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“We need our own food, to grow our own veggies...” Remote Aboriginal food gardens in the Top End of Australia's Northern Territory

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“We need our own food, to grow our own veggies...” Remote Aboriginal food gardens in the Top End of Australia’s Northern Territory

Abstract

Objective: Remote Aboriginal community gardens (gardens) frequently operate below their full potential. A set of gardening sustainability principles may improve their planning, operation and long-term sustainability. This paper aims to document the principles of sustainability of non-profit remote Aboriginal community gardens in the Top End of the Northern Territory.

Methods: Throughout 2011, gardens in the Top End of the Northern Territory were visited. Interviews and observational data were used to explore the principles of garden sustainability with participants. Subsequent iterative thematic analysis informed development of a set of gardening sustainability principles.

Results: Principles of sustainability included effective garden planning; community autonomy, consultation and engagement; growing community vetted crops; employing long-term, effective, culturally sensitive managers; long-term, transparent funding organisations and cycles; garden integration into existing food supply chains; culturally appropriate employment arrangements; and physical aspects of successful gardening.

Conclusions: This work uniquely consults gardeners, managers and Aboriginal and non-Aboriginal people of both genders in the largest reported study of its type, resulting in new and expanded findings, particularly including new social factors for gardening success.

Implications: Expanding the understanding of what makes gardens work to include the important social factors identified here may have merit.

Key words: Aboriginal, nutrition, horticulture

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In comparison to urban centres, remote Aboriginal communities (communities) in Australia’s Northern Territory (NT) are exposed to high fresh fruit and vegetable costs¹ and low consumption patterns.^{2,3} Low fruit and vegetable consumption contributes significantly to the risk of cardiovascular death⁴ (the largest cause of mortality in Australian Aboriginal people)⁵ and to cancers of the lung, stomach, bowel and oesophagus.⁶ It is also a risk factor in the development of obesity.⁷

International studies have reported that community food gardens may improve fruit and vegetable consumption in gardeners and their families,⁸⁻¹² although there is currently no body of evidence relating to this in remote Aboriginal communities. However, calls have been made to promote and investigate the potential of community gardens to improve health status in this setting.¹³⁻¹⁶ Numerous community gardens exist in the Top End of the Northern Territory (gardens),¹⁶ together with a history of gardening dating from their introduction by missionaries.^{17,18} Despite this history, there is evidence that gardens

frequently fail or operate below their full potential.^{13,16,19-23}

Limited attempts have been made in government reports to define the principles behind gardening sustainability in the Northern Territory.^{21,23,24} A 2006 Northern Territory Government report on 30 remote Top End communities defined the factors limiting sustainability as: “a lack of horticulture knowledge within the community; inadequate horticulture training of local people; difficulty in attracting suitably experienced individuals; a non-defined market; lack of incentive to work; no ‘real’ jobs in market gardens; high turnover of managerial staff; poor succession management; and horticultural problems”.²⁴ It is further stated that “a combination of any of these factors is enough to stop the development of community market gardens”.²⁴

This definition was extended by the Northern Territory Government Plant Industries Division in its 2009 Indigenous Horticulture Development Decision Model.²¹ In this model, the requirements for community garden success were defined as: “land with

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access rights, appropriate slope, pH, salinity and drainage; a potable and reliable water supply; infrastructure to transport produce to market; and a business plan". Both reports state that sufficient interested and available community members with skills and a manager with expertise are needed.^{21,24} Neither of these government reports defines its methods or contains any evidence of direct consultation with garden managers, workers, or Aboriginal people.

In contrast, two attempts have been made to examine gardens from an Aboriginal perspective,^{13,22} defined here as "community-oriented" reports. In one of these reports, a series of community consultations was undertaken by Charles Darwin University for a NT government-proposed non-profit garden in a remote Northern Territory community, and raised quite different social requirements for success to those proposed in the government reports.²² These requirements included: the need for community consultation and involvement; expanding existing community capacity; recognition of clan structures when defining how people contribute to, and benefit from, gardens; involvement of young people; integration of the garden with other organisations; and the need to grow crops that people were familiar with and liked eating.²²

Some of the factors raised by the consultations were in common with the government reports: the need to define garden outcomes in a plan; land rights issues; adequate garden staffing; and the need for a committed manager to run gardens.²²

