

Encouraging Indigenous and Heritage Foods to Children and Adolescents

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The SA Nutrition Paradox

1 in 5

children under
5 stunted

9% - 21%
(2000 - 2022)

Overweight
5-9 year old

40%

Kj from ultra-
processed (Adults)

It is a food quality and system problem.

Answer: Indigenous & Heritage Foods



- **Nutritious**
- **Affordable**
- **Culturally relevant**
- **Climate-resilient**

Sorghum

Sorghum bicolor (Mabele)

- ▶ Fermentation - nutrient bioavailability
- ▶ B-Vit, Fe, Mg, Zn, protein -  than maize
- ▶ Dietary fibres
- ▶ Polyphenols - more in red
- ▶ Gluten-free
- ▶ Porridge, baking, flapjacks

Stefoska-Needham A. (2024). J Food Sci, 89:A30-A41.

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Amaranth Leaves

Amaranthus spp. (Thepe/ Imbuya)

- ▶ Thepe/ imbuya (11- 17 types)
- ▶ +100 wild leaves (morogo/umfino)
- ▶ Protein: 23 g/kg  than most leafy vege
- ▶ Dietary fibre: 1-2 g / 100g
- ▶ K, Ca, Mg, Fe, Zn -  than spinach & kale
- ▶ Vitamin C
- ▶ Phytonutrients pigments

Sarker U et al. (2020). Sci Rep, 10:1336.

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Amadumbe (Taro)

Colocasia esculenta

- ▶ Staple of rural KZN and EC
- ▶ Protein: ~4.5-5% (DW) -  than potato
- ▶ Fibre
- ▶ Mucilage - prebiotic
- ▶ Low GI than sweet potatoes
- ▶ Boiling: reduces anti-nutrients by 40-100%

McEwan R et al. (2014). Afr J Food Sci, 8(5):286-291.

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Cowpeas

Vigna unguiculata (Dinawa)

- ▶ Protein 20-30 g/100g (dry)
- ▶ Fe, Zn, K and B-vitamins
- ▶ Antioxidant, anti-inflammatory & anti-diabetic bioactivity
- ▶ Leaves are morogo/imfino
- ▶ Long shelf-life

Jayathilake C et al. (2018). J Food Sci Technol, 55(2):423-436.

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Marula Nuts

Sclerocarya birrea (Dikgeru)

- ▶ Protein
- ▶ Oleic acid: anti-inflammatory
- ▶ Ca, Fe, Mg, Zn
- ▶ Vitamin B's, C and E
- ▶ Antioxidant, antimicrobial & anti-inflammatory
- ▶ Indigenous to + 29 African countries - N,S and E

Africa



Chauke H et al. (2025). S Afr J Bot, 179:188-197.

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Mopani Worm

Gonimbrasia belina (Nato/ Madora)

- ▶ Caterpillar
- ▶ Protein: 49-65% (DW)
- ▶ Iron 19.0 mg/100g (DW) -  than beef
- ▶ Zinc 17.9 mg/100g (DW)
- ▶ Delicacy vs disgust (aversion)
- ▶ Insects - Sustainable protein

Matiza Ruzengwe F, et al (2023). J Insects Food Feed. Aug 27;9(9):1187-1197

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Think of the last child you saw who refused to eat vegetables. The advice was correct. But there was a question nobody asked. 'Has this child ever been given the chance to interact with the food first — before anyone asked them to eat it?'

The Paradigm Shift:

*Children Learn Through Senses First,
Cognitive Understanding Follows*

The Multi-Sensory Sequence

Senses are sequential and integrated:

- 1** SMELL Detected from across the room
- 2** VISION Confirms what nose predicted
- 3** TOUCH Physical investigation
- 4** SOUND Crunch
- 5** TASTE Final validation

Each sense either builds acceptance or compounds rejection

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The Sound & Chewing Dimension

Complete the sensory picture:

Builds acceptance or compounds rejection

- **SOUND** Crunch of nuts — Enjoyed by some children. Freshness
- **CHEWING** Chewing releases flavour: hold your nose, release mid-chew to feel flavour 'appear'
- **TEMP.**
 - Changes texture
 - Eating with hands informs what to expect before you taste

