Final Report

Food security in remote First Nations communities (Phase 1 – National strategy and consultation)

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Public summary

Many remote Indigenous communities across Australia face serious challenges accessing fresh, healthy, and culturally appropriate food. In some areas, food costs up to 50% more than in cities, and more than 30% of Indigenous Australians in remote regions experience food insecurity. These barriers contribute to poor health outcomes, chronic disease, and reduced life expectancy.

This project explored how Indigenous-led food enterprises can transform local food systems while delivering economic, nutritional, and cultural benefits to remote communities.

About the project: Funded by Horticulture Innovation Australia Limited through the Hort Frontiers Healthy Communities Fund, the project was a partnership between the University of Queensland and the Bushtukka and Botanical Indigenous Enterprise Cooperative (BBIEC). Working closely with the Gooliwana Bana community in Far North Queensland, the team co-designed a community-led food enterprise model centered on a five-acre parcel of ancestral land returned to the community.

What we did: The team used a systems thinking approach, drawing on research literature, community interviews, and participatory workshops to understand the local food system. Together with community members, they mapped food challenges, identified priority crops, including native bushfoods and fresh produce and developed a shared long-term vision for a sustainable local food enterprise and sovereignty. The project produced several important outcomes:

- A visual map of the land and its potential
- A community-defined vision for the enterprise
- A comprehensive systems map showing the drivers, barriers, and opportunities within the local food system

Workshops with industry stakeholders validated the approach and revealed exciting future opportunities in areas such as circular economy practices, capacity building and education programs, and bushfood supply chains.

What happens next: All project findings have been submitted to Hort Innovation and are available to guide future investment decisions. The work will inform the next phase of research, development, and extension, including pilot implementation, crop trials, nutritional analysis, behavioural science work, systems thinking and system dynamics modelling, value chain and economic analysis, Indigenous governance models, and impact assessment.

Why It matters: This project demonstrates a nationally relevant model for Indigenous-led food systems built on respect, local knowledge, and shared innovation. The findings will inform the next stage of research, development, and extension (RD&E), including pilot implementation, crop trials, Indigenous governance models, and impact assessment. The project offers a nationally relevant model for Indigenous-led food systems that promote health, culture, and enterprise in remote Australia.

Keywords: Indigenous food systems, food sovereignty, bushfoods, systems thinking, community enterprise, nutrition.

1. Introduction

1.1. Background and rationale

Remote Indigenous communities across Australia face significant barriers to accessing nutritious, culturally appropriate, and affordable food. Approximately 31% of Indigenous Australians in remote areas experience food insecurity, with food costs often 50% higher than in major cities (Abdul et al., 2024; Lopes et al., 2025). These inequities drive disproportionately high rates of chronic disease, nutrient deficiency, childhood stunting, and impaired cognitive development within Indigenous communities (Abdul et al., 2024; Wittman, 2023). Addressing these systemic challenges requires comprehensive interventions that strengthen both food supply systems and cultural food practices—essential components for achieving the broader objectives of the Closing the Gap initiative (Gall et al., 2024; Wittman, 2023).

In response to this need, Hort Innovation established a strategic partnership through its Hort Frontiers Healthy Communities Fund with the University of Queensland and community leaders from the Gooliwana Bana community in Far North Queensland. This collaboration was designed to co-develop an Indigenous-led food enterprise model that would strengthen food sovereignty, improve access to healthy and culturally appropriate food, and create sustainable pathways for Indigenous economic empowerment. The project builds upon UQ's established partnerships with Indigenous communities, particularly through the Australian Research Council Training Centre for Uniquely Australian Foods and the Bushtukka and Botanical Indigenous Enterprise Cooperative, leveraging decades of collaborative research experience to ensure culturally responsive and sustainable outcomes (Lopes et al., 2025; Abdul et al., 2024).

Central to the initiative is the return of a five-acre parcel of ancestral land to the Gooliwana Bana people. This returned land represents both a powerful symbol of cultural reconnection and a practical foundation for developing a community-controlled food enterprise that integrates traditional ecological knowledge with contemporary economic development. Community members envision the site as a place for growing native and introduced crops, harvesting traditional foods, sharing knowledge across generations, and creating new learning opportunities—all designed and controlled by the community for the community's benefit (Gall et al., 2024; Wittman, 2023).

1.2. Significance for industry and future investment

This project represents a significant advancement for the Australian horticulture sector by providing a replicable proof-of-concept for Indigenous-led food enterprise development. The initiative demonstrates how systems thinking, group model building, and place-based food systems can be implemented with Indigenous communities to achieve integrated social, economic, nutritional, and cultural outcomes that extend beyond traditional agricultural metrics. The model developed through this project delivers several key innovations for industry stakeholders:

- ❖ **Strategic crop identification:** Systematic assessment of priority crops—including native bushfoods and market-oriented vegetables—based on integrated analysis of cultural significance, nutritional value, ecological suitability, and commercial viability.
- ❖ **Community-defined impact frameworks**: Articulation of long-term outcomes developed through extensive community consultation, providing clear guidance for research, development, and extension (RD&E) planning and enabling more targeted industry partnerships.
- ❖ **Systems-based investment tools:** Development of detailed systems maps and value propositions that inform strategic investment decisions, funding proposals, and enterprise incubation pathways for similar initiatives.
- ❖ **Participatory co-design methodology:** Demonstration of how meaningful community engagement can strengthen stakeholder trust, improve technology and practice adoption, and ensure long-term project sustainability.

Crucially, this project addresses a significant knowledge gap within the horticulture sector, including how to authentically engage with remote Indigenous communities in ways that honour cultural authority and traditional knowledge systems while creating genuine opportunities for local economic development. By embedding Indigenous leadership and knowledge systems from project inception, the initiative provides a framework for industry partners to move beyond extractive research models toward genuine collaborative partnerships. The project's comprehensive outputs, including a validated food enterprise model, detailed system maps, evidence-based crop priorities, and community-articulated vision statements—position Horticulture Innovation Australia Limited to make strategically informed investment decisions about future RD&E. These evidence-based tools directly support the objectives of the Hort Frontiers Healthy Communities Fund while contributing to national policy priorities around food security, sustainable regional development, and increased Indigenous participation in agricultural value chains.

2. Methodology

The project was implemented between April and September 2025 through a staged, participatory process that integrated systems thinking approaches (Meadows, 2008; Hovmand, 2014) with participatory group model building (GMB) workshops (Vennix, 1996), complex systems mapping, and Indigenous-led design with culturally embedded knowledge exchange and development (Bond et al., 2024; Jarvis, 2021). The methodology combined several key activities:

- ❖ **Literature review:** The team examined 880 records from academic databases and grey literature to understand successful models, documented challenges, and key factors influencing Indigenous agribusiness sustainability.
- ❖ **Community workshops:** Three Indigenous-led engagement workshops brought together 16 Gooliwana Bana community members, including Elders, Traditional Owners, women, youth, and local service providers. Through these sessions, participants collectively explored their food system's complex dynamics, identified barriers and opportunities, and developed a comprehensive vision for the Gooliwana Bana Food Enterprise. Key activities included historical reconstruction and cultural mapping of the five-acre returned land, crop prioritization, development of a community value proposition, and Indigenous-led food enterprise system mapping.
- ❖ **Industry validation:** Community perspectives were cross validated with industry stakeholders, including representatives from horticulture, Indigenous agribusiness, health sectors, and research organizations. This validation process ensured the enterprise model was both culturally grounded and commercially viable, creating a critical bridge between the scoping study and future scaled investment.

The project's methodology was anchored in Indigenous research principles that prioritise community ownership, cultural protocols, and reciprocal knowledge exchange. The Gooliwana Bana community was recognized as both research partners and primary beneficiaries, ensuring all activities built local capacity while generating actionable outcomes for food enterprise development. Central to this approach was participatory group model building—a structured methodology that enables diverse stakeholders to collectively examine complex problems and co-design solutions. This facilitated the integration of traditional ecological knowledge with contemporary business planning while maintaining community agency throughout the process.

2.1. Ethics, cultural protocols, and data sovereignty
All research activities were conducted under the University of Queensland's Human Research Ethics approval and adhered to the AIATSIS Code of Ethics for Aboriginal and Torres Strait Islander Research (2020). The project prioritised Indigenous Cultural and Intellectual Property (ICIP) rights, ensuring that all community knowledge, visual outputs, and narrative materials developed with community members and returned for validation and consent before finalisation.

Cultural protocols established with Gooliwana Bana Elders guided all engagement activities, ensuring respectful interaction with traditional knowledge and meaningful community control over research processes. Activities

incorporated culturally embedded methods, including land-based storytelling, intergenerational dialogue, and values mapping, positioning cultural authority as foundational to every project stage. Data sovereignty principles ensured that the Gooliwana Bana community retained ownership and decision-making authority over all data generated through the project. This included control over how information is stored, shared, and used in future research or policy development, reinforcing the community's right to govern their own knowledge systems and determine how their story is told.

3. Results and discussion

3.1. What past research shows

The systematic literature review identified 58 peer-reviewed studies examining food security challenges and interventions in Indigenous Australian communities. This body of evidence provides critical insights into the systemic barriers affecting remote Indigenous food systems and offers a strong foundation for developing targeted, evidence-based interventions through the Hort Frontiers Healthy Communities Fund.

