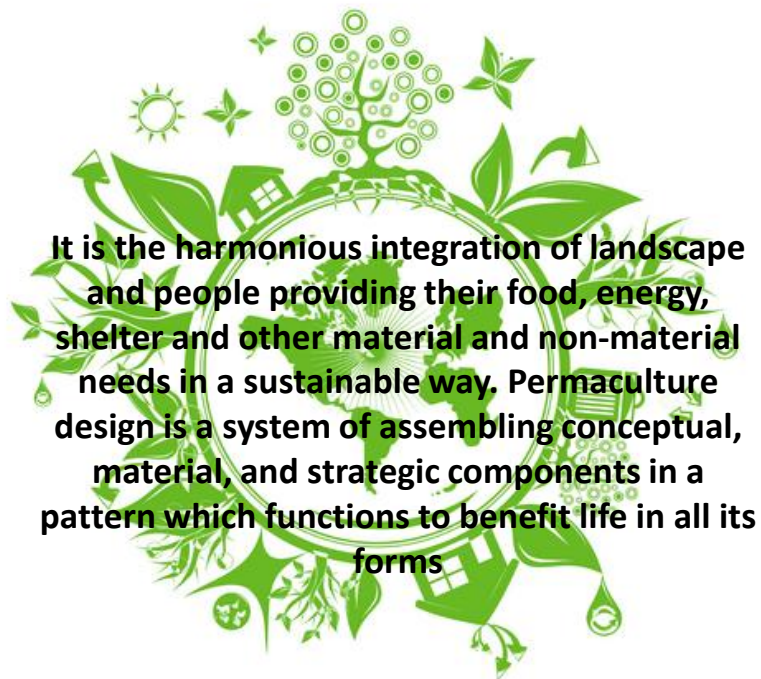


MCCDO Permaculture Design

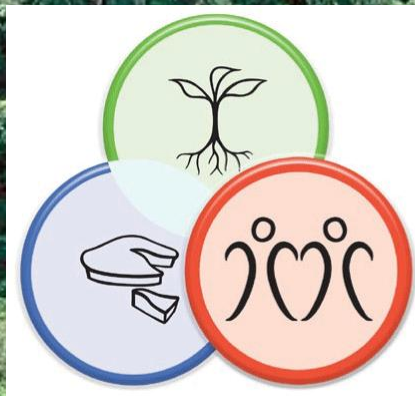


What is Permaculture?

Is the conscious design of human living environments that are reflections of the ecological principle that underlies nature. This principle is applied to all aspects of the human endeavor to attune the new civilization into the greater universal system.



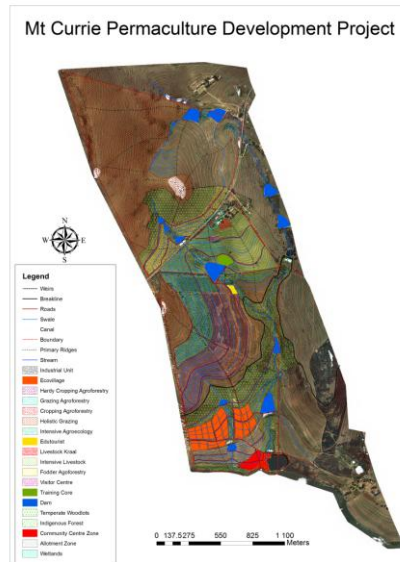
ETHICS FORM THE FOUNDATION OF PERMACULTURE



Permaculture starts by generating the resources our new civilization requires from renewable sources freely provided by nature, Everywhere...

