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## Healthy Gardens/Healthy Lives: Navajo perceptions of growing food locally to prevent diabetes and cancer

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### Abstract

Poor access to nutritious foods, departure from traditional diets, and reduced physical activity are associated with a rise in type-2 diabetes and certain types of cancers among the Navajo. Diabetes in particular is of concern because of its increased prevalence among Navajo youth. Gardening can successfully address issues of poor availability of fruits and vegetables and offer many other social and health benefits. Our assessment aimed to determine Navajo attitudes about gardening and health in San Juan County, New Mexico. We conducted seven focus groups (including 31 people) to assess knowledge and attitudes related to gardening, and uncover barriers and facilitators to participation in a garden project. Each group session was moderated by two Navajo students. Transcripts revealed that many Navajo are aware of adverse health issues, predominantly obesity and diabetes, which occur on the reservation. Participants expressed a preference for educational approaches that incorporated cultural traditions, respect for elders, use of visual aids and experiential learning. Several social and agronomic barriers to gardening were also mentioned. Results suggested a broad interest in promoting gardening especially to reduce the risk of diabetes with the added value of enhancing social capital in Navajo communities.

### Keywords

Gardening; Native American health perceptions; community needs assessment; fruit and vegetable consumption; traditional learning styles

## Introduction

### Dietary behaviors on tribal lands of Southwestern United States

Inadequate fruit and vegetable consumption is a significant health issue among Native Americans. Navajo have 2-4 times higher rates of type-2 diabetes than non-Hispanic whites (Will et al., 1997) and 1 in 359 Navajo adolescents aged 15-19 are now receiving a diagnosis of diabetes (Dabelea et al., 2009). Southwest Native Americans also have higher rates of stomach, gallbladder, liver, myeloma and kidney cancers compared to non-Hispanic whites; for stomach cancer, reviews highlight low fruit and vegetable intake as a major risk factor (Wiggins et al., 2008). Fruit and vegetable consumption in Navajo families have been low for several years (Ballew et al., 1997) and these behaviors continue to persist (Cunningham-Sabo et al., 2008). Among Native Americans residing within Indian Health Service administrative service areas, 70% to 85% reported consuming fewer than 3 servings of vegetables or fruits on the previous day (Jernigan, Duran, Ahn & Winkleby, 2010).

Several factors affect healthy dietary choices, including the gradual abandonment of traditional Navajo diets and lifestyles (Gilbert, Percy, Sugarman, Benson & Percy, 1992; Slattery et al., 2007) as well as increased consumption of “junk” and “fast” food (Cunningham-Sabo et al., 2008; Sharma et al., 2009). Yet two-thirds of Navajo live more than 30 miles away from the nearest supermarket where they may obtain fresh fruits and vegetables (Gittelsohn & Rowan, 2011). “Food desert” communities on the Navajo Nation are served by a trading post, convenience store, or gas station that usually stock only highly processed, canned, dry and predominantly unhealthy foods (Devereaux, 2010). When fruits and vegetables are found in these outlets, they are often overpriced and of poor quality (Gittelsohn & Rowan, 2011).

### Gardening incorporated into a wellness strategy

One approach to promoting wellness, that has been introduced in some areas of the country, is to engage people in gardening. Growing one's own produce was once part of a healthy lifestyle for many Navajo people. The idea of gardening is receiving much attention nationwide including from the Navajo Nation as local food system approaches and desires to reconnect with traditional practices that strengthen communities gain momentum. Reasons to include gardening into a Navajo wellness program have been discussed in detail by Lombard, Forster-Cox, Smeal, and O'Neill (2006). Gardeners adopt healthier diets by consuming what they produce, and parents who garden with their children are more likely to pass this knowledge on to their children (Kortright & Wakefield, 2011). Gardening can provide access to a variety of nutritious and affordable food close to home (Wakefield, Yeudall, Taron, Reynolds, & Skinner, 2007) and some gardeners eventually sell their own produce (Faber, Venter, & Benade, 2002a). An additional bonus is that daily gardening activities performed in bouts of 10 minutes or more meet U.S. Department of Health and Human Service moderate- or vigorous intensity physical activity recommendations (Haskell et al., 2007); these activity levels reduce the risk or manage type-2 diabetes (Jeon, Lokken, Hu, & v.Dam, 2007).

