

Permaculture Inspirations

From the micro to the macro and the short cut through it all

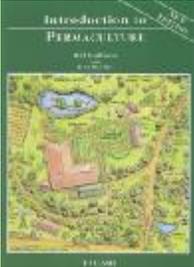
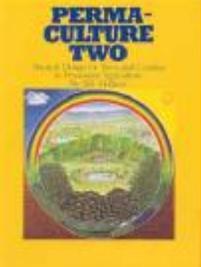
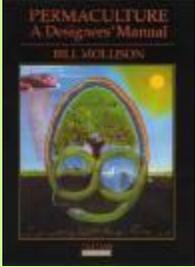
Durban, South Africa
v3 - May 2011

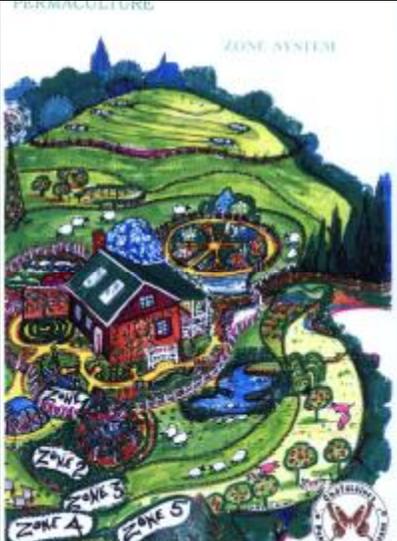
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Permaculture

Permaculture (permanent agriculture) is the conscious design and maintenance of agriculturally productive ecosystems which have the diversity, stability, and resilience of natural ecosystems. It is the harmonious integration of landscape and people providing their food, energy, shelter, and other material and non-material needs in a sustainable way. Without permanent agriculture there is no possibility of a stable social order. (Bill Mollison).



From the micro to the macro and the short cut through it all

- Permaculture background
- Permaculture gardens
- Sustainable agricultural landscape principles
- Rainwater harvesting designs
- Amaoti Organic Farming Project
- The Agri-Village Model
- Sustainable Housing Settlements
- Marikana Housing Project
- Fundamentals for EcoVillage Designs
- Strategic Framework for Sustainability
- Anastasia & the Ringing Cedars of Russia

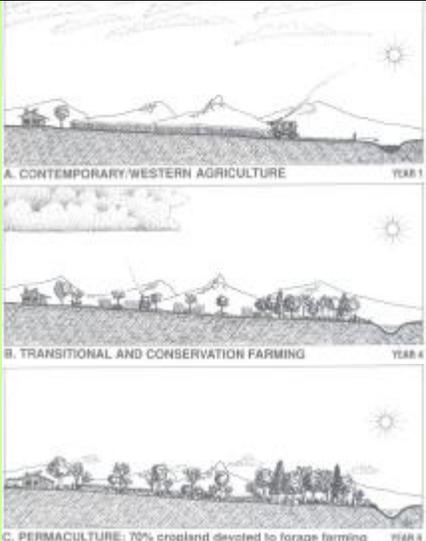
Evolution from Contemporary Agriculture to a Permanent form of Agriculture, hence Permaculture

A 3 to 8 year Transition Period to change over from Contemporary Agriculture to Permaculture.

Basic changes involve:

- replacing animal forage grains with tree crops
- increasing forest cover
- adopting low to no tillage on remaining croplands
- retrofitting the house for energy conservation
- producing some (if not all) fuel on the farm.

Bill Mollison, Permaculture: A Designer's Manual,



A. CONTEMPORARY WESTERN AGRICULTURE YEAR 1

B. TRANSITIONAL AND CONSERVATION FARMING YEAR 4

C. PERMACULTURE: 70% cropland devoted to forage farming YEAR 8

Evolution from Contemporary Agriculture to a Permanent form of Agriculture, hence Permaculture

Annotations to the bar graph:
Accounting the costs of farming

1. Cash Accounting:

Bar 1: Income from total product on the farm.
Bar 2: Cost of producing that income in real terms (including subsidies).

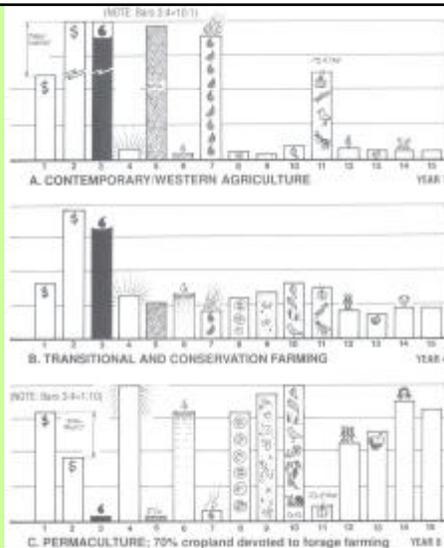
2. Energy Accounting:

Bar 3: Electricity, oil, fertilizers, pesticides, firewood, etc.
Bar 4: Energy produced, eg. Firewood, food calories.

3. Environmental Accounting:

Bar 5: Soil loss, includes loss of humus and mineral nutrient loss.
Bar 6: Efficiency of water use and soil water storage.
Bar 7: Pollution produced.

Bill Mollison, Permaculture:
A Designer's Manual,



Evolution from Contemporary Agriculture to a Permanent form of Agriculture, hence Permaculture

Annotations to the bar graph:
Accounting the costs of farming

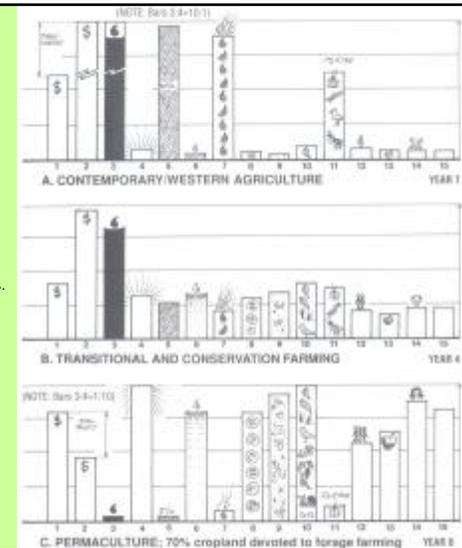
4. Conservation Accounting:

Bar 8: Genetic richness in crops and livestock.
Bar 9: Soil life (biomass).
Bar 10: Forest biomass and wildlife richness.
Bar 11: Loss to pests.

