



ECHO Community Garden Toolkit



**ECHO (Educational Concerns for Hunger Organization)
Community Garden Assistance**

“Connecting community agriculture projects locally and globally”



ECHO

*Reducing Hunger, Improving Lives
Worldwide*

Acknowledgments

The ECHO Community Garden Toolkit is a resource for those interested in starting community-based agricultural projects in sub-tropical and tropical climates. It builds on the experiences of ECHO staff members, interns, and network members in a collaborative overview of key considerations. ECHO's vision is to honor God through sustainable hunger solutions and it is in this context that we seek to share ideas and work diligently as good stewards of the resources available to us.

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Table of Contents

| | |
|---|-----------|
| Introduction | 4 |
| Getting Started | 5 |
| As You Begin | 5 |
| 1. Who Is Interested? | 5 |
| 2. Who Will Lead? | 5 |
| 3. Purpose & Goals | 6 |
| 4. Local Support & Sustainability Concerns | 6 |
| 5. Other Considerations | 7 |
| Context: Globally and Locally | 11 |
| Agricultural Management Considerations | 13 |
| 1. Planning | 14 |
| 2. Planting | 14 |
| 3. Mulching | 15 |
| 4. Irrigation | 15 |
| 5. Fertilization | 16 |
| 6. Pruning | 16 |
| 7. Weeding | 16 |
| 8. Insects and Disease / IPM (integrated pest management) | 16 |
| 9. Off-Season Green Manure/Cover Crop (gm/cc) | 17 |
| Calendar of Annual Events at ECHO | 18 |
| Resources for Further Project Organization | 26 |

Introduction

ECHO (Educational Concerns for Hunger Organization)

ECHO is committed to equipping people with the agriculture resources and skills they need to reduce hunger and improve the lives of the poor. Our primary focus is to provide technical support and training to those seeking sustainable agriculture solutions for those in need all around the world. ECHO networks with organizations in 180 countries, and is proud to be able to share its expertise through programs benefiting the local community.

ECHO Community Garden Assistance Program: Domestic and International Communities in Agriculture

ECHO continues to be motivated by agricultural and community-based needs and strives to make its technical resources available to both global and domestic organizations. Through the Community Garden Assistance Program, an expansion of our organization within southwest Florida, ECHO offers resources such as basic trainings and consultation for local garden projects.

A unique perspective that ECHO brings to the domestic community gardening movement is a perspective of agriculture shaped by our work with small-scale farmers in many of the poorest regions of the world. We seek to provide an opportunity for practical and affordable ideas to be shared and communicated across the globe. This often takes the form of low-cost and low-input recommendations, which typically include the use of nutritious tropical perennials and subtropical plant varieties as part of a sustainable agricultural system.

It is our hope that this toolkit will motivate you to discover the diversity of resources available within your community to meet the felt needs of your community, as well as promote inter-cultural understanding of issues regarding hunger, poverty, and justice in sustainable agriculture around the world.

Purpose

The purpose of this resource is to suggest several key considerations for beginning a small garden project. This information is meant to be a guideline to better assist you in the organization and implementation of particular elements crucial to making a garden project successful. While each element may initially require a significant time commitment, we believe that approaching these considerations thoroughly and creatively from the beginning will contribute positively to the sustainability of the project.

Getting Started

Beginnings: Ideas Meet Soil

So you want to start a garden project? Great! You have an idea and a passion—a vision for what a garden could bring to your school, community, or church. But how do you make your first shovel of soil a sustainable step in your community? We hope this Community Garden Toolkit will be a great starting point for you.



As You Begin

Defining your project is one of the first considerations for any community garden. In what direction do you want to take this endeavor? What needs do you hope to meet or purposes do you wish to accomplish? Creating opportunities to discover others who are interested in participating as well as developing leadership for projects are two important initial steps in this process.

1. Who Is Interested?

The mailman down the street, the home-schooled children up the road, a group of teenagers from a nearby school, or the Master Gardener volunteer next door—find out who is interested in learning more about growing food, working outdoors, sharing land, and creating a garden project. Determine at least two primary means of contacting these individuals (e.g. e-mail, phone, mobile texting, personal communication).

2. Who Will Lead?

Identify key individuals before any seeds are in the ground! These individuals should exhibit strong leadership qualities such as an ability to organize and delegate tasks, teach yet empower others, and relate well to community members. A simple development principle to keep in mind is that, in order for a project to succeed, the individuals involved in that project must have a vested interest in the project and feel like their contributions are meeting needs.

Forming a “community garden leadership team” of several individuals who are committed to seeing the project through a determined amount of time will greatly enhance the overall impact and success, of your project. Feel free to exercise creativity in naming this group of committed leaders. Starting a garden project is not an easy task for one individual; being aware of this will prevent you from allowing the responsibilities and duties of all areas of a project to fall on the shoulders of a single individual.

3. Purpose & Goals

Who? What? Where? When? *Why!* The ‘why’ of your garden project is of the utmost importance as it will answer the questions of curious onlookers, interested students, and reluctant community members. Clearly communicating and displaying the purpose of your project provides an opportunity for others to understand what you are doing and to join in your efforts. People will get excited about your project when they come to share your vision for it. Remember that gardens permit a lot of creative expression, which can allow you to effectively connect with neighbors or coworkers to communicate your vision. Consider creating fliers, hand-painted garden signs, or hosting a natural material sculpture contest for a group of university art students; thousands of possibilities exist!

You may also want to consider what goals you hope to accomplish as part of the garden project’s vision. Consider this brief, non-comprehensive list:

- To educate in the areas of food production, agriculture, and inter-cultural studies.
- To cultivate marketable Farmers’ Market produce.
- To foster community.
- To provide practical experience in agriculture.
- To supplement a local food bank or school cafeteria.
- To provide jobs for unemployed individuals.
- To promote intergenerational learning.
- To provide supplemental food for individual households.
- To increase awareness in nutritional crops.
- To provide life skills training.

4. Local Support & Sustainability Concerns

Building enthusiasm for your project may involve inviting other businesses, local leaders, and gardeners to have an opportunity to contribute to your purpose and goals. Consider what options exist within your community to provide assistance in the areas of education, training, and financial assistance.

Local Treasures

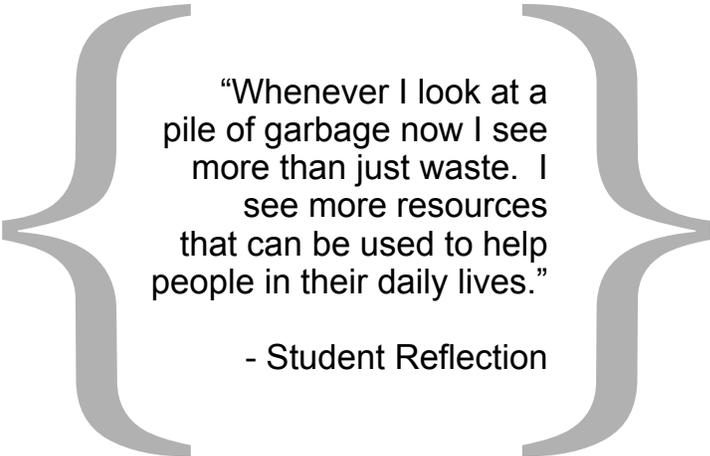
The best place to start? Have a conversation with your next door neighbor. Many of the individuals you interact with on a daily basis may have a skill or connection in an area that would provide more opportunities for your project. Seemingly ordinary people, when asked, may have something extraordinary to contribute!