3.1.1. General overview

Publication trends and research momentum: Analysis of publication trends reveals growing research attention to Indigenous food security over the past decade, with notable increases in 2014-2015, 2018, and particularly 2023-2024 (Figure 1). The surge in recent publications (2023-2024) reflects heightened policy and industry focus on Indigenous food systems, driven by national priorities such as the Closing the Gap initiative, increased recognition of food sovereignty as a determinant of health, and growing investment in Indigenous-led economic development. This research momentum signals strong alignment between academic inquiry, policy priorities, and community needs, creating an opportune environment for scaled investment in Indigenous food enterprises.
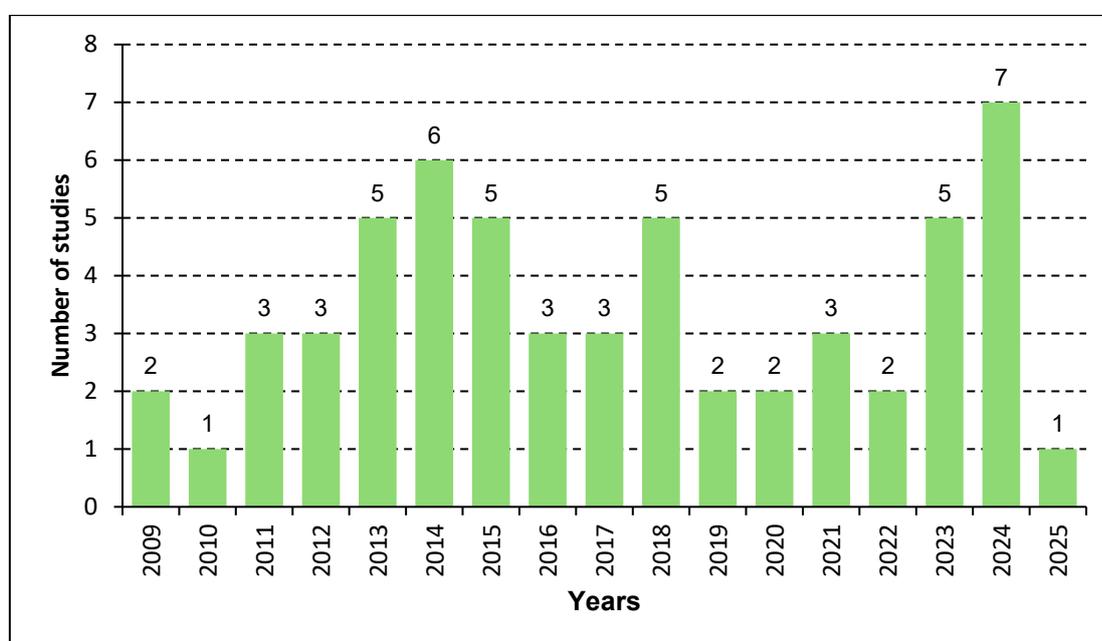
Figure 1: Publication trends in Indigenous food security research (2009-2025)

Geographic distribution and regional priorities: Geographically, the evidence base concentrates heavily in the Northern Territory (n=24, 41% of studies) and Queensland (n=14, 24% of studies), with South Australia (n=7, 12%) also well-represented (Figure 2). Western Australia, New South Wales, and Victoria each contributed five studies (9% each). This geographic distribution directly aligns with the location of remote and very remote

Indigenous community populations where food security challenges are most acute, including highest food costs, greatest distances from fresh food supply chains, and most significant health disparities.

The concentration of research in northern Australia provides a particularly strong evidence base for industry engagement in these regions. For horticultural businesses and supply chain operators, this indicates where market development opportunities exist alongside documented community need. The Northern Territory and Queensland represent priority investment zones where research findings can be translated into practical interventions with the greatest potential for impact.
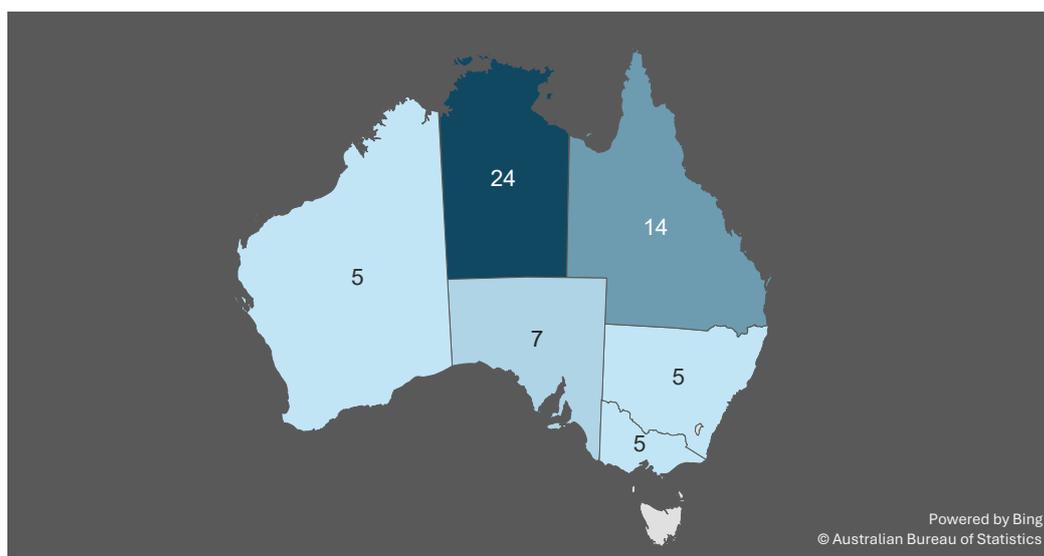

Figure 2. Geographic distribution of Indigenous food security studies across Australia

While the evidence base has grown substantially, important gaps remain. Few studies have examined the commercial viability of Indigenous-led food enterprises over extended timeframes, and limited research exists on the specific horticultural requirements for scaling native food production in remote contexts. Additionally, there is insufficient evidence on how different governance models affect enterprise sustainability, and limited documentation of effective training pathways for Indigenous community members entering horticultural value chains. These gaps represent priority areas for future research, development, and extension (RD&E) investment, particularly through initiatives like the Gooliwana Bana Community Food Enterprise that can generate new knowledge while delivering practical outcomes.

The systematic review establishes that Indigenous food insecurity is well-documented, that effective intervention models exist, and that coordinated, community-led approaches offer the most promising pathway forward. This evidence base directly supports the rationale for investing in Indigenous-led food enterprises that integrate horticultural production, cultural knowledge, and local economic development.

3.1.2. Key challenges and opportunities identified in literature

The systematic review reveals that food insecurity in remote Indigenous communities is fundamentally a systems problem (Figure 3), not simply a matter of individual choice or nutrition knowledge. Thirteen interconnected barriers were identified—ranging from high prices and low incomes, through transport constraints and supply chain fragility, to household infrastructure gaps and policy weaknesses. Interventions targeting single factors consistently show limited impact unless embedded within coordinated, community-led strategies addressing multiple barriers simultaneously.
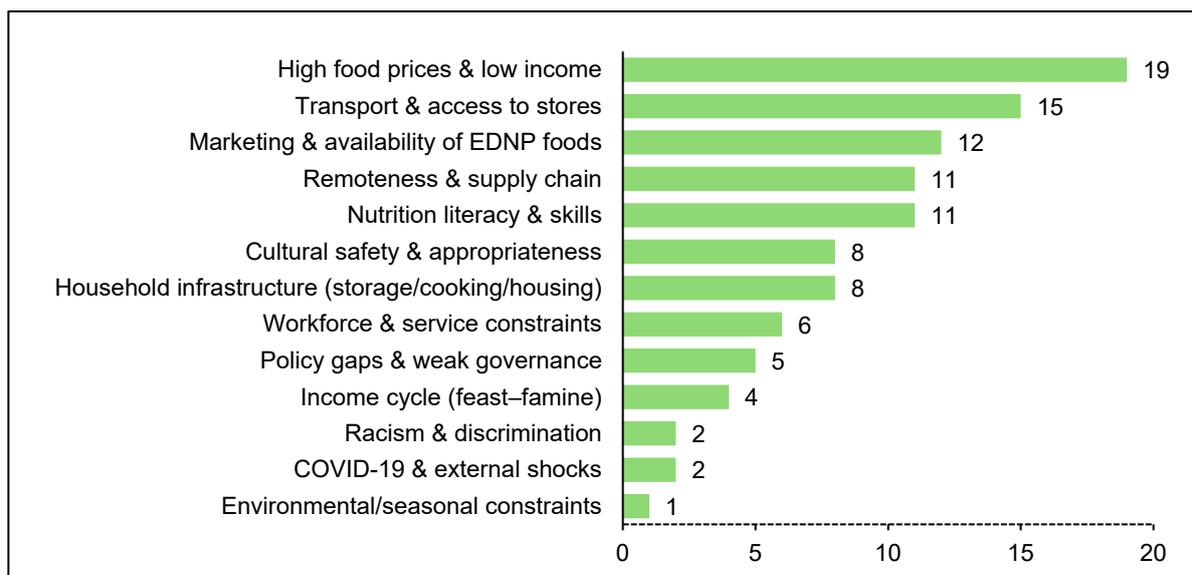
Figure 3. Challenges and opportunities for Indigenous Australian communities to gain good access to food

Market access and commercial viability: Affordability remains the primary barrier (Figure 3), with healthy diets requiring up to 39% of household income in remote areas. However, price discount trials (20% reductions on fruit and vegetables) successfully shifted purchasing patterns toward healthier options, proving market responsiveness exists when economic barriers are lowered. This indicates significant untapped demand that could be activated through targeted subsidy mechanisms, freight cost-sharing arrangements, or local production through community-based enterprises like the Gooliwana Bana model.

Cultural appropriateness determines adoption: Cultural safety and appropriateness emerge as cross-cutting factors influencing every barrier identified in Figure 3. Programs that integrated native foods with introduced crops, used community-controlled governance structures, and employed local staff demonstrated the strongest outcomes. For horticultural businesses, successful market penetration requires genuine partnership with Indigenous communities—incorporating traditional food knowledge, respecting governance protocols, and ensuring First Nations leadership in enterprise design.

Infrastructure gaps constrain market development: Figure 3 highlights critical infrastructure deficits—household storage, transport access, and service constraints—that prevent households from purchasing and storing fresh produce even when affordable. This presents clear investment priorities: cold chain logistics, distributed storage facilities, and household-level infrastructure support are prerequisites for expanding fresh produce markets in remote regions.

3.1.2. What review means for future research and investment
The research evidence points to three priority areas that should guide future work in Indigenous food systems:
- First, we need better understanding of how to make fresh produce affordable for remote communities while ensuring suppliers can operate sustainably—this includes exploring subsidy programs, freight cost-sharing, and innovative pricing models.
- Second, more work is needed to identify which crops grow best in remote conditions and align with cultural food preferences, including trials of native bushfoods and climate-resilient varieties.
- Third, successful solutions must take a whole-system approach that connects multiple elements—local food production, community store policies, workforce training, and household infrastructure—rather than addressing just one piece of the puzzle.

The evidence from the systematic review strongly supports co-designed, Indigenous-led enterprise models as the pathway to sustainable market development. Horticultural businesses positioned to work in genuine partnership with remote communities—respecting cultural authority, sharing governance, and building local

capacity will be best placed to develop viable, long-term supply relationships that deliver both commercial returns and meaningful improvements in community food security.

3.2. Community engagement outcomes

3.2.1. Envisioning the desired future: Gooliwana Bana community food enterprise

The Gooliwana Bana community collaboratively developed a vision for their food enterprise that goes far beyond growing food. They envision a thriving, self-sustaining enterprise that includes community-led food production with bush tucker gardens, cropping areas, and aquaculture systems. The vision incorporates culturally safe spaces such as a café and kitchen, art studios, cold storage, a nursery, and a history and storytelling centre where cultural identity is embedded in daily operations. Economic opportunities through food processing, packaging, and bushfood tourism form another key element, alongside knowledge sharing where children, Elders, and community members learn together. The enterprise will also create connections with visitors through tourism and local produce promotion, all while maintaining cultural authority and respect. Environmental stewardship remains central, with water storage, solar power, and land-based learning that reinforces caring for Country.

