

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

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1

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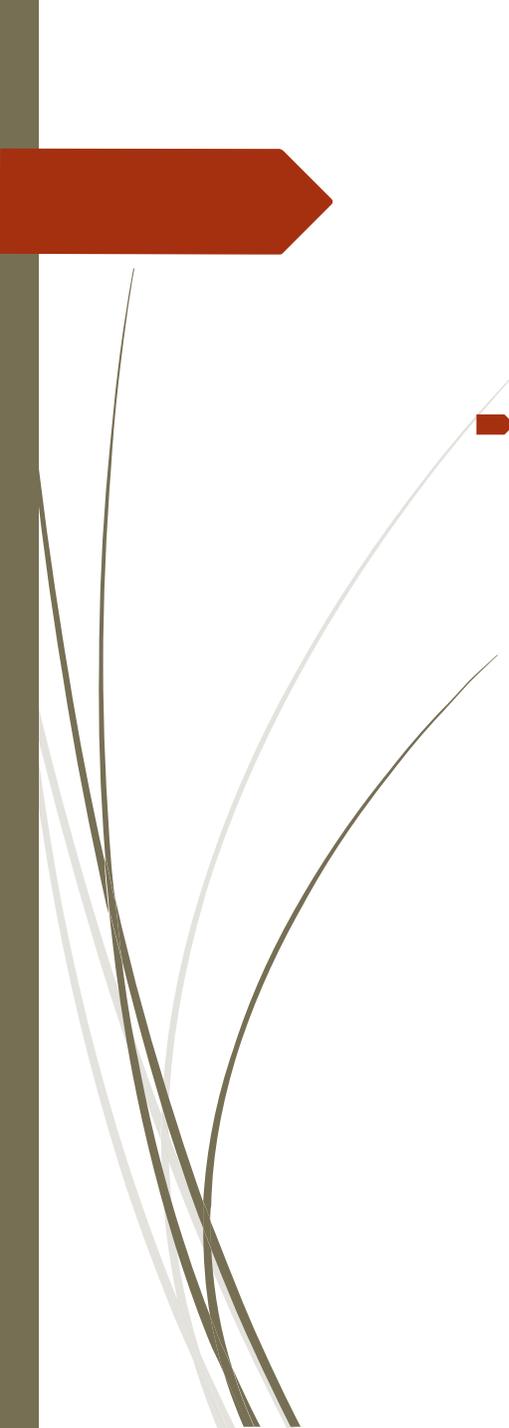
Western Cape context

Ecological

- Over 9000 plant *sp* 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 Sondag, 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 crystallinum*)

