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INSC 559
April 25, 2020

Abstract

Oak Ridge Public Library (ORPL) is requesting $4,240 to create a community demonstration garden in collaboration with the Oak Ridge Civic Center, Oak Ridge National Laboratory (ORNL), Master Gardeners, and University of Tennessee Extension. Through this project, ORPL aims to build community resiliency and develop a model for library garden programming that other public libraries or community organizations can replicate. Several objectives will contribute to achieving these goals: 1) engaging marginalized segments of the Oak Ridge community in library programming, 2) encouraging community ownership of the garden, 3) improving awareness of health and sustainability issues affecting the community, as well as of the relevant resources available through the library, 4) leveraging existing scientific expertise in Oak Ridge to benefit the entire community, and 5) ensuring that other libraries or community organizations have the information necessary to launch similar initiatives.

Food insecure Oak Ridge residents are the primary target for this program. The city of Oak Ridge has a high prevalence of food insecurity: 14.4% compared to 11.1% nationwide (Deloitte et al., 2020). The USDA classifies much of the city as a food desert, based on low income levels and distance to grocery stores (Rhone, 2019). The garden at ORPL will not only provide fresh produce, but also model and teach gardening skills that community members can use in their own homes, and because ORPL has an existing seed exchange program, community members will not even have to purchase seeds or plants to start their home gardens.

Community gardens can also be used to help build relationships between neighbors, provide accessible exercise opportunities (Hanna & Oh, 2000), encourage early literacy (Kallunki, 2015), or teach culinary or nutritional sciences (Morehart, 2019). This project will also draw on the scientific expertise of the community. Oak Ridge is home to ORNL, an internationally recognized hub of climate science research (Oak Ridge City Council, 2019). The garden will be used to ground educational programs developed in collaboration with ORNL scientists about sustainable agriculture and other environmental science topics.

The garden will have two components: an outdoor garden and an indoor tower garden. In addition to demonstrating aeroponics, an alternative gardening method, the indoor component will extend the project's accessibility, increase its visibility, and enable garden programming to run year-round. Because the tower garden requires minimal setup, the indoor component will be implemented first, immediately after receiving funding. The outdoor garden will be a forty square yard space provided by the Oak Ridge Civic Center. UT Extension and Master Gardeners will assist in designing the garden. In order to foster a sense of ownership amongst community members, two open design meetings will be held: one at the beginning of the process to brainstorm and gather suggestions, and one the following month to discuss any feedback on initial plans. The design process and construction is expected to take two months, and will take place during December and January so that the garden is ready for early spring planting. The garden will then be planted and maintained through biweekly, volunteer-led garden workdays.

In order to make pertinent information and planning materials available to other libraries interested in creating similar programs for their own communities, ORPL will document and maintain records of the planning and execution of the garden, as well as of related programming, in order to create a library garden guide. The library will also create a webpage for the garden as a part of the library's website. This page will include contact information so that any interested libraries and community organizations will be able to request the complete guide. By making this guide available, ORPL hopes to expand the community building, health, climate resiliency, and educational benefits of community gardening beyond the Oak Ridge community.

Narrative

Introduction

Oak Ridge Public Library (ORPL) is requesting $4,240 to create a community demonstration garden at the Oak Ridge Civic Center. ORPL aims to cultivate community resiliency by creating a space that will encourage relationship building, provide opportunities and resources for community members to engage in healthy activities, and nurture interest in critical issues in food production and sustainability. By working with Oak Ridge National Laboratory (ORNL), Master Gardeners, and the University of Tennessee Extension to develop a garden and related educational programming, ORPL will leverage the wealth of scientific knowledge already present in the Oak Ridge community. The expertise brought in through these partnerships will be used to increase awareness and knowledge of current health and environmental issues and design a model for community garden-centered programming that can be used by other libraries and community organizations that are interested in implementing similar projects for their own communities.