5. Social Accounting:

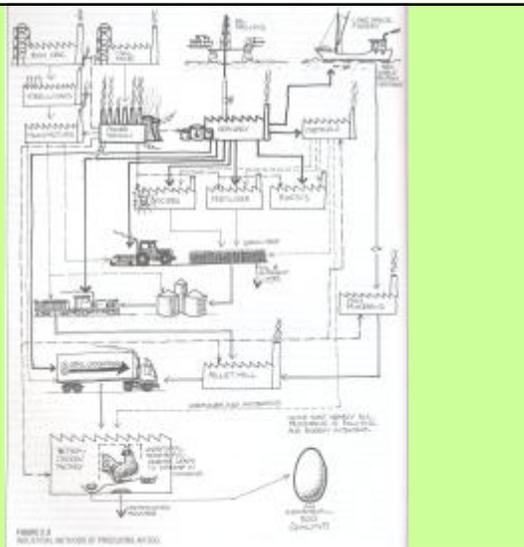
Bar 12: Employment on farm.
Bar 13: Food quality produced.
Bar 14: Human and environmental health.
Bar 15: Life quality as "right livelihood".

Bill Mollison, Permaculture:
A Designer's Manual,



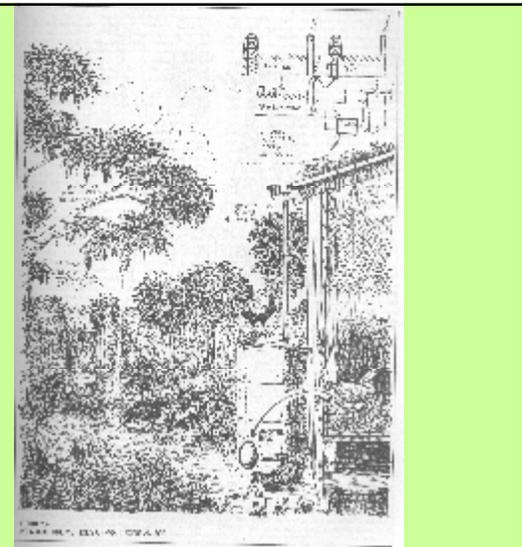
The story of an Industrial Egg

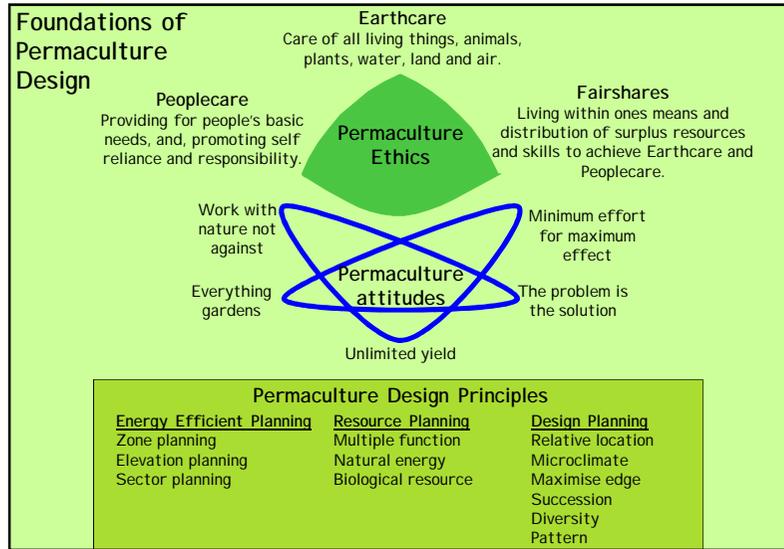
Bill Mollison, Permaculture:
A Designer's Manual,



The story of a Permaculture Egg

Bill Mollison, Permaculture:
A Designer's Manual,





Newlands Mashu Permaculture Learning Centre



Newlands Mashu Permaculture Learning Centre



Newlands Mashu Permaculture Learning Centre





Newlands Mashu Permaculture Learning Centre



Mom's Permaculture Garden



Mom's Permaculture Garden



THE VETIVER NETWORK

Above ground
A one year old Vetiver stand showing stiff and erect leaves that form a thick hedge

Below ground!!
Vetiver roots have a tensile strength equivalent to 3/4 the strength of mild steel reinforcement!

HOW IT WORKS
Left - Longitudinal section through vetiver hedge showing root system
Left - Close section through a vetiver hedge

THE VETIVER NETWORK
The Vetiver System
 A simple grass hedge ...
 Deep and tough roots ...
 A unique technology for soil and water conservation, land rehabilitation, infrastructure stabilisation, pollution control and other uses.
 English French

Keyline DESIGNS
 Key D. Yoonens
 P.A. M.A.I.A.S.T.

