

# NEW BIOSPHERE AGRICULTURE 'Kin Domain' Permaculture



**PASCAS FOUNDATION (Aust) Ltd**  
**ABN 23 133 271 593**

**Queensland, Australia**

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**www.pascasworldcare.com www.pascashealth.com**

**Em: [info@pascasworldcare.com](mailto:info@pascasworldcare.com)**

**Em: [info@pascashealth.com](mailto:info@pascashealth.com)**

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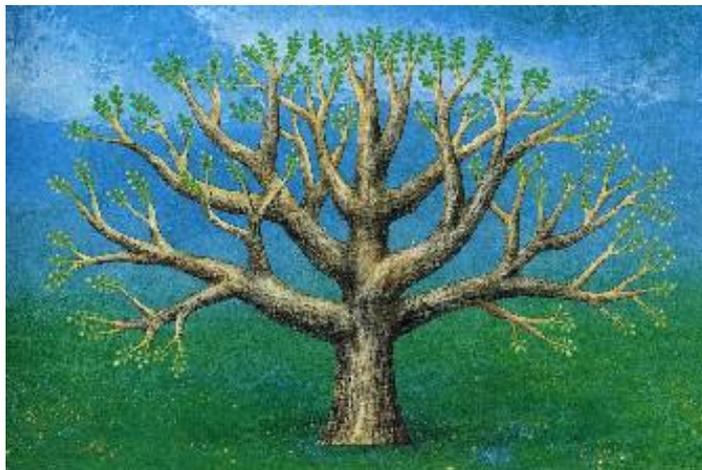
We offer all contents in love and with the fullness of grace, which is intended to flow to readers who join us upon this fascinating journey throughout this incredible changing era we are all experiencing.

Namaste



**KIN DOMAIN – PERMACULTURE:**

<http://en.wikipedia.org/wiki/Permaculture>



'The land does not have a soul condition, it actually REFLECTS our soul condition. (I have never said that the Land has a soul condition, because the land itself does not have a soul).

The land is always attempting to repair itself, but man generally tries to destroy it through mans soul condition.'

Yeshua

9 Dec 10

**Permaculture** is an approach to designing human settlements and perennial [agricultural](#) systems that mimic the relationships found in the natural [ecologies](#). It was first developed by Australians [Bill Mollison](#) and [David Holmgren](#) and their associates during the 1970s in a series of publications. The word *permaculture* is a [portmanteau](#) of *permanent agriculture*, as well as *permanent culture*.

Permaculture [design](#) principles extend from the position that "The only ethical decision is to take responsibility for our own existence and that of our children" (Mollison, 1990). The intent was that, by rapidly training individuals in a core set of design principles, those individuals could design their own environments and build increasingly [self-sufficient](#) human settlements — ones that reduce society's reliance on industrial systems of production and distribution that Mollison identified as fundamentally and systematically destroying Earth's ecosystems.

While originating as an [agro-ecological](#) design theory, permaculture has developed a large international following of individuals who have received training through intensive two week long 'permaculture design courses'. This 'permaculture community' continues to expand on the original ideas, integrating a range of ideas of [alternative culture](#), through a network of training, publications, permaculture gardens, and internet forums. In this way, permaculture has become both a design system and a loosely defined philosophy or [lifestyle ethic](#).



An example of **permaculture** utilizing animals and gardens. Permacultural aspect: helping animals in a veggie garden; harnessing and maintenance.

## HISTORY

The term *permanent agriculture* was coined by [Franklin Hiram King](#) in his classic book from 1911, [Farmers of Forty Centuries: Or Permanent Agriculture in China, Korea and Japan](#). In this context, permanent agriculture is understood as agriculture that can be sustained indefinitely.

This definition was supported by Australian [P. A. Yeomans](#) (*Water for Every Farm*, 1973) who introduced an observation-based approach to land use in Australia in the 1940s, based partially on his understanding of geology. Yeomans introduced [Keyline Design](#) as a way of managing the [supply](#) and distribution of water of a site. Holmgren based his [EcoVillage](#) design on the keyline principle, (see [WikiMapia view](#))

The work of [Howard T. Odum](#) was also an early influence, especially for Holmgren. Odum's work focused on system ecology, in particular the [Maximum power](#) principle, which examines the energy of a system and how natural systems tend to maximise the energy embodied in a system. For example, the total calorific value of woodland is very high with its multitude of plants and animals. It is an efficient converter of [sunlight](#) into [biomass](#). A [wheat](#) field, on the other hand, has much less total energy and often requires a large energy input in terms of [fertiliser](#). Another early influence was the work of [Esther Deans](#), who pioneered No-Dig Gardening methods. Other recent influences include the VAC system in Vietnam which is a government supported system to build Vegetable Aquaculture and Animal enClosures that cycle resources.

In the mid 1970s, [Australians Bill Mollison](#) and [David Holmgren](#) started to develop ideas that they hoped could be used to create stable [agricultural systems](#). This was a result of their perception of a rapidly growing use of destructive industrial-agricultural methods. They saw that these methods were poisoning the land and water, reducing [biodiversity](#), and removing billions of tons of [soil](#) from previously fertile landscapes. A design approach called "permaculture" was their response and was first made public with the publication of [Permaculture One](#) in 1978.

The term *permaculture* initially meant "permanent agriculture" but was quickly expanded to also stand for "permanent culture" as it was seen that social aspects were an integral part of a truly sustainable system. Mollison and Holmgren are widely considered to be the co-originators of the modern permaculture concept.

Observation develops design i.e. Termite mounds inspiration for passive climate control in modern housing  
Illustrator: A Sampson-Kelly

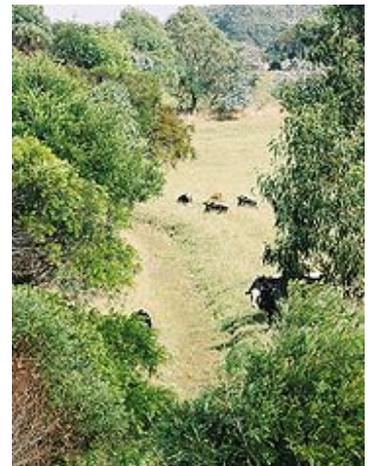
After the publication of *Permaculture One*, Mollison and Holmgren further refined and developed their ideas by designing hundreds of permaculture sites and organizing this information into more detailed books. Mollison lectured in over 80 countries and his two-week Design Course was taught to many hundreds of students. By the early 1980s, the concept had moved on from being predominantly about the design of agricultural systems towards being a more fully [holistic](#) design process for creating sustainable [human habitats](#).



By the mid 1980s, many of the students had become successful practitioners and had themselves begun teaching the techniques they had learned. In a short period of time permaculture groups, projects, associations, and institutes were established in over one hundred countries. In 1991 a four-part Television documentary by ABC productions called 'The Global Gardener' showed permaculture applied to a range of worldwide situations, bringing the concept to a much broader public. Excerpts are available online through YouTube. Permaculture has developed from its origins in Australia into an international 'movement'. English permaculture teacher [Patrick Whitefield](#), author of *The Earth Care Manual* and *Permaculture in a Nutshell*, suggests that there are now two strands of permaculture: a) Original and b) Design permaculture. Original permaculture attempts to closely replicate nature by developing edible ecosystems which closely resemble their wild counterparts. Design permaculture takes the working connections at use in an ecosystem and uses them as its basis. The end result may not look as "natural" as a [forest garden](#), but still has an underlying design based on [ecological principles](#). Through close observation of natural energies and flow patterns efficient design systems can be developed. This has become known as Natural Systems Design. (Dr. M Millington and A Sampson-Kelly)

## ELEMENTS of DESIGN

Permaculture principles draw heavily on the practical application of ecological theory to analyse the characteristics and potential relationships between design elements. Each element of a design is carefully analysed in terms of its needs, outputs, and properties. For example a chicken needs water, moderated microclimate, food and other chickens, and produces meat, eggs, feathers and manure and can help break the soil. Design elements are then assembled in relation to one another so that the products of one element feed the needs of adjacent elements. [Synergy](#) between design elements is achieved while minimizing waste and the demand for human labour or energy. Exemplary permaculture designs evolve over time, and can become extremely complex mosaics of conventional and inventive cultural systems that produce a high density of food and materials with minimal input. While techniques and cultural systems are freely borrowed from [organic agriculture](#), [sustainable forestry](#), [horticulture](#), [agroforestry](#), and the land management systems of [indigenous peoples](#), permaculture's fundamental contribution to the field of [ecological design](#) is the development of a concise set of broadly applicable organizing principles that can be transferred through a brief intensive training.



