this class, the quality of water is not be altered from characteristics which have a direct bearing on the particular cultural or spiritual values.

The RMA is a useful tool for evaluating the cultural pillar and the quadruple bottom line as a whole. However, it is not specifically tailored to do so and does not include any explicit metrics to assist in evaluation of any of the four pillars. Further tools and/or legislation are required to ensure all aspects of the sustainable development are fully assessed.

### **5.2 MAURI MODEL**

Sustainable development requires each pillar to be satisfied and if one aspect is given the veto, there is no longer sustainable development. In New Zealand the veto can commonly be applied to the environmental aspect (i.e.

green lobby dissatisfied by the environmental impact), cultural aspect (influence on Māori culture is unacceptable) and economical aspect (financially too expensive for Local Council). It is important that all of the aspects of sustainable development are able to be balanced, so a project is not bias towards only one or two aspects, which leads to unsustainable development. However, it can be difficult to balance the pillars against each other at times, especially when one of them is not able to be measured against a metric (the cultural pillar).

The Mauri Model is a New Zealand specific decision support tool, which can be used to determine the sustainability of an event, option or approach. This tool encompasses all four dimensions of the quadruple bottom line, and therefore balances the pillars against each other, with no bias towards a particular pillar.

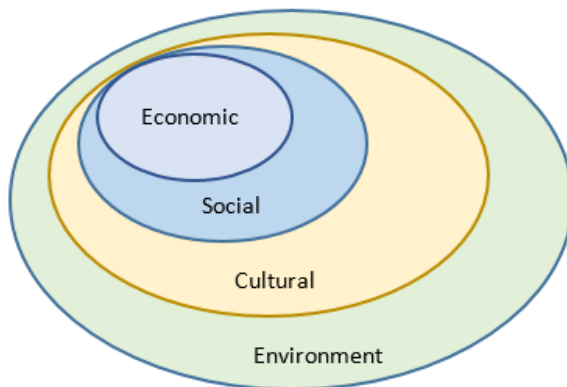


Figure 2: The 'Quadruple Bottom Line' as expressed in the Mauri Model (Morgan, 2006)

The Model is a holistic approach to a cost-benefit analysis, however, instead of quantifying factors in terms of a monetary value, they are assessed based on their mauri (Morgan et al, 2012).

Mauri can be described as the life force of all living and non-living things. Mauri can be strong, weak, or compromised.

The Mauri model quantifies the mauri as either a positive or negative number. When mauri is positive, it is deemed that the event, option or approach is sustainable overall.

Each of the four pillars of sustainable development have a set of indicators, which are then scored based on the event, option or approach. The mauri of an indicator is determined by scoring either a -2, -1, 0, +1, or +2. The negative scores represent a diminishing mauri, while a positive score indicates an enhanced mauri, which is therefore sustainable. This allows for options to be compared based on their impact on mauri.

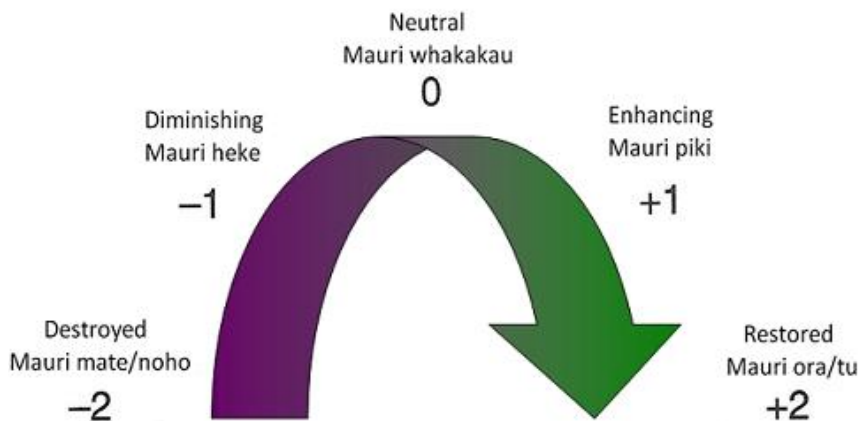


Figure 3: Mauri-ometer impact and tolerance of mauri (Morgan, 2013)

The methodology applied to complete a Mauri Model assessment is provided in the figure below.

