Building Landscape Resilience

Land management fostering pollinator habitat and ecosystem health

"A goal without a plan is just a wish"

Antoine de Saint-Exupéry

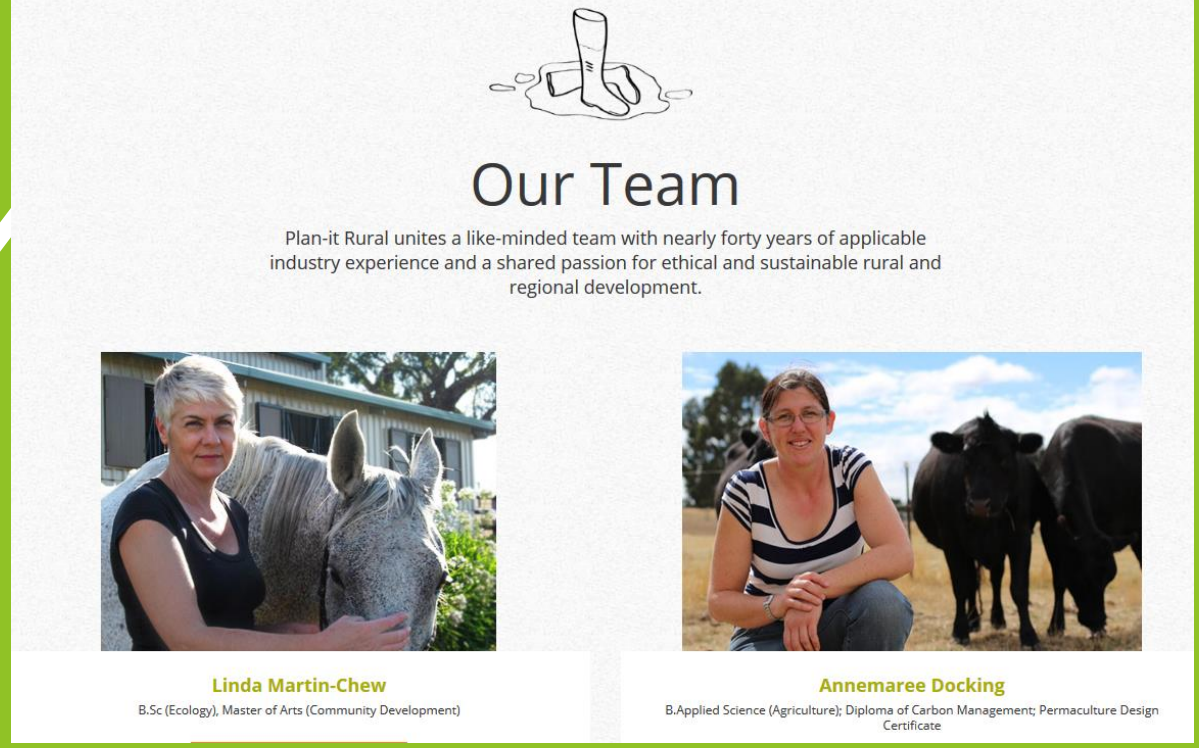
plan-it rural

Workshop Program

- Introductions
  - Name,
  - Brief property description (size, location)
  - What are you hoping to learn today?
- What are pollinators and why are they important?
- What can pollinators do for us on the farm?
- How can we foster pollinators through design and management?
- Questions – anytime!