BILL MOLLISON KEYLINE EXAMPLE

KEYPOINT

DRAINAGE LINE

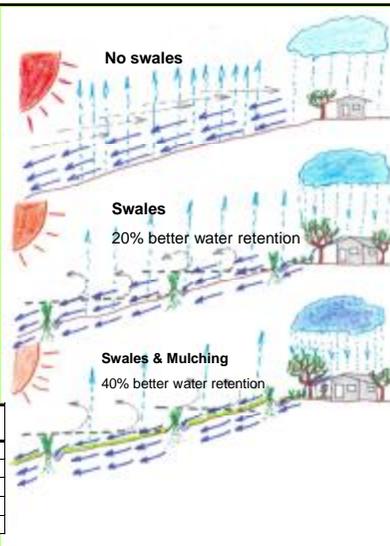
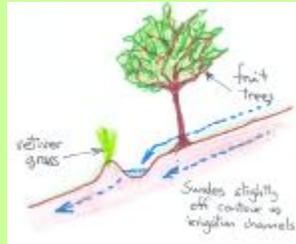
LATENT AREA

RAINWATER HARVESTING LANDSCAPES

Keyline dams
 Maximise source to sink distance

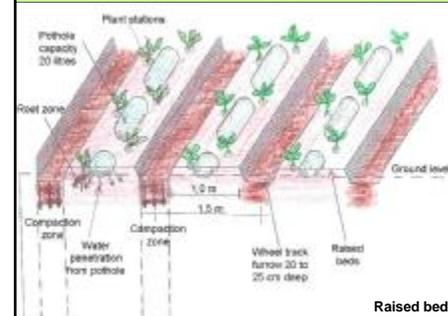
Swales to slow down rainwater runoff, retain moisture in terrain, and recharge water tables

SWALES & VETIVER GRASS



| Progressive benefits from Swales | No Swales | Swales | Swales & Mulching |
|----------------------------------|-----------|-------------|-------------------|
| Rainwater harvesting | None | Good | Very good |
| Soil erosion | Bad | Very little | Contained |
| Water table | Low | Good | Very good |
| Moisture retention | Low | Good | Very good |
| Crop yields | Low | Good | Very good |

NO-TILL OR LIMITED TILL FARMING

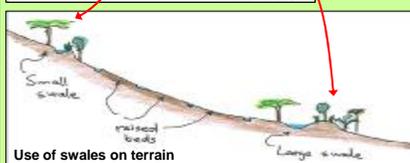
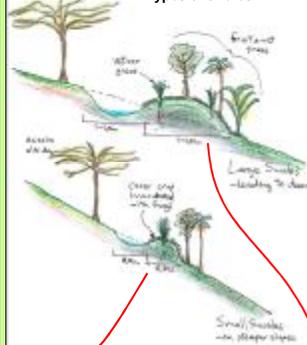


Ridge-bed-maker



Raised beds

Types of swales



SUSTAINABLE AGRICULTURAL LANDSCAPES

- The benefits of **swales** on contour planted with vetiver grass and acacia alba trees :-
- promotes rainwater harvesting
 - re-charges water tables
 - reduces need for irrigation
 - mitigates against soil erosion
 - provides windbreaks that reduces wind burn and creates beneficial micro-climates
 - draws up vital minerals for plant use
 - improves biodiversity
 - contributes to biomass that mitigate against Climate Change.

- The benefits of **raised beds** prepared with a ridge-bed-maker:-
- promotes limited till agriculture with minimal soil compaction
 - reduces need for heavy plant and equipment
 - reduces need for irrigation
 - enhances drainage from excessive stormwater
 - establishes raised beds requiring minimal maintenance and with improvements in soil fertility.

The combination of swales and raised beds can reduce irrigation needs by up to 50% and improve crop yields by up to 30% to 40%.

**BHOBHOYI FARMERS GROUP
HIBISCUS COAST MUNICIPALITY**

DEVELOPMENT CONTEXT

- Urban agricultural land
- Historical buffer strip
- Inanda Ntuzuma KwaMashu Urban Renewal Programme (INK)
- 53,000 people or 11,000 households
- Community bridge building
- Pilot urban agricultural project

SITE ANALYSIS

- Project Area (59.5 gross ha)
- Water courses
- Slope
- Marginal land
- Religious area
- Dry winds
- Rain bearing winds
- Cold night draughts
- Proposed Northern Expressway

SITE ANALYSIS

- Establish wind breaks
- Trap stormwater via detention ponds
- Incorporate the proposed Northern Expressway as a design feature
- Enhance groundwater seepage

SITE DESIGN CONCEPT – RAINWATER HARVESTING

- Percolation dams along the proposed alignment of the Northern Expressway
- Sub-surface dams alongside the Ohlanga River to enhance the water table
- Water wheel pumps to abstract water table to holding tank
- Check weirs in Ohlanga River to spread stormwater discharges
- Swales with vetiver grass
- Gravity fed irrigation from holding tanks

X-Section AA

SITE DESIGN CONCEPT - ALLOTMENTS

Plan Section AA

- 20m by 20m grid for a 400m² allotment
- Vetiver grass and fruit trees provide tree canopy, wind breaks and biomass
- 8 Adjacent allotments can be grouped for a polyculture of integrated rotation system of crops and chickens
- Pecan nut orchard alongside the Ohlanga River
- Polyculture with tilapia fish in percolation dams
- LEISA principles minimise operating costs and create better income margins
- Income yields about 2,5 to 3 times better than yields of conventional large scale agriculture
- Each allotment to earn at least R3,600 per annum