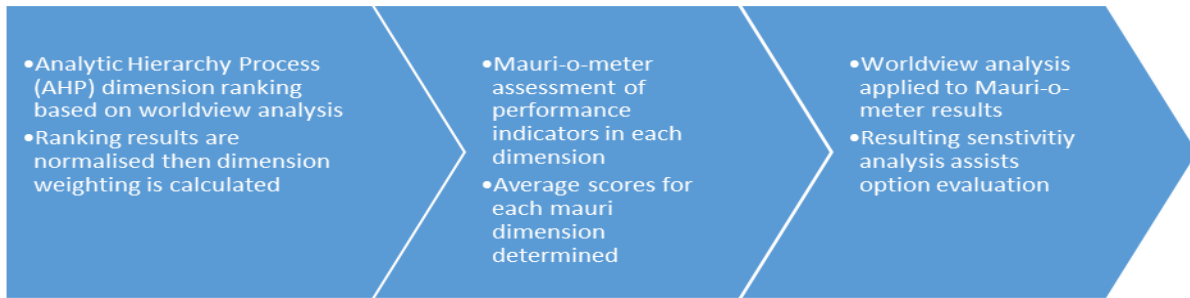


Figure 4: Methodology for the Māori Model (Bennet, PC. 2015)

The Mauri Model differs from other decision support frameworks in the sense that it considers indicators independently from a particular stakeholder view. Then if required, a sensitivity analysis is completed, in which weightings are assigned for each stakeholder's view.

The worldview of a stakeholder takes into account which pillars of sustainable development take priority. For example, the New Zealand Iwi value the cultural and environmental aspects over the economic impacts.

The Mauri Model is most effective when completed by the stakeholders who are invested in a particular decision. These stakeholders produce the indicators and rank them. Their scores can then be aligned when adjusted for each stakeholders' worldviews. If scores are not adjusted, then it is assumed that each pillar has an equal weighting of 25%.

The worldviews acknowledges that not all stakeholders will hold the same view, and therefore, their preferences are often skewed based on their own bias. An ideal model will produce the same result from each stakeholders' responses once their worldview has been factored in. Often decisions are clear cut and the Mauri Model challenges this by encouraging differences to be evaluated. This leads to making more holistic decisions, based on an equal understanding of all four pillars.

### 5.3 MAURI MODEL CASE STUDIES

#### 5.3.1 ASMAT MUNICIPAL WATER SUPPLY

The Agats Township and Syuru Village are located in the Asmat region, situated in the south-western lowlands of Papua Indonesia. Asmat is a large tidal lowlands area, which contains one of the largest alluvial swamplands in the world. The tidal range affects areas approximately 140 km inland.

Fresh water supply is a problem for the people who live in the Asmat region, as the region is often inundated with tides. Population growth in this area has only added to the water supply problem.

In order to address this, a pipeline from the Yomot River was constructed and water reticulated throughout the Agats Township. However, very few of the Asmat people live in the township, with is mainly consisting of government officials and migrants. Majority of the Asmat people reside in the Syuru Village, which the pipeline bypassed. This created inequalities for the community, although the Local Government publically deemed it a success (Wambrauw & Morgan, 2015).

The Asmat people have similar cultural beliefs to the New Zealand Māori. The Asmat people believe in a 'consistency between human beings, the environment and the spirit of the environment'. A study was undertaken in 2015 to assess the sustainability of the implemented solution, and applied the Mauri Model to do so.

The purpose of the water supply project was to provide social welfare (via municipal water supply) for the entire Asmat community. However, the Mauri Model showed that this solution was not sustainable to the Asmat people, only to the Local Government. The model was able to identify that although the project was sustainable for one group of stakeholders, it was unsustainable for another. Overall, this approach to securing water supply may not have been the best option as water is not available to the community as a whole.

