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# Permaculture field manual for teachers

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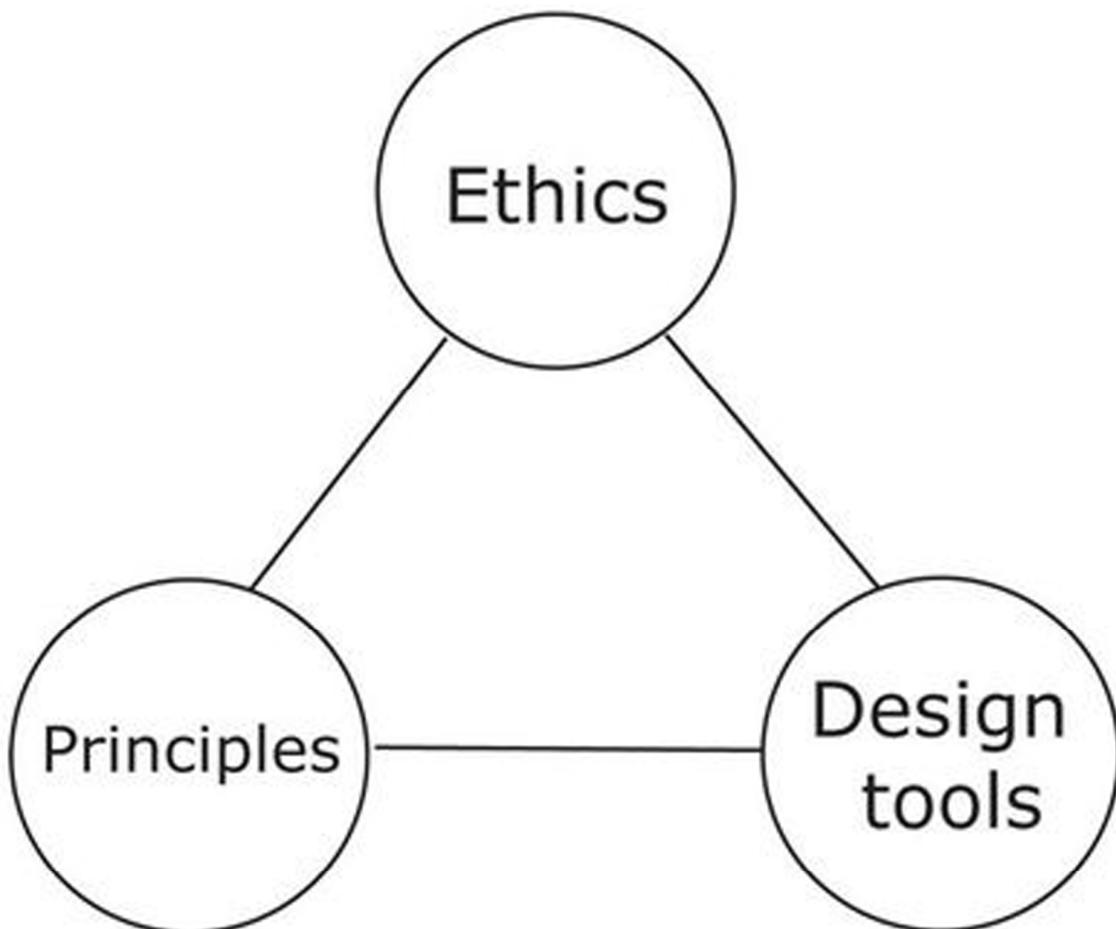
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# Permaculture defintions

## Permaculture



Permaculture is a set of tools and strategies for solving problems.

**Guided** by a clear set of ethics.

**Informed** by a set of principles derived from obvervations of nature.

**Activated** by a practical set of design tools.



# Permaculture ethics

**Fair share**

**People care**

**Earth care**

## **Set limits to your consumption**

Meeting one's own needs comes first but by setting limits and using what remains as an investment creates new possibilities. Permaculture is the constant **reinvestment of surplus** into community and environment to create abundance.

## **Care about people**

Other people really matter. Recognise that other people are also striving to meet their own needs. If we can find ways to **meet our needs in ways that are mutually beneficial** then much more can be achieved.

## **Living Planet**

We humans are part of a huge interconnected ecosystem called planet Earth. Every action we take has consequences for the natural world. Permaculture steers us to **work in harmony with nature**.

If we can meet our personal needs in a way that helps others to meet theirs, whilst working with and enhancing the natural world, then we can unleash limitless new possibilities.

This is the central idea of permaculture.