SITE DESIGN CONCEPT - ALLOTMENTS

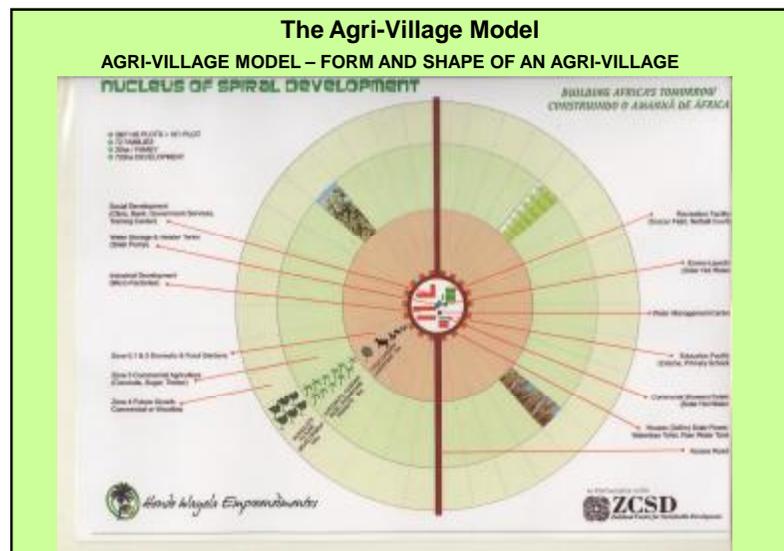
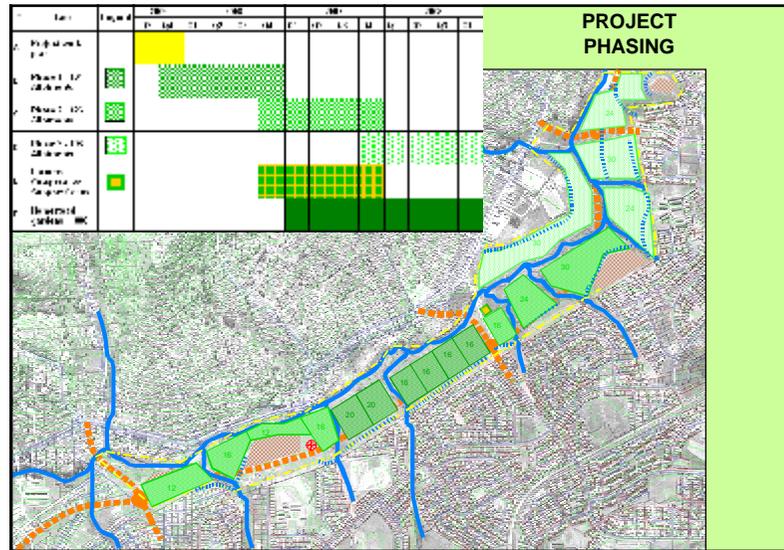
SITE DESIGN CONCEPT - HOMESTEAD GARDENS

- Trainees to become the new community based farm stewards to help establish some 1,000 homestead gardens
- Homestead gardens :- rainwater tank; plant material; fruit and nut trees; and, small tools
- Homestead gardens to be established via small loans up to R2,500 each, R2,000 value of goods and R500 paid to the farm steward upon completion
- Loan funding to be based on the Grameen Banking system
- Bona fide loan applicants will need to provide loan collateral via 4 other households
- Loan guarantee fund worth 10% of the loan stock to be secured in order to entice a micro-finance service provider
- The scheme stops once the loan guarantee fund is exhausted

SITE DESIGN CONCEPT - FARMERS CO-OPERATIVE SUPPORT CENTRE

The scale of this project makes for a viable Farmers Co-operative Support Centre as an independent business unit in order to consolidate and deliver a wide range of functions, such as:-

- management and administration of allotments
- inspections for organic compliance
- administration of micro loans
- training and mentoring of farmers
- advisory services for farmers
- propagation of seeds and trees
- storage and exchange of seeds
- collection point for recycling of glass, paper and steel
- use of local garden refuse for large scale composting
- hiring of plant and equipment
- provide a trading platform on market days
- produce delivered for onward transport to other markets
- add value to niche produce such as packaging and marketing
- provide assistance to emerging SMEs



AGRI-VILLAGE MODEL – FORM AND SHAPE OF AN AGRI-VILLAGE

- A Co-operative with a difference (36 families and 220 beneficiaries)
- An Agricultural Community, the members of which each have equal shares in the village and its activities.
- Each family has:-
 - a one hectare plot for homestead food security.
 - a five hectare share in the village commercial agricultural system.
- A village that handles its own processing and value adding
- A village that creates its own jobs
- A village with its own school, crèche, social services, church and training centre.
- A village owned and run by its people

AGRI-VILLAGE MODEL - HOMESTEAD GARDENS FOR FOOD SECURITY



Each family has a house on a one Ha plot

This has proved to be sufficient to provide for food security needs and a small surplus.

Homestead

AGRI-VILLAGE MODEL - COMMERCIAL CROPS



Each family owns a five hectare share in the Commercial Agriculture zone.

Commercial Agriculture Zone

AGRI-VILLAGE MODEL - COMMUNITY NUCLEUS

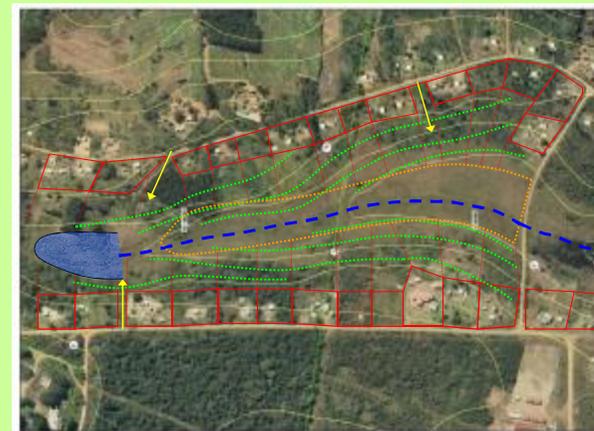


The family plots are arranged around a communal area in which the following facilities are found:-

- Multipurpose Centre
- Primary Industry
- Secondary (Micro) Industries
- Creche
- Primary School
- Ablution Facility
- Enviro-Laundry
- Recycling Centre
- Sports fields
- Water works

Facilities

DESIGN EXAMPLE OF A SUSTAINABLE AGRICULTURAL LAYOUT FOR THE DUKUDUKU ON-SITE RESETTLEMENT PROJECT



Legend

- Homestead gardens on leasehold or freehold sites
- Agricultural allotments on short term leaseholds or PTOs
- Fenced off area for wetland and livestock grazing
- Keyline rainwater harvesting swales
- Water course
- Keyline dam for gravity fed irrigation with ram pumps
- Site access

DESIGN EXAMPLE OF A SUSTAINABLE AGRICULTURAL LAYOUT FOR THE DUKUDUKU ON-SITE RESETTLEMENT PROJECT



1



2



3

Homestead Gardens to Enhance Food Security

Basic food security is the mandate of DAERD and should be grant funded.

Micro-finance institutions (Grameen Bank approach) to be established for small loans for rainwater tanks, tunnels, inputs, etc.

