Traditional Māori Horticulture and resource utility in New Zealand

Nick Roskruge (PhD)
Te Ātiawa/Ngāti Tama
Massey University
Palmerston North, New Zealand
N.Roskruge@massey.ac.nz
This research is based at Massey University Palmerston North, NZ in collaboration with:

The National Maori Growers Collective (Tahuri Whenua), Lincoln University and Plant & Food Research
Aotearoa / New Zealand

- South-west Pacific nation
- Māori are the indigenous people; only colonised post 1840.
- Population of 4 million across many islands, majority in the North
- Temperate to sub-Antarctic climate
- Capricious climate – year-by-year
- Variable landscape and soil qualities
- Potatoes - primary carbohydrate in diet
We are islands of a volcanic origin
We are 3 main islands and hundreds of smaller islands – the longest coastline in the world.

Looking to the mainland from Kapiti Island.
This is how we see the world!
Water is our life-blood
Agriculture is our primary industry - dairy, sheep, beef - approximately 65% of GDP
The pressures from agriculture, especially dairy production, dominate our land management and research e.g. nitrogen and phosphorus levels in soils and waterways, erosion issues.
We have very high conservation demands – unique flora and fauna –

As an example; these native parrots known as KEA
Māori (a collective noun)
Modern term for the Indigenous peoples of Aotearoa / New Zealand
Tribal groupings, Polynesian origins
Unique ‘worldview’- **Te Ao Māori**
**Ki uta ki tai** – inclusive approach to resources

Te Awhina Marae, Motueka
I kune mai i Hawaiiki, ki te kune kai, ki te kune tangata
The source of all things valuable, our food and our people, is from Hawaiiki

Matahiwi marae, Heretaunga
Tribal / Communal

Hāngi – the Māori version of the pachamanca
Maunga (Mt) Taranaki viewed from Maunga (Mt) Ruapehu
- both sacred mountains in tribal mythology

Whakapapa is the unique cultural factor that binds all Māori to their resources and to each other.
Te Waharoa
(Ngai Tai, Torere)

Traditional carvings on a gateway which tell the history of the area.

An example of the mode of information management:
Oral and carved rather than written
Some primary cultural values

- Whakapapa
- Whanaunga
- Wairua
- Manaaki
- Mātauranga
- Tikanga
- Tapu/noa
- Kotahi
- Mauri
Kai-tiaki-tanga

Traditional guardianship
• Includes landscape management as a continuum
• Responds to both traditional and contemporary needs
• Maintains the *mauri* of the landscape

Kouka – Cabbage trees – growing within agricultural landscape
Cultural Practices: **Tikanga** literally ‘best practice’ based on cultural knowledge or **Mātauranga**

For example:
The lunar calendar or **maramataka** where **Matariki** (Pleiades) signifies the Māori New Year (around May/June)
Traditional land use and production systems

- Subsistence and seasonal lifestyle
- Strong spiritual relationships
- Primarily plant focused systems
- No ruminants or animal farming
- Minor pest and disease issues
- Storage and processing of produce important
- Protein source – fish and birds
- Transient occupation of harvest sites
- Strong land management practices
- Rongoa (traditional medicines) important
Ethno-botanical practices

- Whakapapa of plants e.g., the relationship of the spiritual realm to humankind
- Plants managed seasonally for food, utility and/or medicines
- Managed for ecosystem qualities e.g. as food stores for birds, ultimately a food source
- Intimate knowledge systems
- Utility as tohu or signs/omens/portents
Ethno-pedological practices

Knowledge of soil origins & physical processes
Soil nomenclature
Soil biology
Soil fertility
Site selection
Land amendments e.g. terracing, adding gravels & bio-char or fertilizers

Te Atiawa, Te Tau Ihu tribes, South Island, New Zealand
Māori horticulture; managed systems for food & utility products. A selection of key crops:

- Taewa / riwai – *Solanum* sp. (potatoes)
- Kamokamo – *Cucurbita* sp.
- Kaanga – *Zea mays* (Indian corn)
- Hue – *Lagenaria siceraria* (bottle gourds)
- Kūmara – *Ipomoea batatas* (sweetpotato)
- Kouka – *Cordyline* sp. (cabbage tree)
- Taro – *Colocasia esculenta*
- Harakeke – *Phormium tenax* (NZ flax)
- Kōkihi – *Tetragonia tetragonioides* (NZ spinach)
- Pūhā – *Sonchus* sp. (sow-thistles)
TAEWA
*Solanum* sp.
Māori potatoes

KAANGA
*Zea mays*
Indian corn
KŌKIHI
Tetragonia
tetragonioioides
New Zealand Spinach

HARAKEKE
Phormium tenax
New Zealand Flax
KAMOKAMO
*Cucurbitaceae*

KŪMARA
*Ipomoea batatas*
Sweetpotato
KOUKA
*Cordyline* sp.
Cabbage tree

Hue
*Lagenaria siceraria*
Bottle gourds
A late addition to inventory
Replaced kūmara as primary crop
Now in home or marae gardens and commercial production,
Traditional inputs such as site selection, site management, crop rotations or pest & disease management
Sample of main taewa varieties

Moemoe

Pawhero

Karuparera

Huakaroro

Tutae-kuri or Urenika
Relief of traditional carving on the veranda of a meeting house at Ōmaka marae, Blenheim (Te Tau Ihu) showing a kete (basket) of potatoes indicating their importance to the local community
Indigenous production