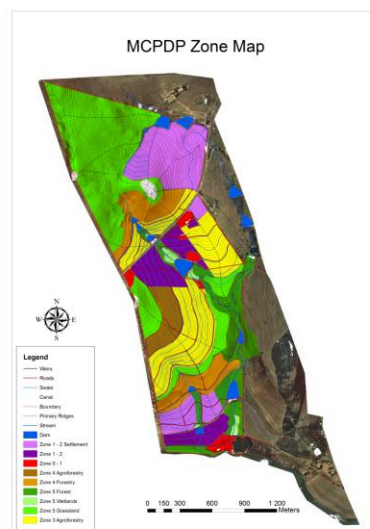


Land Use System





Components

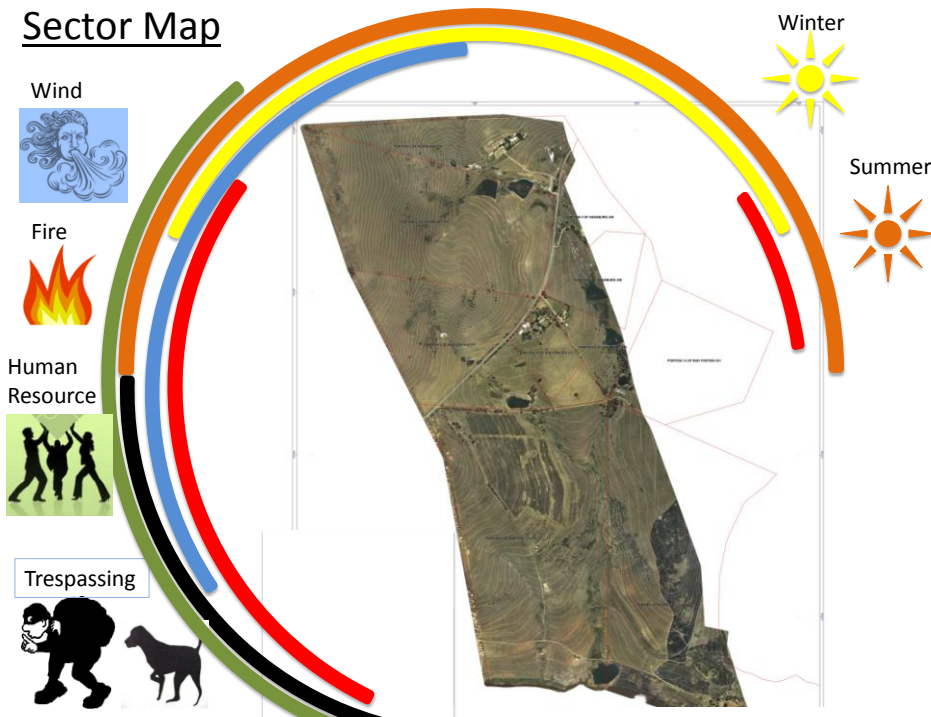


Environment

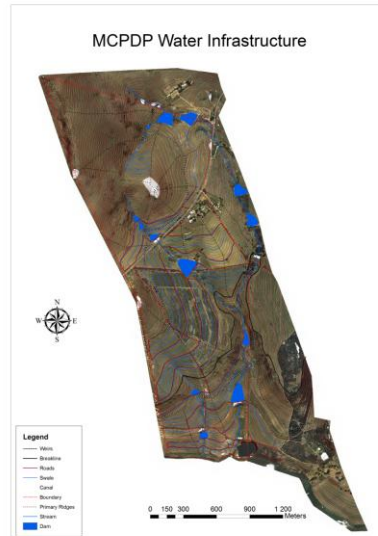
- High Altitude Grassland Biome
- Temperate Climate
- Non-Brittle
- Summer Rainfall
- Dry Cold Winters
- Periodic Powerful winds
- Fire prone
- Fire prone
- Grazing Managed



Sector Map



Water



Water System

- Keyline Dams linked to backflow Swales
- Water released into stream course via lockpipe & diverted into swales running across ridges via a series of downstream weirs (weirs are thin & small to keep the total area of construction in stream course below 50m²)
- Water can also be allowed to flow downstream to fill dams by opening sluice gates in weirs.
- Once overland run-off is harvested in swales it flows out into stream course and fills dams
- Areas between swales is ploughed into keyline pattern of cultivation
- Swales have numerous spillways to release water into avenues below swales
- Water is also run via gravity from high dams into 50mm pipes to supply drip and micro-jet irrigation systems in irrigation areas
- Water may also be released from high dams into swales via lockpipe, stream course and then into swales to irrigate tree lines

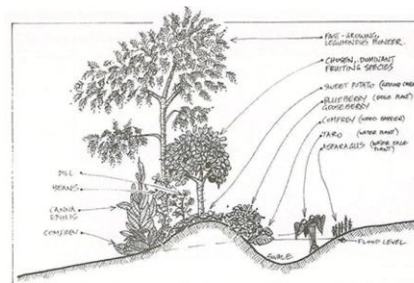
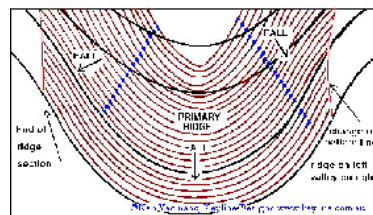


FIGURE 6.4 Trees planted off swale bank to take advantage of wet-season water.