Mature species on a keyline irrigation channel, 'Orana' Farm Temperate Victoria Australia.

## MODERN PERMACULTURE

Modern permaculture is a system design tool. It is a way of:

1. looking at a whole system or problem;
2. observing how the parts relate;
3. planning to mend sick systems by applying ideas learnt from long-term sustainable working systems;
4. seeing connections between key parts.

In permaculture, practitioners learn from the working systems of nature to plan to fix the damaged landscapes of human agricultural and city systems. This thinking applies to the design of a kitchen tool as easily to the re-design of a farm. Permaculture practitioners apply it to everything deemed necessary to build a sustainable future. Commonly, “Initiatives ... tend to evolve from strategies that focus on efficiency (for example, more accurate and controlled uses of inputs and minimisation of waste) to substitution (for example, from more to less disruptive interventions, such as from biocides to more specific biological controls and other more benign alternatives) to redesign (fundamental changes in the design and management of the operation) (Hill & MacRae 1995, Hill et al. 1999).” “Permaculture is about helping people make redesign choices: setting new goals and a shift in thinking that affects not only their home but their actions in the workplace, borrowings and investments” (A Sampson-Kelly and Michel Fanton 1991). Examples include the design and employment of complex transport solutions, optimum use of natural resources such as sunlight, and “radical design of information-rich, multi-storey polyculture systems” (Mollison & Slay 1991).

“This progression generally involves a shift in the nature of one’s dependence — from relying primarily on universal, purchased, imported, technology-based interventions to more specific locally available knowledge and skill-based ones. This usually eventually also involves fundamental shifts in world-views, senses of meaning, and associated lifestyles (Hill 1991).” “My experience is that although efficiency and substitution initiatives can make significant contributions to sustainability over the short term, much greater longer-term improvements can only be achieved by redesign strategies; and, furthermore, that steps need to be taken at the outset to ensure that efficiency and substitution strategies can serve as stepping stones and not barriers to redesign...” (Hill 2000)

## CORE VALUES

Permaculture is a broad-based and holistic approach that has many applications to all aspects of life. At the heart of permaculture design and practice is a fundamental set of ‘core values’ or [ethics](#) which remain constant whatever a person's situation, whether they are creating systems for town planning or trade; whether the land they care for is only a [windowbox](#) or an entire [forest](#). These 'ethics' are often summarised as;

- **Earthcare** – recognising that [Earth](#) is the source of all life (and is possibly itself a living entity — see [Gaia theory](#)), that Earth is our valuable home, and that we are a part of Earth, not apart from it.
- **Peoplecare** – supporting and helping each other to change to ways of living that do not harm ourselves or the planet, and to develop healthy societies.
- **Fairshare** (or placing limits on consumption) - ensuring that Earth's limited [resources](#) are used in ways that are [equitable](#) and [wise](#).

Modern thought about permaculture began with the issue of sustainable [food production](#). It started with the [belief](#) that for people to feed themselves [sustainably](#), they need to move away from reliance on [industrialised agriculture](#). Where industrial farms use technology powered by [fossil fuels](#) (such as [gasoline](#), [diesel](#) and [natural gas](#)), and each farm specialises in producing high [yields](#) of a single [crop](#), permaculture stresses the value of low inputs and diverse crops. The model for this was an abundance of small-scale market and [home gardens](#) for food production, and a main issue was [food miles](#).



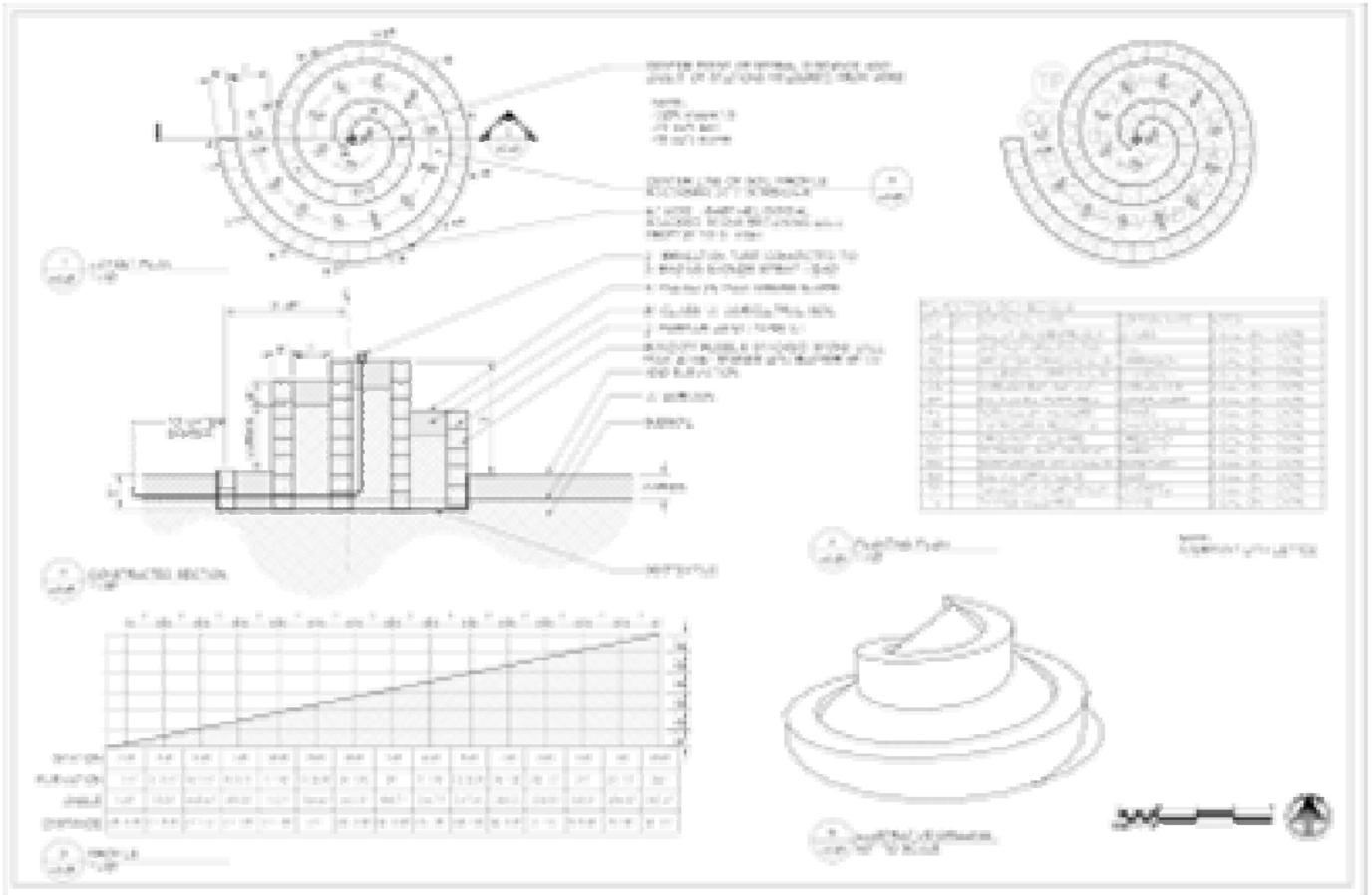
Permacultural aspect: co-operating niches at a small scale

The core of permaculture has always been in supplying a design toolkit for human habitation. This toolkit helps the designer to model a final design based on an [observation](#) of how [ecosystems](#) interact. A simple example of this is how the Sun interacts with a plant by providing it with energy to grow. This plant may then be [pollinated](#) by [bees](#) or eaten by [deer](#). These may disperse [seed](#) to allow other plants to grow into tall trees and provide shelter to these creatures from the wind. The bees may provide food for birds and the trees provide [roosting](#) for them. The tree's leaves fall and rot, providing food for small insects and [fungus](#). Such a web of intricate connections allows a diverse population of plant life and animals to survive by giving them food and shelter. One of the innovations of permaculture design was to appreciate the efficiency and productivity of natural ecosystems, to use natural energies (wind, gravity, solar, fire, wave and more) and seek to apply this to the way human needs for food and shelter are met. One of the most notable proponents of this design system has been [David Holmgren](#), who based much of his permaculture innovation on [zone analysis](#).

