ARIZONA SUSTAINABLE COMMUNITY GARDEN *Resource Guide*

Your Guide to Establishing and Sustaining a Community Garden in Your Neighborhood

ARIZONA DEPARTMENT OF HEALTH SERVICES

Vitalyst HEALTH FOUNDATION

1.0 INTRODUCTION

Between 2010 and 2014, a series of participatory community workshops were held in several Phoenix neighborhoods. Facilitated by graduate students from Arizona State University (ASU) and the Elemental Group, LLC and supported by Vitalyst Health Foundation (formerly St Luke's Health Initiatives), these workshops brought residents and community leaders together to discuss what was working within their communities and what needed improvement. The participating communities were Maryvale through the Maryvale on the Move project; South Phoenix through the South Phoenix: Grounded and Growing and CUSP initiatives; and the Gateway, Eastlake/Garfield, Midtown, Uptown and Solano neighborhoods from the Reinvent Phoenix project. At each workshop it quickly became clear that there is an abundance of social and human capital within each neighborhood and that as a result, many good things are happening: People are starting and supporting community gardens; people are creating opportunities for youth to learn job skills; and people are creating educational and economic venues for community members to realize their potential.

At each workshop, residents also outlined aspects of their communities that required action. Significantly, even though each of the communities is distinct with its own character, many of the identified areas of need are similar. Nearly all residents cited the need for better access to healthy foods, safe and accessible outdoor areas for recreation and public transportation, as well as greater opportunities to showcase their talents and increase household income. Many residents and community leaders expressed eagerness to work to bring these improvements to their neighborhoods.

Responding to the desire of communities to improve access to healthy food, exercise control over the availability and choice of healthy food, and increase neighborhood cohesion and resiliency, Vitalyst Health Foundation published the *Community Garden Tool Kit* in 2015. The prevalence of these feelings in communities throughout Arizona is also the reason that the Arizona Department of Health Services decided to update and expand on the information that document contained to create this *Arizona Sustainable Community Garden Resource Guide* to help aspiring community gardeners across the state.

MARICOPA COUNTY EXTENSION GARDEN, PHOTO BY EILEEN KANE (FLICKR: CC)

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2.0 WHAT IS A COMMUNITY GARDEN?

"Community gardens come in a variety of forms but at their core are defined as any piece of land, either publicly or privately owned, where plants are grown and maintained by a group of people in the community." (www.publichealthlawcenter.org) However, in practice they are much more. Community gardens are sources of fresh produce, places for physical exercise, community gathering sites and educational places. As Denver Urban Gardens notes, "a community garden is a unique and inclusive community space; it reflects the personality and tells the story of the gardeners and the neighborhood that surrounds it." (www.dug.org)

MESA URBAN GARDEN (MUG). PHOTO BY DAVID CRUMMEY (FLICKR: CC).

3.0 BENEFITS OF COMMUNITY GARDENS

According to Designing Healthy Communities, community gardens "play a significant role in enhancing the physical, emotional, and spiritual well-being necessary to build healthy and socially sustainable communities."* As people come together to create and maintain a garden, they socialize with neighbors, family, seniors, and children; develop cross-cultural connections; and grow healthy food for themselves and to share with the broader community. All of these things work together to increase community ownership and build social capital, creating relationships and networks that help sustain and grow a thriving community.

The benefits of community gardens extend beyond creating and strengthening community connections. They include: improved overall health of participants attributable to reduced stress levels; healthier eating and increased physical activity; lower family food budgets due to access to inexpensive fresh fruits and vegetables; possibility for employment, economic development and neighborhood revitalization; opportunities to learn about horticulture and positive environmental practices such as composting and recycling; and the preservation and beautification of neighborhood green space. Some research suggests that community gardens reduce crime and increase surrounding property values.**

* *The Role of Community Gardens in Sustaining Healthy Communities*, Designing Healthy Communities, http://designinghealthycommunities.org/role-community-gardens-sustaining-healthy-communities/

** Garvin, E., Cannuscio, C. and Branas, C. (2013). Greening vacant lots to reduce violent crime: a randomized controlled trial. Injury Prevention, 19(3): 198-203.; Voicu, I. and Been, V. (2008). The Effect of Community Gardens on Neighboring Property Values. Real Estate Economics, 36(2): 241-283.).

THE BENEFITS OF COMMUNITY GARDENS EXTEND BEYOND CREATING AND STRENGTHENING COMMUNITY CONNECTIONS.

PHOTO BY BOB NICHOLS, USDA NRCS

4.0 TYPES OF COMMUNITY GARDENS

Community gardens range from traditional neighborhood gardens that feature subdivided plots tended by individuals or families to gardens associated with a place of worship or community center to gardens with a specific purpose such as job training or stocking a food pantry. The following list provides a snapshot of the variety of community gardens currently operating locally.

Traditional Neighborhood Community Gardens

Separate garden plots that are rented to families or individuals to grow food. Gardeners work together to organize gatherings, community work days and daily operations. Typically there are ten or more garden plots in this type of garden.

Local examples:

- Garden Patch Community Garden, Avondale, AZ
  www.avondalegardenpatch.com
- Native Health Community Garden, Phoenix, AZ
  www.nativehealthphoenix.org/community-garden
- Century Heights Community Garden, Yuma, AZ
  www.facebook.com/CenturyGarden

PHOTO BY AMANDA MILLS, CENTERS FOR DISEASE CONTROL AND PREVENTION

Food Donation Community Gardens

Gardeners donate all or some of the produce from their garden to food banks.

Local examples:

- Payson Community Garden, Payson, AZ
  www.paysoncommunitygardenaz.com
- Community Food Bank of Southern Arizona – Garden Program, Tucson, AZ
  www.communityfoodbank.org/garden
- Escalante Community Garden, Tempe, AZ
  www.facebook.com/EscalanteCommunityGarden

Demonstration Community Gardens

Generally open to the public, demonstration gardens act as open air classrooms, providing education on a particular set of topics or issues.

Local examples:

- Las Milpitas de Cottonwood, Tucson, AZ
  www.communityfoodbank.org/las-milpitas
- University of Arizona Cooperative Extension Demonstration Garden, Phoenix, AZ

PHX RENEWS, COMMUNITY GARDENS, PHOENIX, AZ. PHXRENEWS.ORG

Job Training, Economic Empowerment and Entrepreneurial Gardens

Gardeners are supported with training and technical assistance to help them start new businesses.

Local examples:

- International Rescue Committee New Roots Garden, Phoenix, AZ
- Ajo Center for Sustainable Agriculture Many Hands Urban Farm and Learning Center, Ajo, AZ
  www.facebook.com/pages/Many-Hands-Urban-Farm-and-Learning-Center/852480701516408
- Spaces of Opportunity Garden, Phoenix, AZ
  www.tigermountainfoundation.org/initiatives
- Beneficial Beans Garden, Phoenix, AZ
  www.autismcenter.org/beneficial-beans%C2%AE-garden

GARDEN OF TOMORROW

" WHEN I BECAME MAYOR, I RECOGNIZED THE NEGATIVE IMPACT VACANT LOTS HAVE ON OUR COMMUNITY AND BUSINESSES. SO, WE GOT TO WORK TO BRING BUSINESSES, COMMUNITY MEMBERS, AND NON-PROFITS TOGETHER TO TRANSFORM THESE LOTS INTO NEW OPPORTUNITIES."

GREG STANTON, MAYOR OF PHOENIX

PHOTO BY SCOTT BAUER, USDA-ARS

Youth Enrichment and Education Gardens

Experiential learning for children and adolescents.

Local examples:

- Orchard Community Learning Center, Phoenix, AZ
  www.orchardlearningcenter.org
- Rez Refuge Garden, Fort Defiance, AZ
  www.rezrefuge.org/garden

Institutional Community Gardens

Gardens associated with public or private institutions including places of worship, hospitals, community centers and government facilities.

Local examples:

- Cancer Treatment Centers of America – Goodyear, AZ
  www.cancercenter.com/western/amenities/culinary-services/
- Faith United Methodist Church – West Alice Community Garden, Phoenix, AZ
  www.faithumcphoenix.org/west-alice-community-garden/
- Benedict Community Garden, Our Lady of Guadalupe Monastery, Phoenix, AZ
  www.olgmonastery.com/benedicts-garden/
- Arizona Department of Health Services Garden, Phoenix, AZ

NEW ROOTS GARDEN, PHOENIX, AZ

5.0 STARTING A COMMUNITY GARDEN

Creating a community garden takes planning, organization, and most of all, teamwork. Use these steps to help you get organized so you can get your garden growing! While the steps are listed in the sequence that is most likely to result in the successful establishment of a new community garden, each garden is unique and has its own set of challenges and opportunities. This means that you should proceed in whatever manner makes the most sense given your particular circumstances. For example, if a property is donated for a community garden, choosing a site might be the first thing you do, even though it is listed as the fifth step in this discussion.

Step One: Form a Planning Committee

The Planning Committee is composed of a core group of community members with a shared vision of creating a garden. The Committee may grow from a handful of members to a larger group as the planning unfolds. Over time, the Planning Committee will conduct outreach and generate broader community support, decide what type of garden will be created, hold meetings, select a site, gain permission to use the site, develop and execute a lease with the landowner, secure any permits that may be needed, obtain insurance, set up financial and business structures for the garden, identify resources needed, create a design for the garden, and establish a management and operating structure for day-to-day operation.

ORCHARD COMMUNITY LEARNING CENTER, PHOENIX, AZ,
PHOTO BY AMANDA CLAYTON

Step Two: Determine What Type of Garden to Create and Identify Mission and Goals

Successful, sustainable community gardens feature some common elements: they entertain broad support in the community before they are established; their mission and goals align with community needs; and the value they demonstrate to community members is clear.

The first job of the Planning Committee is to decide what type of garden to create. Start by discussing what the needs are in your community. Then, identify how a garden could help to address some of them. Use this discussion to establish the goals of the garden. Then, develop a mission statement based on those goals. Write down both your mission statement and goals so you can keep coming back to them as you go through the planning process.

Once you have developed your mission and goals, you are ready to consider the question: What type of garden will help us achieve them? You may start by considering more than one type of garden and finalize the decision after you have gauged the community's response.

Step Three: Generate Community Support

Getting support from the community helps to ensure that the garden not only serves the needs of those who use it, but also others in the community, regardless of whether they are actively involved in the day-to-day operation and maintenance of the garden. A frequently cited reason for community garden failure is that the garden's focus was too narrow and benefited only a small percentage of those whose time and talents were necessary to help it grow and flourish. The best and most successful gardens are those that have broad support from diverse individuals and groups in the community.

To generate the type of support necessary for a community garden to succeed and to make it truly sustainable, the Planning Committee should conduct outreach to educate and inform the community about the garden, its goals and mission, and what type of support, involvement, and time commitment is needed to make it a success. You may want to conduct outreach by creating flyers and posting them around the community, going door to door to talk to neighbors, setting up an informal information table in front of a public space such as a library, or reaching out to others in an online forum.

ORCHARD COMMUNITY LEARNING CENTER CHICKEN COOP AND COMMUNITY PLOTS, PHOENIX, AZ, PHOTO BY AMANDA CLAYTON

Consider local government, non-profit, and other community-support organizations in your community outreach as well. They may be able to help you gain support for the garden through other outlets and channels, provide material support, offer technical assistance, and advise you on many aspects of garden planning, design, and implementation.

Refer to Appendix A for a sample outreach flyer.

Step Four: Establish a Formal Organization

Before you begin to choose a site, pursue a lease, or start managing the collection of money and payment for application fees or deposits, you may want to consider formally organizing the garden. Many community gardens become Limited Liability Companies (LLC) or non-profit corporations (note: non-profit corporations do not automatically receive tax-exempt status from the IRS; you must apply for this separately). Organizing in this way allows the group to open a bank account and sign a lease under the umbrella of the organization. LLCs are so named because they limit the liability of the members in their activities – this means that individual members of the LLC are not held personally liable for debts incurred by the LLC or, often, legal judgments directed against the LLC. Also, organizing as a formal entity may convey other benefits, such as qualifying for more grants, tax breaks, or in-kind donations.

The Arizona Corporation Commission manages formal organization of LLCs, non-profit corporations, and other types of business entities. Find more information about the types of formal organization, frequently asked questions, and even e-file forms on their website at www.azcc.gov.

Step Five: Choose a Site

When selecting a site for your community garden, it is necessary to consider a variety of factors including land ownership, current zoning, any utility easements, and water access. Use the following series of questions to guide you in the site selection process.

- ☐ **Does the lot have the appropriate zoning for a community garden?** This is very important to determine before any further planning is done. Contact the local planning department for more information.
- ☐ **What size is the lot?** Will there be enough space for all of the gardeners, tools and tool sheds, composting, and communal spaces that you are envisioning? Is there room to grow?
- ☐ **Is there water access?** Where does the water come from? Contact the local water department to determine who supplies the water for the site and if the water is tested for microbial and other contaminants by the supplier.
- ☐ **Is the lot two or more acres in size?** In certain areas of the state, State law (1980 Groundwater Code) prohibits the use of water for growing food or plants for sale on two or more acres of land without specific water rights. If the property that you want to use for your garden is two or more acres in size, it is recommended that you contact the Arizona Department of Water Resources for assistance (www.azwater.gov). You can find a fact sheet developed regarding water use in community gardens in Arizona in Appendix C of this document.
- ☐ **Is there access to power?** This may or may not be important depending on what activities you intend to have at the garden.
- ☐ **What is the terrain like: flat, sloped, hilly?** Flat or slightly sloped sites generally work best. Avoid hilly sites that will require grading as this can be quite expensive and will have to comply with local regulations regarding site drainage.
- ☐ **How many hours of sun does it receive per day?** A site that doesn't receive enough sun won't be conducive to gardening. At the same time, having some shade for the plants and for gardeners is desirable. Is enough shade available on the site as-is or will you need to add it? Visit the site several times during different parts of the day and year to determine if the site will receive enough sun and/or shade.
- ☐ **Is there vehicle access?** Being able to drive a truck onsite can be very helpful.
- ☐ **Is the garden easy to see from the street or other adjacent areas?** Having good visibility will increase interest in and awareness of the garden and can also contribute to the garden's security.
- ☐ **Are there any nearby sources of contamination?** For example, if there is a septic leach field or animal pen nearby, be sure your garden is located some distance away and upslope from it to avoid potential contamination. Also, are there any environmental hazards? If the garden is located in a flood zone, for example, a flash flood could destroy the garden or introduce contamination. Refer to Step Six, Part B: Assess the History and Condition of the Site for more information.
- ☐ **Are there any indicators of potential environmental contamination?** Soil staining, an oily sheen on puddles, visible tanks or piping, or piles of debris could indicate the presence of contaminants that may affect your use of the site. Refer to Step Six, Part B: Assess the History and Condition of the Site for more information.
- ☐ **Who would your neighbors be?** You will already have determined that your garden has broad community support, but it is important to meet with the adjacent property owners and residents directly to discuss your plans. This will help to prevent and allay any concerns they might have regarding increased activity on the street and other potential impacts from the garden. Better yet, you might find some eager gardeners living right next door!

Refer to Appendix C for a fact sheet regarding water use in community gardens.

Step Six, Part A: Determine Ownership and Negotiate Lease Terms

Once you have identified one or more sites that meet your criteria, you will need to identify the property owner so that you can contact him or her about potentially using the property for your garden.

Before you sign any lease, be sure to find out as much information as you can about the history of how the property was used, as this may affect how, or even if, you use the site. More information about assessing potential sites is included in Step Six, Part B: Assess the History and Condition of the Site.

In Arizona, information about land and property ownership is managed by the counties. It may be easiest to start looking at your county Assessor's office, where you can use the property address or parcel number to discover the current owner's name. Some counties have this information in a searchable online database, while others require a written request or an in-person inquiry. If you find that the owner is a formal entity, such as a corporation or LLC, you can find contact information for them using their articles of organization filed at the Arizona Corporation Commission (www.azcc.gov).

Be prepared to discuss the following with the property owner: that the community garden is a permitted use of the property; your garden's mission and goals; that the idea of the garden has broad support in the community; what you would be looking for from the property owner (e.g., a lease to use the property for a given amount of time, any information they might have about the history of the property to determine suitability); and what concessions you might be willing to make (e.g., have all gardeners sign an indemnification, or "hold harmless," agreement). An organized group with a clear vision and formal presentation is likely to make a good impression and go a long way toward gaining access to the site you have in mind.

Refer to Appendix A for a sample letter to a property owner.

Remember that it takes time for a garden to "take root," and creating a garden is an investment of effort, time, and money that you would not want to go to waste. Therefore, you will want to be sure you can use the property for enough time to become established. It is recommended to find a property for which the owner is willing to agree to 3-5 year lease term.

Refer to Appendix A for a Model Lease Agreement. Model Lease Agreement shared with permission from the University of Arizona Cooperative Extension.

If a property owner agrees to let you use the site for your garden, quite often it will be necessary to obtain liability insurance before you can start operating the community garden. Liability insurance protects the property owner from injuries or other problems incurred on the site. To keep costs down, it might be possible to work with a neighboring business or local non-profit organization to have them add a rider to their insurance policy that covers the garden. Another alternative is to obtain insurance via policies offered by the American Community Garden Association.

ABOVE: PHOTO BY SCOTT BAUER, USDA-ARS

Step Six, Part B: Assess the History and Condition of the Site

It is important to ensure that the soil of your community garden is safe to work and grow food in. Even if you plan to use raised beds in your garden, it is a good idea to test the topsoil since it will be disturbed during garden construction, setup, and everyday operation. To protect human health against the presence of contaminants and ensure that your soil will provide the best nutrients for your garden, always take the following steps before planting any crops:

1. Survey the property and identify potential risks and contaminants for testing.

The types of environmental contaminants that you might find in soil depend on the history and use of the property. Soil near bus routes, busy roads or highways can have elevated concentrations of polycyclic aromatic hydrocarbons (PAHs) and lead. Soil near older homes (built before 1978) can also contain lead-based paint. As a general rule, environmental professionals look at property history and previous uses to identify what environmental contaminants may be present for testing. They also look at nearby properties to see if their use may have created hazards that could affect neighboring areas.

Ideally, the owner will be able to tell you some of the history of the property so that you can identify potential environmental contaminants to test for in the soil.

Common environmental contaminants in soil include:

- Petroleum and waste oils
- Lead and other metals
- Volatile Organic Compounds (VOCs)
- Pesticides
- PAHs

2. Test your soil. Consider likely environmental contaminants, pH, organic content, and soil nutrients needed for healthy plant growth.

If you are testing for environmental contaminants, use a laboratory licensed by the Arizona Department of Health Services (ADHS). You can find a searchable database of these laboratories at the ADHS website (www.azdhs.gov) – simply enter "environmental laboratory licensure" in the search bar.

HEALTHY SOIL, PHOTO BY LYNDA RICHARDSON, USDA NATURAL RESOURCES CONSERVATION SERVICE

If you are interested in testing your soil for nutrients, the University of Arizona's Cooperative Extension has compiled a list of local certified labs that conduct this type of soil testing. To see the list of these labs, go to the University of Arizona Cooperative Extension online publications search (www.extension.arizona.edu/pubs) and search for Publication Number AZ1111.

Regardless of which lab you use to test your soil, you will need to specifically request tests for the environmental contaminants and/or nutrients that you would like them to test for. In general, tests for nutrients are relatively inexpensive while tests for environmental contaminants cost more. Be sure you check prices for the tests with the lab you use before you ask them to do any work to avoid paying for more than you need.

If you have questions about soil contaminants or need information about preventing potentially harmful environmental exposures, contact the ADHS Office of Environmental Health. The ADHS Office of Environmental Health can provide information about specific contaminants you may be concerned about in soil or water, and help to evaluate the results of tests for contaminants once you receive them if you are not sure of their significance.

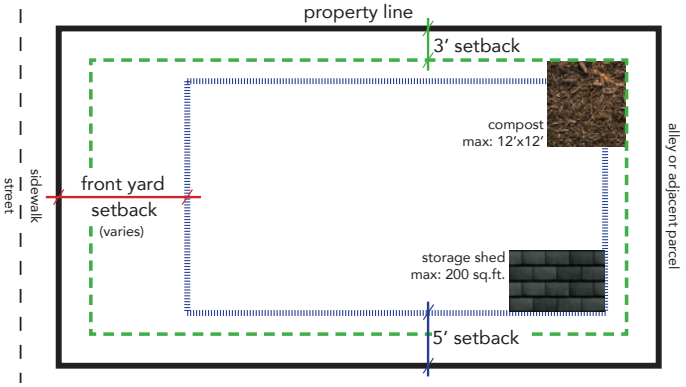
3. Use the results of soil tests to create a plan for a safe growing environment.

If the soil is contaminated, and further, if the contamination is present at a level that is a threat to human health and requires cleanup, contact the Arizona Department of Environmental Quality Brownfields Program (legacy.azdeq.gov/environ/waste/cleanup/brownfields.html) or the local Brownfields/Land Reuse Coordinator of your city or town to see if they have cleanup funds or can connect you with another organization that has such funds.

4. Check for the presence of underground utilities.

Don't dig in the garden until you check utility locations! Dial 811 or visit www.call811.com.

Site Plan: Community Garden Setbacks



CITY OF PHOENIX COMMUNITY GARDEN POLICY GUIDELINES, WWW.PHOENIX.GOV/PDD/PZ

Step Seven: Design the Garden

Now comes the fun part! Involving the entire group in the planning and design of the garden ensures that the final design reflects the collective ideas of the group. Typically, you will need to hold several meetings to give all garden participants the opportunity to contribute. It is also wise to invite the property owner and neighbors to these meetings.

Before beginning to design, two or three members of the garden team will need to measure the site and draw a to-scale site plan that includes any existing features such as trees or driveways. On this plan, be sure to mark the location of the setbacks (the distances that structures are required to be from the property line). This may vary according to the zoning of the property. Obtain this information from the local planning department.

Using copies of the to-scale site plan, ask garden team members and other participants to make simple sketches showing possible locations for the various components of the garden. Discuss what essential features should be included in the garden and begin laying them out on the site plan.

Important elements to consider when designing the garden include the following:

ABOVE AND BELOW: THE HARMON LIBRARY COMMUNITY GARDEN FENCE, BY MS. PHOENIX (FLICKR: CREATIVE COMMONS)

Fencing the property. Your city or town may or may not require a fence for community gardens. If you plan to fence your garden, though, determine where to place gates, including a service gate for vehicular access. Height of fencing allowed by different cities and towns varies by location on the site: front yard fences usually must be several feet shorter than backyard fences. For example, in Phoenix, fences within the front yard setback are limited to 40" (36" in historic districts) and backyard fences to 6 feet unless a use permit is obtained. A building permit is required for all fences higher than 36" in Phoenix.