Introductions

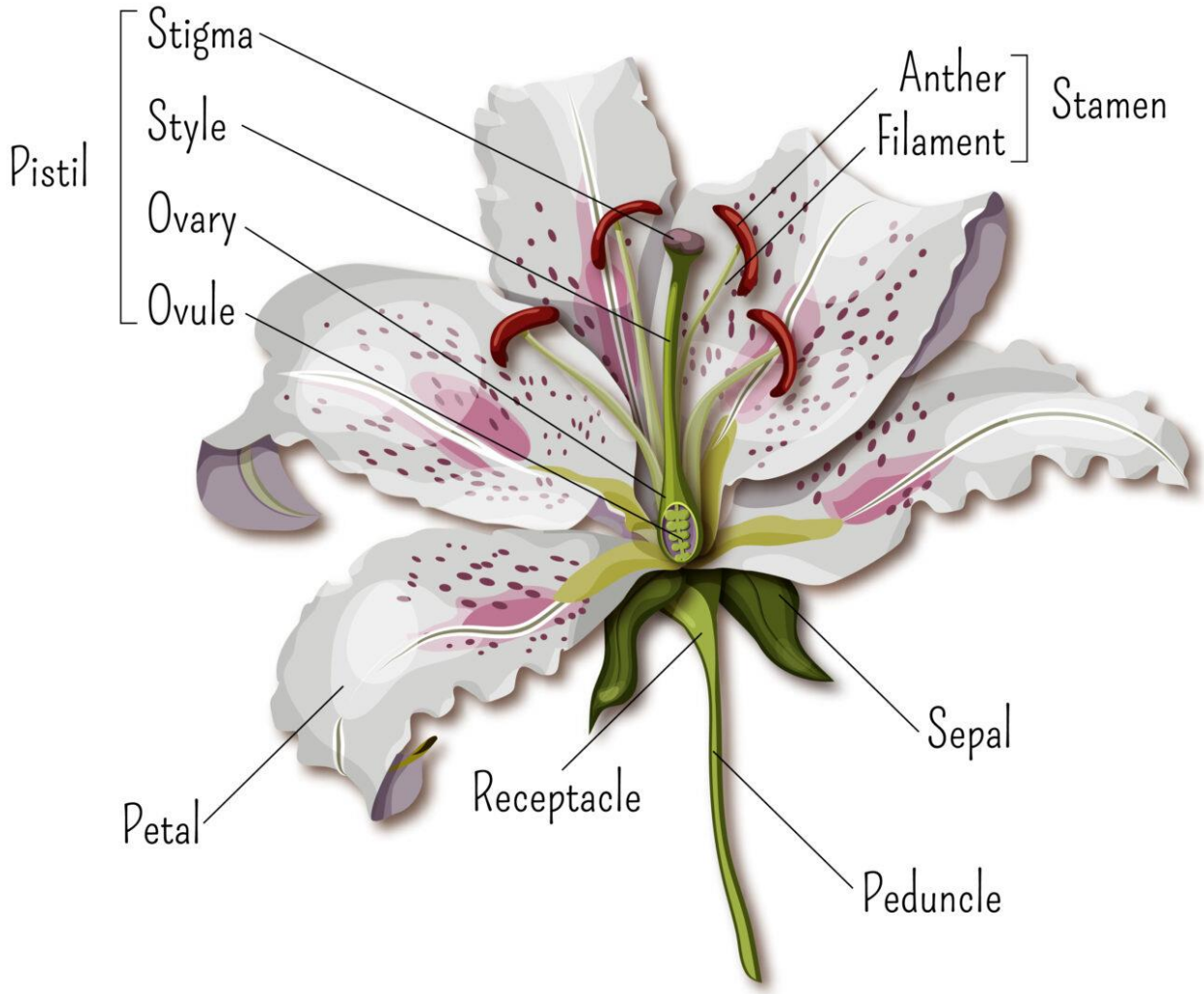
- 25 years industry experience
  - Cattle, sheep, horses, poultry, dairy, horticulture, viticulture
  - 15 years State and Local Government
- Currently farming in Willowmavin (near Kilmore)
- Plan-it Rural – supports new and existing farmers and landholders realise their farming and land management ambitions
  - Whole Farm Planning
  - Regulatory support
  - Tree Change Coaching
  - Peri-urban planning scheme audit – new publication on website www.planitrural.com.au
- PhD student with Deakin University Centre for Regional and Rural Futures
  - Regenerative Agriculture Systems