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

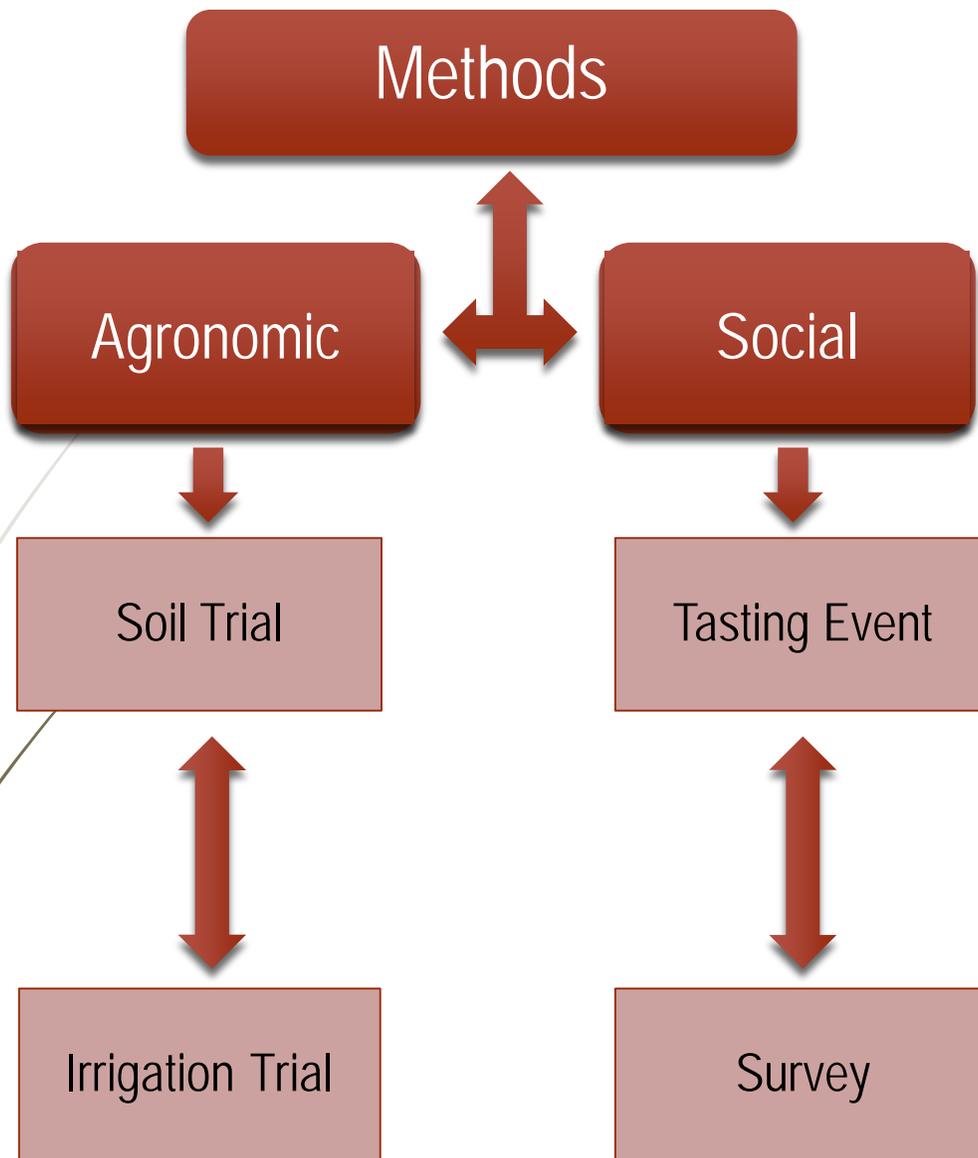
Dune spinach

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

Sout slaai

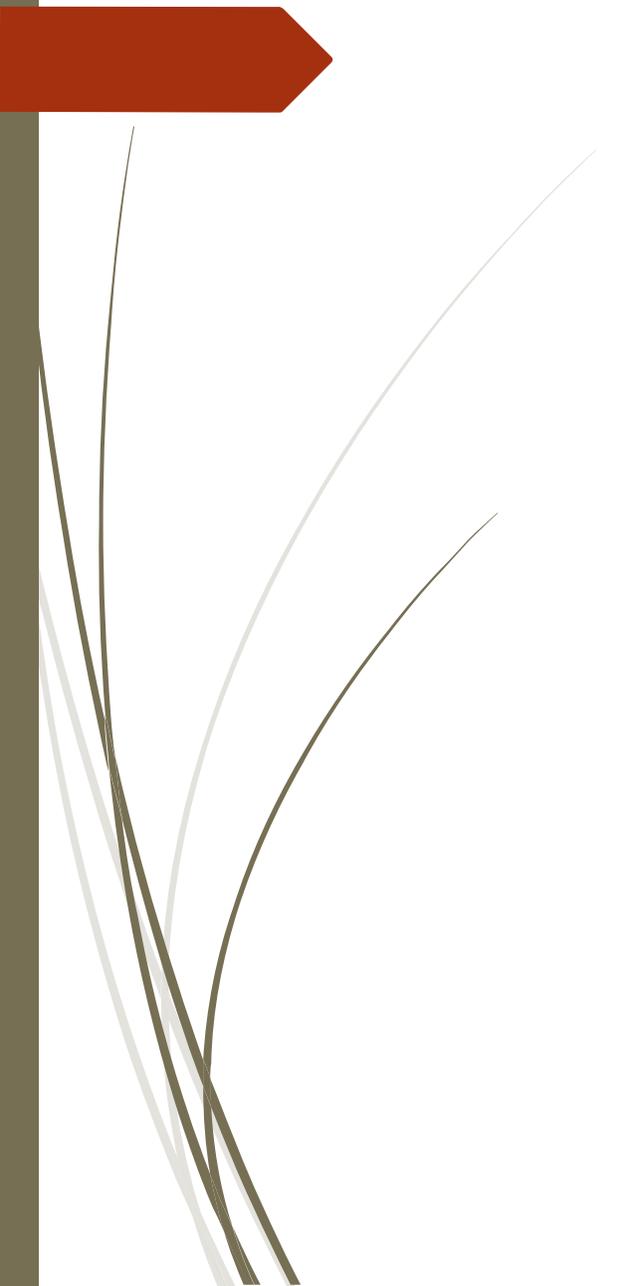
- Eaten raw or cooked and tastes slightly salty
- Can be juiced and used in salsas
- Prepare animal hides for tanning and softening
- Used as soap substitute
- Has medicinal benefits

- 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

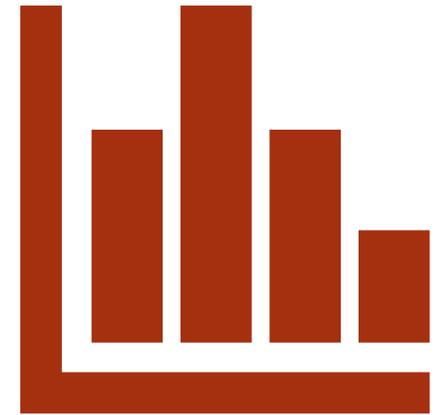


- Conducted at the Sustainability Institute
- Ethical clearance obtained
- Convenience sample of 24 respondents surveyed
- Each vegetables presented in 2 recipes
- Data analyzed using SPSS for Windows, version 25 (SPSS Inc., Chicago, Illinois)