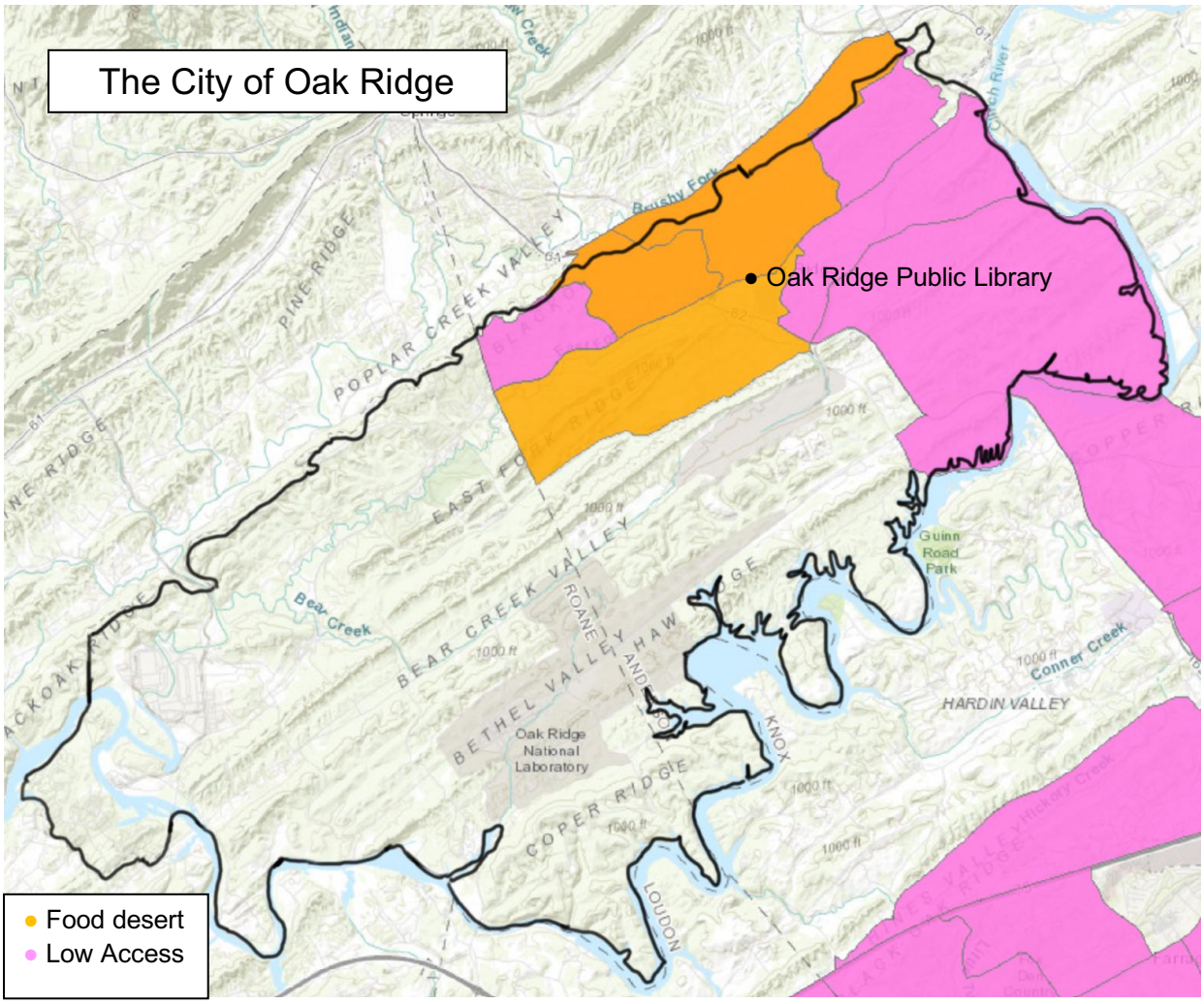
Statement of Need

ORPL is uniquely suited to create a model garden program for other libraries and community organizations around the country to follow. The library already has a successful seed exchange program to build from (Brock, 2018), and is located right next to the Oak Ridge Civic Center, which has ample outdoor space to host the outdoor garden. Oak Ridge is also a scientifically-minded community—it is a hub of national security efforts and international scientific research, with two Department of Energy facilities located within the city: Oak Ridge National Laboratory (ORNL) and the Y-12 National Security Complex (City of Oak Ridge Government, n.d.). This is reflected in the employment of residents; almost 17% of employed residents work in the science industry. Science, engineering, computers, and mathematics are amongst the most common specializations of employed residents (Deloitte et al., 2020). The city even emphasizes STEM education in all of its public schools (Oak Ridge City Council, 2019). Its residents are also highly educated, with 92.2% over 25 having graduated high school and 37.4% holding a bachelor's or higher degree. State-wide only 87% have graduated high school and 26.6% have a bachelor's degree (United States Census Bureau, 2019). ORPL is partnering with ORNL to make the most of the scientific expertise present in the community by bringing scientists who are interested in sharing their specialized knowledge with the public to the library. The science and education-centered culture of Oak Ridge indicates that the community has not only the expertise, but also the enthusiasm to make the most of the vast range of science education and programming opportunities that would be brought about by a community garden at ORPL.

