

CHAPTER 12

Your garden: Zone I

When I think about the food I need for the day my mind goes to what is growing in the garden, and not to what is stashed in the refrigerator. So I visualise my garden as a food shop. In fact, my refrigerator is rarely switched on and it is also fairly empty. Most people in the world living in hot climates do not have refrigeration and manage very well with their food gardens and local markets selling fresh food.

We have three main types of agriculture in the world: agribusiness, the home lawn and the house garden.

Agribusiness is only concerned with food as a commodity in the marketplace. It relies on high inputs of chemicals and is energy hungry. Of its income, 30–40 per cent goes to multinationals. Its greatest expense is servicing debt in the form of interest payments because, worldwide, almost every commodity farmer is in debt. It is only viable with government subsidies. It is the greatest threat to Earth because it causes excessive land degradation.

The home lawn consumes enormous chemical, water and energy inputs yet answers no food need at all. The chemicals such as fertilisers, fungicides and weedicides used per hectare are double and sometimes treble those used in intensive agriculture. Lawns are monsters with an insatiable appetite. In California, 14 per cent of first-class water is used on lawns. Until it started running out, Western Australia poured 20 per cent of its drinking water on lawns. Lawns cost a minimum of \$6.00 per square foot to maintain.

The home garden is what permaculture has, in many people's minds, come to represent. Although it isn't all of permaculture, it is an important part. The home vegetable garden yields at least \$5.00 per

square foot and is the only form of agriculture which directly feeds people. You can grow 80 per cent of your food within 50 metres of your back door. In 1998 the estimated yield from home gardens was \$92 million.



Our ethical task is to:

- grow as much food as we can at home
- ensure that home gardens carry out several vital ecological functions.



Our design aims for a vegetable garden are for it to:

- occupy a permanent position with self-seeding biennial and perennial plants
- be non-polluting for plants, water or soils
- be abundantly productive
- produce surplus to give or sell locally
- reduce food miles and our ecological footprint
- recycle all household organic matter.



If we don't have design aims for a vegetable garden:

- we can waste money and resources
- we can become dependent on polluted, industrial food.

CHARACTERISTICS	RESULTS
SMALL AND INTENSIVELY CULTIVATED FOOD GARDEN (VEGETABLES, HERBS AND SMALL FRUITS).	<ul style="list-style-type: none"> • INCREASES SELF-RELIANCE. • MAKES USE OF HOUSEHOLD ORGANIC WASTES. • PROVIDES HIGH YIELDS PER UNIT AREA.
A BASIC STRUCTURE OF PERENNIAL, BIENNIAL, SELF-SEEDING AND SELF-MULCHING PLANTS.	<ul style="list-style-type: none"> • REDUCES HUMAN LABOUR. • INCREASES ENVIRONMENTAL STABILITY.
ABUNDANT AND DIVERSE PLANTINGS.	<ul style="list-style-type: none"> • ALLOWS NATURAL PROCESSES TO SELECT THE PLANTS MOST SUITED TO THE SITE.
NOT MORE THAN FIFTY METRES FROM THE HOUSE.	<ul style="list-style-type: none"> • GARDEN BEDS ARE NOT EASILY OVERLOOKED. • EASY TO DIRECT GREY WATER TO GARDEN BEDS; HARVEST PRODUCE; WEED PLANTS; AND PROTECT PLANTS AND ANIMALS FROM WEATHER EXTREMES AND PREDATORS.
VISITED FREQUENTLY.	<ul style="list-style-type: none"> • VEGETABLES AND FRUIT CAN BE HARVESTED AS REQUIRED.
CONNECTED BY CIRCULAR, WINDING OR SPIRAL MULTI-PURPOSE PATHS.	<ul style="list-style-type: none"> • COMPOST BINS, GARDEN BEDS, POULTRY YARD, FISHPOND, ETC. CAN BE VISITED IN ONE WALK.
MAINTENANCE AND CLEARING (TRACTORING) DONE BY ANIMALS.	<ul style="list-style-type: none"> • WEEDS, INSECT PESTS AND DISEASED PLANTS ARE CLEANED UP BY ANIMALS, RATHER THAN PEOPLE. • ANIMALS PROVIDE ADDITIONAL YIELDS OF EGGS, MEAT, MANURE, ETC.
SHEET-MULCHED GARDEN BEDS.	<ul style="list-style-type: none"> • REDUCES WATERING AND WEEDING. • PROTECTS SOIL FROM EROSION AND LOSS OF VALUABLE NUTRIENTS.

Figure 12.1 Characteristics of Zone 1.

