



Healthy Choices
Healthy Lifestyles



Yuma County Public Health Services District

**Health Impact Assessment
of a proposed Community
Garden Ordinance for
Yuma County**

June 2015



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Funding for this project was provided by the National Center for Chronic Disease Prevention and Health Promotion (CCDPH) under grant number U58DP004793.

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Acknowledgements

The Yuma County Public Health Services District recognizes the effort and dedication of the many participants and stakeholders who contributed to this Health Impact Assessment. The Health Promotions Division, Health in Arizona Policy Initiative and Arizona Nutrition Network have partnered to prepare this document, with significant inputs from the Yuma County Department of Development Services and other public and community agencies. We want to thank Deborah Robinson and Anissa Jonovich of the Arizona Department of Health Services for offering guidance and resources to support this project, and Anna Vakil for providing technical assistance including the literature review, some data analysis, final report revisions and the process evaluation. We are grateful to the members of the HIA Stakeholder Group who participated in regular meetings and interviews (see list below), as well as the Healthy Communities Food Garden Network. We also extend our grateful recognition to the Yuma County citizens who responded to an interview in order to provide key public input.

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Healthy Communities Food Garden Network, a Health District-led network

A Health District led workgroup aimed to increase access to healthy food and physical activity. Formed in 2013 and comprised of subject matter experts, and non-profit organization representatives interested in promoting and supporting community gardens in Yuma County.

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Yuma County Public Health Services District

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Key Health Impact Assessment Concepts & Terms

Health Impact Assessment:

A Health Impact Assessment (HIA) is a systematic process that uses an array of data sources and analytical methods and considers input from stakeholders and the public to determine the potential effects of a proposed policy, plan, program or project on the health of a population and the distribution of the effects within the population. An HIA also provides recommendations on monitoring and managing those effects.

Health Impact/Effect:

Any change in the health of a population or any change in the physical, natural, or social environment that has a bearing on public health.

Health Determinant:

The range of personal, social, economic and environmental factors which determine the health status of individuals or populations. An example of a health determinant relevant for this HIA would be access to healthy food.

Health Outcome:

The health status of an individual, group or population which is attributable to a number of determining factors such as behaviors, social and community environments, health care services and genetics. An example of health outcomes relevant for this HIA would be diabetes and obesity.

Health Equity:

Health equity refers to absence of disparities between population groups with respect to disease and health outcomes. Health equity is impacted by a variety of social factors such as income inequality, educational quality, natural and built environmental conditions, individual health behavior choices and access to health care. Health equity is improved as these disparities are eliminated or minimized. Health inequity is exacerbated as these disparities grow.

Health Disparity:

Differences in the overall rate of disease, morbidity or mortality between one population group and another. Many personal, social, economic and environmental factors contribute to health disparities. Many populations are affected by disparities including racial and ethnic minorities, residents of rural areas, women, children, elderly and persons with disabilities.

Health in All Policies:

The practice of considering health, well-being and equity in the development and implementation of policies, projects and programs in non-health sectors. It involves a range of activities, such as HIA, to achieve better health outcomes and reduce health disparities.

Rapid, Intermediate and Comprehensive HIA:

Rapid HIA involves collection and analysis of existing data only. An Intermediate HIA is the most common type and entails a more thorough investigation of health impacts as well as the collection of some new data. A Comprehensive HIA involves the collection and analysis of new data using multiple methods and sources and is the most costly and time-consuming of the three.

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Executive Summary

Community gardens have been identified as part of a strategy for improving access to healthy food, which can reduce food insecurity and help lower the risk of several chronic diseases. As a result, in recent years a number of community-based and public health initiatives in Yuma County began encouraging and establishing community gardens. However, this has required an adjustment to the zoning regulations in several jurisdictions that did not otherwise include community gardens as a permitted land use. The City of Yuma was the first to respond, and in the fall of 2014, Yuma County Department of Development Services (Department of Development Services) began work on its own Community Garden Ordinance.

A Health Impact Assessment (HIA) is an information gathering tool used to inform and promote policy decisions that are beneficial for health. Information gathered includes an examination of research literature, data on health outcomes and determinants, and input from stakeholders, experts and the public. From the fall of 2014 to June of 2015, with funding from the Centers for Disease Control and the Pew Charitable Trusts and assistance and support from the Arizona Department of Health Services, the Yuma County Public Health Services District (Health District) conducted a HIA on a proposed Community Garden Ordinance for Yuma County. The main goal of the HIA was to inform Department of Development Services of the health impacts of the Community Garden Ordinance with a focus on four main health determinants: physical activity, diet and nutrition, social capital and food security. The decision-making process for the Community Garden Ordinance will culminate with the submission of a zoning text amendment along with a staff report to the County Board of Supervisors, anticipated to take place in late 2015.

Key decision makers associated with the HIA are Department of Development Services, the Health District and the Yuma County Board of Supervisors. The HIA findings will also serve as an educational tool and example for members of the Yuma County Citizen Advisory Groups, which will help provide public input into the formulation of the Yuma County 2030 Comprehensive Plan. Other stakeholders include the City of Yuma, the University of Arizona Yuma County Cooperative Extension (Cooperative Extension), Yuma County Injury Prevention Program, Arizona Nutrition Network (Nutrition Network), Health in Arizona Policy Initiative (HAPI) and Arizona Alliance for Livable Communities.

Key findings on the health impact of a Community Garden Ordinance

This HIA examines the impact on health of community gardens that would be initiated by county residents as a result of a Community Garden Ordinance in Yuma County.

Current conditions

The following are key health outcomes and determinants that could be positively affected by the establishment of community gardens:

- 1) Yuma County has higher rates of diabetes (13.3%) than Arizona (9%).
- 2) Yuma County has higher rates of cardiovascular disease (12.9%) than Arizona (10.4%).
- 3) Yuma County has higher rates of obesity (30.2%) than Arizona (24.7%)
- 4) 22.3% of residents in Yuma County and 39.4% of children in Yuma County are food insecure.
- 5) Physical inactivity in Yuma County has been rising in recent years.

Projected impacts

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The research literature and stakeholder expert input anticipates the following impacts of community gardens on health:

Physical activity: Those who participate in a community garden will increase their physical activity, which is known to reduce the risk of cardiovascular disease, obesity and stress.

Diet and nutrition: Those who participate in a community garden will significantly increase their consumption of fruits and vegetables and will start eating nutritious foods they were not previously eating. This is especially the case where programming is in place that provides nutrition education and training in food preparation. Increased consumption of fruits and vegetables is associated with lower risk for obesity.

Social capital: Social capital results from the benefits associated with strong relationships with others and includes improved health. Those who participate in a community garden will increase their social interactions with others and will experience lower levels of stress.

Food security: Those who participate in a community garden will enjoy significant food cost savings and will therefore increase their food security. Food insecurity has a significant impact on health, especially that of children, who are sick more often and experience growth impairment, slowed cognitive development, lower school achievement and behavioral problems.

Potential negative impacts: Those who participate in a community garden may increase their exposure to toxins from pesticides or soil contaminants, food-borne illness, heat-related illness and strain injuries. All of these, however, can be mitigated through regulatory measures and appropriate training and education, most of which is already in place.

Recommendations for a Community Garden Ordinance

Several measures can be adopted that facilitate the establishment of community gardens and help ensure that they are successful. The following recommendations would therefore enhance the positive health impacts and reduce the negative impacts of this ordinance:

- 1) That residents interested in establishing community gardens be connected with existing programming support that trains gardeners in efficient gardening techniques, organizational and leadership effectiveness, and how to avoid heat-related illness, food-borne illness, toxin exposure and strain injuries. Cooperative Extension currently offers several different types of this training.
- 2) That soil testing be required in cases where community gardens are proposed for sites that are potentially contaminated and that precautionary soil testing be adopted as a best practice.
- 3) That the Health Services District continue to maintain its existing nutrition programming in order to encourage and support residents in food desert neighborhoods to participate in community gardens. The Nutrition Network already has programs in place that include gardening workshops, nutrition classes and cooking demonstrations.
- 4) That the Department of Development Services encourages the use of vacant land, especially county-owned public land, for community gardens, particularly land that is currently underutilized.

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Conclusion

Summary of health outcomes and impacts

| Summary of Health Outcomes & Impacts | | | |
|--|----------------------------|--|----------------------------|
| Health Outcome or Determinant | Direction of Impact | Distribution of Impacts | Quality of Evidence |
| Increased physical activity | + | All segments of the population | *** |
| Reduction in Type-2 diabetes | + | All segments of the population, children, youth | * |
| Reduction in cardiovascular disease | + | All segments of the population | * |
| Reduced obesity | + | All segments of the population, children, youth, Hispanics | ** |
| Increased consumption of fruits & vegetables | + | All segments of the population, children, youth | ** |
| Increased social interaction | + | Adults, elderly | *** |
| Reduced stress | + | Adults | ** |
| Food cost savings | + | All segments of the population | * |
| Food security | + | All segments, children & youth | ** |
| Increase strains & injuries, heat related illness, food borne illness | - | All segments of the population | * |
| Key: * Less than 5 Studies, ** 5-10 Studies, *** 10-20 Studies | | | |

Summary of health outcomes and impacts is also described in body of document see page 24.

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Introduction

Lack of food security in the US is a significant public health problem. In 2009, it was estimated that approximately 14% of Americans were food insecure (Reference #22). Parallel with this, cardiovascular disease, diabetes and obesity have presented a growing chronic disease burden for the population and the health care system. The CDC has identified that part of a strategy for combating both of these problems is improving access to healthy foods (17).