Multiple social and physical factors for success were cited¹³ in other community-oriented work involving Aboriginal and non-Aboriginal people in seven remote Northern Australian communities across the Northern Territory and Western Australia. These factors included: stable governing and funding structures; adequate pay for gardeners; cultural sensitivity in work arrangements; the fundamental nature of the trainer-gardener relationship; long-term support and handover of gardens; integration of gardens with schools, health clinics and stores; and the inclusion of traditional foods into gardens. Garden location and access; potable and reliable water sources with automatic irrigation; fire damage; machinery access and maintenance; distance to supplies; food storage and distribution infrastructure; and produce transport issues were also identified as being important.¹³ Of interest in this report was the proposition that workforce and community motivation were not limiting factors to success. The paper also proposed that the compound nature of challenges to gardening was enough to ensure their failure, despite high community motivation levels.¹³

Although this body of community-oriented and government literature goes some way to outlining the factors contributing to the sustainability of gardens, it is important to gain a broader picture. If these principles could be better defined from the perspective of all people involved, it may enable the more effective planning and operation of remote community gardens across Northern Australia and improve their chances of long term sustainability.¹³

Consequently, this paper aims to document the principles of sustainability of non-profit remote Aboriginal community gardens in the Top End of the Northern Territory, according to the Aboriginal and non-Aboriginal garden workers and managers involved.

Methods

Study site

The Top End of the Northern Territory covers an area of 450,000 km², with 40,000 people living in 86 remote and very remote localities, and a population density of 0.1 people per km². Of these people, 24,500 (62%) identify as Aboriginal or Torres Strait Islander.^{25,26}

Study design

Throughout 2011, the lead author (AH) located and visited gardens in the Northern Territory Top End as part of a gardens survey.¹⁶ Thematic analysis²⁷ was used to collect information on the perceived principles behind garden sustainability and develop a set of principles for garden sustainability (Figure 1).²⁷

Sampling

Interviewees were purposively sampled during garden visits to include only those who had at least one year's experience with a garden, with the aim of sampling a cross-section of both Aboriginal and non-Aboriginal managers and workers. As visits and interviews progressed, sampling was deliberately broadened to include more Aboriginal garden workers and managers.

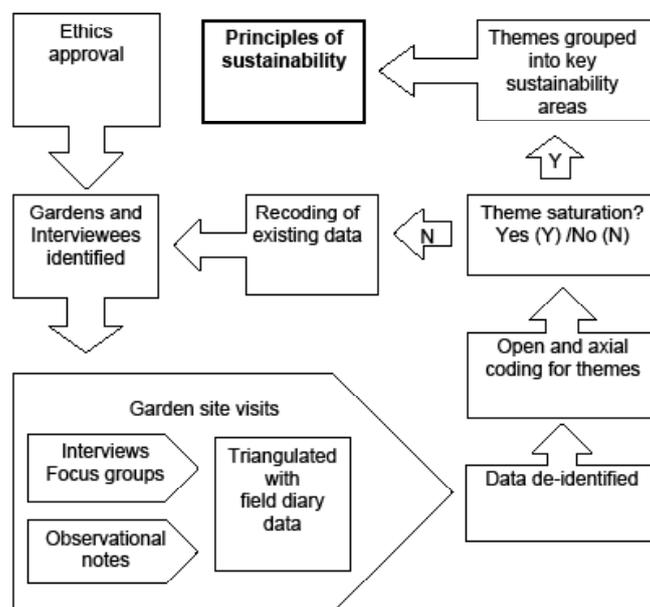
Data collection

Three kinds of data were collected: interview, observational and field diary.

Interviews were recorded using a standard protocol, with the aim of exploring the perceived principles behind garden sustainability.²⁸ Interviewees were asked "What makes this (remote community) garden work well?" and "What stops it from working well?"

Focus groups were used if interviewees were familiar and comfortable with one another, or if they were hesitant to provide

Figure 1: Methods overview.



information on their own.²⁹ One-on-one semi-structured in-depth interviews were used when people were willing to speak and share ideas.²⁸ Interviews were undertaken where interviewees were most comfortable; typically outside in the community garden or in the garden shed. Interviews were recorded and interview notes taken with permission.²⁸

During site visits AH also accessed each garden with permission and used a standardised protocol to collect observational data.²⁸ This protocol included: the date and time; garden location, size and layout; general impression and reaction to the garden; evidence of recent and past activity including ploughing, harrowing, planting, pruning, weeding and watering; maintenance and upkeep; people present during observations; what people were doing; and the presence, nature and condition of sheds and structures, machinery, fences, gates, watering systems, tanks, crops and fruit trees.

