

Adaptive Techniques of Horticultural Crop Production for Disabled People*

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Abstract

Horticultural crops which include vegetables, flowers, ornamental plants, fruits, mushrooms, herbs, spices and medicinal plants are high-value crops which are suitable for production by disabled people. They possess high nutritional and aesthetic values. Besides, they are also suitable to be grown in the urban and suburban areas where market outlets are readily available. This paper describes gardening concepts and ideas for disabled people as well as the possibility for commercial production by them. Special considerations have also been given for choosing horticultural crops for commercial production.

Keywords: *No dig garden, horticultural therapy, 'handicapable'.*

Introduction

The Merit of Horticultural Crops

Horticultural crops are crops which require intensive cultural practices. They can be grouped into vegetables, flowers, ornamental plants, fruits, mushrooms, herb, spice and medicinal plants. They possess several qualities which make their cultivation more profitable and enjoyable than other crops. These are:

High-value commodities:

Horticultural crops are considered high-value commodities as they fetch high price as compared to cereals, pulses, and other field crops.

Adaptive to urban and sub-urban areas of production:

Production of horticultural crops requires less land areas than field crops. Thus they are suitable for production in urban and suburban areas even though the cost of land is much higher than in the rural areas. These areas have the advantage of being close to the markets and other facilities which are required for a better quality of life of the residents.

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High nutritional and/or aesthetic values: Used as food, as in the case of fruits, vegetables, and mushrooms, these crops generally have higher nutritional values than cereals, pulses, or other food crops. In particular, they are high in proteins, vitamins, minerals and fiber contents, but less in fats and oils which are considered hazardous to life if consumed in large quantity. Flowers and ornamental plants possess high aesthetic values. Herbs and spices are used to add flavor to food while medicinal plants cure human ailments.

Suitability of Producing Horticultural Crops by Disabled People

In addition to being grown by ordinary gardeners, horticultural crops also possess several properties which make them suitable to be grown by disabled people.

Therapeutic benefit of gardening: Gardening is being used to calm and interest people who are disturbed or have lack of interest through illness, disability, or other problems. This fact is supported by the following cases:

- The US National Heart Foundation supports the view that gardening has therapeutic benefit for the people who are suffering from heart disease. Its logo is decorated with a rose called "Young at heart", which is their reminder to all that gardening is good

for the heart. Its "Life be in it" program advocates gardening as a means of keeping healthy.

- Throughout Australia, horticultural therapy associations and schools are being formed to cater for the specialized needs of the elderly, and physically or mentally disabled people.

High value to volume ratio: Most horticultural commodities are not only high value, but their volumes as well as weights are small. Such a ratio of high value to low volume is a beneficial attribute for disabled people since they don't have to lift heavy and bulky stuff.

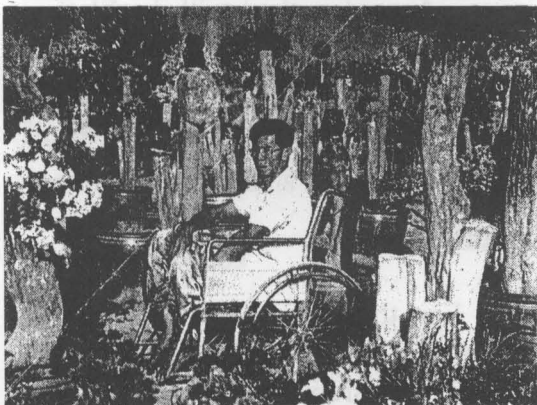
Automatic or semi-automatic systems of production can be installed: Thanks to modern tools and equipment now available, including automatic sprinkler systems (Chomchalow 1981), equipment for composting, soil preparation and filling soil into the pot, ready-made propagator, etc., disabled people can now make gardening more enjoyable and invigorating.

Intensive cropping practices: At first glance, this seems to be a hindrance but it really provides advantages to disabled people as most other people do not have enough patience to work intensively, especially to sit or stand at the same site for a long time.