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# Permaculture ethics

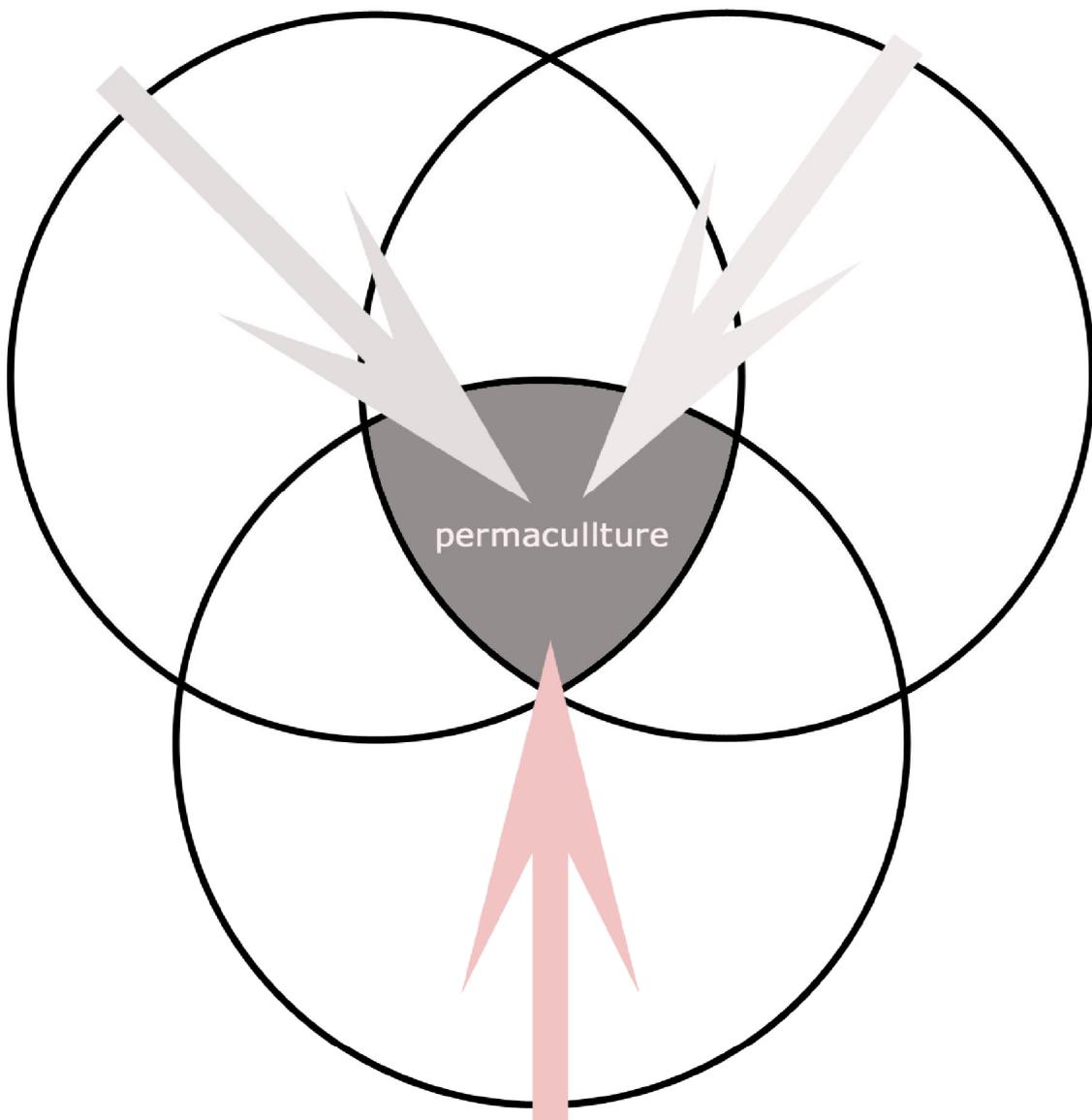
**Fair share**

**People care**

**Earth care**

Community: other people

Environment: natural world



Self: meeting personal and family needs

**permaculture**

Permaculture strategies guide us towards solutions which benefit both our selves, our community and the environment

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# Permaculture Principles

## 1 Observe and Interact

*Beauty is in the eye of the beholder*



Good design depends on a free and harmonious relationship between nature and people.

Careful **observation** and thoughtful **interaction** provide the design inspiration, choices and patterns.

Good design is not something that is generated in isolation, but through continuous two-way interaction with the subject.

Permaculture reminds us that we can solve problems through design based on **experimentation** and careful **planning**.

Design to **fulfill functions** using **locally available resources and skills**.

The proverb 'beauty is in the eye of the beholder' reminds us that the process of observing influences reality, and that we must always understand that truths and values vary as to who is doing the observation.



# Permaculture Principles

## ② Catch and Store Energy *Make hay while the sun shines*



Inappropriate concepts of wealth have led us to ignore opportunities to **capture local flows of both renewable and non-renewable forms of energy.**

Identifying & acting on these opportunities can provide the energy with which we can rebuild capital, as well as provide **“income” for our immediate needs.**

Some of the sources of energy include;

- Sun, wind and run off water flows.
- Wasted resources from agricultural, industrial and commercial activities.
- Nature’s annual surplus of twigs, grasses and leaves which easily be converted via compost into humus.

**The most important** stockpiles of future value include:

- Fertile soil with high humus content.
- Perennial vegetation systems, especially trees that yield food and other useful resources.
- Water bodies and tanks.
- Passive solar buildings

The proverb make hay when the sun shines reminds us that catching energy is **strategic** and **time based.** We must **make the most of opportunities** when they arise.



# Permaculture Principles

## 3 Obtain a Yield *You can't work on an empty stomach*



A yield, profit or income functions as a reward that encourages, maintains and or replicates the system that generated the yield.

In this way, successful systems spread.

In systems language these rewards are called 'positive feedback loops', which amplify the original process or signal.

If we are serious about sustainable design solutions, then we must be aiming for rewards that encourage success, growth and replication of those solutions.

The proverb reminds us that of the importance of creating a yield to sustain one's self. This relates to the permaculture ethic of setting limits to consumption: we can only be sustainable when we **meet our own needs whilst also creating a surplus** for reinvestment.

Our aim, as permaculture designers is to create solutions that can easily be copied and replicated.



# Permaculture Principles

## 4 Apply Self-regulation and Accept Feedback

*The sins of the fathers are visited on the children unto the seventh generation*



**Nature has limits.** If we fail to regulate our actions and observe visible signs of stress then we risk causing long term damage.

**Feedback** is information coming back to us as a response to our actions, this is our chance to **learn** and **moderate actions** to gain insight.

It is essential to consider the short, medium and long term consequences of the design decisions we make.

Traditional societies recognised that the effects of external negative feedback controls are often slow to emerge. People needed explanations and warnings, such as "the sins of the fathers are visited on the children unto the seventh generation."

Think about how when we ride a bike the rider makes constant adjustments to compensate for an uneven road, or their shifting weight. Constant feedback and adjustment creates a **dynamic equilibrium** and stability in an ever changing environment.



# Permaculture Principles

## 5 Use and Value Renewable Resources and Services

*Let nature take it's course*



Renewable resources are those that are renewed and replaced by natural processes over reasonable periods, without the need for major non-renewable inputs.

In the language of business, renewable resources should be seen as our sources of income, while non-renewable resources can be thought of as capital assets. Spending our capital assets for day-to-day living is unsustainable in anyone's language.

Permaculture design should aim to make best use of renewable natural resources to manage and maintain yields, even if some use of non-renewable resources is needed in establishing systems.

The proverb, 'Let nature take its course' reminds us we can't hurry the natural cycle but must wait for the correct time to act.

Similarly, in design we should allow our designs to evolve over time and understand that nature allows time for elements to grow together to build effective systems.



# Permaculture Principles

- 6 Produce No Waste**  
*A stitch in time saves nine*  
*Waste not, want not*



The earthworm is a suitable icon for this principle because it lives by consuming plant litter (wastes), which it converts into humus that improves the soil environment for itself, for soil micro-organisms, and for the plants. Thus the earthworm, like all living things, is a part of a web where the **outputs of one are the inputs for another**.

The proverb 'waste not, want not' reminds us that it is easy to be wasteful when there is an abundance, but that this **waste can be the cause of later hardship**.

The opportunities to reduce waste, and in fact live from waste, are historically unprecedented.

In the past only the most destitute made a living from waste. Today we should acknowledge those who **creatively reuse waste** as the very essence of **living lightly on the earth**.

Opportunities often lie in the waste stream, **spotting potential** in those things others throw away creates huge advantage.



# Permaculture Principles

## 7 Design from Patterns to Details

*Can't see the wood for the trees*



The first six principles tend to consider systems from the bottom-up perspective of elements, organisms, and individuals.

The second six principles tend to emphasise the top-down perspective of the patterns and relationships that tend to emerge by system self-organisation and co-evolution.