> A Food Enterprise where Gooliwana Bana community grow, harvest, share, are economically empowered and consume food in ways that uphold our Cultural Practices, connect with the wider community, protect Country, and pass our knowledge to future generations

The results underscore the community's aspiration for a holistic food enterprise that transcends commercial interests, focusing instead on fostering cultural identity, intergenerational learning, and environmental care. This vision acknowledges the need for integrating traditional knowledge with sustainable business practices to ensure long-term viability and community wellbeing.

Additionally, the results highlight significant implications for horticultural businesses and industry stakeholders. The model demonstrates how Indigenous leadership, and cultural values can underpin successful enterprise development, promote culturally appropriate practices, while opening pathways for market participation and local economic resilience. This approach invites investment partners to engage in culturally respectful collaborations that support place-based development, circular economy principles, and sustainable food systems. For future research and related projects, the vision offers a blueprint for Indigenous-led enterprise models that balance cultural integrity with practical infrastructure and economic goals. It points to opportunities for capacity building, youth engagement, and innovative partnerships that can scale within and beyond remote Indigenous communities.

What success looks like: value proposition: The community defined five long-term outcomes: increased community food sovereignty and security; improved Indigenous health and nutrition through fresh, local food access; enhanced traditional food knowledge and cultural identity supporting intergenerational learning; strengthened local enterprise skills and community capacity; and sustainable local economic opportunities through bushfood cultivation, value-adding, and market access. These outcomes provide a clear framework for future investment, showing how the enterprise will deliver cultural, health, environmental, and economic benefits simultaneously.

Results indicate the community expects the enterprise to restore cultural authority and foster intergenerational learning while delivering tangible health and economic benefits. These long-term outcomes provide a strategic foundation for future investment by industry, research, and government partners. They highlight integrated, Indigenous-led solutions that combine nutrition, economic resilience, cultural revitalisation, and land stewardship. For horticultural businesses, RD&E partners, and policymakers, these outcomes offer a clear, community-driven framework of investment priorities. Key areas such as infrastructure development, market access, training, capacity building, and enterprise incubation are identified where partnerships can add

significant value. This framework also serves as a strategic communication tool to engage funders and stakeholders in supporting an Indigenous-led agrifood transformation model. The approach presents a replicable method for embedding social and cultural outcomes into food enterprise development, fostering scalable Indigenous economic empowerment and social resilience in remote regions.

Industry validation and support: In a final validation workshop, the community's vision was shared with key industry, education, research, and policy stakeholders to test feasibility and identify support opportunities. Rather than challenging the community's direction, experts enthusiastically validated the approach and contributed valuable insights to strengthen implementation pathways. Stakeholders identified concrete opportunities in education and youth engagement through school partnerships and curriculum integration; horticulture and circular economy applications including regenerative crops and soil remediation; cultural storytelling and product branding that honours traditional knowledge; micro-investment approaches starting with pilot projects to demonstrate viability; and technical partnerships spanning horticulture expertise, health and nutrition guidance, enterprise logistics, and supply chain development. Critically, all stakeholders acknowledged that while they could provide essential technical and financial support, leadership must remain firmly community-driven, with the Gooliwana Bana people maintaining control over decision-making, cultural protocols, and the pace and direction of development. This validation confirmed that the project aligns strongly with sector priorities across multiple industries and that genuine, respectful partnerships exist to support the community's vision while honouring their cultural authority and self-determination.

3.2.2. What community engagement means for future research and investment

The participatory workshops produced a culturally grounded, commercially viable, and strategically clear model for Indigenous food enterprise development that provides robust foundations for scaled investment. The community has defined what they want to achieve, articulated how they want to proceed, and identified the specific support they need to succeed. This comprehensive planning provides a strong foundation for the next phase of work: turning vision into operational reality through pilot implementation, agronomic crop trials, infrastructure development, workforce capacity building, and strategic partnership cultivation.

Most importantly, this process demonstrates that when Indigenous communities are given the space, resources, and respect to lead their own development processes, they create solutions that are holistic, sustainable, and deeply connected to place, culture, and wellbeing. The Gooliwana Bana Community Food Enterprise model represents more than an agricultural development project—it is a pathway to cultural revitalization, economic self-determination, and community healing that honors the past while building toward a resilient future. The clarity of vision, depth of community engagement, and strength of stakeholder validation all indicate genuine potential for transformative impact, not only for this specific community but as a nationally relevant model that can inform Indigenous-led food systems development across remote Australia.

4.Outputs

Table 1 outlines the key outputs delivered throughout the project, aligned with objectives and milestones established at inception. Each output has been submitted to Horticulture Innovation Australia Limited, with recommended next steps to support broader dissemination, practical application, and alignment with future research, development, and extension (RD&E) investments. These deliverables collectively provide a robust foundation for the next phase of community-led food system transformation.

Table 1. Output summary

Project Outputs	Output Description	Detail
Program logic & monitoring and evaluation plan	Structured framework linking project activities to intended outcomes, with measurable indicators aligned with Hort Innovation's strategy.	Submitted to Horticulture Innovation Australia Limited. Next step: Adapt summary version for broader stakeholder circulation and integration into future funding proposals.

Comprehensive risk register	Identifies project risks and mitigation strategies to ensure smooth delivery.	Submitted to Horticulture Innovation Australia Limited. Next step: Integrate into long-term planning for any follow-up investments with updated risk triggers and thresholds.
Stakeholder analysis and engagement plan	Strategic engagement plan covering Indigenous communities, policymakers, researchers, and industry stakeholders.	Shared with Horticulture Innovation Australia Limited. Next step: Revisit and refine for Phase 2 to reflect new relationships formed during Workshop 3.
Systematic literature/scoping review and peer-reviewed manuscript	Synthesised evidence from 58 studies to identify best practices, constraints, and research gaps in Indigenous food systems.	Submitted to Horticulture Innovation Australia Limited. Next step: Finalise and submit peer-reviewed article to relevant journal; explore summary publication for industry newsletter.
Interview analysis report	Synthesised insights from key informant interviews on systemic barriers and community aspirations.	Submitted to Horticulture Innovation Australia Limited. Next step: Condense into a stakeholder brief to inform engagement in Phase 2 or other RD&E projects.
Workshop reports (Workshops 1, 2 & 3) with embedded visual maps and graphical recordings	Detailed records of community-led visioning, visual outputs in the form of graphical recordings (arts) from Workshops 2 and 3, including: • a visual map of the 5-acre land across time (past–present–future); • a system-informed vision for the Gooliwana Bana Community Food Enterprise; • a community-developed value proposition framework; • a prioritised crop list (fresh foods, cash crops, and bushfoods); • and hopes, fears, and feedback from industry validation.	Submitted to Horticulture Innovation Australia Limited. Next step: Package for use in future co-investment pitches, visual storytelling, and local training activities.
Validated Indigenous food system map (Causal Loop Diagram)	Final system map highlighting dynamics, leverage points, barriers and enablers in Indigenous food systems.	Submitted to Horticulture Innovation Australia Limited. Next step: Convert into interactive visual and use in stakeholder engagement, investment planning, and training resources.
Final project report & recommendations	Synthesises all findings, offering actionable recommendations and a roadmap for scaling Indigenous-led food systems.	Submitted September 2025. Next step: Prepare a 2-page summary version for community partners and policy stakeholders.

5. Outcomes

The outcomes summarised in table 3 below reflect a refined set of priorities and insights that emerged through deep engagement with the Gooliwana Bana community during the scoping study. While the project initially proposed a set of expected outcomes (see Table 1 of the proposal), the co-design process revealed the need to pivot towards outcomes that better align with community aspirations, cultural context, and on-the-ground feasibility. These revised outcomes now provide a stronger foundation for future RD&E investments through Hort Innovation's Healthy Communities Fund.

Table 3. Outcome summary

Outcome	Alignment to fund outcome, strategy and KPI	Description	Evidence
Increased community food sovereignty and food security	Fund Outcome: Increased access to fresh, healthy food Strategy Priority 1.3: Enhance and safeguard the supply of healthy food	The project enabled the Gooliwana Bana community to articulate their food system aspirations through system mapping, crop selection, and enterprise design. These foundational insights support future initiatives that aim to increase local production, reduce reliance on external food supply, and strengthen food sovereignty.	Visual maps, community-defined vision, CLD diagrams, and participatory workshop outputs. No quantitative indicators collected
Improved Indigenous health and nutrition	Fund Outcome: Improved nutrition and health outcomes Strategy Priority 4.2: Promote healthy diets KPI: Evidence of improved diet quality through increased intake of fresh, local food KPI: Evidence of increased availability of locally grown food in community food system	The prioritised crops include highly nutritious and culturally valued foods aimed at restoring healthy diets within community settings.	Crop selection table, visual maps, workshop transcripts, value proposition outputs.
Enhanced traditional food knowledge, cultural identity & cultural authority	Fund Outcome: Enhanced social and cultural wellbeing through food Strategy Priority 4.1: Embed Indigenous knowledge and participation. KPI: Number of initiatives using Indigenous-led cultural frameworks	Elders led the design of enterprise values, mapped the history of the land, and defined long-term cultural outcomes. These strengthened cultural identity and food knowledge transfer across generations.	Heritage map of the 5-acre site, workshop images, vision and value proposition outputs.
Enhanced local food enterprise skills & community capacity	Fund Outcome: Increased Indigenous participation in horticultural value chains Strategy Priority 2.1: Support workforce development and entrepreneurship KPI: Number of Indigenous people engaged in food enterprise planning	Through GMB sessions and validation workshops, the project built foundational knowledge on business planning, stakeholder engagement, crop selection, and system thinking.	GMB CLD map, validation workshop poster walk outputs, crop planning tables.

Increased sustainable local economic opportunities and income	Fund Outcome: Stronger rural and regional economies Strategy Priority 1.1: Enable value creation through transformation. KPI: Increase in Indigenous-led horticultural micro-enterprises or business concept	Community aspirations for micro-enterprises (e.g., bushfood products, value-added goods) were defined in vision maps and stakeholder validation sessions. These ideas form the basis for Phase 2 investment.	Vision poster, stakeholder feedback, micro-project examples documented in workshops.