Fencing materials. Before you decide on a material for building your fence, keep in mind that some cities and towns have rules about the types of materials that can be used. For example, in Phoenix, the types of materials that can be used to construct fencing are limited to block, wrought iron, wood, chain link or metal mesh. However, installing chain link fencing along a public street or such that it is visible from the street is not permitted unless a green screen is used. No vinyl or plastic slats are allowed. As an alternative to fencing, you might consider planting a hedge along the garden's perimeter. Regardless of what materials you choose, remember that it is a good idea to have some visibility into the garden from the street as this may contribute to security.

WHEELCHAIR ACCESSIBLE GARDEN PATHS WITH RAISED AND IN-GROUND PLANTING BEDS, GARDEN OF TOMORROW, PHOENIX, AZ, PHOTO BY AMANDA CLAYTON

Number of garden plots, type, and size. Traditional community gardens typically have fifteen or more individually assigned plots that range in size from 100 to 400 square feet. However, the number, type, and size of plots will depend on the type of garden you are establishing as well as the available space and budget. When deciding on the type of plots to include, remember that this choice will influence other decisions down the line, such as whether you need to test soil for nutrients, purchase soil or compost, etc. Remember that plots should be placed in the sunniest part of the garden.

Communal plots. Often community gardens will have communal plots to grow food for donation or other uses such as growing perennials, flowers, or herbs.

Raised beds. While raised beds are more costly to install than in-ground garden plots, they are necessary for gardeners with mobility limitations and for sites with contaminated or very poor soil. Keep in mind that people should be able to reach to the center of the bed without difficulty. A width of no more than 4 feet is recommended to achieve this. The length of the bed can vary. Some common dimensions for plots are 4x6 and 4x8 feet. If working with children, consider a width of 3 feet to accommodate their shorter arms. The depth should be at least 1 foot, but can be more. When planning for wheelchair accessibility, plan to have elevated raised beds and ensure beds have adequate distance in between them as well as appropriately sized walk-ways.

Raised bed construction. Beds should be constructed of a non-leaching material that hasn't had contact or been treated with potentially harmful substances that could leach into the soil over time. For example, older pallets were routinely treated with pesticides, some pressure-treated lumber is treated with chemicals that can be harmful to human health, railroad ties are often steeped in creosote, and used tires can release volatile organic compounds as they break down. If salvaging painted wood that is of unknown age, ensure the wood is not painted with lead paint.

Paths. Functional circulation makes working in the garden much easier. Consider the flow of your garden, especially with respect to water access, sinks, communal areas, etc.

In addition, make sure paths will fit the needs of all gardeners and visitors in their design and construction. According to recommendations for wheelchair accessibility, for example, paths should be 4 to 5 feet wide and constructed out of a compacted surface material such as stabilized decomposed granite or stabilized engineered wood fiber. If you have gardeners or other participants who are wheelchair bound, ride mobility scooters, use walkers, or are a bit unsteady, using appropriate path materials is a must.

Vehicular access. To transport garden supplies and equipment, create road access to the storage/tool shed area for a truck or car. For large community gardens, a forklift

often comes in handy – if you have or plan to grow in to a large garden, take care to plan for a convenient and safe space to store and access such large equipment.

Composting area. Most community gardens include a space for composting and most municipalities have rules for composting including site location, maximum size, and odor management. For example, in Phoenix, composting areas may not exceed 12x12 feet and must be set back at least 3 feet from the property line. If a larger composting area is desired, it would be necessary to obtain a use permit through the City of Phoenix Department of Planning and Development.

A compost area should be located near a water source or easily reached by a water hose. Bins can be used to contain the materials and decrease mess. You may consider adding signage for the compost station that includes instructions.

Composting areas should not be located upslope from garden plots to prevent contamination from water runoff.

Common areas. Designate space(s) for community gatherings or events. These common areas could include features such as picnic tables, benches, a water fountain, a community bulletin board, a whiteboard or chalkboard, a children's garden or youth area, and trees and/or a ramada for shade. If your community garden will have a kitchen or will be a site for a farmer's market, check with your local county public health or environmental services department regarding what, if any, permits you may need.

COOKOUT AFTER COMMUNITY WORK DAY. GARDEN OF TOMORROW, PHOENIX, AZ

Toilet facilities. Have restroom facilities available for gardeners, whether the facilities are onsite or on an adjacent property (via agreement with the property owner/operator). Consider, though, how you will accommodate the sanitary needs of a larger group in the garden, such as for any events that you hold. Toilet facilities should be set up professionally if they are installed onsite and afterwards they should be maintained regularly.

Sinks. It is important to have a sink available for hand washing. Stock with soap and paper towels and have a schedule for regularly restocking the sink with these supplies. Any sinks for hand washing should be dedicated for that purpose – for this reason, you may want to install a separate sink for gardeners to rinse their produce. Be sure that any sinks you install drain to the sanitary sewer or, if using a portable-type setup, to a holding tank with a capacity that is at least 15% greater than the supplied volume of water.

Irrigation system. A reliable water source is critical. If the garden sits on the grounds of an organization or public space such as a housing complex, library, park or school, connecting to the existing water line may be possible. If not, a new water tap will need to be installed. Provide one water spigot for every four plots to avoid hoses being dragged over adjacent plots. Installing a drip irrigation system makes sense in the garden's communal areas and around trees. Consider hiring an irrigation specialist if no one has experience designing and installing irrigation systems – local gardening stores and nurseries should be able to connect you with a consultant.

Assigning someone to do periodic checks on the irrigation system will make sure that everything is running as it should. This person should also keep any maps of the underground pipes and the system lines in case there are leaks. Timers should be secured and, if they are battery operated, make sure to have batteries on hand or ask participants to bring their own.

Watering needs may change over time and gardeners should be aware of how their individual plots are doing to adjust as necessary.

TOP: SIGN FOR MESA URBAN GARDEN (MUG) PHOTO BY DAVID CRUMMEY (FLICKR: CC). BOTTOM: COMMUNITY GARDEN ART MURAL, DRAWING BY IDALY CORELLA

Tool sheds and storage areas. Having a place onsite to store garden tools and supplies is a good idea. Whether you buy a prefabricated shed or build one onsite, make sure it is as secure as possible. Unfortunately, tool sheds are sometimes targets of vandalism and theft.

Tool sheds and other structures are typically subject to size restrictions and must be located within the site's buildable area: check with your local planning department for details. If your garden will have machinery such as a lawnmower or a tractor, it will likely need to be screened from view – either inside the garden shed or behind a large hedge. All materials such as fuel, fertilizer, pesticides and herbicides must be stored according to label instructions in their original, clearly labeled containers with childproof caps and inside a locked shed. Material Safety Data Sheets for each product should be easily accessible. To ensure that these materials are properly stored and are not at risk of combustion, it is necessary to consult your local fire department.

Lighting. If there is no existing lighting on the site, installing lighting for security or evening events may be desirable. Solar powered lights are an option if there is no power access on site. If lights need to be connected to an electrical circuit or junction box, you might need a building safety and/or electrical permit. Cities will have different lighting regulations so be sure to check local rules. For example, the City of Phoenix requires that all lighting be shielded so it does not spill onto adjacent properties, streets, or alleys and if motion activated lighting is used, it cannot be installed higher than 12 feet off the ground.

Signage. Including a sign with the garden's name and contact information can help your garden grow and thrive: interested gardeners and community members can easily find and get information about participating and any concerns or issues neighbors may have will more likely be brought to you directly so you can proactively respond to them. If relevant, it may be desirable to include the names of any sponsors. Remember to include information in all appropriate languages for your community.

Before you make any specific plans, check local rules that might apply. For example, community gardens within Phoenix may have one non-illuminated sign (two, if the garden is located on a corner lot) posted within the property boundary. Signs may be no larger than 6 square feet and the top of each sign may reach a maximum of 6 feet. The local planning department will have this information.

Art in the garden. Incorporating art in the garden creates a sense of identity and is fun for garden participants and community members alike. Art elements may include murals, sculpture, metalwork and so on. Work with local artists or harness the creative talents of your gardeners to make the garden area special.

BROPHY PREP GARDEN, PHOENIX, AZ

Security. While there are strategies for discouraging theft and vandalism, eliminating it completely is difficult. Fencing and lighting can help, but if theft within the garden becomes a problem, you could consider the strategic use of spiky plants, growing unfamiliar or unusual crops, or opting for less visibly enticing root crops.

Other nice additions to a garden include:

Perimeter landscaping. Perimeter landscaping can focus on native, drought-tolerant flowers and shrubs, plants which attract butterflies and hummingbirds, or roses and other flowers suitable for cutting bouquets. Herbs are also well-suited to perimeter landscaping and help to create barriers to unwanted insects who do not like the smell of their essential oils.

Area for children. This can include special small plots for children and a covered sand box. Remember that plots for children should be no wider than 3 feet to accommodate their shorter arms.

Meeting area. A meeting area will greatly increase your options for hosting community events. It could range from a semi-circle of hay bales or tree stumps, to a simple amphi-theater built of recycled, broken concrete. A shade structure installed above may be a nice touch.

Community bulletin board. This is a place where rules, meeting notices, and other important information can be posted and shared among gardeners.

Working with a design professional is an option that can greatly simplify the planning of the garden; a designer will be able to take into account the needs and ideas of all gardeners to create a garden that is well organized, easily maintained, and affordable to construct. If you need to apply for permits for the garden, the designer will be able to assist with that as well. You may also consider seeking input from other community gardens to discover what lessons they learned when designing and building their gardens.

When it comes time to select seeds and start planting, be sure to choose plants and varieties that are adapted to the local climate and appropriate for the season. If you or other gardeners need assistance, a wide variety of organizations exist to offer support. However, a good place to start is your local University of Arizona Cooperative Extension. You can access publications and expert guidance on their website or find your nearest Extension office at www.extension.arizona.edu.

Refer to Appendix C for a selection of planting guides.

6.0 SUSTAINING THE GARDEN

Step Eight: Choose a Governing Structure

Many governing structures exist for community gardens. The type that your group chooses will likely depend on the type of garden you have, how extensive your community engagement is, the number of persons who are willing to assist in garden management, and their skills and temperaments.

One approach is managing by committee. For example, Denver Urban Gardens (www.dug.org) recommends putting together three primary committees to keep a garden running smoothly:

- **Steering Committee:** A three-person leadership team that conducts the garden's business. The steering committee includes the following roles:
  - **Administrator:** Responsible for communication activities, including setting meetings and agendas, leading meetings, writing minutes, and maintaining guidelines and records.
  - **Membership:** Assigns empty plots, deals with inquiries and waiting list, and tracks member work hours.
  - **Treasurer:** Manages budget, maintains financial records, and conducts financial business including collecting fees, paying bills, fundraising, and so on.
- **Community Building Committee:** Responsible for outreach, such as coordinating a regular newsletter, organizing garden events, and conducting fundraising in partnership with the Steering Committee.
- **Maintenance Committee:** Responsible for the upkeep of the garden and organizes working groups for individual maintenance projects

A less centralized management approach might look more like the one proposed in The Community Garden Toolkit by the Douglas County Nebraska Health Department . It lists the following management roles and corresponding responsibilities:

- **Coordination:** Provides organization and facilitation of all activities within the garden. Is the lead contact for the garden, manages gardeners and interacts with community members, other organizations, etc.

PHX RENEWS,
COMMUNITY GARDENS,
PHOENIX, AZ

- **Garden Maintenance:** Provides the care and maintenance of garden area including pathways, borders. Ensures that garbage is disposed of properly, manages the compost bins, keeps the garden free of litter, and identifies priority areas for common area maintenance.
- **Maintenance and Repair:** Purchases and repairs structures and equipment, tools, benches, trellises, sheds, hoses, etc.
- **Events:** Develops and coordinates garden and community events. Organizes and works with other gardeners and community members to ensure that all events are handled smoothly.
- **Membership and Plots:** Recruits and manages garden members, assigns plots, collects money for plots, manages plot usage, maintains waiting list, coordinates orientation for new gardeners, measures and stakes plots, restores abandoned plots and maintains membership contact information.
- **Outreach and Community:** Creates a garden newsletter, manages public relations, maintains website, and documents activities of the garden.
- **Water:** Regulates water usage, keeps garden well watered, manages water barrels, manages the hoses and provides access at specific times during the growing season.
- **Pest Control:** Monitors, reports and treats for pest problems including weeds, insects and animal pests.
- **Supplies:** Secures seeds, plants, mulch, soil amendments, dumpsters etc. for the garden season. Coordinates the delivery of mulch as well as any other gardening supplies that will be needed on a consistent basis.
- **Treasurer/Finance:** Prepares detailed budget, collects and disburses all garden monies, deposits all monies in bank, keeps all financial records, deposits money, Keeps track of volunteer hours and items, which might be donated "in kind" (goods and services, instead of cash). Many organizations that provide funds do so on a matching basis and will usually consider "in kind" donations to be acceptable. This committee should also identify and approach sources of funding, both public and private.
- **Signage:** In charge of signs for whole garden, individual plots and labeling of plants.
- **Program Manager:** Manages programs for adults, children and teens.

PHOTO BY BOB NICHOLS, USDA NRCS

In Arizona, Mesa Urban Garden (MUG) has the following leadership positions (positions are on a volunteer basis): Personnel, Fundraising, Operations, Supply & Maintenance, Training, Outreach & Education, Communications, and Membership.

However you organize your management structure, once you have it established the next step is to create rules and guidelines for the garden and agree on a "code of conduct" for gardeners. The rules and code of conduct are excellent tools for establishing expectations, managing conflicts, discouraging undesirable behaviors, and encouraging a sense of shared ownership and purpose.

Refer to Appendix B for a Model Gardeners Agreement and Model Garden Rules. Shared with permission from ChangeLab Solutions

Step Nine: Obtain Funding

For the garden to be sustainable from year to year, establishing a viable plan for fundraising is essential. While some monies will be collected through garden membership fees, it is likely your annual operating budget will exceed that amount. Consider a range of funding sources such as grants, donations, in-kind donations, sales, fundraising events, and partnerships. Before applying for grants or approaching potential donors, go back to your written mission statement and goals and expand on it to include a plan for achieving your goals in the next three to five years. People and organizations generally prefer to give money to groups that are able to articulate their goals and have a plan to achieve them.

Advocates for Health in Action (www.advocatesforhealthinaction.org) suggest developing a specific wish list for the garden and pairing it with a menu of fundraising and donation options. Then define a clear strategy to employ when seeking funds for items on the list. For example:

- Create a list of potential donors and then determine what will be requested and who will do the requesting. Also decide how the donors will be recognized.
- Develop an in-kind donations plan that includes spreading the word about your garden and the work you are doing. Create a brief overview of the garden that you can give to local businesses and organizations and create an in-kind donation request form you can leave with them.
- Develop partnerships with local service organizations, businesses, and community colleges. Get them engaged in an "Adopt a Garden" or "Adopt a Plot" program.

Seek out grants for each stage of the community garden. Some organizations provide start-up funds to new gardens while others prefer funding projects for established gardens. A wide range of grants are available – explore your options by talking to other community gardens, searching online, and contacting local food- and garden-related organizations.

As you manage the garden, be sure to track metrics for the garden and regularly evaluate operations. Tracking how much produce the garden is producing, where it is going, and who is benefiting from it can be helpful when applying for grant funding or soliciting donations. It also helps to develop a clear picture of where the garden is at compared to the mission and goals of the garden.

Step Ten: Create a Budget and Manage Money

You will need to be proactive to manage garden finances – both money taken in and money spent must be tracked carefully, otherwise it can quickly get away from you!

Maintain a community garden-specific bank account. This will ideally be held in the name of your formal

organization (LLC, nonprofit, etc.). Garden accounts should not be tied to any one specific person.

Form a budget based on your initial best estimate of expenses (monthly recurring fees, maintenance costs, events and programs hosted, etc.) and income (plot fees, grants, donations, etc.). Then keep track of actual expenses and income – being sure to keep receipts and other records – and adjust your budget over time so it accurately reflects the financial picture of your garden. This is especially important when it comes to expenses for common maintenance (irrigation system, landscaping, tool repair and replacement) so that you can anticipate when money will be required for them and plan accordingly. The more detailed the records are, the more likely your garden will be able to develop the detailed and accurate budgets needed for applying for grants, effectively soliciting funders for donations, and effectively managing garden finances.

Carefully select a treasurer as part of your management structure to take charge of the garden's finances, and have a system for regular reporting and auditing so the financial state of the garden is clear to the entire garden management team.

Make sure to track – and thank! – individual donors, corporate sponsors, and in kind donations, including volunteer hours. In addition to tracking the individual's name and the date and amount of money, time, or equipment donated, include a significant remark from a conversation you had with an individual, or a personal detail about them. When you send your thanks to them, personalize the note. This helps to develop their relationship with and connection to the garden.

Refer to Appendix B for an example spreadsheet that contains some typical income sources and expenses for gardens.

Step Eleven: Manage the Garden and Address Challenges

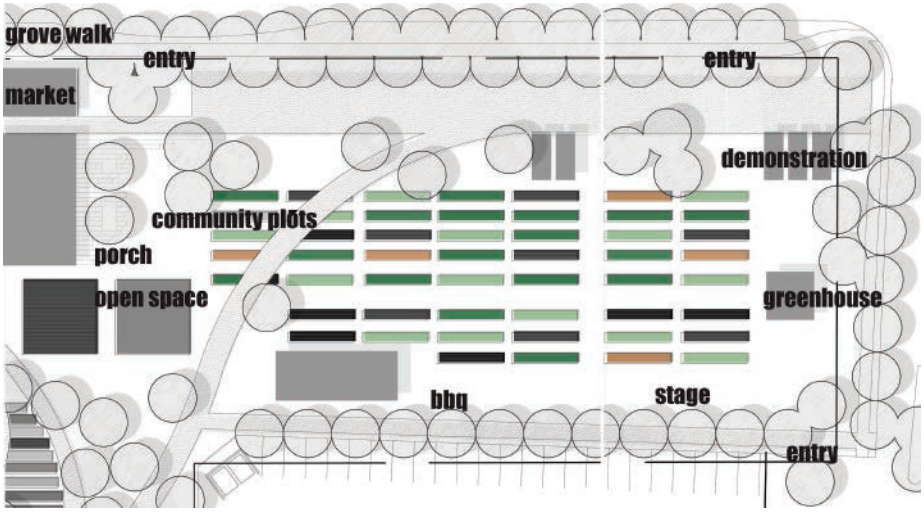
A little cultivation goes a long way to ensuring both the garden and the garden community thrive. All gardens will encounter challenges, but with effective rules, clear communication, sensitivity, and consistency, your garden will continue to grow and flourish.

Establish rules and guidelines via a Gardener Agreement and Garden Rules that each gardener must read and sign. These are excellent tools for establishing expectations, managing conflicts, discouraging undesirable behaviors, and encouraging a sense of shared ownership and purpose. Going hand in hand with this, you should identify someone in your management structure to whom gardeners can bring their concerns and issues if they are not able to work them out on their own.

Refer to Appendix B for the Model Gardener's Agreement and Model Community Garden Rules. Shared with permission from ChangeLab Solutions.

TOP: PHOTO BY JOE LARSON, USDA NRCS.
BOTTOM: COMMUNITY GARDEN PLAN BY JOE LENZ

LEFT: PHOTO BY KAREN LAWSON, USDA



COMMUNITY GARDEN PLAN BY THOMAS FISCHER & ASHLEY BRENDAN

Challenges that are common in gardens, along with potential solutions to address them, are listed below.

Vandalism: Most gardens experience occasional vandalism. The most important thing to remember is not to get too discouraged. The best action you can take is to replant immediately, replace any equipment stolen, etc. – just keep going. Good community outreach can help to prevent or reduce vandalism. You can work with local police to see if they will drive by the garden more frequently. You can install lighting or even an alarm. If you need more physical deterrents to keep vandals out, plant bougainvillea or pyracantha along your fence—their thorns will do the trick! What about barbed wired or razor wire to make the garden more secure? Our advice: don't. It's bad for community relations and garden morale, not to mention hurting the look and feel of the garden.

Communication: Clear and well-enforced garden rules and strong garden leadership can go a long way towards minimizing misunderstandings in the garden, but communication problems do arise. It's the job of the leadership to resolve those issues. If the cause of an issue is something not clearly spelled out in the rules and you feel that it should be, membership can take a vote to add new rules or make modifications to existing rules. Also, language barriers are a very common source of misunderstandings. Garden leadership should make every effort to have a translator at garden meetings where participants are bilingual – perhaps a family member of one of the garden members who speaks the language will offer to help.

Gardener Drop-Out and Other Turnover: There has been, and probably always will be, a high rate of turnover in community gardens. Often, people sign up for plots and then don't follow through. Other times, gardening is just harder, more time consuming work than people anticipate. Be sure to have a clause in your gardener agreement that states the conditions under which gardeners forfeit their right to their plot. While gardeners should be given ample opportunity to follow through, if after several reminders nothing changes, it is time to reassign the plot. It is also advisable that every year, the leadership conduct a renewed community outreach campaign to let them know about the garden and that

plots are available. Leadership changes may also occur. It is important that with the loss of a leader important information – such as accounts, passwords, etc. – is not also lost with their departure. It is recommended that you keep a document, updated periodically, with important details and information.

Refer to Appendix B for a document to help you remember these details.

Trash: It's important to get your compost system going right away and train gardeners on how to compost correctly. If gardeners don't compost, large quantities of waste will begin to build up, create an eyesore, and produce bad odors, which can hurt your relationships with neighbors and the property owner. Waste can also become a fire hazard. Make sure gardeners know how to sort trash properly, what to compost, and what to recycle. Place trash cans in accessible areas to keep a neat and tidy garden.

Weeds: Gardeners tend to visit their plots less during the summer time, and lower participation combined with more heat and rain tends to create a huge weed problem. Remember, part of your agreement with the landowner is that you will maintain the lot and keep weeds from taking over. Be proactive about planning work days so that you have enough participation. Communication goes a long way too: Remind gardeners in advance about what can be planted in summer, ask them to let the garden manager know if their plot will be untended for a while due to a vacation, and remind gardeners about expectations for them to do their part in keeping the garden looking sharp. If you anticipate that plots will be untended during the winter, apply a thick layer of mulch or hay to the beds and paths to reduce weed proliferation.