Despite the high level of education and the relatively lucrative science industry that employs much of Oak Ridge, the percentage of residents living below the poverty line is 15.4%, significantly higher than the national average of 11.8% (United States Census Bureau, 2019). At 14.4%, the prevalence of food insecurity in Oak Ridge is also significantly higher than the national average: 11:1% (Deloitte et al., 2020). Data from the United States Department of Agriculture (USDA) Economic Research Service (ERS) indicates that the percentage of Oak Ridge households that do not own a car and are further than a half mile from the nearest grocery store is unusually high. This lack of access is exacerbated by the lack of public transit options in Oak Ridge. Based on the low income levels and large distances between residences and grocery stores, much of the city is classified by the USDA as a food desert, meaning that the availability

of affordable, nutritious food in this area is severely limited (Rhone, 2019). Figure 1 depicts the segments of the city which are designated as a food desert, as well as areas which, based on the relatively higher income levels, are not considered food desert, but still have low access to grocery stores. As can be seen on the map, ORPL is centrally located within the food desert and low access region, making it an especially suitable location for this project.

Figure 1. Food Deserts and Regions with Low Food Access in the City of Oak Ridge



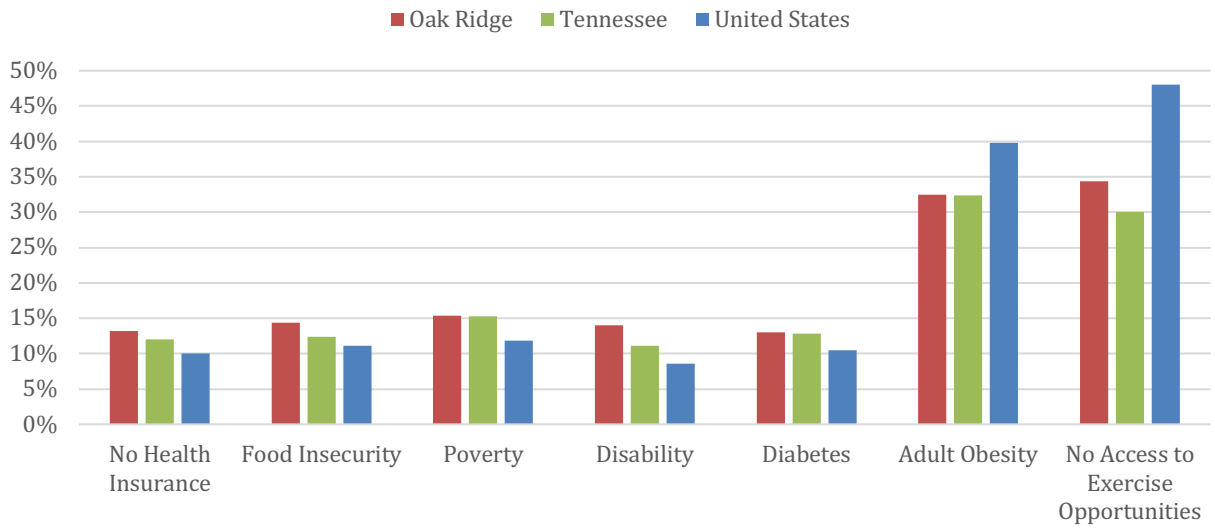
Note. This map shows the segment of Oak Ridge designated by the USDA as a food desert based on low access to food and low income levels. Areas with low access are also shown. Created using USDA Economic Research Service's Food Access Research Atlas (Rhone, 2019).