Development of Productive Commonage for Commercial Cash Crops

Commercialisation projects can be part grant and part interest financed. DFIs to be mobilised to fund these projects. Grant to interest funding as follows:-

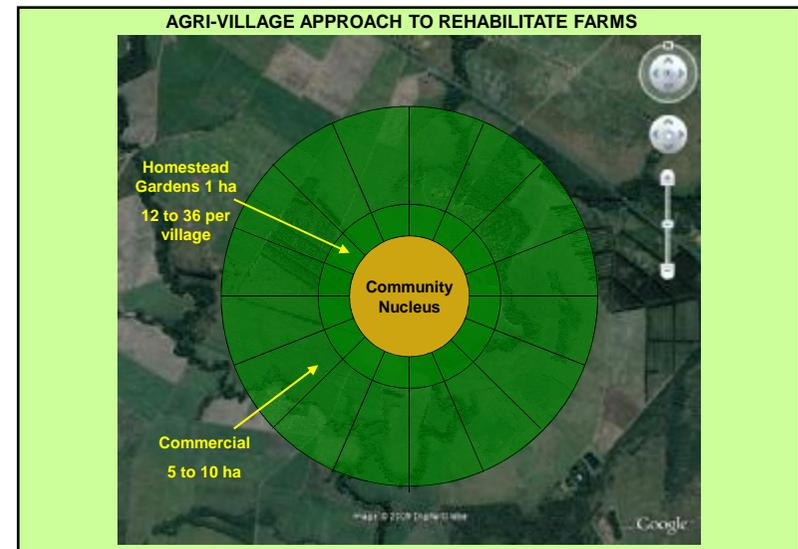
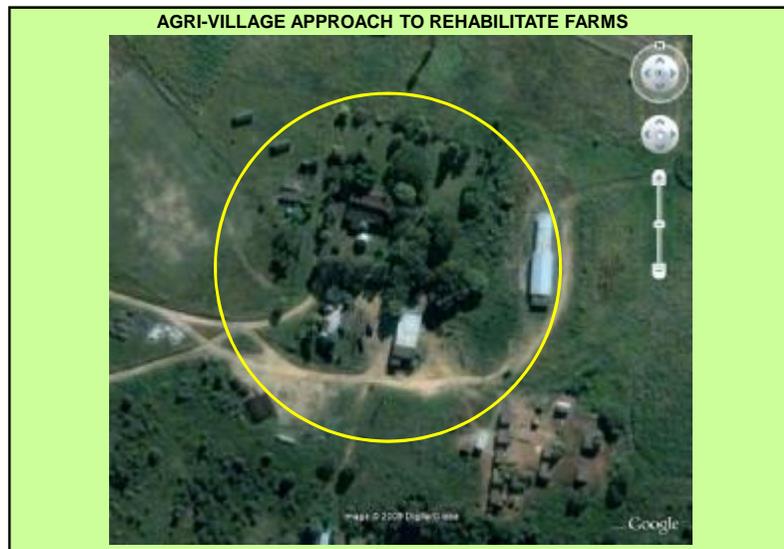
- 1st Loan – 30 / 70
- 2nd Loan – 20 / 80
- 3rd Loan – 10 / 90

Village Co-operative / Farmers Support Centre

Establishment of infrastructure – DEDT

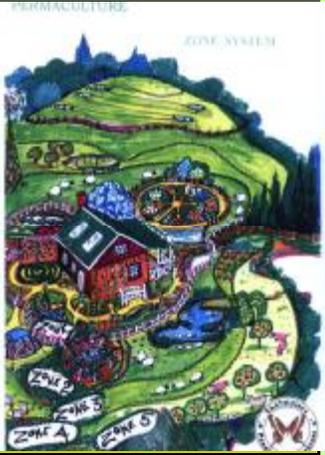
Equipment – DFIs

Operational support - DAERD



Sustainable Housing Settlements

| Zone | Permaculture zones for homesteads |
|---------|---|
| Zone 00 | The Individual |
| Zone 0 | Home dwelling |
| Zone 1 | Domestic self sufficiency - pick and pluck plants for daily usage |
| Zone 2 | Small domestic stock and an orchard |
| Zone 3 | Crops, forage and stored food |
| Zone 4 | Orchards, forage, forestry and pastures |
| Zone 5 | Natural environment |



The diagram illustrates the Permaculture Zone System, showing concentric zones around a central homestead. Zone 00 is the individual, Zone 0 is the home dwelling, Zone 1 is for daily self-sufficiency, Zone 2 is for small stock and orchards, Zone 3 is for crops and food storage, Zone 4 is for orchards, forage, and forestry, and Zone 5 is the natural environment. The diagram is titled 'PERMACULTURE ZONE SYSTEM'.

THE CURRENT REALITY

More photos



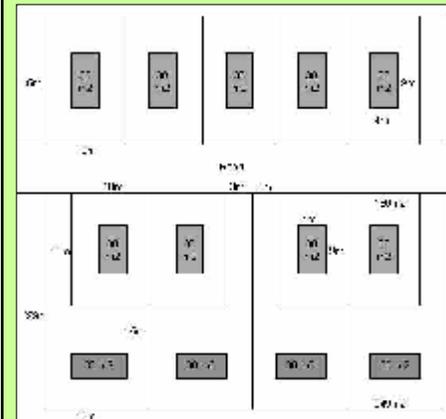
The photographs show various aspects of informal settlements. Top-left: A hillside densely packed with small, colorful, makeshift houses. Top-right: A wide view of a sprawling informal settlement in a valley. Bottom-left: A view of a hillside with some scattered buildings and a fence. Bottom-right: A close-up of a multi-story, unfinished concrete building with a yellow sign.