Yuma County, Arizona, illustrates a unique paradox that while being a vital provider of fresh produce to the nation for much of the year, food insecurity for its own citizens is exceptionally high. As well, rates of several chronic diseases in Yuma County are higher than those in both Arizona and the US, particularly obesity (25). In response to these issues, the community has arisen to initiate several efforts that work towards increasing access to healthy food. One of these is a growing interest in establishing community gardens, however, community gardens have until recently not been permitted by planning jurisdictions in the county.

The City of Yuma was the first to approve a community garden ordinance in April of 2015 and in the fall of 2014 Yuma County began the process of formulating theirs. This development presented an opportunity for the Yuma County Public Health Services District (Health District) to conduct the county's first Health Impact Assessment (HIA).

The purpose of this HIA is to investigate the potential health impacts of a proposed Community Garden Ordinance for Yuma County that is being prepared by the Yuma County Department of Development Services (Department of Development Services). An HIA is one of several tools available that examine the intended and unintended effects of policies, programs and projects on community health.

For the purpose of this HIA, we define "community garden" as any piece of publicly or privately owned land that is planned, designed, built, maintained and gardened by a group of community members for the purpose of producing fruits, vegetables (and sometimes ornamentals) for consumption by community garden members or for donation.

Background: Building a movement for healthy eating in Yuma County

In an effort to build interest and participation in increasing access to healthy food, decreasing risk factors for obesity, reducing the incidence of chronic diseases, and promoting opportunities for physical activity, the Health District, Health in Arizona Policy Initiative (HAPI) and the Arizona Nutrition Network (Nutrition Network) created the Healthy Communities Food Garden Network (Food Garden Network) in August 2013, comprised of individuals and representatives of organizations interested in promoting and supporting community gardens.

Representatives from the following agencies attended an initial roundtable discussion: City of Yuma Housing Authority, Housing America (a local nonprofit housing organization), Palmcroft Elementary School, the Yuma Community Food Bank, JV Farms & Smith (a local farming company) the University of Arizona Yuma County Cooperative Extension (Cooperative Extension), Dr. Jeanne Elnadry (a local physician affiliated with Hospice of Yuma), and other Health District representatives (Deputy Director and Emergency Preparedness). The network has since expanded and now includes representation from the Department of Development Services, City of Yuma Neighborhood Services division, the City of Yuma Planning and Zoning division, the City of Somerton Parks & Recreation division, Crossroads

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Mission and the Cocopah Indian Tribe. The goal of the Food Garden Network is to increase access to healthy food, as well as create community awareness around the multiple benefits of food gardens.

At approximately the same time, the Yuma Regional Medical Center launched the Yuma County Arizona: Healthiest County in America initiative. This effort has four areas of focus: child and family health, chronic disease prevention, access to comprehensive care and workplace wellness, as well as Healthy Eating Adventure Yuma, which encourages eating plant-based whole foods (4). Another significant parallel development is A Healthy Somerton (1), an initiative of the Regional Center for Border Health Inc. that focuses on chronic disease management and increasing physical activity, which also includes a Farmers Market On Wheels that provides fresh produce to Somerton neighborhoods.

As discussions about food gardens gained momentum within Yuma County, school boards and private landowners joined the movement. In September 2014, HAPI in collaboration with the Arizona Department of Health Services and the University of Arizona College Of Agriculture offered a local School Garden Certification program. Schools learned how to meet requirements that enable fresh produce to be safely served in school cafeterias from their on-site school gardens and learned how to develop a school garden curriculum. Currently, there are over eight school gardens and five privately owned gardens operating within Yuma County.

About this Health Impact Assessment

In October 2014, the Health District secured a grant from the Centers for Disease Control distributed through the Arizona Department of Health Services to conduct an HIA on the proposed Yuma County Community Garden Ordinance. Funding to support technical assistance for the project was provided from the Pew Charitable Trusts in November 2014 and Anna Vakil of Canopy Consulting and Research (the Consultant) was contracted to provide this assistance.

The research conducted for this HIA identified four main pathways to health that can result from community gardens. It also proposed recommendations that can enhance these health benefits:

- 1) Physical Activity
- 2) Diet and Nutrition
- 3) Social Capital
- 4) Food Security

There are six essential steps involved in conducting an HIA.

1. **Screening:** The screening process determines if conducting an HIA will benefit the project, plan, program and/or policy and decision makers.
2. **Scoping:** The scoping process identifies the goals, objectives and key health determinants of the HIA.
3. **Assessment:** The assessment process creates a profile of the population affected and existing conditions of the health and environmental outcomes. It also involves collecting information in order to estimate or project positive and negative consequences of the decision.

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4. **Recommendations:** The recommendation process involves suggestions and/or actions for avoiding negative impacts and the opportunity to leverage resources to improve health outcomes.
5. **Reporting:** The reporting process is the presentation of evidence-based recommendations to guide in the final formulation of the decision.
6. **Monitoring and Evaluation:** The monitoring and evaluation process allows the opportunity to determine how the HIA was used, and whether its projections and predictions were accurate. Monitoring also allows for long-term review of implementation of the recommendations and measurement of health outcomes.

The sections which follow describe each of these respective steps.

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Screening: Is an HIA appropriate?

The main purpose of the screening step of the HIA is to determine whether to proceed with an HIA. In this case, the decision was taken to move forward with an HIA of the Community Garden Ordinance for the following reasons: feasibility and timeliness of the HIA relative to the decision-making process of the ordinance, suitability of the topic for the first HIA to be conducted in Yuma County, the policy had potentially important impacts on health, there were sufficient resources to conduct an HIA and there was receptivity of stakeholders. Based on the resources available and the proposed timeline (October 2014 through June, 2015), it was decided that a project somewhere between a Rapid and an Intermediate HIA was feasible since resources were limited but allowed for some new data to be collected.

A Core Team at the Health District was formed to lead the HIA process consisting of Annette Perez, Wellness Coordinator, Health in Arizona Policy Initiative; Suzanne Cooper, Program Coordinator, Arizona Nutrition Network; and Gloria Coronado, Health Promotions Programs Manager; along with Anna Vakil, the Consultant providing technical assistance.

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Scoping the HIA

The HIA Core Team decided that the main goals of the HIA were to:

- 1) Inform the Department of Development Services and other key stakeholders and decision-makers about the health impacts of the proposed Community Garden Ordinance.
- 2) Facilitate partnerships and a learning process among stakeholders about how to do an HIA and the value of HIAs as an important tool in a Health in All Policies strategy.
- 3) Identify recommendations for existing and new policies and programs that enhance the health benefits of community gardens.

Proposed ordinance and HIA study area

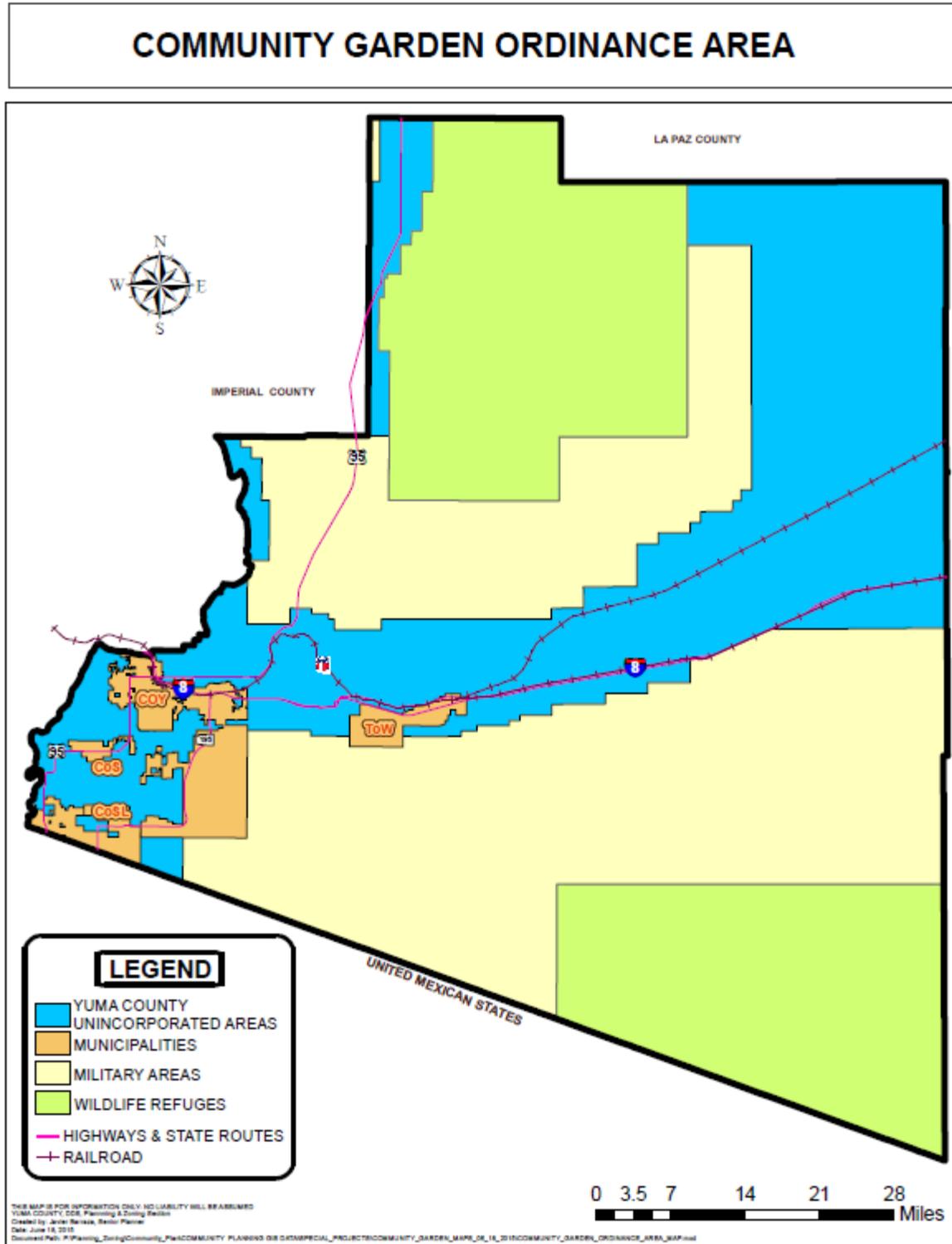
The Department of Development Services first considered proposing a community garden ordinance for Yuma County in 2013 following the passage of similar ordinances in the City of Phoenix. In April 2015, the city council of the City of Yuma approved a text amendment permitting community gardens as a land use in several types of residential, commercial, agricultural, industrial and recreational zoning districts in the city and also signaled support of a Community Garden Policy adopted by the Community Development Department. Since parts of Yuma County are contiguous with the City of Yuma, Department of Development Services indicated to the HIA Core Team their intention that any new proposed community garden ordinance for the county should be compatible with what the City of Yuma already has in place.