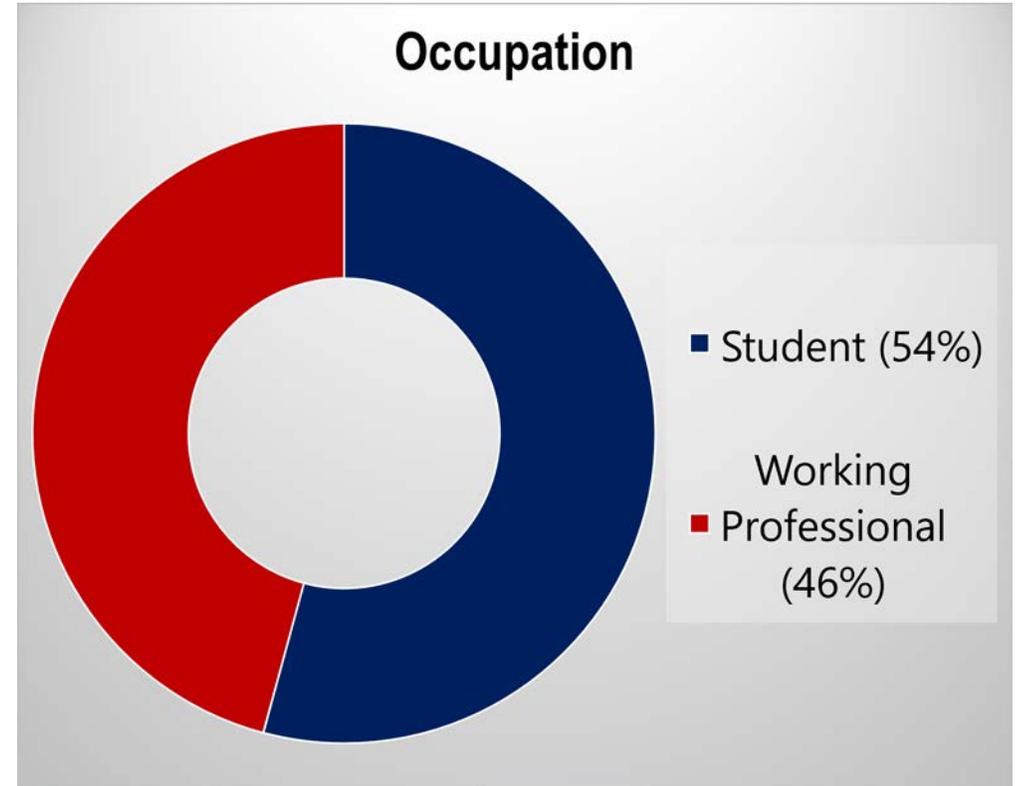
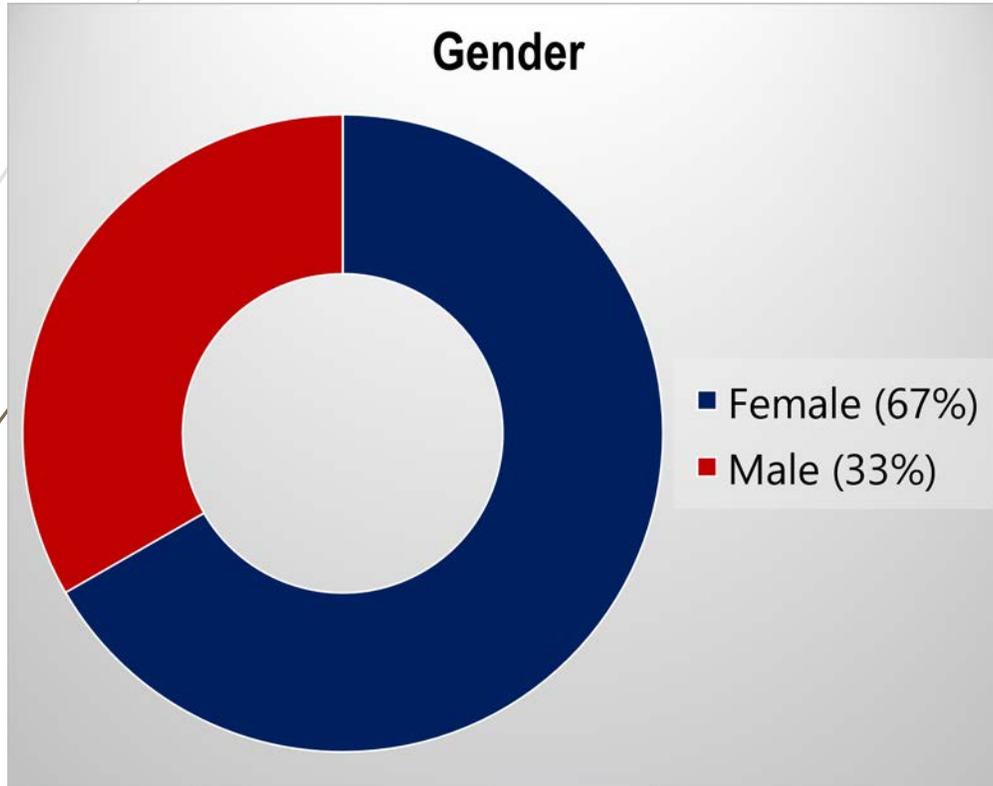
- Demographic information and prior knowledge
- Sensory score sheet (5-point hedonic scale)
- 6-score food action ration scale to measure consumption intent
- 5-point scale for purchasing intent