At 83% white, the community is quite racially homogenous. That said, the city has comparatively large Hispanic, Asian, and multiracial populations for a Tennessean city. Tennessee's population is only 5.6% Hispanic, 1.9% Asian, and 2% multiracial, whereas the breakdown of Oak Ridge is 6.5% black, 0.3% American Indian and Alaska Native, 3.2% Asian, 5.2% multiracial, 6.8% Hispanic and Latino, and 78.3% non-Hispanic white. Immigrants also make up a relatively large portion of the population; almost 8% of residents are foreign-born, and 10% speak a language other than English at home. The percentages for Tennessee overall are only 5% and 7.1% (United States Census Bureau, 2019). These racial demographics are

significant to the issue of food insecurity; in addition to the fact that black and Hispanic residents are disproportionately affected by poverty (Deloitte et al., 2020), research has shown that ethnic minorities are less likely to eat nutritionally balanced diets if they lack access to culturally appropriate foods and nutrition information. Because of this, the impact of food deserts is often amplified for ethnic populations (Abu-Saad et al., 2010). A community garden provides an opportunity for minority community members to exercise some control over their local food supply.

While the most obvious benefit of a community garden is the production of fresh produce, the health benefits extend beyond just that. Community gardens have been successfully used at libraries to teach culinary skills and nutrition science (Morehart, 2019). Gardening has also been shown to be effective as a form of exercise that is easily adapted to all abilities (Hanna & Oh, 2000), a fact which is particularly relevant to the Oak Ridge community, which has relatively high percent of disabled residents: 14% to the nationwide 8.6% (United States Census Bureau, 2019). Further, an additional exercise opportunity would be of use to the entire Oak Ridge community, as 34% of Oak Ridge residents currently lack opportunities or appropriate space to use for exercise. In addition to the high rate of disability, Oak Ridge has substantial numbers of residents experiencing other health concerns. The prevalence of diabetes in Roane County and Anderson County, the counties Oak Ridge is in, is higher than the national average: 14.8% and 11.7%, respectively. In both counties, over 30% of adults are obese (Deloitte et al., 2020). These numbers are augmented by the fact that 13.2% of the Oak Ridge population is not covered by health insurance; nationwide that number is only 10% (United States Census Bureau, 2019).

Figure 2. Health Risk Factors in Oak Ridge, Tennessee, and the United States



Note. This chart shows the 2018 percentages of the population of Oak Ridge, Tennessee, and the United States that experience the following health risks: no health insurance coverage, food insecurity, poverty, disability, diabetes, adult obesity, and a lack of access to exercise opportunities. Data from Data USA (Deloitte et al., 2020), the United States Census Bureau (2019), and County Health Rankings and Roadmaps (University of Wisconsin Population Health Institute, 2020).

Beyond the health benefits they provide, community gardens have value as community building and educational tools. They have been found effective as a means of promoting community ties,

as well as instilling a sense of respect for nature (Hanna & Oh, 2000). Gardening has been successfully integrated into curricula to improve student engagement (Torrise, 2010), and libraries have even found that some gardening activities for children can help increase early literacy (Kallunki, 2015). A community garden at ORPL would not only provide the community with fresh produce, but also create opportunities for exercise and community building, further the library's ability to serve Oak Ridge as a community hub, provide a model for sustainable food production, and open the door for engaging educational programming on topics that are important to this community, such as nutrition, personal health, food production systems, culinary arts, and environmental science.

As previously mentioned, successful community gardens exist across the country, and many public libraries have had success with community gardens as well. Brown County Public Library in Wisconsin, for example, has had success encouraging literacy and hands-on learning through their Cellcom Children's Edible Garden, which was designed in partnership with local extension agents. Boulder Public Library has an edible learning garden where community members can help garden and harvest food (Morehart, 2019). Gwinnett County Public Libraries have used community tower gardens in each of their branches to ground STEAM programming and help address food insecurity (Georgia Public Library Service, 2018). Oak Ridge, however, does not yet have any shared gardening space. Further, although many libraries have shared success stories about their garden programming, most have been centered around children's programming, rather than environmental and food science for all ages. This project will help bring library gardens out of the children's departments by demonstrating the numerous educational and social opportunities a community garden presents for everyone, including adult audiences.