Step Twelve: Foster the Community

Create a plan to get information about the garden to garden members and the community. For example, via a monthly newsletter, a website, social media account(s), and a bulletin board onsite. It is recommended that the garden leadership sign up for an e-mail address that references the name of garden so that communication is centralized instead of being tied to any one particular person. If you create a website, have information about how to get involved in the garden and be sure to include an application form. You could also post information about upcoming events, such as work days or potlucks, photos of the garden, and a map. Social media accounts are another easy way to communicate what the garden is all about and interact with garden members and community members alike. You could complement these public-facing outlets with a private online forum or listserv via which gardeners can discuss garden business directly with one another, such as composting information, plot reassignment, maintenance, security, events, or anything else.

A lot of work goes in to organizing a community garden – once you've got it going, enjoy the fruits of your labor and make the garden a place of joy! Consider hosting special events to celebrate the fall or spring harvests, partner with nearby organizations to help with work days, and conduct other events to include and thank your community for being a part of your garden.

COMMUNITY GARDEN ART MURAL, DRAWING BY IDALY CORELLA

APPENDIX A

In this appendix, you will find:

Sample Flyer for Outreach

This example invites the community and neighborhood to learn more and become involved in the new community garden.

Show Us Your Green Thumb!

Join us to create an Augsburg Community Garden on the corner of 20th Ave & 6th St

What is a Community Garden?

A community garden is a piece of land shared by the community to grow vegetables and flowers.

What benefits would we gain from having a community garden?

- **Garden plots would be offered to members of the Augsburg community and the surrounding neighborhood**
- **Opportunity for positive social interaction both on campus & in the neighborhood**
- **Creation of a supervised youth gardening and nutrition program through Campus Kitchens**
- **Integration of gardening into Augsburg's curriculum**
- **Opportunity to grow & donate food for the local food bank**
- **Establishment of an educational & beautiful landmark in our community**

Want to get involved? Give input? Have questions?

Contact Tim Dougherty at (612)-330-1208 or doughert@augsburg.edu

FLYER BY TIM DOUGHERTY, AUGSBURG COLLEGE

Model Lease Agreement

Instructions for Use – From University of Arizona

INSTRUCTIONS FOR USE OF LEASE AGREEMENT FOR GARDENING/FARMING

The following information is provided to assist gardeners/farmers who wish to use the attached lease agreement prior to food production on property that is owned by another party. It is expected that it can be used for community gardens, an urban agriculture operation, greenhouse, etc. The lease agreement was developed because a written agreement of this type can be beneficial in protecting the rights of both the property owner (the "lessor") and the gardener/farmer (the "lessee"). Specifically, the lease agreement is designed to provide the gardener/farmer with the following advantages relative to use of any property without the benefit of a written document about property use:

- A minimum guaranteed period of property use
- Written understanding of the rights and responsibilities of the gardener/farmer
- Provisions for acquisition, use, and payment for water needed to irrigate crops
- Reasonable advance notice for need to vacate the property
- An opportunity to purchase the property for a fair market value ("first right of refusal"}

These are only recommendations for the best way to use the lease agreement. It is anticipated that the final lease between the property owner and the gardener/farmer will vary depending on the wishes of the parties, property-specific conditions (e.g., the type of irrigation available, etc.). This information is not a legal opinion. If the gardener/farmer is in doubt regarding the legality of any of the provisions in the final lease, especially with respect to insurance, taxes, or liability, consultation with an attorney with experience in these areas is recommended.

ITEMS IN LEASE AGREEMENT

The following is a list of recommendations for how to complete some of the items in the lease agreement.

Parties to Lease Agreement. More than two parties may need to sign the lease. Alternatively, there may be a sublease between gardeners/farmers and the organization that signs the lease with the property owner on their behalf. Liability waivers may also be useful to protect the party that is signing the lease on behalf of the gardeners. If there is a need for more than two parties to sign the agreement, the title of the agreement, as well as part **1. Effective Date**, and the list of signatures on page 2 should be modified.

2. Term. A minimum duration of five years is recommended for the term of the lease.

5. Property Condition. If the property is within an urban environment, the potential presence of manmade contaminants should be considered. Documentation of previous land use may be beneficial but is not conclusive. Prior soil tests may be better but the Lessee should make sure that are recent and appropriate for contaminants of potential concern.

9. Insurance. The amount of insurance to be carried by the Lessor should be no less than needed to cover any reasonably anticipated events, accidents, or occurrences during the term of the lease. It is recommended that the Lessor discuss this with their insurance agent or broker before completing the lease.

OTHER CONSIDERATIONS

The following items are not currently part of the lease agreement but they can be included if

desired by the property owner or gardener/farmer.

Zoning Ordinance Compliance

Once a potential parcel has been identified, check with the local government to verify that the zoning for the parcel permits community gardens/urban agriculture. If community gardens/urban agriculture are a permitted use, ask if there are any zoning restrictions, or other regulations, that might restrict how the property can be used.

Payment of Rent

It may not be necessary to pay rent for use of the property if the property owner does not require it. If you are a neighborhood or community group with limited funds, you may wish to request that the property owner allow property use for food production free of charge. If the property owner requires payment of rent as part of the lease, insert the following text.

Rent. Rent for the Term shall be $_____/acre/year ($_____ annually) for the entire leasing period payable annually on the Lease anniversary date.

Water for Irrigation

Section **3. Taxes and Assessments** of the lease agreement states that the Lessee will be responsible for paying for water during the term of the lease. The lease agreement assumes that water is already available at the property. If not, you will need to work with the property owner to secure an adequate supply of water to irrigate your crops **before you sign the lease**. Contact local water utility to determine the cost of a potable water hook-up. In most cities, vacant parcels do not have a hook-up to the water main or a water meter. The cost of the water meter and the hook-up fee can be thousands of dollars. In this case you should determine who will pay the cost for the water hook-up (lessor or lessee?). If the lessee pays the cost, consider if the lessor will pay the lessee a pro-rata amount of the water hook-up costs if the lease is terminated early.

Note that state law (Groundwater Code of 1980) restricts the use of potable (drinking water) for gardens and farms to property that is two acres in size or less. Irrigation of crops on larger property must use surface water or groundwater with “grandfathered irrigation rights” from land that was irrigated with groundwater between 1970 and 1979. If you have any question about whether use of water at your property is in compliance with state law, contact Mr. Jeff Tannler (602-771-8424) at the Arizona Department of Water Resources.

Tax Credit for Property Owner

It is recommend that parties to the lease agree to the assessed value of the property and/or the annual value of food production on the property prior to initiation of gardening or farming for purposes of assisting the property owner in taking a tax credit for allowing use of the property for a community garden/farming operation. This can be incorporated into the lease agreement or memorialized in a separate agreement. Although this action is not necessary to have a workable lease agreement, it demonstrates to the property owner that the gardener/farmer is willing to make the arrangement as beneficial to the property owner as possible.

Model Lease Agreement

From University of Arizona

LEASE AGREEMENT BETWEEN _____ (LESSOR) AND _____ (LESSEE)

1. **Effective Date.** This Lease ("Lease") is made effective as of _____, 201__ by _____ ("Lessor") and _____ ("Lessee") as to the property located at _____, (the "Property") further identified the following parcels: _____.

2. **Term**. Lessor agrees to lease the Property to Lessee for the period of _____, 20__ through _____, 20__. Within 60 days prior to expiration of the period, the Lessee has the option to renew for an additional three-year period.

3. **Taxes and Assessments**. Lessor will pay all real property taxes and any assessments levied on the Property during the Lease term. However, the water account shall be transferred to the Lessee and the Lessee shall be responsible for the cost of irrigation during the Lease term.

4. **Delivery of Property**. On the first day of the Lease, the Lessor shall deliver the Property to Lessee. Upon termination of the Lease, Lessee agrees to return the Property in substantially the same condition as when it was leased.

5. **Property Condition**. Prior to delivery of the property, the lessor shall provide representation to the lessee of past land use and/or the results of previous soil testing, if any. After receipt of this information the lessee may request additional soil tests to ensure the safe consumption of crops grown at the property. The cost of any additional testing will be paid by the _____.

6. **Use of Property**. Lessee shall use the Property for the purpose of gardening/farming. Lessee shall comply with all applicable rules, regulations, ordinances and laws of the government and agencies and shall not create or permit a nuisance. Lessee shall maintain all irrigation ditches, headgates, and any other improvements on the Property in good repair and safe and sanitary condition.

7. **Lessor's Entry**. Lessor and any party authorized by Lessor may, with Lessee's prior approval, enter upon the Property for the purpose of ensuring compliance herewith or showing the Property to prospective purchasers. Lessor shall assume all risks and liabilities in connection with such entry and also shall abide by the Lessee's directives.

8. **Alterations**. There shall be no material additions or improvements to the Property without Lessor's prior written consent.

9. **Insurance**. Prior to entry on the Property and during the Lease term, Lessee shall maintain general liability insurance of at least $____ per occurrence and in the aggregate. Such insurance shall name Lessor as an additional insured. A certificate evidencing such insurance shall be provided to Lessor prior to Lessee's entry on the Property.

10. **Assignment**. Lessee may sublease any portion of the Property to gardeners/farmers during the Lease term but Lessee will remain responsible for full compliance with the terms of the Lease.

Model Lease Agreement

11. **Abandonment**. If Lessee shall abandon or vacate the Property before the end of the Lease term or other event of default entitling Lessor to take possession thereof, Lessor may take possession of the Property.

12. **Default**. In the event of any breach of this Lease by Lessee which continues for sixty (60) days after written notice is given to Lessee, or, in the event that the breach cannot be cured within sixty (60) days, and the Lessee has not promptly commenced and expeditiously pursued the curing of the breach, the Lessor, in addition to any other rights or remedies it may have at law or otherwise, shall have the immediate right to terminate this Lease.

13. **Entire Agreement**. The Parties affirm that this Lease constitutes the entire agreement between them and all provisions and matters agreed to between them are herein contained.

14. **Binding on Successors**. This Lease shall be binding upon the heirs, successors, executors, administrators and permitted assigns of the parties.

15. **Amendment**. This lease may not be amended or modified except in a written document signed by an authorized representative of Lessor and Lessee.

16. **Termination**: Lessor may terminate this Lease at any time provided a one hundred eighty (180) day written notice is provided to Lessee to enable conclusion of the current farming/garden cycle. The Lessee may terminate the Lease upon giving thirty (30) day written notice.

17. **First Right of Refusal**. In the event that the Lessor received an offer from a third part to purchase the property prior to conclusion of the term of the lease, the Lessee shall be provided with an opportunity to purchase the property for the same price. The Lessee shall have ninety (days) to tender an offer on the property from the date he receives written notification from the property owner that a third party offer has been received. If offers are comparable, preference shall be given to the Lessee.

18. **Severability**. The parties agree that the provisions of this Lease are severable and the determination that any provision hereof is void or unenforceable shall not affect the validity or enforceability of any other provision hereof.

19. **Signature**: Lease Terms agreed to by signature below:

LESSOR[(1)]: LESSEE[(1)]:

_____ _____

By:_____ By:_____

Date:_____ Date: _____

[(1)] By signing this lease agreement parties certify that they have the authority to enter into the agreement on behalf of the organizations that they represent.

Sample Letter to Property Owner

From Community Garden Group

(Insert Property Owner Name)
(Street Address)
(Insert City, State Zip)

Dear (Property Owner Name),

My name is (Insert Your Name) and I am contacting you on behalf of the (Insert Name) Community Garden, a group of neighborhood residents working on starting a community garden in the (Insert Name) Neighborhood. We have met several times and are building a diverse group of garden supporters including (Insert organizations or members of Garden).

While searching for potential garden locations, we came across your property located at (Insert address). We are inquiring about the possibility of using your land as the site of our garden.

We'd love to speak with you in person or over the phone to discuss what hosting a community garden on your property would entail. We'd also like to present to you our vision of this space, discuss it in detail and answer any questions you may have.

In general, a community garden is a space where gardeners could grow nutritious produce on plots they would rent for the cost of maintaining the garden each year. Community gardens improve the quality of life for gardeners, reduce crime, preserve green space, stimulate social interaction and community development, encourage self-reliance and beautify neighborhoods while providing nutritious food and reducing family food budgets as well as creating new recreational and education opportunities outdoors.

The garden would be managed by (Insert name) and there would be an elected Garden Coordinator to oversee the project, a Treasurer and a Garden Steward to handle general garden maintenance and make sure that gardeners are maintaining their individual plots. This means you would have access to all these volunteers and no longer would need to maintain the site by yourself.

Technical issues we would need to discuss may include negotiating a lease, liability insurance, garden rules and regulations, and water access and billing. The gardeners will cover all the costs for the project.

I've included some general information about community gardens and what they can bring to a community. We are an organized group of residents who are committed to creating and maintaining a community garden in the Neighborhood and hope we can gain your support.

Thank you for your consideration and please feel free to contact me to discuss this project in more detail. My contact information is included below. Thank you again.

Respectfully,

(Insert Your Name)

APPENDIX B

In this appendix, you will find:

Model Gardener's Agreement

From ChangeLab Solutions *Ground Rules* Legal Toolkit for Community Gardens

Model Gardener's Agreement

The Model Gardener's Agreement is a binding agreement between an individual gardener and the nonprofit organization ("Sponsor") managing the community garden. It sets forth the terms under which the gardener can use a plot in the garden and is designed for use with the Model Community Garden Rules and Model Community Garden Lease.

The most important factor for a successful community garden is a trusting relationship between the parties. Ensuring that gardeners not only understand the Garden Rules and the responsibilities required for garden participation but also have an open line of communication with the Sponsor is the best way to prevent problems from occurring. The Gardener's Agreement acts primarily as a backstop to resolve a problem when informal dispute resolution is unsuccessful.

The Gardener's Agreement gives the gardener a temporary right to garden during the time period provided in the Agreement. In exchange, it requires the gardener to agree to comply with all of the Garden Rules and provides that failure to abide by the Rules may result in the gardener losing the right to participate in the Garden. The Agreement also requires the gardener to waive any claims against (that is, give up any right to sue) the landowner and sponsoring organization in the unlikely event of property damage, injury, or death. A gardener's waiver is given in exchange for the benefit of having a plot of land to garden. Because gardening is, generally, a low-risk activity, the gardener receives a valuable benefit – the opportunity to garden – in exchange for forgoing an opportunity to sue, which the gardener likely would never exercise. Once the Agreement is signed and the gardener has had an orientation, the Agreement becomes effective and the parties carry out their duties as described in the Agreement.

The comments sections explain the provisions of the Agreement. The language in italics within the text of the Agreement describes the information needed to insert in the blank spaces.

Model Gardener's Agreement

Garden Use, Waiver of Liability, Release and Indemnification Agreement

Gardener Name: _____

Address: _____

City and State: _____

Phone: _____

E-mail: _____

Emergency Contact: _____

Model Gardener's Agreement

Welcome to _____ Community Garden (the "Garden"). *[Name of organization managing the Garden]*, called "Sponsor" or "we" in this document, is a nonprofit organization that sponsors and manages the Garden as part of carrying out its mission. This document is a legal contract between you and the Sponsor.

1. TEMPORARY RIGHT TO GARDEN

1.1 Plot. You have the temporary right to garden in plot ____ (the "Plot") in the Garden, *[as identified in the Garden map attached to this agreement.] (In legal terms, you have a "license" to garden.)* Your immediate family members may garden with you as your guests. You may use the Plot from *[day, month, year]* to *[day, month, year] (duration of Gardener's use of the plot)*.

COMMENT: Some community gardens provide joint cultivation areas rather than individual plots. If so, the language can be changed to refer to the cultivation area rather than an individual plot.

The Agreement allows the gardener to temporarily use the property to garden during the indicated time period. We recommend having gardeners sign the Agreement annually, perhaps at the annual meeting.

1.2 No Refund. You understand that you will not get a refund or reimbursement for your expenses, or any other payment if you decide not to garden or if the Sponsor terminates your right to garden, even if you spend a lot of time and money on the garden. You understand that only you and no one else, including your family, has any rights under this Agreement.

1.3 Fee. When you sign this document, you will pay a fee of $_____to use the Plot. Thereafter, you will pay an annual fee, no later than *[annual date of payment]*. You understand that we may increase the fee in future years.

COMMENT: The Sponsor may choose not to require payment or to require only a nominal payment.

1.4 No Transfers. You cannot let anyone other than your immediate family garden here unless we give our agreement in writing.

2. LIABILITY WAIVER, RELEASE, INDEMNIFICATION AND ACKNOWLEDGEMENTS

2.1 Awareness of Risk. You understand that participating in the Garden has a risk of death or injury to yourself or your guests and damage to your personal property. The risks could be caused by you, other gardeners, the Sponsor, or the owner of the property on which the Garden is located (referred to as "Landowner.") The risks could also come from the condition of the land where the Garden is located, or the equipment and tools available at the Garden, or the weather or other environmental or local conditions. You also understand that hazardous conditions may exist at the Garden and that other gardeners may be unskilled.

2.2 Assumption of Risk and Waiver and Release of Claims. In exchange for your right to participate in the Garden, you agree to take on the risk of harm even if the potential harm is caused by someone else. (In legal terms, you agree to "assume the risk.") You also agree to give up ("waive") any right you may have to sue or

Model Gardener's Agreement

otherwise attempt to collect money from the Landowner, Sponsor, their board members, employees, volunteers, or anyone acting on their behalf (referred to altogether as "Released Parties") for any losses or damages resulting from death, injury, or property damage to you, anyone else, or any property, that occurs while you or your guests are in the Garden. (In legal terms, you "waive and release all claims" against the Released Parties.) You understand that the Sponsor would not permit you to participate in the Garden without your agreeing to these waivers and releases.

2.3 **Medical Care Waiver**. You give up any right to sue or otherwise attempt to collect money from ("waive and release any claim from") the Released Parties arising out of any first aid, treatment, or medical service, including the lack of such or timing of such, given in connection with your participation in the Garden. You understand that you are not covered by or eligible for any insurance, health care, workers' compensation, or any other benefits maintained by Sponsor.

2.4 **Indemnification**. You are responsible for any damages or losses suffered by the Sponsor that are caused by your or your guests' actions. (In legal terms, you agree to indemnify and hold the Released Parties harmless.)

2.5 **Publicity**. You agree to allow us or the Landowner to use any photographs, interviews, videotapes, film, other visual or auditory recordings, or any other medium, including the internet, of you or your guests that we or others may create in connection with your or your guest's participation in the Garden. You agree that you do not have to inspect or approve the finished project and you are not entitled to any compensation for the finished product.

3. TERMINATION

3.1 **Failure to Comply with Agreement or Garden Rules**. You confirm that you have read a copy of the Garden Rules attached to this Agreement and you will comply with them. If you fail to obey the Agreement or the Garden Rules, we can terminate your right to garden.

3.2 **Termination of Lease**. If the Landowner terminates our Lease for the land where the garden is located, your right to garden will end. The Landowner can terminate our Lease at any time. We will notify you if the Landowner terminates the Lease.

4. OTHER PROVISIONS

4.1 **Entire Agreement, Severability and Modification**. If any part of this Agreement is ineffective, the remaining portions of the Agreement remain in effect. Any changes to this Agreement have to be in writing and signed by you and the Sponsor.

4.2 **Third-Party Beneficiaries**. You understand that this Agreement gives the Landowner a right to enforce certain parts of this Agreement against you by going to court. (In legal terms, the Landowner is an "express third party beneficiary.") The Landowner can enforce Sections 2 and 3.2 of this Agreement.

Model Gardener's Agreement

GARDENER

By: _____
(signature)

Name: _____

Date: _____

SPONSOR

By: _____
(signature)

Name: _____

Title: _____

Date: _____

ATTACHMENT: Garden Rules

Model Community Garden Rules

From ChangeLab Solutions *Ground Rules* Legal Toolkit for Community Gardens

Model Community Garden Rules

The Model Community Garden Rules set forth the operating rules for a community garden. They are designed to be used with the attached Model Lease and Gardener's Agreement. There are many different types of community gardens, with different governing structures and operating models. The Garden Rules are intended as a starting framework that can be tailored based on the needs of the specific garden, the parties, and the gardening community. Because the Sponsor is ultimately legally responsible to the Landowner for operation of the garden, the Garden Rules give final authority for many decisions to the Sponsor. Even so, the Sponsor could choose to delegate some of those decisions to the gardening leadership team.

From a legal perspective, Garden Rules are a tool to:

- Maintain the safety of all participants
- Maintain the property safely
- Prevent disputes
- Provide a fair method for resolving disputes to prevent them from escalating
- Prevent disturbances to neighboring property owners and residents

In addition, having and following carefully thought-out Garden Rules can demonstrate to the Landowner that the proposed garden will be operated safely and responsibly, helping convince the Landowner to allow use of the property as a community garden.

To address communities' varying needs, we offer comments explaining the provisions or options. The comments and options are written in italics. Text in brackets is suggested, but should be altered to meet local conditions. When modifying these Rules, consider how changes may affect the factors listed above.

_____ Community Garden Rules

This document sets out the rules that govern the _____ Community Garden (the "Garden"). These Rules are intended to help all our Gardeners grow fresh, healthy food in a thriving garden, to help create a sense of community among our gardeners, and to help the Garden to be a good neighbor.
_____ (the "Sponsor") is a nonprofit organization that leases the land for the Garden, sponsors the Garden, and administers these Rules. Every person who has a plot in the Garden (called "Gardeners") must sign a legal agreement with Sponsor in which the Gardener agrees to comply with these Rules.