Education & Training

Visit local garden projects or small farms that are in your area. Talk to those who have already experienced some of the things you are considering. These individuals may be able to offer suggestions that are more specific to where you are. On an institutional level, an excellent educational resource to consider is your County Extension Office. Large counties will often have a Master Gardener volunteer program through their local extension office that is another beneficial educational resource. Consider as well any garden clubs, plant societies, or community service organizations that may be able to assist in agricultural training.

Availability of Resources

Locally, you may find businesses that are interested in contributing to your project; you just have to provide them with an opportunity to be involved. Consider businesses which supply compost,



“Whenever I look at a pile of garbage now I see more than just waste. I see more resources that can be used to help people in their daily lives.”

- Student Reflection

mulch, and plants. Local landscapers, mechanic shops, and recycling centers may be able to contribute various materials such as plant waste or used tires. Consider also what you already own that may be useful in your garden.

Volunteer Support

Under the direction of a solid leadership committee, your garden project is off to a great start; however, encouraging opportunities for other community members to become strong contributors to the project as volunteers is an essential element to its sustainability. Often times the only motivation a person needs is to simply be asked for help. Most people are likely to participate when asked directly. Consequently, volunteers need to be recognized. Affirmation of their contribution to the project goes a long way to instill a sense of belonging, ownership and purpose. Create opportunities to show appreciation and to celebrate the efforts of everyone involved in making the garden what it has become.

Financial Assistance

Generating financial support for a garden project may take a variety of forms. Determine what opportunities are available to you. You may want to consider the following sources:

- Hosting a dinner event to share about the purpose, goals, and vision of your project to local community members.
- Providing an opportunity for local businesses and social service clubs to learn more about the project and make a financial or product donation.
- Participating in a local Farmers' Market.
- Apply for a grant.

Grants provide an opportunity for you to showcase your project and earn monetary compensation in return. This can be an important option for additional funding, particularly for U.S.-based garden projects. Grant opportunities for agricultural projects can be found on the Internet, through social service organizations, government grants, and businesses.

Here are a few grant resources to get you started:

- American Community Gardening Association, www.communitygardening.org
- Green Education Foundation (GEF), www.greeneducationfoundation.org
- National Gardening Association, www.kidsgardening.com

5. Other Considerations

Other important considerations include a variety of environmental concerns, publicity events, options for maximizing financial resources, and preemptive actions for a safe and shared community environment.

Garden Site: The area in which you choose to create a garden should reflect your purpose and take into consideration the number of workers required to maintain it successfully. Start small! There may be opportunities to expand your garden site in the future if a solid foundation is created early on. Celebrate even the smallest sidewalk garden project and look forward to opportunities for expansion when you have allocated the resources to do so.

Accessibility of Water: Before choosing an appropriate site for your garden, it is important to consider what your primary source of water will be. Is there a local water source such as a spigot? Will you have to hand water? Are there rooftops from which you could collect rain water in barrels? If you have resources to purchase an irrigation system (bucket drip kits are a low-cost option), determine how feasible it would be to incorporate these into your project.

Plant and Soil Life: Choose appropriate plants for your environment. Many traditional American vegetable crops are difficult to grow in the subtropics, especially in South Florida's hot, humid summers. Explore local parks, gardens, and organizations like ECHO for ideas of edible and nutritious subtropical plants. Also consider the soil in which you will be working. What type of soil is it? What amendments

will you need to add over time to maintain healthy plant growth? Cultivating healthy soil will add to the sustainability and will be explored further in a following section entitled, “Garden Activities”.

Container Gardens: A unique means of starting a garden project is through the use of recyclable containers, known affectionately as “container gardening.” Container gardening is a feasible option in areas with little or no access to arable ground. Portable and inexpensive, containers are a protected environment for growing vegetables.

* A resource on Container Gardening is available in the Appendix of this resource.

Safety: Working the land is a challenge and requires persistence and an intuitive mind. When your project involves individuals with varying degrees of experience in agriculture and using tools, clearly communicating the proper use and maintenance of tools and equipment will help prevent accidents. In addition, holding a “Garden Meeting” periodically to collectively inform those involved in your project of some of these issues will make your project more successful.



Publicity: Tell your story. One of the most impactful elements of any project is the value of personal experience. The uniqueness of your project will come through as volunteers, students, and on-lookers communicate what it has meant to them. Creating opportunities such as ‘garden celebrations’, to bring all those involved, in addition to those not involved, are avenues through which these stories can be communicated to a greater audience. Consider connecting your project to the local community by hosting training workshops or other events such as garden competitions (garden art, best produce, edible art projects, etc.)

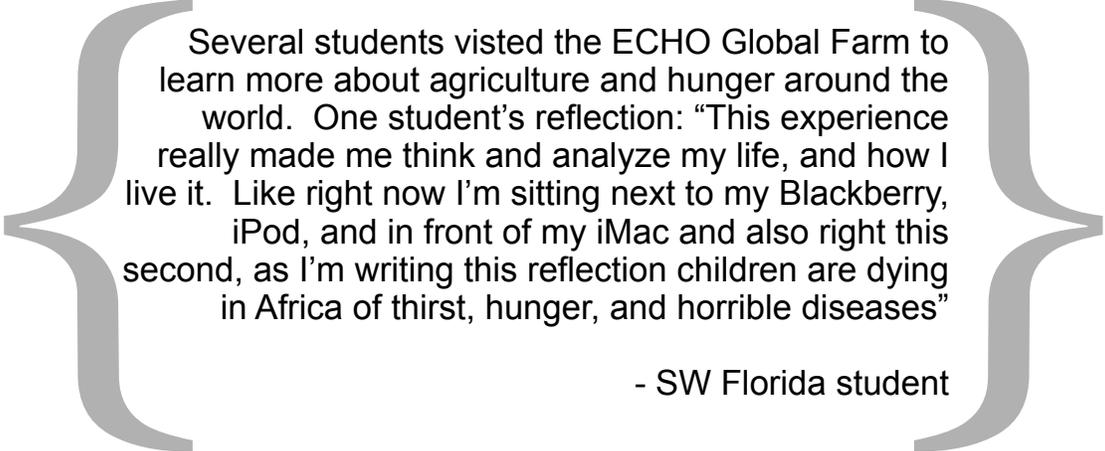
Education: A garden is an open blackboard; you teach the lesson with every planting, weeding, and harvest day. Take advantage of these opportunities to share the knowledge that each volunteer brings to your project. This process may take a variety of forms: community workshops on basic gardening principles, curriculum design for classroom garden lessons, and mentoring opportunities, to name a few. Beyond the basic education in lessons of horticultural and agriculture, remember that your project has the potential to teach a variety of skills—in the areas of creative arts, management, construction, among others.