The current timeline for approval of the county ordinance is late 2015, involving the submission of a zoning text amendment to the County Board of Supervisors accompanied by a staff report, which can include health-related language and other recommendations from this HIA. Work on the 2030 Comprehensive Plan will also begin soon and is expected to be submitted to the County Board of Supervisors in early 2020. The Department of Development Services is hoping to learn from this HIA about how best to incorporate health outcomes into the process of preparing the 2030 Comprehensive Plan.

For the purpose of making the project manageable, it was decided that the HIA would focus on the unincorporated areas in Yuma County and unincorporated areas where the county ordinance cannot be enforced. By definition, this removed the larger urban centers such as the cities of Yuma, Somerton and San Luis, the Yuma Proving Ground and Marine Corps Air Station-Yuma, wildlife refuges and the Cocopah Indian Tribe Reservation, consisting of three noncontiguous areas occupying 6,500 acres on or near the Colorado River west of Yuma (see Figure 1). This enabled a focus on those areas that were directly under the jurisdiction of The Department of Development Services and the proposed ordinance. Notwithstanding this, it is hoped that the information and results provided by this HIA will be used by the cities of Yuma, Somerton and San Luis, as well as the Cocopah Indian Tribe.

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Figure 1: Community Garden Ordinance Area



The total population affected by the Community Garden Ordinance consists of those residing in the unincorporated areas of Yuma County 2013, was 63,007 people (75). Much of the policy area is

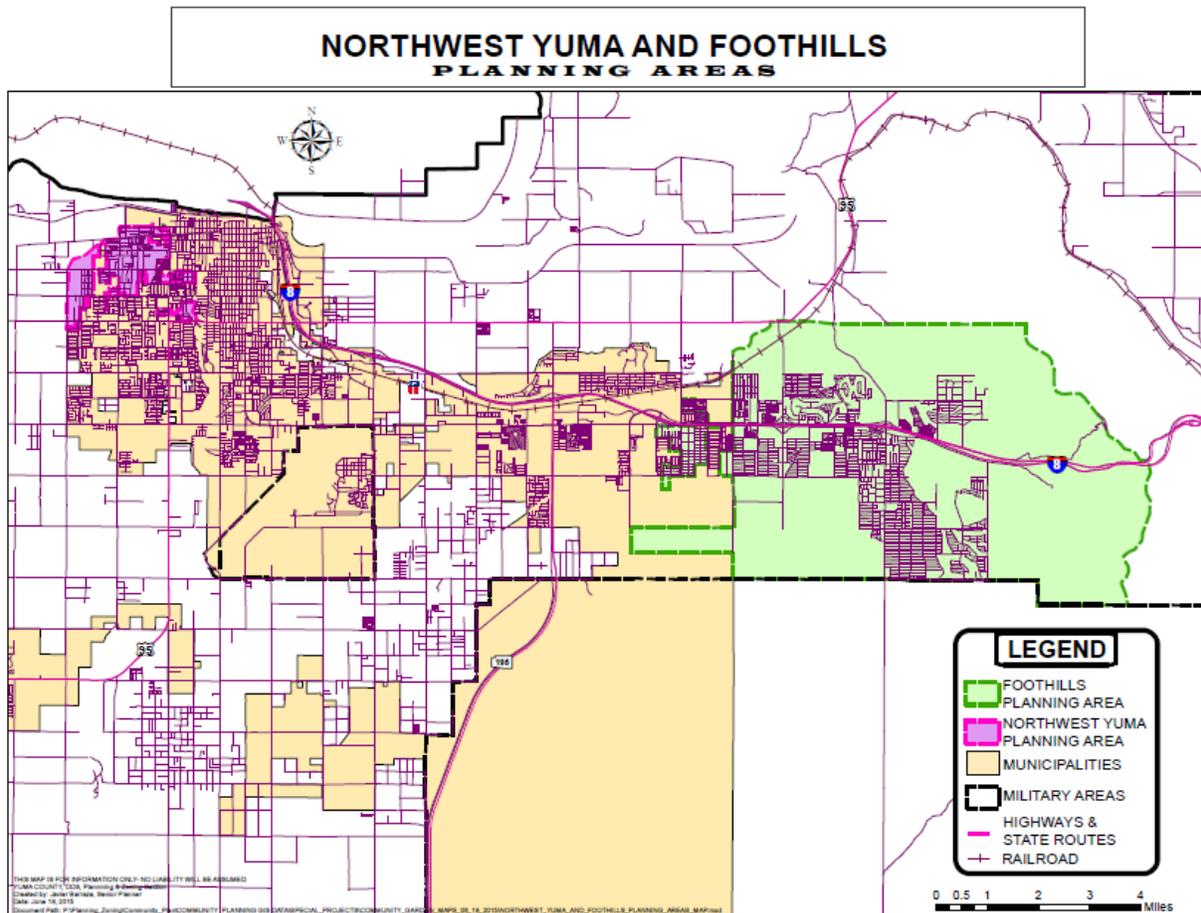
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uninhabited desert or rural farmland; where community gardens are unlikely to be established. As a result, a decision was taken early on to further focus the HIA on neighborhoods in higher-density urban areas within the Community Garden Ordinance area. After consulting with The Department of Development Services, three zones meeting this definition were identified, (two are illustrated in Figure 2):

- 1) Northwest Yuma, which is the urbanized area west of Yuma contiguous with the city
- 2) Foothills, which is the urbanized area east of Yuma
- 3) "County islands" within the City of Yuma, which are small unincorporated areas of Yuma County surrounded on all sides by the City of Yuma

Figure 2: Northwest Yuma and Foothills



Engaging stakeholders

To ensure a collaborative process for the HIA, a Stakeholder Group was formed, include representation from other key divisions of the Health District, City of Yuma Planning Dept. staff, Co-operative Extension, Yuma County Intergovernmental Public Transportation Authority (Carol Perez, Management Analyst) and the Regional Center for Border Health Inc. Throughout the process, the Food Garden Network, which continued to meet regularly, was considered to be a broader stakeholder group for the HIA. Updates on the HIA were provided at every Food Garden Network meeting and input from the various participants was also solicited.

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The stakeholder strategy consisted primarily of a series of four meetings that served the dual purpose of providing information updates and soliciting input from stakeholders at key points of the HIA process:

- 1) February 10, 2015: Input solicited from stakeholders on health outcomes and determinants for the Pathway Diagram.
- 2) April 10, 2015: Presentation of draft Pathway Diagram and interviews of stakeholders on key Assessment variables.
- 3) June 3, 2015: Solicitation of recommendations and suggestions.
- 4) July, 2015: Presentation of Final HIA Report.

Engaging residents: vulnerable populations

While the entire population of the Community Garden Ordinance area will benefit from the establishment of community gardens, our preliminary investigations indicated that the strongest positive impacts would be seen in the vulnerable populations. In addition, HIA best practices encourage the targeting of limited resources toward understanding issues faced specifically by vulnerable populations (83).