Goals and Objectives

The primary goals of this project are (1) to build community resiliency and (2) to develop a model for library garden programming that other public libraries or community organizations can replicate. Several objectives will contribute to achieving these goals: 1) engaging marginalized segments of the Oak Ridge community in library programming; 2) encouraging community ownership of the garden; 3) improving awareness of health and sustainability issues affecting the community, as well as of the relevant resources available through the library; 4) leveraging existing scientific expertise in Oak Ridge to benefit the entire community; 5) ensuring that other libraries or community organizations have the information necessary to launch similar initiatives.

Project Description and Evaluation Plan

The garden will have two components: an outdoor garden and an indoor tower garden. The intention behind including an indoor component is to enable garden programming to run year-round, as well as to ensure that the project is inclusive of anyone who is unable to spend long periods of time gardening outdoors, or for whom outdoor gardening is otherwise difficult or uncomfortable. It will also help to increase the visibility of the project, as its presence in the library will serve as a form of internal marketing. Further, the tower garden functions using aeroponics, a soilless method of growing plants which uses air and mist rather than soil as the growing medium, so it will also provide opportunities for alternative food production demonstrations and educational programming. The inclusion of this non-traditional gardening method will help demonstrate alternative gardening options for households with constraints that

may have prevented them from gardening traditionally, such as a lack of outdoor space, limited indoor space, pets, or a lack of time to spend tending a garden.

Because the tower garden requires minimal setup and maintenance, the indoor component will be implemented first. Immediately after receiving funding, the tower garden will be purchased, set up inside the library building, and planted with the starter seeds included with the purchase of the tower. A small bookcase will be arranged beside the tower garden to display a rotating selection of gardening, agriculture, and environmental science related books, curated by ORPL staff. To kick off the gardening programming, ORPL will host an aeroponic planting demonstration, where the basics of aeroponics will be explained by an ORNL scientist. Attendees will be invited to look at the system and plant pods in the tower together. This will begin a series of monthly educational events centered around gardening-related science topics, such as sustainable agriculture, climate change, and biodiversity, as well as more general indoor gardening roundtables and demonstrations. These events will include expert speakers from ORNL, UT Extension, and Master Gardeners, as well as documentary screenings and discussions. Until the outdoor garden space has been designed and constructed, each of these programs will be held either indoors at ORPL or virtually. By including virtual programming, we will broaden both the audience, by including community members who are unable or unwilling to attend in-person programming, and the pool of expert speakers, by giving them the option of presenting from the convenience of their own home or office.

The outdoor garden will be a forty square yard space provided by the Oak Ridge Civic Center, which is conveniently located directly adjacent to ORPL. It will include both in-ground plots and raised garden beds, which will make the garden more accessible to community members who use wheelchairs or are otherwise mobility-impaired. The exact layout and details of the garden will be designed by experts from the UT Extension and Master Gardeners, using feedback collected directly from the Oak Ridge community. Because the use of an outdoor garden is seasonal, the design and construction of the outdoor portion of this project will be timed for completion by the end of February, so that the garden will be ready for use in time for early spring planting. This process is estimated to take ten weeks, so it will be started at the beginning of December.

The outdoor garden design process will kick off with an open community meeting, where the public will be invited to come and help brainstorm and voice any suggestions or ideas they have for the garden. To ensure as many library patrons and members of the Oak Ridge community as possible are aware of this meeting, it will be advertised both inside the library and on the library website at least a month in advance. Using input from the meeting, our gardening experts will draw up an initial plan within the next month. In early January, a second open design meeting will be held. The initial plans will be presented, and community members will once again have an opportunity to offer feedback and suggest any alterations they see fit. The design team will have two weeks to make any necessary adjustments to the plans, and by the beginning of February, construction will begin. Construction is expected to be minimal and will likely include the installation of a fence to discourage wildlife from entering the garden, as well as the setup of the raised beds.

The outdoor garden will be planted and maintained through biweekly, volunteer-led garden workdays. ORPL will use its existing relationship with Arissa Garden Club, a local gardening club whose members regularly volunteer at the library, as well as the Master Gardeners, to organize these workdays, which will be publicized on the library’s website and via signage in the library. Harvest days will be scheduled as appropriate and will be publicized similarly.