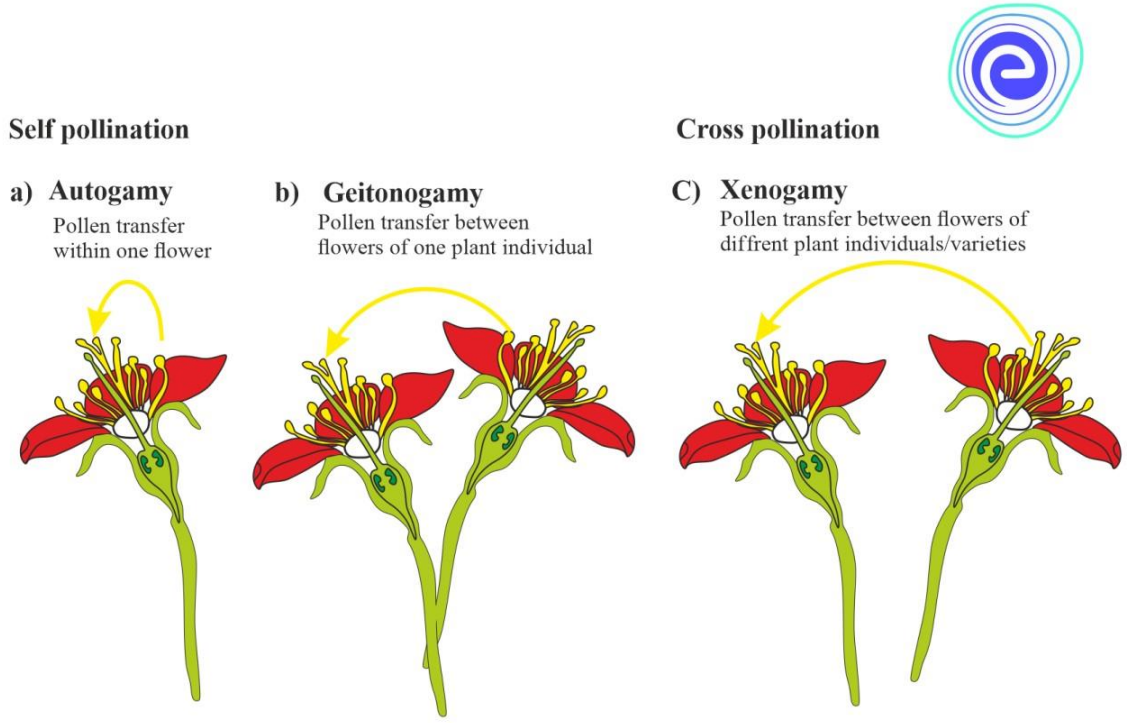
Introductions

- Name,
- Brief property description (size, location)
- Key question you want addressed today?

What is pollination?



What is pollination?



Source: www.embibe.com

Ecosystem Service

What are ecosystem services?

Figure 1: **Ecosystem services and related goods (adapted from multiple sources including the Millennium Ecosystem**

Source: www.iucn.org

POLLINATION

Self-Pollination
(Autogamy)

Cross-Pollination
(Xenogamy or Allogamy)

Abiotic Agencies
1. Anemophily (Wind)
2. Hydrophily (Water)