### 5.3.2 THREE GORGES DAM PROJECT

The Three Gorges Dam is a hydroelectric dam across the Yangtze River in China and has become the world's largest power station.

The dam was constructed based on three main objectives (Morgan et al, 2012):

- Flood control for the Yangtze region;
- Power generation;
- Navigation benefits for improved ship passages and transportation along the Yangtze River.

In 1988 a Cost Benefit Analysis (CBA) was completed by the CIPM Yangtze Joint Venture to determine the feasibility of the project. The CBA concluded that the project was technically feasible, and therefore should proceed.

It was noted that the development of the dam would face a number of challenges, most prominently:

- The loss of a number of prominent sites, such as archaeological sites, natural landscapes, and cultural heritage sites;
- The resettlement of two million people from the surrounding area;
- The loss of productive farmland;
- Sediment deposition which could significantly decrease the capacity of the dam.

The sustainability of the project was reviewed by Morgan et al (2012) using the Mauri Model to determine if this project would have progressed today.

Research has found that mauri is similar to the Chinese concept of Qi, and therefore the model could be used to analysis this particular project. The model assessed the mauri of the project over three time periods (1988, 2010 and 2038) and used the indicators included in the table below.

*Table 1: Three Gorges Dam Mauri Model Indicators*

<b>Dimension</b>	<b>Indicator</b>
Environment	Physical Environment Living Environment Environmental Geology
Cultural	Cultural and Historical Relics Way of Life Identity (regional)
Social	Quality of Life Regional Effects Satisfaction/Strain
Economic	Monetary Benefit/Cost Regional or National Benefits/Costs Individual or Family Development

The analysis concluded that the Three Gorges Dam Project will positively contribute towards economical, social, and environmental sustainability by 2038. However, cultural sustainability was significantly compromised in the long term. Even with a reduced emphasis on the cultural sustainability, the model concluded that the benefits outweighed the negative consequences. The Mauri Model concluded that the project is a sustainable development and was right to proceed.



The results of a CBA are easily understood, as they are presented as a monetary value. However, many social, environmental, and cultural factors cannot be expressed as a monetary value. Morgan et al's investigation recommended that the CBA be accompanied by a Mauri Model assessment. This would ensure the quadruple bottom line was sufficiently considered.

### 5.3.3 RENA PROJECT

On 5<sup>th</sup> October 2011, the cargo ship MV Rena ran aground on the Astrolabe Reef, which is located off the coast of Tauranga, New Zealand. Following the grounding, amounts of debris and oil washed up on the surrounding beaches. The oil spill has been described as New Zealand's worst maritime environmental disaster.

In addition to the environmental impacts, there were also significant cultural impacts. Astrolabe Reef is known to local iwi as Otaiti and holds cultural significance to them (Bennet, 2015). Otaiti is taonga (an object or natural resource in Māori culture which is highly prized) and the surrounding area is used for fishing and food gathering by Ngai Te Hapu (the local descent group).

The goal of the restoration project was to "restore the mauri of the affected environment to its pre-Rena state" (Rena Recovery Programme, 2015).

Three options were investigated:

- 1) Remove the entire wreck;
- 2) Leave the wreck as is;
- 3) Remove or contain cargo and make the site safe.

There are many challenges associated with each option. A report prepared on behalf of Te Arawa ki Tai, Ngati Makino Heritage Trust and nga iwi whanui or Te Arawa waka, assessed the mauri of the affected environment both pre and post Rena. The conclusions of the mauri assessment were as follows (Bennet, PC. 2015):

- "Culturally inconsiderate decision-making in the past has had significant adverse effects upon the mauri of the Maketu (Te Arawa) environment and its people.
- The ahi kā people and their taonga have suffered severely as a result.
- Consequences of the former decisions and actions have never been genuinely acknowledged or addressed and any enhancement of, or restoring of mauri appears to have been conveniently disregarded.
- The integrity, form, functioning, resilience, life-force and mātauranga pertaining to our atua and their domains, our people, our mātauranga and wellbeing were in a compromised state prior Rena running aground
- The grounding of the MV Rena and subsequent oil and debris release had significant negative impacts upon mauri
- Due to the diminished state of mauri pre-Rena, the Maketu (Te Arawa) environment and ahi kā were particularly vulnerable and predisposed to adverse consequences arising from any form of additional impact."