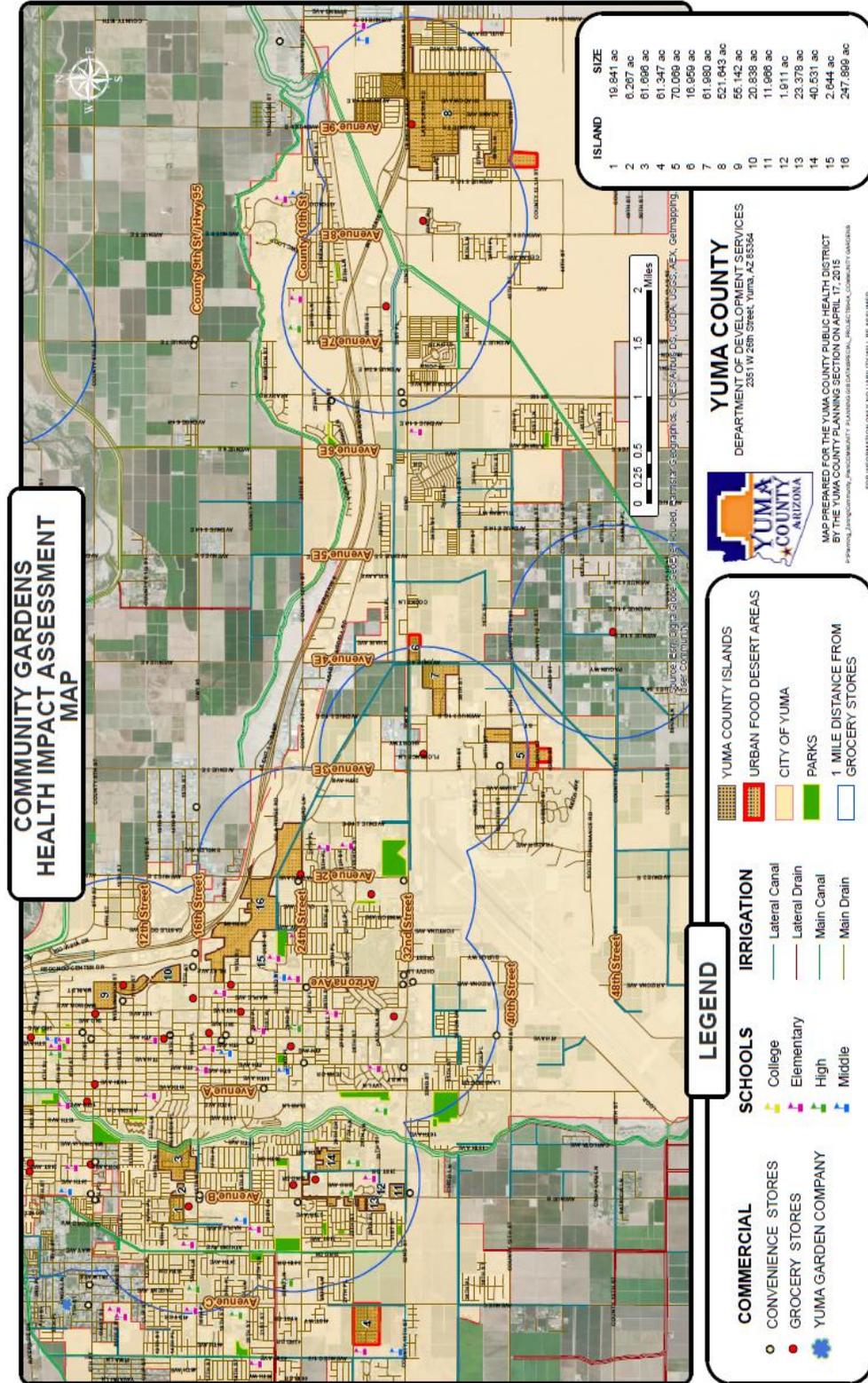
Vulnerable populations for this HIA are those people within the Community Garden Ordinance area who live in food deserts. A food desert is “a low-income census tract where either a substantial number or share of residents has low access to a supermarket or large grocery store” (96). In Yuma County as a whole, 11% of residents do not have access to healthy food (25).

It was decided that public input would be sought from those in the study area residing in food deserts. However, soliciting participation of people residing in these areas is known to be challenging. It was therefore determined that an effective strategy would involve capitalizing on relationships the Health District already has in these neighborhoods. The Department of Development Services was asked to prepare a map showing food deserts in the county islands of Northwest Yuma to facilitate choosing an appropriate neighborhood where residents could be approached to provide input into the HIA.

The Health District currently runs nutrition programs out of several primary schools, which involve meeting regularly with parents of children enrolled in the Headstart Program, so two of these schools located in food desert County Island neighborhoods in Northwest Yuma were chosen as venues where resident input could be sought.

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Figure 3: County islands and food deserts in a section of Northwest Yuma



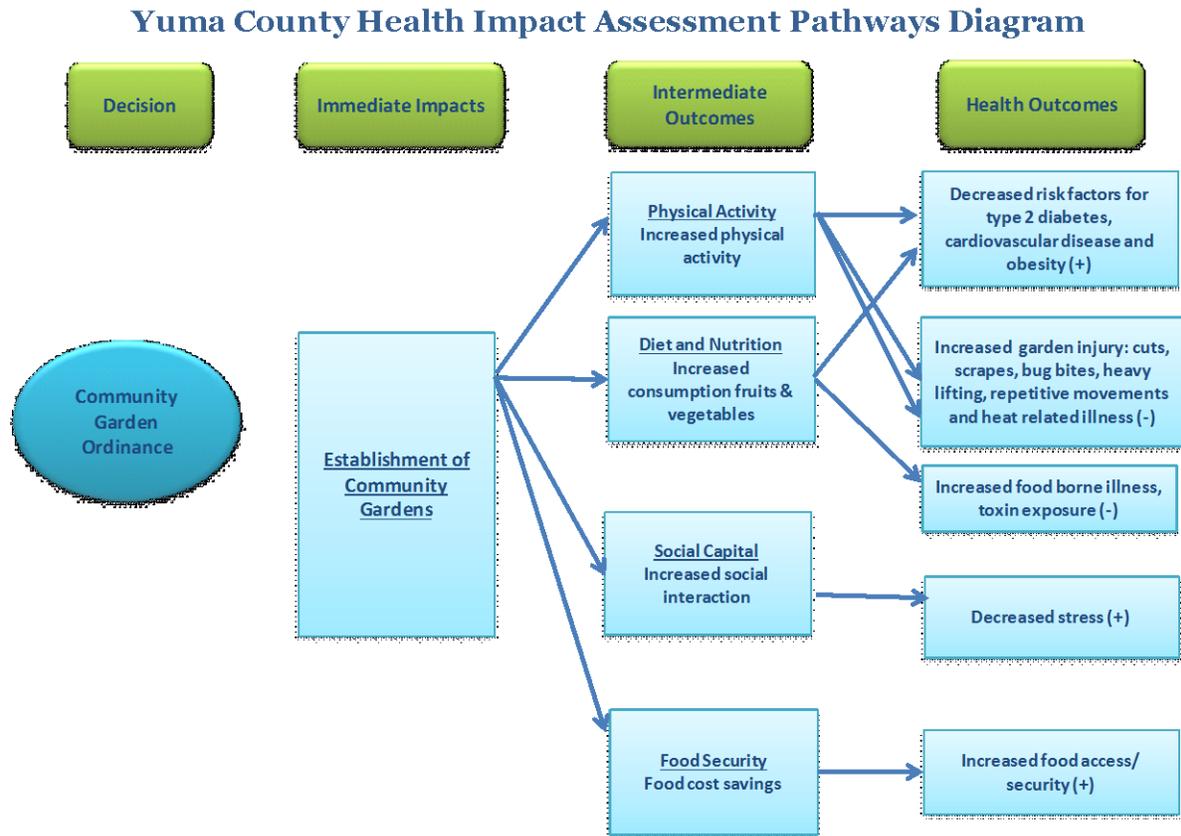
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HIA Pathways to health

A preliminary pathway diagram resulted from the Stakeholder Group meeting of February 10, 2015 that was further developed during the HIA process. Four main pathways were identified that affect health outcomes: physical activity, diet and nutrition, social capital and food security. These pathways are outlined here and described more fully in the Assessment section.

Figure 4: Community Garden HIA Pathways



Physical Activity

It was anticipated that community gardens would increase opportunities for physical activity, which would have a positive impact on four health outcomes emphasized in the research literature: type 2 diabetes; cardiovascular health; obesity and stress. It also anticipated that gardening might increase the probability of strains and injuries as well as heat-related illness, particularly during the summer months. Interviews of residents revealed that 60% of respondents indicated they would be willing to walk more than a mile to a community garden. 40% would be willing to walk less than a mile.

Diet and Nutrition

The second major health pathway is diet and nutrition as a direct result of increased access to fresh produce. It was expected that this would lead to increased consumption of fruits and vegetables among community gardeners, which would in turn have a positive impact on three major health outcomes of type 2 diabetes, cardiovascular health and obesity. It was also anticipated that increased consumption of fresh produce might lead to higher exposure to food-borne illnesses and toxins such as pesticides or soil contaminants.

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Social Capital

Social capital refers to mutual support networks among individuals and households enabling them to function more effectively. Typical examples include resource sharing that occurs at the neighborhood level such as mutual childcare arrangements. This pathway results primarily from increased opportunities for social interaction provided by community gardens, which would also tend to reinforce cultural expression and enhance family relationships. All of these factors would have the effect of reducing stress levels.

Food Security

The fourth major pathway for intermediate outcomes begins with increased food cost savings, which will have a direct positive impact on food security. These savings would free up household resources for other important household expenses.

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Assessment: The health impacts

The Assessment phase of an HIA identifies baseline data available for the most important health outcomes and determinants. It also entails estimating the health impacts in terms of likelihood and possible distribution within the population based on the research evidence. Below are a brief review of the methods used and an outline of significant impacts that may be important for consideration in the formulation of the Community Garden Ordinance.

Assessment Methods

What has already been learned about community gardens and health?

A literature search was conducted using keyword searches derived from the health outcomes and determinants of the HIA Pathway Diagram utilizing English-language digital databases that included studies from the US, Canada, the UK and Australia: EBSCO (sciences, health, social sciences and humanities) and PubMed (medicine, dentistry, nursing, physical therapy biomedical research, clinical practice, administration, policy issues and health care services).

This search resulted in 111 references relevant to the HIA. A document summarizing the most important 37 of these references was prepared that summarized methodology and main findings for each study in order to facilitate informed discussion about the literature within the HIA Core Team.

Ground-truthing: drawing on stakeholder expertise

Like any subject area, the national and international literature on community gardens and health must be connected to what is locally relevant. As a result, attempts to project future impacts of a proposed policy need to be grounded in local experience and expertise. The HIA literature describes this as “ground-truthing” (90). Information was collected from expert members of the stakeholder group, consisting of 12 individuals (including HIA Core Team members) in the form of individual structured interviews and focus group discussions during Stakeholder Group meetings. Information was also gleaned from the proceedings of the Food Garden Network, which met regularly throughout the HIA process.

Ground-truthing: Yuma County resident perceptions

A strategy was developed to obtain input from Yuma County vulnerable populations living in food deserts, capitalizing on existing relationships the Health District has in these areas. Structured interviews were held with parents of preschool or Headstart children in both English and Spanish at two sites on two different dates in May 2015. An interview guide was developed in both English and Spanish and gift cards were provided as incentive. Questions were asked about the respondent’s past experience with gardening, receptiveness to the possibility of participating in a community garden, distance respondent is willing to walk to a community garden, and concerns about community gardens in general. A total of 22 interviews took place.