AH also took a field diary during visits to triangulate interview and observational notes.³⁰

Data de-identification and analysis

Given the small number of remote communities involved and the potentially contentious nature of interview and observational results, all identifying features were removed from the data.

After each garden visit, iterative thematic analysis was undertaken by AH on current and past interview and focus group transcripts, observational notes and the field diary (Figure 1). Open coding and subsequently axial and selective coding for themes were performed on this data.³¹

Garden visits and thematic analysis continued until the themes were saturated and no new themes emerged.²⁸ Themes were then used to inform the principles of garden sustainability outlined in the Results section.

Ethics

The Northern Territory Department of Health and Menzies School of Health Research Human Research Ethics Committee provided ethics approval for the study.

Results

Visits and interviews

As part of a greater gardens survey of the Top End of the Northern Territory, 24 running gardens were found.¹⁶ Eighteen gardens were visited, with observational notes and a field diary taken at each. In sixteen of these gardens, 21 people (six female and 15 male) participated in interviews, including four Aboriginal garden managers (all male), 10 Aboriginal garden workers (four female and six male), and seven non-Aboriginal garden managers (two female and five male).

Principles of garden sustainability

Themes were grouped into principles of garden sustainability under key areas. These areas were planning and integration, management and support, workforce and pay, funding and profits, and physical factors (Figure 2).

The principles of sustainability are expanded below, using illustrative quotes drawn directly from the interviews and focus groups.

Planning and integration

All respondents reported community engagement and control over decision-making in the process of planning and running gardens as fundamental for sustainability. Thirteen respondents expressed an argument that successful gardens needed to be actively supported by the community and to engage multiple interested individuals from that community. If this did not occur over an extended period, gardens were likely to fail. Examples of gardens that had failed or operated below capacity as a result of a perceived lack of support or engagement were cited and observed in five locations.

"Let people [garden workers] decide what they want to do [in the running of gardens]." (Aboriginal garden worker)

"Having community buy-in is fundamental." (Non-Aboriginal manager)

Most interviewees considered that defining clear, measurable and realistic aims in consultation with community and garden workers was a significant part of the planning process. These aims did not solely relate to production, but included employment and training, food distribution to the wider community, profitability, and how the community engaged with the garden. Defining aims reportedly meant that the performance of the garden could be tracked, as well as allowing community members to have realistic expectations about the garden.

Aboriginal gardeners and non-Aboriginal managers had different perspectives on the kinds of aims that were important. Most non-Aboriginal managers were focused on employment and training outcomes, whereas Aboriginal gardeners were more interested in how the garden was integrated into the community and how produce

Figure 2: Key areas of garden sustainability.



was fairly distributed. One Aboriginal manager crossed this divide and recognised both factors as being important.

Six managers and three workers reported that when starting a garden it should be kept small, and expanded later if there was sufficient community interest and funding. This was reported as a way to avoid disappointment when larger operations failed to meet expectations.

Growing crops that people wanted to eat was reported as being a vital part of garden integration into the community. Interviewees gave many examples of crop varieties grown without community consultation, and in six gardens these crops had been left untouched by local people because they were not familiar with cooking or eating them.

"Mainly focusing on what we are used to eat. What we are used to eating. So for instance banana, yes, sweet potato, yes, cassava, yeah, pumpkin, watermelon, those are the things that we usually plant and you know, salads, rock melon. People like them more." (Aboriginal manager)

Another reported aspect of integration was the development of relationships between food receivers (e.g. families, stores, school nutrition programs, aged care facilities) and gardens. These relationships were seen by garden workers and managers as important in informing garden workers about what crops to grow and when to grow them.

In five gardens it was stated that the staggering of crop harvests to align with the receiver's needs helped reduce produce surplus and wastage. Four gardens had developed strong links with the local school and two with the local aged care program. In all cases, these institutions were using garden produce in their nutrition programs.

In fifteen gardens, the distribution of produce to garden workers and their family members was regulated by garden managers or by workers themselves. This had disadvantages in two gardens. In one, only the families of workers were receiving produce to the exclusion of other community members. In another, disagreements were stopping one family gaining access to the garden or its produce because another family considered they had priority. Defining the produce distribution rights of individuals and families was mentioned in four places as a way to reduce discord.