“Actually seeing simple machines at work in real life and the real purpose of having animals on a farm are what helped me make connections to prior knowledge. Now knowing that anything can grow from very little soil and a simple soda can let me realize anything is possible if you try hard enough.”

- Student Reflection

Keep in mind that your project is also an opportunity to invest in an individual and his or her personal development. A community as a whole faces unique challenges in development without development of the individual first. Cultivating leadership, responsibility, and an understanding of one’s strengths and weaknesses in working collectively fosters a positive environment for personal development.

Ultimately, each of the above mentioned elements will contribute to the sustainability of a garden project. It is important to recognize the wealth of resources available around you, many for no cost at all. What most commonly becomes a barrier is a matter of recognizing them as such. When it seems financially or logistically impossible, take heart—and a walk down your street with a new set of eyes, to find potential and possibility in the ordinary.



Several students visited the ECHO Global Farm to learn more about agriculture and hunger around the world. One student's reflection: "This experience really made me think and analyze my life, and how I live it. Like right now I'm sitting next to my Blackberry, iPod, and in front of my iMac and also right this second, as I'm writing this reflection children are dying in Africa of thirst, hunger, and horrible diseases"

- SW Florida student

Schoolyard Gardens: Southwest Florida, United States

'Going to school' for one class of third graders means digging in soil, taste-testing blueberries, and burying pumpkins—not just homework, books, and recess. Their classroom? One that has been created with their very own hands. 'Wait a minute!' You're thinking, 'They built their classroom by themselves?' Yes; with shovels, wood, rakes, recycled tires, soil, and paint—It's their living edible garden classroom, and it is right outside the classroom the school has provided.

Let me introduce you to these elementary school students. Hardworking, eager and diligent, these third graders have grown and nurtured a variety of plants under the guidance of the green thumb of their teacher. Some of these include katuk, a delicious addition to a salad with a light green pea taste, and a tree which produces star-shaped fruits known as carambolas. Over the past six years this garden project has been the canvas for a variety of different classroom projects—most recently an 'edible plants' project. Not only are the students involved in planting the crops, they are young passionate researchers, too—determining what each plant needs and when it can be planted. Two raised beds are the focal point of the garden and the site of many teachable moments for their teacher. His favorite lesson to teach in the garden? It involves a pumpkin, paper, a plastic bag, and food scraps from each nutritional food group. Another unique element of this garden project is that it involves the whole school community. Growing in popularity, a pond and additional plants have been added to the school courtyard landscape. Pre-Kindergarten students feed the fish in the pond and the fifth graders monitor the pond water levels while providing general maintenance around the area. Everyone is looking forward to the addition of edible plants throughout the courtyard, making it an 'experience' to walk through the area.



Wisdom from a green thumb: This teacher's hard work does not go unnoticed by his students nor the school administration. Here is a tidbit of encouragement and wisdom from his experience with school garden projects: 'Share the responsibility and the wealth that comes from this. Involve as much of your school community (students, staff, parents) as you can... The more hands the better!' Amidst allspice, broccoli, tropical pumpkins, and carambola, the young researchers and gardeners of this southwest Florida elementary school are learning life lessons and experiencing the natural world around them in an interactive and intriguing environment.

Context: Globally and Locally

Why begin a community garden? Why invest the time, energy, and resources required for a project? Throughout history, social and cultural needs have been met by various community-oriented initiatives. When



basic human needs are consistently unmet, however, the unmet need causes repercussions throughout society as a whole. Across the globe, communities face the challenges of providing food, clean water, clothing, and shelter. Hunger, malnutrition, and social instability slowly gain prominence in these societies. We ask ourselves, 'How do we cope in difficult situations such as these?'

What is your response? What are the felt needs in your community? In what ways will your garden project contribute to the stability of food systems, wellness and education, and economic stability for those involved? Regions throughout the United States are not immune to the repercussions of hunger and social instability.

“Things that we, as the American people, consider garbage are considered a life-saving tool. Even though having twenty red ant bites on my hand was very painful, I didn't let it bother me; I brushed them off, and continued to work, because I came to realize that my minor pain, was nothing compared to the pain of a starving child, or the heartache a mother experiences when she knows there is nothing she can do for her child”

- Student Reflection

Engaging Perspectives



While a garden is a teaching tool in a variety of hands-on ways, reflecting on those experiences is just as much a valuable component of engaging the development that is also occurring within an individual or within your community. Consider creating opportunities which expand the scope of what you are accomplishing locally to include regional, national, or global issues and perspectives. A few ideas for accomplishing this include: hosting an evening discussion in the garden on small-scale agriculture, inviting an overseas worker to share about his or her own experiences in another country, or cooking a meal using typical ingredients from a particular country and produce from your own garden.

While you strive to meet these needs, consider sharing one another's stories. Seize opportunities to learn from older generations and to teach passionately to younger generations. Celebrate culture, faith, and commonalities in unique ways. Over time, you will begin to see how stewarding your resources, both socially and environmentally, begins to fill the felt needs within your community.

Community Gardens: Mozambique, Africa



As the sun rises, another early morning of planting begins in a small rural town in Mozambique. Several women from this small community migrate to their gardens—small plots of land dotted with Moringa and papaya trees, onions and peanuts. As they come, they bring strong hands, initiative, warm smiles, and plastic containers filled with water to feed the raised beds of crops in the areas around them. This is their hope, and the hope of those they care for in their community.

This rural town of approximately 20,000 people is fairly isolated and the community often faces the challenges of obtaining a consistent supply of nutritious foods. Fields may be filled with maize (corn), yet they do not display much other plant variety. Many friends and family members of the women just mentioned are struggling to receive the

nourishment they need to fight the symptoms of HIV on a daily basis. At such a time as this, the men and women of a local church in this community have come together. Their focus: to teach the community about the nutrition in plants and to help the community grow nutritious food to supplement the diets of those in need in their community.

This village has been transformed by its people. The land has been worked into several raised beds, an area approximately 24 feet by 24 feet, from which a variety of perennial and annual vegetables are flourishing. Each garden area is the responsibility of one family.

Small garden projects throughout this village involve and affect entire communities. What you would not realize initially is that many of the smiling faces you see tending to the crops in these gardens are very ill. While many individuals suffer from the effects of HIV on the inside, their gardens radiate hope to their bodies on the outside, penetrating their inner souls.



Agricultural Management Considerations

Gardening can be an important activity in almost all areas of the world and each area has unique advantages and disadvantages. In the tropics and subtropics, typical advantages include lots of sunlight and warm temperatures for year-round production and a wide diversity of crops that can be grown. In temperate climates, typical advantages include the ability to grow plants that require colder temperatures and a winter to periodically kill many insects and disease organisms. One of the keys to success is matching the right crop to the right season. In this section are some general challenges along with ideas for success.