Ecological functions of a home garden

A home kitchen or vegetable garden is fundamental to your design because, as well as providing you with fresh vegetables, it carries out other important functions. It:

- offers you the security of quality, quantity and supply of chemical-free food

- transforms your waste organic materials into mulch and humus
- builds self-reliance and creative leisure
- absorbs grey water and turns it into biomass (living organisms)
- cleanses grey water before returning it to waterways and the water table
- releases you from the bondage of lawnmowers, edgers and suchlike with their



The north-facing aspect of the author's house has been modified to increase solar gain. A brick terrace reflects heat and light into the house and acts as thermal mass, and the large sliding doors allow direct sunlight inside. A glasshouse grows food in the cooler months and warms the bathroom.



Construction of a small dam on the north-facing slope in front of the author's house. Logs from radiata pines felled on the property have been used to stabilise the steep banks, and straw mulch has been spread over the dam wall to prevent erosion and silting in the stream below.



Several smaller ponds constructed in the overflow channel below the dam are designed to slow down storm surges and trap silt. Eventually, emergent reeds and water plants will stabilise the ponds, biologically filtering water as it leaves the property.



A large-scale reed-bed system constructed to biologically filter nutrient and physically trap sediments in run-off from suburban streets before it flows into sensitive bushland in Katoomba, New South Wales (Blue Mountains City Council).



This house in the high-density Sydney suburb of Manly has been retrofitted with solar power, solar hot water, composting toilet and a complete grey-water recycling system. The backyard has been planted with fruit trees with vegetables growing underneath.



A small pond will help to modify the microclimate, reflect light, attract wildlife, serve as a barrier to fire and a back-up water supply for the garden and animals.

Constructing a sheet mulch garden is simple and quick, and can be a social event, as shown here at Rob's place.



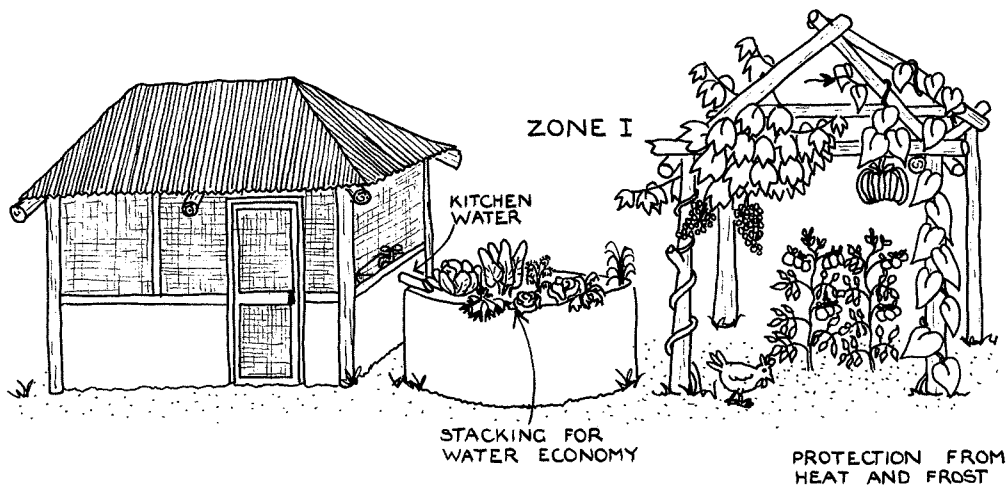
smell, noise, fuel consumption, expense and possible danger

- provides habitat and niches for wildlife and insect predators
- conserves biodiversity and heirloom varieties
- reduces the stress on marginal land used for growing food because cities and suburbs increasingly take the best land
- lowers the overall burden of environmental damage associated with growing food as agribusiness.

The kitchen garden has all elements working in productive, satisfying and efficient ways and will demonstrate the following characteristics:

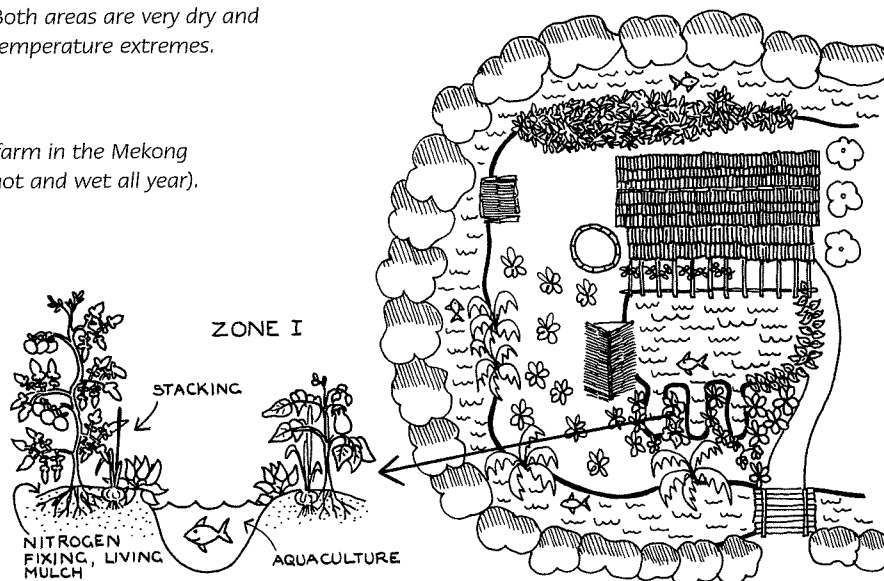
PERMANENCE It moves towards a balanced state where the garden perpetuates itself, thus ideally dispensing with the need for a gardener at all. This is achieved by plants which are self-seeding, and biennials and perennials.