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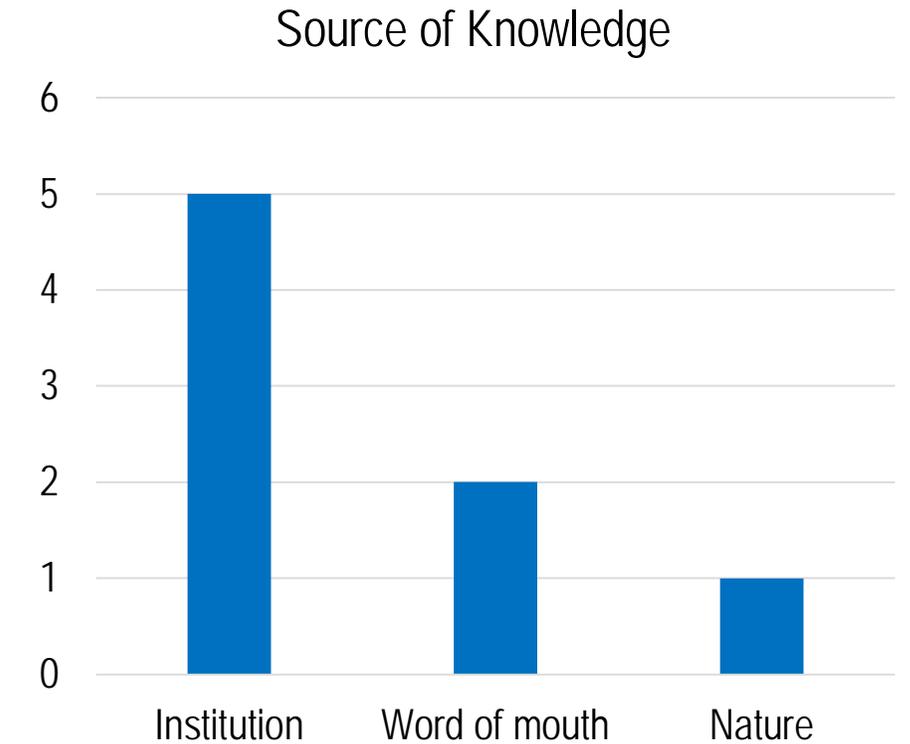
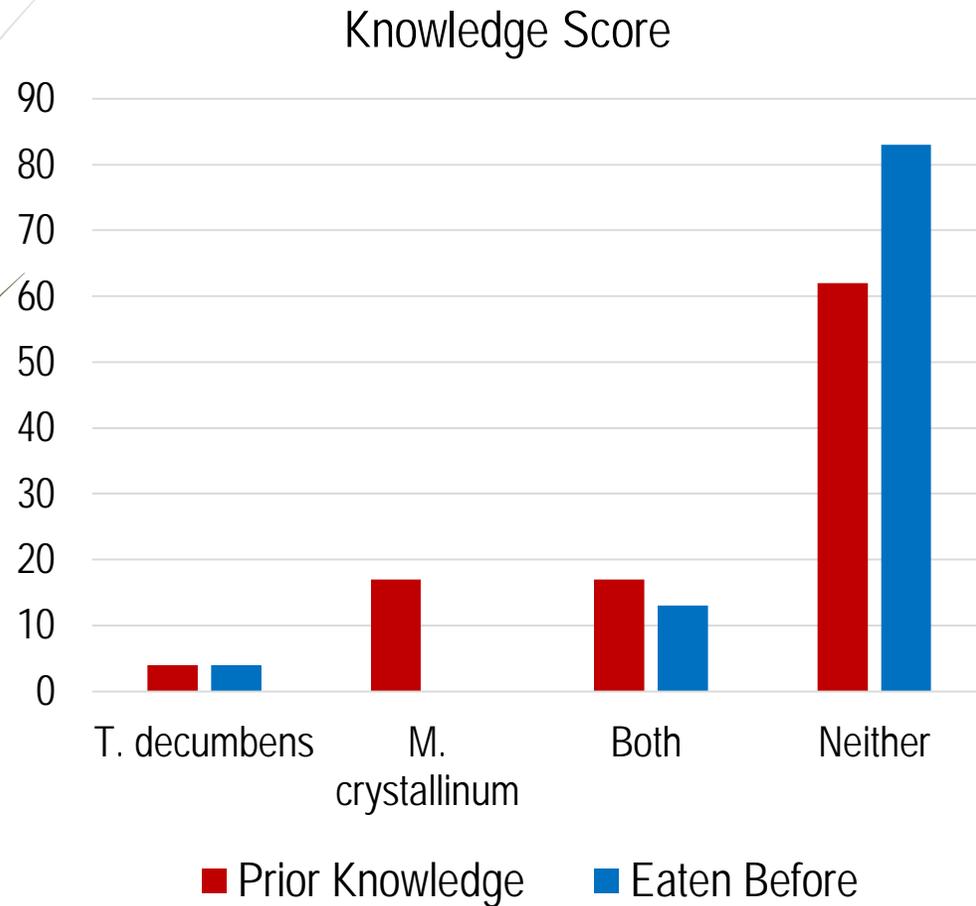
Results