The assessment used the Mauri Model to determine the extent of impacts upon mauri and local taonga. It has been expressed that "the quantification of impact upon mauri has been very influential on the recovery process", in particular with the options deemed acceptable. The model highlighted that the initial plan to remove part of the Rena was insufficient to return the mauri to its pre-Rena state, and therefore, it was recommended that a larger portion of the ship be removed.

The \$2.4 million government funded Rena Recovery Plan has now been completed and ongoing monitoring of the site continues. While the mauri of the area has not been returned to its pre-Rena state, time will allow the

reef to recover. However, local iwi consider that the mauri will never be fully restored if the Rena remains on the reef, due to the reef's cultural significance.

The Rena Recovery Project is an example of assessing the impacts of a project in terms of economic, environmental, cultural, and social aspects. The project also highlights how cultural beliefs can influence project options and ultimately, the success of the project.

## **6 CONCLUSIONS**

- Water plays a significant role in the Māori culture and therefore, inclusion of their cultural beliefs in the decision making process is paramount to being able to implement sustainable water and wastewater operations.
- Due to the variation of cultures, it is exceedingly difficult (or even impossible) to apply an international metric or legislation to assess the cultural impact of a project or operation.
- New Zealand has the RMA available to assist with the evaluation of sustainable development. However, although there are specific references to each of the four pillars, this Act provides qualitative aspirations as opposed to an applicable metric.
- The Mauri Model is available and has been used on a number of projects, both in New Zealand and internationally. The model can be adapted to other cultures given there are strong similarities to the Māori culture.

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## 8 REFERENCES

- Morgan, T.K.K.B (2013). *Mauriometer*. Retrieved from <http://www.mauriometer.com>
- Kepa Brian Morgan, T.K., et al. The Three Gorges Project: How sustainable? *J.Hydrol.* (2012), <http://dx.doi.org/10.1016/j.jhydrol.2012.05.008>
- Chapman, M. (2014). Catchment Management in the Indian Himalaya, *Water*, 184, 44-45.
- Wambrauw, E. V. & Morgan, T. K. (2015). Understanding the differing realities experienced by stakeholders impacted by the Agats municipal water supply, Papua. *Water Utility Journal*. [http://ewra.net/wuj/issue\\_11.htm](http://ewra.net/wuj/issue_11.htm)
- Kei Merito, (2008). *The Life of a River A Māori Cultural View of Rivers*. Retrieved from <http://www.seakeepers-nz.com/RIVERS/rivermori.html>
- Bennet, PC. 2015. An Assessment on the Grounding of MV Rena on Otaiti and Subsequent Oil Spill and Debris Pollutions Effects upon Mauri. Prepared for and on behalf of Te Arawa ki Tai, Ngati Makino Heritage Trust me Nga Iwi whanui o Te Arawa waka. Mauri Tau Solutions Report 04-415
- Rena Recovery Newsletter, 21. (2015, August 21). Retrieved August 12, 2016, from <http://www.renarecovery.org.nz>
- Guidelines for Assessing Cultural Impacts Adopted by the Environmental Council, State of Hawaii. (1997). Retrieved from <http://www.culturalsurveys.com/shpd/ciag.pdf>
- Nalder, G. (2006). Indigenous Knowledge and Water Engineering – A New Zealand Perspective. *15<sup>th</sup> Congress of APD-IAHR, IIT Madras*, 1611-1615
- Bryant, E. (2011). Innovation or Degradation? An Analysis of Hawi'I's Cultural Impact Assessment Process as a Vehicle of Environmental Justice for Kanaka Maoli. *Asian-Pacific Law and Policy Journal*, 13:1, 230 – 267.
- Morgan, T.K.K.B. (2006) Decision-support tools and the indigenous paradigm, *ICE Engineering Sustainability*, 159, (4), p169-177.