Model Community Garden Rules

A. ACCESS TO THE GARDEN	
Season:	The Garden is open and accessible [*all year. Alternative: from ____ to ____*].
Hours:	Gardeners may be in the Garden between [*6*] am and [*8*] pm. [*Alternative: dawn to dusk.*]
Keys and Security:	Sponsor will give each Gardener one key to the Garden [*or the combination or code to open the lock*]. [*Gardeners will pay a $____ deposit in exchange for receiving the key. The deposit will be returned when Gardener returns the key upon vacating his or her plot.*] Gardeners may not make any copies of the key. On leaving the Garden, Gardeners are responsible for locking the gate if there are no other individuals in the Garden. Gardeners will follow any additional security guidelines that may be announced by Sponsor. ***Comment:*** *Some gardens may not have gates secured by locks. If so, consider whether there are other security measures or a "closing" protocol gardeners should follow and change the text accordingly. Locked gates may lower the risk of vandalism, theft, and liability.*
B. GARDEN PLOTS	
Use of Own Plot:	Gardeners may use only the plots assigned to them by the Sponsor **[** *leadership team* **]**. Gardeners will maintain their plants within their plots and will trim any plants that extend into neighboring plots or into common areas. Gardeners may not alter the dimensions of their plot. ***Comment:*** *Some gardens use joint cultivation areas. If so, change the text in these Rules to address the Gardeners' responsibilities when gardening in the joint cultivation areas.*
Plantings:	Gardeners may plant vegetables, fruits, and flowers. Gardeners may not grow any plants above [*4*] feet in height. [*Alternative language: Gardeners may plant vegetables, fruits, and flowers. Gardeners may not maintain plantings or plant-supporting structures that impede the security of the garden or impede adjacent gardeners' access to sunlight by the nature of their height, material or density.*] ***Comment***: *Landowners may want to impose a height limit on plants for safety reasons or out of deference to neighbors. Some communities have zoning or other restrictions regarding landscaping that blocks views or shades adjacent property. It is important to check local laws before increasing height restrictions. For gardens with a shorter lifespan, the Sponsor may recommend that Gardeners not grow plants that take multiple years to produce food. In addition, the Sponsor may wish to maintain a list of plants prohibited in the Garden, such as highly invasive vines or stinging nettles.*
Supplies:	Gardeners are solely responsible for the planning and management of their own plots, including providing their own seeds, plants, fertilizer, and any tools not provided by Sponsor or Gardeners collectively.

Model Community Garden Rules

Organic Methods:	Gardeners will garden organically. Gardeners will check with the Sponsor before applying any fertilizers, pesticides, herbicides, or rodenticides, even if labeled "organic." Use of compost, organic mulch, and weeding is always acceptable.
Water:	Each Gardener is responsible for watering his or her own plot [*using the hose provided by Sponsor or Gardeners collectively.*] Gardeners will not overwater their plants or leave a hose unattended. [*The cost of water is included in the cost of plot rental, so any excessive water usage may cause the cost of plot rental to increase the following year.*]
Tools:	Gardeners may bring their own tools into the Garden to use in their plots, but they cannot store any tools in the Garden. Gardeners are responsible for any damage caused by tools they bring into the Garden and so should use them with care. Gardeners may not use any power tools, such as those that require gasoline, batteries, or electricity.
Plot Maintenance and Trash:	Gardeners will maintain their plots and adjacent paths in a clean and neat fashion, promptly removing any weeds, overgrowth, or other waste from their plot. Gardeners will promptly harvest edible plants. Gardeners are responsible for hauling and disposing of their own trash, such as weeds, boxes, trays, bags, packets, and similar items. [*Summer gardening begins in early spring. Plots should be weeded and planted by* [May 1]. *Winter gardening begins in early fall. Your plot should be replanted with a winter or cover crop, amended with compost or covered by mulch by* [November 1] .] ***Comment:*** *This Rule should be changed to reflect local growing seasons and what gardening, if any, occurs in the fall and winter months. Giving specific dates ensures that Gardeners understand their responsibilities at the end of the growing season(s). Depending on the local climate, the Rules should include responsibilities for leaf and snow removal. Finally, it may be helpful to provide a chart that designates all of the maintenance chores and the responsibilities for them.*
Yearly Clean-up:	Gardeners will perform a yearly clean-up on their plots on [*date to be determined by Sponsor.*]
[*Compost:*]	[*Gardeners will place any organic waste such as weeds, dead plants, or rotten produce, in the compost pile designated by Sponsor.*] ***Comment:*** *Compost feasibility varies from site to site, but should be encouraged. Some communities have local laws requiring composting. It is important to check local requirements and to adjust the Rules accordingly. The Sponsor may also wish to have weeds composted separately and exclude unchopped thick stems and diseased plant materials from compost piles.*
Absence:	Gardeners may not abandon their plots. Abandonment means failing to maintain a plot for [*2 weeks*]. If a Gardener expects to be away from the Garden for more than [*2 weeks*], but less than [*3 months*], he or she must inform Sponsor. The Gardener and the Sponsor will then determine an alternative, such as a temporary substitute, acceptable to both. Gardeners who are away for more than [*3 months*] will lose their plots.
No Personal Property:	Gardeners may not keep any personal property on their plots or in the Garden when they are not in the Garden. If Gardeners leave personal property on their plots after the termination of their participation in the Garden, Sponsor can keep and sell the abandoned property.

Model Community Garden Rules

C. COMMON AREAS AND RESPONSIBILITIES	
[*Common Tools:*]	[*Sponsor or Gardeners collectively will provide a set of tools in a storage shed in the Garden for use by all Gardeners (the "Common Tools.") Gardeners will return the Common Tools to the storage shed as soon as they are finished using them. If a Common Tool appears dangerous or in disrepair, Gardener will not use the Common Tool and inform Sponsor immediately.*]
Common Responsibilities:	Gardeners will keep clean and neat any common areas, such as pathways and storage sheds. Gardeners will promptly report any concerns about the safety of the Garden to the Sponsor. If there is vandalism, storm damage, or other damage to the Garden, all Gardeners are expected to help in cleaning up and restoring the Garden to its prior condition, but the Sponsor will bear the cost of the repairs.
[*Garden Work Days:*]	[*All Gardeners must participate in* [*4*] *Garden Work Days per year, where they participate in cleaning and maintaining the Garden.*]
D. COMMUNICATION	
	Comment to section D: *As noted previously, community gardens use various governance structures, including having one garden manager, a leadership team, or governance council. In certain gardens, the Sponsor may wish to make management decisions. In that case the Sponsor should designate two Garden Coordinators responsible for communication between the Sponsor and Gardeners. In other gardens, the Sponsor may wish to allow the Gardeners, through a garden council or leadership team, to provide more management functions. Regardless of the governance structure, it is important to ensure there is a specific method of communication between the Sponsor and Gardeners so that Gardeners have input into the management and operation of the Garden and are aware of the Rules and any changes to the Rules or operations of the Garden required by the Sponsor.* [*Insert text here briefly describing the management structure*]
Garden Management:	The [*insert name of Garden leadership*] has complete authority to interpret the Rules and make decisions.
Communication:	The [*Sponsor, Governance Council, leadership team, other entity* _____] will designate [*two*] members as "Garden Coordinators" to be the official point of contact for the Sponsor [*and leadership team*] and Gardeners.
Contact Information:	The Sponsor will provide a bulletin/announcement board in the garden. The Coordinators [*and other members of the Leadership team*] will post contact numbers on the board in the Garden. Gardeners must tell the Coordinators of any change in their contact e-mail addresses or phone numbers. ***Comment:*** *Some gardens assign oversight of different functions to different members. If so, the Rule should require that the names, duties, and contact information for each of the leaders be posted.*

Model Community Garden Rules

Gardener Input:	Gardeners are encouraged to provide suggestions about Garden operations to the Coordinators. Gardeners should contact the Coordinators directly at the number provided by the Coordinator, not the Sponsor's office, with any questions relating to day-to-day operational matters.
Gardener Orientation:	New Gardeners must attend a Sponsor *[and leadership team]*-led orientation to become familiar with how the Garden functions and their responsibilities as a Gardener.
Annual Meeting:	Once a year, the Sponsor will invite all Gardeners to an annual meeting to notify Gardeners of any changes made in how the Garden operates, these Rules, in assignments of plots, to discuss any issues or concerns, *[and to elect a new leadership team].* Sponsor will give written notice of the annual meeting, sent by email or first-class mail, no fewer than 14 days in advance. ***Comment:*** *Many gardens distribute leadership duties by designating positions for membership, treasurer, common area maintenance, communications, and other functions. Distributing responsibilities for garden management and oversight prevents overburdening a few members. Leaders can be elected at the annual meeting.*
Confidentiality:	Sponsor and other Gardeners will not use any personally identifiable information, including Gardener's name, email address, telephone number, or street address, for purposes other than the operation of the Garden.
E. CONDUCT	
General Conduct:	Gardeners are expected to be civil, honest, and cooperative in dealing with the Landowner, Sponsor, Garden neighbors, other Gardeners, and guests of other Gardeners.
Guests:	Gardeners may bring guests, including children, into the Garden, provided that the guests comply with the Rules. Gardeners will supervise any child under the age of sixteen. Gardeners will be responsible for the conduct of children and their guests including making sure they do not damage or interfere with activities on other plots or otherwise engage in inappropriate conduct. Guest violations of these Rules are treated as violations by the Gardener. ***Comment:*** *Many gardens encourage Gardeners to hold internal garden community-building events such as potluck dinners, gardening workshops, music in the garden, etc. Other gardens may limit the number of guests a Gardener can bring in at any time and require explicit permission before bringing in a large group (for example, a school class for a visit or special event) or holding an "open house" for the community. The Rules should reflect what activities are permitted, how frequently, any restrictions on guests, and what activities require special permission.*

Model Community Garden Rules

Pets:	Gardeners may not bring any pets or animals into the Garden, including for burial. [*Alternative: Gardeners may bring their pets into the Garden only if Gardeners keep them on a leash or other restraint for the entire time the pets are in the Garden. Gardeners are responsible for cleaning up after their pets and ensuring that their pets stay on their plots and do not interfere with activities or damage plants on other plots. If other Gardeners complain about the pet, Gardener will remove it from the Garden.*] ***Comment**: Pets can be points of controversy for community gardens. Many community gardens simply ban all pets.*
Respect Others' Property:	Gardeners may not enter other plots, use another Gardener's tools or supplies, or harvest another Gardener's produce, without the explicit permission of the other Gardener. Gardeners may not enter property next to the Garden without the owner's permission.
No Illegal Plants:	Gardeners may not grow any plants considered illegal under state or federal law. For example, Gardeners may not grow Cannabis sativa (marijuana), whether or not the use of marijuana may be lawful for medical purposes under state law.
Compliance:	Gardeners must comply with all applicable local, state, and federal laws.
No Firearms:	Gardeners may not carry, use, or store firearms in the Garden.
No Smoking:	Gardeners may not smoke in the Garden.
No Alcohol/Drug Use:	Gardeners may not consume or use alcohol or illegal drugs while on the Garden premises. Gardeners may not bring alcohol or illegal drugs onto the Garden premises. Gardeners may not come into the Garden while under the influence of alcohol or illegal drugs.
No Sexual Relations:	Gardeners may not engage in sexual relations in the Garden.
No Fires or Cooking:	Gardeners may not start or maintain a campfire, burn weeds, *[use a barbecue grill, or cook]* in the Garden. ***Comment:** Many community gardens encourage using a barbecue grill for garden-wide events. If so, change the Rule to reflect when, and under what circumstances, barbecue use is permitted.*
No Loud Music:	Gardeners may not play music or the radio loud enough to be a nuisance to other Gardeners or to the Garden's neighbors.
No Sales:	The Garden is for personal, noncommercial use only; Gardeners may not sell any produce or flowers grown in the Garden. ***Comment:** Some landowners may permit limited on-site sales during specific times. Before permitting sales, the Sponsor should check state and local law to determine whether a permit or license is required for sales and ensure that Gardeners comply with all laws.*

Model Community Garden Rules

F. PROBLEMS

Dispute Resolution:	Gardeners will raise with the Coordinators any disputes about the Garden or with fellow Gardeners. The Coordinators *[Leadership team]* will have the power to hear these disputes and will resolve them in the best interest of the Garden.
Rules Violations:	Gardeners may lose their rights to participate in the Garden if they fail to comply with any of these Rules. If a Gardener: • endangers other Gardeners, Sponsor, neighbors, or other individuals; • takes or uses another Gardener's tools, supplies, or produce without permission; • encroaches on Garden neighbors' property; • grows illegal plants; • carries, uses or stores firearms in the Garden; • uses alcohol or illegal drugs in the Garden; or • has sexual relations in the Garden The Sponsor may, at its discretion, terminate immediately the Gardener's right to participate in the Garden. If that occurs, the Gardener must leave the Garden by the end of Garden hours on the termination day and may not reenter without Sponsor's permission. If a Gardener violates any other of these Rules, Sponsor will inform Gardener of the violation by [*sending an email to Gardener or putting a red flag on Gardener's plot.*] Gardener will have [*one week*] to correct the violation. If the violation is not corrected within [*one week,*] as determined by the Sponsor in its discretion, the Sponsor may, at its discretion, terminate the Gardener's Agreement. After termination, Gardener will have [*two weeks*] to harvest and clean up the plot. Upon termination for any reason, a Gardener will promptly return to the Sponsor the key to the Garden and any other Sponsor property. Terminated Gardeners are not entitled to any refunds or other payments from the Sponsor.
No Limit on Sponsor Rights:	The process described in this Section G does not (i) limit the Sponsor's ability to enforce its rights under these Rules; (ii) limit or qualify a Gardener's obligation to comply with applicable law or the Rules; or (iii) limit the Sponsor's right to notify and/or involve government authorities as it may determine.
No Refund or Other Claims:	Gardeners under no circumstances will be entitled, directly or indirectly, to any refunds, any direct, incidental, consequential, punitive, or other damages, any other forms of compensation from the Sponsor or the owner of the Garden's land, or to obtain an injunction, specific performance, or other equitable remedy, as a consequence of termination from participation in the Garden.

Model Community Garden Rules

G. OTHER PROVISIONS	
Changes in the Rules:	Sponsor may amend these Rules in its discretion without advance notice. Sponsor will provide all Gardeners with a copy of the current Rules, will post a copy of the current Rules at the Garden, and will summarize any changes in the next annual meeting. The Gardeners, through the *[Garden Coordinators/leadership team]*, may propose Rules for the Sponsor's consideration.
Master Lease:	The Gardener's Agreements with individual Gardeners are subject to the master Lease between the landlord who owns the Garden's land and Sponsor. As a result, if the landlord terminates the lease, the Garden will close, and the Gardener's Agreement will terminate. At that time the Gardeners will no longer have access to the Garden.
Garden Agreement Controls:	Nothing in these Rules limits, qualifies, or otherwise affects the Garden Agreements between the Sponsor and each Gardener. Should there be any ambiguity or conflict between a Gardener Agreement and these Rules, the Gardener Agreement will control.
Waiver:	Any waiver by the Sponsor of these Rules must be in writing and signed by the Sponsor. Failure, neglect, or delay by the Sponsor at any time to enforce the provision of these Rules will not be considered a waiver of the Sponsor's rights under these Rules. Waiver of any breach or provision of these Rules or failure to enforce any breach or provision of these Rules will not be considered a waiver of any later breach or the right to enforce any provision of these Rules.
No Discrimination:	Sponsor will not discriminate on the basis of race, color, national origin, religion, sex, disability, age, medical condition, ancestry, marital status, citizenship, sexual orientation, gender identity, or status as a veteran [*except the Sponsor will keep available* [25%] *of the plots for certain groups of individuals*].
Translations Not Binding:	Sponsor may provide Gardeners with a translation of these Rules and related summaries or other explanatory materials. Sponsor does so as a convenience. Should there be any ambiguity or conflict between the English and the translated versions of these documents, the English language versions will control. They, not the translations, are the official, legally binding documents.
Other Rules:	***Comment:*** *Depending on the anticipated tenure of the garden and local circumstances, the Sponsor may wish to include Rules addressing some additional issues, such as allocation of plots when there is a waiting list to join the garden, the allocation of costs when infrastructure repairs are needed, and other topics.*

Sample Community Garden Budget

Line Items	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Revenue/Income													
Plot Fees (# plots x cost/plot/month)													
Neighborhood Start-up Grant													
Garage Sale Fundraiser													
Donations													
Total Income													
Expenses/ Costs													
Basic Elements													
Water bill (meter and/or hydrant hook-up)													
Water system (supplies, like hoses & barrels)													
Tool storage and combo lock													
Hand tools (shovels, rakes, trowels, pruners)													
Lease fee (if applicable)													
Liability insurance (if applicable)													
Woodchips													
Compost or topsoil													
Plant materials (seeds & seedlings)													
Printing (agreements, flyers, etc)													
Garden sign – construction materials (stakes,board, paint, brushes)													
Trash pickup													
Nice Additions (Wishlist)													
Bulletin board – construction materials													
Pavers													
Fence													
Hedges													
Picnic table													
Arbor													
Tree(s)													
Total Expenses													
NET INCOME (income-expenses)													

Remember the Details

Preserving the Garden: Elements of Sustainability

Anything can happen suddenly to the garden coordinator, and with them the information they hold that makes the garden go each year. By being proactive, an accident or suddenly moving away won't leave the garden group in the lurch and necessitate "reinventing the wheel".

Be sure that at least three people know the logistics of the community garden and where information is located, such as…

1. **Bank Account**

   Bank Name:

   Bank Address:

   Name on Bank Account:

   Account-holders' name(s) (if different):

   Bank Account number:

2. **Landowner contact information and lease agreement**

   Address of Community Garden Site:

   Parcel Number of garden site:

   Name of landowner: Name of contact person:

   Mailing address:

   Phone: Annual Fee (if any):

   Email: End of Lease Date:

   Comments:

3. **Liability Insurance renewal**

   Name of Insurance Holder: Contact person:

   Mailing address:

   Phone: Fee (if any):

   Email: Expiration Date:

4. **Water system** (how is water handled for the garden?)

   Water source: _____ Fee:
   (neighbor, water hydrant, on-site water system, etc.)

   Contact name, phone and email: Payment Schedule:

   Briefly describe the arrangement and how the water system works:

Remember the Details

5. Garbage pick-up (if applicable)

Name of Garbage Service:

Account Number: Fee:

Name of Account holder: Payment Schedule:

6. Information about the organizations associated with the community garden.

Name of organization/ agency	Relationship to the garden	Contact person and title (if applicable)	Contact info: mailing address, phone, email
Sample spreadsheet			

7. For the Garden

a) Ward: _____ City Councilmember & ph: _____

b) Neighborhood Association/District Council: _____

8. Contact information for all gardeners

Name of Garden member	Phone number	Email address (if have one)	Mailing address	Plot number (if applicable)
Sample spreadsheet				

7. Garden Contact information

Mailing Address if not the coordinator:

Phone number:

Billing address for phone bill (if applicable):

Garden Email address:

Who is in charge of checking the email address:

Website Address:

Website host, name of company:

Contact info for website host:

APPENDIX C

In this appendix, you will find:

Arizona Groundwater Code: What Community Gardeners Need to Know [DRAFT]

ARIZONA GROUNDWATER CODE

What Community Gardeners Need to Know

Interest in community gardening and farming is on the rise in Arizona. An important consideration to anyone developing a community garden should be the Arizona Groundwater Management Code. This is an important state policy that helps protect the water supply we have and ensure we have enough water for the future. Because water is such a precious resource in Arizona, the Groundwater Code limits the use of groundwater for irrigation that may impact community gardens and farms.

The Arizona Department of Water Resources (ADWR) is the state agency responsible for administering the Groundwater Code. ADWR is supportive of community gardens and farms. However, if a community garden or farm is violating the provisions of the Groundwater Code, ADWR can impose fines and issue orders to cease and desist.

The purpose of this fact sheet is to summarize the Groundwater Code requirements that may apply to community gardens and farms. If you have questions about whether your community garden of farm is located in an Active Management Area (AMA) or Irrigation Non-Expansion Area (INA) or concerns about how the Groundwater Code may apply to your community garden or farm, you are encouraged to contact **ADWR Active Management Area staff at (602) 771-8585.**

ARIZONA GROUNDWATER CODE

How to determine if the Arizona Groundwater Code applies to your community garden

What is the size of the irrigated area of your community garden?

Less than Two Acres

YES

Your community garden is in compliance with the Arizona Groundwater Code

Two Acres or More

YES

Contact ADWR to determine water rights

Statewide AMA Section – Phone 602-771-8585
Provide County Assessor Parcel Number (APN)

IF

Your land *has* an Irrigation Grandfathered Right (IGR)

THEN

Your community garden can move forward

IF

Your land does *not have* an Irrigation Grandfathered Right

THEN

Review irrigation options with ADWR

Arizona Groundwater Code: What Community Gardeners Need to Know [DRAFT]

IGR – Irrigation Grandfathered Rights

Irrigation rights determine the amount of water that can be used for a community garden or farm. These rights are based on whether or not the land was used for an agricultural purpose between 1975 and 1980. If the land was being used for irrigated agricultural purposes during that time, it has an Irrigation Grandfathered Right (IGR). This right remains with the land unless the use of the land changes or the IGR is retired or extinguished.

- If the land has an IGR, you may have a community garden or farm of two or more acres of in-ground crops or pasture.
- If the use of the land has changed to a non-agricultural use, the irrigation right may have been retired or extinguished. Contact ADWR to determine applicability to your property.
- If a property **does not** have an IGR, you may not be able to use the property for a community garden or farm of over two acres if using in-ground gardening techniques. However, you may need to adapt your gardening plans to conform with the ADWR Industrial Conservation Program (see below for more details).

How do I know if my property has an IGR?

Contact ADWR at (602) 771-8585 for this information. Have the Assessor Parcel Number (APN) available so ADWR can make a determination. To identify the APN, contact your County Assessor Office or go on-line to your County Assessor website.

Exception to the two-acre irrigation limit: Industrial Program

Land used for growing products such as food or plants for sale, can be larger than two acres, if these products are grown in containers or raised beds. Please discuss this alternative with ADWR staff.

How do I know if my community garden or farm is more than two acres?

Contact ADWR for clarification and guidance regarding calculating the two-acre irrigation limit.

Does this limit apply to all water sources?

- Salt River Project (SRP) – Community gardens and farms using Salt River Project (SRP) water are limited to less than two acres.
- Potable Water (municipal; private water company) – Community gardens and farms using potable water are limited in size to less than two acres.
- Reclaimed Water – Community gardens and farms using reclaimed water are limited in size to less than two acres.

Water Conservation Resources

Arizona Department of Water Resources (ADWR) – http://www.azwater.gov/AzDWR/StatewidePlanning/Conservation2/default.htm
Arizona Municipal Water Users Association (AMWUA) – http://www.amwua.org
Southern Arizona Water Users Association (SAWUA) – http://www.sawua.org
Northern Arizona Municipal Water Users Association (NAMWUA) – http://namwua.org/index.html

ARIZONA COOPERATIVE EXTENSION

THE UNIVERSITY OF ARIZONA
College of Agriculture and Life Sciences

AZ1005 Revised 09/10

Vegetable Planting Calendar for Maricopa County

Kelly Murray Young, Kai Umeda

Photo by Jeff Schalau

In Maricopa County, most any type of vegetables and fruits can be grown successfully when **appropriate varieties are selected and planted at the right time.** The climate, the season, and potential pests all impact the selection of what to plant when. Experienced gardeners and nurseries can offer advice about popular varieties of vegetables and fruits that perform well in desert conditions.