### Study Aims

Most previous interventions to promote wellness through gardens on the Navajo Nation have not been based on theory or formative research. Although well intentioned, these programs have resulted in underutilization of garden spaces or in efforts that failed completely. It is important to learn from the lessons of previous programs, and seek guidance and participation from the community as a first step to sustaining a wellness intervention. Therefore this study used focus groups to elicit Navajo community members' attitudes about gardening and wellness and the barriers they face to establishing gardens to

help inform the choice of a theoretical framework and salient strategies within it for future garden-based wellness interventions on the Navajo Nation.

## Methods

### Study Procedures

We used focus groups because they 1) encourage participation in a relaxed environment; 2) engage discussion generated by other group members who might be reserved in expressing their opinions; and 3) do not discriminate against people who cannot read or write (Krueger & Casey, 2000). The focus group method has been used by other research teams working with the Navajo (Cunningham-Sabo et al., 2008). Questions were developed by Topaha and Becenti, Navajo undergraduate students, Lombard, a horticulturist and Beresford, an epidemiologist, provided additional input. Both Lombard and Beresford are non-Navajo. Once developed, questions were pilot tested, and then refined with participant feedback and additional suggestions from IRB reviewers. Interview questions touched mainly on 1) health/wellness topics pertaining to diabetes and cancer and 2) gardening topics pertaining to perceived importance in Navajo tradition, sources of information, and perceived agronomic/land tenure barriers to gardening like water and land access, and soil quality (Table 1).

Respondents were recruited with fliers and by word of mouth. Fliers were placed at the interview venues near the Navajo Nation in Kirtland (San Juan College [SJC], West campus), Farmington (Farmington Senior Citizens Center, National Indian Youth Council, and SJC Main campus) and Bloomfield, New Mexico (Bloomfield Senior Citizens Center). Many Navajo reside in these towns while others commute off of the Navajo Nation to work and shop. Navajo who frequented these locations either for educational or services were most likely to know about the study and volunteered because they heard about the study by word of mouth.

Inclusion criteria were being Navajo and over the age of 18 years. Eligible adults who expressed interest in participating were informed of the date(s)/time(s) of each focus group session by Topaha. Only Navajo members of the team (Topaha and Becenti, both female and Thomas, male) moderated and/or provided support for each session. Staff received some training in qualitative methods from Dr. Beti Thompson (Fred Hutchinson Cancer Research Center [FHCRC]), including facilitating focus groups. They were trained in the ethical conduct of human dimensional research through the National Institutes of Health online tutorial (NIH, 2011) and Institutional Review Board (IRB) approval was obtained from the FHCRC and New Mexico State University. The Navajo Nation Human Research Review Board (NNHRRB) also reviewed and approved the protocol.

Before starting, the moderator distributed consent forms and read through each form, asking for questions before obtaining consent. The questions were projected onto a screen so that participants could follow the questions being read out loud. All sessions were recorded. Sessions lasted approximately 45 minutes. At the conclusion of the session, participants received a copy of the consent form and a \$20 gift card as appreciation. Thirty-one individuals participated in one of seven focus groups between November 2009 and February 2011 and no-one refused to participate.

### Data Analysis

Members of the moderating team debriefed with the PI directly after each focus group session to note repeated talking points made among participants and begin preliminary theme development. Focus groups were conducted until data saturation had been achieved and no new themes emerged. Recordings were then transcribed verbatim by Navajo research

team members. Respondents were coded to identify who was speaking. Transcripts were sorted by interview question and independently reviewed by members of the research team (Lombard and Vela, a member of the Lipan Apache). Transcribers also assisted with data interpretation. Research team members met informally (while recordings were being transcribed) during the 2011 summer and formally once in December 2011 to identify, compare and refine key themes that were mentioned consistently within and across groups. Final refinement was made by the PI during the period Jan to April, 2012. Main themes centered on attitudes about gardening for health and gardening barriers and ways of learning. Subthemes (e.g. under Barriers to Establishing a Gardening) were embedded in each of the main themes identified. The NNHRRB received all raw data and transcripts for their archives and reviewed the manuscript.

## Results

Focus group respondents identified several social and agronomic barriers to garden adoption. These are outlined in Table 2, and are discussed within themes below.

### Gardens as a Source of Health and Wellbeing

“One of the major health concerns in Native communities is obesity and diabetes”.