Taste Signals: Evolution & Practice

Why the brain accepts or rejects each taste — and indigenous foods to use

TASTE	EVOLUTIONARY FUNCTION	INDIGENOUS FOODS
SWEET	Energy — innately preferred	amadumbe, sorghum, fruits
SOUR	Potential spoilage warning	baobab, fermented milk & grains
BITTER	Poison warning — innately rejected, can be overcome	morogo/ umfino

Taste Signals: Evolution & Practice

Why the brain accepts or rejects each taste — and indigenous foods to use

TASTE	EVOLUTIONARY FUNCTION	INDIGENOUS FOODS
SALT	Essential mineral	small amounts reduce bitterness
UMAMI	Protein signal (glutamate)	cowpeas, groundnuts, mopani

Move children from ‘I like it / I don’t like it’ to naming the taste, flavour and sense

Positive Cascade: Sweet (Orange)

- ✓SMELL: Citrus aroma → anticipation
- ✓VISION: Bright orange → sweet promise
- ✓TOUCH: Juicy, smooth → pleasure
- ✓SOUND: 'Yum!' → celebration
- ✓TASTE: Delivers on every promise

Amadumbe, Marula, Sorghum - sweet-sour-bitter-nutty profiles teach children to find the sweet within complexity

RESULT:

All senses say YES

Trust built through sweet → willingness to try bitter

Negative Cascade: Bitter (Morogo)

- X SMELL: Grassy → warning
- X VISION: Dark green → danger
- X TOUCH: Slimy → rejection
- X SOUND: Chewing → negativity
- X TASTE: Confirms every fear

RESULT
Each sense builds
resistance

Logical rejection based
on consistent negative
information

**Food neophobia peaks at 2-6 years
(evolutionary toxin protection)**

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The Practical Revolution:

Interrupting the Negative Cascade

Strategy 1: Reverse Each Sensory Barrier

SMELL	Cook gently	<i>Reduce bitter compounds</i>
VISION	Mix with bright veg	<i>Reduce dark green overwhelm</i>
TOUCH	Squeeze, add acid	<i>Reduced mucilage</i>
SOUND	Smooth, cook	<i>Create positive associations</i>
TASTE	Protein, acid, salt, fat, umami	<i>Mask bitterness</i>

Start with ONE barrier. Progress gradually.

Strategy 2: Progressive Exposure (No Pressure)

- W 1: SMELL** Child smells while you cook. Talk about it. No eating.
- W 2: TOUCH** Child washes morogo. Discuss who loves it. No eating.
- W 3: TASTE** Offer 50/50 mix on plate. Celebrate any contact.
- W 4: INCREASE** Slowly increase ratio. Expect 10-15 exposures.
Regressions normal.

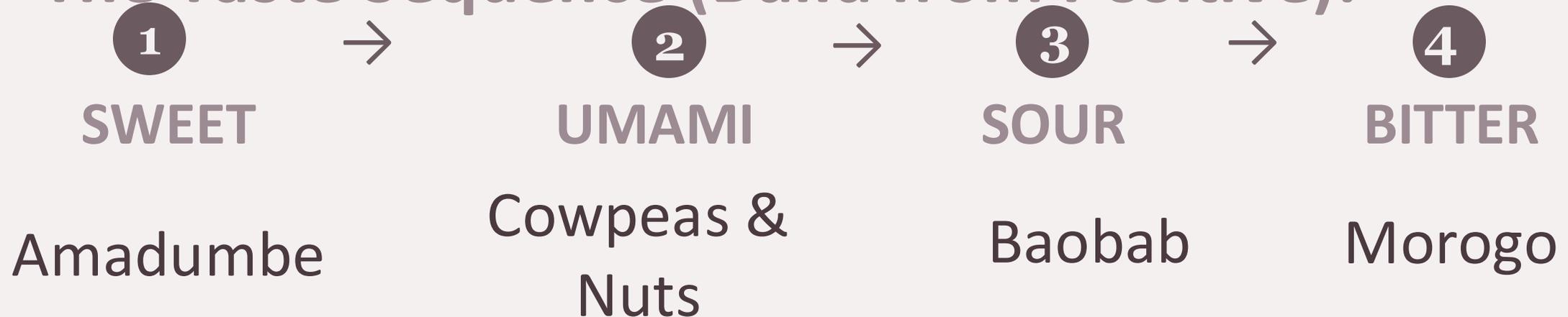
Strategy 3: Flavour Bridging & Taste Progression

