



NATURAL GARDENING AND INTENSIVE BIOLOGICAL GARDENING: STRATEGIES FOR SUSTAINABLE GARDEN AGRICULTURE

*This 1991 paper follows on from Article 8 - **Gardening As Agriculture** and deals more directly with the issue of appropriate garden methods. I sought to minimise the arguments over best techniques by providing a strategic and inclusive overview. Peter Harper, the ecologist and organic garden manager at the Centre for Alternative Technology in Wales responded very positively to this paper and it was published in their Journal in 1995. He found the ideas had a direct parallel with his own teachings on the subject and provided evidence in his disputes with the teaching of permaculture in Britain which he believed only gave credence to the natural gardening approach. This revised version of the article includes more current references.*



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Within the broad church of organic gardening literature and practice there is a bewildering array of strategies, methods and techniques. Permaculture is seen by many as one particular set of organic gardening techniques which appear to contradict many of those applied by more traditional organic gardeners.

In fact, permaculture is a design system rather than a set of techniques and is eclectic enough to incorporate radically different strategies and techniques. Permaculture provides a conceptual framework within which it is possible to better understand and apply strategies and techniques which will prove ecologically sustainable over time.

I find it useful to think of organic gardening methods as a continuum between two extremes or polarities. One of those polarities has been called natural, wild, or low input gardening, the other as intensive biological gardening.

Natural gardening is a “do little, observe lots” approach which aims to focus the natural processes of climate, soil, plants and animals to provide food and other yields with minimal inputs or intervention. It is most eloquently described by the Japanese farmer/scientist/philosopher Masanoba Fukuoka in his classic text *The One Straw Revolution*¹. Most of the methods associated with permaculture and popularised by Bill Mollison reflect this wild or even ‘do nothing’ approach. Other popular organic gardening writers such as Jackie French² have favoured this approach without using the permaculture label. Another example of the ‘low input’ approach has been the promotion in the British permaculture movement of the “forest gardening” writings and model garden of Robert Hart³ as a distinct alternative to traditional organic gardening for cool climate permaculture.

The traditional land management methods of many indigenous hunter/gatherer peoples including the Australian aborigines have been reinterpreted in recent times as forms of gardening and farming which can now be seen as archetypical of natural gardening.

For example by disturbing the yam beds during harvesting, aboriginal women were cultivating the soil and thinning the tubers, allowing the plants to produce more and larger tubers. By picking and eating the largest, sweetest fruit and defecating near ancient camp sites, indigenous people planted and fertilised the seeds of better varieties of their favourite fruits⁴.

Even the more interventionist slash and burn gardeners of the wet tropics such as the Highlands of New Guinea used a cycle of natural fertility renewal to provide for the gardens which themselves mimicked the structure of the rainforest and contained trees which were described as “mothers of the forest” (pioneer species which would return the site to forest once it had become too dense to harvest and fertility had declined).

1 Also see Fukuoka, M. *The Natural Way of Farming* Japan Books 1985

2 French, J. *Beyond Organic Gardening: The Wilderness Garden* Aird Books 1992

3 Hart, Robert *Forest Gardening* Green Earth Books

4 See Article Five - *Aboriginal Land Use* in this collected writings

Detailed ecological studies⁵ of Highlands gardens prior to modernisation show them to be the most energy efficient form of agriculture yet studied. Until recently these gardens, together with the surrounding rainforest, provided the total needs of one of the world's most densely populated rural regions.

Intensive biological gardening involves much more control of natural processes to get the highest yields while not sacrificing quality and ecological sustainability. In many ways the biodynamic methods of gardening (and farming) based on the teachings of the German philosopher Rudolph Steiner⁶ epitomise this approach. Human labour is used to make very high quality composts and to deep dig garden beds which are often raised. Planting is intensive but highly planned to allow each crop and individual plant to achieve its full potential. Homeopathic preparations such as the "500" spray are applied to soil at particular moon phases to increase soil biological activity, plant vigour and resistance of pests and diseases as well as quality of harvested produce.

John Jeavons classic Californian gardening book *How to Grow More Vegetables than you ever thought possible from less land than you can imagine*⁷ provides a less esoteric version of "biodynamic gardening" showing that a combination of human labour, design and very high fertility can produce staggering yields without the use of toxic pesticides or artificial fertilisers.