ABUNDANCE Abundance is achieved through dense and diverse planting which acts as a buffer in adverse conditions and yields under all conditions. Don't aim for large harvests of one particular fruit or vegetable, although you will certainly get this sometimes. Harvest a large amount of many species and their parts.



A desert garden in central Australia. The design is based on traditional gardens in northern Africa. Both areas are very dry and experience daily temperature extremes.

A family garden/farm in the Mekong Delta, Vietnam (hot and wet all year).



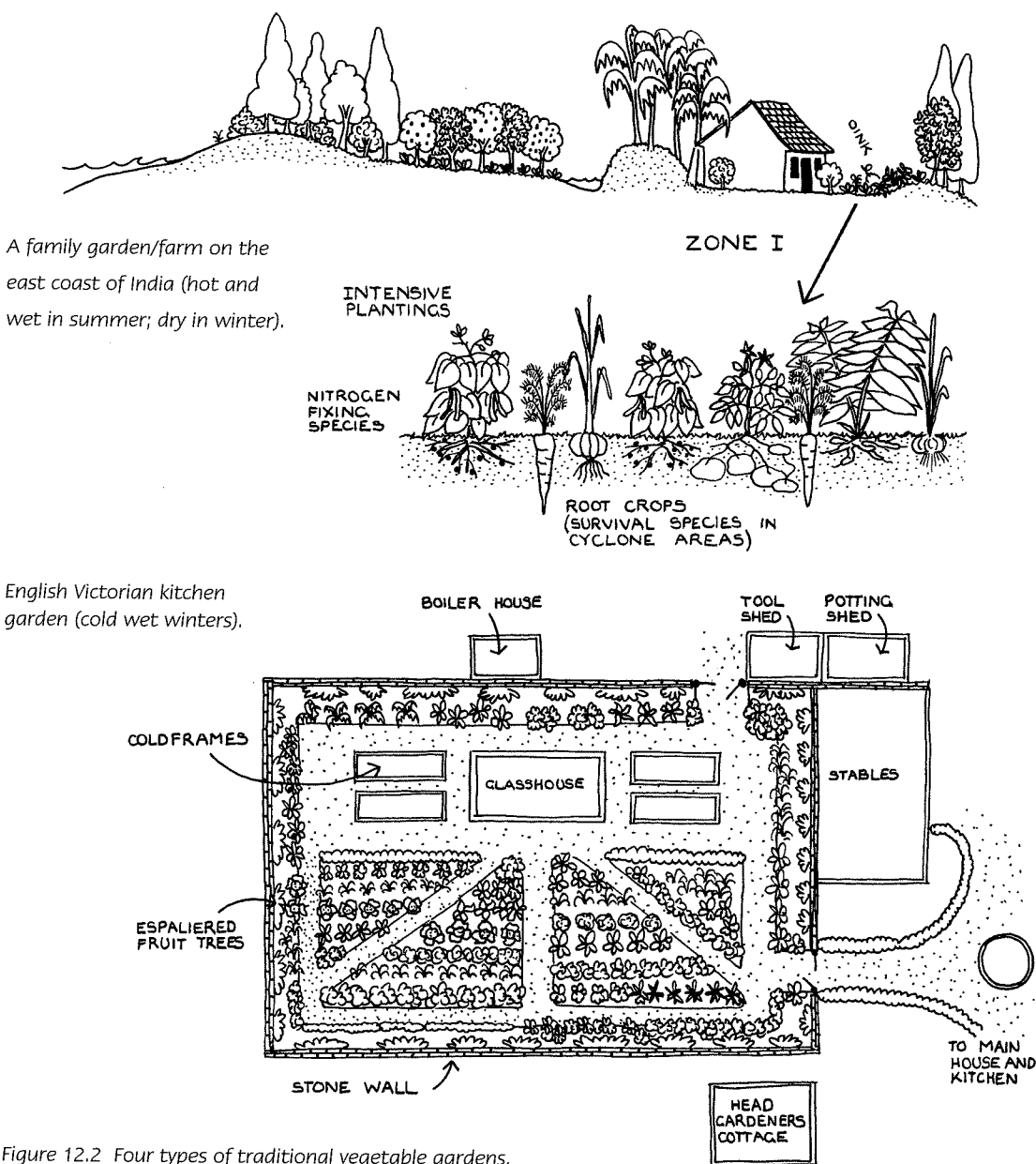


Figure 12.2 Four types of traditional vegetable gardens.

