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A culturally-focused life cycle sustainability assessment: Analysis of forestry value chain options with Māori land owners

A thesis presented in partial fulfilment of the requirements of

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in

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Abstract

The purpose of this research was to 1) explore the potential for the more distinctive representation of Māori culture in Life Cycle Sustainability Assessment (LCSA), and 2) understand the relationship between culturally-focused LCSA and the Māori decision-making process. These two interrelated aspects were investigated through participatory engagement with three members of the Ngāti Porou iwi (tribe), and through collaborative development of three forestry LCSA scenarios (radiata pine, rimu, and mānuka).

Aligning with principles of kaupapa Māori research, a participatory LCSA methodology approach was created which encapsulated five phases: 1) understand Ngāti Porou aspirations and concerns, 2) co-develop options for forestry scenarios, 3) co-develop and select LCSA indicators (including a cultural indicator), 4) LCSA indicator data collection and modelling, and 5) communication of results. The methodology utilised a mixed methods approach as Stage 1, 2, 3, and 5 are predominantly qualitative while Stage 4 is predominantly quantitative.

Culture was represented in the participatory LCSA in two ways. Firstly, a bespoke cultural indicator (Cultural Indicator Matrix) was co-developed to distinctly include culture within LCSA. The Cultural Indicator Matrix was based on and adapted an existing cultural decision-making framework (i.e. the Mauri Model) in order to ensure its capability to represent both Ngāti Porou aspirations and the forestry value chains explored in this research. The Cultural Indicator Matrix was completed by each participant and subjectively measured the impact they perceived each forestry process or product had upon a range of Ngāti Porou aspirations. Secondly, a participatory research approach was utilised that itself made the LCSA process more culturally-focused. The participatory approach relied on active engagement with the research participants throughout the LCSA study, primarily with the utilisation of semi-structured interviews. Such collaborative participatory engagement with the research participants allowed for their cultural input, preferences, and knowledge at each stage of the LCSA process.

This research has yielded several original and meaningful results:

1. The Cultural Indicator Matrix is a new culturally-focused mechanism which can be used to support the Māori decision-making process. The participants viewed

the Cultural Indicator Matrix as an effective method for gathering community impressions of how potential forestry life cycle processes could impact upon their cultural aspirations.

2. The participants felt the participatory LCSA aspect was crucially important; the open and consistent communication between themselves and the LCSA practitioner provided them with more control, access to information, understanding of the LCSA process, and enhanced their acceptance of the final results. They considered that the results of the culturally-focused LCSA gave them "validation" and "direction", and justified their interests in pursuing forestry options for their land.
3. The participatory LCSA process led to the identification of a need to formally include a Cultural Compliance process with the LCSA. The Cultural Compliance process is comprised of six cultural components occurring throughout the forestry life cycle. Recognition of these components helps to ensure that appropriate and necessary cultural considerations are taken into account during relevant forestry life cycle processes. It is unlikely that this insight would have been reached if not for the participatory engagement focus of this LCSA research.
4. The development and analysis of three forestry scenarios using a range of sustainability indicators generated distinctive datasets on the life cycles of radiata pine, rimu, and mānuka. As the rimu and mānuka scenarios are particularly underrepresented in forestry-life cycle literature, this research has provided a contribution to knowledge regarding these two forestry options.

For the first time, indigenous culture has been represented alongside economic, social, and environmental impacts in LCSA. This comprehensive presentation of results facilitates the decision-making process by providing the decision maker(s) with information about the "big picture", thus supporting educated and informed decisions. Furthermore, a culturally-focused LCSA approach helps to ensure that culture is not lost during the decision-making process, but rather is an active component. Finally, of critical importance, both the culturally-focused LCSA process and associated results will further enable the recognition cultural groups, including their values and aspirations. The explicit acknowledgement of culture in LCSA will engender more awareness and protection for culture, lessen the isolation and marginalisation of culture, and empower cultural groups to develop and pursue brave choices.

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Abbreviations and acronyms

ABM	Agent Based Modelling
ALCA	Attributional Life Cycle Assessment
CIA	Cultural Impact Assessment
CHI	Cultural Health Index
CLCA	Consequential Life Cycle Assessment
DSTD	Dutch Sustainable Technology Development programme
EIA	Environmental Impact Assessment
E-LCA	Environmental-Life Cycle Assessment
ETS	Emissions Trading Scheme
FDB	Feller-Delimber-Buncher
GIS	Geographic Information Systems
GWP	Global Warming Potential
ISO	International Organisation for Standardisation
L1, L2, L3	Large branch logs
LCC	Life Cycle Costing
LCSA	Life Cycle Sustainability Assessment
NPS-FM	National Policy Statement for Freshwater Management
NPV	Net Present Value
PP	Pia Pohatu
S1, S2	Structural logs
SED	Small end diameter
SIA	Social Impact Assessment
S-LCA	Social-Life Cycle Assessment
TEK	Traditional environmental knowledge
TP	Tina Porou
TW	Tui Warmenhoven
UNESCO	United Nations Educational, Scientific and Cultural Organisation

Māori/English Glossary

Māori word	**English word**
Aotearoa	New Zealand
Awa	River
Hapū	Sub-tribe(s)
Heke	Descend, fall
Hui	Meeting
Iwi	Tribe(s)
Kai	Food
Kāinga	Home
Kaitiaki	Guardian, minder, steward
Kaitiakitanga	Guardianship, stewardship (often used regarding the environment)
Karakia	Prayer, blessing
Kaumātua	Elders
Kaupapa Māori	Māori ideology - a philosophical doctrine, incorporating the knowledge, skills, attitudes and values of Māori society
Ki uta ki ta	Mountain-to-the-sea holistic philosophy
Kōiwi	Bones
Kōrero	Discussion, stories
Mahinga kai	Traditional resource harvesting
Mana	Spiritual power and authority, control
Manaakitanga	Kindness, generosity, support
Mana motuhake	Autonomy, self-government, self-determination, independence
Mana whenua	Power from the land, territorial rights
Marae	Courtyard where formal greetings and discussions occur
Mātauranga	Knowledge, wisdom, understanding
Mate	Dead, ailing, unwell, diseased
Maunga	Mountain
Mauri	Binding life force between all living and non-living things
Mihi	Greetings
Noho	Stay, remain

Ora	Alive, well, safe, healthy, healed, vitality
Pākeke	Adults
Papatūānuku	Earth mother and wife of Sky father (Rangi-nui), all life originates from them
Patu	Weapons
Piki	Climb, ascend
Rākau whenua	Trees of the land
Rangi-nui	Sky father and husband of Earth mother (Papatūānuku), all life originates from them
Rongoā	Māori traditional medicine, remedy, cure, treatment
Taiao	Natural world, environment, Earth
Tangata whenua	People of the land, indigenous people
Taonga	Treasure, anything prized or of value including culturally and socially
Te reo Māori	Māori language
Tikanga	Protocol, procedure, custom, practice
Tū	To be raised
Urupā	Burial grounds
Waka	Canoe, vehicle
Wāhi tapu	Sacred place or site
Wairuatanga	Spirituality
Wai taonga	Waters that are treasured
Wānanga	Traditional learning and knowledge, Māori tertiary institution
Weka	Endemic (woodhen) bird
Whakaaro	To think, plan, understanding, idea
Whakakau	Gradually appear, rise
Whakamana taiata	Importance of treating everybody with respect and ensure that they are empowered
Whakapapa	Genealogy, lineage, descent
Whakataukī	Māori proverb
Whānau	Family
Whānaugatanga	Māori kinship and togetherness