- 3 year rotation of crops
- Integration of environmental factors for crops e.g. frosts to kill cull tubers
- Soil preparation – stale seedbed method
- Soil amendments using natural products
- Retention of seed tubers
- Underground storage of seed tubers
Seed tuber quality: an example of a primary issue

- Seed kept year-by-year by producers
- Considerable virus loading
  - PVS; PVA; PVX; PVY all present
- Submitted for elimination treatment
  - Thermotherapy and meristem culture
- ELISA testing to confirm virus free
- Tissue culture plants then submitted for bulking up procedure – 2-5 years
- Seed certification programme applied annually
Virus-free taewa

Top/haulm growth much more precocious and tuber set still too high resulting in too many unmarketable tubers by size

*Picture shows Moemoe variety at about week 12*
Virus-free and Certified ‘seed’ production crop

Moemoe variety

(bulking up phase)
Shape and size consistency improved. Flesh colour still somewhat variable e.g. partially through to wholly pigmented flesh in tutaekuri variety (shown)
Timeframe for the production of taewa Potatoes

1 Year

Seed Tubers
   Sourced locally

Production systems

Seed stock

Markets/consumers

1 Year

Virus elimination
   Tissue Culture

Bulking up

Certified seed production

Production

Markets

Processed product
Other factors related to taewa crops

• Soil management – e.g. biofumigation, rotation
• Strategising inputs – e.g. water, fertilisers
• Potential for pest and disease resistance through natural selection
• Trials looking at susceptibility of taewa to key diseases e.g. powdery scab and late-blight
• Trials looking at physiological factors e.g. timing of tuber set, skin colour, tuber shape and size distributions
• Nutritional makeup of taewa as health benefits e.g. starch values, antioxidants
Improving Māori producer systems

- Establishing national grower group
- Aligning research to grower needs
- Creating joint research strategies
- Market alignment
- Disseminating information – written/verbal
- Regular field days (practical)
- Regional hui (Māori conferences) yearly
- Investing in education – all levels
Tahuri Whenua
National group of Māori growers
TW Strategic Plan

• To establish a grower entity & Constitution
• To promote a collaborative place in the horticulture sector
• To facilitate full Māori participation
• To improve crop production systems
• To build relationships
• To facilitate participation in R & D
• To support Māori business development
• To acknowledge Mātauranga Māori
• To foster education, training & development
Annual Hui-a-rohe

To bring people together to the kaupapa of Māori horticulture & Tahuri Whenua
The growers participate with the research; here interviewed on traditional knowledge after a harvest.
Grower and land-owner workshops
School projects

School gardens, ‘Spud-in-a-bucket’ project & interactive visits to schools
Kūmara Production

*Ipomoea batatas*

- Crop adapted to meet temperate climate of NZ
- Vegetative reproduction (cut pieces not shoots)
- Need long summers, no frosts
- Historical product for commerce between tribes
- Modern varieties differ to traditional ones
- Strong spiritual significance
- Important carbohydrate source in diet
KOUKA (cabbage tree)  
(an example of a managed landscape for a traditional food source)

- Also known as tii, kōmata or whānake
- A utility crop; leaves for weaving & thatching, heart leaves for eating and roots processed for sucrose
- Varieties known for their attributes
- Harvested in-season for high sucrose
- Roots treated and processed
- Successional regrowth of trees encouraged
PUHĀ (Sonchus spp.)

an example of a contemporary crop

- Several species
- Introduced rather than native
- Traditionally a condiment
- Now used as a vegetable
- Some medicinal uses
- Available commercially
- Sourced from wild populations
- Considerable traditional knowledge (mātauranga) surrounding the plant
Identifying market opportunities – all crops –

- Fresh market – limited volumes
- Organic market – limited volumes
- Indigenous marketing /systems – international opportunities
- Processed products – variable opportunities
  e.g. extruded products based on starch qualities or pre-cooked products etc.
Transitional period 1840-2009

Some key influences for Māori

- Loss of land and social structure
- Introduction of new economics, tools, religion, government and agriculture
- Pastoralism – extensive v’s intensive
- Loss of leadership (e.g. WW I & WW II)
- Urbanisation, especially after 1950
- Relearning culture, including language
Relationships have changed

- Resource utility has changed
- Exploitation pressures are common
- Cultural experiences have changed
- Kaitiaki–tanga needs to be restored
Contemporary landscape

Urbanisation of Māori
Political influences
Technology v’s mātauranga
Pockets of land-discontinuous, isolated and varied quality
Absentee owners
Cultural restoration around horticulture/food production

- Capturing traditional knowledge around soils, plants and horticulture (& agriculture)
- Restoring the relationship to the land
- Reworking traditional tools
  - kaitiaki, maramatakapia, soil management etc.
- Creating contemporary tools
  - decision systems, learning programmes etc.
- Restoration of knowledge to new generation
Future Māori directions through horticulture & agriculture

Economic and commercial opportunities
Education for our future generations who will be the land (and culture) managers
Integration of mātauranga Māori and contemporary knowledge & technology
Acknowledgement of Māori inputs to systems
Kia ora

Thankyou

ngā mihi atu ki a koutou

and greetings to you all

He pātaí?

Questions?