Common challenges and problems to gardening in the humid tropics and sub-tropics:

- Poor soil fertility
- Low soil organic matter content
- Seasonal flooding/high water table
- Nematodes
- No hard prolonged freezes to kill off insects and insect eggs
- Weed pressure during the rainy season

Keys to success in the humid tropics and sub-tropics:

- Improved raised beds
- Covering the soil with mulch
- Utilizing amendments like compost, manures, or fertilizers
- Controlling weeds (one weed going to seed can result in thousands)
- Consistent watering
- Importance of increasing organic matter in the soil and “life in the soil”
- Matching crops to the seasons
- Take advantage of edible perennials in the garden
- Using cover crops and crop rotation

Common challenges and problems to gardening in the arid and semi-arid tropics:

- Poor soil fertility
- Low soil organic matter content
- Extreme temperatures
- Drought and water stress
- High winds

Keys to success in the arid and semi-arid tropics:

- Covering the soil with mulch
- Utilizing amendments like compost, manures, or fertilizers
- Increasing soil organic matter and “life in the soil”
- Utilizing sunken beds and planting stations
- Controlling weeds
- Consistent watering
- Choosing the right crops
- Take advantage of perennials in the garden
- Using cover crops

1. Planning

Know the season

Plan out your gardening events according to your local seasons—rainy season, dry season, hot season, or cool season. Research local weather data or talk to local farmers to get a good idea of rain patterns, temperature patterns and flooding or drainage information for the area you are going to use for the garden.

Know the crop

- Enjoy researching plants and getting to know their characteristics.
- Match crop to season; best to categorize plants by warm season, cool season, rainy season, and dry season.

Designing A Plan

Think about when to sow and harvest, labor requirements, water requirements, pest potential, market potential and other factors.

- Where will each crop be planted? Consider crop rotations, proximity to walkways, need for a trellis, etc.
- What preparation must take place—e.g. reforming beds, trellis construction, adding amendments, repairing irrigation, mulch before or after planting?
- Develop a plan for adding manures or other fertilizers.
- Develop a plan for controlling weeds, pests and diseases.

2. Planting

Seeding

- You must decide whether to Direct Seed (DS) or Transplant (TP) each of the crops you have chosen to grow in the garden. Researching each plant will help you make an informed decision. In general, we encourage transplanting most vegetables except for beans, carrots, pumpkins, squash, cucumbers, melons, okra and other large seeded crops.

Starting Transplants

- See first; prepare bed later.
- Choose appropriate container or seedbed; guidelines for commercial seed trays:
 - 1 ¾" X 2 ¼" cells; excellent for lettuce, cabbage, and broccoli.
 - 1 ¾" X 4 ¼" cells; all purpose tray for tomatoes, peppers, can also be cabbage and broccoli, rhubarb.
 - Tray without cells filled with soil (around 2") for thickly sowing onions.
- Make sure to properly label containers; include plant name and date seeded.
- Make sure potting soil is moistened in advance of seeding.
- Properly pack soil to reduce settling.
- Plant seed at proper depth (1 cm for most seeds or twice as deep as the seed is wide).
- Cover seed and pack firmly.
- Water gently.
- Place trays in an area that gets enough sun but not so much it dries out in a day.
- Water daily.
- Thin seedlings to one plant per cell at appropriate time (i.e. young enough not to damage adjacent plant).

Direct Seeding

- Prepare planting area first— irrigate planting area in advance (never seed into dry soil).
- Overseeding is important in the field, esp. in small plots where thinning is manageable.
- Seed deeper in field than you would in transplant trays, except for small seeds.
- Pack the ground firmly.
- Water seeded area thoroughly.

- Protect if necessary from wildlife.
- Always have your field plantings labeled and recorded in notebook—map, plant, and date planted.

Planting strategies to consider:

- Encourage experimentation with different planting methods.
- Relay planting—planting before last crop is harvested.
- Succession or sequence planting—following on the heels of the last crop; this is easiest.
- Monoculture—individual stands.
- Intercropping—e.g. onions/cabbage, pigeon pea/ sweet potato, marigolds and tomatoes.

Spacing

- You can use different planting guides (such as the IFAS recommendations included in this manual in the reference section).
- Spacing recommendations from planting guides are often further apart than necessary for small gardens; if anything plant slightly closer.
- Tight spacing reduces weed pressure.
- Wider spacing can reduce diseases in humid climates or during the rainy season.

Transplanting

- Ensure moistened soil in advance of planting.
- If possible, add a small amount of subsurface manure/compost/fertilizer in the bottom of the planting hole. This can be done in advance if you know where the plant is going or can be done at the same time as transplanting—better in advance, but harder to coordinate.
- Prevent air gaps just below transplant.
- No mulch or coarse organic matter in transplant hole, only fine organic matter like cow manure or fine screened compost. No horse manure or wood chips in the bottom of the holes.
- Plant to proper depth.
 - Solanaceae crops (e.g. tomato, pepper) to first true leaf.
 - Crops with a crown (lettuce, cabbage, strawberries) should be planted with the crown about soil level.
 - Most others species to cotyledon or 1-2 centimeters above existing potting soil.
- Pack soil around transplant well ensuring the soil is packed well around the roots.
- Water! Water! Water your transplants within an hour of planting to remove air pockets and reduce transplant stress.

3. Mulching

- Mulching helps stabilize soil temperatures, saves and conserves water, helps control weeds, reduces soil born diseases, protects against erosion, encourages root growth, encourages soil life, and can add nutrients to the soil.
- Mulch options: hay is excellent for vegetable beds; leaf/wood chip mulch, leftover crop residues, rice straw, pine needles, horse manure/wood shavings, pine needles (sold as pine straw).
- Usually easier to mulch after planting than before. A tip: Place pots or containers over new transplants to make mulch application easier; then pull pots off top of plants after placing mulch.
- Mulch should not touch the vegetable stems as this may encourage rotting.

4. Irrigation

- Be attentive to weather conditions—clear, hot days; overcast; humid and still; windy and

- dry; heavy dews; rain and how much.
- Know the seasons; know which months have the highest evapotranspiration rates.
- Check the moisture level of the soil with your hands.
- Match it to the stage of your crop(s)—small plants have shallow roots needing more frequent watering while old plants ready for harvest have deeper roots with less moisture needs

5. Fertilization

Fertilizing can occur through organic and inorganic means. Fertilizing Garden Vegetables (Annuals).

- Pre plant and early applications are critical for success.
- Subsurface application is preferred, but is more work
- When combining manure with fertilizer, always place fertilizer in below the manure or compost to protect the microorganisms from high salt concentrations.
- General recommendation is ½ to 1 qt. per planting hole/station of manure and/or compost.
- Consider side-dressing with fertilizer according to the appropriate rate or side dress early with good quality chicken manure, depending on crop (not on lettuce or crops you plan to eat raw).

Fertilizing Perennials

- Apply a 6 month controlled release fertilizer, two times per year).
- Fertilize bananas and papayas more frequently (every 2 months recommended).
- Commercial and organic fertilizers may be used.
- Application rates will vary according to species and size and type of product used and timing of year.
- Be sure to be aware of any ordinances regarding the use of particular fertilizers in your area.