### **O'BREDIM design methodology**

O'BREDIM is a [mnemonic](#) and [acronym](#) for *observation, boundaries, resources, evaluation, design, implementation and maintenance*.

- **Observation** allows you first to see how the site functions within itself, to gain an understanding of its initial relationships. Some people recommend a year-long observation of a site before anything is planted. During this period all factors, such as lay of the land, natural flora and so forth, can be brought into the design. A year allows the site to be observed through all seasons, although it must be realised that, particularly in temperate climates, there can be substantial variations between years.
- **Boundaries** refer to physical ones as well as to those your neighbours might place on you, for example.
- **Resources** include the people involved, funding, as well as what you can grow or produce in the future.
- **Evaluation** of the first three will then allow you to prepare for the next three. This is a careful phase of taking stock of what you have at hand to work with.
- **Design** is a creative and intensive process, and you must stretch your ability to see possible future [synergetic](#) relationships.
- **Implementation** is literally the ground-breaking part of the process when you carefully dig and shape the site.
- **Maintenance** is then required to keep your site at a healthy optimum, making minor adjustments as necessary. Good design will preclude the need for any major adjustment.



## Patterns

### Herb spiral

The use of patterns both in nature and reusable patterns from other sites is often key to permaculture design. This echoes the [Pattern language](#) of [Christopher Alexander](#) used in [architecture](#) which has been an inspiration for many permaculture designers. All things, even the wind, the waves and the earth on its axis, moving around the Sun, form patterns. In pattern application, permaculture designers are encouraged to develop:

1. Awareness of the patterns that exist in nature (and how these function)
2. Application of pattern on sites in order to satisfy specific design needs.

"The application of pattern on a design site involves the designer recognising the shape and potential to fit these patterns or combinations of patterns comfortably onto the landscape" Sampson-Kelly. Branching can be used for the direction of paths, rather than straight paths with square angles. Lobe-like paths of the main path (known as keyhole paths) can be used to minimise waste and compaction of the soil.

## Zones

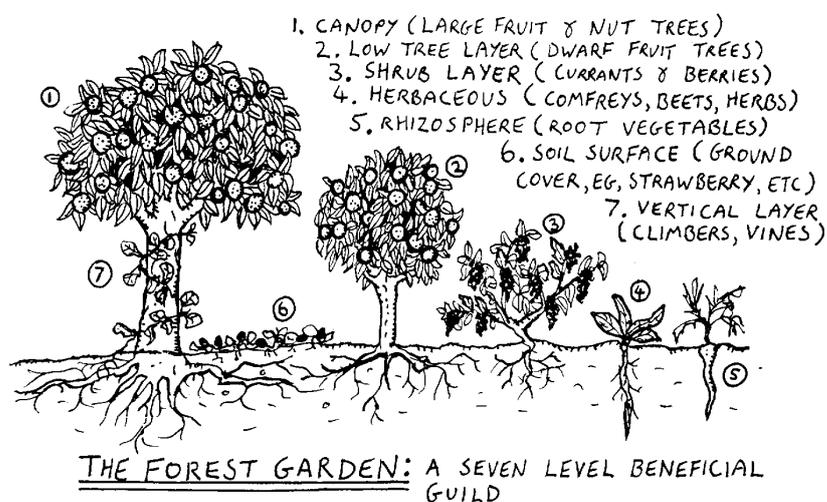
Main article: [Zones \(Permaculture\)](#)

Permaculture zones are a way of organising design elements in a human environment based on the frequency of human use and plant or animal needs. Frequently manipulated or harvested elements of the design are located close to the house in zones one and two such as herbs for the kitchen, whereas chickens like to be close but need to be kept at a safe distance to reduce noise and contamination (unless they are house trained). Less frequently used or manipulated elements, and elements that benefit from isolation (such as wild species) are farther away.

## Links and connections

Also key to the permacultural design model is that useful connections are made between components in the final design. The formal analogy for this is a natural mature ecosystem. So, in much the same way as there are useful connections between Sun, plants, insects and [soil](#) there will be useful connections between different plants and their relationship to the [landscape](#) and humans. Another innovation of the permaculture design is to design a land use or other system that has multiple outputs. In terms of

Holmgren's application of H.T. Odum's work, a useful connection is viewed as one that maximises power: that is, maximizes the rate of useful energy transformation. A comparison which illustrates this is between a [wheat](#) field and a forest. "It is not the number of diverse things in a design that leads to stability, it is the number of beneficial connections between these components" Mollison 1988.



## Layers / 'stacking'

The seven layers of the forest garden.

See also: [Forest gardening](#)

In permaculture and forest gardening, seven layers are identified:

1. The [canopy](#)
2. Low tree layer (dwarf fruit trees)
3. [Shrubs](#)
4. [Herbaceous](#)
5. [Rhizosphere](#) ([root crops](#))
6. Soil Surface ([cover crops](#))
7. Vertical Layer (climbers, [vines](#))

An eighth layer, Mycosphere (fungi), is often included.

A mature [ecosystem](#) such as [ancient woodland](#) has a huge number of relationships between its component parts: [trees](#), [understory](#), [ground cover](#), [soil](#), [fungi](#), [insects](#) and other animals. Plants grow at different heights. This allows a diverse community of life to grow in a relatively small space. Plants come into leaf and fruit at different times of year.

Layering in temperate garden Mt Kembla photo: A Sampson-Kelly.

For example, in the [UK](#), [wild garlic](#) comes into leaf on the woodland floor in the time before the top [canopy](#) re-appears with the spring. A wood suffers very little [soil erosion](#), as there are always roots in the soil. It offers a habitat to a wide variety of animal life, which the plants rely on for [pollination](#) and seed distribution. The productivity of such a forest, in terms of how much new growth it produces, exceeds that of the most productive wheat field. It is in this observation - of how much more productive a wood may be on far less fertilizer input - that the potential productivity of a permaculture design is modelled. The many connections in a wood contribute together to a proliferation of opportunities for amplifier feedbacks to evolve that in turn maximise energy flow through the system.



Here is a photo of a layered warm temperate garden in NSW, Australia (courtesy of PermacultureVisions). There are several layers: the canopy layer is [Inga Edulis](#) (ice cream bean), the middle stratum contains [plum](#) and [peach](#), [mango](#), [mulberry](#) and nurse plants such as native [wattle](#). There are [shrubs](#) such as [sage](#) and woody herbs, ground covers such as [sweet potato](#) and vines such as [passion fruit](#) and [kiwi fruit](#). The tubers consist of onions and taro.

## Polyculture

[Polyculture](#) is agriculture using multiple crops in the same space, in imitation of the diversity of natural ecosystems, and avoiding large stands of single crops, or [monoculture](#). It includes [crop rotation](#), [multi-cropping](#), and [inter-cropping](#). [Alley cropping](#) is a simplification of the layered system which typically uses just two layers, with alternate rows of trees and smaller plants.