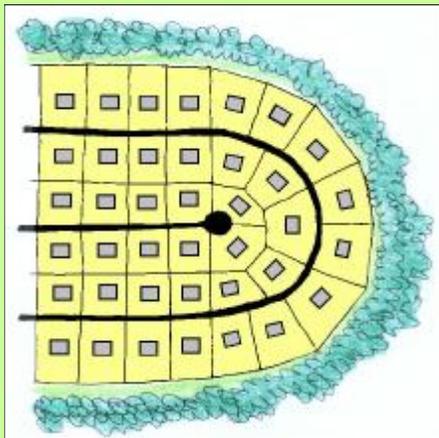


Typical conventional greenfield housing layout



- higher servicing cost
- less housing residual
- less privacy
- less functional space
- predominantly on steeper land
- lower densities
- unsafe neighbourhoods
- lower economic thresholds
- higher energy use
- 30m² house

Typical housing layout on a spur development



A sterile, unhealthy, unsafe, mono-culture built environment that subdues community spirit and forms a barrier to the natural environment.

THE PERMACULTURE DESIGN OPPORTUNITY



FUNDAMENTALS FOR ECOVILLAGE DEVELOPMENTS

Holistic Permaculture Design
to produce a vibrant, diverse and safe built environment that promotes a sense of community, urban agriculture and an appreciation of the natural environment.

Natural Building Systems

- Low energy footprint
- Low maintenance costs
- Use of local materials
- Vernacular design

Renewable Energy

- Wind power
- Solar power
- Biogas

Food Security

- Organic farming
- Local food security
- Edible landscapes
- Community Supported Agriculture

Ecological Water & Sanitation

- Constructed wetlands, and/or,
- Living machines
- Re-cycle grey water for irrigation
- Rainwater harvesting

Socio-Economic Fabric

- Local employment opportunities
- Community facilities
- Educational facilities
- Local shopping facilities
- Local currency

STRATEGIC FRAMEWORK FOR SUSTAINABILITY

Concept Presentation v2 – 1st September 2010

SOURCES OF INSPIRATION

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STRATEGIC FRAMEWORK FOR SUSTAINABILITY

Concept Document v3a – 15th November 2010

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SUSTAINABILITY DEFINED

Is Development Progress, or, is Progress Development?

Slide by Jonathon Wigley (2007)

THE NEED FOR A COMMON STRATEGIC FRAMEWORK FOR SUSTAINABILITY

There is a wealth of foresight for Sustainability, but, there is no **common** policy, values, strategy, measurement, action plan, targets, political will and leadership to implement Sustainability, hence the need for a common approach. This presentation contains very few new ideas, but rather, compiles some key foresights for Sustainability into a common Strategic Framework for Sustainability.

And, apologies to many other great initiatives that have not been mentioned

HUMANITY'S TWO GREATEST CHALLENGES

WHEN SEEN AS TWO ASPECTS OF THE SAME PROBLEM: **BUILDING RESILIENCE PLUS CUTTING CARBON EMISSIONS**

PEAK OIL

- Coal to liquids
- Gas to liquids
- Relaxed drilling regulations
- Massively scaled biofuels
- Tar sands and non-conventional oils
- Resource nationalism and stockpiling

Planned relocalisation (building local resilience)

- Tradable energy quotas
- Decentralised energy infrastructure
- The Great Re-skilling
- Localised food production (food feet)
- Energy descent planning
- Local currencies
- Local medicinal capacity

CLIMATE CHANGE

- Climate engineering
- Carbon capture and storage
- Tree-based carbon offsets
- International emissions trading
- Climate adaptation
- Improved transport logistics
- Nuclear power

Excerpt from Transition Handbook

IMPACT MEASUREMENT AND TRADEOFFS

Reducing Carbon Emissions

- Does not change bad industrial practices
- Does not reduce consumption patterns
- Shifts emissions to lesser pollutants
- Does not enable equitable development
- May be difficult to measure effectively

*Smoke and mirrors
Fogenhagen*

Reducing Ecological Footprint

- Promotes industrial efficiencies
- Reduces consumption patterns
- Promotes spread of new efficiencies
- Enables equitable development
- Measures are more tangible

A vivid measurement of resource consumption and how many more planets Humanity requires

OR

HUMANITY'S FUTURE SCENARIOS

Stagnation Scenario

- 1st World tries to maintain high level of consumption & lifestyle
- 1st World is swamped by 3rd World immigrants
- Human skills flight from 3rd World
- Overall stagnation from population shifts

Shrink & Share

Gap narrows between high and low ecological footprint nations

Sustainable Humanity Scenario

- Ecological Footprint of Nations converges to Biocapacity
- Minimal resource conflicts
- Low Gini coefficients