6. Monitoring and evaluation

6.1. Project performance and reflections

Given that this is the first phase of the project, a complete Monitoring and Evaluation (M&E) plan was not designed and implemented or measured during this period. Instead, we present here the project's performance and reflections based on our collaborative work with the Indigenous community. This first phase of the project successfully delivered all planned activities within the specified timeframe (April-September 2025) and budget. The project completed three sequential workshops with 16 Gooliwana Bana community members, conducted key informant interviews with diverse stakeholders, and synthesized findings through a comprehensive scoping review. All outputs, including systems maps, community vision statements, crop priority lists, and the enterprise model framework were validated by community members and are ready to inform future investment decisions.

6.2 What worked well

The participatory Group Model Building methodology proved highly effective for engaging Indigenous community members in complex systems thinking. The structured facilitation enabled meaningful intergenerational dialogue between Elders and youth, while visual mapping tools made abstract concepts accessible to all participants regardless of literacy levels or prior research experience. The staged approach allowed trust to build progressively. Beginning with relationship-building activities and cultural mapping before moving into systems analysis ensured that community members felt comfortable contributing their knowledge and maintained ownership throughout the process.

Community leadership remained central at every stage. By positioning Elders and Traditional Owners as primary knowledge holders and decision-makers, the project reinforced cultural authority while generating outcomes that authentically reflect community priorities and values. The multi-stakeholder validation workshop successfully bridged community vision with industry expertise without compromising Indigenous leadership. Industry stakeholders provided practical insights on market opportunities and resource requirements while respecting community autonomy over enterprise design decisions.

6.3. Key learnings for future phases

- Timeframes and community engagement: While the six-month scoping period was sufficient for initial model development, deeper engagement would benefit from longer timeframes that accommodate community ceremonial obligations, seasonal activities, and decision-making processes that require extended consultation periods.

- Resource requirements: The return of ancestral land created powerful momentum for the project, but it also revealed significant infrastructure gaps that must be addressed before enterprise implementation. Future phases will require substantial investment in food crops, soil preparation, equipment, storage facilities, and transportation logistics.

- Capacity building needs: The scoping study identified critical skills gaps in areas such as business management, financial literacy, marketing, and food safety compliance. Future project phases should incorporate structured training programs delivered in culturally appropriate ways that build on existing community strengths.

- Partnership development: While the project successfully engaged key stakeholders, scaling the enterprise will require additional partnerships with supply chain operators, retailers, food service providers, and government agencies. Early relationship building in these areas will be essential for market access and regulatory navigation.

- Knowledge documentation: The oral histories and traditional ecological knowledge shared during cultural mapping represent invaluable intellectual property. Future phases should include dedicated resources for appropriate documentation, archiving, and transmission of this knowledge to younger generations while respecting cultural protocols around sensitive information.

6.4. Continuous improvement opportunities

The project has identified key opportunities for continuous improvement to enhance its impact and sustainability. These include increasing youth engagement by ensuring their voices are equally valued alongside Elders in enterprise operations and sustainability planning. Broader community involvement is needed by expanding consultation beyond the core group of 16 participants to include those unable to attend due to other commitments. Gender equity should be explicitly addressed to support balanced participation and benefits for women and men. Strengthening integration with existing regional programs in health, education, and land management will improve resource efficiency and create synergistic support systems. The scoping study has successfully laid a robust foundation for scaling the food enterprise, with strong community ownership, validated enterprise models, and clearly defined priorities. The project team is well-prepared to progress to implementation, with strategic pathways established for infrastructure development, capacity building, and partnership cultivation. These continuous improvement opportunities are critical for fostering resilience, inclusivity, and sustainable growth in the Gooliwana Bana Community Food Enterprise.

7. Recommendations for Future Research and Investment (Phase 2)

This project has delivered a successful proof-of-concept for an Indigenous-led, community-owned food enterprise model. Grounded in cultural values, systems thinking, and co-design, the project has demonstrated how remote Indigenous communities can design sustainable food systems that deliver social, nutritional, economic, and cultural benefits.

To build on these foundations and unlock full impact for community and industry, we recommend the following next steps for RD&E investment, aligned with the objectives of Hort Innovation's Hort Frontiers Healthy Communities Fund.

1. Prioritise Phase 2 investment in the Gooliwana Bana community food enterprise: community designed and implement a pilot of the Gooliwana Bana Community Food Enterprise on the identified 5-acre site. This research should:
   - Action research to test Indigenous food enterprise models
   - Co-design and implement a pilot of the Gooliwana Bana Community Food Enterprise on the identified 5-acre site.
   - Agronomic trial propagation, cultivation and harvesting of prioritised crops (fresh, native, cash)
   - Monitor enterprise performance across economic, nutritional, ecological, and cultural indicators
   - Evaluate governance models, workforce structures, and local value-adding strategies. This will provide robust, evidence-based models for scalable Indigenous agribusiness.

This provides a high-visibility opportunity for Hort Innovation to demonstrate national leadership in Indigenous agrifood innovation.

2. Systems-based evaluation of health and nutrition outcomes: Embed a systems thinking and evaluation framework to track how local production and enterprise activity influence:
- Community food access and consumption behaviours
- Nutritional outcomes and cultural food preferences
- Wellbeing indicators linked to food sovereignty and local agency

This supports Hort Innovation's Healthy Communities KPIs and links horticulture directly to public health.

3. Agronomic and horticultural research on native bushfoods: Generate new knowledge on selected native crops with commercial, ecological, and cultural value:
- Soil, water, pest/disease, and climate resilience trials.
- Value chain assessments for post-harvest handling, storage and transport.
- Regenerative and intercropping practices informed by Indigenous ecological knowledge.

This will strengthen the bushfoods sector and position Horticulture Innovation Australia Limited at the forefront of culturally driven crop diversification.

4. Develop Indigenous food enterprise training and certification pathways: The capacity building needs identified in this study require systematic, culturally appropriate training programs:
- Business planning and financial management adapted for Indigenous governance contexts
- Business models that reinvest in local training, land stewardship, and youth involvement
- Food safety and regulatory compliance delivered through place-based, hands-on learning
- Marketing and branding emphasizing cultural storytelling and values-based positioning
- Supply chain management and logistics specific to remote operations
- Digital literacy for online sales, social media marketing, and administrative systems

Training should be delivered by Indigenous trainers where possible, incorporate on-Country learning, and recognize prior learning and traditional knowledge systems.

5. Governance, IP, and cultural protocols in Indigenous agribusiness: Undertake participatory research on:
- Best-practice models for Indigenous governance, enterprise control, and benefit sharing
- Protection and ethical use of cultural knowledge in product development and storytelling
- Legal and policy barriers to Indigenous-led horticultural participation

This ensures that RD&E investment supports cultural integrity, equity, and long-term sustainability.

These recommendations and next steps reflect both the readiness of the Gooliwana Bana community and the strategic opportunity for industry to invest in inclusive, sustainable, and place-based horticultural development. The model developed through this project is scalable, and further investment will deliver benefits across health, economic participation, cultural renewal, and regional development.

8. Knowledge mobilization and industry adoption

Project findings will be shared through diverse channels to engage varied audiences effectively:
- Academic Outputs: Including peer-reviewed publications on Indigenous research methodologies, case studies of participatory systems mapping, and presentations at relevant conferences.
- Industry Outputs: Such as concise summary briefs highlighting commercial opportunities, visual storytelling materials showcasing community values, and interactive webinars demonstrating co-design tools.
- Policy Outputs: Comprising briefing papers for government on investment priorities, inclusion in strategic plans of industry bodies, and media engagement to promote community achievements.
    This streamlined approach ensures broad dissemination and fosters adoption of project insights across academic, industry, and policy area.

9. Intellectual property

This project generated multiple forms of intellectual property managed in accordance with the AIATSIS Code of Ethics (2020), University of Queensland ethics protocols, and Indigenous Data Sovereignty principles.

Indigenous Cultural and Intellectual Property (ICIP): Traditional knowledge, oral histories, cultural mapping, and place-based information shared by Gooliwana Bana community members remain the intellectual and cultural property of the Gooliwana Bana people. This includes traditional ecological knowledge, cultural protocols, governance frameworks, and community-articulated visions. The community retains full ownership and control; any future use requires explicit prior consent from community leadership.

Project Outputs: Co-developed outputs include workshop reports, visual systems maps (causal loop diagrams), interview datasets, the final project report, and extension materials. These are subject to shared ownership arrangements between the University of Queensland and the Gooliwana Bana community, with specific licensing under Creative Commons BY-NC 4.0 (non-commercial use with attribution). All outputs require cultural vetting before reuse and must maintain appropriate cultural context.

Commercial Applications: Any commercial application arising from this project requires negotiated benefit-sharing agreements with the Gooliwana Bana community prior to commercialization. For comprehensive documentation of all intellectual property, licensing arrangements, conditions of use, and identified risks, refer to the IP Register (HN24007) in Appendix E.

Acknowledgements

Appendices

The following appendices are submitted with this final report, the highlighted parts of the final report are confidential. These documents contain key project outputs, evidence of engagement, and materials supporting the project's outcomes. All appendices are intended for publication with the report, unless otherwise stated.

Appendix No.	Title	Description	Confidentiality Status
Appendix A	Stakeholder engagement plan	A summary of all stakeholders identified during workshop 1	Confidential
Appendix B	Comprehensive literature review	The full PRISMA flow diagram is provided in Appendix A.	Public
Appendix c	Summary of Key Informant Interviews – HN24007	A thematic summary of interviews conducted with researchers, policy experts, and Indigenous stakeholders to inform systems mapping and model validation.	Confidential
Appendix D	Workshops 1 and 2 and 3 Report – HN24007	A detailed account of the co-design, validation, and stakeholder engagement activities held in May–June 2025, including system maps, value proposition framework, and prioritised crops.	Confidential
Appendix E	IP Register – HN24007	A register of intellectual property developed or used in the project, including creative commons and community-generated outputs.	Confidential

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Appendix B

Food Security and Access in Indigenous Australia: A Systematic Review of Barriers, Policies, and Opportunities

1. Introduction

Food security for Indigenous Australians is shaped by far more than the price or availability of food. It is inseparable from Country, culture, kinship, and control over local food systems. Remote geography, high costs, uneven supply chains, and historical policy settings continue to constrain access to affordable, nutritious, and culturally preferred foods. At the same time, communities are leading practical solutions—reforming store policies, building local supply, and strengthening food literacy and early-life supports—when resourced and empowered to do so.

This review synthesises evidence on barriers, enablers, and implemented efforts/policies affecting food security and access for Indigenous Australian communities across remote, regional, and urban settings. We organise findings around recurring themes (pricing and income, retail environments, remoteness and logistics, household infrastructure, workforce and governance, cultural safety and foodways), and describe how culture shapes both need and impact.