## Guilds

Permaculture Guilds are groups of plants, animals and microbacteria which work particularly well together. These can be those observed in nature such as the [White Oak](#) guild which centres on the White Oak tree and includes 10 other plants. [Native](#) communities can be adapted by substitution of plants more suitable for human use.

The [Three Sisters](#) of [maize](#), [squash](#) and [beans](#) is a well known guild. The [British National Vegetation Classification](#) provides a comprehensive list of plant communities in the UK. Guilds can be thought of as an extension of [companion planting](#).

## Increase edge

See also [edge effect](#)

Permaculturists maintain that where vastly differing systems meet, there is an intense area of productivity and useful connections. The greatest example of this is the coast. Where the land and the sea meet there is a particularly rich area that meets a disproportionate percentage of human and animal needs. This is evidenced by the fact that the overwhelming majority of humankind lives within 100 km of the sea. So this idea is played out in permacultural designs by using spirals in the herb garden or creating ponds that have wavy undulating shorelines rather than a simple circle or oval. Edges between woodland and open areas have been claimed to be the most productive.

## Perennial plants

[Perennial plants](#) are often used in permaculture design. As they do not need to be planted every year they require less maintenance and [fertilisers](#). They are especially important in the outer zones and in layered systems. [Ken Fern](#) of [Plants For A Future](#) has spent many years investigating suitable perennial plants. As has Wes Jackson of The Land Institute.

Further information: [List of useful plants](#)

## Animals

Chickens in a [chicken tractor](#) prepare a section of land before it's dug up for a new vegetable bed. (An organic farm near [Bruthen](#), Victoria)



Many permaculture designs involve animals other than humans. Chickens can be used as a method of weed control and also as a producer of eggs, meat and fertiliser. Some types of [agroforestry](#) systems combine trees with [grazing](#) animals.

Some projects are critical of the use of animals (see [vegan organic gardening](#)). However not all permaculture sites farm the animals. The animals are pets and can be treated as co-habitators and co-workers of the site, eating foods normally unpalatable to people such as slugs, termites, being an integral part of the pest management by eating some pests, supplying fertiliser through their droppings and controlling some weed species.

## Annual monoculture (anti-pattern)

[Annual monoculture](#) such as a wheatfield can be considered a pattern to be avoided in terms of space (height is uniform) and time (crops grow at the same rate until [harvesting](#)). During growth and especially after harvesting the system is [prone](#) to [soil erosion](#) from rain. The field requires a hefty input of [fertilizers](#) for growth and machinery for harvesting. The work is more likely to be repetitive, mechanised and rely on [fossil fuels](#).

No pattern should be hard and fast and depending on the design considerations they can be broken. An example of this is broadscale permaculture practiced at [Ragmans Lane Farm](#), which has a component of annual farming. Here the amount of human involvement is a key factor influencing the design.

## Energy

Natural Energy use: e.g. a cave for preservation  
Illustrator: A Sampson-Kelly



Applying these values means using fewer non-renewable sources of [energy](#), particularly [petroleum](#) based forms of energy. Burning fossil fuels contributes to [greenhouse gases](#) and [global warming](#); however, using less energy is more than just combating global warming. Food production should be a fully [renewable](#) system; but using current agricultural systems this is not the case. Industrial agriculture requires large amounts of petroleum, both to run the equipment, and to supply [pesticides](#) and fertilizers. Permaculture is in part an attempt to create a renewable system of food production that relies upon minimal amounts of energy.

For example permaculture focuses on maximizing the use of trees ([agroforestry](#)) and [perennial](#) food crops because they make a more efficient and long term use of energy than traditional [seasonal](#) crops. A farmer does not have to exert energy every year replanting them, and this frees up that energy to be used somewhere else.

Traditional [pre-industrial agriculture](#) was labour intensive, [industrial agriculture](#) is fossil fuel intensive and permaculture is design and information intensive and [petrofree](#). Partially permaculture is an attempt to work smarter, not harder; and when possible the energy used should come from [renewable sources](#) such as [wind power](#), [passive solar](#) designs or [biofuels](#).

A good example of this kind of efficient design is the [chicken greenhouse](#). By attaching the [chicken coop](#) to a greenhouse you can reduce the need to heat the greenhouse by fossil fuels, as the chicken's bodies heat the area. The chickens [scratching](#) and [pecking](#) can be put to good use to clear new land for crops. Their [manure](#) can be used in [composting](#) to [fertilise](#) the [soil](#). [Feathers](#) could be used in [compost](#) or as a [mulch](#). In a conventional [factory](#) situation all these chicken outputs are seen as a [waste](#) problem. So in factories cooled by huge [air conditioners](#), the chicken waste is extracted. All the energy is focused on [egg](#) production. Thus it is a further principle of permaculture that "[pollution](#) is energy in the wrong place".

## Holmgren's 12 design principles

These restatements of the principles of permaculture appear in David Holmgren's *Permaculture: Principles and Pathways Beyond Sustainability*; also see [permacultureprinciples.com](http://permacultureprinciples.com);

1. **Observe and interact** - By taking the time to engage with nature we can design solutions that suit our particular situation.
2. **Catch and store energy** - By developing systems that collect resources when they are abundant, we can use them in times of need.

3. **Obtain a yield** - Ensure that you are getting truly useful rewards as part of the work that you are doing.
4. **Apply self-regulation and accept feedback** - We need to discourage inappropriate activity to ensure that systems can continue to function well.
5. **Use and value renewable resources and services** - Make the best use of nature's abundance to reduce our consumptive behaviour and dependence on non-renewable resources.
6. **Produce no waste** - By valuing and making use of all the resources that are available to us, nothing goes to waste.
7. **Design from patterns to details** - By stepping back, we can observe patterns in nature and society. These can form the backbone of our designs, with the details filled in as we go.
8. **Integrate rather than segregate** - By putting the right things in the right place, relationships develop between those things and they work together to support each other.
9. **Use small and slow solutions** - Small and slow systems are easier to maintain than big ones, making better use of local resources and producing more sustainable outcomes.
10. **Use and value diversity** - Diversity reduces vulnerability to a variety of threats and takes advantage of the unique nature of the environment in which it resides.
11. **Use edges and value the marginal** - The interface between things is where the most interesting events take place. These are often the most valuable, diverse and productive elements in the system.
12. **Creatively use and respond to change** - We can have a positive impact on inevitable change by carefully observing, and then intervening at the right time.

## Design for ecologinomic (ecology-economic) ethics

A basic principle is thus to "add value" to existing crops. A permaculture design therefore seeks to provide a wide range of solutions by including its main ethics (see above) as an integral part of the final value-added design. Crucially, it seeks to address problems that include the [economic](#) question of how to either make money from growing crops or exchange crops for labour such as in the [LETS](#) scheme. Each final design therefore should include economic considerations as well as give equal weight to maintaining ecological balance, making sure that the needs of people working on the project are met and that no one is exploited.

Community economics requires a balance between the three aspects that comprise a community: justice, environment and economics, also called the "triple bottom line", or "ecological-economics-ethics" (EEE) or "triple E". A cooperative farmer's market could be an example of this structure. The farmers are the workers and owners. Additionally, all economics are limited by their ecology. No economic system stands apart independently from its eco-system; therefore, all external costs must be considered when discussing economics.

### Examples of ecologic design

One way of doing this is through designing a system that has "multiple outputs". For example, a [wheat](#) field interspersed with [walnuts](#) will reduce soil erosion, act as a [windbreak](#) and provide a walnut crop as well as a [wheat](#) crop. Managing two crops will be more interesting work. Here the system comes into conflict with conventional agriculture and economics. Interplanting trees in a wheat field reduces the wheat yield and makes the field harder to harvest using machinery, as the operator has to drive around the

trees. Most farms specialise in a few [crops](#) at a time and seek to maximise [surplus](#) in order to increase profit. This surplus can only be maintained with a massive injection of fossil fuels.