Climate: High temperatures, both day and night for extended periods of time, low humidity, and the high solar intensity can put tremendous stress on plants. In addition, some plants may not survive freezing temperatures if there is a hard winter frost. Select varieties that are tolerant of temperature extremes, plant at the appropriate times to avoid temperature extremes, or plan to protect the plants. It is possible to grow crops out of season by providing shade, more humidity, artificial heat, etc.

Seasons: We have two optimal growing seasons: one in the spring, the other in the fall. Both day length and temperature vary dramatically between seasons (short days and cold temperatures in winter to long days and extreme temperatures in summer). Since few annual plants are suited to thrive in both conditions, it is important to choose plants that mature quickly to ensure a full life cycle within one season.

Pests: Choose varieties that have been bred to be resistant to diseases and pests. These are indicated by initials following the plant variety name, for example, in tomatoes, "V" means resistant to *Verticillium* wilt disease, "N" indicates resistance to Nematodes, "F" indicates resistance to *Fusarium* wilt disease, and "T" indicates resistance to Tobacco mosaic virus. Choose a planting date to avoid known pest seasons. For example, delay fall planting until whitefly populations decline with cooler temperatures; delay spring planting until soils become warm and dry to reduce fungal and bacterial disease problems.

At a Glance

Choose varieties that:

1. mature quickly;
2. provide desirable yield, taste, texture, & color;
3. are recommended by local gardeners;
4. are adapted to climate & soils; and
5. are disease & pest resistant.

Use chart to choose planting date.

Location/Elevation Specific Planting Guides – Lower Elevations

Vegetable Planting Calendar for Maricopa County – University of Arizona Cooperative Extension

THE UNIVERSITY OF ARIZONA COOPERATIVE EXTENSION
Maricopa County Garden Planting Calendar for Annual Fruits and Vegetables

Fruit • Vegetable	Time to Harvest	Jan.		Feb.		March		April		May		June		July		August		Sept.		Oct.		Nov.		Dec.	
		1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15
Artichokes, Globe	4-6 months		T	T	T	T	T															S	S	S	
Artichokes, Jerusalem	6-8 months		T	T	T	T	T	T	T	T	T														
Asparagus	1-2 years	T	T	T																		T	T	T	T
Basil	T = 30 S = 60-75 days			S		TS	TS	TS	TS	TS	TS														
Beans, Lima	60-100 days						S	S																	
Beans, Pinto	60-90 days													S											
Beans, Snap	60-90 days						S	S	S					S	S	S	S	S							
Beans, Yardlong	60-90days						S	S	S	S	S	S	S			S	S								
Beets	60-80 days	S	S	S	S	S						S	S					S	S	S	S	S	S	S	S
Blackeyed Peas	90-120 days							S	S	S	S	S	S	S	S	S	S								
Bok Choy	45 days	S	S	S	S											S	S	S	S	S	S	S	S	S	S
Broccoli	T=90-100 S=120-130 days	TS	T													S	S	S	TS	TS	TS	TS	TS	TS	TS
Brussel Sprouts	T=100-120 S=130-150 days															S	TS	TS	TS	TS	TS	TS	TS		
Cabbage	T=80-90 S=120-130 days	TS	T													S	S	S	TS	TS	TS	TS	TS	TS	TS
Cabbage, Chinese	T=45 S=70-80 days	TS	T													S	S	S	TS	TS	TS	TS	TS	TS	TS
Carrots	60-100 days	S	S	S	S	S	S	S	S							S	S	S	S	S	S	S	S	S	S
Cauliflower	T=90-100 S=120-130 days	TS	T														S	S	TS	TS	TS	TS	TS	TS	TS
Celery	120-150 days																S	S	TS	TS	TS	TS	TS	TS	TS
Chard	60-90 days	TS	TS	T													S	S	TS	TS	TS	TS	TS	TS	TS
Collard Greens	80 days	S	S	S	S												S	S	S	S	S	S	S	S	S
Corn, Sweet	70-90 days			S	S	S	S	S							S	S	S								
Cucumbers	60-90 days			S	S	S	S	S	S								S	S	S						
Cucumbers, Armenian	55 days			S	S	S	S	S	S	S	S	S	S	S											
Eggplant	70-120 days					T	T																		
Endive	80-120 days	S	S															S	S	S	S	S	S	S	S

S = Seeds T = Transplants X = Sets of Cloves

Location/Elevation Specific Planting Guides – Lower Elevations

Vegetable Planting Calendar for Maricopa County – University of Arizona Cooperative Extension

Fruit • Vegetable	Time to Harvest	Jan.		Feb.		March		April		May		June		July		August		Sept.		Oct.		Nov.		Dec.	
		1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15
Garlic	5-7 months																			X	X				
Kale	60-90 days																S	S	S	S	S	S	S	S	S
Kohlrabi	T=45-60 S=50-60 days	T	T	T													S	S	S	S	TS	TS	TS	T	T
Lettuce, Head	50-100 days	TS	TS	T													S	S	TS	TS	TS	TS	TS	TS	TS
Lettuce, Leaf	50-90 days	TS	TS	TS	T												S	S	TS	TS	TS	TS	TS	TS	TS
Leek	180-200 days	S	S														S	S	S	S					
Melons, Cantaloupe	80-120 days				S	S	S	S	S	S	S	S	S	S	S										
Melons, Watermelon	90-120 days				S	S	S																		
Mustard	35-45 days	S	S	S	S												S	S	S	S	S	S	S	S	S
Okra	70-100 days						S	S	S	S	S														
Onions, Bulb	Sets=4-5 months S=7-8 months	X	X	X																S	S	S	X	X	X
Onions, Green	90-100 days	S	S	S	S	S	S	S	S								S	S	S	S	S	S	S	S	S
Onions, Shallots	80 - 110 days													X	X										
Parsnips	100-120 days																	S	S	S	S	S	S		
Peanuts	5 months						S	S	S																
Peas	Sept.=60-120 Nov.=120-150 days	S	S	S	S														S	S	S	S	S	S	S
Peppers	90-120 days				T	T	T							T	T										
Potatoes	90-120 days	S	S	S	S																				
Potatoes, Sweet	120-160 days					T	T	T	T	T	T	T	T												
Pumpkin	90-120 days					S	S							S	S	S									
Radishes	40-60 days	S	S	S	S	S	S	S	S									S	S	S	S	S	S	S	S
Rutabagas	100-120 days	S	S															S	S	S	S	S	S	S	S
Spinach	40-90 days	S	S	S	S													S	S	S	S	S	S	S	S
Squash, Summer	60-90 days			S	S	S	S	S	S								S	S							
Squash, Winter	90-120 days					S	S							S	S	S									
Sunflower	90-110 days			S	S	S	S	S	S	S	S	S	S	S	S										
Tomatoes	50-120 days				T	T	T							T	T										
Tumips	90-120 days	S	S	S	S												S	S	S	S	S	S	S	S	S

S = Seeds T = Transplants X = Sets of Cloves

Location/Elevation Specific Planting Guides – Lower Elevations

Deciduous Fruit Trees for up to 3,500' Elevations – University of Arizona Cooperative Extension

Revised 04/2011

DECIDUOUS FRUIT TREES FOR UP TO 3,500'

Terry H. Mikel, Extension Agent
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Deciduous fruit trees, whether standard or semi dwarf, planted for shade, bloom for fruit, are affected by elevation. At lower elevations, lack of winter chilling may cause erratic spring bloom and poor fruit set. At the upper end of the elevation scale, near 3,500 feet, spring frosts may damage bloom and small fruit on many varieties. The spring frost hazard varies widely by site and from season to season. Air drainage is the most important variable during potential frost periods. Deciduous fruits in general are not salt tolerant, particularly to chlorides or boron. Water over 900 parts per million (ppm) of total soluble salts should not be used. Not long-lived, all varieties are prone to disease. Ten to 20 years is about as long as you should expect them to live.

CHOOSING A VARIETY

For landscaping, some non-fruiting or minimum fruit-bearing types such as flowering peach and Hollywood or Vesuvius plums may be better than fruit-bearing varieties. However, since most people want both spring color and fruit, these variety recommendations take both capabilities into account. Most of these recommendations are based on experiences of commercial growers in Maricopa, Pinal and Pima counties, and since some of the varieties only recently have been released for propagation, they may not yet be readily found in retail nurseries. Patented varieties do not always mean more or better fruit, unless otherwise indicated, recommended varieties are fully or partially self-pollinating, so individual trees will normally bear adequate crops.

PEACHES

Desertgold: A strong growing, excellent quality, semi-freestone, yellow peach. Early bloom restricts its use to Maricopa, Yuma and warmer areas of Pinal and Pima counties. Produces large fruit when thinning is adequate. It has a low chilling requirement and ripens in May.
Loring: Yellow, freestone peach, ripens in late July and early August in Tucson area. Good quality. Better adapted to 2,500-3,500 foot elevations. An early ripening selection available as a mail order item.
Red Haven: Good quality, red-blush skin peach, ripens in early to mid-July in the Tucson area. Better adapted to 2,500-3,5000 foot elevations.
"Delicious" Peach: Patented variety, selected from the July Elberta, produces good quality fruit in 2,500-3,500 foot elevations. Currently available through mail order only.
Bonanza: A semi dwarf yellow peach generally proven adapted to southern Arizona. Under good growing conditions, will reach 8-10 feet. Can be planted in large containers to restrict size. Because of growth habit, fruit is less susceptible to bird damage. Fruiting habit is somewhat erratic. Ripens in June.
Kim Elberta: A high-quality strain of Elberta, better adapted to 2,500 and 3,500 foot elevations. Ripens in early August in Tucson area.
Mid-Pride: Good quality, yellow freestone type, patented variety from California, ripens in mid-to late June. Somewhat higher chilling requirement than Desertgold, but has done well in yard situations in southern Arizona.
Earli Grande: A well adapted, semi freestone, yellow flesh peach. Early bloom makes it more suitable to Maricopa, Yuma and warmest areas of Pima and Pinal. Fruit size and maturity are similar to Desertgold. Ripens in May.
Florida Prince: A well-adapted variety not yet widely available in retail trade. Early bloom also makes it more suitable for Maricopa, Yuma and warmest areas of Pima and Pinal. Yellow flesh, semi freestone, early to mid May maturing. Fruit size and maturity are similar to Desertgold. Ripens in May.

NECTARINES

Nectarines are very susceptible to thrips injury. The lack of suitable thrips control makes nectarines a marginal recommendation.

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APRICOTS

Because of open, spreading growth habit, apricots are well adapted for shade use in yard landscaping.

Royal or Blenheim: Good quality, semidry fruit, considered the standard of the early apricots. Ripens late May to June. Generally procuces well in minimum chilling areas.
Katy: Relatively new variety with a low chilling requirement. This variety has produced good quality fruit in the few seasons it has been grown in southern Arizona. The fruit is attractive dark-blush color, ripening in early June. Fruit thinning need not be practiced to induce adequate fruit size at maturity.
Caselton: A good quality apricot that seem well adapted to Tucson areas.
Keeves and Tilton: Later blooming and ripening varieties, generally more suitable for 2,000 to 3,000 foot elevation range, but excellent crops have been produced in colder areas of Maricopa and Pinal counties.

PLUMS

Trees grow upright when young, then branching spreads out with age.
Santa Rose: Recommended for both commercial and home yard plantings. A high quality, purple plum that bears consistent crops. Ripens in June to early July.
Beauty: An amber-flesh plum, early ripening with high quality, but requires cross pollination. Lighter yielding than Santa Rose. Ripens in early June.
Laroda: A dark-skinned, yellow-fleshed plum. Semidry, this high quality plum bears well under minimum chilling conditions if cross-pollinated with Santa Rose. Ripens in late August and early September for extended harvest. Excellent for drying or plum leather.

PEARS

Pears are upright in their growth when young, spreading into attractive, stately older trees. Recommended for 1,200 feet or higher, they may be marginal fruit producers throughout this elevation range in some years. Fruit bearing is more consistent on mature trees. All pears are susceptible to fire blight disease.

Barlett: The most consistent bearing pear variety, with medium-sized fruit of good quality. Ripens from September to October. Partially self-pollinating. Will generally not bear in elevations below 1,200 feet.
Keifer: Generally larger and somewhat drier than Bartlett. Individual trees have produced crops at 1,200-3,000 foot elevations. Ripens October to November. Pears do not ripen well at low elevations, fruit should be wrapped in paper and stored for several weeks.

ASIATIC PEAR
Nurseries and catalogs sometimes call it “apple pear.” This leads many to believe it is a cross between apple and pear, which it is not. A descendant of two old-line Asiatic pears, this pear has gained popularity for American gardeners in recent years. The pear varies from the more common European pears in its shape and texture. Typically the fruits are round with a crip-to-hard texture. The trees are more precocious than European pears, bearing the seocnd eyar. Varieties fro lower elevations have a limited track record for suitability. The **Shinseiki** and **Twentieth Century** have not been impressive in fruit size or quality.

FIGS
These are wide spreading, vigorous growing trees in southern Arizona with dense, heavy, summer foliage. Figs do well throughout the lower elevation range, normally bearing two crops each year. Fig trees are often subject to iron chlorosis and some high temperature leaf burn. Mature trees of all varieties are highly susceptible to root rot fungus. Because fig trees grow vigorously and with an irregular growth pattern, they have a form more like that of a large shrub than of a tree, having either an open center or central leader. Because mature fig trees will occupy more space in most yards than is reasonable, they should be pruned annually in January to maintain smaller tree size. This practice will result in less, but larger-sized fruit. Fig trees are self-pollinating and grow on their own root with budding.
Black Mission: The best known and best adapted, particularly in lower elevation range. They’re self-pollinating. The purple-black fruit is of good quality. One late spring, one summer crop.
Brown Turkey: Is well adapted, particularly in 2,000 to 3,000 foot elevations. Not as prolific as Mission, but produces good size and quality fruit.
Kadota: A white fig not recommended for low elevations because of erratic ripening characteristics.

Location/Elevation Specific Planting Guides – Lower Elevations

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Caudata: A white fig not recommended for low elevations because of erratic ripening characteristics.
Canadria: A white fig of good quality, capable of producing under minimum chilling conditions. Less susceptible to sour fruit beetle than Mission. High fruit drop in low humidity.

ALMONDS
The discussion of a nut crop in this publication may be somewhat out of place, but almonds fit into most home yard planting schemes as a complement to or replacement for deciduous fruit trees. With a relatively low chilling requirement, almonds will produce in the same areas as low chill deciduous varieties. Most common almond varieties require cross-pollination. The **Ne-Plus Ultra**, **Price** and **Carmel** are suggested as a pollinizer for the Nonpariel varieties to produce satisfactory crops. A self-fertile variety call the **All-In-One** is available and appears to be well adapted to low elevation conditions. This variety also can be used as a pollinizer for Nonpariel and Mission. Piercing type insects such as stink bugs and leaf-footed plant bugs often limit the quality of almonds by piercing the almond nut early in the season, resulting in the excretion of gum material late as nut filling takes place. The kernel quality of these injured nuts is very low. No adequate control has been developed for these insects.

APPLES
With several years information available, the best adapted applie varieties for low elevations appear to be the **Anna** and **Dorsett Golden** varieties. **Anna** is acceptably self-pollinating. **Dorsett Golden**, as a pollinator, can aid the fruit set of **Anna**, and yields wells as a fruiting tree. Check with your Cooperative Extension office for information on local experience and recommendations. The **Early Summer Red**, Ein **Sheiner** and **Tropical Beauty** apples have also fruited in the Salt River Valley, but have been less impressive in size and quality than the Anna. The **Gordon** variety has not fruited well in Phoenix.

MINOR DECIDUOUS FRUIT VARIETIES
Pomegrantes, quinces and persimmons are other deciduous fruit possibilities. The **Yellow Papershell** or **Wonderful** pomegrantes, **Pineapple** quince, **Hachiya** or **Fuyu** persimmon and Transcendent crabapple varieties all have produced satisfactory crops between 1,200 and 3,500 foot elevation.

PLANTING THE YOUNG TREE
Although some varieties of deciduous fruit trees come in containers, a large selection is available during the bare-root season in January and early February. All varieties required good subsoil drainage. Any “caliche” or hard pan should be shattered and amended to permit salt leaching and normal root development. Even under good soil conditions, the planting hold should be 2 feet deeper and 2 feet wider than the tree root system and backfilled with a soil-organic matter mix. In poor soil conditions, a hold as large as 5 feet by 5 feet will lensure better growth. Sand is a useful additive in soils that drain poorly. No manure should be put in the planting hole. Manure can be sued as “Pills” of fertilizer that release nutrients slowly also are available and safe to use at planting time. If Texas root rot fungus has been identified on other plants in the area, soil preparation should be as described in the bulletin, Root Rot in Trees and Shrubs, available from your local Cooperative Extension office.

Water thoroughly at planting time and on a weekly basis through the first season after new growth begins. The young tree should be cut back to a trunk height of 18-36 inches at planting time. This height will determine scaffold lim form. Where lawn maintenance activity is not required around the base of the tree, lower scaffold limbs will facilitate easier fruit picking, pruning and tree care. In yards where flood irrigation is not available, a watering basin should be maintained around the tree and expanded in size as the tree roots grow. Bermuda grass should be controlled to allow maximum root development. Any exposed bark should be protected from sunburn with white was or water-based white paint. Place a cardboard for newspaper wrap around the trunk to prevent mechanical injury.

IRRIGATION
Young trees need watering weekly in medium-to-heavy textured soils and twice weekly in sandy soils after leaf growth has started and throughout the summer months. As trees age, watering intervals can be lengthened but with more wate applied per application. Four to six inches should be applied at each irrigation as the trees reach bearing age.

Irrigation intervals can be lengthened after fruit maturity and sharply reduced during the fall months. In dry winters, one watering may be

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Deciduous Fruit Trees for up to 3,500' Elevations – University of Arizona Cooperative Extension

applied in early January. Salt burn and tree defoliation may result if sprinkler water is allowed to contact tree foliage. Evaporative cooler drain water should **NOT** be used. Drip or trickle irrigation on deciduous fruit is practical but the system should be run for longer periods during fruit sizing and additional emitters added as tree size increases.

FERTILIZATION

Nitrogen in some form is the major element required to grow deciduous trees and fruit. It can be supplied in the form of ammonium sulfate or any balanced fertilizer, manure can be used as a nutrient on deciduous fruit but should be applied only during the winter dormant season. Control of Bermuda grass around the base of the young tree will result in better response to fertilizer. A few spoonfuls of fertilizer will be needed two or threes times during the second growing season and gradually increased with tree age. From ½ to one pound of actual nitrogen per tree per season should be enough for bearing-age trees if surrounding grass is adequately fertilized. To get the number of pounds of any fertilizer needed to supply one pound of actual nitrogen, divide the percentage of nitrogen of that fertilizer into 100. Example: five pound of a 20 percent nitrogen material will give one pound of actual nitrogen. Apply most of the fertilizer of deciduous fruit before bud break in the winter or early spring, with alight application in sany soil after fruit thinning. When applying nitrogen fertilizer, broadcast the recommended amount within the area from trunk to the outer branch area and deep-water into the soil. Composted manure may be used for the organic benefits, and does supply a portion of the nitrogen requirement and enough phosphate for normal growth where phosphate deficiencies have been identified. Apply manure during the late fall and winter months. Some varieties, particularly peaches, are susceptible to iron deficiency, indicated by yellow leaves with green veins. Where possible, reduce the frequency of water and apply chelated iron compounds to correct the condition.

PRUNING DECIDUOUS FRUIT

Some annual pruning is necessary for a strong tree structure, to reduce the amount of fruiting wood, force vegetative growth and to keep tree size suitable for yard use. All peach, plum and apricot trees are pruned to a spreading lateral from in which the center of the tree is kept open to sunlight; lateral fruiting limbs are “headed back” to promote bud break and limit tree height.

Prune most other varieties to an upright central leader, with lateral fruiting branches evenly spaced but tipped back to restrict tree size. No drastic pruning is recommended on genetic dwarf varieties, but some thinning out of crossing limbs is recommended. Pruning guides are available from each county Extension office.

FRUIT THINNING

With most peach, plum, apricot and apple varieties, the usual number of fruit set will severly limit the size of individual fruit at maturity. If you want larger size fruit, considerable thinning must be done early in the season. For individual yard trees, do this when fruit are pea-to-marble size and spaced 608 inches apart. If the total number of fruit is reduced to two per fruiting spur or twig, much better quality mature fruit can be expected.

INSECT CONTROL

Annual application of insecticide is recommended for control of peach twig borer on peaches, plums and apricots when damage has appeared as wilting of branch tip growth or worm feeding around the fruit pit.

Other insects that may require control on a seasonal basis include aphids, mites and stink bugs.

Sour fruit beetles are a troublesome problem in ripening figs and other deciduous fruit. Some reduction in beetle populations can be achieved by keeping any bird-pecked or overripe fruit picked off the tree. Picking the fruit slightly green each day and allowing it to ripen at room temperature will reduce beetle activity. Remove any unusable fruit from the tree and pick up any fruit that has fallen on the ground.

Flatheaded wood borers, a whitish-yellow larvae, which bores directly into the trunk or major scaffold limbs, are a serious problem where bark has been sunburned. Remove any borer-affected limbs and apply water-based white paint to any summer sun-exposed bark.

DECIDUOUS FRUIT DISEASES

Two major disease problems of deciduous fruit at low elevations are Texas root rot and crown gall. Deciduous fruit varieties in the peach, plum and apricot group are particularly susceptible to Texas root rot fungus and crown gall bacteria problems.

Texas root rot fungus and crown gall bacteria problems. Texas root rot caused by a fungus **Phymatotrichum omnivorum** causes rapid wilting and tree death during high temperature periods on trees two years or older. If Texas root rot has been identified on field crops or other landscape material in a particular area, peach, plum and apricot trees should not be planted. Citrus is not susceptible and can be substituted where climatic conditions permit. Prompt treatment of trees suspected of root rot infection will sometimes produce a regrowth response. The symptoms and treatment of root rot are discussed in a publication available from your local Cooperative Extension office.