Many felt a sense of urgency around issues related to diabetes in the community, especially the increasing prevalence among young children, the availability of unhealthy foods, and the loss of traditional lifestyles. With this recognition, most viewed gardening as part of a return to a traditional, healthy lifestyle and a way to prevent or reduce diabetes. As one man stated, “*I think you'd improve physically just from strenuous activity, from going to one plant to another, to another and then the next lane.*” Another suggested that “[*Gardening*] *decreases stress and it's just actually it makes you feel good.*” The perception that gardens provide a source of healthy foods was noted in the following way:

“I was just remembering, when we had a garden every summer, how we did not have a lot of store bought snacks but we would go to the garden to snack on what was growing, and it was fun and interesting to experiment a new taste or a new vegetable that was growing in our garden ... as a child I remember that. Instead of running home for a snack, we would just run to the garden...”.

Statements like: “*It doesn't cost that much to buy seed as it does to go to the produce stand*” indicated awareness about the cost savings in growing your own produce. As one woman explained: “*You know most of the Navajo people, they have low income, and if they raise their own garden, then they can save some [money], enough*”.

### Barriers to establishing a garden

Many barriers were discussed as to why gardening might be difficult for Navajo people. These barriers are outlined below and include issues related to land and water, lack of time, and information.

**Where to garden?**—Comments such as, “*It's hard to garden when you don't have your own land*” and, “*No backyard!*” were emphatically stated in unison in one focus group, which pointed toward land tenure issues. Also, city dwellers, especially young people, did not think it was possible to garden in rented housing unless “*the manager or owners allow you to dig up the soil to plant*”.

When asked about individual or community garden preference as locations for gardens, the discussion invoked a mixed range of responses. The subject of disputes and the desire to avoid them and produce theft out of communal plots were mentioned as one reason not to

garden communally. For this reason, individual gardens around one's home was preferred by some *“because you know you have a smaller area to take care of”* and *“I work at my pace and I don't have anybody to bicker with”*. Others thought that community gardens were part of past community efforts when *“the whole community would come out and help us”* and that community gardens could foster communication. Expressed this way: *“I think the way things are going right now the changes in society and what not on the reservation, might not be a bad idea to have a community project, that way it would increase communication”*.

**Poor Access to Water and Poor Soil**—The cost of water and access to water were widely cited as the biggest agronomic barrier to gardening. Referring to gaining access to irrigation acequias (canals) typically serving farms, a woman stated: *“We live in a subdivision on the reservation but we can't get access to the water unless you have an actual farm area. You're not allowed to have [a] garden in your home or on your lot unless you have access to the ditch and then the people that own the irrigation [water] complain that these people are taking their water”*. Additionally, hauling water in a storage tank in the back of a pick-up truck is a reality for many Navajo who do not have access to water or who mistrust the quality of their local water source: *“...sometimes I'll get a barrel on the truck and go down to the river and bring some water up to the house”*. Stated by another woman: *“we go to the water well and haul the water at my sister-in-law's farm then we'll just put it in bigger barrels and let it run into the fields”*. Poor soil was also considered problematic. For example, one woman stated: *“the soil is really sandy up where I live...it just blows so hard up there, and wind just burns my plants. I don't know what to do about it”*.

**No Time to Garden and Lack of Knowledge**—*“We used to garden every year but we stop[ped] gardening now and the main reason is time and you know working and stuff for me that is how it is”* indicated that busy schedules, especially among respondents that commuted from to cities to work (a reality for many Navajo), discouraged individuals from having the time to garden. Other respondents, however, acknowledged that gardening could be a way to spend family time together out-of-doors as opposed to spending time indoors on non-physical activities like television watching.

Lack of knowledge transfer received a great deal of discussion in all focus groups as a barrier to gardening. Many respondents stated they had learned about gardening from their elder family members but statements like this: *“My aunts, mother, grandmother... we used to jar a lot of fruits and vegetables and I was small then I see them do it, they use to have a can sealer...but I never learned how to do it”* pointed toward loss of knowledge passed between generations. A comment *“They don't know anything about white people's food like: lettuce, tomatoes, all these fresh salad”* indicated limited knowledge about non-traditional crops, their cultivation or consumption in the diet.