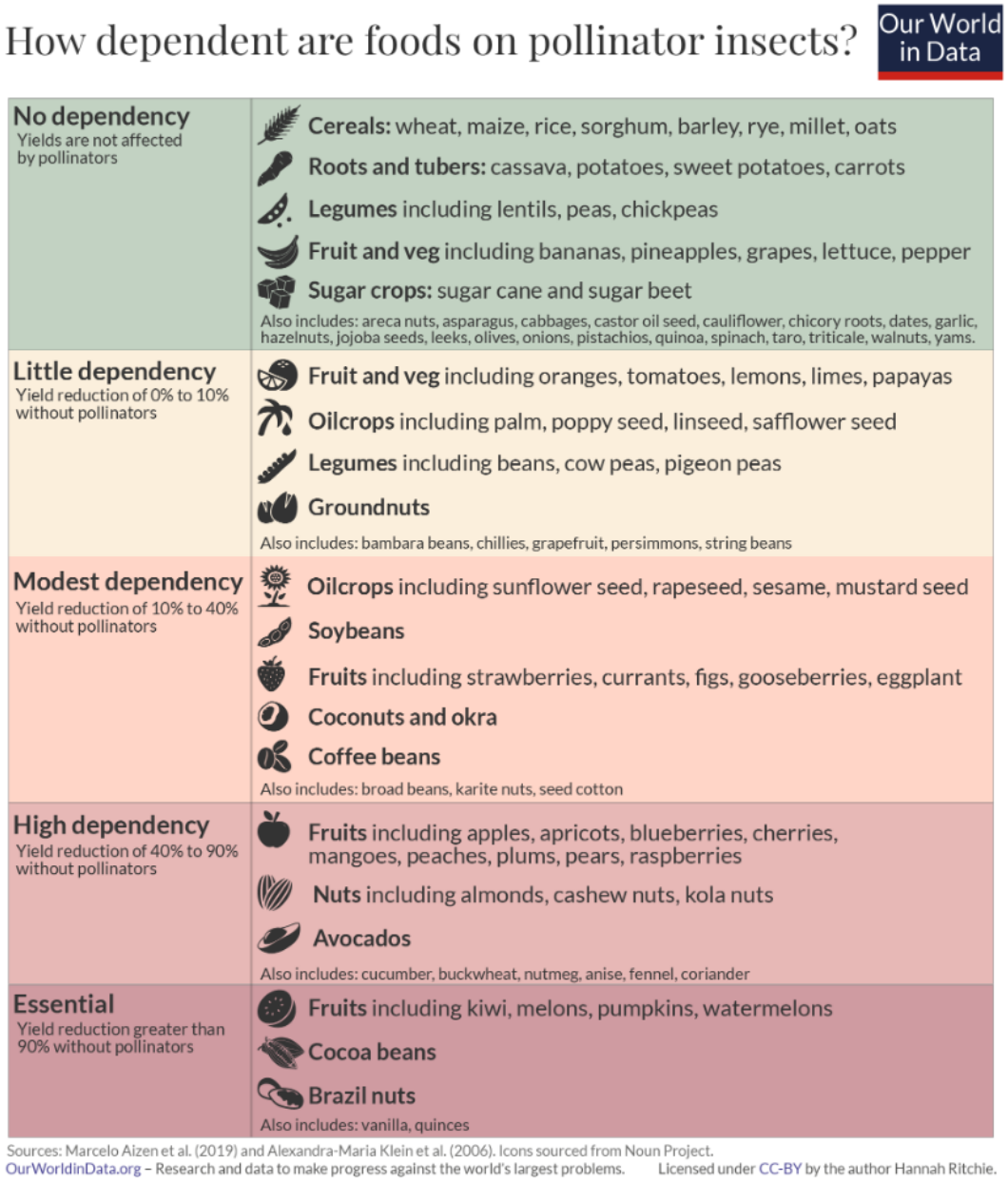
Biotic Agencies

Cantharophily (Beetle)	Phalaenophily (Moths)	Mellitophily (Bees)	Psychophily (Butterflies)	Malacophily (Snails)	Ornithophily (Birds)	Chieropterophily (Bats)	Myrmecophily (Ants)
							

Why are pollinators important?