The commonality of patterns observable in nature and society allows us to not only make sense of what we see, but to use a pattern from one context and scale to design in another.

Pattern recognition is an outcome of the application of Principle 1: Observe and interact, and is the necessary precursor to the process of design.

Zones and sectors, seasons and climate types, soils and cultures are all patterns.

**Recognising patterns gives us an overview to apply our own experiences and improve understanding.**



# Permaculture Principles

## 8 Integrate Rather than Segregate *Many hands make light work*



By **correct placement of plants, animals, earthworks and other infrastructure** it is possible to develop a higher degree of **integration** and **self-regulation** without the need for constant human input.

For example, the scratching of poultry under forage forests can be used to harvest litter and regulate pests.

Herbaceous and woody weed species in animal pasture systems often contribute to soil improvement, biodiversity, medicinal and other special uses.

Appropriate rotationally grazed livestock can often control these weedy species without eliminating them and their values completely.

By developing an awareness of the importance of **relationships** in the design of **self-reliant systems**, two statements in permaculture literature and teaching have been central:

- Each element performs **many functions**.
- Each important function is supported by **many elements**.



# Permaculture Principles

## 9 Use Small and Slow Solutions

*The bigger they are, the harder they fall  
Slow and steady wins the race*



Systems should be designed to **perform functions at the smallest scale** that is **practical & energy-efficient** for that function. Human scale and capacity should be the yardstick for a humane, democratic and sustainable society.

'Small is Beautiful.' Small and slow solutions mean **mistakes can be corrected** and become learning opportunities. Starting small also allows for the design to evolve and grow in proportion. **Incremental growth** is much more sustainable and allows for learning and reinvestment.

Permaculture designs must fulfill their function and return a surplus, the **reinvestment of surplus** allows for incremental growth. This is the key to successful design. Start small, allow growth then seek to **replicate** the best examples.

The proverb 'the bigger they are, the harder they fall' is a reminder of one of the disadvantages of size and excessive growth. While the proverb 'slow and steady wins the race' is one of many that encourages **patience** while reflecting a common truth in nature and society.



# Permaculture Principles

## 10 Use and Value Diversity

*Don't put all your eggs in one basket*



The great diversity of forms, functions and interactions in nature and humanity are the source of evolved **complexity**.

The role and value of diversity in nature, culture and permaculture is itself complex, dynamic, and at times apparently contradictory.

Diversity needs to be seen as a result of the balance and tension in nature between **variety & possibility** on the one hand, and **productivity & power** on the other.

It is now widely recognised that **monoculture is a major cause of vulnerability** to pests and diseases, and therefore of the widespread use of toxic chemicals and energy to control these.

**Polyculture** is one of the most important and widely recognised applications of the use of diversity to reduce **vulnerability** to pests, adverse seasons and market fluctuations.

Polyculture also reduces reliance on market systems, and bolsters **household & community self-reliance** by providing a wider range of goods and services.



# Permaculture Principles

## 11 Use Edges and Value the Marginal

*Don't think you are on the right track just because it is a well-beaten path*



The icon of the sun coming up over the horizon with a river in the foreground shows us a **world composed of edges**.

Within every land based ecosystem, the living soil, which may only be a few centimetres deep, is **an edge or interface** between non-living mineral earth and the atmosphere. For all terrestrial life, including humanity, this is the most important edge of all. Only a limited number of hardy species can thrive in shallow, compacted and poorly drained soil, which has insufficient interface. Deep, well-drained and aerated soil is like a sponge, a great interface that supports productive and healthy plant life.

**Increasing the edge** between field and pond **increases the productivity** of both. Alley farming and shelterbelt forestry can be seen as systems where increasing edge between field & forest has contributed to productivity.

The proverb 'don't think you are on the right track just because it is a well-beaten path' reminds us that the most common, obvious and popular is not necessarily the most significant or influential.



# Permaculture Principles

## 12 Creatively Use and Respond to Change

*Vision is not seeing things as they are but as they will be*



This principle has two threads: **designing** to make use of change in a **deliberate** and **cooperative** way, and **creatively responding** or **adapting** to large-scale system change which is beyond our control or influence.

The acceleration of ecological succession is the most common expression of this principle in permaculture. For example, the use of fast growing nitrogen fixing trees to improve soil, and to provide shelter and shade for more valuable slow growing food trees, reflects an ecological succession process from pioneers to climax.

Change, in whatever form it comes is inevitable. **Change is the one constant in life.** Permaculture design is a way to successfully navigate the constantly shifting sands of time. Change can be frightening, destabilising & challenging but it is also represents **new opportunity.**

Permaculture challenges us to embrace change and to apply learning and design to create ways forward that make **best advantage of new conditions.**

For the very reason that things never stay the same, permaculture invites us to **observe & interact** to find creative ways to turn problems into solutions.



# Permaculture Design Tools

**Design is a process. In permaculture form always follows function.**

The most important thing is that a design works, rather than what it looks like. We can break the design process into a series of steps, and this can be seen as an open and ongoing process.

## S

### **Survey**

Good design begins with a **survey**.

Who is the client?

What are their objectives?

What are their resources and limitations?

What are their values and long term goals?

## A

### **Analysis**

What are the components of your design?

**List the functions** and then list elements and systems that can help support the named functions of the design.

## D

### **Design**

How can we build relationship between each element placed in the design so that they **form a system** or have a some kind of relationship?

Does our design fulfill the goals and limitations identified in the survey?

## I

### **Implementation**

Sequence, **build infrastructure first**, create tools and train the team. Think of seasons, cash flow, availability and make your plan strategic.

## M

### **Maintenance**

Before you implement consider how you will maintain any new elements added to your design.

Plan a **maintenance strategy** from the outset.

## ET

### **Evaluation and tweaks**

No design is ever 100% correct, external conditions also change, permaculture is a process of

**testing, feedback and adjustment.**

What is working well?