Produce prices was another reported aspect of effective garden integration. In four localities, produce prices for sale to shops and the community were set daily to mirror published city market prices, which were usually lower than local fresh food prices. The aim of this was to ensure that community-grown produce was sold at a lower price than imported food. In some localities, food was given away for free.

Management and support

Two out of four Aboriginal managers reported their perceived advantage over non-Aboriginal managers in understanding their communities and in fostering community engagement and autonomy. They had grown up in their communities with a common history and cultural knowledge spanning generations, spoke the local languages, and knew the local people.

In contrast, none of the non-Aboriginal managers had lived in the community for extended periods. None spoke the local language fluently, and four reported having a limited relationship with local people outside the garden. This was reflected by both Aboriginal workers and non-Aboriginal managers in interviews.

Despite the perceived advantage over non-Aboriginal managers of community engagement, three Aboriginal managers recounted difficulty in getting people to come to work, or in getting people to do the necessary work needed when they did attend. Four non-Aboriginal managers and eight gardeners reported the same issue in getting people to come to work.

"It's hard to get the men to come to work. They just don't want to come to work. I can't go and make them come to work." (Aboriginal manager)

Aboriginal managers reported facing additional pressures not experienced by non-Aboriginal managers. In two cases, Aboriginal managers reported being pressured by community members to give away food or plants, or to sign off pay sheets when people had not been at work. These managers tried to reduce the problem by avoiding personal involvement in pay matters, and by asking community members not to take plants or food home.

"That's a big thing, security, people come in and take things, and there is a lot of pressure to give things away (from the garden) to family." (Aboriginal garden worker)

It was discussed in eleven communities that managers needed to communicate well with garden workers, other managers and community members. This communication was seen as vital in building relationships to enable the garden to function.

"I like working together (with the non-Aboriginal manager), but communicating each other, sometimes not very good. We had that problem, a week or so ago. It comes up a lot." (Aboriginal manager)

Virtually all interviewees reported that managerial support needed to be balanced alongside the need for community autonomy. All interviewees agreed that the ultimate aim of any garden operation should be total community control.

"One of the reasons the garden was working well was that there was a manager involved, helping people, but the workers had a level of autonomy there, rostering themselves to look after the garden." (Non-Aboriginal manager)

Past horticulture experience and experience in remote Top End communities were considered beneficial by three non-Aboriginal managers, as both the horticulture and social environments were so different to other places in Australia.

"I have a horticulture qualification, but what has been most useful to me here (in the Northern Territory) is experience. It's experience of working with Aboriginal people in the Top End and growing fruit and vegetables in the Top End that will increase the probability that a project will succeed." (Non-Aboriginal manager)

It was universally reported that long periods were needed for relationships to develop between managers and the community, and that these relationships were integral to running successful gardens. Ten interviewees also accepted that long handover periods were needed to build local capacity.

"The boss is one of the men now, one of the crew. That's from last year to now (eleven months), taken a year, but he's alright now." (Aboriginal garden worker)

Six Aboriginal workers reported that enthusiasm for gardening declined when managers changed, and that production dropped at these times and workers did not come to the garden as often. In four places, the lack of an appropriate manager was seen as the main reason for the failure of the garden. In two places, the specific issue of cultural sensitivity of managers was raised.

"The manager left because we didn't want him. He wouldn't work with the young men – some of them have never had jobs, it takes a long time to get used to work. He wanted his way all the time, doing everything himself. Men just left." (Aboriginal manager)

In two instances, the gender of managers was cited as an important factor in engaging women in gardening.

"The woman that was here, the ladies got on well with her, they was comfortable with her, the lady coordinator see, but when she moved on, everything stopped, for the ladies anyway. They're still willing to come back, if there is a woman coordinator." (Aboriginal garden worker)

Three interviewees suggested non-Aboriginal managers needed to stay living in communities for the longer term. Two others thought that managers could work successfully from elsewhere, while providing appropriate support on a frequent basis, and that this provided better autonomy for local people.

Outside horticultural support provided by horticultural agencies or universities was reported as being useful by seven workers and two managers, but not by the three other managers.

Workforce and pay

Five gardeners reported having an insufficient workforce available to run gardens properly. Gardens that were scaled to suit the workforce were seen as one solution to this.