In other ways many of the design ideas associated with permaculture especially the integration of structures for maximising yield from small urban gardens also fit into the intensive biological model. Many of the permaculture books including Bill Mollison's *Introduction to Permaculture*⁸ and Ross and Jenny Mars' *Getting Started in Permaculture*⁹ give many ways to make better use of limited space and recycled materials to increase food production, but Robert Kourik's *Designing and Maintaining Your Edible Landscape Naturally*¹⁰ is perhaps the most complete text for integrating intensive managed food production into modern living environments.

Another element in the intensive approach is the use of soil and leaf testing to determine the specific mineral deficiencies and using minerals to correct these underlying inhibitions to high yield, high quality and pest and disease resistance. The issue of what is "correct" testing, interpretation and remedies is hotly debated within the broad organic farming movement and for gardeners the cost of testing remains an obstacle. However there is a lineage of method beginning with the great American soil scientist William Albrecht¹¹ and

5 Rappaport, R. The Flow of Energy In An Agricultural Society in *Biology and Culture in Modern Perspective Readings from Scientific American* W.H. Freeman 1972

6 Steiner, R. Agriculture: A course of eight lectures BD Agriculture Association London 1972 and other books such as Koepf, Pettersson & Schaumann *Bio-Dynamic Agriculture: An Introduction* The Anthroposophic Press New York 1976

7 Jeavons, J. *How To Grow More Vegetable: than you ever thought possible on less land than you can image* Ten Speed Press 1976

8 Mollison, B. *Introduction To Permaculture* Tagari 1991

9 Mars, R&J *Getting Starting In Permaculture* Candlelight Trust 1994

10 Kourik, R. *Designing and Maintaining Your Edible Landscape Naturally* Metamorphic Press 1986

11 Walters, Charles, Jr. (ed) *The Albrecht Papers* Acres USA 1975

continued today by some of the most experienced consultant agronomists such as Neal Kinsey¹² both in America and Australia which is showing that intensive organic gardens can benefit greatly by correcting remaining natural imbalances or ones induced by overuse of specific, even organic, fertilisers.

Pre-industrial models for modern intensive biological gardening can be seen in both eastern and western civilisations wherever the pressure of limited land and numbers of people have prevailed for long periods of time. F. H King¹³ described the intensive farming (read 'gardening' methods) of the Chinese at the turn of the century. King was an agricultural scientist who laid some the foundations for the debate about sustainability of food production and the need to recycle human waste.

Also from the turn of the century the Russian naturalist/anarchist Peter Kropotkin in *Fields, Factories and Workshops of Tomorrow*¹⁴ draws together the evidence for the practicality of super intensive garden scale agriculture based on the same French intensive horticultural methods which later became a source for John Jeavons' methods.

The broad nature of the natural and intensive approaches are compared and contrasted by focussing on a range of functional characteristics. The following tables summarise those comparisons.

	Natural Gardening	Intensive Gardening
Form	Determined by natural site conditions, but often as a multi layered food forest with sunny edges and openings. Plant density reflects soil depth and moisture holding, rainfall and climatic factors.	Integrated with built environment, careful design and placement of structures to make optimal and multiple use of limited space and light as well as labour.
Process	Natural processes and limitation of seasons and soils dominate the system.	Human skill including design, culture and outside resources transform natural limitations of soil and climate.
Resource Inputs	Minimal capital or energy investment other than in the land.	Moderate capital and energy investment in structures, irrigation, initial plant stock, nutrients and mulches.

¹² Kinsey, N & Walterns, Charles. *Hand On Agronomy* Acres USA 1993

¹³ King, F.H. *Farmers of Forty Centuries* Rodale Press (facsimile edition of 1911 pub)

¹⁴ Ward, Colin (Ed) Kropotkin: *Fields, Factories and Workshops of Tomorrow* George Allen and Unwin 1974

	Natural Gardening	Intensive Gardening
Physical Labour Inputs	Low input, mainly in establishment and harvesting.	High establishment input and then consistent labour in management as well as harvesting.
Information Inputs	Mainly from careful observation (can involve large amounts of time)	High external information input via seeds, pest control agents, soil tests, books etc.
Structures	Few built structures other than fences to exclude inappropriate animals. Materials used often grown on site (eg. bamboo)	Trellis, pergola, raised bed, terrace, attached solar greenhouse and shade house, small livestock housing, compost bays and fencing.
Soil Development	Nutrient pumping, foraging and fixing plant species including trees, green manures (including “weed” species), living mulches. Possible imported minerals and organic matter during establishment.	Balancing of deficient major and trace elements with rock minerals. Sheet mulch of imported materials mainly during establishment. Use of deep aeration forks and/or deep digging.
Fertility Maintenance	Naturally distributed manures from managed small livestock and wild animals. In situ decomposition of crop wastes.	Optimal recycling of on site vegetation, animal manures, household wastes, grey water and possibly human waste, via deep litter yards, hot compost heaps, worm farms etc. In BD use of ‘500’ and other homeopathic preparations
Irrigation	Minimal irrigation, use of natural runoff from hard surfaces etc. to swales and other absorption structures	Regular irrigation by hand or reticulation from reliable external water supply.
Perennials	Provide main framework and climate control with trees used as trellises. Seedlings and wild types accepted.	Physically separate from annual (often deep dug) beds but close biological interaction. Grafted stock selected and sited for multiple functions including shade and beauty. Regular pruning, use of dwarf stocks, multigrafts,