A Classic Case of Mr. Witthaya Siripibul

As featured in 'Daily News' newspaper of 16 January 1997, Mr. Witthaya Siriwebul, aged 50, of 49/1 Mu 2, Hat Kham subdistrict, Kui Buri district, Prachuap Khiri Khan province was born as ordinary person until he had accident from which he lost both legs. With his big responsibility of supporting his three children after his wife deserted him, he decided to work in horticulture. As the first step, he hired the villagers to dig wild trees

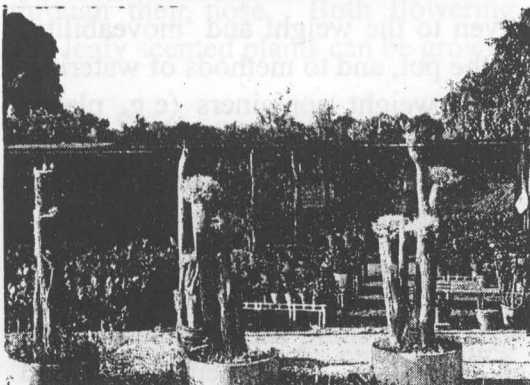
from the nearby forest and trained them to grow as bonsai in big pots. These trees include 'Mok' (*Wrightia religiosa*), 'Sai' (*Ficus benjamina*), 'Tako' (*Diospyros malabarica*), 'Mak Lek' (*Pinanga* sp.), palms, etc. By placing them in front of his house, he was able to sell them to passers-by. He also grew elite varieties of mango, jackfruit, guava, roseapple, etc. around his house so that he could use them as sources of material for propagation by cutting, budding, marcotting, grafting, etc., all performed by himself with the help of his laborers. He was quite



Mr. Witthaya on his wheelchair in front of his huge bonsai trees in pots ready for sale.



Grafted mango trees placed in large plastic bags to keep moist after grafting operation.



Ornamental plants produced by Mr. Witthaya in his nursery at home

successful in selling these plants to other farmers. His latest innovation was the production of potting soil for growing ornamental plants. He started by gathering soil underneath the bamboo forest, mixed it with raintree-leaf litter, coconut coir dust and farm manure. The mixture was left to decompose with the help of a 'starter' provided by 'Mo Din' (a volunteer soil advisor) and urea fertilizer for

three months. The compost obtained was packed in plastic bag with the capacity of 8 kg per bag and sold at 20 Baht per bag. With all these products he was able to earn 200,000 Baht per year, enough to support his children to finish their higher education. His success was achieved, as expressed by himself, not by luck, but by determination, which has enabled him, a disabled person, to be able to work in the field of horticulture and support his family without creating problem to other people.

Gardening Concepts and Ideas for Disabled People

Several concepts and ideas of gardening have been proposed by several innovators, some of which have now been practised by disabled people. Among the common ones are the following:

The Concept of “No Dig Garden”

Esther Deans’ concept of “No Dig garden” (Deans 1977) is tailor-made for disabled people, and has wide appeal because it saves time and effort, and is friendly to the environment since it keeps the soil in good repair. Its construction and operation are quite simple. She also suggested a variety of ideas (described below), such as making garden in pots, placing pots on casters and creating raised garden beds for people with mobility problems.

Wheelchair Access

Disabled people who have to sit and work on the wheelchair need special access to work in the garden. The following precautions should be born in mind when facilities are established for disabled people.

- Paths need to be smooth and wide enough for the wheelchair, with ramps to move to different levels.

- Raised garden beds make it easier for disabled people who cannot bend over. A garden shed with benches at wheelchair height is recommended since when the wheelchair is placed under the bench, the work area is easily reached.

Plants in Pots

For those disabled people who are not mobile enough to produce a “No Dig Garden”, growing annuals, vegetables, and shrubs in pots may be a solution. Consideration must be given to the weight and ‘moveability’ of the pot, and to methods of watering. Light weight containers (e.g. plastic pots which look like terra-cotta, fiberglass pots having the appearance of concrete, hanging baskets lined with bark or fiber, etc.) should be used. Hydropots, or pots with built-in watering system, should also be used as they are convenient and need watering once a week instead of once of day (Chomchalow 1982).

Window Boxes

Window boxes are a good way of enjoying plants and having them within reach. Flowers or plants with interesting leaves can be grown to brighten a room. Herbs can also be grown to add flavor to food and drink.

Hanging Baskets

Although any kind of plants can be grown in hanging baskets, it is best to grow trailing plants. Using a long-handled hose will make watering hanging baskets much easier if one is in a wheelchair. Use of pulley system to lower the baskets down when needed and raise them up after the work is done, can also be recommended (Deans 1994).

Scented Gardens

Fragrant plants will turn any garden a perfumed paradise. This is highly recommended for the blind since they can enjoy these plants through their nose. Both flowering and leafy scented plants can be grown.