We used a systematic extraction template across qualitative, quantitative, and policy studies, then grouped outcomes into common themes to compare patterns and identify opportunities. The goal is to provide a concise, practice-oriented map of what hinders access, what has been tried, what works, and where sustained, community-led investment can deliver the greatest gains.

Objective: to understand barriers, challenges, and opportunities to improve food security for Australian remote first nations communities

1. What are the barriers/challenges for Indigenous Australian communities to gain good access to food?
2. Is there any opportunities for indigenous Australian communities to improve their food security?
3. What are the effort or policies that has been conducted to improve the performance of indigenous Australian communities' food system, in terms of food security and access?
4. How culture influences food security in Indigenous Australian communities?

2. Methods: Systematic literature review

We conducted a systematic literature review following a predefined protocol. Searches were run in Scopus, ScienceDirect, and Web of Science Core Collection, using combinations of keywords related to *Indigenous Australians*, *food security*, *nutrition*, *consumption behaviours*, *market participation*, *community-led initiatives*, and *culture*. The complete search logic and hit counts for each database are summarised in Table 1 (Search terms and results).

Table 1. Search terms and results

Database	Strings	Results

Scopus	(TITLE-ABS-KEY (australia) AND TITLE-ABS-KEY (aborigin* OR native OR "first nation" OR "first-nation" OR indigenous OR torres) AND TITLE-ABS-KEY (food) AND TITLE-ABS-KEY (nutrition))	227
ScienceDirect	(TITLE-ABS-KEY (australia) AND TITLE-ABS-KEY (aborigin OR native OR "first nation" OR "first-nation" OR indigenous OR torres) AND TITLE-ABS-KEY (food) AND TITLE-ABS-KEY (nutrition))	549
Web of Science	australia (Topic) AND aborigin* or native or "first nation" or "first-nation" or indigenous or torres (Topic) AND food (Topic) AND nutrition (Topic)	104

All records were deduplicated and screened in two stages: (1) title/abstract screening against the eligibility criteria, followed by (2) full-text review for studies that passed the first stage. Selection proceeded according to the inclusion and exclusion criteria listed in Table 2. Studies meeting inclusion criteria were retained for data extraction and synthesis; those meeting any exclusion criterion were removed.

Table 2. Inclusion and exclusion criteria for article selection

Inclusion criteria	Exclusion criteria
• Study about the Australian indigenous community's nutritional health, consumption behaviours, market participation barriers, and community-led initiatives • Discuss how culture influences food security	• Review papers • Study about technical nutrition (e.g. indigenous food characterisation, clinical trial, etc.) • Studies before 2008 • Study about Australian indigenous community in the urban • Studies discuss specific food properties • Studies not related to food • Study not about Australian indigenous community

Each selected paper was read in full and entered into a standardised extraction form with fixed fields: No., Title, Authors, Published Year, Study location, Activities/Methodology, and seven thematic domains (Nutritional Health; Consumption Behaviours; Market Participation Barriers; Successful Community-led Initiatives; Opportunities to improve food security; Efforts/policies to improve food security; How culture influences food security). When a study did not report on a domain, the cell was left blank, and where multiple findings applied, they were recorded as bullet points within a single cell.

Data management was performed in a single master spreadsheet. We verified numbering against PDF filenames and cross-checked titles to resolve discrepancies. For synthesis, we used narrative/thematic grouping across the extracted domains and produced simple frequency tallies

(e.g., counts of studies per theme, state, and method category). Findings are presented as qualitative and descriptive summaries aligned to the review questions.

3. Results

3.1. Number of studies

The PRISMA-style flow diagram shows that 880 records were identified from databases—ScienceDirect (n=549), Scopus (n=227), and Web of Science (n=104). After removing 117 duplicates (2 manually and 115 via Covidence), 763 unique records remained for title/abstract screening, of which 644 were excluded. The full texts of 119 articles were sought and all were retrieved; these 119 were assessed for eligibility, and 61 were excluded (no full text n=2; review papers n=27; studies before 2000 n=1; studies before 2008 n=7; not related to food n=1; studies discussing specific food properties n=1; not about Australian Indigenous community n=1). In total, 58 studies were included in the final review. Figure 1 show the PRISMA flow diagram.
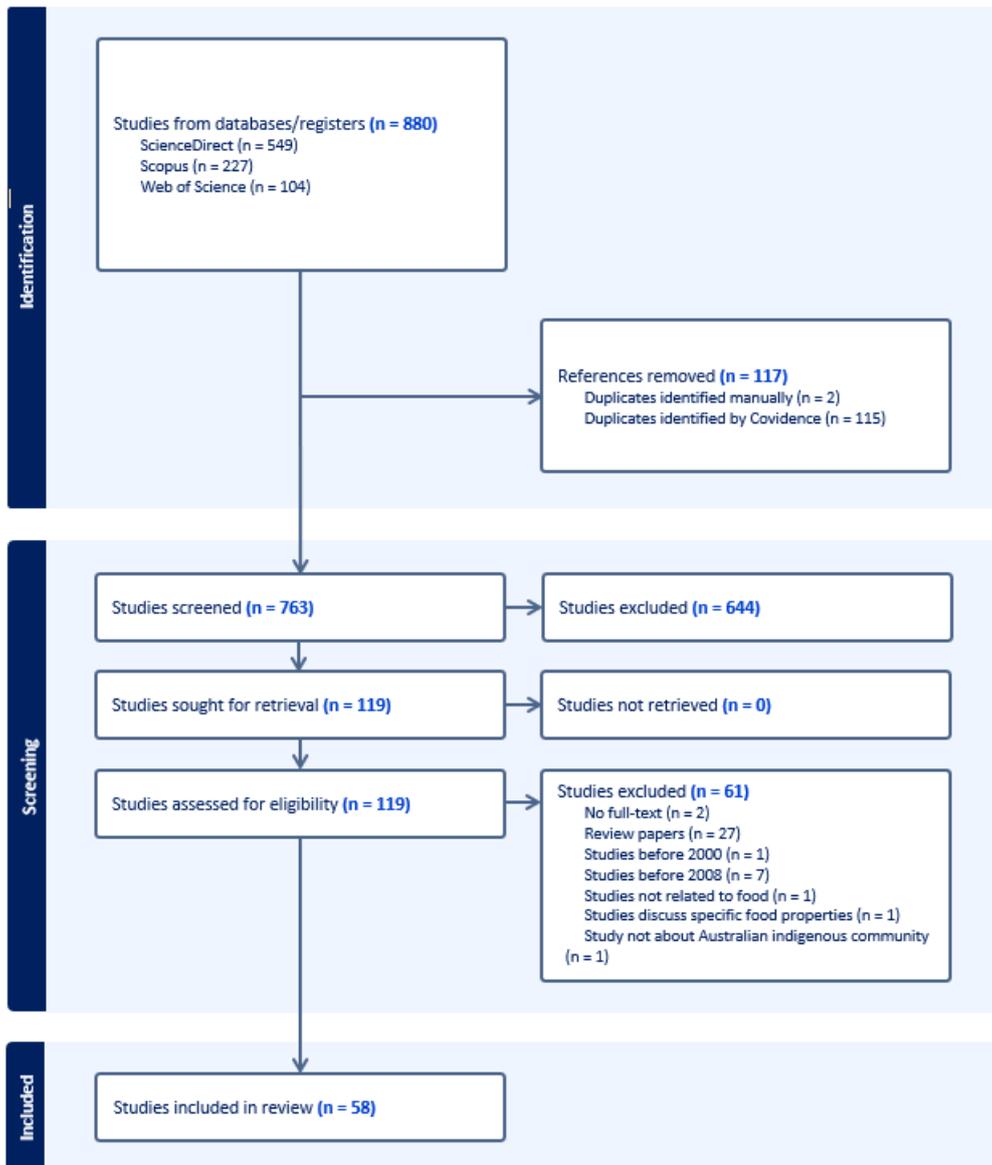
Figure 1. Literature selection process based on the PRISMA flow diagram (Moher et al. 2009)

The bar chart (Figure 2) shows the number of studies published each year from 2009 to 2025. Output rises from 2 (2009) and 1 (2010) to a sustained higher level in the early–mid 2010s, with peaks at 2014 (6 studies) and 2015 (5). After mid-decade, counts fluctuate—3 in 2016–2017, up to 5 in 2018, dipping to 2 in 2019–2020, then 3 in 2021 and 2 in 2022. Recent years show renewed activity with 5 studies in 2023 and the highest count in 2024 (7 studies). 2025 shows 1 study to date, which likely reflects a partial year. Overall, the trend indicates intermittent growth with notable surges in 2014, 2015, 2018, 2023, and especially 2024.
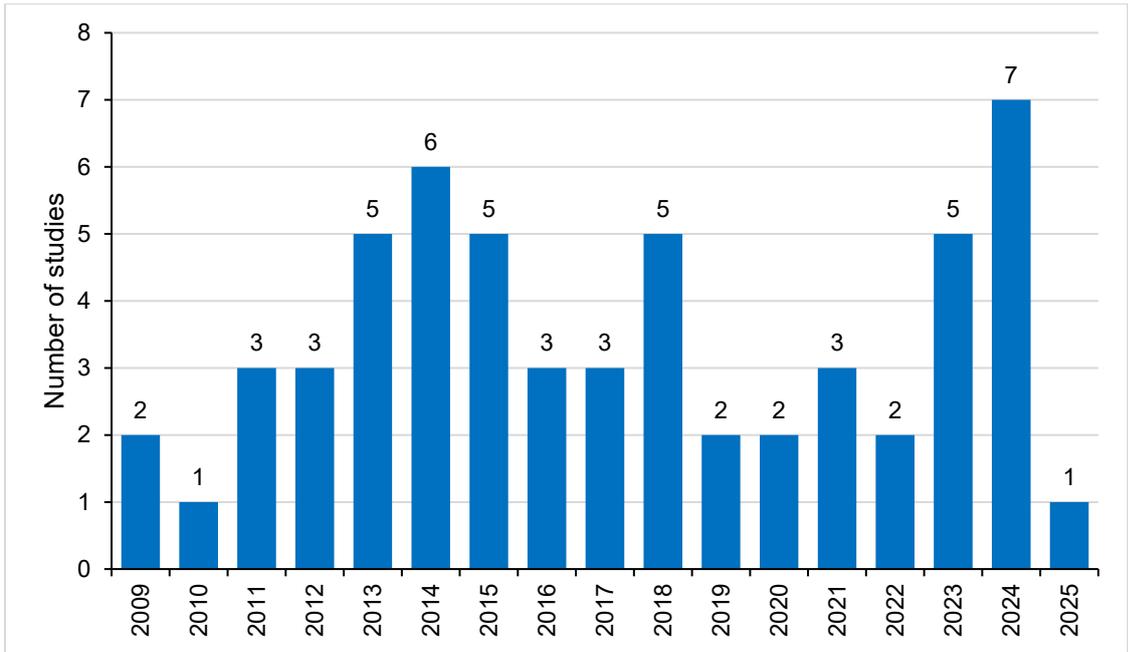
Figure 2. Number of selected papers according to year published