Participants in harvest days will be able to take produce home, and any excess will be donated to Oak Ridge's food pantry.

The measures of success will be similar to those used for existing library programs. Program attendance will be measured and monitored to ensure that the programs are matching community interests. ORPL will also continue to monitor seed library usage to determine whether the community garden leads to an increase in demand for seeds. Additionally, one of ORPL's goals is to increase circulation of its adult nonfiction collection, so those numbers will be monitored for changes as well, to see whether the gardening, agriculture, and environmental science programming leads to any increases in related nonfiction titles.

This project is anticipated to be low risk. The primary risk is contamination of the garden causing food unsafe produce. To mitigate this concern, soil samples will be collected and sent to the UT Extension for testing before the garden is constructed. This will ensure that the soil is free of lead or other dangerous contaminants. The garden will also be designed and planted using principles of biodiversity to keep pests at bay, which will eliminate the need for harmful pesticides. The probability of contamination in the Tower Garden is relatively low due to the enclosed nature of the system, and will be prevented by regular monthly rinsing of the filter and shower cap.

In order to share the results of this project and extend its benefits beyond Oak Ridge, ORPL intends to compile a guide for starting a community garden. The guide will include notes on all of the events and programs developed around the garden, as well as a copy of the blueprints for ORPL's garden and thoughts and tips from ORPL librarians on successfully collaborating with scientific institutions. In order to ensure that this guide is available to all other public libraries and community organizations seeking to establish similar programs, ORPL will create a web page for the garden to include on the library's website. This page will be used to list relevant upcoming events and programs and will also include contact information encouraging interested organizations to reach out for the full guide, which will be sent to all requesters via email. To maximize this project's visibility and reach, the guide will also be shared through the Tennessee Library Association (TLA) and Public Library Association (PLA).

Diversity Plan

While this community garden project will provide opportunities for all community members and be beneficial to the whole of Oak Ridge, the primary target audience is Oak Ridge households that are experiencing food insecurity. Low income levels have a strong correlation with food insecurity (Coleman-Jensen et al., 2019), so residents who are living under the poverty line will be targeted. Disability is another risk factor for food insecurity (Coleman-Jensen & Nord, 2013), and gardening provides an opportunity to exercise that is highly adaptable to different abilities (Hanna & Oh, 2000), so disabled residents will also be a focus.

ORPL will use existing relationships with local schools, food banks, and community organizations including the YWCA, to conduct targeted outreach to reach community members who are experiencing food insecurity, ethnic minorities, and individuals with disabilities. Through these connections, individuals from the target demographics will be encouraged to participate in community garden events such as harvest days, as well as events that promote home gardening—for example, planting cuttings from the garden to take home. By marketing in settings that currently assist people experiencing food insecurity, such as public schools and food

banks, ORPL will spread awareness of the program within the targeted segment of the community and welcome their participation.

Because of the role that the availability of culturally appropriate foods plays in the health of ethnic minorities, a critical component of this project is ensuring the specific food needs of all residents are being addressed equally. ORPL plans to accomplish this by soliciting design input from the community and encouraging community ownership of the garden. When designing the garden, the design team, which will include experts from the UT Extension and Master Gardeners, will include community input. To collect this input, two open community design meetings will be held at ORPL, one at the beginning of the design process to gather initial ideas and concerns, and a second once an initial design has been drawn up to gather feedback and any final suggestions before finalizing the design and beginning construction. To encourage continued community ownership of the project, the garden will be planted and maintained through biweekly volunteer led garden workdays. This will allow community members to have direct input on what is grown in the garden, ensuring that the plants that are grown reflect the community member's preferences.

Impact

To ensure the longevity of the community garden past the initial funding period, the project has been designed to minimize dependence on continued funding. In addition to helping to instill a sense of community ownership, establishing a volunteer-led system for garden maintenance and programming also helps to minimize the need for additional funding beyond the initial set up of the garden. Further, because ORPL has an established seed exchange program, a portion of seeds from the garden will be saved each year and contributed to the seed library, creating a supply of seeds for planting the following year. In this way, as well as by investing in quality tools up front, the community garden will be almost entirely self-sustaining; the ORPL community will be able to replant the garden year after year, without any need for large orders of seeds or supplies.