High Ecological Footprint

Global Ecological Footprint expands beyond Biocapacity

Ecocide

Low Ecological Footprint

Global Ecological Footprint shrinks to within Biocapacity

Ecocide Scenario

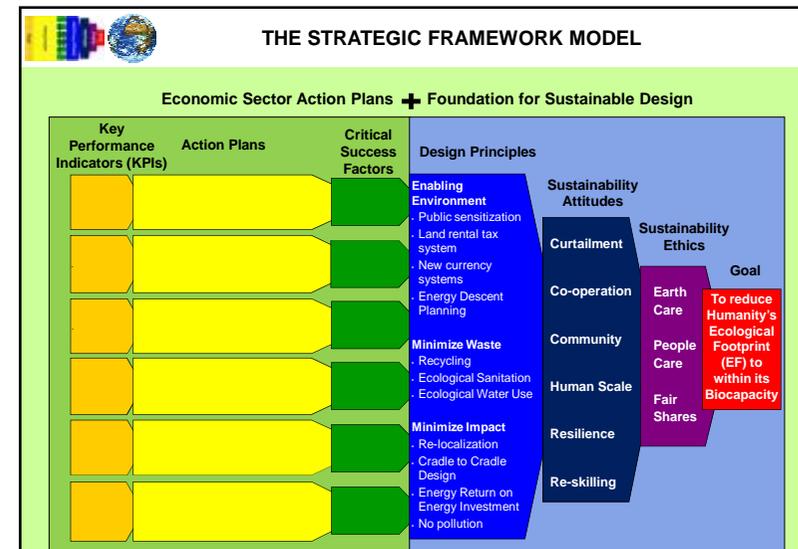
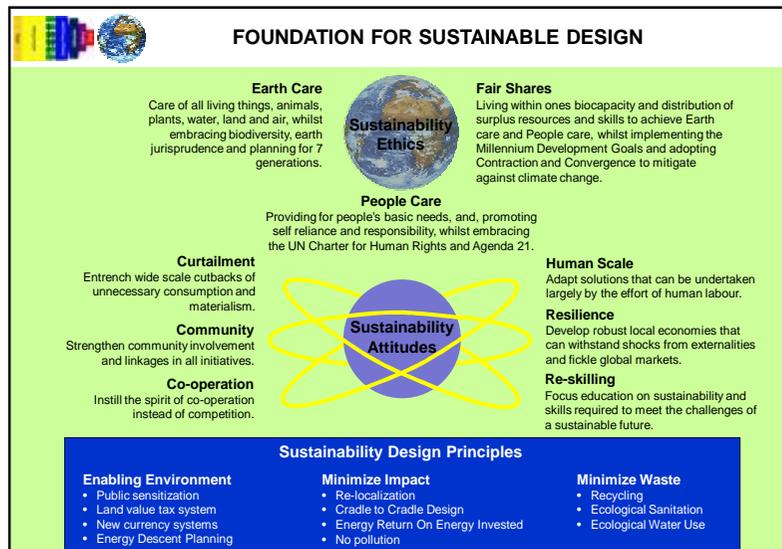
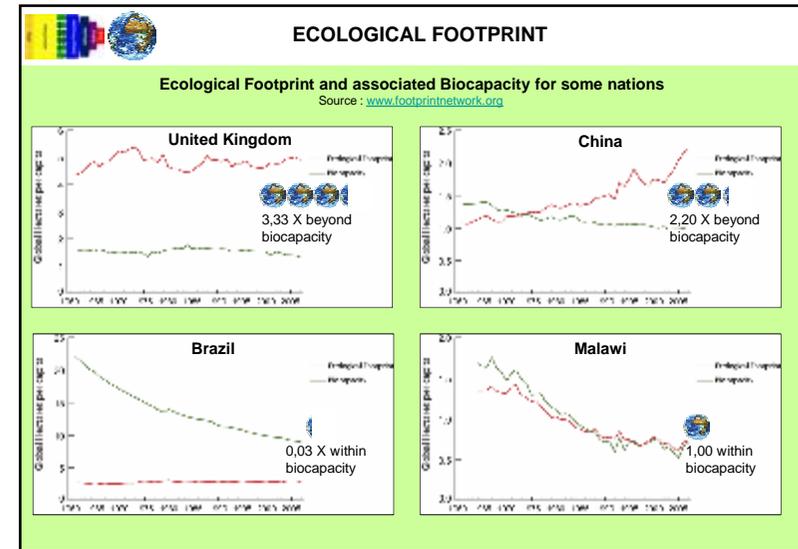
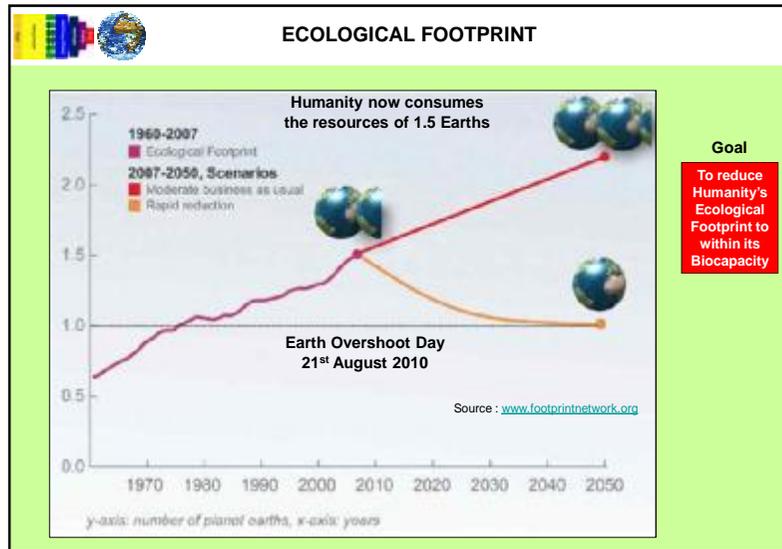
- 3rd World tries to emulate 1st World consumption
- Economic growth until resources exhausted.
- Major contributor to Climate Change
- Overshoot and collapse
- Threat to worldwide human survival