Figure 3 summarises where the included studies were conducted across Australia. The distribution is highly concentrated in the Northern Territory (n=24), followed by Queensland (n=14) and South Australia (n=7). Smaller clusters appear in New South Wales (n=5), Western Australia (n=5) and Victoria (n=5); no studies are shown for Tasmania or the ACT on this map. Several studies were conducted across more than one state, so state counts exceed the number of unique studies. In addition, 12 studies did not report a specific location, and are therefore not mapped. Overall, the evidence base is strongest in the NT and northern regions, reflecting the focus on remote and very remote communities.
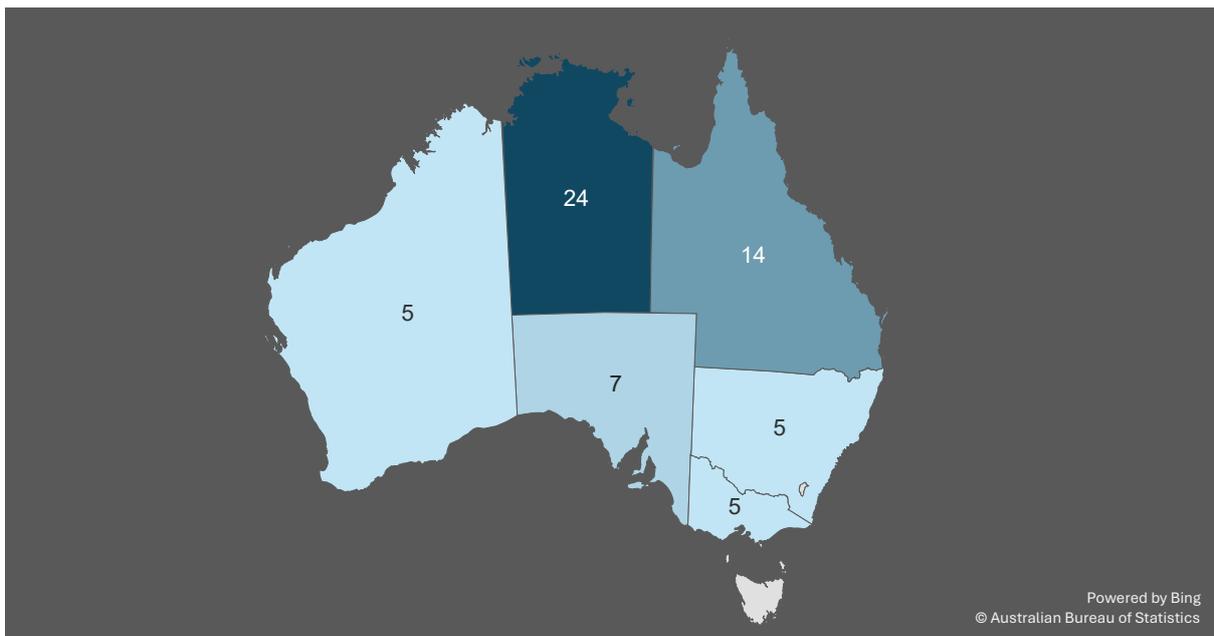
12 studies did not mentioned where the studies were conducted

Figure 3. Breakdown of location where studies were conducted

3.2. Barriers and challenges for Indigenous Australian communities to gain good access to food

Figure 4 shows barriers and challenges for Indigenous Australian communities to gain good access to food.

Figure 4. Barriers and challenges for Indigenous Australian communities to gain good access to food

3.2.1. High food prices & low income

In very remote and low-income settings, healthy choices are often the expensive choices. Tailored diet-price work in remote Aboriginal communities found that the current diet (with substantial discretionary items) cost ~50% of disposable household income, while the healthy (recommended) diet still required ~39%, rendering both unaffordable for many households (Lee & Lewis, 2018 [No. 19]). At the item level, energy-dense, nutrient-poor (EDNP) foods deliver more kilojoules per dollar than healthier options, making them attractive when money is tight (Brimblecombe et al., 2013 [No. 38]).

Irregular cash flow compounds the price problem. Studies show a "feast–famine" income cycle tied to fortnightly payments: purchase of discretionary foods spikes straight after pay day and diet quality declines as cash runs down (Ferguson et al., 2017 [No. 31]). Community/retail interviews also highlight low incomes and high prices as structural barriers that stores alone struggle to overcome (Ferguson et al., 2018 [No. 9]).

Policy experiments suggest levers that help but don't fully solve affordability: price discounts/subsidies can shift baskets toward fruit/veg and water/diet drinks (Magnus et al., 2018 [No. 7]), yet gains often fade without sustained price support and complementary actions.

3.2.2. Transport & access to stores

For many households, getting to food is itself a barrier. In remote areas, long distances, limited transport, and single-store dependence restrict choice and the freshness of perishables (Brimblecombe et al., 2012 [No. 42]). Ethnographic and qualitative work report that everyday food decisions are shaped by cash, transport availability, and obligations to share, with "hungry days" more likely when travel or money fails (Kerins, 2010 [No. 62]; Ethnographic Households, 2010 [No. 58]).

Parents and carers explicitly call out transport costs and the lack of reliable access as drivers of food insecurity, recommending practical supports (e.g., transport assistance, utilities relief) to stabilize household food access (Conceptualisation of Food Security, 2011 [No. 53]). In urban Aboriginal settings, transport and service access still matter—especially for families trying to reach culturally safe nutrition supports (Adams et al., 2012 [No. 45]). For people displaced from Country for medical reasons, unfamiliar urban food environments and mobility constraints further limit access and disrupt traditional food practices (Cubillo et al., 2020 [No. 18]).

3.2.3. Marketing & availability of EDNP foods

Store environments and marketing nudge choices. In a POS analysis across remote stores, purchases were dominated by white bread, added sugars and sugary drinks, while fruit/veg formed only ~10% of sales; sodium levels were several times advised intakes (Brimblecombe et al., 2012 [No. 42]). Among rural children, EDNP foods contributed ~45–49% of energy, with SSBs, hot chips, salty snacks and processed meats prominent (Gwynn et al., 2012 [No. 43]).

When communities act on in-store marketing and product mix, change is possible. A community-developed policy that removed top-selling SSBs reduced sugar and kilojoules purchased without cutting total beverage volume—customers shifted toward lower-sugar options (Butler et al., 2011 [No. 44]). Concept design for a culturally tailored "Thumbs Up!" food-choice app targets point-of-purchase decision cues, plain language, and local imagery to counter EDNP defaults (Henryks et al., 2017 [No. 41]). Still, the price per calorie advantage of EDNP items (Brimblecombe et al., 2013 [No. 38]) can blunt marketing reforms unless pricing and availability change together.

3.2.4. Remoteness & supply chain

Remoteness amplifies every weak link: freight costs, small delivery volumes, storage, staffing, and shocks. Interviews with retailers and health practitioners across very remote communities describe supply-chain fragility and the difficulty of making policy-consistent decisions when logistics and margins are tight (Ferguson et al., 2018 [No. 9]). Community-level work on APY Lands showed that even with a strengthened store nutrition policy and local capacity, external shocks (e.g., COVID-19) and low household incomes can erode gains (Lee et al., 2024 [No. 14]). Media and policy analysis during early COVID-19 documented delivery disruptions and scarcity in remote stores and a tendency toward short-term fixes rather than system-level solutions (van Burgel et al., 2023 [No. 17]).

At the same time, traditional foods—where accessible—buffer diets and strengthen culture, but their availability is uneven across communities and seasons (Buchan et al., 2016 [No. 37]). Programmatic responses that take a systems perspective (multi-sector coalitions, continuous

improvement, local leadership) show promise for building resilience in remote food systems (Good Food Systems, 2019 [No. 24]).

3.2.5. Nutrition literacy & skills

Across settings (remote, regional, urban), many households want to eat well but lack practical, context-fit skills and supports. Evaluations of community programs that build *planning, budgeting, label reading, and cooking confidence* report shifts in everyday behaviours (e.g., better meal planning, more scratch cooking, fewer sugary drinks/fast food) after course participation (Foodbank WA—Food Sensations program, 2017 [No. 61]). Among parents of young children, services also identified gaps in staff capacity to support culturally responsive infant/child feeding guidance (Myers et al., 2014 [No. 48]).

Strengths-based, culturally resonant education materials work best. Co-designed resources for Aboriginal children (Superhero Foods®) were widely accepted, reinforced bush foods, and gave teachers concrete, fun tools to talk about nutrition (Tartaglia et al., 2022 [No. 8]). For pregnant and perinatal women, a digital screening/education tool aligned with Indigenous ways of knowing (yarning; non-linear time) helped elicit diet information and tailor support (James et al., 2024 [No. 11]). Ethnography with urban Aboriginal women shows "family food work" (stretching budgets, camouflaging veg, sharing) is already skilled and intentional; promotion succeeds when it builds on existing household strategies rather than prescribing unrealistic change (Foley, 2010 [No. 49]). Participatory methods such as Photo-Voice and community advisory panels increase ownership and translate skills into practice (Adams et al., 2012 [No. 45]).

3.2.6. Cultural safety & appropriateness

Cultural safety is a determinant of engagement, not a "nice to have." Interventions embedded in co-design, yarning, Elders' guidance, language, and Country report higher acceptability and stronger participation (Adams et al., 2012 [No. 45]; Tartaglia et al., 2022 [No. 8]). Conceptual and empirical work shows food is inseparable from identity, wellbeing, and sovereignty; when programs elevate traditional/native foods, motivation and relevance increase (Cubillo et al., 2023 [No. 10]; Anderson et al., 2024 [No. 6]; Lopes et al., 2025 [No. 16]). The cultural adaptations review demonstrates that deep tailoring (storytelling, protocols, community governance) improves reach and outcomes across contexts (Review, 2015 [No. 54]). Policy analysis similarly argues that cultural safety and First Nations leadership in policy processes are prerequisites for equitable food and nutrition policy (Browne et al., 2021 [No. 20]). Community food gardens succeed where clan structures, local species, and Aboriginal management are centred (Hume et al., 2013 [No. 27]).