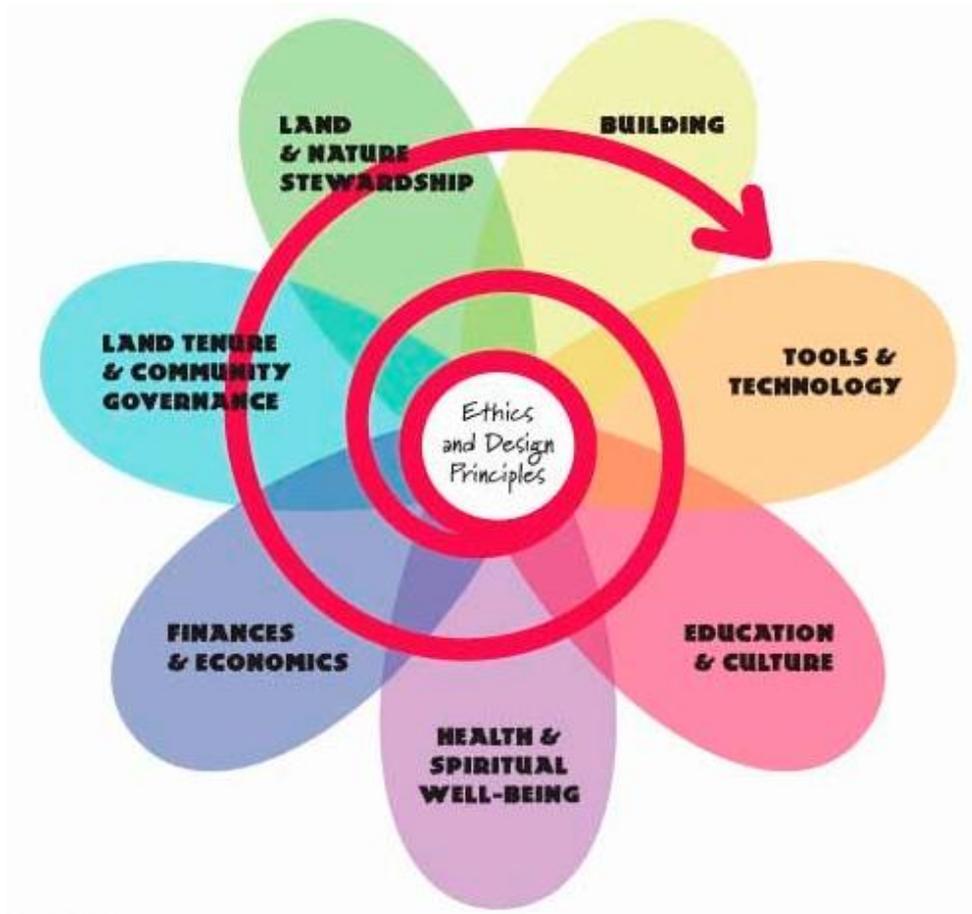
What is challenging?

What changes can we to make to improve it?

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# Permaculture Design Tools



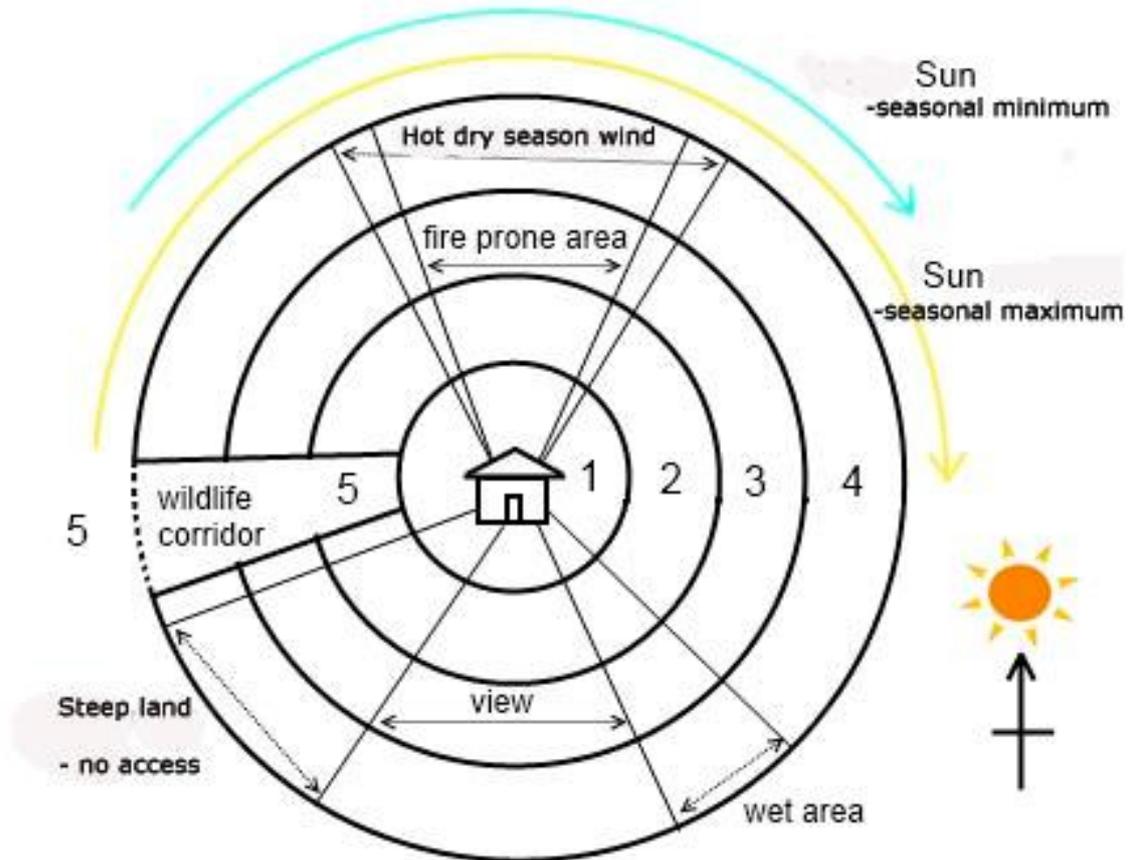
## Design by increments

We can't reach where we need to go in a single step. **Begin with the self and how we make our income.** If we can better access land and manage it effectively then we have opportunity to **further invest in infrastructure**, learning more about tools and technology along the way.

**Sharing** what we have learned helps **build community and culture**, which in turn empowers and enables the individual. Permaculture Design is an ongoing process that **builds on successes** and **develops experience** along the way.



# Permaculture Design Tools



## Zones and sectors

Part of permaculture's pattern language is to see the zones and sectors that define any plot. The closer to home the easier things are to manage and the more we receive feedback. Whilst out in Zone 5's unmanaged areas often new ideas and new associations form, which give us new insight and learning.

Sectors remind us there is always a windy side and a sheltered one, wetter areas and drier ones. Wildlife is as much a flow across a landscape as water or traffic, all of these can be designed for and made the best from. Limitations can be minimised through **correct placement and planning**.

Start from the back door, make space for nature and arrange elements strategically according to their **function** and **relationship to other elements**.