Lack of motivation in the workforce was cited by twelve managers and six workers as a reason for sub-optimal operation of gardens. Some of the reported reasons for this problem included medical and mental health issues, lack of work experience, welfare dependence, substance misuse, lack of interest in horticulture and poor identification with gardening in a community.

"Tiredness, substance abuse, nutrition, welfare dependence, you are damned close to being clinically depressed. These things make it very difficult for anyone to work (in a garden)." (Non-Aboriginal manager)

Eight Aboriginal workers reported mandatory and sometimes unpredictable family and cultural responsibilities that could make working in gardens difficult, and both Aboriginal and non-Aboriginal managers raised this as an issue. Culturally appropriate employment arrangements reportedly made it easier for people to come to work. For example, in three cases women and men wanted to work separately.

"When it's time to come for veggie plucking, fruit plucking or whatever, the ladies will come in and do their stuff and we (the men) will go and do other projects in the community. It's better that way, separate." (Aboriginal garden worker)

Five Aboriginal workers and three non-Aboriginal managers reported that a 'worker surplus' kept the garden running during

funerals or ceremony, or if interest in the garden waned among some individuals or groups.

"When there is a funeral or ceremony in a remote community, many people are obligated to attend, and often for long periods and a long way away. This can mean that there is no-one left to run the garden. If there are many people trained in the same job, it can make it easier during these times." (Non-Aboriginal manager)

Fair pay for garden work was mentioned by all Aboriginal workers and four managers as a way to get people to come to work in gardens. Many workers were being paid the same amount as unemployment benefits to work. Differences in the pay structures of workers working in the same gardens, but with funding support from different organisations, made consistency impossible for five managers. These factors combined to create a disincentive to work, and lead to disagreements between workers in five of the visited gardens.

"For people who decide to do work for their community, they should be paid for it. Money makes a difference. White people only do voluntary work if we are young and students, or we've earned enough already. Why does anyone think it is different for Aboriginal people?" (Non-Aboriginal manager)

"All of that (getting people to come to work), it comes down to giving them (workers) a good wage. You give them a good wage, they will come to work." (Aboriginal garden worker)

Pay times were mentioned as being important too; three managers reported having difficulty getting people to come to work on pay day, or felt that staggered pay for different workers might reduce the number of people away at any given time.

"Today is Friday see. And there's no-one here (in the garden) because yesterday was pay day. We asked them (Centrelink) to make pay day on Friday afternoon... but it never happen." (Aboriginal garden worker)

Funding and profits

Long, stable funding cycles were seen by two managers and three garden workers as being pivotal to sustainability. Stable funding was considered to depend on the reliability and longevity of funding organisations and structures. There were three reported instances of gardens that had failed because the funding body was liquidated. In addition, two funding bodies could not guarantee funding for the next year, leaving gardens unable to plan operations. Eight garden workers reported being unlikely to invest time in gardens that might not have funding.

"How long is this funding (for the garden) going to last? Because last time it dried up, stopped. We don't bother (getting involved)." (Aboriginal manager)

On a more general level, five non-Aboriginal and two Aboriginal managers raised the question of who should be responsible for the funding of gardens. Three felt that funding should be taken up by government on a larger scale as a part of standard service provision to communities in an effort to provide employment and a stable, reduced-cost, nutritious diet. One felt that private enterprise should be responsible for employing local people in a garden, and one that gardens should be abandoned altogether.

"It's got to be picked up by a government agency (remote gardening). Everyone thinks this is a good idea, but no-one is committing to the funding of remote gardens. This is not a commercial question, it's about better food in communities, and it needs to be funded." (Non-Aboriginal manager)

Transparent distribution and control of the profits generated by gardens was continually raised as an issue by workers and managers in all locations. Five managers thought that cash transactions were a way to teach gardeners money management skills and give them control over the garden finances, rather than using electronic transactions. In three gardens, community stores or nutrition programs were buying produce from the garden using only electronic transactions, and gardeners had no input into the process.

In regards to garden profits, there were seven instances where managers and workers were unhappy with profits being absorbed by larger organisations such as the shire council, because they were unsure if the garden was getting its fair share of profit. In four places, managers and gardeners were unsure what their garden's running costs or profitability were, because they had no access to the information.

