Adoption of edible Fynbos plants in the Western Cape: a case study of *Tetragonia decumbens* and *Mesembryanthemum crystallinum*

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Western Cape context

Ecological

- Over 9000 plant species in Cape Floristic Region (CFR), over 70% endemic
- Sporadic rainfall and drought conditions
- Semi-arid to arid conditions and poor soils
- *Fynbos* biome mostly known for its flora’s biological, medicinal and health, aesthetic and eco-tourism value (R77 million/year)
- Cape *Fynbos* has been neglected regarding its edible species as sustainable agronomic resources

Historical/ Social

- Colonialism, apartheid, loss of land
- Erosion of knowledge around plants
- Use of indigenous plant species tied up in older Cape Khoe and San heritage
- ‘Food and nutrition insecurity at household level
- 25.3% poverty rate and unemployment for communities dependent on agriculture
Value of indigenous edible species

- The use and cultivation of indigenous edible species present a unique opportunity to addressing the dual issues of mitigating food insecurity and poverty.

- Lower requirements and nutritious (Uusiku, 2010; Maseko, 2014)

- Potential year round harvesting (Ribeiro, 2017)

- Tolerant to drought, pests and diseases (Slabbert, 2004; Venter, 2007; Backeberg, 2014)

- Better adapted to marginal areas than exotic edible species
Community awareness and participation

- Preference for westernized diets renders indigenous edibles as low status foods and backward
- Lack of diversity in preparation discourages adoption
- Lack of knowledge and recognition of nutritive value among the young contributes to decline in usage
- Food innovators, activists and chefs in the Western Cape; Loubie Rusch, Chuma Mgcoyi, Nazeer Sondy, Zayaan Khan and Kobus van der Merwe
- There are community gardens and initiatives that involve one of both species
Dune Spinach (*Tetragonia decumbens*)

- Member species of Cape Floristic Region (CFR), Ice plant family (Aizoaceae); decumbent perennial shrub

- Occurs in coastal sands of CFR (WC and EC) and Namibia

- Long roots and runners with hairy leaves and yellow flowers

- Survives dry summer months and re-sprouts when exposed to water
Sout slaai (*Mesembrianthemum crystalinum*)

- Member species of Cape Floristic Region (CFR), Ice plant family (Aizoaceae); prostate annual plant

- Occurs in coastal sands of Western and eastern Cape, Cederberg and Karoo, roadsides and yards

- Oval, paddle shaped succulent leaves covered with bladder cells. Bears white and pinkish leaves in November and December

- Survives dry summer months
Uses

Dune spinach
- Stabilize sand dunes
- Acts as seed trap
- Generate organic matter
- Eaten raw in salads
- Or cooked with other vegetables; has salty taste

Sout slaai
- Eaten raw or cooked and tastes slightly salty
- Can be juiced and used in salsas
- Prepare animal hides for tanning and softening
- Used as soap substitute
- Has medicinal benefits
To explore potential consumer acceptance and potential adoption of two indigenous wild vegetables indigenous to the Western Cape; i.e. dune spinach (*T. decumbens*) and *sout slaai* (*M. crystallinum*):

**Specifically;**

Investigate the general perceptions of indigenous vegetables, the acceptability of the dune spinach and *sout slaai* in their cooked and raw forms as well as the intended future consumption.
Methods

Agronomic
- Soil Trial
- Irrigation Trial

Social
- Tasting Event
- Survey

- Conducted at the Sustainability Institute
- Ethical clearance obtained
- Convenience sample of 24 respondents surveyed
- Each vegetables presented in 2 recipes
- Data analyzed using SPSS for Windows, version 25 (SPSS Inc., Chicago, Illinois)

- Demographic information and prior knowledge
- Sensory score sheet (5-point hedonic scale)
- 6-score food action ration scale to measure consumption intent
- 5-point scale for purchasing intent
Results
Demography

Gender
- Female (67%)
- Male (33%)

Occupation
- Student (54%)
- Professional (46%)

Working
Prior Knowledge

Knowledge Score

Source of Knowledge

- Prior Knowledge
- Eaten Before

T. decumbens M. crystallinum Neither

Institution Word of mouth Nature
Perceptions

- Sustainable; eco-friendly, economical, diverse, affordable, nutritious
- Heritage; local, indigenous, cultural heritage
- Taste; delicious

**POSITIVE PERCEPTIONS**

- Sustainable (52%)
- Heritage (28%)
- Taste (12%)
Perceptions

- Unsustainable; Inaccessible, low yield, ecological threat
- Beliefs and insufficient knowledge of wild foods, unfamiliar
- Distaste; not tasty, wild, inedible, acrid taste
- Unsafe; have potential pathogens, wary, unsure about them

Negative perceptions

- Unsustainable: 29%
- Belief: 29%
- Distaste: 28%
- Unsafe: 14%
Acceptability

- Comparison of acceptance score between dune spinach salsa and *smoor*, exact $p = 0.035^*$

- Comparison of acceptance score between *sout slaai* salsa and *smoor*, exact $p = 0.092$
Correlations

- Statistically significant positive correlation between the dune spinach and sout slaai, $p = 0.012$

- No sig. difference in acceptability scores between men and women, $p = 0.223$

- No sig. difference in acceptability scores between workers and students, $p = 0.649$
Purchasing Intent

- Strong positive association between respondents' purchasing intention and the overall acceptance of the two indigenous vegetables, $p = 0.00 < 0.01$

- Frequency – anytime, occasional and special occasions

- Economics – affordable, available and nothing else available

- Local farmer’s market

- Information and Health
Consumption Intent

- There was no association between consumption intent and overall acceptance of the two indigenous vegetables, $p = 0.082$

- Suggests an unwillingness to adopt vegetables despite finding recipes acceptable and willing to purchase if available in stores
No generalisations made as representative of Western Cape population

Within study context;

Great need for awareness of edible indigenous species of the Western Cape even at Institutional level

Cooked versions (smoortjie) were better liked compared to raw versions

The positive relationship between purchasing intention and overall acceptance of both vegetables suggest presence of these vegetables in food stores may encourage consumption
Conclusion

- Locally adapted edible species can be sustainable food and nutrition sources

- Little use of indigenous Western Cape species and scarce presence in food stores despite their benefits, necessitate collaboration and research

- Adoption of indigenous species can address environmental, social, cultural, nutritional and economic challenges
References

- Rusch, L., 2016. The Cape Wild Food Garden: a pilot cultivation project funded by the SI.
Community gardens and initiatives

- Indigenous Food Garden, Sustainability Institute in Lynedoch
- Beacon Organic Garden, Mitchells Plain
- Village Heights Community Garden, Village Heights, Lavender Hill
- Oude Molen Eco Village in Pinelands
- Dik Delta Culinary Garden, Solms Delta in Groot Drakenstein
- Grootbos in Gansbaai
- Ikhaya Food Garden, Isikhokelo Primary School in Site C, Khayelitsha
- The Philippi Horticultural Area Food and Farming Campaign,
- Tyisa Nabanye permaculture farm in Tamboerskloof