EVERYTHING GARDENS This means plants and animals are carrying out functions usually seen to be the work of humans. Animals cultivate the earth with their feet, beaks and burrows, and plants use their roots and associated micro-organisms such as fungi. Plants and animals nourish each other and the soil with products. They prune and harvest fruit, leaves, seeds and limbs and propagate plants by carrying seeds, spores, runners, layering and eating.

Over the centuries, wherever people have gardened sustainably they have employed the same principles, regardless of climate or culture. You can see this in

the four types of gardens illustrated in Figure 12.2. Unlike modern agribusiness, these gardens have sustained people without degrading the land:

- desert garden in Australia, based on traditional oasis gardens of northern Africa—arid climate with extremes of temperature
- Mekong Delta of Vietnam—conditions are hot and wet all year round
- monsoonal east coast of India—hot, wet summers and dry winters
- English Victorian kitchen garden—a cool temperate climate with wet, cold winters and summers.

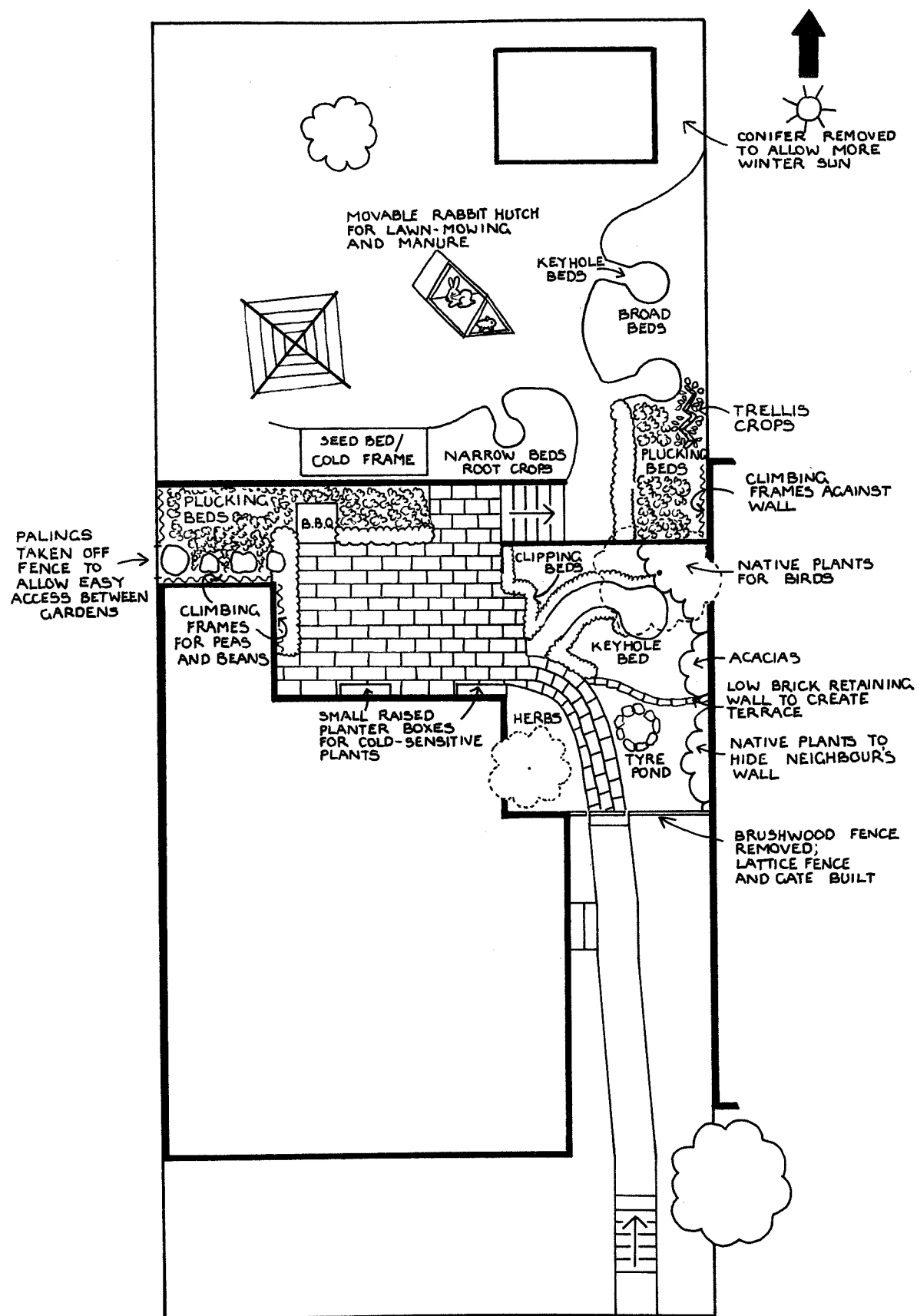


Figure 12.3 Rob's place, Zone I design.