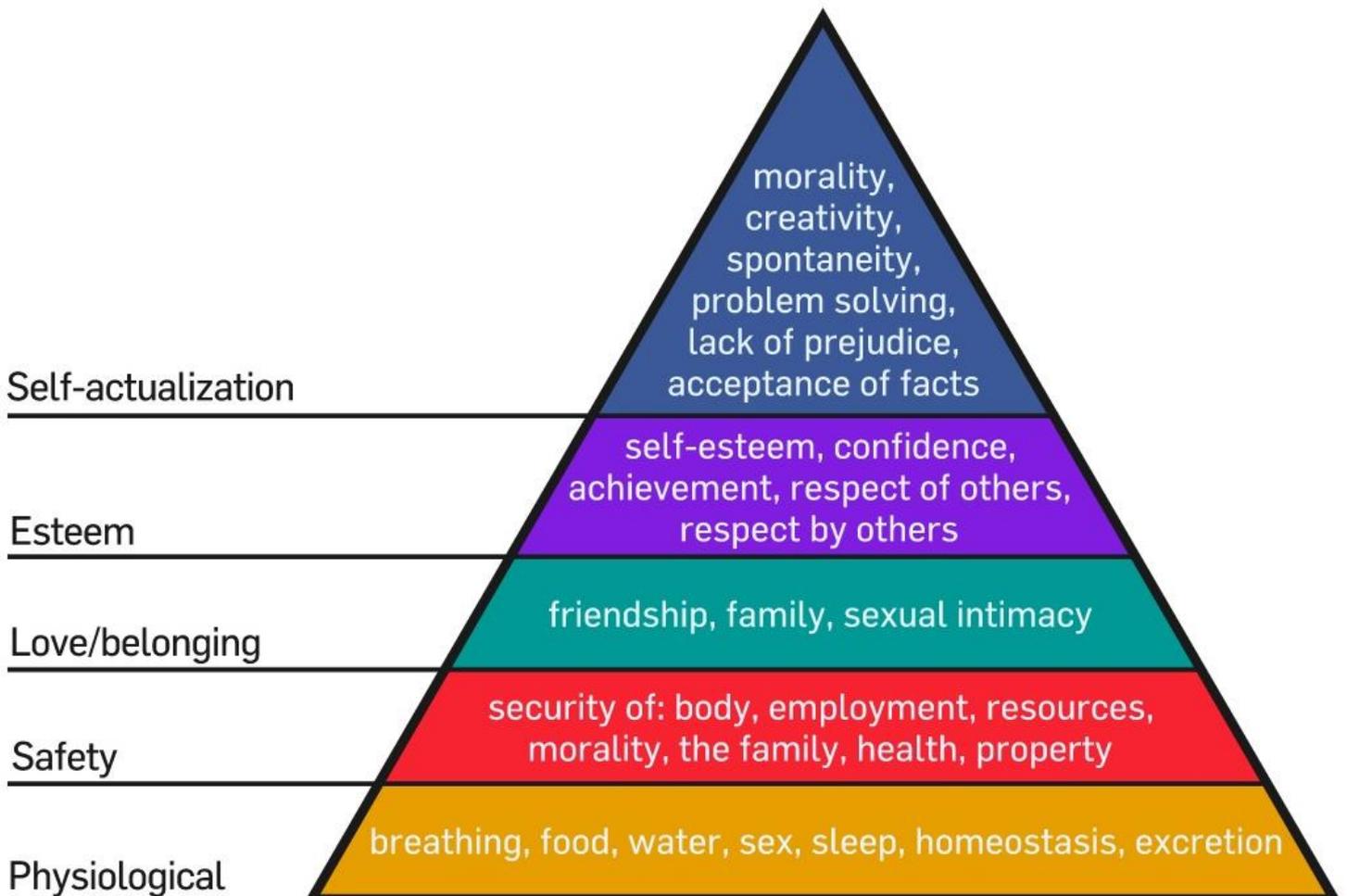
# Permaculture Design Tools

## Taking care of self comes first

Zones and sectors give a strong sense of priority, helping a designer decide what comes first what is most important. The answer maybe that many things may seem of equal importance, but what to focus on first are the things that enable you to become more effective to build the infrastructure or train the people to accomplish ar reaching goal. Also for groups of people to be bale to agree on what to do first it is important to have an equal sense of priority.

A psychologist called MASLOW came up with a hierarchy of need which is a very useful way to consider such issues.

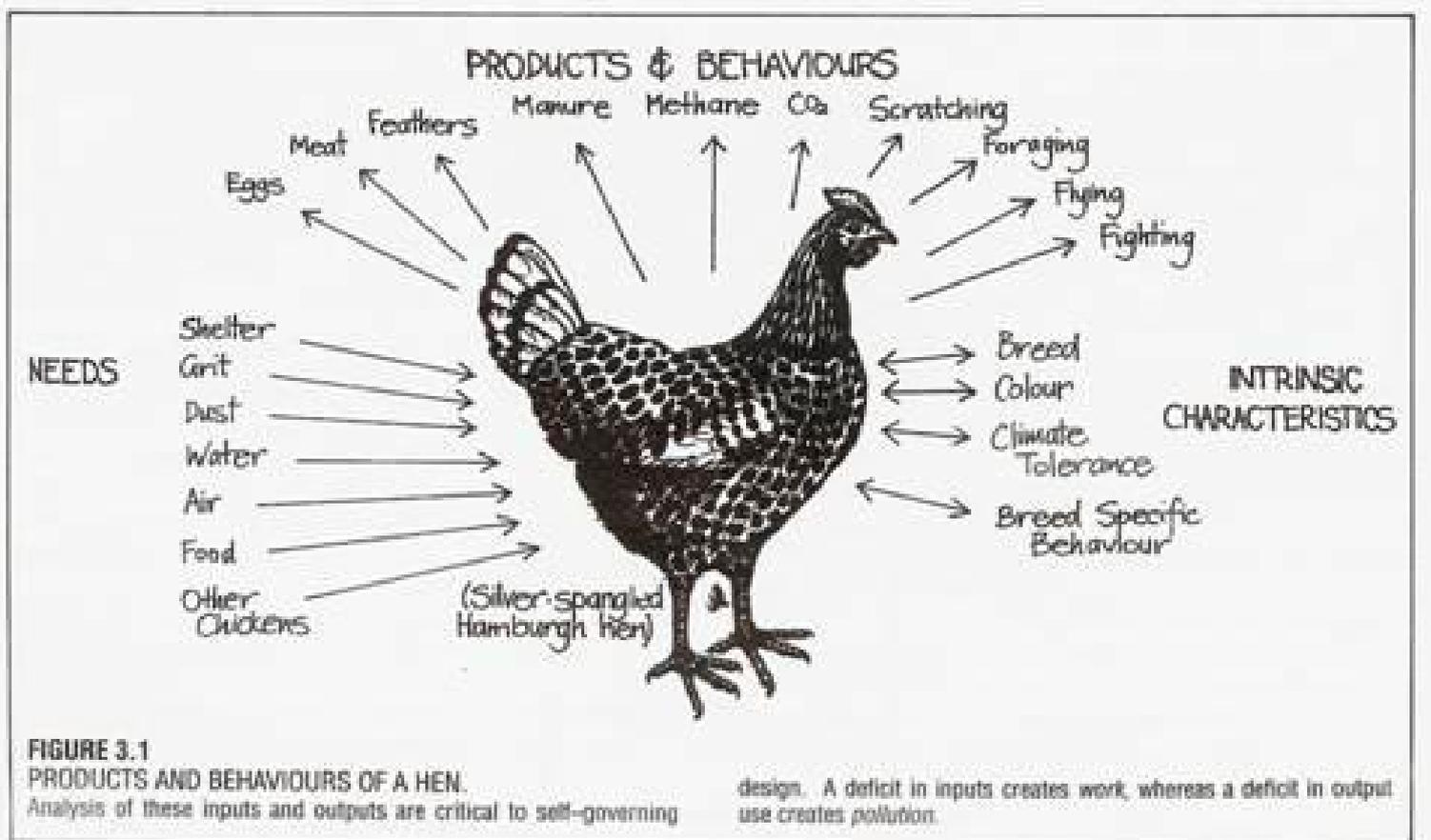
He saw 5 distinct levels of priority: the first being about the self and our own basic survival needs. It has almost impossible to address other areas in your life if these key needs are not met first. The base layers of the pyramid reflect short term more immediate needs. The higher layers are the product of longer term planning and consistent actions.