3.2.7. Household infrastructure (storage/cooking/housing)

Even motivated households face material constraints: limited cold storage, basic equipment, overcrowding, and unstable utilities make it hard to store fresh produce, batch cook, or keep regular mealtimes. Service providers working with families describe overcrowding and poverty as daily barriers to consistent, health-promoting feeding routines (Yarning with workers, 2022 [No. 60]). Parents and carers call for practical supports (e.g., transport assistance, *electricity rebates*

for refrigeration) and more frequent income payments to smooth food purchasing and storage (Conceptualisation of Food Security, 2011 [No. 53]). Participatory work in urban settings echoed the need for realistic, low-equipment cooking and collective meal spaces that match family life (Adams et al., 2012 [No. 45]). Ethnographic studies in remote communities link household infrastructure problems with broader remoteness and cash-flow constraints — people juggle sharing obligations, irregular deliveries, and limited facilities (Ethnographic Households, 2010 [No. 58]).

3.2.8. Workforce & service constraints

Front-line nutrition work in remote retail and community settings is resource-intensive and isolating. Nutritionists report limited engagement time with stores, high turnover, and few peers to troubleshoot with; a community of practice improved confidence, problem-solving and innovation, but structural challenges remained (Holden et al., 2015 [No. 28]). Case-study work on APY Lands showed that dedicated local employment (a community project officer) helped implement store nutrition policy and coordinate >100 community-requested activities, with measurable dietary improvements — yet gains eroded when resourcing or external conditions shifted (Lee et al., 2024 [No. 14]). Early childhood stakeholders in Victoria highlighted staff training gaps and the need for coordinated, culturally safe systems to support breastfeeding and child nutrition (Myers et al., 2014 [No. 48]). Tools like the Good Food Planning Tool aim to build local capacity and inter-sector coordination for sustained action (2018 [No. 55]).

3.2.9. Policy gaps & weak governance

Multiple strands of evidence point to gaps between policy rhetoric and lived reality. National analyses argue that nutrition has been under-specified in Closing the Gap frameworks and that First Nations leadership and cultural safety must be embedded in policy design and implementation (Lee, 2015 [No. 34]; Browne et al., 2021 [No. 20]). At the local level, only a minority of councils explicitly addressed Aboriginal nutrition, often through individual-focused strategies rather than systemic approaches (Helson et al., 2017 [No. 56]). In very remote community stores, pricing policies and decisions were only partially aligned with evidence, reflecting commercial/logistical pressures (Ferguson et al., 2018 [No. 9]). Historical reviews of remote nutrition efforts show community-led governance (e.g., Mai Wiru) can deliver meaningful retail changes, but sustained government support is crucial (Brimblecombe & O'Dea, 2010 [No. 47]). During COVID-19, policy responses often prioritised short-term delivery fixes over systems-level resilience (van Burgel et al., 2023 [No. 17]). Economic evidence indicates that without fiscal measures (e.g., targeted subsidies/discounts; GST and levy settings), healthy baskets remain unaffordable (Lee & Lewis, 2018 [No. 19]).

3.2.10. Income cycle (feast–famine)

In remote communities, cash flow follows a sharp fortnightly rhythm: spending spikes right after payments, then diet quality declines as money runs down. Purchasing and diet data show more discretionary items immediately post-pay and fewer healthy foods later in the cycle (Ferguson et al., 2017 [No. 31]). Ethnographic work adds detail: household food decisions are negotiated daily around cash on hand, transport, and obligations to share, producing predictable "hungry days"

when incomes are thin (Remote Household Ethnography, 2010 [No. 58]). Urban ethnography similarly documents a feast–famine budgeting cycle—stretching meals, relying on supermarket specials, and "camouflaging" veg to maintain family satisfaction (Foley, 2010 [No. 49]). At the point of purchase, designers of a culturally-tailored labelling/app concept explicitly targeted this automatic, budget-driven decision space to interrupt default EDNP picks (Henryks et al., 2017 [No. 41]). Caregivers also explicitly recommended more frequent payments (and utilities support) to smooth purchasing and storage (Conceptualisation of Food Security, 2011 [No. 53]).

3.2.11. Racism & discrimination

Historical and contemporary racism shapes food access—from policy legacies to everyday service encounters. A historical/policy review traces how colonial policy eras (protection, assimilation, contemporary reforms) restructured Aboriginal food systems toward refined staples and store reliance, helping entrench diet-related disease and structural disadvantage (Sebastian & Donelly, 2013 [No. 46]). In urban practice, community participants link food insecurity to racism and broader disadvantage, which undermines access to nutrition supports and mainstream services (Adams et al., 2012 [No. 45]). At the policy level, First Nations under-representation in food/nutrition policy-making is identified as a continuing barrier; authors argue cultural safety and Aboriginal leadership are prerequisites for equitable outcomes (Browne et al., 2021 [No. 20]). Local government reviews show Aboriginal nutrition is rarely prioritised and is often framed as individual behaviour rather than a structural issue—another expression of systemic neglect (Helson et al., 2017 [No. 56]).

3.2.12. COVID-19 & external shocks

The pandemic revealed and amplified supply vulnerabilities. A media/press analysis (Jan–Jun 2020) documented delivery disruptions, stock scarcity, and rising prices in very remote stores; proposed fixes were often short-term logistics workarounds rather than system-level solutions (van Burgel et al., 2023 [No. 17]). Longitudinal case work on the APY Lands shows that dietary gains achieved through strengthened store policy and local capacity eroded under COVID-19 pressures, especially alongside low household incomes (Lee et al., 2024 [No. 14]). Both strands underscore that external shocks quickly overwhelm fragile food systems, unless underlying logistics and affordability are strengthened (Nos. 17, 14).

3.2.13. Environmental/seasonal constraints

Food access is also seasonal and ecological. Where available, traditional foods contribute nutrient-dense protein and micronutrients, but their availability varies by place and season, and across communities (Buchan et al., 2016 [No. 37]). Ethnography shows that hunting success, fishing conditions, and seasonal cycles interact with cash and store supply to shape weekly choices (Kerins, 2010 [No. 62]). Community gardens thrive when local species, climate, and culturally informed management are centred; otherwise, fragile funding/governance and harsh conditions limit yields (Hume et al., 2013 [No. 27]). Broader agro-nutrition work highlights the need for locally adapted germplasm and school gardens to fit climate and improve availability (Lyons et al., 2015 [No. 50]). For people relocated to cities for dialysis, distance from Country and local environments disrupts access to traditional foods, altering diet and identity connections

(Cubillo et al., 2020 [No. 18]). Systems projects that convene multiple sectors (retail, services, leadership) aim to build environmental and logistical resilience around these constraints (Good Food Systems, 2019 [No. 24]).

4. Opportunities for indigenous Australian communities to improve their food security

Opportunities identified across studies map to complementary levers: (i) affordability (pricing/income), (ii) healthy defaults in retail systems (policy, product mix, monitoring), (iii) First Nations-led, culturally safe governance, (iv) strengthened foodways and local supply, (v) skills with emphasis on early life, and (vi) infrastructure and planning that enable practice. The literature suggests that bundled strategies—combining fiscal measures with store policy, community governance, and practical enablers—are most likely to deliver durable gains in food security in Indigenous Australian contexts

4.1. Pricing and income supports

Affordability remains a first-order determinant of food security. Remote price studies show that the current diet may absorb ~50% of disposable income, while the recommended healthy diet still requires ~39%—both unaffordable for many households (Lee & Lewis, 2018 [No. 19]). Field trials and modelling indicate that targeted price discounts/subsidies on fruit, vegetables and healthier beverages shift purchasing patterns towards recommended options and are cost-effective, although effects require sustained application and complementary supports (Magnus et al., 2018 [No. 7]; Sacks et al., 2011 [No. 32]; Gwynn et al., 2014/2016 equivalents [Nos. 13, 23, 29]). Community-voiced proposals to smooth cash flow (e.g., more frequent payments) and offset utility costs (e.g., electricity rebates to support refrigeration) address the well-documented "feast–famine" income cycle that degrades diet quality late in the pay period (Conceptualisation of Food Security, 2011 [No. 53]).

4.2. Retail systems: policy, product mix and monitoring

Given the centrality of community stores, retail policy and practice are high-leverage opportunities. A community-developed nutrition policy that withdrew top-selling sugar-sweetened beverages reduced sugar and kilojoules purchased without reducing total beverage volume, indicating successful product substitution rather than demand suppression (Butler et al., 2011 [No. 44]). Routine, indicator-based monitoring using point-of-sale (POS) data enables transparent feedback on food-group and nutrient purchasing, improving system responsiveness (Brimblecombe et al., 2012 [No. 42]) and can be operationalised via a web-based reporting portal for store directors (McMahon et al., 2024 [No. 12]). Co-designed benchmarking and continuous-improvement frameworks further structure change at scale (Benchmarking protocol, 2024 [No. 1]). In-store decision support—e.g., a culturally tailored "Thumbs Up!" scanning app—targets the moment of choice to counter defaults toward EDNP products (Henryks et al., 2017 [No. 41]). These retail levers are most effective when aligned with pricing policies and community governance (Ferguson et al., 2018 [No. 9]).

4.3. Community-led and culturally safe action

Opportunities consistently converge on First Nations leadership, co-design and cultural safety. Programs built with yarning, Elders' guidance, and language adaptations report higher acceptability and stronger participation (Adams et al., 2012 [No. 45]; Tartaglia et al., 2022 [No. 8]). A review of cultural adaptations shows deeper tailoring (e.g., storytelling, community governance) improves reach and outcomes (Review, 2015 [No. 54]). Case evidence demonstrates that locally employed coordinators/project officers can operationalise community priorities and sustain momentum (Lee et al., 2024 [No. 14]). Policy scholarship argues for mandated First Nations participation in food and nutrition policy to close the implementation gap (Browne et al., 2021 [No. 20]).

4.4. Foodways and local supply

Strengthening foodways—traditional/native foods, community and school gardens—offers nutritional, cultural and systems benefits. Traditional foods contribute meaningful protein and micronutrients where accessible (Buchan et al., 2016 [No. 37]) and support identity and wellbeing (Anderson et al., 2024 [No. 6]; Cubillo et al., 2023 [No. 10]). Successful community gardens hinge on culturally informed governance, local species and stable resourcing (Hume et al., 2013 [No. 27]). Regionally adapted leafy-vegetable initiatives and germplasm supply to schools broaden the local food base (Lyons et al., 2015 [No. 50]). Co-designed frameworks to integrate native foods within contemporary supply chains and governance signal a pragmatic pathway to scale (Lopes et al., 2025 [No. 16]). For patients displaced for care, facilitating access to traditional foods mitigates dietary and cultural disruption (Cubillo et al., 2020 [No. 18]).