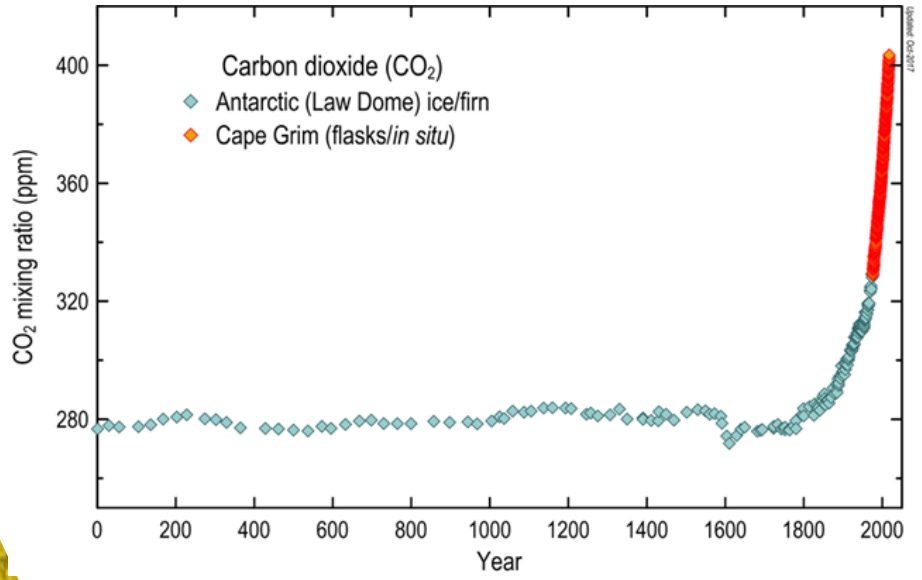
- “Pollinators such as bees, birds and bats affect 35 percent of the world’s crop production, increasing the outputs of 87 of the leading food crops worldwide, plus many plant-derived medicines for the world’s pharmacies. Pollinators contribute significantly to human health; pollinator dependent crops supply major proportions of micronutrients. In terms of ecosystem health, approximately 90 percent of wild plants rely on pollinators that support wider biodiversity.”

  Source: FAO

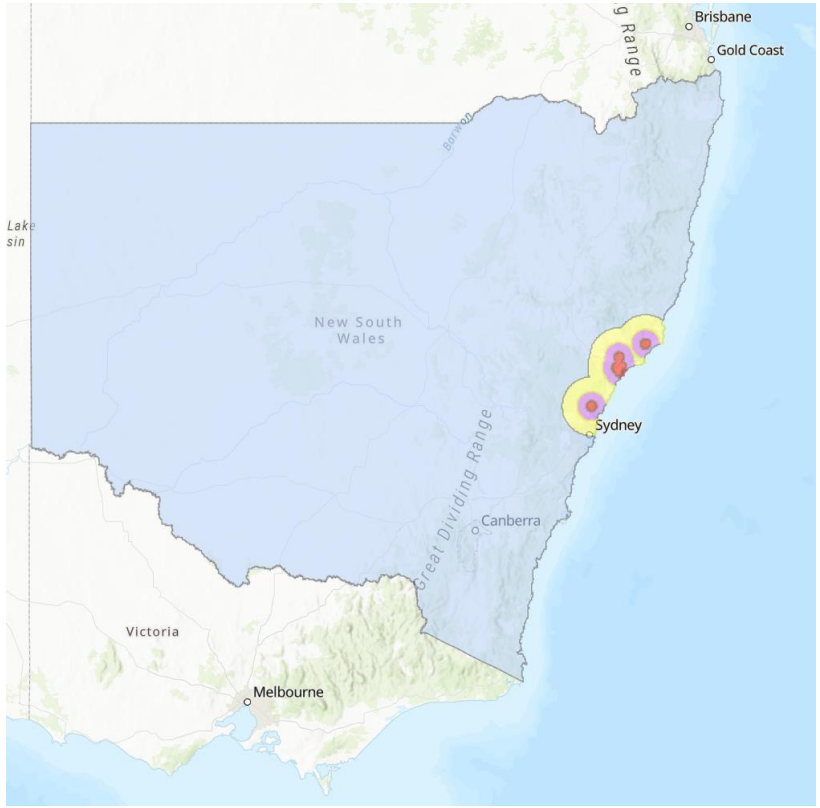


Why are pollinators in decline?