Demography



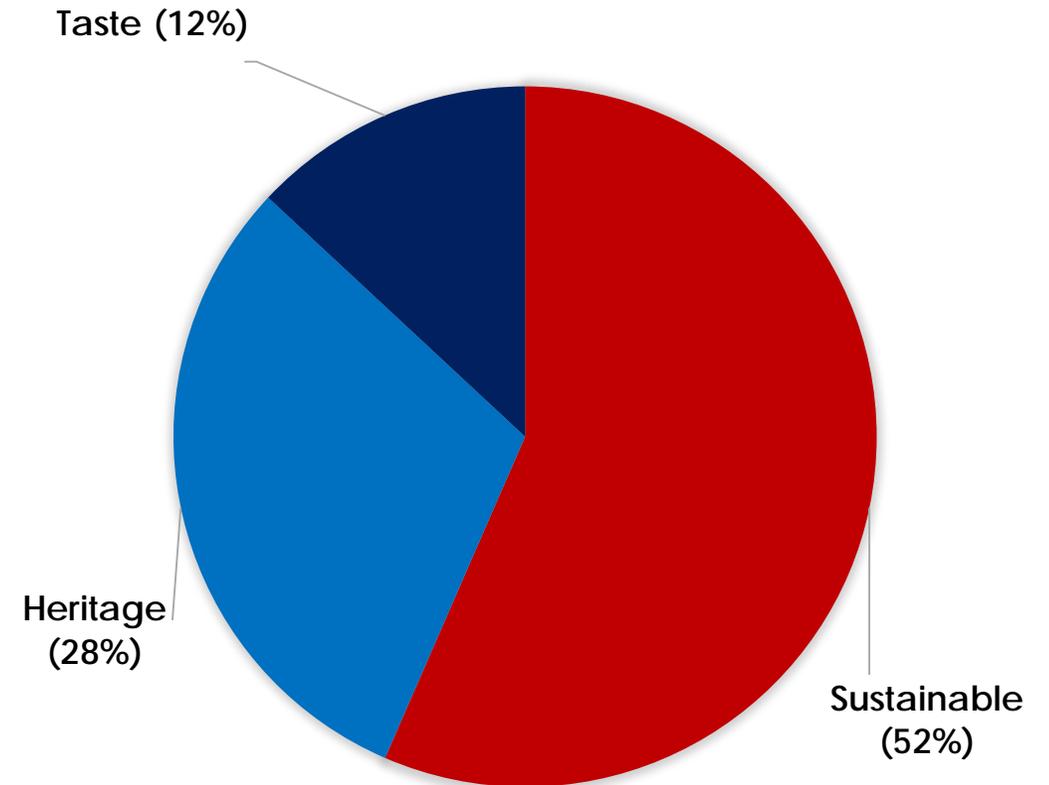
Prior Knowledge



Perceptions

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

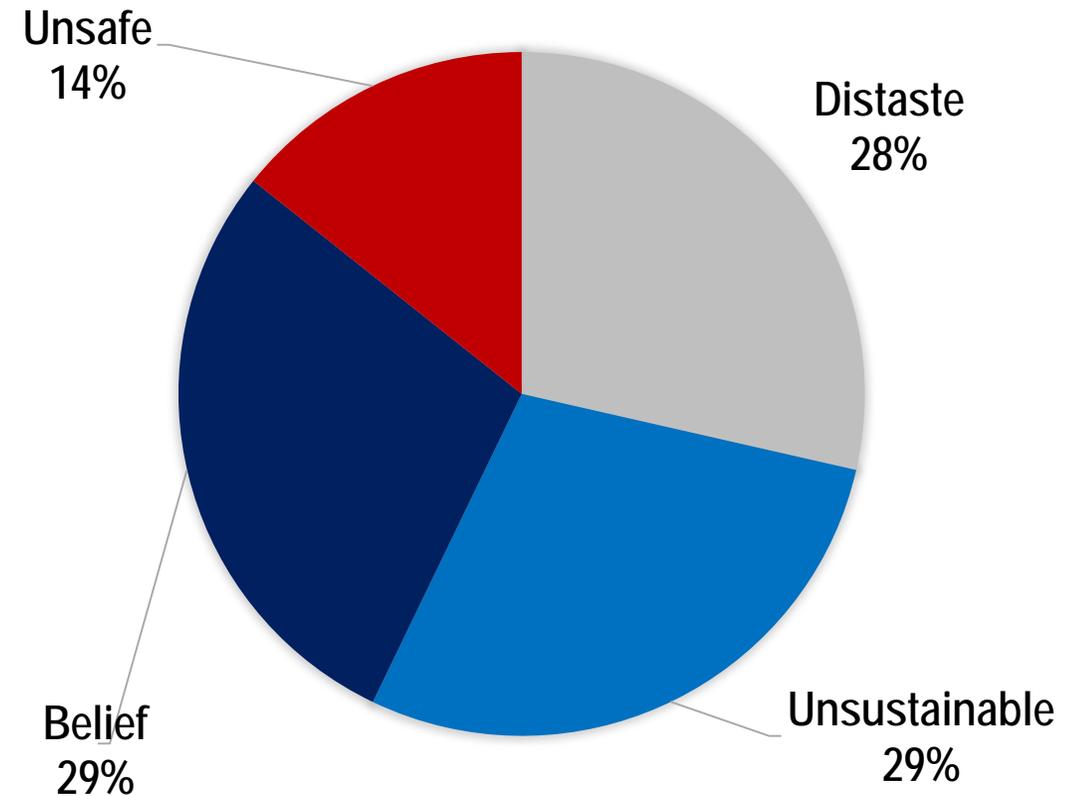
POSITIVE PERCEPTIONS