4.5. Skills and early-life supports

Practical, strengths-based food literacy programs—planning, budgeting, label use, and cooking—improve everyday behaviours (reduced SSB/fast-food consumption; more meal planning) when tailored to local realities (Food Sensations®, 2017 [No. 61]; Foley, 2010 [No. 49]). In early life, opportunities include culturally safe breastfeeding and infant feeding systems, workforce capability building, and digital tools that align with Indigenous pedagogies to enhance perinatal nutrition assessment and counselling (Myers et al., 2014 [No. 48]; James et al., 2024 [No. 11]). Classroom-ready, co-designed resources for children embed healthy, culturally relevant messages (Tartaglia et al., 2022 [No. 8]). Education gains amplify when coordinated with retail and pricing reforms.

4.6. Access and planning infrastructure

Column L also highlights enabling infrastructure: transport supports to shops and services, utilities relief to maintain cold chains at home, and embedding food access within liveability and regional planning frameworks (Bourke et al., 2018 [No. 63]). Tools such as the Good Food Planning Tool facilitate inter-sector planning and priority-setting (2018 [No. 55]), while communities of practice mitigate workforce isolation and improve implementation capability in remote retail (Holden et al., 2015 [No. 28]). These measures knit together household-level feasibility with system-level coordination.

5. Effort and policies that has been conducted to improve the performance of indigenous Australian communities' food system

5.1. Fiscal levers to make healthy food affordable

Multiple field interventions demonstrate the use of price-based instruments to shift purchasing toward healthier options. A 20% price discount applied to fruit, vegetables, water and diet drinks produced favourable changes in baskets and was cost-effective in remote settings (Magnus et al., 2018 [No. 7]). Community programs that subsidised fruit and vegetables for Aboriginal children reported improvements in intake and child health indicators (Gwynn et al., 2014/2016 equivalents [Nos. 23, 29]). Economic work has also assessed the feasibility of discounts at the store level (Sacks et al., 2011 [No. 32]). Together, these efforts operationalise affordability as a policy lever in real stores, not just in modelling.

5.2. Retail policy and product-mix reforms in community stores

The store environment has been actively used as a policy platform. A community-developed nutrition policy that withdrew top-selling sugar-sweetened beverages (SSBs) from a remote store reduced sugar and kilojoules purchased without suppressing total beverage volume, indicating substitution to lower-sugar options (Butler et al., 2011 [No. 44]). Over a longer horizon, governance initiatives such as Mai Wiru and the Outback Stores model have been used to re-shape retail practice in very remote communities, although their impact has depended on the stability of support and broader economic conditions (Brimblecombe & O'Dea, 2010 [No. 47]; Ferguson et al., 2018 [No. 9]). Recent case work on the APY Lands shows that a revised store nutrition policy, delivered with a locally employed project officer, enabled more than 100 community-requested actions and measurable dietary improvements prior to external shocks (Lee et al., 2024 [No. 14]). Collectively, these efforts treat the retail setting as a policy-implementing institution, not merely a point of sale.

5.3. Measurement, monitoring and data systems

A suite of efforts has focused on measurement infrastructure to guide practice. Linking point-of-sale (POS) data to nutrient indicators enabled objective monitoring of purchasing patterns across remote stores and created low-burden feedback loops for decision-makers (Brimblecombe et al., 2012 [No. 42]). Building on this, a web-based reporting portal was developed to display key dietary indicators from sales data, improving transparency and governance for store directors and managers (McMahon et al., 2024 [No. 12]). Diet-price frameworks have been used to test the affordability of current versus recommended diets in remote communities, thereby informing policy settings on price and availability (Lee & Lewis, 2018 [No. 19]). These monitoring and reporting efforts have been implemented with retailers and communities, anchoring policy choices in empirical signals.

5.4. Community-led governance and workforce development

Several conducted efforts explicitly centre First Nations leadership and local capacity. The Good Food Systems project established Food Interest Groups and participatory, multi-sector

processes to co-design and track actions that improve food environments (2019 [No. 24]). A community of practice for public health nutritionists working with remote retail reduced professional isolation and accelerated store-level improvements, effectively functioning as a workforce policy (Holden et al., 2015 [No. 28]). On the APY Lands, the policy package combined a strengthened store framework with local employment to drive day-to-day implementation (Lee et al., 2024 [No. 14]). These efforts show that governance and human resources are policy instruments in their own right when they embed control and continuity within communities.

5.5. Planning tools and coordinated system design

Communities and stakeholders have co-produced planning instruments to coordinate action across sectors. The Good Food Planning Tool, developed with 148 stakeholders, provides a structured way to set priorities around leadership, infrastructure, local/traditional food, and services (2018 [No. 55]). At the regional scale, integrating food access into liveability and planning frameworks has been advanced as a policy approach to ensure transport, utilities and retail siting enable healthy purchasing and storage (Bourke et al., 2018 [No. 63]). These conducted efforts translate diffuse aspirations into operational roadmaps that public agencies and Aboriginal organisations can enact.

5.6. Nutrition education programs in community and household settings

Implemented food literacy programs—notably Foodbank WA's Food Sensations®—reported improvements in planning, budgeting, selection and preparation behaviours, alongside reductions in fast-food and SSB consumption among adult participants in regional and remote Western Australia (Food Sensations®, 2017 [No. 61]). Urban participatory programs using Photo-Voice and community advisory panels produced locally controlled actions (e.g., cooking workshops, visual plate guides), demonstrating a feasible policy pathway for Aboriginal organisations to lead context-fit nutrition promotion (Adams et al., 2012 [No. 45]). In the perinatal period, the development of a culturally aligned assessment/education tool has supported nutrition counselling in clinical services (James et al., 2024 [No. 11]). These efforts extend policy beyond price and retail into capability-building at household and service levels.

6. Influence of culture to food security in Indigenous Australian communities

6.1. Country, identity and foodways

Food is inseparable from Country, identity and wellbeing. Studies describe "foodways" as a relational system in which land, kinship and knowledge shape what is considered nourishing and appropriate; when these ties are supported, engagement with healthy foods strengthens (Anderson et al., 2024 [No. 6]). Conceptual work similarly frames nutrition, health and wellbeing through Indigenous worldviews that emphasise relationality and place, re-positioning food security beyond calories or price (Conceptualisation paper, 2024 [No. 10]). Where traditional foods are accessible, they contribute nutrient-dense protein and micronutrients while reinforcing identity and cultural continuity (Buchan et al., 2016 [No. 37]; Kerins, 2010 [No. 62]). Conversely, disconnection from Country—for example during relocation to urban centres for medical care—

disrupts access to traditional foods and undermines both diet quality and cultural connection (Cubillo et al., 2020 [No. 18]).

6.2. Kinship, sharing and household food work

Cultural norms of sharing and collective responsibility structure everyday food decisions. Ethnographic studies in remote and urban settings show that households actively balance family harmony, sharing obligations and budget constraints, which can buffer insecurity during "hungry days" but also thin out resources across kin (Foley, 2010 [No. 49]; Household ethnography, 2010 [No. 58]). In practice, women's "family food work"—stretching budgets, adapting recipes, camouflaging vegetables—expresses care and obligation as much as nutrition, indicating that interventions resonate best when they build on existing cultural practices rather than prescribe external ideals (Foley, 2010 [No. 49]).

6.3. Cultural safety, language and co-design as enablers of access

Program uptake and effectiveness hinge on cultural safety—yarning, Elders' guidance, language, visuals and protocols that reflect local meanings. Community-led Photo-Voice projects and Aboriginal-controlled organisations translated cultural knowledge into actionable nutrition supports (e.g., visual plate guides, social cooking) with strong participation (Adams et al., 2012 [No. 45]). School-age resources that embed local food stories (e.g., Superhero Foods®) normalise healthy eating in culturally relevant ways (Tartaglia et al., 2022 [No. 8]). At the point of purchase, even digital tools require cultural tailoring—plain language and local imagery—to be trusted and used in store environments (Henryks et al., 2017 [No. 41]). At the policy level, evidence argues that First Nations leadership in agenda-setting and governance is itself a cultural determinant of equitable food access (Browne et al., 2021 [No. 20]).

6.4. Traditional and native foods, and culturally governed production

Culture shapes which foods are desirable, celebratory and feasible to produce locally. Community garden initiatives succeed where clan structures, local species and Aboriginal management are centred; these gardens are more than supply—they are sites of knowledge exchange and pride (Hume et al., 2013 [No. 27]). Broader initiatives to integrate native foods into contemporary food systems—through co-design, appropriate governance and value chains— seek to align markets with cultural preference and ecological knowledge (Lopes et al., 2025 [No. 16]). Regionally adapted leafy-vegetable programs similarly leverage local biodiversity and traditional uses (Lyons et al., 2015 [No. 50]). These efforts illustrate how cultural valuation directs both demand and the forms of local production that are most likely to endure.

6.5. Cultural logics in food choice within store-based environments

Even where store foods dominate, cultural logics guide choice. Remote community studies describe households integrating "bush tucker" and "shop tucker," with cash flow, hunting success and obligations to share mediating the balance (Kerins, 2010 [No. 62]). Earlier work showed that traditional preferences and knowledge continue to inform choices within store-

based ecologies, including how promotions, packaging recognition and status cues are interpreted (Brimblecombe et al., 2001/2003 equivalents; qualitative study, 2001 [No. 30]). Retail governance that reflects community priorities—for example, locally controlled nutrition policies—aligns the store environment with cultural expectations and enhances legitimacy (Brimblecombe & O'Dea, 2010 [No. 47]; Good Food Systems, 2019 [No. 24]).

7. Relational mechanisms: why culture matters for food security

Across studies, culture influences food security through three recurring mechanisms:

1. Meaning and motivation: cultural frames define what "good food" is, linking it to Country, ceremony and care, thereby motivating selection and persistence (Nos. 6, 10, 37, 62).

2. Social organisation of access—kinship and sharing shape who eats and when, buffering scarcity but also diluting resources when incomes are constrained (Nos. 49, 58).

3. Governance and delivery—cultural safety and Indigenous leadership determine which programs are legitimate, accessible and sustained (Nos. 20, 24, 27, 41, 45).

Food security programs work best when they also respect and build on culture. That means supporting traditional foods and practices, backing the family and community networks that share food, and making sure First Nations people lead the decisions. In real terms, community-run store policies, including native/traditional foods, and education and tools designed together with communities don't just boost participation—they make the whole food system fit how people live, shop, and share food, so changes are more trusted and last longer.