Herb, Spice and Medicinal-Plant Gardens

Culinary herbs and spices are useful as well as attractive plants. It is best to grow them as close to the kitchen as possible to enable quick access when cooking. They can be grown in pots, used as hedges or

edging plants, or as part of the general shrubbery. Medicinal plants can also be grown in the same manner.

Commercial Production of Horticultural Crops by Disabled People

Horticultural crops which can be grown commercially by disabled people may be grouped into six categories, namely vegetables, flowers, ornamental plants, fruits, mushrooms, and herb, spice and medicinal plants. They are described in detail below:

Vegetables

Conventional type: These are vegetables which are normally grown commercially by ordinary people. They include:

- *Leafy vegetables:* Such as lettuce, kale, cabbage, spinach, morning glory, etc.

- *Flowering vegetables:* Such as cauliflower, broccoli, 'Khae' (*Sesbania gradiflora*), etc.

- *Fruit vegetables:* Such as tomato, cucumber, pumpkin, squash, etc.

- *Root vegetables:* Such as Chinese radish, carrot, turnip, etc.

Systems of growing these vegetables should be made appropriate to disabled people. The use of nylon

net to cover the bed completely on all sides to keep insects away helps to eliminate the use of costly and harmful insecticides. The produces thus obtained which are insecticide-free can be sold at premium price.

Non-conventional type: These are plants which are not normally used as vegetables, but through new discovery or idea, they are now produced as vegetables. These are vegetable soybean (young pod of soybean consumed as snack); various kinds of seed sprouts (e.g. mungbean sprout, blackgram sprout, soybean sprout, sweetpea sprout, radish-seed sprout, etc.); young fruits (e.g. baby corn, young fruits of jackfruit, breadfruit, watermelon, etc.). This type of vegetables normally fetch higher prices and require special growing conditions which disabled people can do.

Flowers

Many types of flowers and flower-related products can be produced by disabled people. These are:

Cut flowers: Most popular cut flowers are orchids, roses, anthurium, carnation, chrysanthemum, lilies, gerbera, heliconias, tuberose, etc.

Pot plants: Many kinds for flowering plants can be grown as pot plants, e.g. roses, bougainvillea, chrysanthemum, adenium, petunia,

jasmine, 'Poei Sian' (*Euphorbia* sp.), etc.

Seeds, bulbs, corms, cuttings, marcots, graftages, etc.: These planting materials can be produced by disabled people and normally earn better income than growing them for flowers. Special skill is needed for commercial production of these planting materials, but it is not too difficult, especially if some training can be provided to them.

Ornamental Plants

There are numerous approaches to produce ornamental plants for sale (Ardpradit 1997). They are:

Pot plants: These are the easiest thing for disabled people to make money, as there is a boom in growing ornamental plants everywhere. House plants of all kinds, flowering plants, garden plants, hedge plants, etc. can be grown in pots for sale by disabled people.

Trees and shrubs: These are a little bit larger in size and more difficult for some disabled people. However, if he is strong enough and has access to some land, it is more profitable to grow them with less problem of selling since they are not short-lived.

Cut leaves and branches: Flower arrangement requires a large

amount of cut leaves and branches like leather-leafed fern, asparagus fern, philodendron, dracaena, croton, yellow palm, sprengeri fern, ti plant, davallia, pandanas, dieffenbachia, philodendron, etc.

Bonsai: These are miniature plants grown in special containers for their dwarf size. Normally their roots are trimmed to the minimum and above ground parts are twisted, trimmed, bent, etc. in specially-designed forms. They are quite long-lived and fetch quite a high price. Disabled people can be trained to produce bonsai plants for sale on a commercial basis.

Seedlings: Producing seedlings of ornamental plants is a growing business. Various species are being sold as seedlings by mail order.

Seeds and other planting materials: Disabled people can be trained to produce seeds of most of the above-mentioned plants. Similarly they can be trained to produce budded or grafted plants for shrubby ornamental plants (e.g. hibiscus, roses)

Fruits

Fruits and their planting materials can be produced by disabled people. These are:

Trees and shrubs: Although disabled people may not be able to

grow large fruit trees or shrubs, many who are strong enough can do, particularly if the plants are not too high. The use of dwarf rootstocks or dwarf plants makes it possible for disabled people to work with fruit trees and shrubs.