"The money going in (to the corporation), from the garden, gets lost. It's okay if that money is going in (to the corporation) the right way. But sometimes the money gets lost, and we don't see it." (Aboriginal manager)

Physical factors

It was reported in thirteen places that crop varieties needed to be favoured by the community, seasonally appropriate, low maintenance and high yield. Crops that people were familiar with and knew how to prepare, cook and eat, were reported as less likely to be wasted. Perennial crops or fruit trees that could be harvested as needed were more likely to survive periods of gardening inactivity. In three gardens, inappropriate temperate climate vegetables had been planted, to the disappointment of garden workers.

Six managers and thirteen gardeners reported that gardens needed to be located on land that was sanctioned by the local community and traditional owners. In two recorded instances, garden operations located on traditional lands had been interrupted for cultural reasons. The non-Aboriginal managers of these gardens found that this improved community engagement in the long term because local people saw that traditional owners were being respected. There was also an argument in four gardens that gardens should be centrally located within the community to improve their prominence and to improve access for people without transport.

Interviewees referred to gardens needing good drainage, arable soil and appropriate aspect to run well in seven places. In three gardens visited, waterlogging problems were observed and, in two of them the gardens were set up on very sandy soil, which was limiting growth potential. Both issues were confirmed by the interviewees in those locations. One failed garden had been set up on an old airstrip that was too compacted for root penetration and one in an area that exposed it to damaging wind.

Nine gardeners reported needed a reliable, good quality water source and robust, low-maintenance, automated irrigation that

people knew how to use and maintain. In one instance, a garden failed because mains water was being used without permission, and in another the garden was in jeopardy because questions arose over the safety of the water source.

In thirteen communities visited, the provision of supplies was limited by high freight costs and intermittent deliveries. Eleven of these communities had no hardware, nursery, or equipment providers or repairers. This was a major limitation to garden sustainability.

"There is nowhere (in the community) to buy anything (for gardening). The only people that can afford to buy (gardening) supplies are the white people with jobs who ship it in especially and for lots of money, but that's for their own hobbies. Locals can't afford to do it. When there are seedlings in the shop they sell in about three hours, there is so much community demand, but the shop mostly doesn't stock them." (Non-Aboriginal manager)

Eight garden workers and managers stated that mechanisation (such as tractors, harrows, harvesters, mowers and trimmers) made working in hot weather much easier, meant people were more likely to come to work and enabled more food to be produced.

"You need mechanisation to get people to come to work. These blokes are not going to stand around in the sun at 90% humidity, with a harrow, digging sweet potato. Would you?" (Non-Aboriginal manager)

On the other hand, this technology was reported as expensive and difficult to use and maintain by two non-Aboriginal managers. In multiple gardens visited, there was machinery waiting for parts, specialised knowledge or funding so that it could be repaired.

"That's the sprayer. There's a part we are waiting for, since April (nine months ago)." (Aboriginal manager)

All gardens had a fence around them to keep out roaming stock and dogs. Nine had high fences and gates and were locked at different times. Some people reported that fences limited community engagement, while others felt they were important to reduce vandalism as well as damage from wandering stock. No one reported malicious vandalism.

Four gardens had problems with children picking unripe fruit, but had reduced this by teaching children how to identify ripe fruit and by inviting them into the garden. One garden worker commented that there were no children picking unripe fruit when they knew adults who worked in the garden.

"Every member of the (garden) workforce, their kid goes to the school. So they know (the kids) better not go there, run amuck there (in the garden)." (Aboriginal garden worker)

Conclusions

This study has expanded on previous evidence and identified five principles of sustainability considered important for the sustainable operation of remote community gardens. These principles are listed under the headings of planning and integration, management and support, workforce and pay, funding and profits, and physical factors (Figure 2).

Included here under planning and integration, the concepts of community autonomy, consultation, engagement and control were

consistent with the community-oriented literature produced by Green and Charles Darwin University,^{13,22} although there was more focus on expanding community capacity in Green.¹³

Similarly, growing crops that the community want, as reported by this study, was highlighted across the community-oriented literature, but not in the government reports.^{21,24}

The concepts of planning and identifying aims found here were also common with the community-oriented literature,^{13,22} as was the need to integrate gardening into the community food supply through links with other organisations.

The factors identified here as important to garden success and sustainability align more closely with the community-oriented literature, rather than that of government reports, where physical factors tended to dominate and social factors were given less emphasis.