SHEET MULCHING

WHAT TO DO

- SLASH LONG GRASS AND WEEDS, MOW LAWN AND LEAVE CLIPPINGS IN PLACE

- WET WHOLE AREA THOROUGHLY

- ADD SOME AGRICULTURAL LIME

- SOAK PAPER, CARDBOARD, UNDERFELT OR EVEN OLD CARPET. LAY OVERLAPPING SHEETS OVER WHOLE AREA

- MARK OUT PATHS WITH LIME, STONE, BRICKS OR TIMBER

- THROW ANY ORGANIC WASTE SUCH AS GRASS CLIPPINGS, GARDEN SCRAPS OR WEEDS ON GARDEN BED

- ADD OLD HAY OR GRASS TO 15cm DEEP

- ADD 10-15cm OF ROTTED MANURE, COMPOST OR MUSHROOM COMPOST (ALWAYS DIFFICULT TO GET ENOUGH!)

- ADD LAYER OF CLEAN WEED-FREE MULCH (10cm) SUCH AS STRAW, RICE HULLS, OAT HUSKS OR SUNFLOWER HUSKS

WHY DO IT

- CLIPPINGS DECOMPOSE AND ADD ORGANIC MATTER TO THE SOIL

- RAIN WON'T REACH THE SOIL THROUGH THE LAYERS

- HELPS BIND ANY HEAVY METALS SO THEY CANNOT BE TAKEN UP BY PLANTS

- STOPS WEEDS AND ADDS MORE ORGANIC MATTER TO THE SOIL

- PREVENTS BEDS BEING BUILT OVER PATHS

- IT WILL ALSO DECOMPOSE AND TURN INTO HUMUS

- MORE COMPOST TO TURN INTO HUMUS

- IMMEDIATE SOURCE OF PLANT NUTRIENTS

- HOLD WATER IN, RETAIN VOLATILE NUTRIENTS, PROTECT SEEDLINGS SOIL TEMPERATURE CONTROL

WHAT IT LOOKS LIKE

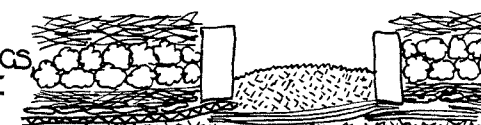
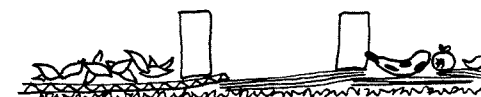
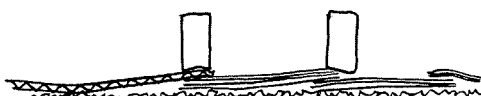
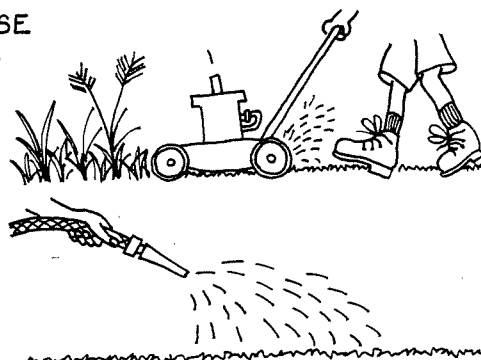


Figure 12.4 Sheet mulching.

Planning your Zone I garden layout

Review the sun and wind patterns on your property, the ease of access, your whole site water plan, soils and microclimates—and draw up a plan keeping these ideas in mind.

- *Start small* and get it right. There is nothing like success to carry you forward and to ensure that you have enough resources to complete the next stage. Mistakes or problems can also be corrected while they're small.
- Begin your plan with *permanent structures*. Think carefully and then place some or all of the following permanent structures where you want them. If you have planned a structure but don't have the time or money to build it now, then keep the space by undertaking only short-term activities there.
 - water gardens ● clothesline
 - greenhouse ● cold frames/hot beds
 - shadehouse ● garden shed
 - worm bed ● water tanks
 - recycling area ● outdoor toilet
 - cooking space ● fixed animal housing
 - compost ● pergolas/trellises
 - herb spiral ● keyhole beds.
- Design *paths* as circular, winding or spiral so they enable you to take an interesting walk to accomplish several things with one saunter around the garden. On the way to collect eggs or feed poultry, hang out the clothes and visit the cold frames.
- *Eliminate small fussy lawns* because they waste valuable space and require too much maintenance.
- *Group* similar activities and decide how activities will support each other. For example, place the potting shed near the greenhouse, the worm farm near the vegetable garden, and the compost bins right in the middle of the vegetable garden. Your outdoor cooking area can be close to the kitchen door.