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

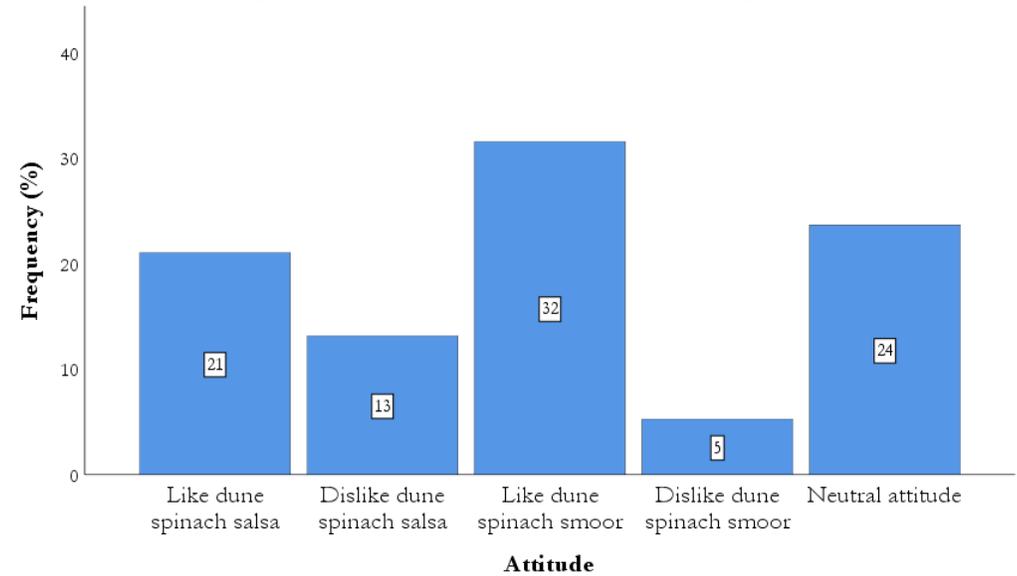
Negative perceptions



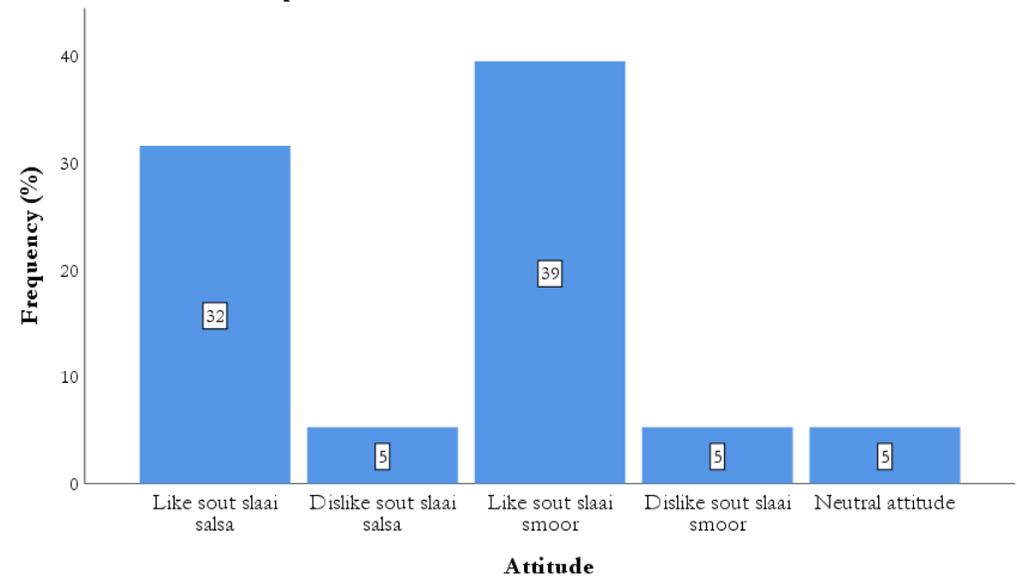
Acceptability

- ▶ 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 $p = 0.092$