6. Pruning

Purpose of Pruning

- Remove dead, diseased, cross-branched or undesirable stems/branches.
- Shape the plant or control its size.
- Prepare the plant for the next fruiting season.

Each plant needs to be pruned in its season.

- Perennial vegetables can be pruned almost anytime of the year, except no drastic pruning before the cold season or the hot dry season.
- In general, prune fruit trees as soon as the fruit harvest is finished.

7. Weeding

- Weekly management is best.
- Hoe, pull, or spray herbicide.
- Know how the weeds reproduce (seed or vegetative).
- Get weeds out before they produce seed.
- Schoolyard gardens will need to come up with a plan for managing weeds during summer.
- Use cover crops for fallow areas.

8. Insects and Disease / IPM (integrated pest management)

- Best strategy for pest problems is to raise healthy crops.
- Scout weekly.
- Generally do not spray for fungus or bacteria.
- Soft-bodied aphids and white flies are controlled easily with oil.
- Good crop rotation can help control pests and diseases.
- Planting at suitable times can control some pests and diseases; as a general rule pests and

diseases are most active during hot, humid weather so plants that can resist or withstand attack should be planted during these times.

- Removing weeds and plant residues can control some insects by breaking their life cycle or removing places for them to lay their eggs.
- Know your local beneficial insects and animals and encourage them in the garden; beneficial include: lady beetles, ground beetles, rove beetles, praying mantis, and dragon flies.
- Plant strong smelling plants like garlic, mint, and marigolds in the garden or around the borders.
- Plant a diversity of plants to provide a healthy ecosystem.

9. Off-Season Green Manure/Cover Crop (gm/cc)

The off-season (extreme heat, extreme rain, cold, etc) is an excellent time to sow a gm/cc to protect and improve the vegetable beds for the next intensive growing season. In schoolyard gardens, this can correlate well with school breaks for students and teachers.

Sowing a cover crop can reduce labor by controlling weeds, protect the soil from erosion, protect the soil from high temperatures, help to conserve soil moisture, and produce mulch on site. Many legumes have a unique association with specialized bacteria that convert atmospheric nitrogen into plant available forms of nitrogen. These bacteria live in the soil and colonize the root systems of legumes. Therefore, gm/cc's can have a great ability to enhance soil fertility by adding more nitrogen to the soil.

A cover crop can be sown on top of the garden beds once the produce has been harvested. Before the next planting season, the cover crop can be killed by cutting the base of the plant near ground level. The green matter dries down in place and the vines over the walkways can be cut back and placed on top of beds as well. Over the next couple months, the cover crop will break down, adding organic matter to the soil while protecting the ground from the sun and reducing the evaporation rate from the soil. Vegetable transplants can be planted directly into the mulch cover and less labor is needed to cover the soil to prevent weeds.

Some common GM/CC's include:

- Velvet bean (*Mucuna pruriens*) is a great cover crop that will out-compete weeds once the rains start and the heat arrives; it can be direct seeded.
 - A bush velvet bean or vining type can be used. The bush type will stay on the bed and is easier to manage, but less smothering. Sow the bush velvet bean at 6" X 12".
 - The vining type is best for smothering weeds, but can be very aggressive; check periodically to make sure it is not taking over walk ways or other plants. Sow at 12"x12".
- Jack bean (*Canavlia ensiformis*) is a more arid tolerant green manure/cover crop; sow at 6" X 12".
- Lablab bean is a very good GM/CC that covers the ground well and is fairly tolerant of dry or wet conditions; sow at 6"x12".
- One section of gm/cc's can be saved from cutting to allow plants to produce seeds to harvest and store for next year's cover crop.

Calendar of Annual Events at ECHO

This is a sample guide for maintenance and garden activities based on the four different seasons in SW Florida.

Overview of Garden Activities at ECHO:

- Fall (September through November)
 - Fall is the start of the “traditional” vegetable season in Florida. Though commercial growers begin in August, success is most likely when starting in September.
 - Sow warm season crops beginning in Sept.
 - Sow cool season crops beginning in Oct.
 - Sow winter season crops at end of Oct. or beginning of Nov. (these are especially cool season crops like spinach, carrots, and peas)
- Winter (December and January)
 - Cool and winter season vegetables thrive (e.g. cabbage, cauliflower, spinach, carrots, peas, lettuce). There is a risk of freeze damage on warm season crops like tomato, but can still succeed with these.
 - Sow more cool season crops in December and January like broccoli, cabbage, and lettuce.
 - Fall tomatoes and peppers may be finishing but still grow well
 - Risk of freezing temperatures may necessitate protecting plants. See January section in Calendar section for cold protection ideas.
- Spring (February through May)
 - Spring is early in Florida
 - Last sowing of cool season crops like broccoli and lettuce usually occurs in February
 - Spring planting of warm season crops occurs in February and March
 - April and May usually hottest and driest months during the year.
 - Mulch and irrigation are especially important due to frequent dry spring weather
 - Sow fallow crop on vegetable beds in May or June.
- Summer (June-August)
 - Garden focus becomes perennials and tropical based crops like the perennials greens: chaya, Moringa, and basket vine; also plants like pigeon pea, papaya, sweet potato
 - Weed pressure can be enormous
 - Unused vegetable beds can be planted to green manure/cover crops

Monthly Details for ECHO:

September

September is usually the last month of the rainy season, though a few rains can be expected early in October. This is the time of year when we begin annual gardening. The focus is on warm season vegetables like tomatoes, peppers, and green beans. Garden bed preparation—essentially weeding the summer weeds and reforming and re-mulching beds—and planting seeds for later transplanting into the garden are the main activities.

- Plant seeds of selected warm season vegetables in trays for transplanting later. Refer to planting guide for list of warm season vegetables and which ones are normally transplanted and which ones can be sown directly later.
- Cut down any cover crop vines that cover the vegetable beds and let them die in place for mulch.
- Remove weeds from all gardens.
- Reform garden beds as necessary.
- Irrigate gardens if needed.
- Prune perennial vegetable hedgerow around garden beds to allow new growth to occur before cooler winter weather when growth slows or stops.

Notes:

October

Plant! Plant! Plant! This month is characterized by planting vegetables. Hopefully you have transplants ready to go in this month or you can direct seed plants like squash, melons, beans, and carrots.

- First week of October, fertilize all in-ground perennials with either cow manure or fertilizer.
- Transplant warm season crops like tomatoes, eggplants, and peppers into garden beds.
- Use additional mulch for vegetable beds.
- In early October, start seeds for cooler season vegetables like broccoli, cabbage, and lettuce.
- Direct seed cooler season plants into garden beds that require direct seeding such as carrots and peas ('Mammoth Melting Pod' excellent variety, but remember to build trellis).
- Keep gardens well-weeded, watered, fertilized and covered with mulch.

Notes:

November

This is usually a pleasant month to tend the garden. The summer weeds should all be gone. The warm season vegetables should be growing well and the cool season vegetables that were seeded in trays earlier are now ready to transplant into the garden.