# Permaculture Design Tools

## Input/ Output Analysis



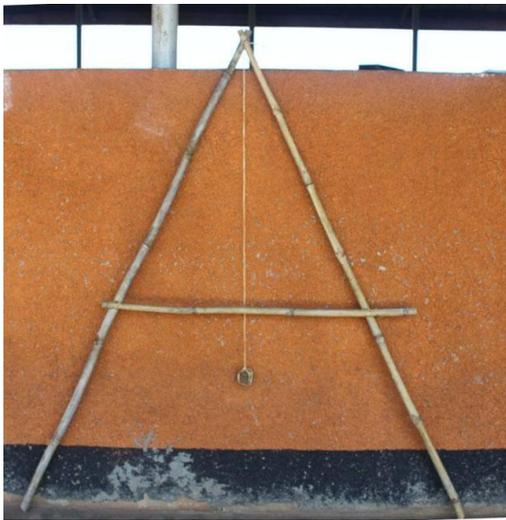
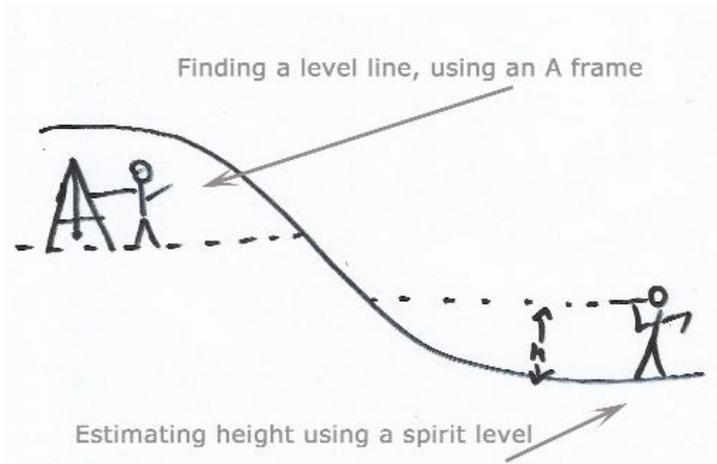
Nothing exists in isolation or performs one single task. Consider the needs, outputs, behaviours and characteristics of each element in any system.

Good design links **each output** in such a way that it **becomes an input** somewhere else in the system. Every product can be potentially be harvested **eliminating waste**, and every behaviour if effectively managed can become a part of the overall output of the design.

Permaculture encourages the designer to see the **connections** and **relationships between elements** and how, if linked together, they might form a **system**.



# Permaculture Design Tools



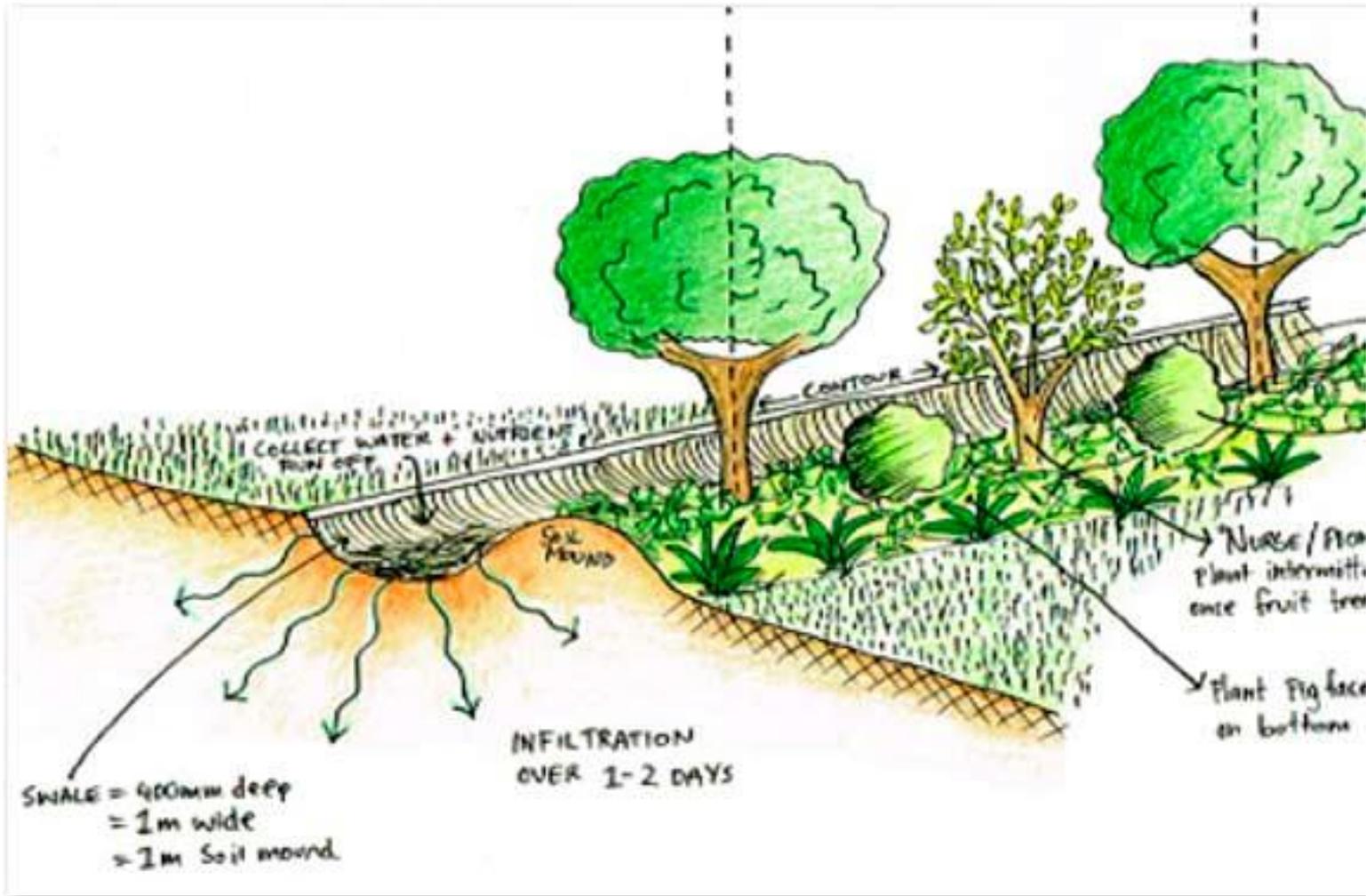
## Survey

Finding a level line across land enables the construction of surface water trapping features such as **swales**.