KEYLINE RIPPING

- Yeomans Plough is the primary soil building and water infiltrating infrastructure
- The landscape has widely spaced swales with the interswale alley cultivated into the keyline pattern of cultivation



CREATE A SPONGE



OFF-CONTOUR RIP LINES FOR TOTAL INFILTRATION



KEYLINE DAMS



Dams

Info

- Dams can support an aquaculture design producing fish, water fowl and aquatic food plants as well as mulch and composting materials
- Dam wall areas can be planted to clumping timber bamboos
- All dams to be fenced off from livestock
- Dams become ecological aquaculture systems providing a diversity of fish, water fowl, plant, crustacean & algal outputs as well as hosting insect predators

Building Process

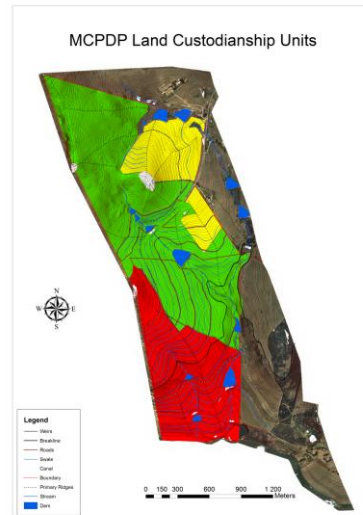
- Find top quality dam builder to assess dam sites and sizes for viability
- Bring in civil engineer to draw up plans for dams
- Pass the plan through Environmental Affairs & Water Affairs
- Dam building rollout can be developed from that point

Dam Volumes

Dams (Top of Main Valley to Bottom)	Area	Depth	Volume in m3
1	3933	7	11107.6
2	2237	6	5368.8
3	3327	4	5323.2
4	13383	7	37472.4
5	9469	7	26513.2
Total			85785.2
A	14054	5	28108
B	13563	5	27126
Total			55234

Land Custodianship Model

- **3 models of Custodianship**
- Community Custodianship through a Cooperative
- Core Production Areas stewarded via Training Institute
- Private Units consist of the family farm & the Ecoestate. Ecoestate to be redesigned through permaculture principles



Permaculture Zones



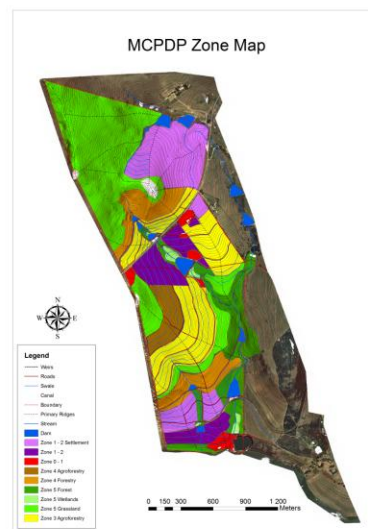
Zones

Zone planning involves the concentric zone arrangement of the design with the homestead/village at the centre. The land-use system gradates outwards in lessening degrees of farming intensity eventually into wilderness.

The elements and components are placed into Zones according to how many times you need to use and manage them, and how much space they use

Zones

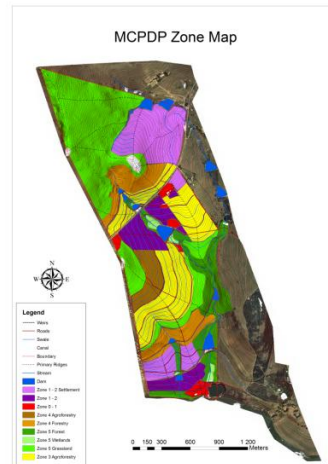
- Zone 0 – Homestead/Workplace
- Zone 1 – Intensive Annual systems, high management
- Zone 2 – Intensive Perennial Systems, Food Forest, Staple Foods
- Zone 3 – Agroforestry, Agricultural Scale
- Zone 4 – Semi Managed, Grazing, Timber
- Zone 5 – Wild Natural Systems