As the home of ORNL, the city of Oak Ridge is a hub of relevant expertise for this project. In order to share the benefits of this community's unique scientific expertise with communities around the country and world, ORPL will compile a guide for starting a community garden program. In addition to providing libraries with a blueprint of ORPL's garden and notes on collaborating with extension agents and Master Gardeners, the guide will include information about all of the related programming and events developed around the garden. The complete guide will be available by request to any interested parties. By making this guide publicly available, ORPL hopes to help spread awareness and knowledge about critical contemporary issues including climate change, sustainable agriculture, alternative food production systems, and nutrition and health science.

Budget Summary

ORPL is requesting a total of $4,240. Oak Ridge Civic Center will provide forty square yards of land for free, but the land will need to be prepared. The soil must be tested to ensure food safety, which will cost $15. $550 is needed to purchase compost to supplement the existing soil. A chain link fence will be installed for $1400 to prevent excessive damage to the garden plants by wildlife. $230 will be used to purchase raised gardening beds, which will increase ease of access for wheelchair users and others with impaired mobility. $160 will be used for a compost bin, and $615 for gardening tools, gloves, and wheelbarrows. An additional $250 is requested for other

miscellaneous gardening supplies, such as stakes, crop cages, and garden labels. Seeds for the garden will primarily be sourced from ORPL's seed library and will be returned at the end of growing season, so only $50 will be used to purchase additional seeds to start the garden. Finally, the cost of one indoor Tower Garden system, which includes an aeroponic planter, grow lights, seeds, and all other items needed to start growing immediately, is $970.

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Timeline

Activities	Nov.	Dec.	Jan.	Feb.	Mar.	Responsible Agencies
Purchase and install indoor tower garden	•					ORPL
Create and update a web page for the garden on the ORPL website	•			•		ORPL
Maintain notes and records for the guide	•	•	•	•		ORPL
Begin gardening-themed programming and track program attendance	•	•	•	•	•	ORPL, ORNL, Master Gardeners
1st planning meeting for outdoor garden		•				ORPL, Master Gardeners, UT Extension
Create initial design for the outdoor garden		•				ORPL, Master Gardeners, UT Extension
2nd planning meeting for garden			•			ORPL, Master Gardeners, UT Extension
Finalize garden design and begin construction			•			ORPL, Master Gardeners, UT Extension, Oak Ridge Civic Center
Host a planting event to kick off the outdoor garden				•		ORPL, Master Gardeners
Establish biweekly garden workdays for continued maintenance				•	•	ORPL
Compile and share guide					•	ORPL

Budget

ORPL is requesting a total of $4,240 for materials and services needed to construct the garden, as detailed in the table below. The land is being provided free of charge by the Oak Ridge Civic Center. Expert speakers from ORNL will present programming on a volunteer-basis, with any transportation or supply costs covered by ORNL's community engagement funds. The soil will be tested to ensure food safety and determine what soil supplements will be most appropriate; this will cost $15. $550 is needed to purchase compost to supplement the existing soil so that it is conducive to gardening. $1400 will be spent to purchase chain link fencing and have it installed. This will help prevent excessive damage to the garden plants by wildlife. $160 will be used for a compost bin, which will reduce waste and help improve the garden's ability to sustain itself. $615 will go towards gardening tools, gloves, and wheelbarrows, and an additional $250 is requested for additional gardening supplies stakes, crop cages, and garden labels. $50 will be used to purchase seeds to supplement the seed library when starting the garden. Raised beds will be purchase for $230. Finally, the cost of one indoor Tower Garden system, which includes an aeroponic planter, grow lights, seeds, and all other items needed to start growing immediately, is $970.

Item	Cost
Soil testing	$15
Compost (~40 sq. ft)	$550
Fence (~76 ft. chain link and installation)	$1400
Raised garden bed	$230
Compost bin	$160
Gardening hand tools	$415
Gardening gloves	$40
Watering cans	$30
Wheelbarrow/gardening cart	$130
Misc. supplies (stakes, cages, garden labels, etc.)	$250
Seeds	$50
Tower Garden	$970
TOTAL	$4,240