## Critiques

John Robin has been one the strongest critics of permaculture, criticising it for its potential to spread environmental [weeds](#). This reflects a divide between native plant advocates and permaculture.

Another criticism of permaculture is found in a book review of Toby Hemenway's book *Gaia's Garden*, published in the Winter 2001 edition of the *Whole Earth Review*. In it, Greg Williams critiques the view that woods were more productive than farmland, based on the theory of ecological succession which says that net productivity declines as ecosystems mature. He also criticised the lack of scientifically respectable data and questions whether permaculture is applicable to more than a small number of dedicated people. But Hemenway's response in the same magazine disputes Williams's claim on productivity as focusing on climax rather than on maturing forests, citing data from ecologist [Robert Whittaker](#)'s book *Communities and Ecosystems*. Hemenway is also critical of Williams's characterisation of permaculture as simply forest gardening.

## Contemporary examples

In the years since its conception, permaculture has become a successful approach to designing sustainable systems. Its adaptability and emphasis on meeting human needs means that it can be utilized in every climatic and cultural zone. However, at the moment the large proportion of practitioners are only likely to be inspired individuals and there is a distinct lack of broadscale permaculture projects. Nevertheless, permaculture has also been used successfully as a development tool to help meet the needs of [indigenous communities](#) facing degraded standards of living from exposure to free-market economics.

Below are some examples of permaculture sites (see also a [wiki-map of permaculture sites](#)):

### Africa

[Zimbabwe](#) has 60 schools designed using permaculture, with a national team working within the schools' curriculum development unit. The [UN High Commissioner for Refugees](#) (UNHCR) has produced a report on using permaculture in refugee situations after successful use in camps in [Southern Africa](#) and [Republic of Macedonia](#). The [Biofarming approach](#) applied in [Ethiopia](#) has very similar features and can be considered permaculture. It is mainly promoted by the [non-governmental organisation](#) BEA, based in [Addis Ababa](#).

### Oceania

#### Australia

The development of permaculture co-founder David Holmgren's home plot at Melliodora, [Central Victoria](#), has been well documented at his website and published in [e-book](#) format.

Designed from permaculture principles, [Crystal Waters](#) is a socially and environmentally responsible, economically viable rural subdivision north of [Brisbane, Australia](#). Crystal Waters was designed by Max Lindegger, Robert Tap, Barry Goodman and Geoff Young, and established in 1987. It received the 1996 [World Habitat Award](#) (assessed by Dr Wally N'Dow) for its "pioneering work in demonstrating new ways of low impact, sustainable living". Eighty-three freehold residential and two commercial lots occupy 20% of the 259ha (640 acre) property. The remaining 80% is the best land, and is owned in common. It can be licensed for sustainable agriculture, forestry, recreation and habitat projects.

### **[Tikopia](#)**

Tikopians practice an intensive permaculture system, similar in principle to forest gardening and the gardens of the New Guinea highlands. Their agricultural practices are strongly and consciously tied to the population density. For example, around 1600 AD, the people agreed to slaughter all [pigs](#) on the island and substitute fishing, because the pigs were taking too much food that could be eaten by people.

### **New Zealand**

There are many well established living examples of permaculture practice in New Zealand. Rainbow Valley Farm is the premier model. Rainbow Valley Farm was established in 1988 by Joe Polaischer and Trish Allen. The 21 ha. organic farm was designed on permaculture principles and ethics.

### **Asia**

#### **Indonesia**

The [Indonesian Development of Education and Permaculture](#) assisted in disaster relief in [Aceh, Indonesia](#) after the [2004 Tsunami](#). They have also developed [Wastewater Gardens](#), a small-scale [sewage](#) treatment systems similar to [Reedbeds](#).

#### **Thailand**

[The Panya Project](#), located in Mae Taeng, Chiang Mai, Thailand, is a sustainable living project implementing permaculture principals and hosting workshops in English and Thai. In fall 2006, the project hosted a PDC taught by [Geoff Lawton](#) of the Permaculture Research Institute of Australia, and subsequently installed over 500 metres of swales and a 2 million litre dam. The Panya Project used permaculture to help regenerate what used to be a monocrop mango plantation, transforming it into what is called a "biodiverse food forest, organic farm and education centre". The Panya Project also incorporates what they call "natural building" into their design, e.g., wattle, cob and adobe brick.

### **Europe**

#### **Cyprus**

Two acres of land at Ayia Skepi Therapeutic Centre in Filani village, a drug rehabilitation centre about 25 km from [Nicosia](#), are being developed by Emily Markides, Julia Yelton, Charles Yelton and the residents of the detoxification centre.

#### **France**

- Annual events
  - Introduction to Permaculture events
  - Permaculture design courses in French and English
  - Regular 'entre-aide' work days.
- [Francophone Permaculture](#)
- [Francophone Permaculture Forum](#)
- [L'Université Populaire de Permaculture](#)
- [The French Permaculture Association](#)

2009 will see a *Permaculture Festival* with music, stories, film, accreditations, workshops, discussions and much more. The tickets are on sale now, limited to 1000,

#### Publications

- La Permaculture, conception, construction et entretien des communautés durable, various available here.
- Vers une vie abondante, saine sûre et en harmonie, Vos premiers pas dans la création d'un Perma-Lieux, edited by Steve Read and Cloé LeGoïc, free download here.

#### In English

- "The same planet a different World; Designers edition" edited by Steve Read and Cloé LeGoïc free download.
- "The same planet a different World; Public edition" edited by Steve Read and Cloé LeGoïc free download.

#### Iberia

[RPI](#) - Red de Permacultura Ibérica (Iberic Permaculture Network)

#### United Kingdom

[Robert Hart's](#) forest garden in Shropshire, England

There are a number of example permaculture projects in the UK, including:

- Agroforestry Research Trust, a not-for-profit organisation based in [Dartington](#), [Devon](#) that runs a 2-acre (8,100 m<sup>2</sup>) forest garden and publishes the journal Agroforestry News.
- Chickenshack Housing co-op, a fully mutual housing co-op established in 1995 using permaculture design principles. Based in rural North Wales, the community has 4 dwellings and 6 residents on a 5-acre (20,000 m<sup>2</sup>) site. Features include a biomass and solar district heating scheme, a half-acre forest garden and various wildlife conservation and habitat creation



strategies. The community is very active in regional sustainability projects such as the Machynlleth Transition Towns initiative. It runs occasional courses in permaculture design and regularly receives visits from interested parties.

- Middlewood Trust, a permaculture-based farm in [North Lancashire](#) running courses in permaculture, crafts, forestry and sustainability.
- [Plants for a Future](#), a [vegan-organic](#) project based at [Lostwithiel](#) in [Cornwall](#) that is researching and trialing edible and otherwise useful plant crops for sustainable cultivation. Their online database features over 7,000 such species that can be grown within the UK. A collaborative version of the database is in development by the [permaculture.info](#) project.
- *Prickly Nut Woods*, a 10-acre (40,000 m<sup>2</sup>) woodland near [Haslemere](#), [Surrey](#) that is [managed](#) by [Ben Law](#). He uses a 'whole system' permacultural approach, using a wide variety of woodland products and documenting a complex web of relationships. He built a house almost entirely using products from the woodland, which was featured in [Channel 4's Grand Designs](#) TV series. The project has a second, larger property in North [Devon](#), for which it is seeking a new group to take over.
- [Ragmans Lane](#), a 60-acre (240,000 m<sup>2</sup>) farm in the [Forest of Dean](#) in [Gloucestershire](#).
- The RISC Roof Garden, on top of a development education centre in Reading city centre and inspired by Robert Hart's permaculture forest garden in Shropshire, is an excellent example of urban permaculture design. It is used by schools, educators and designers as an educational resource for sustainable development and is a member of the National Gardens Scheme. The garden is composed of dense plantings of over 180 species of edible and medicinal plants and is fed by rainwater and composted waste from the centre.
- Tir Penrhos Isaf, near Dolgellau, developed by Chris and Lyn Dixon since 1986.