Build trust through familiar → heritage transitions:

- Maize → 50% sorghum & 50% Maize → 100% sorghum
- Spinach → 50/50 morogo → 100% morogo
- Potato → Potato + amadumbe → 100% Amadumbe

Strategy 3: Flavour Bridging + Taste Progression...

The Taste Sequence (Build from Positive):



Document progression.

Celebrate: 'You're eating Gogo's food!'

Strategy 4: Mixing, Temperature & Shared Feast

- 1 MIXING** Layer flavours: morogo + nut paste (umami masks bitter), baobab + honey (sour balances sweet)
- 2 TEMP.** Warm vs. cold — heat enhances flavour and tastes; cold masks bitterness.
- 3 SPICE** Introduce heat gradually — a pinch of chilli in cowpea stew teaches the spicy signal without overwhelming

Strategy 4: Mixing, Temperature & Shared Feast

- 4 FLAVOUR MAP** Children document discoveries: build a class flavour map of indigenous foods by taste and temperature
- 5 SHARED FEAST** Culminating activity: a communal meal of foods explored across the programme — cook, share stories, celebrate

**‘Every food on this table is something you once only smelled.’
— The shared feast is the proof of learning**

Adapting Sensory-First by Age and Stage

*Tailoring Indigenous Food Introduction Across
Childhood & Adolescence*

6–12 Months

The Complementary Feeding Window

The Window

- Most sensitive period for flavour learning
- Accepts novel tastes more readily than any later stage
- Gut microbiome shaped by early food exposure
- Missing this window = harder acceptance later

6–12 Months

The Complementary Feeding Window

Indigenous Foods

- Amadumbe - mash, mix with other vegetables
- Sorghum/ Millet - ferment, add milk
- Cowpeas - mash and add to starches
- Morogo — introduce gradually

6–12 Months

The Complementary Feeding Window

How to Introduce

- Smooth → thicker → lumpy
- Mix with breast milk or formula
- Offer same food 8–15 times before judging rejection
- Introduce one new food every 3–5 days

Senses open the door — nutrition follows. Taste is learned, not fixed.

The grimace is normal — keep going.

1–5 Years · ECD & Early Childhood

— Building Familiarity: Senses Before Health

What's Happening

- Food neophobia peaks ages 2–6 (evolutionary protection)
- 25% are super-tasters
- Colour, shape & texture drive acceptance as much as taste
- Caregiver behaviour is most powerful — no food is inherently 'bad'

1–5 Years · ECD & Early Childhood

— Building Familiarity: Senses Before Health

Indigenous Foods

- Cowpea stew — familiar bean texture
- Sweet potato — bright colour, sweet taste
- Groundnuts — paste
- Mabele porridge + fruit
- Introduce morogo mixed 50/50 with spinach

1–5 Years · ECD & Early Childhood

— Building Familiarity: Senses Before Health

Strategies

- Involve in simple prep: washing, stirring, mashing
- Colourful plates — make it visually exciting
- Storytelling: ‘This is what Gogo ate as a child’
- Positive role modelling — eat it yourself with pleasure
- Avoid pressure: offer without forcing, celebrate any contact

ECD centres shape lifelong taste memory — menus are the most powerful lever at this stage (Nepfumbada et al., 2021)

1–5 Years · ECD & Early Childhood

— Building Familiarity: Senses Before Health

Sensory-First Approach

- Smell first (week 1–2), then touch (week 3–4)
- Flavour bridge: spinach → 50/50 morogo → pure morogo
- Add umami/fat to reduce bitterness
- Keep portions tiny — reduce overwhelm
- Garden exposure reduces neophobia — build nutrition after senses

ECD centres shape lifelong taste memory — menus are the most powerful lever at this stage (Nepfumbada et al., 2021)