- Monitor all garden plants for nutrient deficiencies, disease, or insect problems.
- Transplant cool season vegetables that were sown in trays.
- Fertilize annual vegetables.
- Keep gardens well-weeded, watered, and mulched.

Notes:

December

This month marks the beginning of winter. It is also the time of year that you begin to see the fruits of your labor from the vegetable garden. Tomatoes, eggplants, peppers, squash, zucchini, green beans, and lettuce are often ready for harvest.

- Begin to make a succession plan for the vegetable beds for spring season.
- Cool season vegetables such as lettuce, broccoli, and kale grow well.
- Be careful not to over water perennials during cool weather.
- Keep up with fertilization of vegetables.
- Remember that a frost or freeze can occur this month.

Notes:

January

January is the month where we normally get our coldest temperatures. Plants may be damaged or killed by a freeze (air temperature is at or below 32 degrees) or frost (leaves of plants fall below 32 even though the air is warmer and ice crystals form).

- Irrigate the garden heavily two days before a predicted frost/freeze event.
- If the weather forecast says a frost or freeze is possible, the gardens may need covered with frost cloth or thick covers while plants are young.
- Watering the soil to build up a reservoir of heat in advance of the cold weather is the easiest and best protective measure, but may not be enough if it is a hard freeze or frost.
- Seed the spring vegetables in trays (tomatoes, peppers, eggplants, cabbage, broccoli, zucchini, squash, lettuce, etc.)
- Keep up with fertilization of annuals.
- Direct seed green beans if desired.
- Be careful not to over water perennials during cool weather.

Notes:

February

Spring is coming. The first week of February we recommend fertilizing all in-ground perennials with fertilizer and/or manure. February is usually an ideal month for planting more vegetables, both warm and cool season vegetables.

- Fertilize all perennials and vegetables as needed.
- Plant vegetables as they are ready for transplanting into garden. If sowing more vegetables especially at the end of the month, focus on warm-season crops like tomato, pepper, eggplant, okra, watermelon, and green beans.
- Keep gardens well-weeded, watered, and mulched.

Notes:

March

March is the time to prepare for our dry season. Mulch! Mulch! Mulch! This is the best time of year to re-mulch all the perennials in the garden in preparation for the two hottest and driest months of the year. In addition to mulching, because the gardens are irrigated, replace any dead or dying perennial trees or shrubs now that danger of cold weather is past. Continue to tend the vegetable gardens and adjust watering and fertilizer rates as necessary for growing tomatoes, beans, etc.

- Mulch! Mulch! Mulch! Reapply 1-2" of wood chip mulch around all perennials in the gardens.
- Continue to use grass, pine "straw" or hay mulch (our preference) for annual vegetables as well as perennials.
- Irrigation length and frequency usually increases during this month.
- Insects and disease problems can become issues as the temperatures and humidity increase.
- This is the month for direct sowing pigeon peas in raised beds. Sow seeds 6" X 12". This makes a great intercrop with sweet potatoes.
- This is usually one of the last months for planting annual vegetables as the temperatures start to be too warm. At this point, only warm season crops like tomato, pepper, okra, eggplant, tropical pumpkin, and sweet potato should be transplanted into gardens.
- Continue to add manure to fast-growing and nutrient demanding plants like bananas and papayas.
- Replant any missing perennials in the hedgerows or dead or unhealthy plants in the gardens (e.g. replant papayas, pineapples, cranberry hibiscus, Okinawa spinach, Malabar spinach, etc.).
- Add new trees/shrubs as desired (this is best done March-July because of irrigation and long warm season to help in establishment and growth before next winter).
- Continue with fertilization of annual vegetables.
- Keep gardens well-weeded, watered, and mulched.

Notes:

April

This can be a very hard month on plants due to the clear skies, lower humidity, and very warm and sometimes breezy days. Our three critical months for irrigation are April, May, and often June (or until the rainy season is underway). The evapotranspiration rate is highest in our area during the months of April and May. This means that plants and soil are losing a great deal of water, often much more than is being replenished through irrigation and the occasional light rain. Mulching and consistent irrigation go a very long way in conserving soil moisture, reducing plant stress, and improving the overall health of plants and soils.

- Irrigate! Irrigate! Irrigate! Some Aprils do provide significant and needed rain, but in general this is a very hot and dry month.
- The vegetable garden should be yielding lots of produce
- New growth should be evidence on perennials from the increased temperatures, response to February fertilizer, and the irrigated or rain-fed soils.
- Cool season crops will begin to wrap up and suffer from the hotter days. This is normal as the season transitions.
- If looking for options, you can plant summer annuals like okra, eggplant, sweet potato, cowpea, Lagos spinach, Malabar spinach, tropical pumpkin, etc.
- Perennials should by now have plenty of new growth and be harvested for food and to control size.
- Keep gardens well-watered and weeded.

Notes:

May

Summer begins early in SW Florida. This month marks the transition into summer-like conditions where daytime and evening temperatures now make it very difficult for cool season vegetables to thrive. The focus of the garden moves more toward the perennials which flourish under these more tropical-like conditions. Fertilizer is usually applied to all perennials before the end of the month to be in compliance with our county codes.. It is very important to not get behind on irrigation as this month and April are usually the two hardest months on the Florida landscape. Depending upon your desire, it is also the month where you might begin sowing a cover crop for vegetable beds for the summer.

- Irrigate as necessary!
- Continue with summer planting. Plant cover crops (velvet bean, jack bean, lablab bean) on raised beds.
- It is very important that garden beds don't remain unplanted. Weeds will become a difficult challenge if beds are uncovered in the summer.
- Continue to harvest leaves from perennial greens. Prune as necessary to control size of plants.
- This is the last time perennials can and should be fertilized until October 1, in compliance with our local codes.
- Keep gardens well-watered and weeded.
- If weeds are difficult to control consider using a herbicide.

Notes:

June

Prepare gardens for the hot and wet summer. This means keeping up with the weeds, replacing missing plants that may have died or are not doing well, and pruning plants so that new growth occurs in desirable places. The focus is now on perennial plants, annuals that can withstand the heat and humidity, and the cover crops.

- Early summer rains are erratic and so irrigation is very important in between rains.
- Replant cover crops as needed if there are gaps from poor germination, pests, etc.
- Harvest greens for eating from perennials; constant harvesting is good for facilitating new growth.
- Keep weeds under control; the weed pressure during summer months is incredibly intense. Weed weekly if not using herbicide.

Notes:

July

The growth of plants is intense during the next three months. Keeping up with weed pressure and harvesting from perennials are the main activities during July, August, and September. Monitor cover crops in backyard garden raised beds.

- This is one of the easiest months to succeed with planting new trees due to the hot and humid weather.
- Monitor cover crops.
- Continue to harvest perennial greens.
- Many of the fruit trees will begin to bear fruit during this month—jackfruit, mango, Barbados cherry, etc. Enjoy!
- Usually irrigation systems can be turned off until September.
- Weed. Weed. Weed.