Other projects tend to be more community oriented, particularly in [urban areas](#). These include [Naturewise](#), a north [London](#) based group that tends a number of forest gardens and [allotments](#) as well as running regular permaculture introductory and design courses; and [Organiclea](#), a [workers cooperative](#) that is involved in developing local food-growing and distribution initiatives around the [Walthamstow](#) area of east London. The [Transition Towns](#) movement initiated in [Totnes](#) and [Kinsale](#) by Rob Hopkins is underpinned by permaculture design principles in its attempts to visualise sustainable communities beyond [peak oil](#).

The UK [Permaculture Association](#) publishes an extensive directory of other projects and example sites throughout the country.

## North America

### Canada

Kootenay Permaculture Institute, British Columbia <http://www3.telus.net/permaculture>

### United States of America

Also see the Permaculture Association of Teachers and Organizers on [WiserEarth](#) for a more-complete US Listing: <http://www.wiserearth.org/group/PATO>

### Northeast US

- The [Northeastern Permaculture Network](#) brings together enthusiasts in the northeastern United States and eastern [Canada](#).
- Burlington Permaculture is an ad-hoc community group based out of Burlington Vermont. BP unites neighbours to promote urban agriculture and reforestation, enhance neighbourhoods, and strengthen the web of community resources as we look beyond sustainability towards a vibrant healthy relationship with our landscape.
- [Camp Epworth Permaculture Demonstration and Education Center](#) is a collaborative project of [Green Phoenix Permaculture](#), the United Methodist Church, and many permaculture designers & teachers including [AppleSeed Permaculture](#), [Sowing Solutions](#), and more.

#### **Southeast US**

- The Edible Plant Project implements and promotes elements of permaculture through a nonprofit nursery and workshops in [Gainesville, FL](#) (home of [University of Florida](#)).

#### **Central US**

- Permaculture Research Institute Minnesota
- The Round Mountain Institute in the Gunnison valley of Colorado is a nonprofit that is dedicated to sustainable agriculture high in the rocky mountains near the continental divide.
- Central Rocky Mountain Permaculture Institute.
- The [Urban-Suburban Sustainability Initiative](#) based in [Belleville, Illinois](#) is a local grassroots organization in the process of starting up. Its focus will be on permaculture, bioremediation, environmental education and [Local Exchange Trading Systems](#).
- Bloomington Permaculture Guild, Bloomington, Indiana

#### **Western US**

- The Regenerative Design Institute (RDI) is a non-profit educational organization in [Bolinis, California](#).
- Promoting urban permaculture in [Los Angeles](#) is Path to Freedom.
- The Urban Permaculture Guild implements and promotes elements of permaculture through educational workshops and projects in East Bay and San Francisco, CA.
- Indigenous Permaculture (IPP) revitalizes the relationship of communities to the earth, and operates as a collaborative of communities sharing information, resources, and tools.

#### **Southwest US**

- In [Santa Fe, New Mexico](#), the Permaculture Institute utilizes a hands on approach to education on topics such as landscape and building design as well as water systems.

#### **Northwest US**

- The [Seattle](#) Permaculture Guild is active in that city.
- The Portland Permaculture Guild (PPG) is very active in [Portland, Oregon](#). There are many PC gardens in and around the Portland area. There are many fine teachers in Portland and in Oregon,

including teachers OF PC teachers. Also, Toby Hemenway, noted Permaculture author and teacher, lives in the Portland area.

## **Cuba**

Cuba has in the past 18 years transformed its food production using low-input, or [organic agriculture](#) and, to some degree, permaculture. [Havana](#) produces up to 50% of its food requirements within the city limits, all of it is organic and produced by people in their homes, gardens and in municipal spaces.

## **Latin America**

### **Nicaragua**

Project Bona Fide is a 43-acre (170,000 m<sup>2</sup>) site on the twin [volcano](#) island of [Ometepe, Nicaragua](#). Project Bona Fide has been in development for nearly a decade, and has become an important centre for education and community development. Infrastructural systems contain: natural buildings built with local materials, terraced and medicinal plant gardens, an extensive nursery, seed bank, developing fruit and nut orchards, food forests, native timber forestry, timber bamboo plantings, water-catchment, drip irrigation and ferrocement technologies, renewable energy systems, and [composting toilets](#). Outreach efforts include social programs that provide educational opportunities based in ecological agriculture, community reforestation efforts that are supported by a seed bank and nursery, local seed and plant exchanges, a children's nutritional kitchen and an upcoming community centre.

### **Brazil**

[IPEC](#) - Ecocentro at the Instituto de Permacultura e Ecovilas do [Cerrado](#) - the Institute of Permaculture and Ecovillage of the Cerrado

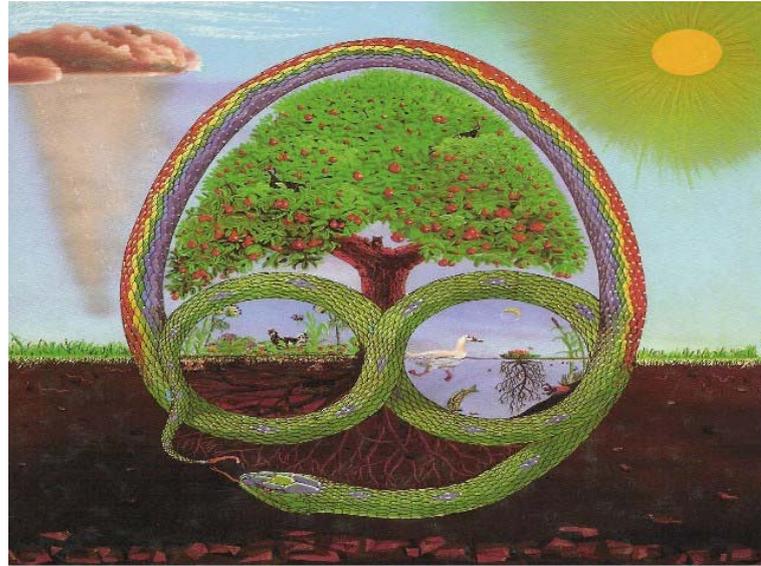
[IPCP](#) - Instituto de Permacultura Cerrado-Pantanal (Permaculture Institute of Cerrado-Pantanal), Campo Grande, MS. Specializing in interactive teaching of Permaculture and direct work with Indigenous communities within the Cerrado biome.

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### An OVERVIEW of CRYSTAL WATERS PERMACULTURE VILLAGE:

<http://www.ecologicalsolutions.com.au/crystalwaters/overview/overview.html>

A socially and environmentally responsible, economically viable rural subdivision north of Brisbane (Australia), Crystal Waters was designed by Max Lindegger, Robert Tap, Barry Goodman and Geoff Young, and established in 1987. It received the 1996 World Habitat Award (assessed by Dr Wally N'Dow) for its "pioneering work in demonstrating new ways of low impact, sustainable living".

83 freehold residential and 2 commercial lots occupy 20% of the 259ha (640 acre) property. The remaining 80% is the best land, and is owned in common. It can be licensed for sustainable agriculture, forestry, recreation and habitat projects.

The village centre is zoned for commerce, light industry, tourism and educational activities.

Crystal Waters has become a community of 200 people with a multitude of businesses and food producing gardens. Land productivity has been dramatically increased. See many [photos of our community here](#).

By-laws ensure that residents are responsible for the provision of their needs and the disposal of waste within ecological parameters. While these by-laws provide a framework for sustainable living, perhaps more effective is the reality of living where your decisions affect 'your own backyard'. Here, you can't just flush the problem away.