What we found: HIA results

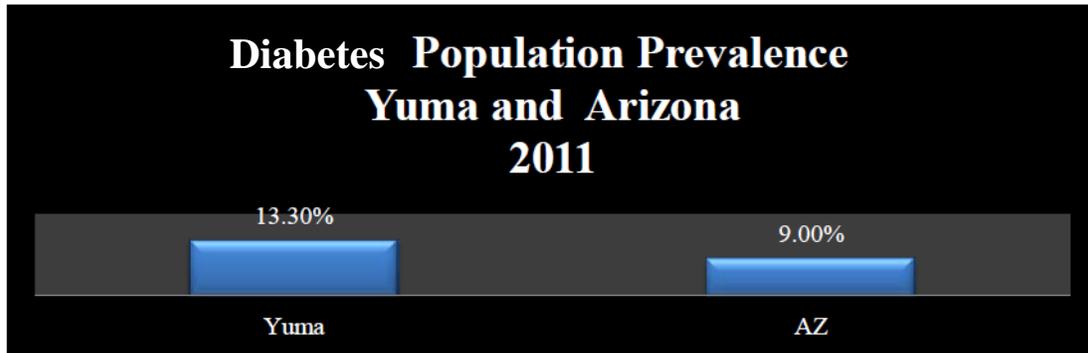
This section first presents baseline information on the main health outcomes: diabetes, cardiovascular disease, obesity, stress and food security. This is followed by an assessment of the four main pathways to health (physical activity, diet and nutrition, social capital and food security). Other potentially important impacts are also briefly reviewed. Finally, resident perceptions about community gardens are described.

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Where are we now? Baseline data on health outcomes
Type-2 diabetes

Figure 5: Diabetes in Yuma County



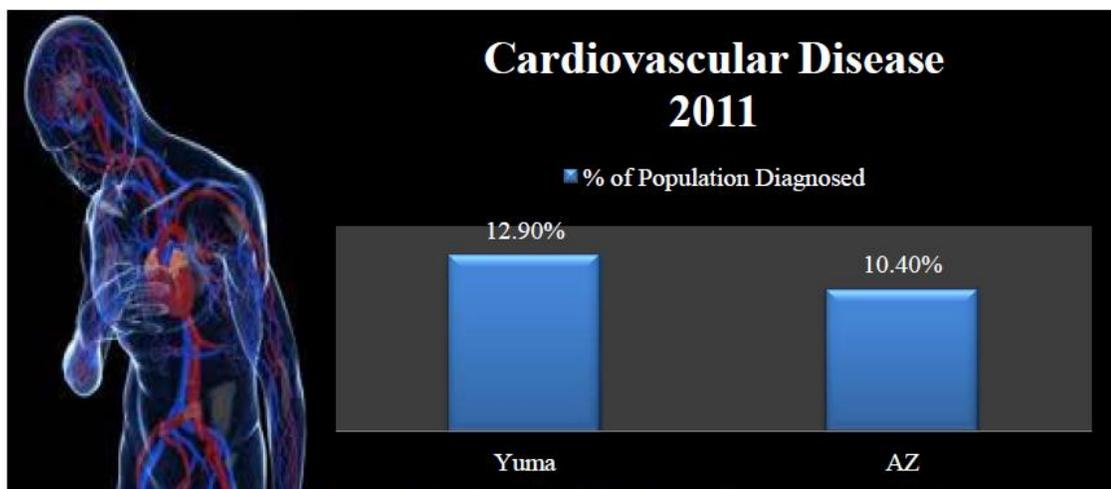
Centers for Disease Control and Prevention (CDC). Behavioral Risk Factor Surveillance System Survey Data. Arizona Health Matters 2010 Data.

Source: *Yuma County Health Assessment, 2012*

Figure 1 illustrates that Yuma County had significantly higher rates of diabetes in 2011 than the state of Arizona as a whole. Obesity and physical inactivity are risk factors contributing to diabetes rates. Diabetes itself also increases the risk for heart disease, neuropathy and stroke and often remains undiagnosed (111). Type-2 diabetes is increasingly being seen in the child population, which is of special concern.

Cardiovascular disease

Figure 6: Cardiovascular disease in Yuma County



Centers for Disease Control and Prevention (CDC). Behavioral Risk Factor Surveillance System Survey 2010 Data.

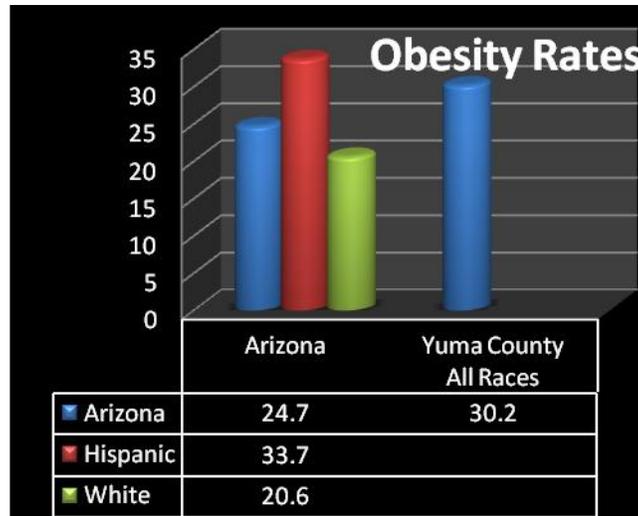
Source: *Yuma County Health Assessment, 2012*

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Cardiovascular disease describes any condition that affects the heart muscle, valves or rhythm. As can be seen in Figure 6, rates of this disease in Yuma County for 2011 are higher than Arizona. The most serious consequence of cardiovascular disease is sudden death. Unhealthy diet, physical inactivity, obesity and smoking raise the risk of cardiovascular disease (96).

Obesity

Figure 7: Obesity in Yuma County



Source: *Yuma County Community Health Needs Assessment, May 2009*

The obesity problem in the US is well document and, as can be seen in Figure 7, obesity rates are higher in Yuma County than Arizona as a whole, approaching one-third of the population. Furthermore, Hispanics, which in 2013 comprised 61% of Yuma County’s population (94), tend to have the highest obesity rates. Obesity is a serious health threat that leads to higher risk for several diseases and conditions including heart disease, stroke, high blood pressure, type-II diabetes, some cancers, gallbladder disease, osteoarthritis, gout, and breathing problems such as sleep apnea and asthma. While obesity is basically caused by eating too much and moving too little, a diet that includes plenty of fresh vegetables and fruits is part of an effective weight control strategy (16). Childhood obesity is a growing trend and is of special concern since health during childhood sets the stage for the remainder of the lifecycle. As well, the long term consequences of childhood obesity are not yet fully understood. Although not recent data, in 2005, nearly 36% of students in grades 9 through 12 living in Yuma County were overweight or at risk of becoming overweight (6).

Stress

Stress reduction is an important potential benefit of gardening. Since baseline figures on stress levels in Yuma County were not readily available, two proxy variables were identified. The first is number of “poor mental health days” in one month; Yuma County ranked relatively well in Arizona with 3.1, as compared with 3.4 for Arizona as a whole. The second is “social associations”, which is a measure of connectedness to formal social associations. For Yuma County, this is 4.4, as compared with 5.7 for the state of Arizona (25). However, this number could be deceptive in that it does not take into account informal associations, which can be a strong source of social support.

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Food security

Food insecurity is a continually shifting concept, but generally means that consistent access to adequate food is limited by a lack of money and other resources at times during the year. By this measure, Yuma County ranks among the highest in Arizona for food insecurity: 22.3% of the population and 39.4% of children in 2013 (65). Changes in a household's socio-economic situation, especially if sudden, can trigger food insecurity (22). Examples are housing change or job loss. Food insecurity is a major health problem, especially for children since it results in being sick more often, growth impairment, slowed cognitive development, lower school achievement and behavioral problems (19, 80).

Community garden pathways to health

Based on the examination of the research literature, stakeholder input and resident input, the following projections were made regarding the health impacts of community gardens in Yuma County that can be realized through implementation of the Community Garden Ordinance. The likelihood and distribution of these impacts will be further enhanced if the suggestions outlined in the Recommendations section are implemented. The following table provides a summary of the anticipated health impacts of the proposed ordinance.