Estimating height allows us to work out a suitable distance between swales and to understand the steepness and shape of a piece of land.



# Permaculture Design Tools



## Elements Arranged to Fulfill Multiple Functions

Catching surface water runoff, preventing soil damage and increasing rain water percolation.

Nitrogen fixing trees that act as nurse plants, building soil, feeding beneficial insects and animals whilst providing shade for young higher value plants.

A managed succession over time that creates conditions suitable for a more diverse agriculture and increasing variety of yields.

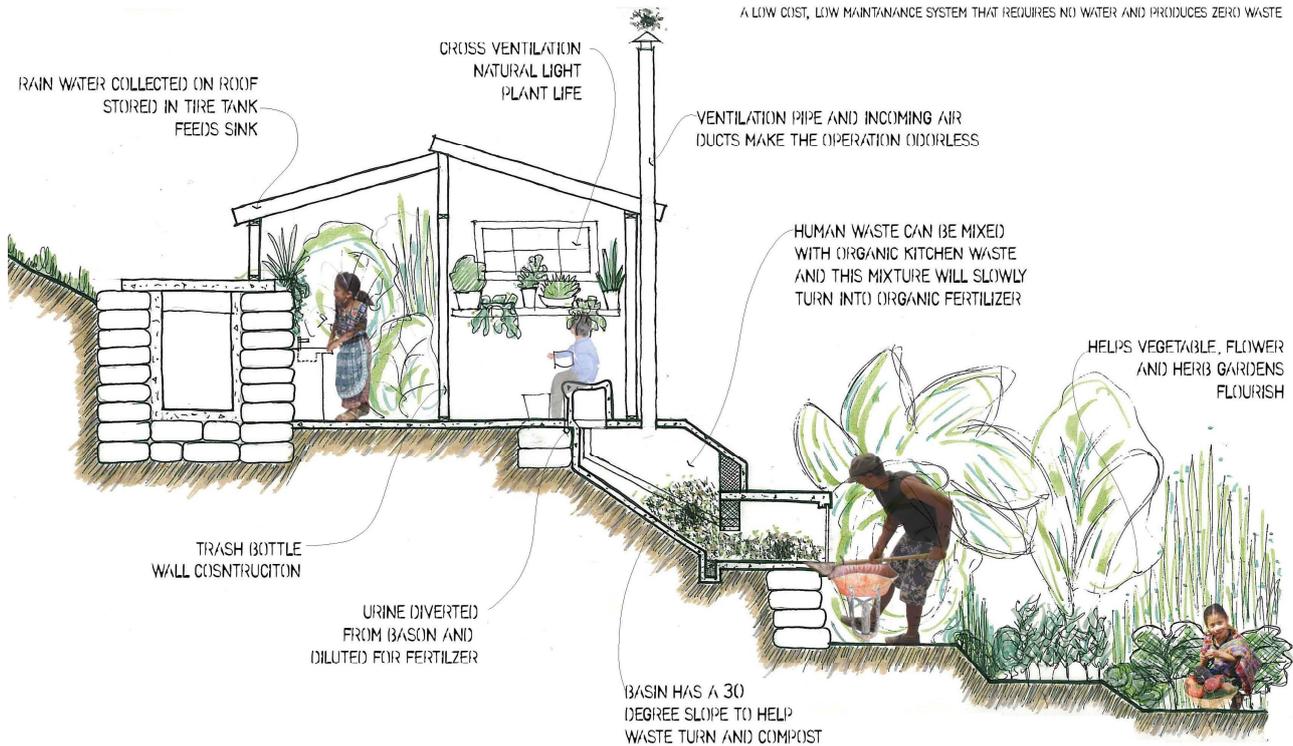
A system that improves over time by trapping natural run offs and harvesting as much available energy as possible.



# Permaculture Design Tools

## DRY COMPOSTING TOILET

A LOW COST, LOW MAINTAINANCE SYSTEM THAT REQUIRES NO WATER AND PRODUCES ZERO WASTE



## Systems thinking

### Food and nutrients, input and outputs

Vertical flows, water and nutrients flow down hill, warm air rises and can be used to cool and ventilate a building. Nature cycles everything.

A carefully designed system can harvest the energy from natural flows and convert it into useful outputs that nourish and support other parts of the system.

Every instance is unique, every person has different priorities, tastes and skills. There is never a single or right solution, but a problem solving approach can help find the best combination to suit a specific location or circumstance.

# 5 Minute Lesson Plan - Effective Communication of Permaculture Principles

**The Big Picture** (e.g. Systems thinking...)

**Objectives** for the lesson (e.g. by the end of the lesson, students will know...)

- \*
- \*
- \*
- \*

**Key issues** for the lesson (e.g. The main points to take away...)

- \*
- \*
- \*
- \*

**Assessment for learning** (e.g. How will you show that students have learned? What will the outputs be?)

**Starter Activity**  
(Introduce the lesson)

**Lesson Activity**  
(Main body of lesson)

**Lesson Activity**  
(Main body of lesson)

**Plenary Activity**  
(Summarise the lesson)





# Permaculture Design Tools

## Writing a business plan:

### Tell the **STORY** or **PURPOSE** of your project

- \*Who is involved?
- \*How is it managed?

State your idea? .....

Product or a service? .....

What need in your community does it address?.....

Is your idea different from the competition, what makes it stand out

.....  
Why will people want to buy what you offer?

.....