6–12 Years · Primary School Age

— Culture, Peers & Identity

What's Happening

- Peer influence overtakes parental influence
- Cognitive capacity to understand WHY — link to maths, geography, science & language
- School meals = 30–50% of daily intake
- Food acceptance driven by geography, culture, language, science

6–12 Years · Primary School Age

— Culture, Peers & Identity

Indigenous Foods

- Sorghum in school-cooked dishes
- Legume patties
- Mopani worm — reframe as protein powerhouse
- Morogo — now more accepted with bitter adaptation
- Baobab smoothies
- Cowpea and amadumbe stews

6–12 Years · Primary School Age

— Culture, Peers & Identity

Strategies

- Cultural significance & history of the food
- Food geography
- School gardens with indigenous plants
- Group cooking — peer influence
- Sport: ‘sorghum = slow-release energy’
- Sensory education first — then nutrition literacy

13–18 Years · Adolescence

— Identity, Autonomy & Ethics

What's Happening

- Identity formation: food geography — what and why
- Acceptance driven by identity, autonomy, performance, belonging
- Peer and social media influence
- Susceptible to body image messaging

13–18 Years · Adolescence

— Identity, Autonomy & Ethics

Indigenous Foods

- Amaranth — ‘ancestral superfood’ framing
- Cowpeas — planet’s lowest-emission protein
- Sorghum — gluten-free performance grain
- Marula — African antioxidant, beauty food
- Mopani worm — insect protein, sustainable protein, novel uses

13–18 Years · Adolescence

— Identity, Autonomy & Ethics

Strategies

- Emphasise identity, sustainability & ethics
- Recipe creation autonomy — let them innovate
- Frame as ancestral biohacks & performance enhancers
- Link to body image positivity, not weight control
- Celebrate what has been eaten — build pride in dietary variety

13–18 Years · Adolescence

— Identity, Autonomy & Ethics

What Works

- Peer-led cooking & sharing on social media
- Connect to sport/academic performance goals
- Honour their scepticism — share the science
- Cultural pride: connect food choices to identity, belonging and performance

Frame it right: not 'eat your vegetables' — but 'your ancestors' food is the original performance nutrition'

Creating Indigenous Food Diet

- ✓ ECD stakeholders (Sekhukhune District, Limpopo)
- ✓ Created an indigenous food diet using community-based participatory research:
- ✓ Ditokomane (Ground nuts)
- ✓ Oranges
- ✓ Mabele (Sorghum) porridge
- ✓ Dithotse (Pumpkin seeds)
- ✓ Dinawa (Beans) - ranked highest

(Nepfumbada et al., 2021)

Indigenous Food Education

2 rural primary schools, Vhembe District, Limpopo.

One-group: pre- and post-test

172 children, ages 9-14, Grades 5 & 6

3 lessons in Xitsonga and TshiVenda:

- healthy eating habits
- dietary diversification
- health benefits of indigenous foods

(Mbhatsani et al., 2017)

Sensory Acceptance

Farm community primary schools - North West, SA

- 29 parents (*focus groups*) + 98 children aged **7–10**
- Sensory evaluation of indigenous leafy vegetables:
 - Amaranth leaves
 - Pumpkin leaves
 - Spider plant (Lerotho, African cabbage)
- Children rated - **acceptable for colour, smell and taste**

Key finding: Barrier is exposure, not palatability.

(van der Hoeven et al., 2013)

Evidence: SA & International Studies on Indigenous Food Interventions

Key findings:

**Structured education and community co-design both drive
indigenous food uptake.**

**No S.A. study has yet tested the sensory-first sequence — this is
the missing research**

Your Practice Shapes Food Memory

- **Clinical Counselling: Stop 'just try it'. Start: 'Smell it first. No pressure.'**
- **Caregiver Education: Teach sensory cascade. 10-15 exposures.**
- **Developmental Guidance: 6-24 months = critical window. Start sweet, progress to bitter.**
- **Cultural Facilitation: Connect families to elders. Food = identity**
- **Policy Advocacy: School meals = 30-50% of intake. Procurement shapes taste memory.**

**The lunchbox is
where we solve the
nutrition paradox**