Zones 0 - 1

6 Core Hardscape Zones

- Training Centre x 2
- Industrial Centre
- Visitor Centre
- Edutourist Centre
- Community Centre



Training Centre Zone

- Multipurpose Classroom
- Student Accommodation
- Outdoor teaching spaces
- Resource Centre
- Close to models & Examples
- Agricultural Processing
- Nursery/Seed Bank
- Project Office



Training Landscape

- This area is the core of the agricultural landscape so becomes the venue for all related processing. Barns and storage systems are placed close to the dirt road across the stream from the Training Centre
- Intensive Vegetable/Food Forest Production integrates with & surrounds the training complex
- Vegetables, herbs, small animals, composting, vine crops on buildings to feed residents, students & visitors
- Shady social/gathering areas



Visitor Centre

- Integration Centre
- Retail Centre
- Tea Garden
- Commercial Nursery
- Consulting Office
- Cinema
- Information Centre



Industrial Zone

- Open Source Technology Designs manufactured to support permaculture development
- Tools, engineering machines, vehicles, etc
- Skills development
- Small Business Models
- Workshops



Energy

- Off grid supply of electricity & Heating
- Heating – Firewood, passive solar, Vacuum tube water heaters
- Rocket Stove & Biogas for cooking/heating
- Biomass power (syngas)
- Solar panels
- Each building or complex has a standalone energy system
- If biomass energy is used then syngas generators can be linked into smartgrid either servicing the whole farm or building clusters



Community Zone

- Service point for the community stewarded area
- Workshops
- Agricultural Processing
- Community Centre
- Art & Craft Centre
- Nursery
- School/Creche
- Resource Centre/Internet Access
- Restaurant
- Tool Share Centre
- Natural Healing Centre
- Outdoor activities around lake
- Market place for trading and fairs



Ecovillage



Ecovillage

- Model for Sustainable Rural Settlement
- Village Pattern
- 14 one to two Acre Plots on 15 hectares
- Each plot is a sustainable homestead
- Food Security Systems
- Off Grid Energy
- Shared Resources
- Natural Buildings
- The design is contour based with shared swales leading water across slope from dams in the primary stream
- Water supply comes from rainwater catchment, off grid pumping from quarry lake as well as gravity feed from keyline dams located above in the watershed.
- Large biogas system connects to sewage grid and supplies households with cooking gas
- Residents are involved in the training centre and consulting from the project as part of a nationwide model replication program



Edu-Tourism

- Living space for visitors who have come to learn through interaction
- Backpackers
- Social Areas
- Short Course Programs
- Volunteer Programs
- On Farm Outdoor Activities linked to the zone
- Hiking trails
- Mounting biking
- Horse riding
- Personal Development Courses

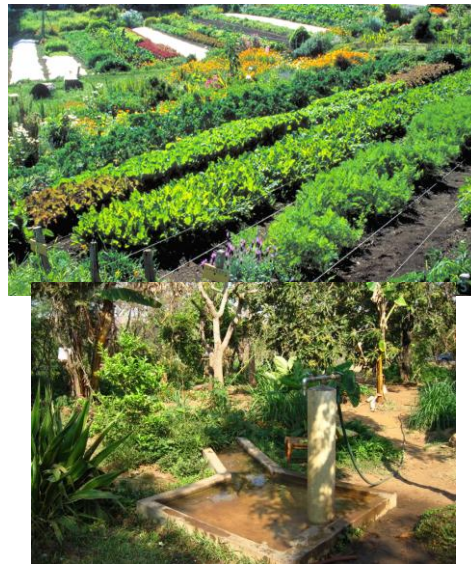


REGENERATIVE AGROECOLOGY



Intensive Agroecology Zone 2

- 16 Hectares
- Food Forests
- Staple vegetable systems
- Integration of poultry in rotation systems
- Most intensively productive aspect of the farm, tree based
- Main nursery placed here