Crown gall bacteria, **Agrobacterium tumefaciens**, may be present in desert soils or may be carried on the tree roots at planting time. The bacteria always will be present in sites where gall-affected trees have died. From the microscopic bacteria in the soil or carried on the tree roots at planting time, a series of corky superficial galls – 1/4 inch to 3 inches in diameter – grow below the ground in the crown area or root system of the tree. Young galls are tan in color, darkening with age. Invasion is usually associated with injury or wounds in the root system. Yellowing of foliage followed by gradual dieback of limbs usually results in the loss of the tree in a two- or three-year period. Gum oozing through the bark on the trunk or scaffold limbs has often been associated with the presence of crown gall. No effective soil fumigants are available for treating gall-bacteria infected soils, so replanting citrus or non-susceptible shade trees is recommended. Where it is necessary to replant stone fruit in the same location, soil should be removed in an area 3 feet by 3 feet and new soil used as replant backfill material.

BIRD CONTROL

No chemical repellents are currently registered or effective in keeping birds away from ripening fruit. Fastening stuffed toy animals in trees and moving them frequently may help. Birds soon become accustomed to them if they are left in a stationary position. Corded nylon netting available at retail outlets can be draped over relatively small trees. This should be tied at the bottom. Fruit can be picked hard ripe before it is highly attractive to birds and ripened at room temperature.

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RG/vac

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Website: http://extension.arizona.edu/mohave

Location/Elevation Specific Planting Guides – Lower Elevations

Planting and Harvesting in the Low Desert – Native Seeds/SEARCH

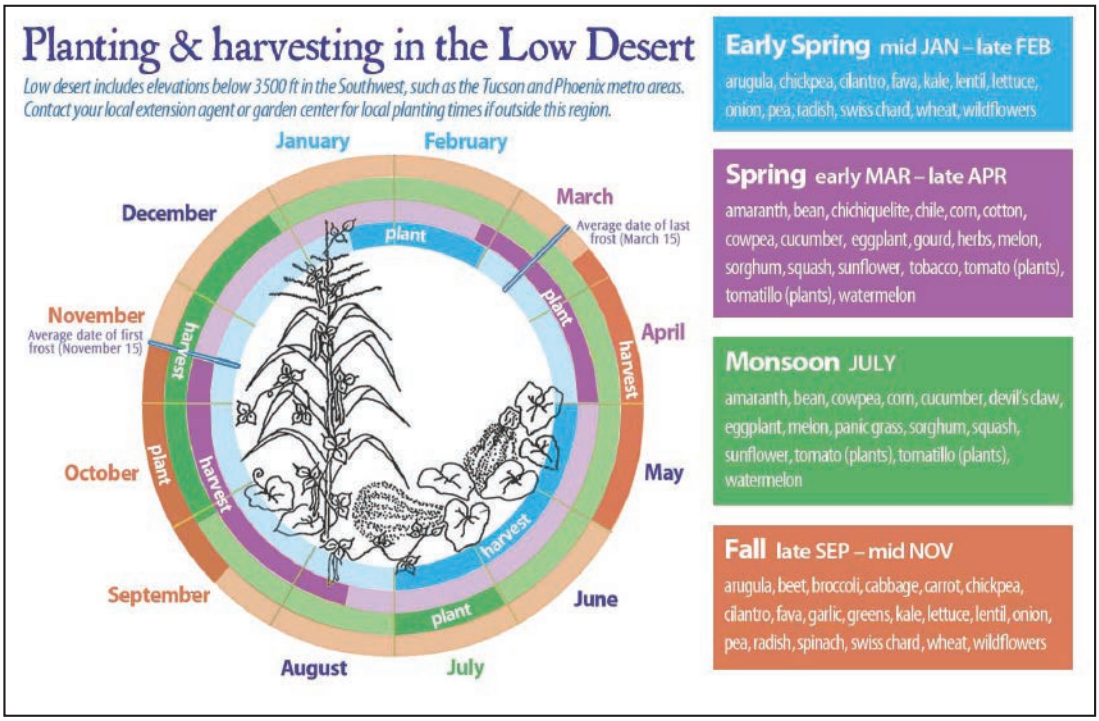
Native Seeds/SEARCH
3061 N. Campbell Ave.
Tucson, AZ 85719

Ph: 520-622-5561
www.nativeseeds.org

CROP	SEASON	PLANTING DEPTH	DISTANCE	HELPFUL TIPS
AMARANTH	Spring, Monsoon	¼"	Thin to 10-15" apart	Broadcast seeds
BEANS				
Common	Spring, Monsoon	1"	6"	Plant with corn & squash
Lima	Spring, Monsoon	1"	6"	Plant with corn & squash
Runner	Spring, Monsoon	1"	6"	Use trellis, does not tolerate heat
Tepary	Monsoon	½"	4"	Avoid overwatering
Wild	Spring, Monsoon	½"	4"	Soak seeds overnight
CHILES	Spring, Monsoon	½"	6-12"	Start inside 6 weeks before transplanting
CHILTEPINES	Spring, Monsoon	½"	12"	Transplant under mesquite trees
CORN	Spring, Monsoon	1"	12" in rows that are 1-2' aparts, or in hills 3-6' apart with 4 seeds	Plant in blocks of several hills or rows instead of a single row to increase pollination
COTTON	Spring	½"	12"	Soak seeds overnight
COWPEA	Spring, Monsoon	1"	6"	Great nitrogen fixer
CUCUMBER	Spring, Monsoon	1"	3-6" in basins 48" apart, 12-24" in rows	Trellis
DEVIL'S CLAW	Monsoon	½"	24"	Peel open outer seedcoat
EGGPLANT	Spring, Monsoon	½"	12"	Start inside 6 weeks before transplanting
FAVA	Fall, Early Spring	1"	6"	Great nitrogen fixer
GARBANZO	Fall, Early Spring	½"	6"	Do not transplant
GREENS	Fall, Early Spring	¼"	Thin to 10-15" apart	Broadcast seeds and thin
GOURDS	Spring	1"	3-6" in basins 48" apart, 12-24" in rows	Can be trellised
HERBS				
Basil, Epazote	Spring, Monsoon	¼"	6-12"	Frost sensitive
Cilantro, Dill, Thyme, Oregano, Parsley	Fall	¼"	1-2"	Cold tolerant
INDIGO	Spring	½"	12"	Scarify seeds
MELON	Spring, Monsoon	½"	12-48"	Plants will sprawl
OKRA	Spring, Monsoon	½"	12-18"	Scarify seeds and soak overnight
ONION	Fall	1"	2-3"	
PANIC GRASS	Monsoon	¼"	Broadcast seeds	Rake in seeds
PEAS	Fall, Early Spring	½"	6"	Do not tolerate the heat
ROOT VEGETABLES	Fall, Early Spring	¼"-½"	Varies	Cold tolerant, thin seedlings to avoid overcrowding
SORGHUM	Spring, Monsoon	½"	10"	
SQUASH	Spring, Monsoon	1"	3-6" in basins 48" apart, 12-24" in rows	Plant with corn & sunflowers
SUNFLOWERS	Spring, Monsoon	1"	12"	Plant with beans & cucumbers
TEOSINTE	Monsoon	½"	4-6"	Plant around corn, soak seeds overnight
TOBACCO	Spring, Monsoon	Rake in <¼"	Thin to 12"	A natural insecticide
TOMATILLOS	Spring	½"	15"	Start inside 6 weeks before transplanting
TOMATOES	Spring, Monsoon	½"	15"	Start inside 6 weeks before transplanting
WATERMELON	Spring, Monsoon	½"	24-48"	Plants will sprawl
WHEAT	Fall, Early Spring	½"	3-6"	Broadcast and rake in for small spaces

Location/Elevation Specific Planting Guides – Lower Elevations

Planting and Harvesting in the Low Desert – Native Seeds/SEARCH



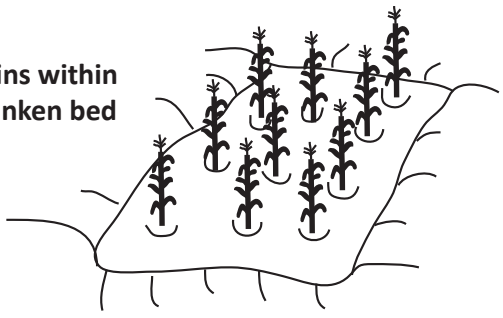
General Instructions Gardening in the Southwest can sometimes be a challenge. For thousands of years, Native Americans have been and continue to be successful gardeners and farmers in this region. Planting seasonally appropriate crops, using arid-adapted seed varieties, and managing water and soils are keys to successful gardening in this region.

Soils Organic matter should be added to most garden soils. Compost or manures add nutrients and improve soil texture, allowing for better water holding capacity. Amendments should be added annually. Add sand (20-30%) to heavy clay soils to improve water percolation.

Water & Mulch Desert-adapted seeds need moisture to germinate and require water throughout their growing cycle, however they "tolerate" heat and drought better than varieties from less arid climates. Mulch around plants (at least 3" thick). Plant seeds in individual basins or sunken beds to collect and hold more moisture and concentrate water around each plant to penetrate deeply and encourage deep root growth. Basins and sunken beds will also keep soil and roots cooler.

Basin

Basins within a sunken bed



Location/Elevation Specific Planting Guides – Higher Elevations

Yavapai County Vegetable Planting Dates – University of Arizona Cooperative Extension

Yavapai County

ARIZONA COOPERATIVE EXTENSION

COLLEGE OF AGRICULTURE AND LIFE SCIENCES

Bulletin #51

Yavapai County Vegetable Planting Dates

Warm Season Crops: bean, cantaloupe, cucumber, corn, eggplant, herbs, okra, pepper, pumpkin, squash, tomato, watermelon

Cool Season Crops: beet, carrot, chard, collard, leaf lettuce, onion, pea, radish, spinach, turnip

Vegetable	Planting Dates		
	2000 – 3000 Foot Elevation *Black Canyon City*	**3000 – 4500 Foot Elevation** *Camp Verde, Cottonwood, Sedona, Skull Valley*	**4500 – 6000 Foot Elevation** *Chino Valley, Dewey, Prescott, Prescott Valley*
Asparagus	Oct 1-Mar 1	Feb 15-Apr1	Apr 1-30
Bean, bush	Mar 1-Apr 1 Jul 15-Aug 15	Apr 25-Jul 15	May 15-Jul 1
Bean, pole	Jul 15-Aug 10	Apr 25-Jul 15	May 15-Jul 1
Bean, lima	Mar 1-Apr 1	Apr 25-Jul 15	May 15-Jul 1
Bean, edible soy	Apr 1-Jun 1	May 15-Jul 15	May 25-Jul 1
Beet	Aug 25-Apr 1	Mar 1-May 15	May 1-Jul 15
Broccoli	Jul 25-Oct 1	Apr 15-Jul 15	Apr 1-Jul 1
Brussels sprouts	Aug 15-Oct 1	Jul 1-Aug 1	Jun 1-Jul 1
Cabbage (seed)	Aug 1-Dec 1	Feb 15-Apr 15	Mar 15
Cabbage (plants)	Sep 1-Feb 1	Mar 15-May 1 Jul 10-Aug 20	May 1-Jun 1
Cantaloupe	Mar 15-Jun 1	May 1-Jun 20	May 15-Jun 15
Carrot	Aug 25-Mar 15	Jul 15-Sep 15 Mar 1-May 10	May 1-Jul 15
Cauliflower	Same as cabbage	Same as cabbage	Same as cabbage
Celery	Aug 1-Oct 15	May 15-Jun 20	Jun 1-Jul 15
Chard	Aug 15-Apr 1	Jul 15-Sep15 Feb 15-Apr 30	Jul 1-Aug 1 Mar 1-Apr 10
Chinese Cabbage	Aug 15-Jan 15	Jul 1-Sep 15	Jun 1-Jul 15
Collard	Sep 1-Jan 15	Jun 15-Aug 1	Jun 1-Jul 15
Corn, sweet	Mar 15-Apr 1 Jul 15-Aug 15	May 10-Jul 15	May 25-Jul 1
Corn, Mexican June	Jul 1-Jul 5	May 10-Jul 15	May 25-Jun 15
Cucumber	Mar 20-May 15 Aug 1-Sep 1	May 10-Jun 15	May 15-Jun 15
Eggplant	Apr 1-May 15	May 1-Jun 15	May 15-Jun 15
Endive	Sep 1-Feb 1	Feb 1-Apr 1	Apr 15-Jun 15
Garlic	Sep 1-Jan 1	Feb 15-Apr 10	Apr (cloves)
Horseradish	Nov 1-Feb 1	Feb-Apr	Feb 15-Mar 15
Kale	Aug 15-Feb 15	Feb 1-Mar 20 Aug 1-Sep 15	Feb 15-Apr 10
Kohlrabi	Sep 1-Feb 1	Feb 15-Apr 1	Apr 15-May 15

Location/Elevation Specific Planting Guides – Higher Elevations

Yavapai County Vegetable Planting Dates – University of Arizona Cooperative Extension

Vegetable	Planting Dates		
	2000 – 3000 Foot Elevation *Black Canyon City*	**3000 – 4500 Foot Elevation** *Camp Verde, Cottonwood, Sedona, Skull Valley*	**4500 – 6000 Foot Elevation** *Chino Valley, Dewey, Prescott, Prescott Valley*
Leek	Sep 1-Jan 15	Feb 15-Apr 10	April
Lettuce, head	Sep 1-Jan 15	Feb 15 Mar 15 Jul 15-Sep 1	Jul 1-Aug 1
Lettuce, leaf	Aug 20-Apr 1	Mar 1-Apr 15 Jul 15-Sep 1	Mar 15-Apr 15 Aug 1-Sep 15
Muskmelon	Apr 1-Jul 15	May 10-Jun 15	May 15-Jun 15
Mustard	Sep 1-Feb 1	Feb 15-Jul 15	Apr 1-Jul 1
Okra	Apr 1-Jun 15	May 10-Jul 1	May 15-Jun 15
Onion, bunch	Aug 15-Feb 1	Feb 15-May 1	Apr 15-May 1
Onion, dry seed	Oct 15-Jan 1	Nov 1-Dec 15	Oct 15-Jan 1 Feb 15-Apr 15
Onion, dry sets	Nov 1-Feb 15	Jan 15-Mar 15 Nov 15-Jan 15	Nov 1-Feb 1 Apr 1-15
Parsley	Sep 1-Jan 15	Feb 15-Apr 15	Apr 1-15
Parsnip	Sep 1-Jan 15	May 1-Jun 15	Apr 1-May 20
Pea, fall	Aug 15-Sep 15	Mar 1-May 1	Not adapted
Pea, spring	Feb 1-Mar 15	Jul 20-Aug 25	Feb 15-Apr 15
Pepper, seed	Feb 15-Mar 15	Feb 1-Mar 15	Mar 1-Apr 1
Pepper, plants	Apr 1-Jun 1	Feb 15-Mar 30	May 10-May 25
Potato, Irish	Feb 15-May 1	May 10-Jun 1	May 10-Jun 1
Potato, sweet	May 1-Jun 15	May 10-25	May 15-20
Pumpkin	Apr 1-Jul 15	May 15-Jul 1	May 20-Jun 15
Radish	Aug 5-May 1	Mar 1-May 15 Jul 15-Sep 15	Apr 1-Jun 15
Rhubarb	Oct 1-Mar 1	Mar 1-Apr 20	Mar 1-Apr 1
Rutabaga	Aug 20-Mar 1	Mar 1-Apr 1	Apr 1-May 15
Salsify	Oct 1-Dec 1	Mar 15-Jun 1	Apr 1-May 15
Spinach	Aug 20-Mar 1	Feb 15-Apr 15 Jul 15-Aug 15	Apr 1-May 15
Squash, summer	Mar 15-Jul 15	May 10-Jul 15	May 1-Jul 1
Squash, winter	Jul 1-31	May 10-Jul 1	May 15-Jul 1
Tomato, seed	Jan 10-Feb 15	Mar 1-Apr 1	Mar 1-Apr 1
Tomato, plants	Mar 15-Apr 15	May 1-Jun 15	May 10-Jun 1
Turnip	Aug 15-Mar 1	Mar 1-Apr 15 Aug 15-Sep 15	Apr 1-May 15
Watermelon	Mar 15-Jun 1	May 10-Jun 25	May 1-Jun 1

Additional Notes:

- Peppers and tomatoes won't set fruit when temperature is over 90°.
- Maintain an even soil moisture around tomato plants to prevent fruit from cracking.
- Fertilize vegetables through the growing season.

Updated August 1, 2007
http://cals.arizona.edu/yavapai
Replaces "Suggested Vegetable Varieties for Yavapai County"
Source: U of A Master Gardener Manual – On-line version

COLLEGE OF AGRICULTURE & LIFE SCIENCES
Cooperative Extension

AZ1282

Revised 10/14

Growing Tomatoes Above 6000 Foot Elevations in Arizona

Tom DeGomez

Introduction

Tomatoes are the most popular vegetable item in the home garden. Only a half dozen plants will supply an average family's needs. Throughout much of the country tomatoes are considered an easy crop to grow, but at the higher elevations of Arizona it becomes very difficult. Late spring frosts and low night time summer temperatures are the two major limiting factors. Tomatoes have to be planted early enough to ripen fruit by fall yet not too early or they will be killed by a late spring frost. This means that the familiar long-season varieties prove disappointing in Arizona at high elevations. The varieties that are successful are the small-fruited, quick-growing types (60-70 days); such as cherry, pear, and Siberian types.

Six Steps to Growing Tomatoes Successfully at High Elevations

1. Choose short-season varieties (less than 70 days).

Seed catalogs list varieties by the number of days required to ripen fruit. Days are counted from when a six inch healthy plant is set in the garden until the first fruit is ripe. Experience of Master Gardeners in Coconino County indicate the following varieties produce good yields: Early Girl, Pixie Hybrid, Kellogg's Breakfast, Sweet 100, Galina, Yellow Pear, Lemon Boy and Stupice.

2. Get an early start by planting 6-inch plants by early-June.

This is best done by sowing seeds in late April and growing plants under protection from cold. It will take about six weeks to grow good plants from seed. In June retail nurseries may have plants of the desirable varieties that are too large. When tomato plants are planted in early June they *must* be protected at night to prevent damage or stunting from cold (see step 3 for details).

3. Encourage rapid growth by insuring good soil preparation and soil warming.

Soil fertility should be moderately high but should not have too much nitrogen. (Plants grown in soil high in nitrogen will be green and very lush with few fruit). Soil high in organic matter will improve growth. At planting, water with a starter solution that has a higher percent of phosphorus than nitrogen. Thereafter, do not allow the plant to dry out.

Select a warm, sunny, wind sheltered part of the garden. Cover the soil with plastic, clear does the best job, to warm the soil. Surround the newly planted tomato with one of the following; a tall cage made of wire fencing with clear plastic wrapped around it, a 'Wall-O-Water', a plastic milk jug with the bottom cut out and the top open, or three to five plastic milk jugs filled with water and surrounding the plants. All of these methods creates a greenhouse effect around the plant. If a single plastic jug is used over the plant mound soil half way up the jug (Fig. 1).

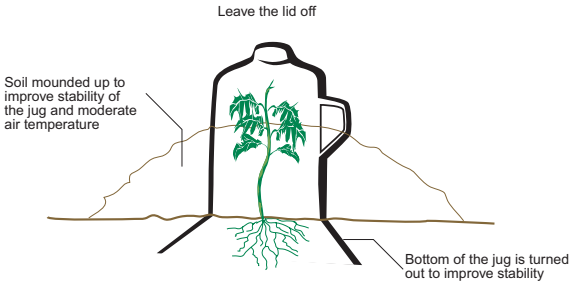


Figure 1. Mounding soil half way up a plastic milk jug will moderate the temperature of the air inside the jug.

Location/Elevation Specific Planting Guides – Higher Elevations

Growing Tomatoes Above 6,000' Elevations – University of Arizona Cooperative Extension

By growing tomatoes in five gallon cans or tubs, some flexibility is achieved. Plants can be moved into the sun during the day and moved to a protected spot during the night.

4. **FLOWERS DO NOT SET FRUIT WHEN NIGHT TEMPERATURES ARE BELOW 55ºF.**

Blossoms which eventually turn into fruit are sensitive to low temperature. Fruit set can be initiated by spraying the young flowers with "Tomato Bloom Set" or by covering the plants at night. Bees are not necessary for pollination but it does help to manually shake the flowers by gently tapping the stem to promote self-pollination.

5. **COVER THE PLANTS WITH FLOATING ROW COVER OR SLITTED CLEAR PLASTIC TO IMPROVE GROWTH AND FRUIT SET.**

Row covers such as Remay, Tufbell, Agryl, and Agribon, can keep night time temperatures up to 10°F warmer. Clear plastic works well also, but must be slitted or removed daily to let hot air out. Optimum temperature for tomato growth and development is 65-80°F.

6. **PROPER WATERING WILL GIVE A BIGGER HARVEST.**

Tomato plants need frequent watering when young. When flowering starts it is best to reduce the frequency but increase quantity. When the first fruit can be seen, reduce both frequency and quantity of watering. Always add water if the plant is wilted.

Starting Your Own Plants from Seed

Individual or multi-pack pots are excellent for starting tomatoes. However other containers can also be used. If the side of a ½ gallon milk carton is cut off and some drainage holes punched in the base, it makes a suitable container for six starter plants. Many other kinds of containers can be salvaged from the kitchen.

Nearly fill the carton with equal parts of sterilized house plant soil mix and coarse building sand. Soak it till water comes out the drainage holes and the soil is settled. With the blunt end of a pencil, make six ¼" deep holes and sow two seeds in each hole. Cover the seeds with soil, put in a warm place (60-85°F), and keep moist but not wet. The seeds will germinate in 5-14 days. This same basic process can be used for individual or multi-pack pots.

The first few days after emergence are important. Young seedlings must have good light as soon as they come out of the soil, otherwise they will grow toward the light source and stretch. Choose the location for the seedlings carefully. A place such as the kitchen window is usually too dark to grow strong seedlings. Adding bright light with a fluorescent bulb will prevent thin leggy stems from developing. As the seedlings grow, thin them by pinching out the weaker plant of each pair. Do not apply any fertilizer until more than five true leaves have developed. Young tomato plants are tender; they burn easily when sprayed or fertilized. Watering with a fertilizer solution made of house plant food or a fish emulsion suitably diluted is a good method of fertilizing. In 6-8 weeks the plants will be ready for planting out; being six inches tall, a dark green color and getting ready to flower.

Choosing a Good Plant in the Nursery

A plant of good quality is dark green in color with a sturdy series of leaves starting low down on a strong stem. It should be six inches high, with young flower buds not yet open, and showing new growth at the tips. Nurseries generally sell single plants sometimes pack of six or eight are available for a lower price per plant.