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Table 1: Summary of health outcomes and impacts

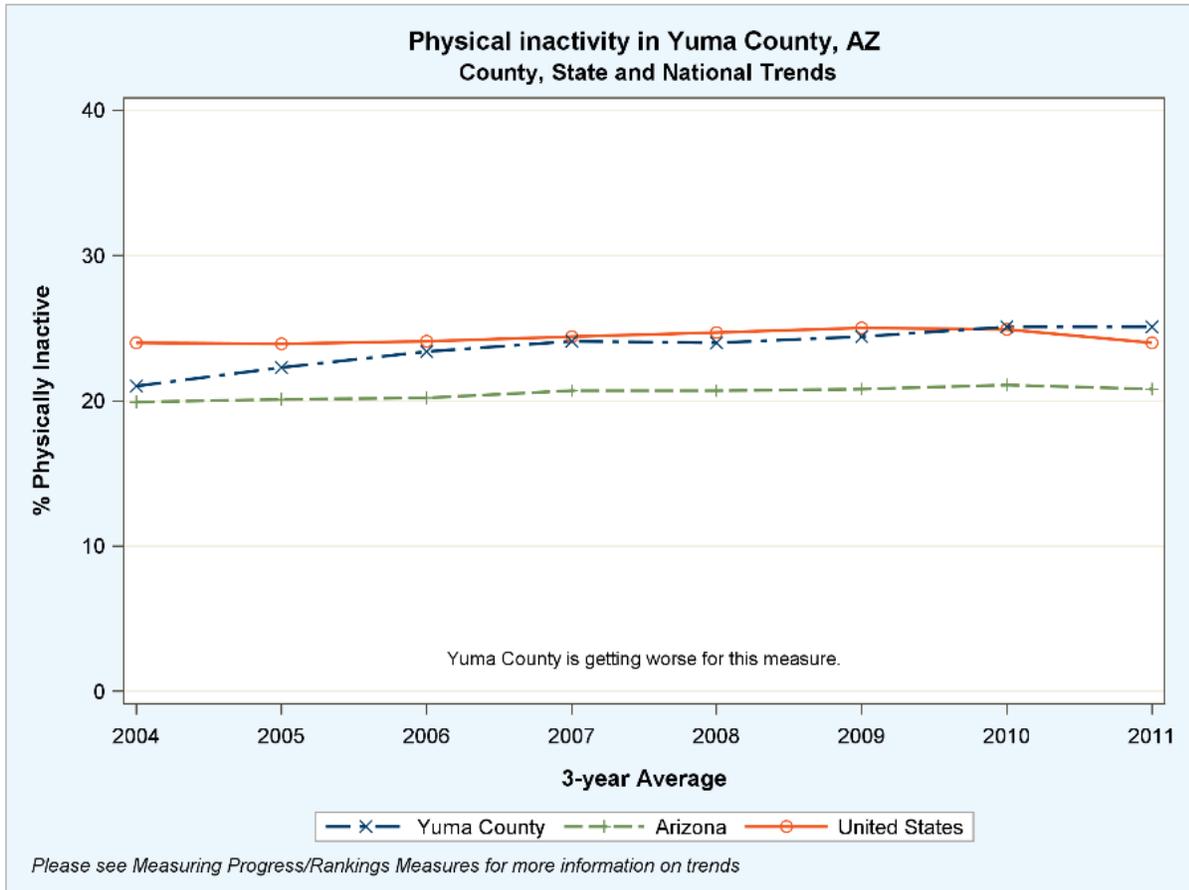
| Summary of Health Outcomes & Impacts | | | |
|--|----------------------------|--|----------------------------|
| Health Outcome or Determinant | Direction of Impact | Distribution of Impacts | Quality of Evidence |
| Increased physical activity | + | All segments of the population | *** |
| Reduction in Type-2 diabetes | + | All segments of the population, children, youth | * |
| Reduction in cardiovascular disease | + | All segments of the population | * |
| Reduced obesity | + | All segments of the population, children, youth, Hispanics | ** |
| Increased consumption of fruits & vegetables | + | All segments of the population, children, youth | ** |
| Increased social interaction | + | Adults, elderly | *** |
| Reduced stress | + | Adults | ** |
| Food cost savings | + | All segments of the population | * |
| Food security | + | All segments, children & youth | ** |
| Increase strains & injuries, heat related illness, food borne illness | - | All segments of the population | * |
| Key: * Less than 5 Studies, ** 5-10 Studies, *** 10-20 Studies | | | |

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Physical activity

It can be seen in Figure 8 that between 2004 and 2011, the rate of physical inactivity in Yuma County rose; while holding steady both in Arizona and in the country as a whole. The recent trend in Yuma County with respect to physical inactivity therefore appears to be moving in the wrong direction.

Figure 8: Physical inactivity in Yuma County



Source: County Health Rankings and Roadmap, 2015

Figure 9: Physical activity pathway



It is predicted that those who participate in a community garden will experience an increase in the level of physical activity (29, 39, 101). Gardening meets the US Department of Health and Human Services standards for moderate or vigorous-intensity physical activity and helps assist management of type 2 diabetes if done at least 10 minutes daily (64, 42). This is also the case for both children and senior

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citizens (46, 77, 76, 106, 107). Physical activity in general reduces the risk of stroke, cardiovascular disease and coronary heart disease (103). It also contributes generally to reduced rates of obesity and stress (39, 98, 14, 101).

Greater physical activity associated with community gardens can potentially lead to an increase in strains and injuries. Poor body mechanics during gardening activities can result in low back pain, knee and muscle/joint pain (77), although some of this evidence comes from study of professional rather than recreational gardeners (56). We believe this negative impact can be mitigated and address this in the Recommendations section.

A potential association between gardening and heat-related illness was not mentioned in the research literature, however, in southern Arizona this possibility must always be taken seriously. Stakeholder input indicated that the main growing season in Yuma is September through June, although some types of produce (melons, okra, eggplant) can be grown during the hot summer months. This means that while gardening activity declines considerably during the summer, it must nonetheless be considered. Measures to address mitigation of heat-related illness resulting from community gardening in the Recommendations section.

Diet and Nutrition

Figure 10: Diet and nutrition pathway



It is anticipated that the consumption of fruits and vegetables will increase among those who participate in a community garden, a strong finding in the research literature. Many studies confirm not only that the volume of fruit and vegetable consumption increases (10, 43, 61, 69, 29, 3, 17, 45), but that community garden participants often start eating nutritious foods they have not previously tried (36, 108, 60). These effects are seen not just in individuals but in households with one or more gardeners.

One study revealed a four-fold increase in vegetable consumption, three-fold in children (14). This same study found that before participating in a community garden only 18% of participants had sufficient vegetable intake, which subsequently rose to 84%. Another report found that gardeners were 3.5 times more likely to consume fruits and vegetables at least 5 times a day than non-gardeners (39). The research literature also emphasizes that increased consumption of fruits and vegetables is more likely to occur if there is supportive programming in place that educates community gardeners about the nutritional value of fresh fruits and vegetables and how to prepare and cook them, particularly for low-income populations (110, 33, 109). We discuss this further in the Recommendations section.

Although not well established, there appears to be a link between increased fruit and vegetable consumption among community gardeners and reduction in type-2 diabetes (109, 63, 9).

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Some studies have established a connection between increased fruit and vegetable consumption among community gardeners and lower body mass index (BMI), which is a measure of obesity (111). This is especially significant for children and youth. One found that 17% of obese or overweight children had improved BMI; another found that a sub-group of community gardeners classified as obese had a 16% greater increase in preference for vegetables compared with non-gardeners (36). In Los Angeles, a study revealed that community garden participation led to lower BMI for Latino youth (26).

Stakeholder and resident input indicated concerns about the possibility of consumption of produce from community gardens leading to higher incidences of food-borne illness as a result of exposure to pathogens either in produce or in the soil. There was no mention of this in the research literature, however, it is nonetheless a legitimate concern that we address in the Recommendations section.

A second potentially negative impact is the possibility of exposure to toxins, contaminants or harmful chemicals that are either already in the soil as a result of previous land uses, or applied as herbicides or pesticides during the gardening process. This problem is raised in the research literature, which discusses exposure of community gardeners to arsenic (85), lead (86) and other contaminants (101, 55). Measures that can be taken to address this are discussed in the Recommendations section.

Social capital

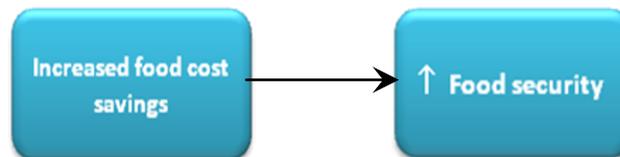
Figure 11: Social capital pathway



It is predicted that higher levels of social interaction will result from gardeners regularly congregating at the community garden, which in turns leads to lower levels of stress (29, 31, 38, 2, 84, 101, 11, 32, 48). Also part of this health pathway is the community garden as a form of cultural expression and a means to solidify family relationships, particularly for ethnic communities (14, 108, 36, 63). In addition, the research strongly supports the value of gardening itself as a stress-relieving activity (82, 29, 39, 98, 14, 102, 101, 109).

Food security

Figure 12: Food security pathway



It is anticipated that there will be significant food cost savings among those who participate in community gardens. Evidence indicates that these cost savings can be substantial. One study found that

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individual gardeners were able to save \$475 per season; over a multi-year period for an entire community garden, the cost savings were estimated at \$915,000 (39). Up to \$2/lb of savings in fresh produce has also been reported (4). Another study revealed that 81% of gardeners reported they used the community garden to stretch food dollars (69).

One report found that food security concerns dropped from 31% before a community garden project to only 3% (14). This positive impact on food security is particularly important for children's health, which has been shown to be strongly affected by food insecurity (19, 80). Furthermore, experts believe that community gardens can contribute not just to individual or household food security, but to community food security as well (23, 29, 30, 105).

Other impacts

Five other variables, while not yet demonstrating an established relationship with health outcomes, are described in the research literature on community gardens and are therefore worthy of mention.

The first is increased citizen engagement and empowerment that results from participating in community gardens. Because community gardens are local gathering places, they therefore lead naturally to community-building and collective problem-solving (39, 44, 29, 8).

The second is municipal cost-savings associated with the development of community gardens. One study estimates these savings at approximately \$4,100 per year per site resulting from the prevention of vandalism, illegal dumping and associated labor-intensive (and costly) upkeep.

The third is neighborhood beautification resulting from sites that are transformed from eyesores to community gardens. This has a positive impact on neighborhood property values, which can in turn increase municipal tax revenue (100, 58, 84, 29). One study reported an increase of \$1/2-million per garden in increased tax revenue over a 20-year period (39).

Fourth, community gardens contribute to neighborhood crime prevention (29, 39, 58) as a result of more people and "eyes" on the street.

Finally, the research literature describes how community gardens have been shown to have therapeutic value for special populations: cancer survivors, the elderly, at-risk youth and homeless women (89, 12, 82, 36, 81).