Intensive Agroecology Zone 2

Info

Food Forests

- Soft Fruit Food Forests placed under hail netting
- Intensive Alley Cropping Food forest pattern follows swales on contour, with the most intensive and fragile along the bottom of the valley with a gradient moving upslope of increasing hardness and simplicity.
- Fruit Cages under hail netting (keeping out birds) growing soft fruit berries, vine crops like kiwi fruit, Grapes, strawberries, etc
- Fertility maintained by chicken rotation yards in staple food systems, chicken tractors in vegetable gardens, poultry in food forests, deep mulching and EM inoculations', worm inoculations', composting (worms), biodynamic preps (BD 500), etc

Species

- Soft Fruits
- Pome Fruits
- Citrus
- Nuts
- Kiwifruit (hardy kiwi)
- Grapes (table)
- Berries (big variety available)

Allotment Zone

- 9 Hectares
- Linked to township
- Allotment system for local people to grow their own food resources
- Come and go from town on a daily basis
- Vegetables
- Staples
- Fruits
- Herbs
- Medicines
- Small Animals



Zone 3 Agroforestry

- Cultivation of production trees on contour rows with cropping or grazing in the alley's between
- Multiple yield systems
- Agricultural scale of production
- Focus on resource provision into the local & regional economy
- Processing of resources before export



ZONE 3 AGROFORESTRY



Cropping Agroforestry

- 11 Hectares
- Fruit & Nut trees in Rows
- Staple Grains in alleys
- Irrigated and intensively managed
- Integrated animals to follow up & fertilise after harvest
- Animal Tractors (Pigs, Poultry)



Cropping Agroforestry

Info

- Rows contain Chop and drop legumes & biomass/mulch species mixed with herb pioneers
- Alleys have rotation of annual cash crop in simple polyculture, always accompanied with legume
- Harvest is followed by animal tractors or mobile electric fence moving paddocks. Chickens and mini pigs are ideal
- After animals Row plants are chopped and dropped as mulch, with EM inoculations

Plant Species

Rows : Tagasate

Alleys: Grains, pulses, field beans, pumpkins, lupines, grain amaranth



Hardy Cropping Agroforestry

- 18 Hectares
- Non-Irrigated
- Focus on perennial Crops in alleys
- Medicinal plants – indigenous medicines, big potential for cropping trees, shrubs (leaves), bulbs for a formalised muthi market and pharmacuetica.
- Hardy Fruits & Nuts
- Hardy Super Foods
- Climate resilient species



Hardy Cropping Agroforestry

Info

- Perennial trees on the rows in a polyculture of support pioneers around them
- Rows are on swales with trees below swales with support species (fragrant & flowering plants, chop & drop species) on the mounds
- Alleys are planted to perennial crops such as medicinal plants with mixed groundcovers of legume & herbage
- Poultry forage through the system (wild birds such as bantam flocks)

Plant Species

- Nut trees (Almond, Hazel, European Chestnut, Pecan, Walnut)
- Fruit Trees (White Sapote, Pomegranate, White Mulberry, Quince)

Fodder Agroforestry

- 12 Hectares
- Focus on production of animal fodder
- Tree and cropping systems to harvest & feed as well as managed grazing in within electric fences
- Sugar pods, nut trees
- Lucerne, legumes, grains
- Non-irrigated/hardy



Fodder Agroforestry

Info

- Fodder Trees on swales with cultivated harvested fodder in the rows
- The combination of trees and grains/legume in the system enable harvesting over summer and storage for winter feeding.
- The products from this system are a supplement to the diet of grazing. Tree fodder provides resilience & food for animals over drought
- Animals are rotated through alleys using mobile electric fencing as a follow up to harvesting

Species

- Trees – Carob, Honey Locust, Walnut, European Chestnut, Acacia spp
- Alley Crops – Grains, lucerne, lotus

Zone 4 Grazing Agroforestry

- 12 Hectares
- Integrating trees with rotation grazing in alleys
- Timber, Fodder & Medicinal Trees
- Grassland or cultivated pasture
- Bees & wild poultry integrated
- Timed Seasonal management of livestock within mobile electric fences



Zone 4 Grazing Agroforestry

Info

- A mixture of exotic & indigenous timbers and fodder of swales
- Very simple polyculture supports the trees
- Mixed indigenous grasses & legumes in alleys that are grazed using holistic management grazing methods