If you have done a thorough site analysis you will design well. Figure 12.3 shows structures sited after a thorough site analysis.

Making your garden

Sheet mulching is the permaculture technique used in Zone I for improving and building soils (usually a long, slow process). In normal 'hard work' gardens, soil improvement is achieved by tilling or digging, then perhaps hoeing and finally raking the whole area, then leaving it bare until you wish to plant. However, we know that, except for deserts, nature never leaves the soil bare and vulnerable to damage.

Sheet mulching simply involves covering the existing ground surface, whether it is old roadway, concrete or grass, and building a new clean soil over the old base. The technique is called 'sheet mulching' because a cover sheet of mulch is laid over the garden. Figure 12.4 shows the nine steps I use in sheet mulching. Other people vary them slightly.

All the layers must be thoroughly wet as you build up your garden. However, in the long term the garden will require far less watering than a normal 'hard work' garden. And you can plant into your new sheet-mulched garden immediately.

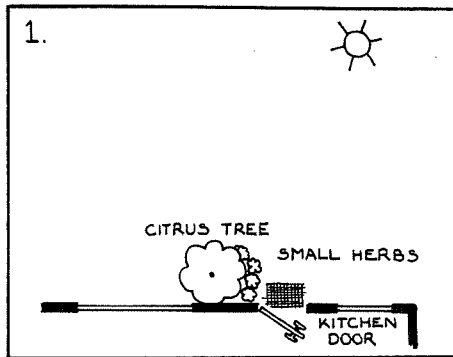
Planning your planting

Siting vegetables, flowers, fruits and herbs depends on the following factors:

- frequency of harvesting and use
- level of maintenance
- plants' life expectancy
- growth habit (or adult shape)
- space required when mature
- plants' requirements for water, sun and wind.

The following diagrams illustrate a 'model' Zone I food garden. You can use all or just some of these ideas in your own garden.

- *At the kitchen door:* Plant a citrus tree such as a lime or lemon with small herbs such as chives and parsley underneath. A variety

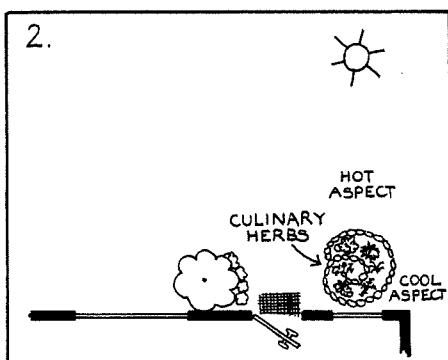


specially chosen for your area will crop 2–3 times a year. Citrus are best stored on the tree. Harvest them frequently because they have high vitamin C content.

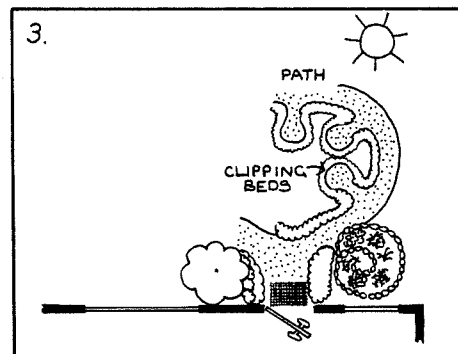
Figure 12.5
Herb spiral.



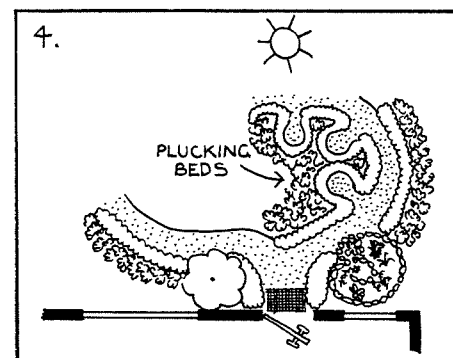
- *Culinary and medicinal herb spiral:* These herbs, which you use daily for health or cooking, are planted in a spiral on the other side of the kitchen door. The spiral has many aspects and niches and allows for a variety of microclimates from very hot on the west to dry at the top. It stacks plants vertically as well. Herbs grown here include all the cultivars of marjoram, oregano, rosemary, sages, basils, savouries, thymes and tarragons. Inter-plant annual and perennial herbs.