Public perceptions about community gardens in food-desert neighborhoods

Twenty two interviews were held with parents of children enrolled in preschool or Headstart programs in two neighborhoods in northwest Yuma. The results are not statistically significant, however, they shed light on the potential receptiveness of residents in a food-desert neighborhood to community gardens; and provided some useful qualitative information on concerns and issues. The gift card incentive resulted in very little missing data.

- 1) 55% of respondents had no prior experience with gardening.
- 2) 85% of respondents had a positive response to the idea of a community garden in their neighborhood. 15% had some reservations (specific concerns are described below).

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- 3) 60% of respondents indicated they would be willing to walk more than a mile to a community garden. 40% would be willing to walk less than a mile.
- 4) In response to an open-ended question, 41% of respondents stated they would be willing to commit 1 hour daily to working in a community garden; another 36% indicated they could work every day (varied amounts of time). Other responses included: a few hours per week, 1 hour per week, and weekends only.

Residents offered several reasons why they would like to participate in a community garden:

- 1) Desire to eat healthier foods
- 2) Interest in teaching their children how to garden
- 3) Not enough space for a garden at home
- 4) Desire for organic produce (“none of that toxic stuff”)

Residents also expressed the following reservations about participating in a community garden:

- 1) Membership fees
- 2) Gardening in the heat
- 3) Lack of knowledge about gardening
- 4) Insufficient time
- 5) Pests and produce contamination

Those residents with gardening experience have previously grown the following foods: chilis, cilantro, pumpkins, radishes, carrots, oranges, zucchini, herbs and mint.

Due to the relatively low number of interviews, it is important not to over-interpret these results. However, there seems to be a general positive response to the concept of a community garden for residents who were interviewed. Mention of “not enough space” by a community resident probably refers to the dilemma faced by apartment renters who do not have the option of having a backyard garden. Concern about community garden membership fees indicates that for residents of food deserts, these fees need to be affordable.

The apparent willingness of most to walk more than a mile to the community garden is of interest since there are currently no known planning standards for estimating this. Also of interest is the stated willingness of some to work in the garden every day. Finally, the majority of respondents had no prior gardening experience, suggesting a need for training, which is discussed further in the Recommendations. Most of the concerns expressed by residents listed here are also addressed in the next section.

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Recommendations: Moving forward

- 1) That the Department of Development Services, the Health District and Cooperative Extension continue to collaborate in order to facilitate the establishment, support and effectiveness of community gardens in Yuma County, particularly in food deserts.**

This HIA and activities that preceded and accompany it provide an opportunity for continued collaboration that promises to be beneficial for the further development and effectiveness of community gardens in Yuma County. Our research indicates that local leadership-local champion(s) is a key element of success (93).

- 2) That The Department of Development Services, the Health District and Cooperative Extension partner to prepare a Community Garden Toolkit to connect residents interested in establishing community gardens with existing programs offered through Cooperative Extension that train gardeners in: efficient gardening techniques; organizational and leadership effectiveness; and how to avoid heat-related illness, food-borne illness, toxin exposure and strain injuries.**

The research indicates that training can be an important contributor to the success of community gardens (109). A community garden is as productive as the collective gardening skills of its members. It was determined that training mechanisms for supporting community gardens are already in place through programs offered through the Cooperative Extension Department. In addition, the Food Garden Network recently began distributing a newsletter to its members with important community gardening tips. Input from residents suggests that the majority of those in food deserts may not have had previous gardening experience so training may be critical.

A second area where community gardeners could benefit is training in organizational management and leadership skills. Community gardens are essentially neighborhood-based organizations; our research revealed that gardens are as successful and sustainable as the organizations that manage them. Issues that can often be challenging for these organizations include: management of volunteer time, dispute resolution, produce theft and vandalism.

Also, stakeholder input revealed a need for a community garden toolkit or community garden policy guideline to assist in standardizing and establishing community gardens. Stakeholders also communicated the importance of ensuring that the design and features of community gardens be suited to their membership. (An example would be raised beds for seniors who may have less physical flexibility). Organizational support for community gardens is also available through Cooperative Extension. Other state and national organizations such as the American Community Gardening Association provide useful information (see Useful Resources below).

Training can also help mitigate the possible negative impacts of community gardens discussed previously. Cooperative Extension currently runs several programs that can train community garden leaders and members in how to avoid heat-related illness and food-borne illness resulting from improper gardening and food handling practices; proper use of pesticides and other chemicals (it is important to note that organic gardening also requires the use of some types of chemicals); safe composting; vector control; minimizing contamination of food by domestic and other animals; and

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reducing strain injuries that result from poor body mechanics while engaging in gardening activities. The Department of Development Services can play a proactive role in connecting prospective gardeners to the following Cooperative Extension resources:

- a) Master gardening class: a 14-week course that trains individuals interested in become gardening experts.
- b) Hands-on gardening training sessions and presentations can be arranged on special request.
- c) Longer-term training of community garden leaders and members can also be arranged on special request.

3) That soil testing be required in cases where community gardens are proposed for sites that are potentially contaminated.

The City of Yuma has already implemented a similar provision. Stakeholder input revealed that when there are doubts about soil quality, raised soil beds can often resolve this issue. We recommend that precautionary soil testing be conducted as a best practice. The Arizona Department of Health Services, Office of Environmental Health School Garden Program conducts soil testing for school gardens and community food gardens that will undergo the ADHS Garden Certification Process.

Office of Environmental Health

School Garden Program
150 N 18th Avenue, Suite 140
Phoenix, AZ 85007
(602) 361-3952
(602) 364-3146 Fax

4) That the Health District continue to maintain its existing nutrition programming in food desert neighborhoods.

The research revealed that fruit and vegetable consumption increases where programs are offered in nutrition and food preparation that educate people on how to incorporate fresh produce into their daily diet (109, 33). Such programs are currently offered in Yuma County through the Nutrition Network at public housing complexes and for parents of children enrolled in the Head start program, as well as at selected primary and middle schools.

One of the Nutrition Network educators is also a Master Gardener. We identified those living in food deserts as the primary vulnerable population; therefore we recommend that, where possible, these important supportive programs continue to focus on food desert neighborhoods in Yuma County. Programming currently includes gardening workshops, nutrition classes and cooking demonstrations.

5) That where possible, the Department of Development Services encourage the use of vacant land, especially public county-owned land, for community gardens.

While community gardens can be established on either public or private land under various legal arrangements (18), publicly owned land represents a somewhat more stable option, since private land is more likely to change hands or uses, forcing community gardens to relocate. Lack of secure tenure is a persistent dilemma that can affect the willingness of community organizations to invest and commit to their community garden projects (28, 72). The ultimate form of site security is for the land to be owned

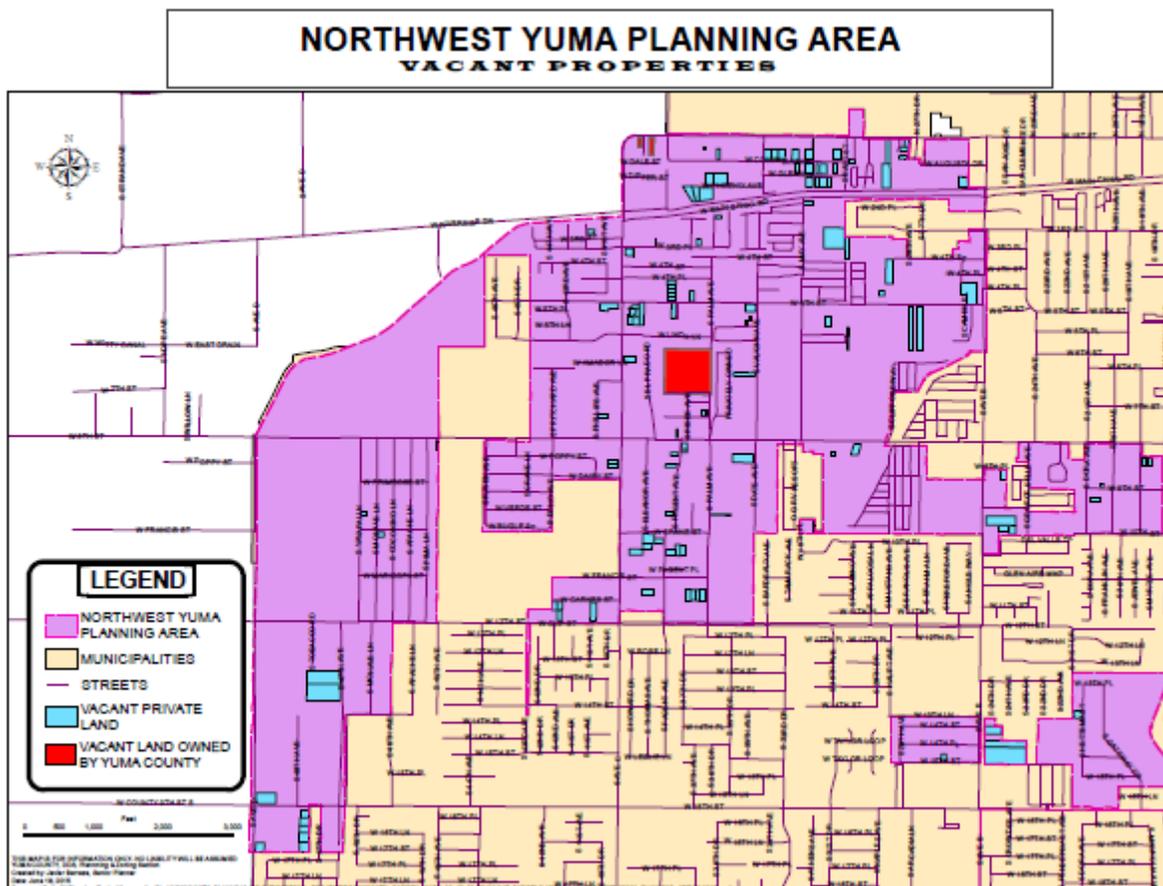
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by the community organization itself, supportive nonprofit organization or land trust, however, this possibility seems remote for Yuma County. Given limited resources, what seems appropriate is for Department of The Department of Development Services to geographically target any policy efforts toward food desert neighborhoods (105, 57, 78).