Respondents Attitude to Texture of Dune Spinach

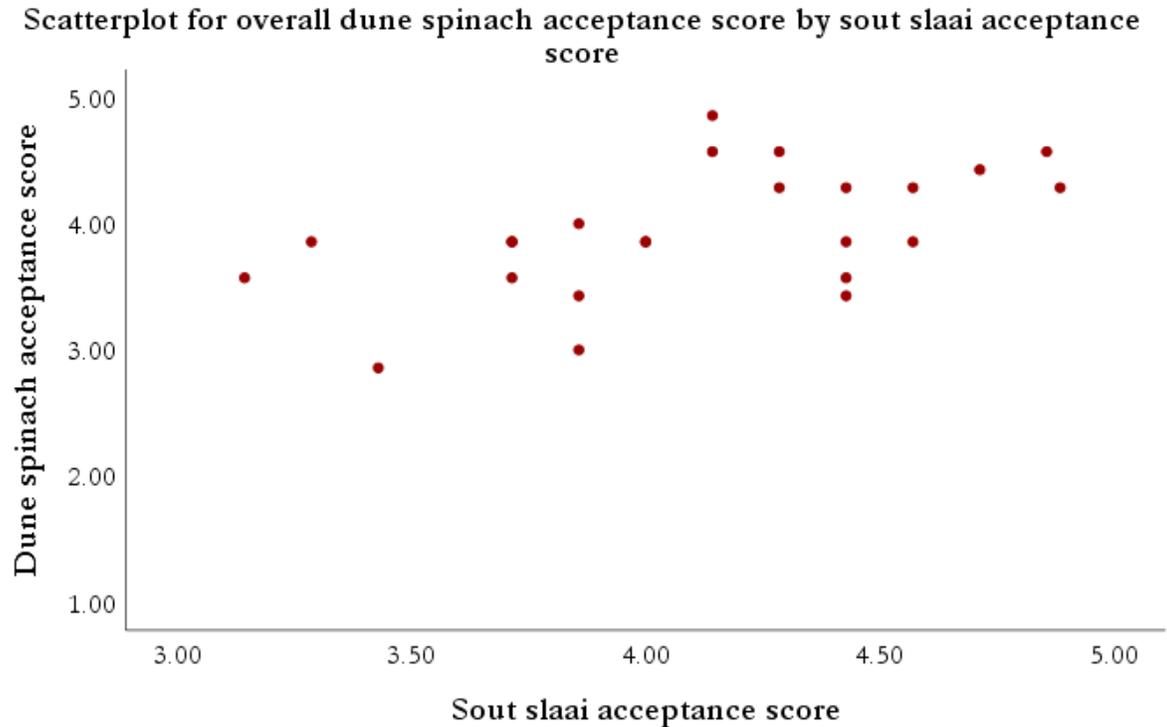


Respondents Attitude to Texture of Sout Slaai



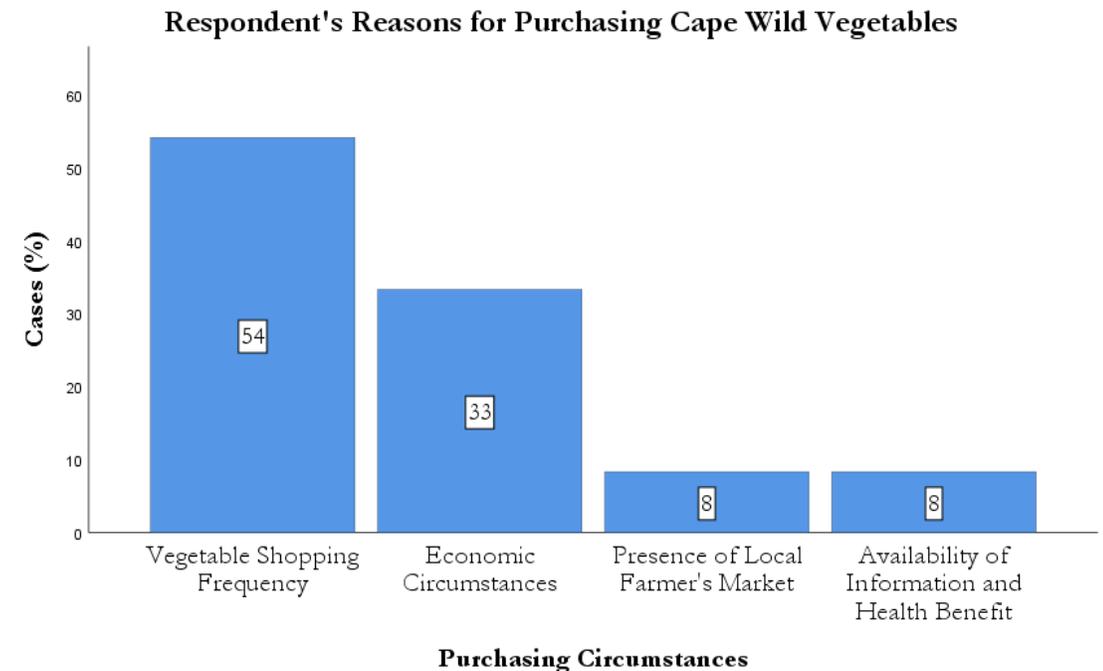
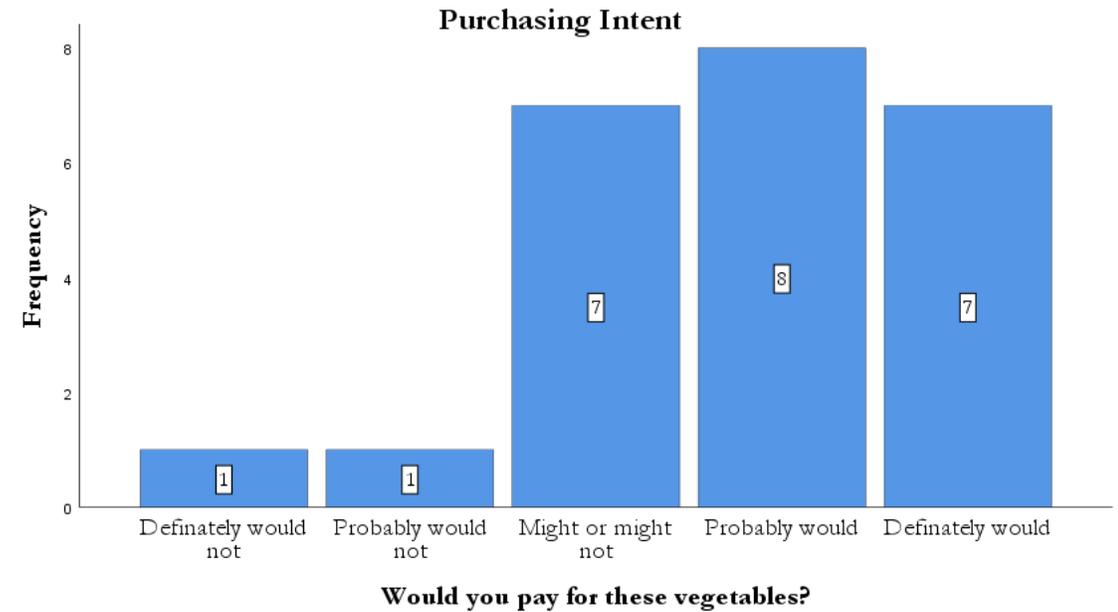
Correlations