- *Clipping beds:* Position these on the edges of the paths and inside keyhole beds. They are mainly perennials and clipped for their edible leaves. They require worm castings, potash and lime about twice a year. Planted next to paths they receive lots of sun, are highly accessible for frequent clipping and are usually protected from wind. Suitable plants are chives, sorrel, corn salad, dandelion, salad burnet, mustard greens and nasturtiums.

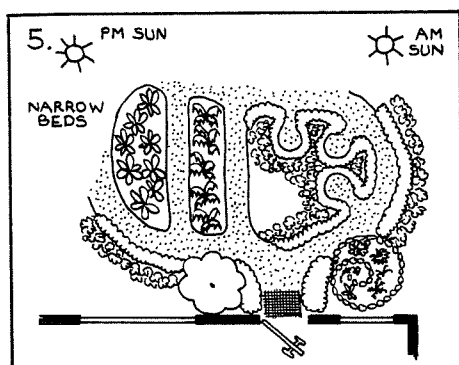


- *Plucking beds:* These are placed just behind the clipping beds, still close to the house, and consist of fast-growing and taller plants that are frequently harvested without pulling the whole plant. You can pluck leaves, seeds and fruit. Plant broccoli, silverbeet, Swiss chard, rose chard, kale, English spinach, Brussels sprouts, bunching onions, celery, non-hearting lettuce, coriander and zucchini, which all need frequent harvesting or they grow too big.

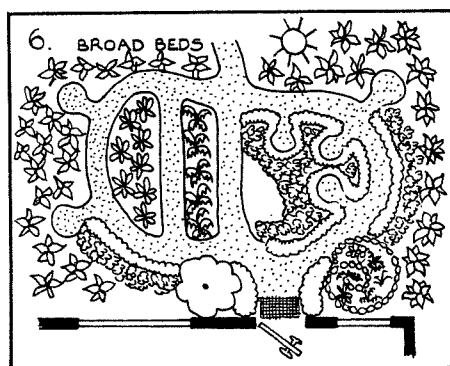


- *Narrow beds:* Narrow beds are for plants that grow vertically or have high light requirements. The beds are aligned

north-south to receive both morning and afternoon sun. It is valuable to have some permanent plants here such as asparagus, which has a lifetime of about 20 years. You can plant beans, peas, carrots, tomatoes, radishes, climbing peas and beans, asparagus, okra and eggplant.



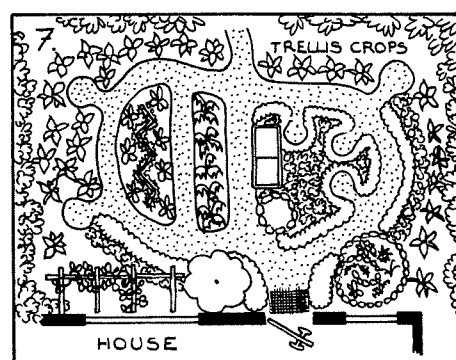
- **Broad beds:** These are for vegetables that take a longer time to ripen and are only harvested once. They are slower growing and do not need too much attention. Some of these plants are hearted lettuces, cabbages, lupins, sweet corn, pumpkin, sugar cane (eaten raw), Chinese cabbage and cauliflower. You can add Jerusalem and globe artichokes and use them as low suntraps and temporary windbreaks.



- **Broad-scale beds (staples):** These beds are possible if you have half a hectare or more land available. Growing grains moves you closer to self-sufficiency. Staples can be grown either by alley cropping (see page 152) or by the Fukuoka methods (see page 155). Choose the most successful and best adapted

for your area from corn, wheat, rice, oats, barley, millet, sorghum, potatoes and sweet potato. Corn is the highest yielding.

- **Vertical growing/trellis crops:** Fences, pergolas and sides of buildings increase the growing area and take advantage of a plant's needs for a special micro-climate. They assist garden productivity by effectively increasing the size of the garden. Crops you can grow are climbing peas and beans, passionfruit, choko (chayote), brambles, kiwifruit, jicama, New Zealand spinach, cucumbers, pumpkin and grapes.



Now look again at Figure 12.3 and see how Rob's Zone I compares with the 'model' Zone I garden described above. Rob modified the model because of limiting factors which he found in his site analysis.

Permaculture gardening hints

Here are a few tips and hints to keep in mind as you establish your home garden.

Crop rotation

This means changing the place where you grow plants. Crops are rotated according to their families, nutrient needs and build-up of pests. For example, for garden hygiene, change the place where potatoes grow each year so pests do not build up. In general the order of rotation is: legumes, cabbages, tomatoes, onions, root vegetables, and then start again with legumes.