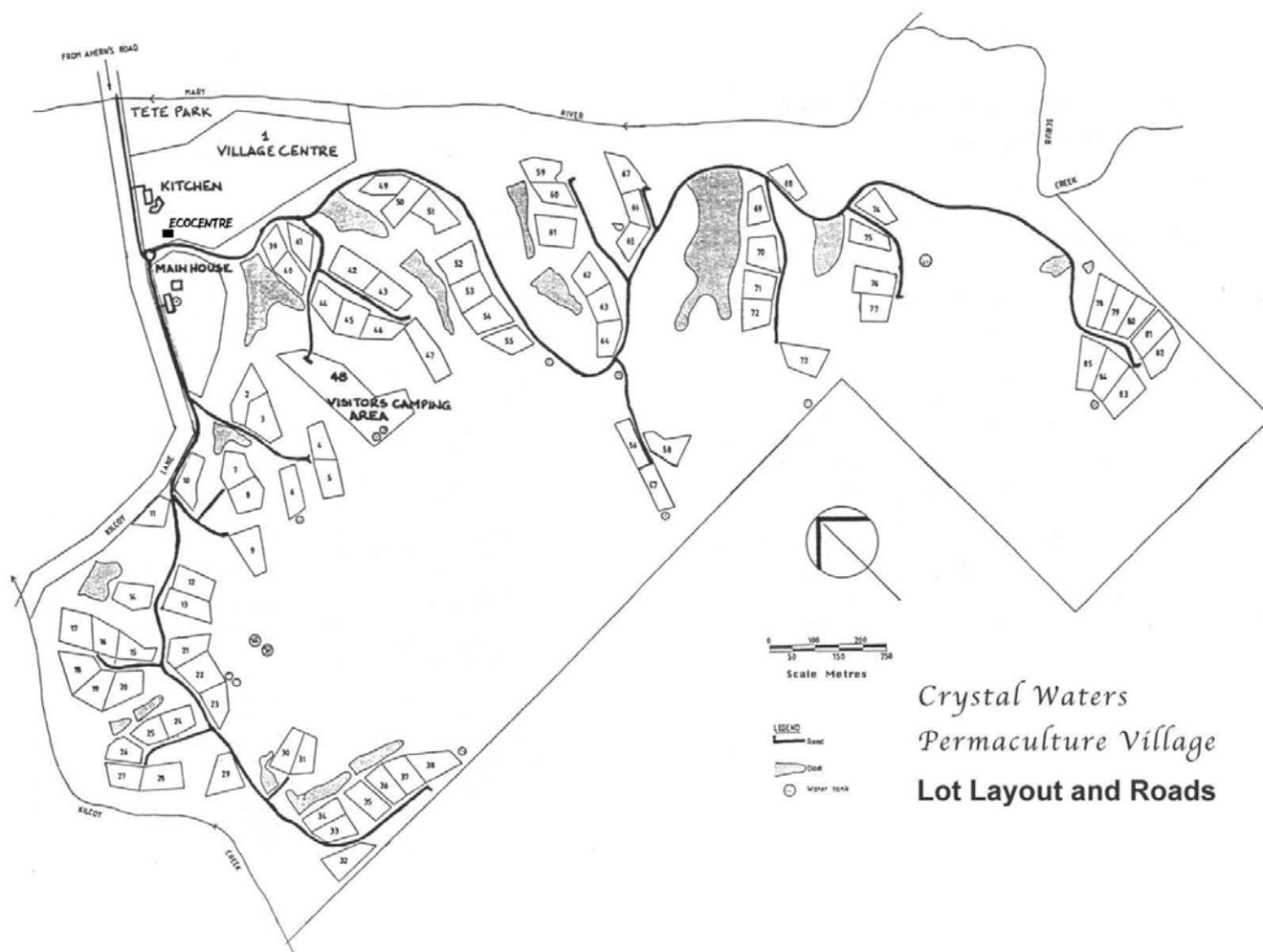
Important impacts include the revitalisation of the local bio-region by the influx of new residents, the increased diversity of flora and fauna, the improvement in land quality, the nurturing of new 'green' technologies, and the education of the many course participants and guests visiting Crystal Waters. They learn how little you need to change your life in a Westernised country to make a very positive impact on the environment.

#### **Situation before the initiative began**

The 640 acre (259 ha) property had been extensively logged and many of the ridges were near treeless. The land was in a stressed condition, and producing little in the way of food or income. Seven adults living on the property had no legal tenure.

The area is typically rural, suffering from unemployment due to the decline of traditional industries (timber and dairy farming) and population drift to the cities. All services from the local shop to the school were suffering. As the environment became over exploited the economy followed in a downward spiral.

It was necessary to focus on the strengths of this bio-region and utilise these in a sustainable manner to create meaningful work and security to the remaining residents and to attract more people.



### Preparing information and clarifying priorities

The seven existing residents were asked to define their dreams and expectations. The designers worked up sketch plans via a series of further discussions and later presentation of preliminary ideas to the local government authority.

### Formulation of objectives, strategies and mobilization of resources

Meetings with stakeholders led to the development of 6 basic objectives for the village design:

- Clean air, water and soil (thus food)
- Freedom of spiritual belief
- To work towards a guarantee of meaningful activity for all
- To create a place for healthy play and safe recreation

- Active social interaction
- Healthy shelter

The objectives became the umbrella directive in all design processes. The completed design proposal was well illustrated and presented, and sent to each individual local government politician. Strong lobbying and clarity in explanation and purpose resulted in a unanimous approval after a relatively short but vigorous discussion period.

Leadership roles were initially assumed by two of the designers. During the implementation period this extended to four. Weekly meetings ensured that problems were solved relatively painlessly. Each leader was given a number of portfolios and each portfolio was backed up by two designers.

Finance was tight throughout the development period and remains a challenge. As a pioneering project the developer and the government authorities had to learn 'on the job'. Both parties went through an educational process where solutions were found co-operatively.

Job creation remains an important task.

### **Results Achieved**

At this stage (15 years down the track) most of our objectives have been achieved. For example:

Water quality in our major dams and the adjoining creeks remains excellent. A water testing workshop was held here and one of the participants now regularly tests the water, sometimes sending samples to an independent laboratory. The water downstream of the development has not been negatively affected.

Crystal Waters is now a very social place. Our café serves regular meals on Friday evenings and for Sunday brunch. We have residents writing and producing concerts. People meet for working bees, yoga, permaculture, theatre, music, volleyball, discussion of community issues

The layout of the 83 residential lots was arranged in clusters to encourage neighbourly interaction, co-operation and a sense of belonging.

Many residents have established projects within their cluster, which they work on together. The children's play areas and the café are popular meeting places.

Spiritually Crystal Waters is very open and tolerant. Christians of various denominations mix easily with Jews, Bahais and Buddhists and others.

Food growing is increasing. Most residents maintain home gardens and orchards, many have chickens and some have bees, cows, sheep, pigs, geese....



Residents are encouraged to plan well in designing their homes. Most houses use materials where the impact at the source is considered (eg rainforest timber is avoided, local and recycled timber are popular); they avoid potentially toxic materials (eg: off-gassing of plastic and composite timbers). Site placement and house design aim to maximise passive solar possibilities.

We successfully applied for 'home occupation' zoning, as by working from home time and energy are saved. Many businesses now operate within Crystal Waters. Residents employ each other rather than non residents whenever possible. Several businesses here are providing steady employment for other residents and many have a trickle down effect. For example, many run courses in our facilities. These not only pay the teachers but also administrators, cooks, cleaners, food growers and accommodation businesses.



Crystal Waters is an excellent testing ground for 'green' technology. Innovative systems have been developed here before being introduced into the wider community.

Many of the ideas introduced here have been adopted well beyond our boundaries - our model of a mixed land ownership and design process has been used in the design of human settlements here and overseas; wastewater techniques tested here have travelled as far as Vietnam and New Zealand. The World Habitat Award recognised our achievements in 1996. We are often the basis for academic surveys and media articles, and receive a constant stream of enquiries from people interested in following our example.

