Vertical Gardening - growing more in less space

Introduction

Growing plants vertically expands the possibilities for garden spaces. Many plants grow very well on supports and tend to climb on or hang from vertical structures. Vertical gardening is an efficient use of space. It increases the movement of air between plants and decreases the risk of humidity-loving diseases. It can also provide shade for smaller plants. This lesson focuses on traditional garden spaces, but in a wider context we can illustrate creative examples of vertical gardening in urban buildings or in greenhouse production, where layers of crops are grown at different heights on shelves or hanging from supporting structures.

Learning Objective

To provide alternative solutions and examples for growing food plants vertically and explain how vertical gardening can be efficiently implemented.

Learning Outcomes

- Female extension educators will understand the benefits and basics and identify opportunities for vertical gardening
- Female extension educators will be prepared to teach vertical gardening basics and techniques

Materials

- flipchart or blackboard
- chalk or markers
- pictures with examples of different kinds of vertical structures, both for growth bottom up and for hanging
- buckets or containers for planting
- growing media
- tomato plants
- drill or saw to cut hole in buckets

Lecture Notes and Lesson Plan

Recall the mention of vertical gardening in the unit about different types of beds. Ask the women to share what they remember and know about growing plants vertically. Use examples common in their experience: grape vines, morning glory plants,
squashes taking advantages of poles, fences or other tall plants.

Whenever a plant can grow and thrive either crawling up or hanging down, it is an efficient use of vertical space. Growing vegetables on trellises, pergolas, fences, posts, poles with strings or nets, or any suitable structure available such as walls can greatly expand the potential food production by increasing yields per sq. ft. because plants take up less space and are healthier. Although it may require extra time, work, and expense, vertical growing decreases fruit problems and make it easier to pick, water, and spray. It adds complex texture to the garden and enhances the ecosystems (e.g., shading, micro-climates) and can cool home or garden and add to privacy. Plants grown vertically can modify microclimates for other plants or in turn take advantage of different growing conditions.

When thinking of structures for vertical gardening, add shelving, pallets, stacked containers or bottles, stacked bricks, thick plastic pouches. Think not only bottom up, but also in the opposite direction: we can grow many plants in hanging containers, including species that do not grow vertically.

Good support surfaces and structures for a vertical garden include:

- Fences
- Trellises
- Hanging baskets or containers
- Trees
- Cages
- Bicycles wheels
- Poles with strings and nets
- Old ladders
- Old frames (metal, wood, plastic)
- Wooden pallets
- Gutters
- Unused metal of wooden shelving units
- Metal nets
- Bamboo poles

More structures can be easily made with wood, metal, plastic jugs and bottles, bricks etc. Be creative!
Choosing the right plants for a vertical garden is important. While many plants can be trained to grow vertically, not every plant is suitable. Pole beans, some peas, tomatoes and most cucumbers can be grown vertically with the necessary support. Eggplant, sweet corn, pepper, and some cucurbit plants can likewise be supported to prevent lodging and limit vine sprawl.

Tomatoes benefit when grown with support of cages or other trellising systems, especially the indeterminate types. They use less space, are less likely to become infected with soil-borne diseases, and also increase air circulation, which is another powerful way of preventing diseases.

Cucumbers grow as vines naturally.

Corn grows vertically and can be used as a support for beans or other plants. Together with a squash, this is the well-known Three Sisters system. It is a wise use of space and is a good companion planting combination with a nitrogen soil enriching component, weed smothering effect from the squash and big residual biomass production with a nutritionally balanced harvest.

Peas, melons, gourds, squashes, pumpkins all like upwards growth. Some require more support than others, especially because some can grow extensively and their fruits are heavy.

There are several additional considerations to take into account for a successful vertical garden:

- Some plants entwine themselves onto the support, while others may need to be tied.
- Vertically-grown plants are more exposed to the sun and air and dry out faster. Water them more frequently than if they are allowed to sprawl.
- Position vertically-grown plants where they don’t shade sun-loving plants. Instead, plant shade-tolerant crops near the vertically-supported crops.
- For maximum exposure to sunlight, grow plants on the south side of the support.
- In very windy areas, vertical gardens require wind break protection and sturdier support. They might not be allowed to be very tall.
- Soil should be deep and well-drained so root systems can develop reaching deep into the soil, rather than growing outwards where they will compete with other plants.
- Adequately water the garden, which will dry faster without plants covering the soil (and mulch, mulch, mulch!)
- Often drip and micro irrigation alternatives can be combined very successfully with vertical growing and prove crucial for success when water is scarce.

Follow-up Activities

- Plant upside down tomato buckets together. Refer to instructions on the last page of document.
- Lead a tour of the demonstration farm to view and discuss examples of different types of structures and their use.

Assessment questions

1) What is vertical gardening?
2) What are its advantages?
3) What vegetables/plants are well suited for vertical gardening?
4) What can we use as supporting structures?
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