- 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, $p = 0.649$



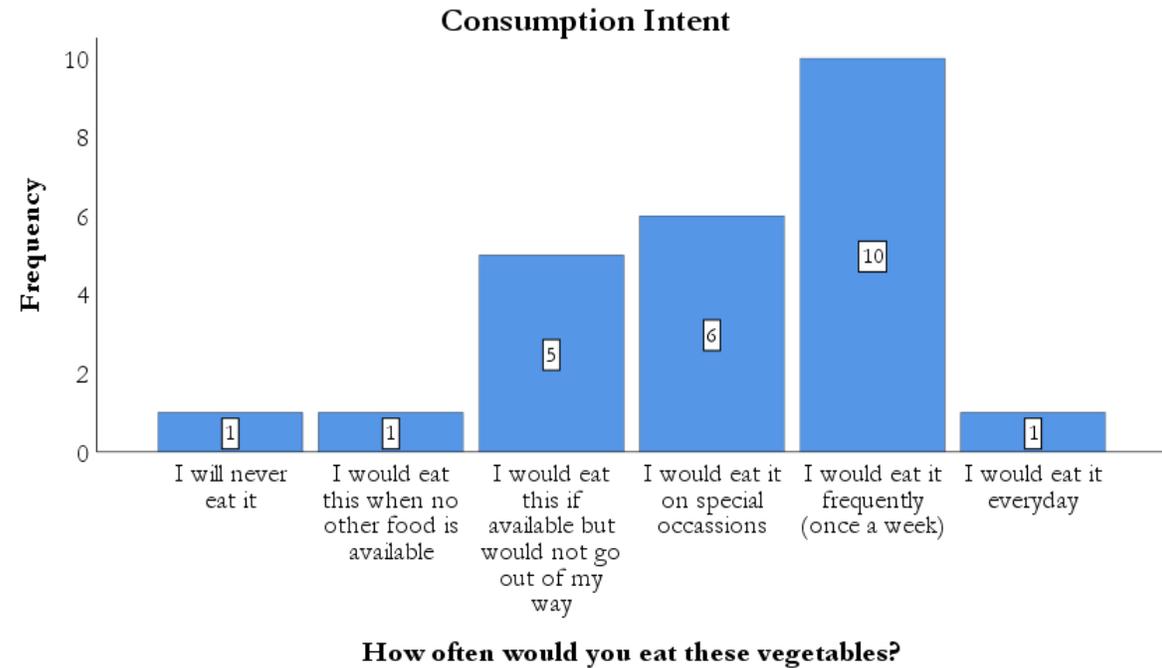
Purchasing Intent

- 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

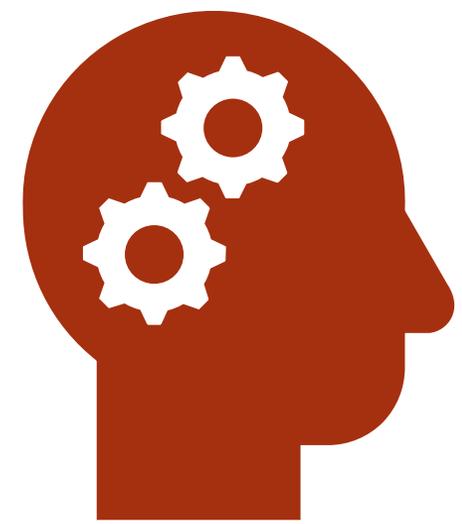


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- No generalisations made as representative of Western Cape population
 - Within study context;
 - Great need for awareness of edible indigenous species of the Western Cape even at Institutional level
 - Cooked versions (*smoortjie*) were better liked 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

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



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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