The increase in population has meant our local school has grown, the neighbourhood sawmill was revitalised and nearby Conondale still has a village shop. Our own volunteer fire brigade supplements the Conondale Bush Fire Brigade, and has assisted farmers and residents elsewhere in the valley in times of need.

Crystal Waters has proved to be a model from which lessons can be learned. Many visitors come here from all corners of the world to see that small changes in our personal lives can be made relatively painlessly, that there are viable alternatives to suburban isolation, and to experience the realities of living lightly on the earth.

Here are a [series of webpages](#) which show photos of past community events such as building construction, celebrating our community birthday, and new businesses being formed.

### **Sustainability**

We realised very early that it would need the understanding and support of all to be able to reach a high level of social, economic, environmental and spiritual integration. We started with the design process. From March 1985 to the end of that year we learned from the land and the people by watching and listening. This stage showed us where the water flowed during the rainy periods, frost levels, the warm slopes and cool pockets. It also revealed the best areas - which we kept as common land, so all could benefit rather than just one resident. Out of this lengthy but by no means complicated process 15 criteria

for lot selection were determined. These criteria were included in the explanation to government. The lots were then pegged out.

Regular meetings with interested settlers and a monthly newsletter (the Village Voice, which is still published) were used to communicate with people and get regular feedback. The planners published and gave to each resident two books. The "Crystal Waters Conceptual Report" and the "Crystal Waters Owner's Manual" which explained the concepts behind the development and gave tips on living lightly on the earth.

Crystal Waters was financed by the people who wanted to live here. No money was borrowed. The land was not purchased in a conventional manner. The previous owner of Crystal Waters accepted payment in the form of 10 developed lots in lieu of cash, of which the designers accepted 3 as payment. As there had been no money to pay for their services during the 3 years of initial work, this deferment was crucial to the project's success

Residents purchased 'off the plan', paying a deposit once they selected a lot. When 42 deposits had been collected sufficient funds were available to undertake most of the infrastructure. The balance of payments finished the work and included a profit margin. All profits were donated to the Crystal Waters Community Co-op. These profits have since been used to build community facilities.

We never aimed to become totally self-sufficient, believing that interaction with the surrounding bioregion is more sustainable. However, many people are very self reliant. Potentially, we can grow most of our food. Much of our timber requirements (buildings, fencing, firewood) could also be grown here; some timber lots have already been planted. There will always be imports - fuel and metals are items which can be substituted in a limited way but not replaced completely. We thus have a responsibility to offset our imports with some exports. These are as varied as fruit and vegetables, knowledge, skills and experiences. From the outset we used the theme of 'education tourism' to define our strengths. So far this has been shown to be an appropriate choice.

### **Lessons Learned**

A few years before Crystal Waters was initiated a proposed subdivision in NSW received a lot of publicity. Sadly, the project collapsed but we felt it was basically sound and studied it to learn what had worked and what did not. It seemed that publicity - particularly if hyped up too much - can be damaging as it creates many expectations which one may not be able to fulfil.



The NSW project had some legal and financial hiccups fairly early in the process of getting approval. Deadlines which had been promised could not be kept. We learned that it was better to err on the side of caution. Promises tied to dates should be preferably conservative, not overly optimistic. Investors expect steady progress and need to be kept informed. The Village Voice newsletter was created to keep people up to date with progress and avoid misunderstandings.

We learned not to accept speculators in a sustainable project. We had a number of offers from investors wanting to buy multiple allotments for future re-sale. One person offered to purchase 5 lots. While it was very tempting to accept the badly-needed funds, we declined. What an aspiring village needs most is

people. It is people who make a community and we knew that speculators would be absentee owners and would make little contribution to the social fabric of Crystal Waters.

### **Transferability**

When we first put our ideas to the local authority the legal framework and political climate were unfavourable. The accepted wisdom was that rural areas should not be subdivided below 40 acres (16 ha). In Queensland new villages were not permitted (although exceptions existed for mining companies). The combination of agricultural, residential, manufacturing, educational and recreational use of land was discouraged.

However, by patient negotiation and discussion with the local authority we were able to work through these issues, and we have shown that people and agriculture are a healthy combination and are actually interdependent. We have learned that 'no' need not be the last answer and that politicians can be convinced with well researched arguments.

Many of our initiatives are transferable if differences between places (climatic, cultural) are given due consideration. Many of our principles and features fit the recommendations of 'Agenda 21'.

The most obvious and easily transferable features are:

- Basic human needs (clean air, water, food, work, social interaction, spiritual freedom, recreation, shelter) are interconnected, not artificially separated.
- Wastewater is utilised on site.
- Rainwater is collected on site.
- Energy saving is part of policy, not an add-on.
- Careful choice and use of materials.
- Clustering of housing to enhance social interaction.
- Planning takes economical and environmental sustainability as the basis for design.



### **Permaculture is design.**

"A new method based on old ideas, Permaculture is not a dogma, but it has fixed ethics. Permaculture is not one person's way only, but follows the expanding paths of many. Permaculture is not just local, it is worldwide. Permaculture is not stationary, it is growing in its fullest sense. Permaculture is not back to nature, but it uses natural methods. Permaculture is not organic gardening alone, but it includes it. Permaculture doesn't happen, it is designed" (Barry Goodman).

Permaculture has its basis in PERMANent agriCULTURE but it has bearing on all aspects of culture, as the land is our natural heritage. The origins of the two words are "to remain" and "to care". From this came the three ethics of Permaculture.

### **We care for the earth**

- All living and non-living things; animals, plants, water, land, air.

### **We care for people**

- Promoting self-reliance and community responsibilities.

### **We disperse that which is surplus to our needs**

- Distribution of surplus labour, information, money, skills.

### **Where's the Permaculture?**

Permaculture is about design, and the efficient and productive use of land while taking care of the earth. Permaculture looks at the incredible diversity of plant and wildlife, the intricacies of eco-systems with their natural checks and balances and uses this knowledge to create a sustainable way of life.

### **Examples of principles used in the design are:**

- The balance of the hydrology was maintained, ensuring that the quality and quantity of the water downstream has not been negatively affected by Crystal Waters' development.
- 17 dams were created and are multi-purpose -
  - increasing the 'edge',
  - providing access for traffic from ridge to ridge,
  - opportunities for aquaculture, climate moderation, recreation, beauty and habitat.
  - They provide a flood mitigation strategy; as they absorb runoff and the overflow is directed into the Mary River and Kilcoy Creek via specially placed swales.
  - They are also a source of emergency water.
- Re--use and recycle are two catchcrysts of Permaculture. Evidence of this philosophy can be seen all around Crystal Waters, in the overall design and in individual lots. There has been a consciousness change towards human waste. It is not seen as someone else's problem but as a resource.
- A long term sustainable approach is taken, particularly with regard to forestry. Trees have been planted with the intention that they provide habitat and moderate environmental extremes, as well as various timber end uses.
- Buildings make extensive use of renewable materials such as earth and wood, with particular emphasis on solar passive design.
- The multiple usage of land. Crystal Waters can now accommodate up to 300 people, 83 home gardens. The best land has been set aside for agriculture, the steeper areas for forestry, recreation and natural habitat.
- Zoning can be seen on individual lots, but also in the overall design.
  - The public face of the village is placed in Zone 1, and all are welcome here. This area is in the early stages of development. The Information Centre is part of this zone.
  - Zone 2 incorporates the Visitor's Camping Area (VCA) and the Community House / Training Centre, where visitors come for short term stays and to take part in courses.
  - Zone 3 contains the residential, agricultural and habitat areas, and visitors need to be invited here.

A new DVD video has been produced which covers many of the above themes. [Details here.](#)



# NEW BIOSPHERE AGRICULTURE

## "Beacons of Light"

### around the globe