Vines and climbers: Disabled people can grow fruit crops which are vine or climbers, e.g. grape, passion fruit, kiwi fruit, etc.

Annuals: These are most suitable for disabled people to grow since their size is normally small. These include watermelon, cantaloupe, honeydew, strawberry, etc.

Seeds, cuttings, marcots, budded rootstocks, graftages, and other planting materials: If well-trained, disabled people can produce all these planting materials right in their own land.

Mushrooms

Several kinds of edible mushrooms can be produced by disabled people. These include straw mushroom, button mushroom, oyster mushroom, shiitake, etc. The availability of spawns of most commercial mushrooms makes it easier for disabled people since they don't have to produce spawns by themselves. What they need to do is to build a mushroom shed to grow the spawn and harvest the mushrooms

when they emerge from the bag of spawn. A popular Chinese medicinal mushroom, called 'linzheng', which is believed to fight against cancer, is now widely grown in China and Thailand and sold at a high price.

The growing of mushrooms requires much less space than other horticultural produces and does not require too much labor, while the produces are saleable at a relatively high price.

Herb, Spice and Medicinal Plants

These are related groups of plants which are quite suitable to be grown by disabled people as they are normally small and do not require large area for production, but need intensive care during the entire period of growth. The income obtained from these plants is quite high, provided that quality is under strict control.

Special Considerations for Choosing Horticultural Crops

Be Opportunists

Disabled people have some disadvantages over normal people, thus certain considerations should be made before attempting commercial production of horticultural crops. The following considerations are suggested:

Production of crops which are on demand in time and place: The

following considerations should be borne in mind when disabled people choose their crops

- Seasonal produces normally fetch low price as the supply is higher than the demand, particularly when production condition is favorable. This is particularly true of highly perishable fruits like lychee, longan, strawberry, durian, mango, etc. Cut flowers like orchids and jasmine also fetch very low price in the rainy season. The same is true for lime. Production of off-season flowers and fruits has several advantages over normal-season production. These include fetching higher price per unit of produce, avoiding the danger of seasonal pests (but sometimes it is the opposite!), avoiding the problem of labor shortage, etc. Off-season varieties (mutants) of flowering and fruit crops are available for a number of species. Normal bearing varieties can also be treated (by chemicals or other means) to produce flower or fruit off-season, or on particular dates or festivals, e.g. New Year (1 January), Chinese New Year (first week of February), Valentine Day (14 February), Mother Day (12 August for Thailand), Easter (early April), Graduation Exercise (variable depending on universities), Christmas (25 December), etc. There are also a number of festivals to promote the sale of flowers and fruits throughout the year in different provinces.

- Produces sold at the place of production normally fetch low price. Take the example of Thailand where durian produced in the southern and the eastern parts, lychee and longan in the northern part, grape in the central part, etc. fetch very low price locally. If production can take place in other locations and the produces to be sold there, the price obtained is much higher. This can be seen in the case of grape, durian, mangosteen, rambutan, langsat, etc. produced in the north or northeast, and longan produced in the south. Similarly, sub-tropical or temperate flowers or fruits which are produced on the highland can fetch high price, if the quality is up to standard.

Production of crops which require special techniques/care:

Crops which are easily produced fetch low price in contrast to those which require special techniques or care. Thus it is advisable to produce the latter in order to obtain higher price. Multicolored flowering plants and multiple varieties of crops on the same plants (produced by grafting) are good examples of such crops.

Advertised as “Produced by Disabled People”

Most customers are sympathetic with disabled people. They are most willing to help by buying the commodities produced by disabled people even at a little higher price

than other comparable produces. If the commodities are produced through organic farming (as is the case of No Dig Garden), or free from insecticide, they should also be advertised to obtain premium price.

Crops to be Chosen

Horticultural crops cover a wide range of plants, many of which are not suitable to be grown by disabled people. Thus it is important to choose only the most suitable ones, including:

High value: Disabled people cannot compete with other people if they grow low-value crops.

High input or high technology: Similarly, crops which are provided with high input or high technology will fetch higher price than those which do not have such treatment.

High yield and/or quality: Following high input or technology, it is expected that the produces are of higher yield and/or quality. Thus, it is natural that they fetch higher prices from the customers.

Easily marketable: Commodities produced by disabled people should be readily marketable. One should try to avoid those which are easily perishable, or require special post-harvest treatments, unless they are paid a premium price.