**Ways of Learning – Didactic, Visual and Tradition-based**—Statements like: *“I would like someone to really help me develop my own yard. I need to learn the whole process of planting, season, and time of the year to plant”*; *“Vegetables, I used to do it. It's been years since I did it; so a refresher course wouldn't hurt”*; and *“We pretty much learn visually, so like actually seeing what it does first hand, I mean like right in front of you”* indicated that having guided, hands-on trainings and mentoring combined with demonstration garden sites were important ways to learn gardening techniques and food preservation methods. In one focus group, respondents discussed the need to expand services like health and agricultural technical support to more rural portions of the Navajo Nation.

The impact of television and print media was referenced several times as a way that information is conveyed to children and adults. Garden “how to” specific media sources that

respondents referenced included women's magazines, reading material from libraries, and news bulletins. In several focus groups, respondents discussed the ideas of conveying gardening/health information through a combination of traditional story exchange and modern use of multimedia like a home and gardening channel that was broadcast on television. Elaborating further:

“If you want to get the Navajos to improve their diet and health you probably need a Navajo Martha Stewart. Yeah, because she could come at a classroom or chapterhouse and communicate in English and Navajo and you know, get their work out that way. You know get a cable or a satellite dish. It's not just on any channel. So that would help to get the word out to someone that's not eligible to and talk in Navajo and English about the benefits of gardening and health. You know incorporate some of the Anglo philosophies and also the Navajo philosophies to know what's good. They kind of understand it better the benefits of it”.

Respondents repeatedly stated their respect for elders and intergenerational knowledge transfer as an important way of learning gardening techniques. Summarized in this way:

“...reeducate the people and transfer, that information to the next generation, younger generation, I think that would be good, you know somebody to instruct in that way, and that would mean using your own language, [be]cause when you use your own language it seems like it really touches you know the soul of people, spirit of people out there on the reservation, and they really appreciate that, especially young people they don't speak the language really good, and when they do hear it, it motivates them to want learn and understand what this person is saying, so you would generate a lot of communication... [be]cause now nobody has that information anymore, but I think they would see the value in it... You can make it like a lesson plan where you're teaching the kids...and instill in them discipline and hard work you know and those kinds of values need to come back to your kids”.

## Discussion

### Gardens Recognized as a Source of Health and Wellbeing

Obesity and diabetes (and, to a lesser extent, cancer) were discussed as the most serious health issues facing Navajo people. Respondents talked about multiple family members receiving a diagnosis of diabetes and there was a general consensus that poor diet was largely to blame. Previous studies have identified store stocking of unhealthy foods, high cost and poor availability of fruit and vegetables on the reservation, parenting factors, food preferences, and time pressures as barriers to healthful eating in Navajo families (Cunningham-Sabo et al., 2008; Devereaux, 2010; Sharma et al., 2009). Our findings are in agreement with these previous assessments. Interestingly, they are also similar to those of a study by Hu, Acosta, McDaniel, and Gittelsohn (2011) that assessed low-income, urban, predominantly African American groups. Specifically: the fact that “food deserts” limit healthy eating choices, the belief that some fruits and vegetables are “white man's food”, lack of available time to garden, and lack of information on gardening are similarly noted perceptions. Poor dietary habits that are developed in childhood increase the risk of diabetes in adulthood (Gahagan & Silverstein, 2003) and in our interviews, some respondents recognized this.

### Barriers to establishing a Garden

Where lease agreements, lack of available space, or poor access to water (more below) prevent gardening, community gardens successfully provide garden spaces for these individuals and are now frequently integrated into urban planning (Hou, 2009) and health

initiatives (Hale et al., 2011). For those not wishing to participate in community gardens, individual gardens around homesteads still address health disparities (Faber, Phunnngula, Venter, Dhansay & Benade, 2002b) and small raised bed patio gardens offer alternatives for people living in housing units that restrict in-ground cultivation of gardens. In our study, attitudes about gardening in a community setting versus gardening around one's home were mixed. Some Navajo may prefer to garden at home to avoid situations where disputes might occur, while others, such as in cases where gardeners are already tending to a vegetable plot around their own home, may view a community garden approach as an extra chore. In fact this latter point was actually raised in one focus group session. For community outreach workers wanting to undertake garden projects, no single garden model (communal versus homestead) should be assumed until a community needs assessment has been undertaken.