#### **Business name?**

- What does your choice of name say about your business?
- Does it help them understand what you are offering?
- Is it memorable, unique easy to say

#### **Your Market**

- Who will your customers be?
- Where do they live, how will you reach them?
- Word of mouth is the cheapest and often most effective, how will you get people talking about your business?
- Do you need fliers or posters, a website or Facebook page, can you get in a local newspaper or on the local radio if what you are doing is interesting?
- 5 P's of marketing Product, price, place promotion & packaging

#### **Profitability**

Cost of production in materials and in human hours  
transport and distribution, credit and loans, try to think of every cost no matter how small

#### **Investment and growth**

How much money do you need to make for your business to be measured a success, set a target. What will you do with profit? How much for repayments, costs, reinvestment and what do with surplus

#### **FUNCTIONS OF A BUSINESS PLAN**

- \* Raises money
- \* Collates research
- \* Presents clear and realistic vision

- 1: Convinces YOU that it is possible
- 2: It shows funders/ collaborators & investors to take you seriously
- 3: Recruits members/ supporters with realistic expectations

Like a good story your plan should be gripping, exciting and realistic!



# Permaculture Design Tools

## Consensus model



Consensus decision-making is a group decision-making process in which group members develop, and agree to support a decision in the best interest of the whole.

Consensus may be defined professionally as an acceptable resolution, one that can be supported, even if not the "favourite" of each individual.

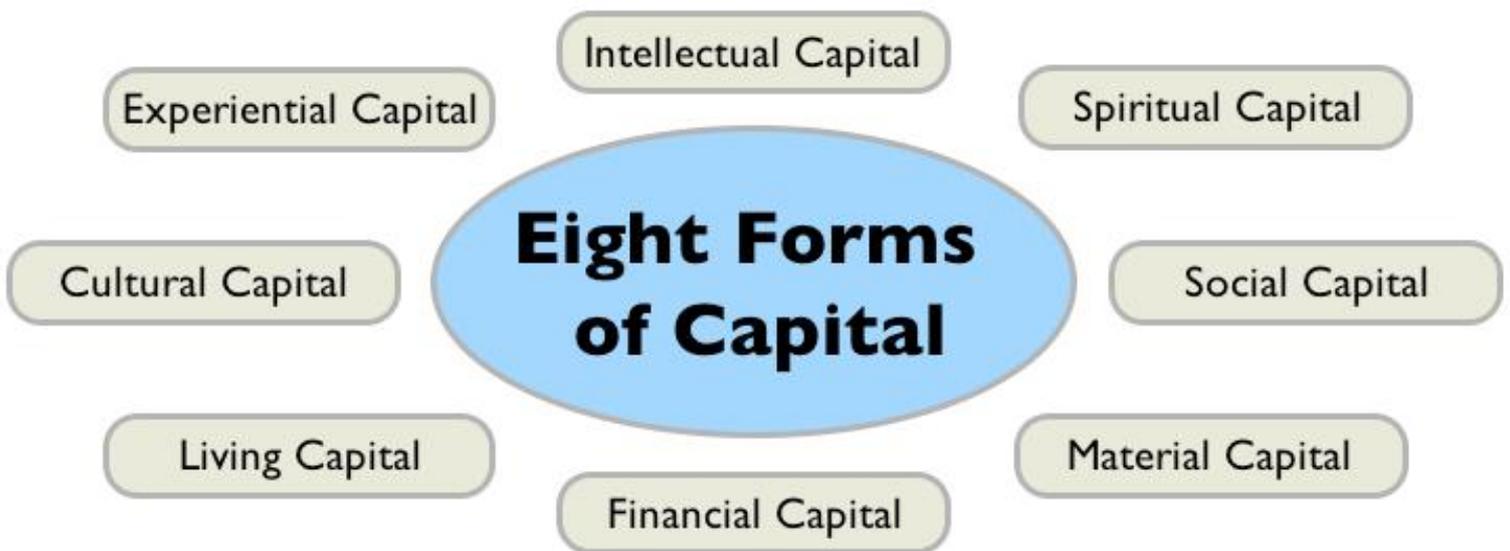
Consensus decision-making is thus concerned with the process of deliberating and finalizing a decision, and the social, economic, legal, environmental and political effects of applying this process.





# Permaculture Design Tools

Enterprise development  
- creating a new business



Social Capital: Influence and connections are social capital

Material Capital: Non-living physical objects form material capital.

Financial Capital: M We are most familiar with financial capital: Money, currencies, securities and other instruments of the global financial system.

Living capital "Measure your wealth in ounces, acres, and hooves."

Intellectual Capital: Intellectual capital is best described as a 'knowledge' asset.

Experiential (or Human) Capital. We accumulate experiential capital through actually organizing a project in our community,

Spiritual Capital As one practices their religion, spirituality, or other means of connection to self and universe, one may accumulate spiritual capital.

Cultural Capital All the other forms of capital may be held and owed by individuals, but cultural capital can only be gathered by a community of people.

**Use this frame for thinking about what you have to offer, where are your won strengths and weaknesses and where might you need help or seek collaboration.**



# Permaculture Design Tools

## Eight Forms of Currency

Capital	Currency	Complexing to...
Social Capital	<i>Connections</i>	<i>influence, relationships</i>
Material Capital	<i>Materials; "natural" resources</i>	<i>tools, buildings, infrastructure</i>
Financial Capital	<i>Money</i>	<i>financial instruments &amp; securities</i>
Living Capital	<i>Carbon, Nitrogen, Water</i>	<i>soil, living organisms, land, ecosystem services</i>
Intellectual Capital	<i>Ideas, Knowledge</i>	<i>words, images, "intellectual property"</i>
Experiential Capital	<i>Action</i>	<i>embodied experience, wisdom</i>
Spiritual Capital	<i>Prayer, Intention; Faith, Karma</i>	<i>spiritual attainment</i>
Cultural Capital	<i>Song, Story, Ritual</i>	<i>community</i>

Lacking money for investment is not a barrier to beginning a successful enterprise. Certainly it can help but also having money available can lead us to create opportunities which ultimately rely on none local inputs, meaning we are not building a truly sustainable business or are relying on resources we don't have to begin.

A permaculture approach encourages a business start up to value a broader diversity of inputs and recognise the wealth and assets we have already before seeking external inputs or outside help. If we can build from the bottom and create something from what we have already we can then reduce inputs costs and create an efficient business model.

In the same way that we link plants together to build ecosystems in farming and growing, we create links different areas of available capital resource to develop a strong and dynamic business plan

# Acknowledgements



## Thanks and recognition to:

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Ysgol Llanfyllin

The good people of Bidibidi and Maaji refugee settlements

## Permaculture is working with nature

Trees that build soil, give us fruits, timber & a home for wildlife, fuel trees, bamboo and more..

A food forest is a perfect habitat for vegetable growing, chicken and goat rearing, a place for people and community to flourish together in a productive partnership with nature.

Valuing trees and re-incorporating them into our farms allows space for wildlife, a cool shade, medicines, seeds and fibres long known to our forebearers. The forest traps water, makes rain, and gives shelter to all that need it.

Permaculture is inspired by nature and nature's greatest expression of abundance is a forest



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