Notes:

August

This is a maintenance month in terms of keeping up with weeds and a “watch-it-grow” month. If the gardens are well-fertilized, mulched, and weeded, they should be flourishing. If plants are not flourishing during this month, there is likely a problem. This month, plants produce enormous biomass—generating plentiful new shoots, leaves, and stems.

- The sub-tropical and tropical fruit trees continue to bear fruit. Keep up and enjoy the harvest.
- Weed pressure is significant.
- There is usually ample soil moisture, especially with mulched beds, eliminating the need for irrigation.
- Cover crops should be out-competing weeds; make sure they do not take over walkways or other plants.
- Continue harvesting leaves from perennials.

Notes:

Reference Materials Index

American Community Gardening Association (ACGA)

www.communitygardening.org

ECHO (Educational Concerns for Hunger Organization)

www.echonet.org

FAO School Gardens

http://www.fao.org/schoolgarden/index_en.htm

Florida Vegetable Gardening Guide *IFAS Publication SP 103* <http://edis.ifas.ufl.edu/vh021>

Home Gardening in Cambodia

www.hki.org/research/Home%20_Gardening_Cambodia.pdf

Insect Management in the Home Garden Publication #ENY-476 <http://edis.ifas.ufl.edu/vh036>

Organic Vegetable Gardening Publication #CIR375

<http://edis.ifas.ufl.edu/vh019>

Starting the Garden With Transplants HS507

<http://edis.ifas.ufl.edu/pdf/VH/VH02700.pdf>

Vegetables for SW Florida in the Summer Months

<http://www.echonet.org/content/agriculturalResources/611>



Resources for Further Project Organization

Includes:

Brainstorming Guide A

Brainstorming Guide B

Brainstorming Guide C

Container Gardening

Nutritious Plant Highlights

Educational Resources for Teachers



Brainstorming Guide A: Defining the Project

List those who are interested in actively participating in a community garden project:

List those who are interested in supporting your project through specific means:
(For example, the local landscaper who would like to contribute left over mulch for your project).

Identify key individuals who would like to have a leadership role in the project:

The purposes of this project are:

- _____
- _____
- _____

Suggest three goals for your project:

1. _____
2. _____
3. _____

What needs do you hope to meet for individuals and your community as a whole?

Individual:

Community:

In what direction do those involved in your project want to take this endeavor?



Brainstorming Guide B: Proposal Checklist

Utilize the following checklist to better organize your garden project proposal. Take into consideration as many elements as possible which you feel are applicable to achieving your intended purposes and goals.

- Local Support: Interested individuals, businesses, civic groups

- Education & Training Opportunities

- Availability of Resources

- Volunteer Support: Organization, maintenance

- Financial Assistance

- Publicity: Opportunities to share your story

- Sustainability: Assessment and reflection



Brainstorming Guide C: Agricultural Considerations

Utilize the following checklist to better organize your garden project proposal. Refer to the discussion of each element in the Toolkit as needed during this process. Take into consideration as many elements as possible you feel are applicable to achieving your intended purposes and goals.

- Garden Site: What is the location and appropriate size?

- Accessibility of Water: What type of irrigation is needed?

- Research: What plants are appropriate for climate? Fertilization options?

- Soil Life: What type of soil will you be working with?

- Maintenance: What resources do you have available to accomplish this?

- Safety Considerations



An Introduction to Container Gardening

By Dr. Martin Price, Senior Agricultural Scientist and Founding CEO of ECHO
And Karyn Traum, Community Urban Garden Outreach Intern

Three Things Roots need for Maximum Growth

- Constant moisture
- Constant air
- Constant nutrients
- (You also need to prevent the sun and wind from directly hitting the roots. In some cases you will need to provide some way to support the plant.)

Why Garden in Containers?

- Can grow plants where there is no soil
- More attractive
- Get away from nematodes, soil diseases, rabbits
- No competition from tree roots
- Easier to water
- Nutrients don't wash away (except when rain exceeds capacity of the container)
- Portable (e.g. move to garage on a freeze night, move to featured spot when in full bloom)
- Can manipulate the root environment more easily
- Limited size and need for weeding makes it easier to get started/motivated

Frequent Watering is a Limitation

Steps to reduce need for frequent watering

- Larger containers with a reserve of water (in the bottom or in buckets)
- Water-absorbing polymer
- Make use of shade

Depth of Soil is not as Important as you Might Think

- For many plants depth is not as important as horizontal area for root growth.
 - Eave trough
 - Wick gardens
 - Shallow pool gardens

Ensuring Constant Presence of Air and Water in the Root Zone

- Very "light" soil mix
- Very shallow beds
- Suspension over a pool of water

Items to Have on Hand

Peters or Miracle Grow fertilizer, Dolomite, Fertilizer (e.g. 10-10-10) with micronutrients. Possibly water-absorbing polymers to enhance water retention



Nutritional Plant Highlights

If increasing nutrition is one of your project goals, consider introducing vegetables and fruits that contain significant nutritional elements. Be creative and informative when introducing any unfamiliar vegetable or fruit to those in your community.

Are you familiar with these highly nutritious vegetables?

MORINGA

Ben Tree, Benzolive, Horseradish Tree, Malunggay, Drumstick Tree

Moringa oleifera

Moringaceae – Moringa family

ORIGIN – The Moringa tree, known also as the Horseradish Tree, is native to northwestern India. Moringa is widely grown, however, in other parts of the old- and new-world tropics, including tropical Asia, many regions of Africa, Indonesia, and South and Central America.

USES – Moringa has a variety of uses. Its leaves, flowers, and pods are a food source for humans and animals. The flowers are a good nectar source for honey, and the seeds are a rich oil source for cooking and lubricant uses. The roots are a source of a spice resembling horseradish, and many parts of the plant have been used in medicinal preparations. Whole plants have been used as living hedges, fences, and windbreaks. The wood is very soft; useful for paper but makes low-grade firewood and poor charcoal.

Attracting attention in recent decades is the use of the dried, crushed seeds as a coagulant similar to the chemical alum. Even very muddy water can be cleared when crushed seeds are added. Solid matter and some bacteria will coagulate and then sink to the bottom of a container. The cleaned water can then be poured off and boiled. Use 100 milligrams (about 1 to 1 1/2 seeds) of crushed seed to clean 1 liter (1 quart) of muddy water. Fresh leaves are a nutritious animal fodder.

COOKING AND NUTRITION – Moringa foliage and fruit pods are rich sources of calcium and iron, and good sources of vitamins B, A, and C (when raw) and of protein (including goodly amounts of the sulfur-containing amino acids, methionine and cystine). Cook and eat young tender shoots, whole young leaves, and leaflets of older leaves like spinach. Blossoms are edible; they taste like radish. Use sun and oven-dried flowers and leaves to prepare a tea. Store dried leaves as future soup supplements. Cook young pods for a vegetable reminiscent of asparagus. Browning seeds from mature pods in a skillet, mashing them, and placing them in boiling water causes an excellent cooking or lubricating oil (very similar to olive oil) to float to the surface. The oil preserves well although it does become rancid with age. To prepare a horseradish sauce, pull small trees after a few months, scrape the taproot of its bark, and grind the root until fine. Mix 240 mL (1 cup) ground root with 120 mL (1/2 cup) vinegar and 1 mL (1/4 tsp.) of salt. Chill. Use sparingly; excessive use has been reported as potentially harmful.