Limited access to water not surprisingly received most of the discussion as an agronomic barrier to gardening, given our study was in northwest New Mexico. Poor access to water has also been noted by others as being a barrier to growing crops (Devereaux, 2010). Water is essential in this semi-arid region which receives on average 203 mm of precipitation per year and has experienced only 81 mm of precipitation for the year 2012 up to mid-December. Although in some parts of the Navajo Nation, irrigation ditches divert river water from mountainous snow melt to small farms during the growing season (May-October), access to the “ditch” is restricted to landholders having “water rights” – legal access to the ditch. This policy restricts those without water rights to using expensive tap water to irrigate a garden. Suggestions for increasing access to affordable water were minimal although in one focus group, rain catchment and water conservation education were briefly discussed. Our results suggest a need for more irrigation related educational programming.

### **Ways of Learning – Experiential, Visual, and Tradition-based**

Promoting gardening practices as a return to a healthier lifestyle, intergenerational education, reeducation on traditional culinary herbs, fruits and vegetables, Navajo language outreach, and promoting parents as positive role models were expressed as ways to overcome unhealthy eating habits. The use of multimedia (e.g., television, Internet, social media, print and radio) was also expressed by some focus group participants as a way of learning that could be used to supplement an intervention or improve cooperative education outreach by agricultural and health workers. Innovative use of multimedia has been implemented in addressing youth nutrition (Roseman, Riddell, & Haynes, 2011). Youth are familiar with the technology of social media which is now being used to address other garden related issues in New Mexico (Sutherin, Lombard, & St.Hilaire, 2011).

Fruit and vegetable asking behavior increases in children when school/afterschool-based integrated nutrition and garden programs involve parents working with their children (Heim, Stang, & Ireland, 2009; Libman, 2007). Other in-school/after-school garden projects have achieved two-fold increases in fruit and vegetable consumption in youth (McAleese & Rankin 2007), especially when indigenous traditions and familiar fruits and vegetables are incorporated into the curriculum (Pobocik, Montgomery, & Gemlo, 1998; Hermann et al., 2006). The difficult realities of home life, however, can offset gains for children that participate in school-based wellness initiatives (Gittelsohn & Rowan, 2011). These issues reiterate the need to engage parents as positive role models in any behavior change intervention. The recognition of these health issues in the Navajo community indicates an awareness of their susceptibility to these problems, recognition of loss of intergenerational traditional knowledge transfer, and perhaps an interest and willingness to participate in programs aimed at reducing their diabetes and cancer risk.

## Limitations

One limitation of our study is that it took place, not on the Navajo Nation reservation, but in an urban/commuter area nearby. We did not ask participants to identify whether they resided on or off of the Navajo Nation and so answers may not have been totally reflective of attitudes held within the interior of the reservation. On the other hand, data indicating that about 71% of Navajo income is spent off of the Navajo Nation (Choudhary, 2003) suggests that we captured the attitudes of Navajo that live near border towns like Farmington.

Questions concerning topics of health were limited to cancer and diabetes because we wanted to inform a future cancer and diabetes intervention. Many social and agronomic barriers to gardening adoption, as well as strategies to sustain gardening adoption, were identified and discussed among the Navajo focus groups that were part of this study.

## Conclusion

Ultimately, successful garden-based interventions address a community need, involve participants in meaningful ways that foster a sense of ownership, have dedicated leadership, partner with local governments, and form alliances with organizations that have related goals (Bal, 2009). Although garden-based wellness programs are popular, no particular model (e.g., community versus individual garden) should be assumed until these steps are undertaken. Emphasizing visual learning methods, Navajo traditions and story-telling in the learning process and addressing poor access to water and other agronomic barriers while providing supports to parents and their children in a demonstration based learning environment, would add value to a Navajo garden intervention program and would help ensure long-term success of a garden-based wellness initiative.

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**Table 1**

## Gardening and Health Themed Focus Group Questions.

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1	Is gardening important to you?
2	How do you think that your health could be improved by tending a garden?
3	How do you think that your economic and food security could be improved by tending a garden?
4	What kinds of information have you received about gardening?
5	What problems or barriers do you encounter for farming/gardening in your community?
6	Where might a garden be placed in your community; are community or individual gardens preferred?
7	What kind of gardens might work? School gardens? Senior Citizen Center gardens? Other ideas?
8	Would you participate in a gardening class, canning class, or gardening 101? How might this help? In your home community, what are your major health concerns?
9	What do you know about diabetes?
10	Is cancer a health concern?
11	Does your chapter talk about diabetes at their meetings?
12	Does your chapter talk about cancer at their meetings?
13	Can you think of ways we can reduce diabetes among the Navajo people?