One solution employed by local governments addressing the problem of insecure tenure is to allocate a portion of parks and recreation land for community gardens. Some cities (such as Boston, Portland, Seattle) have managed to designate a separate zoning category for community gardens in order to promote them as a legitimate land use and open space category (37, 47). Others have converted underutilized land near transportation routes, utility easements or along existing trails that can help encourage greater use of these corridors (49).

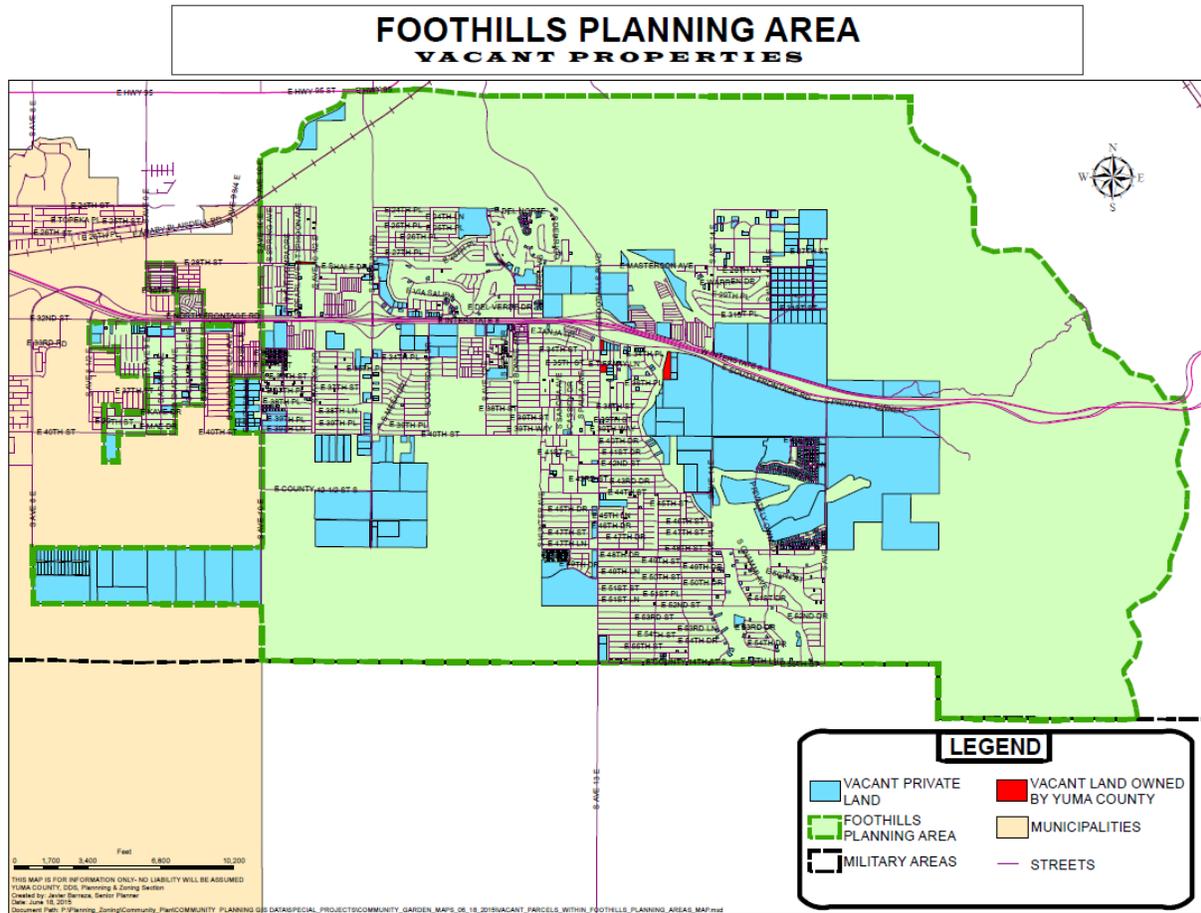
Figures 13 and 14 illustrate the location of vacant parcels in northwest Yuma and the Foothills, areas where community gardens are most likely to be established in Yuma County. These maps show that most vacant land is privately owned.

Figure 13: Vacant land in Northwest Yuma



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Figure 14: Vacant land in the Foothills



6) That the Department of Development Services encourage housing developers to consider including space for community gardens in their plans.

Due to established interest and demand for community gardens in the Yuma area, we recommend that Development Services consider encouraging housing developers, particularly those who build or rehabilitate apartment complexes, to allow sufficient space as well as a possible specific site for a community garden.

7) That when provided opportunities, the Department of Development Services promote other components of an overall strategy to increase access to healthy food.

Community gardens are one part of a broader strategy that can increase access to healthy food in the community. When implemented together with community gardens, these other elements have a synergistic effect, multiplying the overall health benefits:

- 1) School gardens, an initiative described earlier that is already in place in Yuma County.

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- 2) Retail stores that offer affordable fresh produce located in or accessible to food desert neighborhoods. Approval of a Walmart Neighborhood Market in March, 2015 on the City of Yuma's north side is an example.
- 3) Farmers markets selling locally-grown fresh produce located in or accessible to food desert neighborhoods. The Farmers Market on Wheels, part of A Healthy Somerton initiative, is an example.
- 4) Community-supported agriculture (CSA); which is larger-scale cultivation of fresh produce in urban areas. Vegetables and fruits produced by CSA can be sold in local farmers markets. Yuma Garden Company located in the northwest Yuma portion of Yuma County is an example.

Useful Resources

The following are a few readily available information resources that support the development of community gardens:

1. How local governments can support community gardens:
<http://nccommunitygarden.ncsu.edu/RoleLocalGov.pdf>
2. Legal options for community gardens:
http://changelabsolutions.org/sites/default/files/CommunityGardenToolkit_Final_%28CLS_2012_0530%29_20110207.pdf
3. Funding of community gardens: <https://communitygarden.org/resources/funding-opportunities/>
4. Mapping tool that can be used to identify food desert neighborhoods:
<http://apps.ams.usda.gov/fooddeserts/faqlocatortool2-pgr.pdf>

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Reporting

Once the HIA is finalized, the report will be presented to all stakeholders involved in the HIA process and shared with the Healthy Communities Food Garden Network, and Department of Development Services Citizens Advisory Group. A portion of the findings will also be included in the staff report to the Department of Development Services planning & zoning board.

Portions of the HIA will also be made available to the public via Community Garden Toolkit and Yuma County Website.

Monitoring & Evaluation

Funding for the HIA does not extend past June, 2015, as a result there is no support for monitoring or evaluation beyond the completion of the HIA. Nonetheless, it is possible for the Health Promotions Division of the Health District to informally monitor key upcoming decision points of the Community Garden Ordinance, such as submission of the Department of Development Services staff report accompanying the Community Garden Ordinance text amendment to the County Board of Supervisors, anticipated to occur in late 2015, through the assistance of the HAPI program. It is hoped that this report will include mention of health determinants and outcomes and also refer to recommendations of this HIA. Reference to or citation of the HIA by other local jurisdictions such as the city of Yuma, Somerton, San Luis and the Cocopah Indian Tribe could also be monitored. Other important opportunities for monitoring could occur from 1 to 5 years following the adoption of the ordinance. The Health District, Department of Development Services and Cooperative Extension could take stock at regular intervals of the establishment and development of community gardens in Yuma County and determine if there are gaps in the ordinance as well as the Health District and Cooperative Extension programming that supports it.

| RECOMMENDATION | AGENCY RESPONSIBLE | TIMELINE |
|---|--|--|
| Monitor inclusion of health language in submission of staff report to accompany recommendation of text amendment. | Yuma County Public Health Services District, Health in Arizona Policy Initiative Program | Immediate as each segment is completed |
| Monitor the establishment of Community Gardens | Yuma County Public Health Services District, Health in Arizona Policy Initiative Program | Annual review |

An outcome evaluation would assess whether the projections for health outcomes made in this HIA were accurate, however, funding to support this research is currently unavailable, particularly for longer-term outcomes. If such an outcome evaluation were to be carried out, a quasi-experiment with pre- and post-test would be an appropriate study design. This would involve the measurement of

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changes in variables associated with the four main pathways (physical activity, diet and nutrition, social capital and food security) among community garden participants before and after the establishment of selected community gardens, comparing these with measures of non-gardeners from the same or similar neighborhoods in order to determine if the community gardens affected health outcomes in the manner that was predicted by the HIA.

The Consultant is currently conducting a simple process evaluation, which assesses whether the HIA was implemented in the manner that was anticipated or intended. It consists of two data points, both involving unstructured interviews. The first, which was already carried out in April 2015, involved interviews of HIA Core Team members; the second will involve interviews of Core Team members and stakeholders following completion of the HIA. Topic areas to be covered include: areas of learning about how to conduct an HIA, strengths and weaknesses of the overall process, resources available for conducting the HIA, data availability, timeframe for conducting the HIA, adequacy of training, and effectiveness of community involvement and stakeholder engagement. Process evaluation results will be reported separately by the Consultant to the Health District, Department of Development Services, other stakeholders and the Arizona Department of Health Services. Results will include a list of lessons learned and recommendations for improvement of future HIAs.

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