Unique to this work was a specific focus on staggering crop harvests and setting crop prices as being important to garden sustainability. Management support from committed, long-term managers was consistent with all the literature reviewed.^{13,21,22,24}

Under the heading of management and support, the fundamental need for good managerial communication skills and cultural sensitivity was in agreement with the community-oriented literature only,^{13,22} but was not mentioned in the government reports.^{21,24}

A novel aspect of this work relating to management and support was the inclusion of consultation with Aboriginal managers and the reporting of the advantages and disadvantages they face. Likewise, the differences in focus between Aboriginal and non-Aboriginal managers found here have not been examined in other work. Issues of gender division in the workforce were also noted by Green.¹²

Categorised here under the label workforce and pay, the issue of workforce motivation found in this study contrasts with Green's work, where it was explicitly stated that workforce motivation was not a limiting factor in garden sustainability.¹³

The idea of using a worker surplus is unique to this work, as are differences in pay structures, pay times, and scaling the workforce to suit the garden size and to allow for cultural demands. Culturally-appropriate working arrangements were noted by Green, but expanded further here.¹³

Listed here under funding and profits, stable funding structures and dedicated long-term funding were also raised by Green,¹³ although overall funding responsibility was not discussed in that work. Similarly, transparent profit distribution, which was raised frequently in the present study, has not been discussed in previous publications.

In the category of physical factors listed here, Green (but not others) suggested traditional foods were important to incorporate into gardens;¹³ however, it was not raised by interviewees in this work as a key component to the success of community gardens.

Land rights issues, soil, water, and horticultural supply issues are common to all the literature. Key infrastructure, including automated irrigation, labour-saving farming machinery and the availability of garden supplies and equipment, were specifically mentioned here and in Green's work, but not elsewhere.

Study strengths

This is the largest reported study of its type, encompassing the most interviewees and communities, and taking a community-oriented gardening perspective.^{13,22}

The broad range of interviewees including Aboriginal, non-Aboriginal, managerial and gardeners' perspectives, and both male and female interviewees, add weight to previous work, which had only examined small numbers of individuals from each of these groups. Data triangulation between a field diary, interviews and observational data further strengthened this study.

This cross-section of communities in the Top End of the Northern Territory is likely to be representative of other remote Aboriginal communities in tropical Northern Australia, with similar food supply, employment, remoteness, climate and culture. The similarity in findings between this work and that of Green, in tropical remote Northern Western Australia, adds weight to that argument. As such, this information is likely to be of benefit to the sustainable operation of remote community gardens across Northern Australia.

Study limitations

AH only visited each community garden once. Given the transient nature of community gardens,¹⁶ this may have given an inaccurate representation of any given garden over the longer term. On the other hand, interviewees were asked to reflect on their past and current experiences.

Single visits also limited the development of relationships with interviewees, which may have affected the interview data, because interviewees may have been more reserved. However the experience of the author (AH) was that nearly all interviewees valued the opportunity to tell their story.

Finding relevant interviewees in communities was sometimes difficult because people were often travelling or not contactable when the garden was visited. The impact of this on interviewee sampling is unknown, but it may have reduced the number of interviewees.

Finally, single person coding of data may have introduced bias into the work. However, the iterative analysis of data over the study period allowed for emerging themes to be checked through further community visits and interviews.

Policy implications

Benefits have arisen from the direct consultation with Aboriginal and non-Aboriginal managers and workers, resulting in new and expanded findings not found elsewhere.

Marked differences exist between the results found here based on community consultation, and those reported by government agencies.^{21,24} These reports focus almost entirely on the physical aspects of gardening, with little recognition of the importance of the social factors found in this and other community-focused work,^{13,22} including community autonomy and integration; culturally sensitive managers and employment conditions; fair pay; and very importantly, transparent financial management and profit distribution.

Given that government is largely responsible for the running of community gardens,¹⁶ there may be merit in expanding the understanding of what makes gardens work to include the important social factors identified in this study.

The ability of gardens to improve employment and food supply in remote communities is unknown, but potentially large. Given the history of sub-optimal garden operation under current management practices, this potential seems unlikely to be reached without large-scale and long-term changes to the way gardens are run. If the five principles of sustainability defined here are taken up, there is potential for long-term advances to community uptake, engagement and control of remote community gardens, with resulting improvements in their longevity, production capacity, and ability to provide nutritious food to communities.

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