	Natural Gardening	Intensive Gardening
Annuals	Many self sown and hardy types including those adapted to minimal water and few added nutrients. Shade tolerant and long bearing. Higher yielding selected types mainly on edges and disturbed pockets.	Selected varieties for high yield, ability to use water and added nutrients, small size, disease resistance, shade tolerance and value as perishable food (eg. lettuce before potatoes). Close spacing, continuous cropping, companion planting.
Pest Control	Mostly by natural resistance and natural predators sustained by diverse garden and surrounding environment	Integrated pest management using resistant varieties, cultural methods, biological controls and introduced predators, lures and some use of low toxicity pesticides.
Weeds	Few plants regarded as noxious, most used as nutrient foragers, living mulches, animal feed. Persistent weeds eliminated in pioneer preparatory phase by animals (eg. pigs) or careful site selection, alleopathic barrier plants and full use of light.	Surface cultivation and/or mulch used to control germination and young weeds. Hand weeding to hot compost or animal feed. Persistent weeds eliminated during establishment phase by deep sheet mulching and follow up hand weeding. BD weed “peppers”.
Propagation	High proportion of self sown annuals, vegetative reproduction plus broadcasting and undersowing. Seed saving of a few key productive species and varieties. Grafting of self sown trees in situ.	Seed often purchased for wide diversity of varieties. Seedlings often raised in greenhouse for transplanting. Tree stock grafted (often multi grafted) to optimal rootstocks.
Animals	Periodic controlled direct grazing by suitable poultry breeds, beneficial wild animals (lizards and small insect eating birds) encouraged by diverse habitats and forage. Harvesting of wild pest species.	Small livestock (rabbits, poultry) in well managed deep litter yards or movable cages on lawn areas. Feeding and collecting of manure for composting. Very limited controlled foraging. Bees often on the roof of sheds.

	Natural Gardening	Intensive Gardening
Yields	Modest per unit area but high per unit of labour. With high skills and evolution over time, system may become very productive of a limited range of food crop plus abundant secondary and backup yields. High seasonal variation.	Exceptionally high productivity per unit area. With good design and management productivity per labour unit can be high. Wide range of valuable food crops with moderate seasonal variation.

This framework allows us to play with the apparently competing aims of productivity and stability. By characterising the extremes, existing garden models and recommended methods can be appreciated for the pro and cons and relevance to particular situations without judgments about what is right and wrong. In this way we can explore and accept a wide range of techniques, methods and options while remaining committed to evolving more sustainable and productive garden agriculture.

Most gardeners influenced by permaculture place more emphasis on the natural gardening approach but in its ideal conception permaculture design should aim to combine the minimal input self regulatory aspects of natural gardening with the people - friendly character and high yields of intensive biological gardening. In its broadest conception, this ideal is a new expression of the constant search within the organic movement for the “holy grail” of high productivity and sustainability [*so much depends on time/skill - see the “yields” row above*].

Inevitably most good permaculture gardens tend to lie somewhere between the two extremes described in the table with compromise and trades-offs rather than sublime synthesis being the norm¹⁵.

By adding another dimension to this polarity between natural and intensive gardening it is possible to integrate another apparently great polarity, in the search for sustainable food production that between the scientific and the spiritual. Proponents of both the natural and intensive approaches may understand and interpret their successes (and failures) in terms of hard scientific and pragmatic materialist explanations or alternatively in terms of spiritual attunement to esoteric (hidden) forces and beings. This divide may be philosophically much more contentious and confusing than the natural/intensive polarity but again an understanding of the spectrum allows everyone to see a broader context for considering what is appropriate.

¹⁵ I have to say that the worst examples of permaculture inspired gardens combine limitations rather than the advantages of both approaches. In these cases, the use of elaborate structures and massive amounts of imported organic materials are used to create jungles of a diverse range of marginally useful species which may or may not supplement the residents' externally supplied diet.