Check plants for insect infestation and discard leggy plants that have a bronze coloration. Such plants are growth-checked because their roots had insufficient room to grow in the small containers. Avoid plants that are in flower because they are over mature.

It can be advantageous to make an early purchase of three to four-inch plants in a six-pack. Pot these plants into 4-6" diameter single containers and grow them in a sheltered place three or four weeks before planting out. Growth is encouraged by watering with a fertilizer solution as often as necessary to keep the plants looking healthy. Given adequate space on their own, the plants make more branches and sturdier stems in a larger container such as a cut-off ½ gallon milk carton standing on its base.

Planting Out into the Garden

Tomatoes need, as do all vegetables, deep fertile soil that drains well. In a permanent site, this means a deep digging, putting in well rotted manure and ammonium phosphate as outlined in publication AZ1435 "Ten Steps to a Successful Vegetable Garden."

Tomato plants should be set deep in the soil or on their side in a shallow trench up to the first leaf branch, since the stem, once in the soil, produces additional roots (Fig. 2). Some growers remove the lower two or three leaves from a sturdy plant to get even deeper planting. This encourages additional root formation, which in turn gives a stronger plant, provided it is in a well-prepared fertile soil that is warm at root depth. Planting in a trench puts the root system in the warm upper part of the soil.

Keep the leaves and fruit off the ground in the interest of disease control, but allow the plant to bush out. A good support is provided by encircling the plant with a cylinder of construction wire two or three feet tall and one to two feet across. The branches grow through and are supported by the six inch squares.

If you were not able to add compost or well rotted manure before planting, water with a balanced fertilizer solution every week to ten days to encourage growth. Water-soluble

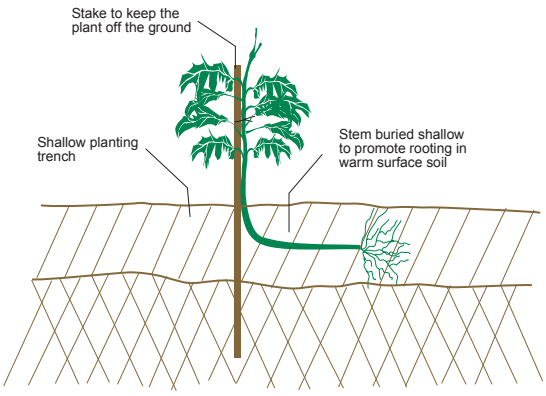


Figure 2. Planting tomato plants on their side in a shallow trench will promote root growth along the stem.

fertilizers are easiest to use after the plants are growing in garden soil. However, heavy nitrogen feeding reduces fruit production and makes for lush leaf growth. A plant that has been well-fertilized early in its life will not generally need further fertilizing after the first fruit is set.

Pests

Few diseases infect tomato plants at the high elevations of Arizona, the number one killer of tomatoes in the high country is cold weather.

Old garden soils that have grown several crops of tomatoes often become infested with nematodes. These are microscopic worm-like creatures that invade vegetable plant roots and cause them to be swollen and distorted. No chemical treatment for this problem is licensed for home use so the best solution is to leave the ground vacant for a year and then add 3-6" of organic matter to the soil before reusing. There are varieties of tomatoes, designated by the letters V.F.T.N. after their name, that show some resistance to verticillium wilt (a fungus), fusarium (a fungus), tobacco mosaic virus and nematodes.

Aphids sucking on the young leaves weaken the plants. Home use pesticides are labeled for their control. Organic nicotine spray or insecticidal soap can be effective.

Caterpillars, such as tomato hornworms, and tomato fruitworms can be picked off by hand, sprayed with home use pesticides labeled for their control, or sprayed with an insect disease organism *Bacillus thuringensis* (Bt).

Blossom-end rot is caused by a lack of calcium in the fruit and is often associated with irregular watering. This typically affects the larger, longer season varieties. A deep soil, well-supplied with humus and the use of mulches helps prevent this occurrence.

References

Obeker, N.F. and R.E. Call. 2008. Ten Steps to a Successful Vegetable Garden. University of Arizona, College of Agriculture and Life Sciences Bulletin. AZ1435. Tucson, Arizona.

Adapted from:

Brookbank, G. 1985. Growing Tomatoes. University of Arizona Cooperative Extension Bulletin Q295. Tucson, AZ.

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This information has been reviewed by University faculty.
extension.arizona.edu/pubs/az1282-2014.pdf

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Location/Elevation Specific Planting Guides – Higher Elevations

February Garden Tips from Navajo County – University of Arizona Cooperative Extension

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Navajo County

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http://extension.arizona.edu/navajo

February Garden Tips

Authored by: Steve Campbell
Navajo County Cooperative Extension Agent

Depending on the property elevation there are several things that can be done in February which will provide limited production and help make the gardening season more productive. The biggest issue will be whether the soil is still frozen or not.

1. Composting: It is a good time to work compost into unfrozen ground during February. This allows the compost to integrate into the soil making it a more susceptible planting medium in April and May.

2. Turning the cover crop into the soil during February is as important as incorporating compost. Cover crops are not nitrogen stabilized and will require longer to become suitably incorporated into the soil making it suitable for productive planting.

3. For our lower elevation gardeners, cool season crops should be planted in areas where there is at least half day exposure to sunlight. Locally, the suggested crops are Kale, spinach, red romaine, radishes, and turnips. Onions, garlic, Jerusalem artichokes, and leeks can be set out. All of these crops, especially asparagus and artichokes should be well mulched to protect the crown area from late frost.

4. If the goal is to have well developed seedlings to set once temperatures reach the level where they can thrive; cold frames, mini greenhouses, sunny rooms, and window ledges can be used as planting areas.
    a. Anything that will allow the plant and its developed root ball to be removed intact will serve as a good planting container: Just be certain that holes are cut into the bottom of the container to facilitate drainage.

    b. Plastic containers with clear lids can be used as mini green houses for tender plants, remembering that nighttime temperatures may necessitate bringing them indoors at night.

    c. Walls of water can be used outside and will provide protection from all but the hardest frost. They can be somewhat labor intensive in that they need to closed at night when hard frost is experienced and opened when daytime temperatures exceed fifty degrees.

5. Bare root fruit and landscape planting is suitable when the soil has thawed from the winter. These plantings should include a mulch bed at least two inches thick covering the roots and extending up the stem.

6. Starting Sweet potatoes early is essential for a productive crop locally. They are time consuming and require considerable attention if you are to be rewarded with success.

    a. Obtain an organic sweet potato and fit it hallway into a jar or glass filled with water.

    b. Wait for the root slips to form, it takes about two months for them to reach significant size.

Location/Elevation Specific Planting Guides – Higher Elevations

February Garden Tips from Navajo County – University of Arizona Cooperative Extension

c. When slips are about six inches long, twist them off the sweet potato and place in a separate jar filled with water.

d. Allow the slips to form a good a root mass before planting in loose, sandy, soil.

e. Do not plant until the ground is warm and all danger of frost is over. In the White Mountains it is generally best to plant sweet potatoes outside after the first week of June.

7. Pruning! Arguably, the most important maintenance activity the gardener will ever conduct is proper pruning of the fruit and landscape plants they are growing. Depending on the plant and the desired outcomes, pruning is a very specific process.

   a. Fruit trees produce on differently aged wood depending on variety. Obtain an accurate pruning guide and prune according to the needs of the plant and the desired outcomes of the gardener.

   b. One key to pruning success is to prune regularly and never remove too much material at any one time.

   c. Due to the high wind season each spring, pruning must be adjusted to accommodate the impacts of wind. The key is to keep the canopy of the tree or shrub open enough to let the wind pass through without causing damage to the plant. Also, branches will tend to grow longer on the downwind side, therefore, adjustments need to be made when pruning to balance the canopy each time it is pruned.

Cleanup! Winter results in leaves, broken branches, damaged plants, and lots of debris on the ground. February is a great time to do a thorough cleanup of the garden area. Mulch the smaller material and remove the large. Finally, all February cleaning does is make March, April, and May cleanup easier. The longer you let it lie around the harder it is to get it moving again

COLLEGE OF AGRICULTURE & LIFE SCIENCES
Cooperative Extension

AZ1435 Revised 02/15

Ten Steps to a Successful Vegetable Garden

Gardening with vegetables can be fun and can provide delicious and highly nutritious fresh food. Watching and working with plants can add a new dimension of enjoyment to life. Bring an awareness of the wonderful world of nature in the backyard. The marvels of nature will have special personal meaning when nurturing a small seed into a colorful productive plant with your own hands. These accomplishments can be obtained regardless of the size of garden. A few plants or a large plot will give rewarding experiences for both young and old.The path to a successful vegetable garden is not difficult or long. Ten carefully taken steps will produce many enjoyable moments and an abundant harvest of fresh vegetables during much of the year.

Step 1 Select a good location

Choose an area with plenty of morning sunlight and some afternoon shade. Most vegetables, especially fruiting types, do best with six to eight hours of full sun exposure. Leafy and root vegetables will tolerate partial shade. Don't plant gardens under or near trees or large shrubs—their roots will rob fertility and water from vegetables. Don't plant vegetables in the narrow shaded space between houses and walls.

A loose, fertile, level, well-drained soil is best. If possible, avoid heavy clays and very sandy soils. If caliche is present it must be dug out and removed. Avoid areas that are crusted with alkali salts or infested with hard to control weeds such as Bermudagrass, nutgrass, Johnson grass or bindweed.

A synthetic soil, self prepared or purchased, can be used in raised beds or containers (pots, tubs, boxes) if good soil is not available. Where space is limited, container gardening can be practiced. A convenient water supply for irrigating is necessary.

Microclimates occur throughout the property. Depending upon your elevation select spots on the property that are best suited to warm or cool season vegetables.

Step 2 Plan your garden layout

Planning ahead will help avoid problems and make your garden a complement to your landscape. First, sketch a plan of the intended planting area for vegetables. Write down the size of the area or location of containers. This is the beginning of a gardening notebook or journal. A gardening journal will help when making decisions for your garden in subsequent years.

- Decide on the vegetables species wanted. Select those that your household likes, that are adapted to your climate and practical for the location. If space is limited, plant those that utilize space efficiently like bush varieties, beets, broccoli, cabbage, carrots, leaf lettuce, basil, onions, radishes, Swiss chard, tomatoes, and turnips. Use vertical space by trellising climbing crops.

  Refer to table 10.9 in the Arizona Master Gardener Manual for the number of plants needed for each vegetable per person in the household.

- Mark on the plan where the vegetables will be planted, making sure to leave room for growing space between plants. Also, list the planting date for each vegetable. Arrange plantings according to harvest periods and growth characteristics. Plant vegetables adjacent to each other which will be harvested about the same time. Avoid having taller plants shade younger and smaller vegetables.

Step 3 Grow recommended varieties

Gardening success can be greatly influenced by the varieties you use. Select from recommended lists and from those known to do well locally. It is a good idea to try one or two new varieties each year. Plant them next to old favorites for comparison. Keep a notebook or journal from year to year to note what varieties perform best. For mini-gardens try bush or dwarf varieties.

Some vegetables are colorful, use them in areas traditionally planted with ornaments.

Seed catalogues will be a big help in finding these. Look for All-American Selection Award winners. (www.all-americaselections.org/)

Step 4 Obtain good seed, plants, equipment and supplies

Before planting, find a reputable source for seed and other garden supplies. Seed catalogs can be helpful, but be sure the varieties are locally adapted. Buy new seed since some seeds over a year old will not germinate (sprout) well. Some seeds can be saved and are best placed in jars or in plastic bags and stored in a freezer. Due the hybridization, seed saved from hybrid vegetables will not produce plants like the parent.

Vegetable transplants can be purchased at garden stores, nurseries and greenhouses. Insist on recommended varieties. Select plants that are healthy, stocky, medium-sized, with vigorous roots and that are pest free. Avoid plants that have insects or are wilted, yellow, spindly, too large or have spots on the leaves, brown lesions on the stems or knots/galls on the roots. Obtain plants in containers (pots, 6 or 8 packs, bands or boxes) when possible so that the root systems are intact. Transplants should not be disturbed any more than necessary and "hardened-off." Transplants can be started if desired.

Have all equipment and tools clean and in good condition before working the soil. A hoe, spade, garden rake, trowel, measuring stick and planting line are essential. A hand cultivator and seed drill reduce work in larger gardens. Hoses, sprinklers and drip lines are convenient for watering. Other needed supplies are fertilizers and mulching materials.

Study pest control recommendations to determine what may be needed after positively identifying the pest. It is important to have a quick source of materials for pest control if needed. A good sprayer or duster to control garden pests should be available for use. Care should be taken in handling, applying and storing all chemicals. **Always follow the pesticide label instructions, it is a legal document!**

Step 5 Prepare and care for the soil properly

Soil provides nutrients and water for plants. If limited or if the soil is compact or hard and crusty when dry, and water-soaked and sticky when wet, plants will not grow and develop properly. To maintain and improve soil conditions, mix organic matter and fertilizers into the soil before planting, and prepare and cultivate the soil when dry or slightly moist (never when wet).

Organic matter makes the soil loose (friable) and easy to work and improves nutrient and water-holding capacity, drainage and aeration. Well rotted manure, compost, and leaf mulch are commonly used organic materials. Composted manure is easy to use and is relatively free of weed seeds. Apply a layer of organic matter 2 to 3 inches thick on the garden area about 1 to 2 months before planting. Work it into the top 10-12 inches of soil. A thorough watering of soil at this time helps leach harmful salts from the root zone. If poultry manures are used apply them at half rate.

A fertilizer should be added containing both nitrogen and phosphorus and be applied before planting. These nutrients will benefit most garden crops. Although soils vary in fertility, a typical fertilizer application would be 1 to 2 lbs. (1 to 2 cups) of 16-20-0 (ammonium phosphate) per 100 $ft.^2$ spread evenly over the soil. Also, 3 to 5 lb. of soil sulfur/100 $ft.^2$ may be added if water drainage is poor. All these materials should be plowed, roto-tilled or spaded into the top 10 to 12 inches of soil shortly before planting.

In preparing the seedbed, do not work the soil when it is too wet. Wait for it to dry sufficiently so it crumbles in your hands. Level the area by raking. Then make raised beds if using furrow irrigation (*See Figure A*). Top dress planted area with a three inch layer of organic mulch after seedlings emerge or after transplanting (*See Step 8*). Organic mulch will cool the soil which can retard growth at the higher elevations in Arizona.

When growing vegetables in close quarters or where good soil is not available, an artificial soil can be used. If the soil doesn't drain well consider using raised beds filled with ½ garden soil and ½ artificial soil mix, coarse sand, perlite or vermiculite. (*see Figure B*).

During the growing season fertilizers may be needed. Applying bands of fertilizer, usually only nitrogen, is called "side-dressing." Apply ½ lb./100 feet of row of 21-0-0 or equivalent fertilizer, three inches deep and about four inches to the side of the plants. Alternatively, spread nitrogen fertilizer on the soil surface about 4 inches from the plant and water it in. However, too much fertilizer too close to the plant may injure plant roots. Examples of side-dressing timing are: tomatoes—after the first clusters of tomatoes form; sweet corn—when plants are "knee high" and again when they tassel and cucumbers, melons and squash when they begin to produce runners.

Step 6 Plant your vegetables properly

Most vegetables are started from seeds or transplants. Seed can be sown directly into the garden soil, while transplants are started elsewhere and later planted into the garden. Harvest can be obtained sooner with transplants; however, it is more expensive and certain plants do not transplant well. Generally, beans, beets, carrots, cucumbers, lettuce, muskmelons, onions, peas, pumpkin, radish, spinach, squash, sweet corn and watermelon are started in the garden from seed. Vegetables like asparagus, broccoli, cabbage, cauliflower, eggplant, peppers, sweet potatoes and tomatoes are generally transplanted, but care needs to be taken to minimize root drying and injury.

A few simple rules need to be followed in seeding:

- Mark out straight rows to make the garden attractive and to make cultivation, insect control and harvesting easier. To mark a row, drive two stakes into the ground at each end of the garden and draw a string tightly between them. Shallow furrows, suitable for small seed, can be made by drawing a hoe handle along the line indicated by the string. For deeper furrows, use the corner of the hoe blade. Use correct spacing between rows.
- Space seeds properly in the row. The number of seeds to sow per foot or hill (more than one seed/hole) is suggested on seed packages or in reference materials. Space the seeds uniformly. Sometimes small seeds can be handled better if they are mixed with dry, pulverized soil or sand and then spread. To aid in spacing seed spread on one layer of toilet paper placed on the soil. The contrast of the white toilet paper will aid in seeing seed spacing. Cover the paper and the seed at the same time.
- Plant at the proper depth. A general rule to follow is to place the seed at a depth about four times the diameter of the seed. Cover small seeds such as carrots and lettuce with no more than ¼ to ½ inch of soil. Place large seeds such as corn, beans and peas 1 to 2 inches deep. In sandy soils seed can be planted somewhat deeper.
- Cover seeds and firm the soil over them by gently tamping the soil by hand or the flat back of a hoe. This prevents rain or sprinkler water from washing away the seeds.
- Irrigate by sprinkling the soil surface lightly. When using furrow irrigation, hold water until moisture moves across seed row. Seeds need moisture to germinate. Water often enough to prevent crusting and drying around the seed. After plants emerge, water less often but deeper.
- Thin plants to the desired number as soon as possible. Remove weaker plants. Scissors can aid in thinning by cutting out young plants. Do not wait too long before thinning or injury will result from crowding and disturbing the remaining plants.

When transplanting follow these directions:

- Transplants need to be hardened off when first taken outside. Before planting take several days to gradually introduce them to the full sun, cool nights and wind.
- Transplant on a cloudy day or in the evening.
- Handle plants with care. About an hour before transplanting thoroughly water plants and soil in the containers (pots, bands, flats). Carefully remove plants from their containers, disturbing the roots as little as possible. Try to keep the "soil ball" around the roots. Keep roots moist at all times when they are out of the soil. If roots are "pot bound" tease them out before planting.
- Dig a hole large enough so that the transplanted plant sets slightly deeper than it grew in the container.
- Use a start solution to get plants off to a faster start. Starter fertilizer is a soluble fertilizer high in phosphorous like 10-52-17 or 10-50-10 mixture. Mix fertilizer with water following the label directions. After plants are set in the soil, pour about 1 cup of solution around the roots of each plant. When peat or fiber pots are set in the soil add enough water to soften pot. Also, break off any excessive pot material so it is below the garden soil level to prevent water wicking. Remove any plastic or wooden bands from around roots.
- Cover the roots with soil and firm the soil around the plant.
- Protect plants for a few days from sun, wind or cold if necessary.

Step 7 Irrigate with care

Irrigation is necessary for all garden crops in Arizona because of limited and uncertain rainfall. Water enough to keep the soil moist (not wet) in the root zone of the plant throughout the growing season. Excessive fluctuations of soil moisture adversely affect plant growth and quality. Regular applications of water need to be made to prevent the soil from becoming too dry (*see Figure C*).

Proper watering can be accomplished by observing the plant and soil. Do not allow the plant to become stressed, wilted or slow-growing. On the other hand, too much water, especially on heavy soils, will exclude air from the root zone, resulting in poor growth. When the soil becomes crumbly upon squeezing, it's time to irrigate. Moisture is needed around the seed for sprouting. Frequent watering will be needed to keep the soil adequately moist and prevent crusting of the surface. A three inch layer of organic mulch will help prevent evaporation. Do not place mulch on top of seedlings or transplants, but around them.

As the plant grows, the watering period should be longer, allowing deeper penetration through the root zone. Determine the moisture depth with a spade or by probing with a stick, trowel or iron rod. Most vegetables are shallow-

rooted and use water from the upper 12 to 24 inches of soil.

Frequency of watering depends on many things. A large plant needs more water than a small plant. A shallow-rooted vegetable (cabbage, onion, lettuce, corn) needs to be irrigated more often than a deep-rooted vegetable (asparagus, tomato, watermelon). Coarse textured soils (sandy loams) need to be irrigated more often than fine-textured (clay or silt loams). Plants need to be watered more often during hot periods than cool periods. In an average situation during warm weather, a good soaking of the soil every 5 to 7 days should give satisfactory results with established plants when using flood or sprinkler irrigation. More frequent watering will be required when using a drip system.

The following irrigation methods are commonly used: furrow, sprinkler, soaker hoses and drip (trickle). The furrow method delivers water alongside the plant row. Water should be kept in the furrow long enough for moisture to completely infiltrate the soil of the root zone. Garden sprinklers apply water on both plants and soil and should not be used if the water is salty. Drip or trickle emitter systems and soaker hoses apply water through a hose which lies beside the crop row. All these methods have a place in Arizona gardens. Traditionally, a raised bed with two rows is used with furrow irrigation, while a flat bed with no furrows is normally used with the other methods. If a watering method moistens the plant foliage irrigate in the morning so plants have time to dry during the day. This will lessen disease problems. Night time watering encourages disease growth. Drip can reduce weed problems.

Plants growing in containers should be watched more closely for water needs because the roots are more crowded and temperatures of root media are more extreme. Keep soil moist but do not over-water. Make holes on the side and/or the bottom of the container for drainage and air.

Step 8 Mulch & cultivate to control weeds

Weeds compete with vegetables for water, nutrients and light. Weeds often harbor insects and diseases. Two important ways to keep down the weeds in and around your garden are mulching and cultivation. If proper attention is given to controlling weeds when small, time and effort can be saved. Small weeds are easier to control than large ones. When weeds are allowed to get large they can cause many headaches and backaches, and retard plant growth.

Mulching is covering the soil around your vegetables with a protective material. Besides controlling weeds, the mulch will conserve moisture, regulate the soil temperature and keep the vegetables cleaner. With mulch very little cultivation is needed to control weeds. Mulch materials include leaves, straw, sawdust, wood chips, cardboard, newspaper, shredded paper, old carpet, and paper and plastic sheeting. On established plantings, materials are spread around the plants. With paper or plastic sheeting the material is rolled out on the prepared seedbed and anchored on the edges with soil. Seeds and transplants are planted through holes at the desired spacings. Water can be applied from the side through furrow irrigation or by a trickle/drip tube or soaker hose under the mulch.

Cultivate with a sharp hoe or cultivator just as the weeds begin to sprout. Scrape and loosen the total soil surface around the plants without going too deep, which would cut or damage shallow roots of the vegetable plants. Cultivation will also help aerate the soil and can be used to mix a side-dressing of nitrogen fertilizer into the soil.