Grey water

Grey water from the house is harmless only if you use mild pure vegetable soaps for all washing. Water your Zone I garden only when the soil is dry down to the second joint of the forefinger. This encourages roots to search deeply for soil water and they will be more drought-resistant.

Weed management

This is best performed by repetitive sheet mulching, dense planting, and judicious use of small animals such as caged rabbits, quail and guineapigs. Move the cages as necessary.

Companion plants

These are plants that help other plants in one or more of the following ways:

- the smell of their volatile oils discourages pests
- they are nitrogen-fixing plants of the legume family and supply nitrogen to other plants
- they have shapes that confuse pests' recognition ability.

The benefits of companion planting are achieved by inter-planting using some of the well-known herbs, and adding herbs and flowers to your vegetable garden for their multiple benefits.

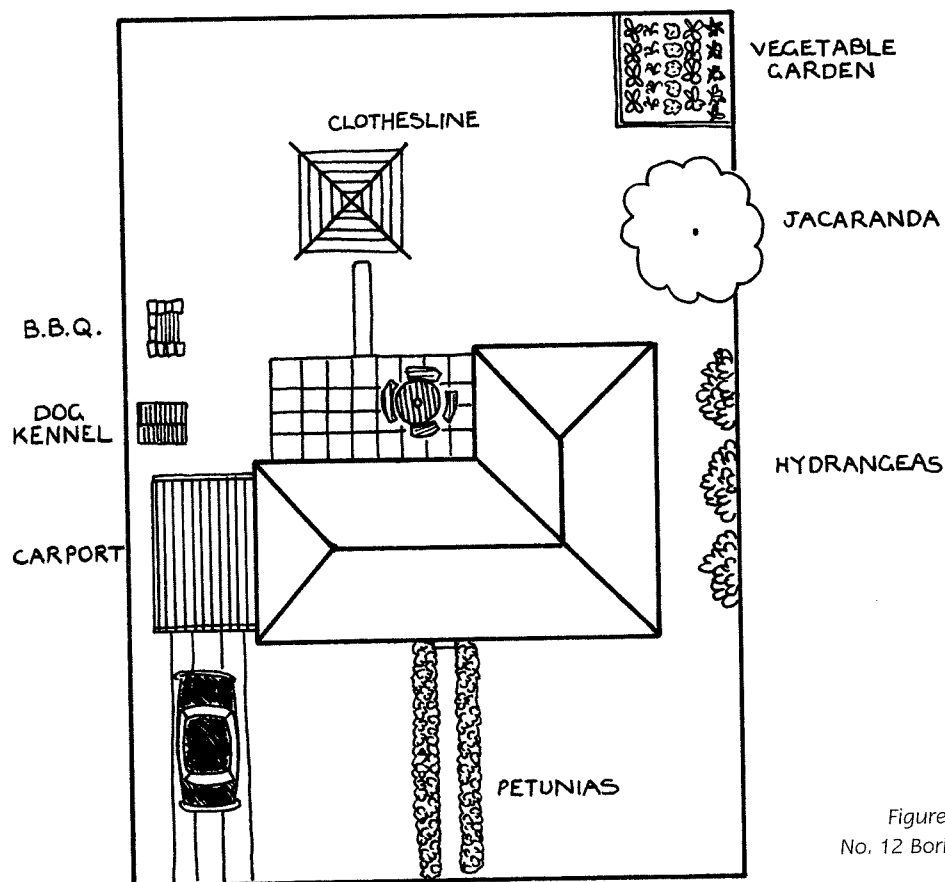


Figure 12.6
No. 12 Boring Street.

Indigenous plants

Native plants are fundamental to every garden since they provide habitat and food for wildlife threatened by loss of habitat. They can be planted as a food garden hedge to supply food for both animals and humans. Most importantly, they assist in maintaining biodiversity on a regional scale. Become a propagator of local species.

Fruit

You don't need a large garden to grow fruit. Berries don't take up much room and they are ideal on trellises. Depending on your microclimate, choose from Cape gooseberry, brambles, English gooseberry, currants, strawberries or whatever grows well near your place. Most fruit trees are available as dwarf stock suitable for growing in pots or you can plant fruit trees with multi-grafts. Fruit trees can also be espaliered against walls or grown in hot houses.



Try these:

1. Look at Figure 12.6, an average house and garden block. In your notebook turn it into a permaculture food garden by redesigning it.
2. Now redesign your food garden, taking into account the limitations you found in your site analysis and seeing whether you can turn them into possibilities. Follow as closely as you can the garden design steps given in this chapter.
3. Write down all the vegetables, herbs and flowers you would like to harvest from your garden. Then make a growing calendar according to harvest season to show how you can keep yourself in food all year round.