

# The Use of GIS for Agroecology, Medicinal Flora and Public Access aspects of an *iwi*-run Farm

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## ABSTRACT

The application of GIS has been important for resource management and environmental planning. The Maori notion of *kaitiaki* or guardianship of land and resources can also be incorporated into resource management through the use of GIS; links with *tipuna* (ancestors) and *turanagwaewae* (a place of belonging) are also fostered with GIS (Pacey, 2005). Combining indigenous knowledge and a GIS, if achieved sensitively, and mindful of culture, security and property rights, gives the advantage of capturing and storing cultural and traditional values and concepts, along with geographic data (Landcare Research, 2013). Used in this way and at this level, management of the GIS requires community participation, becoming an example of a Public Participation GIS (Weiner, et al., 2002). An example of such an implementation in New Zealand was reported on by Harmsworth et al. (2005), who describe an *iwi* (tribe) – led GIS project founded on local participation, in Motueka, Nelson. This principle of “active participation” is stated locally (NZ) as integral to indigenous farm management (Science for Environmental Policy, 2011).

Te Putahi farm, covering some 449 hectares of Banks Peninsula (Canterbury). is owned by Wairewa runanga (a Ngai Tahu papatipu runanga) and managed by two trusts. Like many Maori trust farms, the runanga wish Te Putahi to become a more biodiverse and eco-friendly farm but also require an economic return. Tourism may provide an option for additional income, particularly if the farm is managed according to the principles of agroecology, the application of various ecological principles to enhance agricultural production (Nga Pae o te Maramatanga, 2012). Specifically, indigenous agroecology is being adopted, which draws upon local traditional knowledge systems, agroecological practices and socio-cultural dynamics. To increase biodiversity on the farm and to foster cultural activity, Te Putahi are assessing the possibility of planting rongoa (Maori traditional medicine) species on areas of the farm that would benefit from being retired from grazing, such as stream margins and eroding banks. Animal health is likely to be enhanced through a broader diet and the allelopathic compounds found in rongoa species, and the community will benefit from having access to native species. High value timber plantings can be interspersed providing a future income and/or carbon credits.

This presentation will introduce Te Putahi as a Maori trust farm, managed on principles of indigenous agroecology and briefly describe some of the GIS-based projects run out of the Indigenous Agroecology Project Group (Johnson et al, 2013). These all are referenced relative to a baseline contextual dataset surveyed in 2011, and include:

- the design and implementation of a time-stamped spatial database to house baseline data and agroecology monitoring data (e.g. biological – invertebrates, vegetation; chemical – pH, nitrates; physical – temperature, stream velocity) in years to come (Pagan, 2013)
- the use of spatial analysis, specifically multi-criteria analysis (Malczewski, 1999) fed by topographic data indicators and botanical knowledge to identify areas of the farm that could sustain growth of plant species with medicinal properties for the benefit of animal stock health (Coutts et al, 2012)
- using cost path analysis to define public access paths to the farm, with slope, visibility and distance to gully bottom as input. The major checking criterion for the paths generated is diversity of medicinal plant species seen from the path, as generated in the previous project.

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