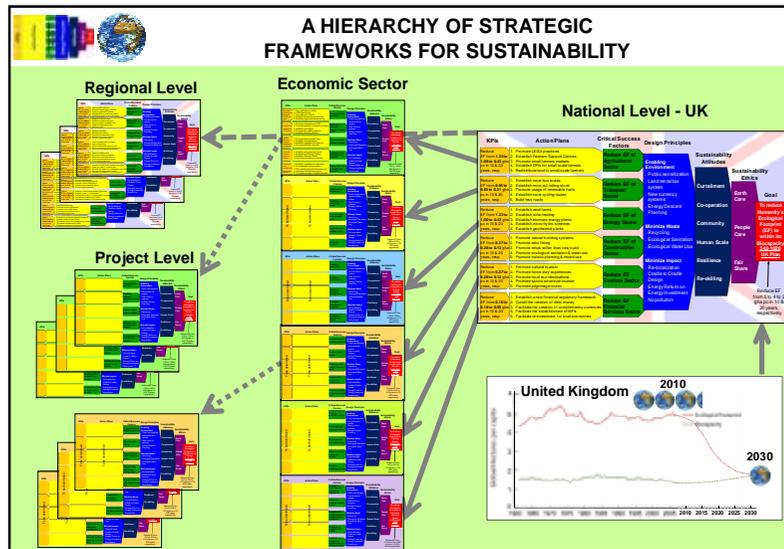
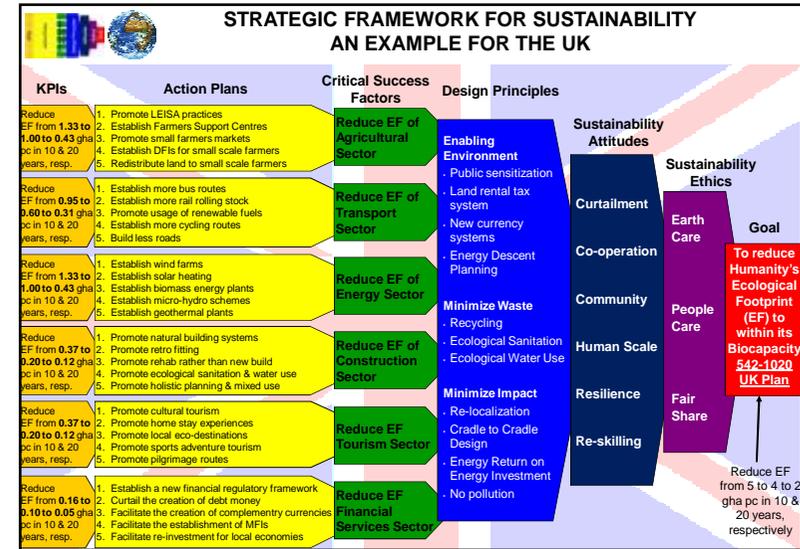
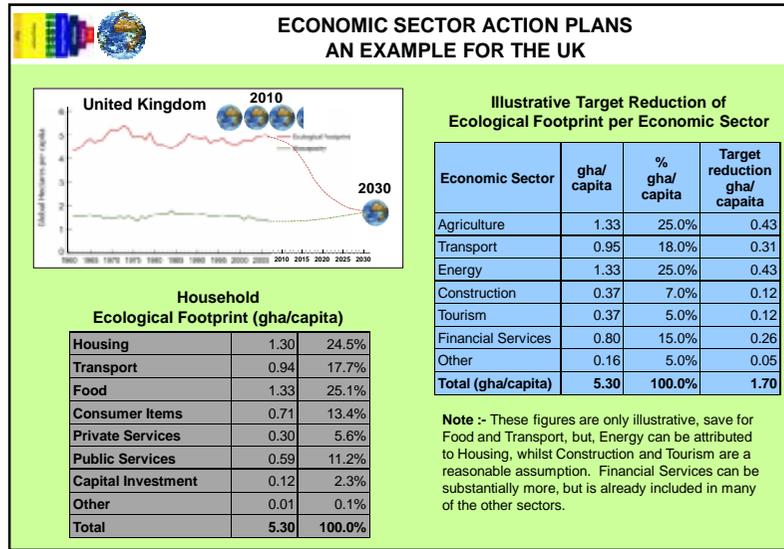
Expand and Steal

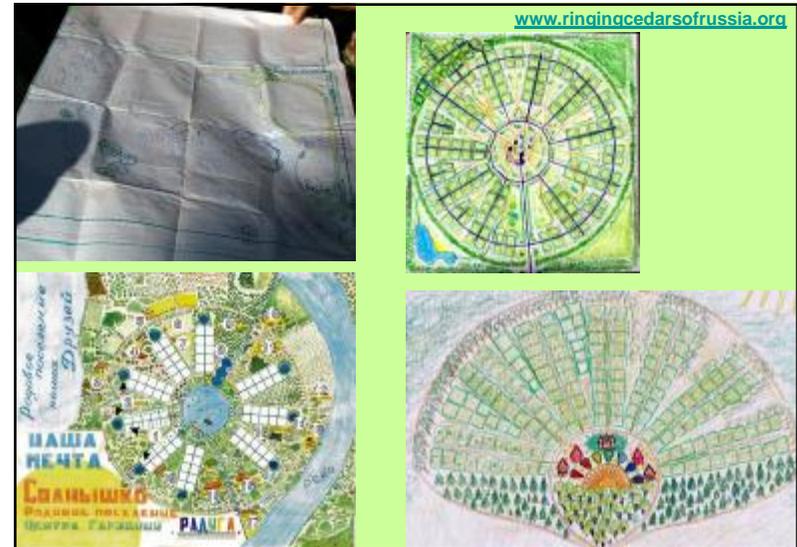
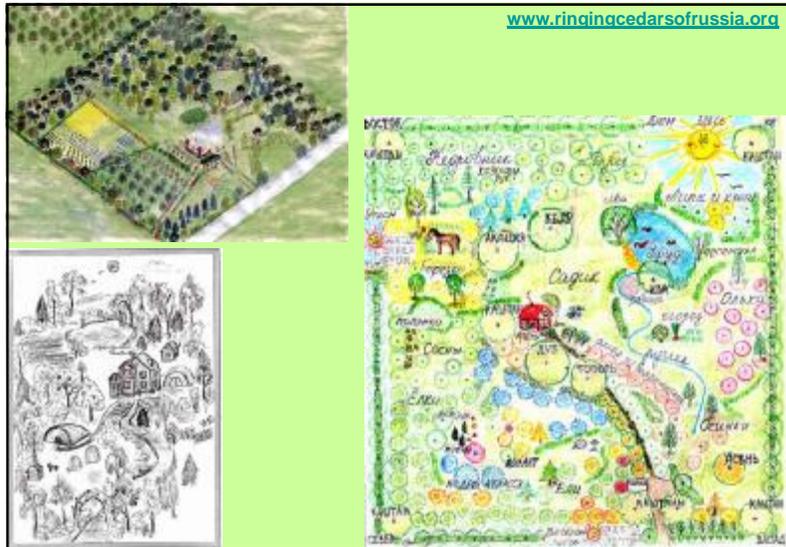
Gap increases between high and low ecological footprint nations

Resource Wars Scenario

- 3rd World plundered of resources
- Decrease in ecological footprint but at expense of the 3rd World
- 1st World economies grow but 3rd World economies stagnate
- Increased resource wars







First steps to your Permaculture Garden



- Mulching
- Composting
- Mycelium running
- Organic seed exchange
- Planting diversity
- Vermiculture
- Rainwater harvesting with swales & vetiver grass
- Create microclimates
- Grey water recycling
- Form your Permaculture Guild Group

Thank You