Species

- Timbers – Pine, Beech, Walnut, Wild Peach, Acacia spp
- Fodder Trees – Carob, Honey Locust, Acacia spp
- Alleys – Mixed indigenous veld grass, clover, vetch

Zone 4 Temperate Woodlots

- 28 Hectares
- Cultivated Mixed Woodland Ecosystems
- Indigenous & Exotic timbers for construction, firewood, craft, furniture making
- Multiproduct yields from selected trees
- Staggered harvesting



Intensive Livestock

- 21 Hectares
- Family Farm
- Focus on mixed livestock integrated with food production systems
- Rotation & alley systems
- Intensive Agroforestry Model
- Intensive multiyeild systems that are animal based
- Source of animal manure



Livestock Kraal

- Large Animal Processing System
- Kraal
- Dairy
- Barn
- Composing Systems
- Worm Farms
- Breeding Pens



Zone 4 & 5 Holistic Grazing

- 110 Hectares
- Mimicking of natural herd effect in grazing management
- Wild veld & landscape regeneration using grazing animals
- Animals cycled through veld using electric fencing or herders to keep the herd effect present
- Multi benefit system



Zone 5 Indigenous Riperian Forest

- 30 Hectares
- Re-vegetation of appropriate valleys & slopes with indigenous forest
- Around wetlands and along stream courses
- Multiple yield systems
- Observation & spiritual value
- Evolution of natural wildlife on the site through habitat provision
- Catchment system rehydration



Wetlands

- 3.5 Hectares
- Farm is located in critical upland watershed ecosystem
- Wetlands in valleys recovered & preserved
- Recharge plantings to increase wetland function
- Animals fenced out
- Relationship between other components of the design that result in wetland recharge



Community Integration



Community Integration

- How does the project plan to integrate the human and social resources present in Shayamoya with the natural and material resources on the farm?
- How do we create a sustainable, and balanced relationship between the people and the land rather?
- How do we create empowered participation rather than dependency?

Asset Based Community Development

A new paradigm of effective community engagement

	Needs/Deficit Based	Asset Based
Purpose	Changing Community through increased services	Changing Community through citizen involvement
Method	Institutional Reform	Citizen-Centered production
Accountability	Leaders are professional staff. accountable to institutional stakeholders	Leaders are widening circles of volunteer citizens. Accountable to the community.
Significance of Assets	Assets are system inputs. Asset mapping is data collection	Assets are relationships to be discovered and connected. Asset mapping is self-realization and leadership development.
Production Resource	Money is the key resource. Falls apart without money.	Relationships are the key resource. Falls apart when money becomes the focus.
Operating Challenge	How do we get citizens involved?	How do we channel and build on all this citizen participation?
System Dynamic	Tends to spread itself thinner over time.	Tends to snowball over time.
Evaluation	Success is service outcomes, measured mostly by institutional stakeholders.	Success is capacity, measured mostly by relationships.

Asset Based Community Development

The process

1. Motivating People: First fertilize the soil by getting people excited, proud and confident with positive thinking (see Mdu, Mpume, Alfred etc).
Appreciative inquiry, 3 types of poverty, aspirations and dreams.
2. Task Team: Recruit residents of Shayamoya to research their own community rather than outsiders.
3. Asset Inventory and Mapping: Find financial, material, human, social and natural assets that already exist in Shayamoya.
Group interviews, community surveys, resource mapping.
4. Visioning and Planning: Use what the community and what it aspires to to create the Integration Plan.
Compile all assets, resources and aspirations to create an implementation plan
5. Mobilize assets: Mobilize the assets to implement the plan.
6. Leverage: Leverage the existing assets and activated plan to attract outside resources.

Acknowledgements

Work Team

- Project Management – Piet Bosman
- Design Facilitator – Kent Tahir Cooper
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- Base Data Document – Alex Eppe & Matt Purkis
- Design Document – Kent Tahir Cooper
- Community Engagement – Tim Wigerly, Piet Bosman
- Surveying & Video Recording – Tim Wigerly, Green Ambassadors & Mountain View Farm Permaculture Staff

Design

- The ideas and concepts held in this design are the product of the observations, interactions and concept development of all members of the team over 7 days