Chemical herbicides for weed control are not generally recommended for use in home gardens.

Step 9 Be prepared for pests and problems

Problems of the garden can be minimized by being prepared for them. Learn about the insects and diseases that commonly occur in the area and learn control methods. Whenever possible select disease resistant varieties. Soil problems can be reduced if the steps mentioned earlier are followed; however, crop injury from salt can appear if proper management has not been followed. Avoid planting vegetables from the same family in the same spot year after year. This practice is referred to as "crop rotation".

At the lower elevations in Arizona high temperature and shallow watering often cause problems especially when plantings are made too late in the spring or too early in the fall. Also, as temperatures increase more pest problems will occur, be prepared for them. Learn as much as possible from books, bulletins and professionals. Experience is the best teacher on how to handle these problems. Recording treatments in a gardening notebook will be helpful in the future when they occur again.

Step 10 Harvest at peak quality

The job is not done until top quality vegetables are harvested from the garden. When the "fruits" of your labor are tasted, then it will be worth all the effort.

Most vegetables are at peak quality for only a short period of time and should be harvested. Learn to tell the proper time to harvest each crop. Immature vegetables will not improve after harvest and over-mature vegetables will be tough and lack the desired taste and texture.

To maintain quality after harvest, handle vegetables carefully. Cool and store vegetables like asparagus, broccoli, leafy crops, peas and sweet corn below 40° F.; tomatoes, peppers, cucumbers and eggplant around 55° F. Remove "field heat" as soon as possible, unless they are eaten immediately.

Garden vegetables offer you a variety of experiences and flavors throughout the year. Enjoy them both.

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Elevations of locations in Arizona (feet above sea level)							
10 to 1000'	**Feet**	**1000 to 2000'**	**Feet**	**2000 to 3000'**	**Feet**	**3000 to 4500'**	**Feet**
Buckeye	888	Ajo	1763	Mammoth	2348	Benson	3585
Gila Bend	737	Casa Gd.	1390	Roosevelt	2200	Bowie	3765
Mohawk	538	Chandler	1213	Safford	2920	Camp Verde	3160
Parker	425	Florence	1500	San Carlos	2630	Chino Valley	4250
Quartzsite	875	Mesa	1225	Sells	2375	Clarkdale	3550
Wellton	260	Phoenix	1108	Superior	2820	Clifton	3465
Yuma	141	Red Rock	1864	Tucson	2423	Cottonwood	3550
Yuma Mesa	181	Salome	1700	Wickenburg	2093	Douglas	3973
3000 to 4500'	**Feet**	**4500 to 6000'**	**Feet**	**4500 to 6000'**	**Feet**	**6000' and above**	**Feet**
Duncan	3535	Ashfork	5140	St. Johns	5560	Alpine	8000
Globe	3540	Bisbee	5350	Sierra Vista	4620	Flagstaff	6993
Kingman	3333	Chinle	5538	Snowflake	5644	Fort Valley	7347
Nogales	3865	Colorado City	4980	Sonoita	4865	Grand Canyon	6890
Page	4380	Fredonia	5000	Tombstone	4540	Heber	6439
Patagonia	4044	Holbrook	5075	Whiteriver	5280	Pinedale	6500
San Simon	3613	Jerome	5245	Winslow	4850	Show Low	6331
Sedona	4240	Payson	4930	Young	5577	Springerville	6964
Willcox	4182	Prescott	5354	Kayente	5798	Window Rock	6750

When to plant vegetables in the Arizona garden

Vegetables differ in their climatic requirements making it necessary to know when to plant them in order to have a successful garden.

Some vegetables will withstand cool and even slight freezing weather. Others need warmer conditions to germinate and to produce. Generally vegetables are placed in two categories—cool-season crops and warm-season crops.

Cool-season vegetables include beet, broccoli, cabbage, carrot, lettuce, onion, pea, potato, radish, spinach and turnip. These are hardy or frost tolerant plants and germinate in cold soil. They can be planted in the fall, winter or early spring depending on location. For best quality these crops need to mature during cooler periods rather than in the heat of the summer.

Warm-season vegetables include beans, cucumber, eggplant, melons, pepper, pumpkin, squash, sweet corn, sweet potato and tomato. These do not tolerate frost but need warm temperatures to set and properly mature fruit. However, high temperatures reduce quality- Examples: sunburned fruit, poorly colored tomatoes and poor ear fill of sweet corn.

Elevation is indicative of climate. In Arizona gardening occurs from almost sea level to over 7,000 feet. Two problem periods exist—the hot summer at lower elevations and cold winter at higher elevations. Since these conditions should be avoided for many vegetables, considerations should be made when planning the garden planting schedule.

At lower elevations up to 3,000 feet, two main planting periods are generally followed—early spring period for warm-season vegetables and late summer to winter period for cool-season crops. In the higher elevations 3,000 to 7,000 feet, there is one main cropping period which is planted during the spring and early summer. Although, at these elevations in Central and Southern Arizona, an early fall planting of cool season vegetables is usually productive.

The lists below give suggested planting dates for different elevations. These guides are based on experience, observation, frost dates, hardiness and other characteristics of vegetable species. Elevations for certain locations in Arizona are listed above. Find the elevation closest to your location and use these dates along with local experience to develop a vegetable planting program. County Cooperative Extension Office can offer advice as well as local nurseries and garden centers.

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These diagrams show some commonly-used systems for growing garden vegetables.

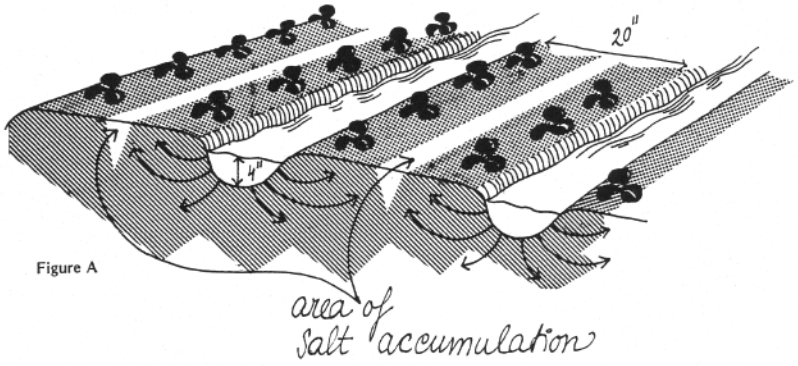

Figure A

Figure A: The soil-bed technique allows for furrow irrigation water to move from furrow ditches into the bed, pushing salts to the center. To avoid salt problems plant near the bed edge. When using furrow irrigation a slight slope is needed so water will run down the furrow. Salt problems to be a greater problem at lower elevations in Arizona where natural precipitation is low.

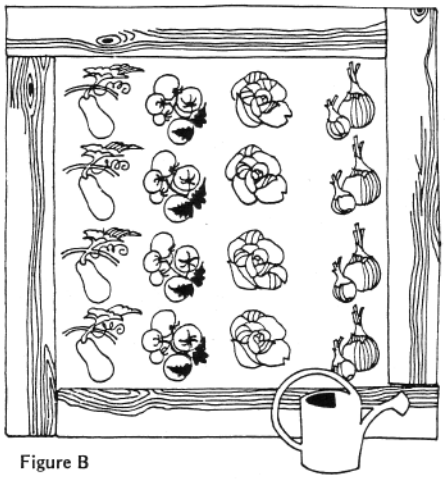

Figure B

Figure B: Make raised beds using railroad ties, landscaping wood, lumber, blocks or rocks. The bed is filled with at least one foot of soil, organic matter, sand, perilite and other materials that promote good plant growth. Raised beds should be used when an area does not have good soil.

In windy areas, sunken beds might be considered to protect young plants and collect water.

Figure C

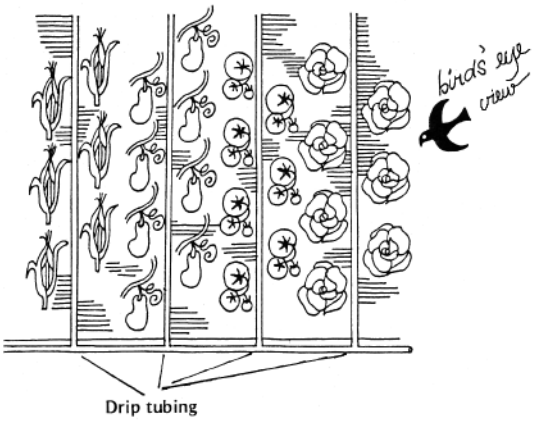

Figure C: Water can be applied by drip or soaker hose as shown here or by furrow, or sprinkler irrigation. There are many types of systems available that apply water efficiently. What ever method is used, adequate watering moves salts down and away from the plant roots. Select a system that meets the need and can be managed properly.

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VEGETABLE PLANTING DATES

Vegetable Species	10-1000 feet	1000-2000 feet	2000-3000 feet
Asparagus	Oct. 1-Feb. 1	Oct. 1-Mar. 1	Oct. 1-Mar. 1
Basil	Jan. 1 - Mar. 1	Feb. 15 - Mar. 15	Mar. 15 - Apr. 15
Bean,bush	Feb. 1-Mar. 1	Feb. 15-Mar. 15	Mar. 1-Apr. 1
	Aug. 1-Sept. 1	July 25-Aug. 15	July 15-Aug. 15
Bean, pole	Aug. 1-Sept. 1	July 15-Aug. 15	July 15-Aug. 10
Bean, lima	Feb. 1-Mar. 1	Feb. 15-Mar. 15	Mar. 1-Apr. 1
Bean, edible soy	Mar. 1-May 1	Mar. 15-June 1	Apr. 1-June 1
Beet	Sept. 15-Mar. 1	Sept. 1-Mar. 15	Aug. 25-Apr. 1
Broccoli	Sept. 1-Jan. 1	Sept. 1-Dec. 1	July 25-Oct. 1
Brussels Sprouts	Sept. 1-Jan. 1	Sept. 1-Dec. 1	Aug. 15-Oct. 1
Cabbage (seed)	Sept. 1-Nov. 20	Aug. 15-Dec. 1	Aug. 1-Dec. 1
Cabbage (plants)	Oct. 1-Dec. 1	Sept. 15-Jan. 1	Sept. 1-Feb. 1
Cantaloupe	Dec. 1-Apr. 10	Feb. 15-Apr. 1	Mar. 15-June 1
Carrot	July 15-Aug. 15	Sept. 1-Mar. 1	Aug. 25- Mar.15
	Sept. 1-Jan. 1		
Cauliflower	*Same as cabbage*	*Same as cabbage*	*Same as cabbage*
Celery	October 15	Aug. 15-Oct. 15	Aug. 1-Oct. 15
Chard	Sept. 1-Jan. 1	Sept. 1-Mar. 1	Aug. 15-Apr. 1
Chinese Cabbage	Sept. 15-Dec. 1	Sept 1-Jan. 1	Aug.15-Jan.15
Collard	Sept. 15-Dec. 1	Sept. 1-Jan. 1	Sept.1 -Jan.15
Corn, sweet	Feb. 15-Mar. 1	Feb. 15-Mar. 15	Mar. 15-Apr. 1
	July 30-Aug. 30	July 20-Aug. 20	July 15-Aug. 15
Corn, Mexican June		June 20-July 20	July 1-July 5
Cucumber	Dec. 1-Apr. 1	Mar. 1-Apr. 1	Mar. 20-May 15
		Aug. 15-Sept. 15	Aug. 1-Sept. 1
Eggplant	Jan. 15-Apr. 1	Feb. 1-Apr. 1	Apr. 1-May 15
Endive	Sept. 1-Dec. 1	Sept. 1-Jan. 1	Sept. 1-Feb. 1
Garlic	Sept. 1-Dec. 1	Sept. 1-Dec. 1	Sept. 1-Jan. 1
Horseradish	*Not adapted*	*Not adapted*	Nov. 1-Feb. 1
Kale	Sept. 1-Dec. 1	Sept. 1-Dec. 1	Aug. 15-Feb. 15
Kohlrabi	Sept. 1-Dec. 1	Sept. 1-Dec. 1	Sept. 1-Feb. 1
Leek	Sept. 15-Dec. 15	Sept. 1-Jan. 1	Sept. 1-Jan. 15
Lettuce, head	Sept. 20-Nov. 20	Sept. 1-Jan. 1	Sept. 1-Feb. 15
Lettuce, leaf	Sept. 20-Jan. 1	Sept. 1-Mar. 1	Aug. 20-Apr. 1
Muskmelon	Dec. 1-Apr. 10	Feb. 15-Apr. 1	Apr. 1-July 15
		July 1-Aug. 1	
Mustard	Sept. 15-Dec. 15	Sept. 1-Jan. 1	Sept. 1-Feb. 1
Okra	Mar. 1-Apr. 15	Mar. 1-June 1	Apr. -June 15
Onion, green bunch	Sept. 15-Jan. 15	Sept. 1-Feb. 1	Aug. 15-Feb. 1
Onion, dry (seeds)	Nov.1-Dec.15	Oct. 15-Jan. 1	Oct. 15-Jan. 1
Onion, dry (sets)	Nov. 15-Jan. 15	Nov. 1-Feb. 1	Nov. 1-Feb. 15

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Vegetable Species	10-1000 feet	1000-2000 feet	2000-3000 feet
Parsley	Oct. 1-Jan. 15	Sept. 1-Jan. 1	Sept. 1-Jan. 15
Parsnip	*Not adapted*	Sept. 1-Jan. 1	Sept. 1-Jan. 15
Pea, fall	Sept. 10-Sept. 20	Aug. 15-Sept. 15	Aug. 15-Sept. 15
Pea, spring	Jan. 20-Feb. 15	Oct. 15-Dec. 15	Feb. 1-Mar. 15
Pepper (seed)	Nov.-Jan.	Feb. 1-Mar. 1	Feb. 15-Mar. 15
Pepper (plants)	Feb. 1-Mar. 15	Mar. 1-Apr. 1	Apr. 1-June 1
Potato, Irish	Sept. 1-Feb. 15	Feb. 1-Mar. 15	Feb. 15-May 1
Potato, sweet	Mar. 1-June 20	Mar. 1-June 1	May 1-June 15
Pumpkin	July 15-Aug. 15	July 1-Aug. 1	Apr. 1-July 15
Radish	Sept. 1-Apr. 1	Sept 1-Apr. 15	Aug. 5-May 1
Rhubarb	*Not adapted*	*Not adapted*	Oct. 1-Mar. 1
Rutabaga	Sept. 15-Jan. 15	Sept. 1-Feb. 1	Aug. 20-Mar. 1
Salsify	*Not adapted*	*Not adapted*	Oct. 1-Dec. 1
Spinach	Sept. 15-Feb. 1	Sept. 1-Feb. 1	Aug. 20-Mar. 1
Squash, summer	Dec. 15-Apr. 10	Feb. 1-May 1	Mar. 15-July 15
Squash, winter	July 15-Aug. 15	July 1-31	July 1- July 31
Tomato (seed)	Nov.-Jan.	Jan. 1-Mar.1	Jan. 10-Feb. 15
Tomato (plants)	Jan.-Mar. 15	Feb. 15-Mar. 15	Mar. 15- Apr. 15
Turnip	Sept. 15-Feb. 1	Sept. 1-Feb. 1	Aug. 15- Mar. 1
Watermelon	Dec. 15-Apr. 1	Feb. 15-Apr. 1	Mar. 15- June 1
Vegetable Species	**3000-4500 feet**	**4500-6000 feet**	**Above 6000 feet**
Asparagus	Feb. 15-Apr. 1	April 1-30	Apr. 15-May 15
Basil	May 1-June 15	May 10-June 1	May 25-June10
Bean, bush	Apr. 25-July 15	May 15-July 1	May 25-June 15
Bean, pole	Apr. 25-July 15	May 15-July 1	May 25-June 15
Bean, lima	Apr. 25-July 15	May 15-July 1	May 25-June 15
Bean, edible soy	May 15-July 1	May 25-July 1	*Not adapted*
Beet	Mar. 1-May 15	May 1-July 15	May15-June15
Broccoli	*Same as cabbage*	*Same as cabbage*	*Same as cabbage*
	Sept. 1-Oct. 15		
Broccoli (plants)	*Same as cabbage*	*Same as cabbage*	*Same as cabbage*
Brussels Sprouts	July 1-Aug. 1	June 1-July 1	May 15-June 15
Cabbage (seed)	Feb. 15-Apr. 15	March 15-30	April 1-15
Cabbage (plants)	Mar. 15-May 1	Apr.15-July 15	May 1-July 1
	Aug. 20-Oct. 1	May 1- June 1	May 15-June 15
Cantaloupe	May 1-June 20	May 15-June 15	May 25-June 10
Carrot	Mar. 1-May 10	May 1-July 15	May 15-July 1
	July 15-Sept. 15		
Cauliflower	*Same as cabbage*	*Same as cabbage*	*Same as cabbage*
Cauliflower (plants)	*Same as cabbage*	*Same as cabbage*	*Same as cabbage*
Celery (plants)	May 15-June 20	June 1-July 15	*Not adapted*
Chard	July 15-Sept. 15	July 1-Aug. 1	
	Feb. 15-Apr. 30	Mar. 1-Apr. 10	Apr. 1-June 10
Chinese Cabbage	July 1-Sept.15	June 1-July 15	May 15-June 15
Collard	June 15-Aug. 1	June 1-July 15	May 15-July 1

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Vegetable Species	3000-4500 feet	4500-6000 feet	Above 6000 feet
Corn, sweet	May 10-July 15	May 25-July 1	June 1-10
Corn, Mexican June	May 10-July 15	May 25-June 15	*Not adapted*
Cucumber	May 10-June 15	May 15-June 15	June 1-25
Eggplant (plants)	May 1-June 15	May 15-June 15	June 1-20
Endive	Feb. 1-Apr. 1	Apr. 15-June 15	May 15-June 15
Garlic	Feb. 15-Apr. 10	April 1-30 (cloves)	*Not adapted*
	Sept. 15-Nov. 15		
Horseradish	Feb.-Apr.	Feb. 15-Mar. 15	April-May
Kale	Feb. 1-Mar. 20	Feb. 15-Apr 10	April-May
	Aug. 1-Sept. 15		
Kohlrabi	Feb. 15-Apr. 1	Apr.15-May15	May 15-June 1
Leek	Feb. 15-Apr. 10	April 1-30	*Not adapted*
Lettuce, head	Feb. 15-Mar. 15	July 1-Aug. 1	June 1-30
	July 15-Aug. 15		
Lettuce, leaf	Mar. 1-Apr. 15	Mar. 15-Apr.15	May 1- July 1
	July 15-Sept. 15	Aug. 1-Sept.15	
Muskmelon	May 10-June 15	May 15-June 15	*Not adapted*
Mustard	Feb. 15-July 15	Apr. 1-July 1	April-May
Okra	May 10-July 1	May 15-June 15	June 1-10
Onion, green bunch	Feb. 15-May 1	Apr. 15-May 1	May 1-31
Onion, dry (seeds)	Jan. 15-Mar. 15	Feb. 15-Apr. 15	April 1-30
	Sept. 15-Nov. 15	Oct. 15-Jan. 1	Oct. 15-Jan. 1
Onions, dry (sets)	Sept. 15-Nov. 15	Nov. 1-Feb. 1	Nov. 1-Feb. 15
	Feb. 15-Apr. 15	Apr. 1-15	Apr. 15-June 1
Parsley	May 1-June 15	Apr. 1-15	May 1-31
Parsnip	Mar. 1-May 1	Apr. 1-May 20	April-May
Pea, spring	Feb. 1-Mar. 15	Feb. 15-Aug. 15	May 1-June 1
Pea, fall	Aug. 25-Oct. 15	Aug. 1-Sept. 1	*Not adapted*
Pepper (seed)	Feb. 15-Mar. 30	Mar. 1-Apr. 1	Apr. 1-15
Pepper (plants)	May 10-June 1	May 10-Aug. 25	May 15-June 1
Potato, Irish	Mar. 20-Apr. 20	May 10-June 1	May 15-June 1
	July 25-Aug. 15		
Potato, sweet	May 10-25	May 15-20	*Not adapted*
Pumpkin	May 15-July 1	May 20-June 15	May 25-June 10
Radish	Mar. 1-May 15	Apr. 1-June 15	May 15-June15
	July 15-Sept. 15		
Rhubarb	Mar. 1-Apr. 20	Mar. 1-Apr. 1	April 1-30
Rutabaga	Mar. 1-Apr. 1	Apr. 1-May 15	May 1-June 1
Salsify	Mar. 15-June 1	Apr. 1-May 15	May 1-June 1
Spinach	Feb. 15-Apr. 15	Apr. 1-May 15	May 1-June 1
	Sept. 15-Oct. 15		
Squash. summer	May 10-July 15	May 1-July 1	May 15-June 15
Squash, winter	May 10-July 1	May 15-July 1	May 15-June 10

Statewide Planting Guide

Ten Steps to a Successful Vegetable Garden – University of Arizona Cooperative Extension

Vegetable Species	3000-4500 feet	4500-6000 feet	Above 6000 feet
Tomato (seed)	Mar. 1-Apr. 1	Mar. 1-Apr. 1	Apr. 1-10
Tomato (plants)	May 1-June 15	May 10-June 1	May 25-June 10
Turnip	Mar. 1-Apr. 15	Apr. 1-May15	May 15-June 1
	Aug. 15-Sept.15		
Watermelon	May 10-July 15	May 1-June 1	*Not adapted*

References:

For more information on growing vegetables in Arizona refer to:

Call, R.E. Arizona Master Manual. 1995 http://cals.arizona.edu/pubs/garden/mg

DeGomez, T. 2002, revised 2014. Growing Tomatoes Above 6000 foot Elevations in Arizona. University of Arizona, College of Agriculture and Life Sciences Bulletin, AZ1282. Tucson, AZ.

DeGomez, T. 1999, revised 2014. Fertilizing Home Gardens in Arizona. University of Arizona College of Agriculture and Life Sciences, Cooperative Extension Bulletin, AZ1020. Tucson, AZ.

Drip Irrigation: The Basics. 2006 University of Arizona College of Agriculture and Life Sciences, Cooperative Extension Bulletin, AZ1392. Tucson, AZ.

USDA 1977. Gardening for Food and Fun. Year book of Agriculture 1977. USDA, Washington D.C.

For more detailed publication on vegetable gardening refer to Chapter 7 of the Arizona Master Gardener Manual. http://cals.arizona.edu/pubs/garden/mg

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This information has been reviewed by University faculty.
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