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**Table 2**

Barriers and strategies to gardening and food preservation on the Navajo Nation as perceived by focus group participants.

Issues	Barriers	Strategies
Diabetes is high – in adults and now in children.	<ul style="list-style-type: none"> <li>Lack of education.</li> </ul>	<ul style="list-style-type: none"> <li>Educate children and adults.</li> <li>Emphasize health benefits of gardening recognized as increased physical activity.</li> </ul>
Foods are unhealthy.	<ul style="list-style-type: none"> <li>Cheaper to buy unhealthy junk foods.</li> </ul>	<ul style="list-style-type: none"> <li>Growing your own fruits and vegetables is cheaper than purchasing.</li> </ul>
Unfamiliar fruits and vegetables viewed as “white man’s food”.	<ul style="list-style-type: none"> <li>Lack of education.</li> </ul>	<ul style="list-style-type: none"> <li>Emphasize traditional culinary herbs, fruits and vegetables and familiar foods that are healthy.</li> </ul>
Loss of traditional knowledge.	<ul style="list-style-type: none"> <li>I never learned from my grandparents.</li> <li>Drifting away from traditional practices.</li> </ul>	<ul style="list-style-type: none"> <li>Emphasize elders as a source of information and knowledge transfer.</li> <li>Emphasize Navajo tradition-based learning.</li> <li>Record/document elders and their stories.</li> </ul>
Sedentary lifestyle.	<ul style="list-style-type: none"> <li>Kids watching too much TV and staying inactive.</li> </ul>	<ul style="list-style-type: none"> <li>Emphasize parents as role models.</li> <li>Utilize multimedia in a positive way.</li> </ul>
How do I go about gardening?	<ul style="list-style-type: none"> <li>Lack of information.</li> <li>Lack of tools.</li> </ul>	<ul style="list-style-type: none"> <li>Emphasize hands-on, visually based demonstration plots and workshops – the starting point to gardening practices.</li> <li>Emphasize gardening/canning classes for kids.</li> <li>Use multimedia. “Navajo Martha Stewart”; magazines and printed media.</li> <li>Expand technical assistance to rural and underserved areas.</li> </ul>
Where can I find space to garden?	<ul style="list-style-type: none"> <li>Lack of access to land.</li> <li>Live in an apartment complex in the city.</li> <li>Land lease agreements.</li> </ul>	<ul style="list-style-type: none"> <li>Promote small patio gardens around house.</li> <li>Promote community gardens.</li> <li>Educate manager or owner of housing units to allow gardens on leased property.</li> </ul>
Where can I find time to garden?	<ul style="list-style-type: none"> <li>Busy schedules prevent time to spend out of doors.</li> </ul>	<ul style="list-style-type: none"> <li>Encourage family time on out of door activities instead of indoor activities.</li> </ul>
Water.	<ul style="list-style-type: none"> <li>Lack of access to affordable and high quality water.</li> <li>Lack of water rights.</li> </ul>	<ul style="list-style-type: none"> <li>Increase universal access to water.</li> <li>Promote water conservation.</li> <li>Promote rain catchment.</li> </ul>
Soil quality is poor.	<ul style="list-style-type: none"> <li>Wind, sandy soil.</li> </ul>	<ul style="list-style-type: none"> <li>Emphasize technical assistance.</li> </ul>

Issues	Barriers	Strategies
Desire to avoid disputes.	<ul style="list-style-type: none"><li data-bbox="509 262 773 300">• Disputes over water (e.g., access to irrigation canals).</li><li data-bbox="509 317 773 359">• Theft of garden produce in communal spaces.</li></ul>	<ul style="list-style-type: none"><li data-bbox="873 262 1362 300">• Individual gardens around one's home viewed as convenient and a way to avoid disputes.</li><li data-bbox="873 317 1362 380">• Communicate with one another. Community garden viewed as a way to foster greater communication, have other people around to assist when things got "busy".</li></ul>