KATUK

Star-gooseberry, Sweetleaf bush
Sauropus androgynus
Euphorbiaceae family

ORIGIN – Katuk is native to the lowland, rainforest understory of the warm tropics and is a familiar plant in home gardens from the wetter parts of southeast Asia.

USES – This perennial plant is popular for its edible leaves and young shoots as well as for its ability to survive under hot and humid conditions even occasional flooding. If shoots are planted close together with additions of manure and some shade, the bushes will form a hedge of edible leaves for year round consumption by families or for commercial sale.

COOKING AND NUTRITION – A 1/2 cup (100 gm) serving of fresh katuk leaves supplies 22% of the daily requirement for vitamin A and is a substantial source of vitamin C (138% of daily requirement). It also has value as a source of calcium and iron, elements often lacking in diets that do not contain enough milk. The new growth as well as the flowers and small fruits are all used for food. The fact that the greens retain their color and firmness when cooked make them valuable for sale to restaurants.

CHAYA

Spinach tree, Mayan spinach
Cnidioscolus aconitifolius ssp. aconitifolius 'Chayamansa' (Syn. Cnidioscolus chayamansa)
Euphorbiaceae – Spurge family

ORIGIN - Chaya is native to Mexico. It has long been used by the Mayans of the Yucatan Peninsula. The label “chaya” is derived from the Mayan name “chay” for this species. Chaya also is reported in portions of Honduras and Guatemala. It has been introduced in other tropical and subtropical regions including India, Ghana, Cuba, southern Florida, southern Texas, the West Indies and Hawaii. The highly sterile cultivated variety ‘Chayamansa’ is considered a derivative from the wild species, *C. aconitifolius*.

USES - Chaya’s young leaves and thick succulent stems make a tasty, nutritious, nonslimy vegetable when cooked. Both the domesticated strains, known as *chaya mansa*, and the wild forms, *chaya brava*, are edible. However, the wild forms characteristically possess stinging epidermal hairs that are highly irritating to the harvester’s skin. The entire plant may be ground, dried and used as animal feed. Mayans feed chaya leaves to chickens and chaya leaf meal has been developed as a chick feed in Ghana.v

COOKING AND NUTRITION – Chaya is a highly nutritional vegetable. It is a good source of protein; calcium, phosphorus, and iron; and vitamins A and C as well as niacin, riboflavin and thiamine. The leaves and stem tip materials normally are chopped into pieces before cooking like spinach. Chaya must never be eaten raw. Chaya contains cyanogenic glycosides, sources of cyanide poisoning. Cooking chaya in boiling water for five minutes or frying rids the stem and leaf materials of the poisonous cyanide components. Stirfry cooking probably is not adequate to eliminate the cyanides. Avoid breathing in the vapors produced during cooking chaya.

For more information regarding the use, cultivation techniques and nutritional content of other tropical and sub-tropical vegetation, please visit the ECHO website, www.echonet.org, and explore the resources available through the ECHO Seed Bank.



Educational Resources for Teachers

American Community Gardening Association: The mission of this association is to build community by increasing and enhancing community gardening and greening across the United States and Canada. <http://communitygarden.org/>

Caring for Planet Earth by Barbara Holland and Hazel Lucas. Designed for both parents and teachers to help teach children the need to care for our world. (Primarily used copies available.)

Church World Service, Resource Library available for you or your group to use in education, advocacy, promotion or worship. <http://www.churchworldservice.org/>

Florida Agriculture in the Classroom, a non-profit organization that develops and trains teachers and agriculture industry volunteers in its agricultural curricula and materials, which they in turn use to educate students about the importance of agriculture. <http://www.flagintheclassroom.com/>

Garden in the City, a 4-H leader's guide for urban gardening. The project is designed for youth and leaders who have had little experience with gardening and limited space. It is a step-by-step guide to beginning gardening. <http://hdl.handle.net/1813/3628>

The Growing Classroom: Garden & Nutrition Activity Guide by Roberta Jaffe and Gary Appel. A resource book for educators contains science, math, and language arts activities that you can do with your students in the garden.

Kid's Gardening by the National Gardening Association. The website full of resources including grant information and classroom resources. www.kidsgardening.org

Kid's Gardening: A Kid's Guide to Messing Around in the Dirt, by Kevin Raftery and Kim Gilbert Raftery, 1989. Plutz Press

Knowing, Caring, Sharing: Children Hunger & Poverty; An elementary & middle school curriculum teaching about world hunger and poverty with the goal of helping students take the step from knowledge and concern to action. www.heifer.org (Get Involved tab->Schools)

Life Lab Science Program Garden based learning that promotes a sustainable future. <http://www.lifelab.org/store-curricula.html>

Outreach, international network disseminates information on environmental and health issues for teachers and youth group leaders. A sample material packet can be found at <http://www.nrel.colostate.edu/projects/iboy/kids/outreach.html>. Additional resources are available by writing to Outreach at TVE USA, P.O. Box 820, Shelburne, VT 05482 or e-mail tveusa@together.net.

Oxfam America, Educational materials for people in the U.S. on issues of hunger and development. <http://www.oxfamamerica.org/publications>

Planting Seeds, Growing Minds by the California Association of Nurserymen. This curriculum is all about students participating in first-hand experiences and hands-on experiments as scientists, they will discover the basic needs and concepts of seeds, plants, flowers and trees. www.cangc.org

Population Reference Bureau, an organization that gathers, interprets and disseminates information on population trends. Among other things (charts, tables, handbooks, etc.) they put out an excellent DVD that strikingly demonstrates population growth since the dawn of man. <http://www.populationeducation.org/>

Schoolyard Garden Design, written to help teachers in urban elementary schools Alison Clarke, Rural

Urban Garden Program, 243 Rosedale Street, Rochester, NY 14607

Sowing the Seeds of Wonder-Discovering the Garden in Early Childhood Education by Life Lab

Through hands-on activities preschool-age children will engage all of their senses as they discover the joys of gardening. <http://www.lifelab.org/store-curricula.html>

World Hunger Education Service, exists to inform the community of people interested in issues of hunger and poverty, the public, and policymakers, about the causes, extent, and efforts to end hunger and poverty in the United States and the world. Also to further understanding, which integrates ethical, religious, social, economic, political, and scientific perspectives on hunger and poverty. <http://www.worldhunger.org/index.html>

World Vision, free, downloadable learning materials for educators, parents, and church ministers who seek to become more informed about global poverty. <http://www.worldvision.org/content.nsf/learn/educational-curriculum-free>

World Wise Schools, Peace Corps Many lesson plans to translate firsthand experiences of Peace Corps Volunteers into cultural, geographical, and language arts lessons for your students. www.peacecorps.gov/wws/educators