- Climate change
- Habitat fragmentation by urbanisation and farming practices
- Reduced forage plants in modified landscapes
- Monocultural approaches to crop production
- Colony collapse
  - Pesticide use – specifically neonicotinoids
  - Pest and disease



Varroa mite – current outbreak



- Varroa mite (Varroa destructor) was detected in two of six sentinel hives at the Port of Newcastle on Wednesday 22 June 2022.
- The detection was the result of routine surveillance on sentinel hives by NSW Bee Biosecurity Officers.
- The red represents the 10km eradication zones where honeybee hives will be euthanised.
- The purple shows the 25km surveillance zones, where officials are monitoring and inspecting managed and feral honeybees to limit the extent of these incursions.
- The yellow represents the 50km biosecurity zones and beekeepers within that area must notify NSW DPI of the locations of their hives.

Pollinator friendly practices

- High complexity (diversity, heterogeneity) of habitats (different types of habitats).
- High habitat quality (not only natural).
- Low or no presence of pesticides.
- High within-field plant biodiversity (e.g. having abundant and diverse plants)

Source: www.fao.org

Pollinator friendly examples

EXAMPLES OF POLLINATOR-FRIENDLY PRACTICES/LANDSCAPES: A) WEEDS CLOSE TO NATURAL FIELDS IN SWEDEN; B) GOATS WEEDING THE COFFEE FARM INSTEAD OF USING MACHINES IN BAHIA, BRAZIL; C) NATURAL AREAS CLOSE TO GUARANÁ PLANTATIONS IN AMAZONAS, BRAZIL; AND D) SMALL FARMS IN COLOMBIA.

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Source: www.fao.org

Pollinator unfriendly examples

EXAMPLES OF POLLINATOR-UNFRIENDLY PRACTICES/LANDSCAPES: A) MONOCULTURE FIELDS IN FRANCE; B) GRASS AREAS IN COLOMBIA WITH LOW DIVERSITY; C) MONOCULTURE OF A CORN FIELD IN NEBRASKA, UNITED STATES; AND D) SUNFLOWER MONOCULTURE IN ARGENTINA.

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Source: www.fao.org

The three strategies

- Keep the natural habitat you already have.
- Enhance and extend habitat - in both indigenous and modified land uses.
- Reduce the use of pesticides.

- Reference: www.pollinator.org/pollinator.org/assets/generalFiles/LandManagerGuide.Ontario.Farms.FINAL.PDF

Keep the natural habitat you already have

- Redefining what is a weed?
  - As simple as leaving flowering plants uncut in a lawn or pasture can provide additional pollinator forage.
- Understand your existing farm habitat and ecosystems:
  - Power of observation
  - Improve plant identification skills
  - Understand the local plants that feed and support pollinators common to your area
    - Ecological Vegetation Classes
    - Production systems and plants
- Assessing appropriate grazing times to allow flowering of forage plants.
- Foster diversity in productive and natural ecosystems

Enhance and extend habitat

- Targeted introduction of forage and habitat species for pollinators
  - Remember diversity in habitat restoration will foster diversity in pollinators too!
- Traditional concepts of tree plantings, shelter belts and conservation areas
- Also be in the form of highly diverse grasslands and well managed grazing regimes
  - Increased livestock health, welfare and productivity
  - Greater soil health and microbiological diversity

Enhance and extend habitat

- Connectivity and biolinkages
  - Builds climate resilience by offering migratory connection for flora and fauna
  - If done well, can network entire communities and landscapes to larger biodiversity assets
  - Creates additional ecosystem services through habitat support for not only pollinators, but other beneficial insects, animals and birds
  - Assist with addressing soil degradation and erosion by slowing wind and water speeds

Enhance and extend habitat

- Land Classing
  - Grouping like with like for ease of management
    - Aspect
    - Topography
    - Soil Type
    - Special consideration areas –
      - Water logging
      - Salinity
      - Erosion
  - Resource http://vro.agriculture.vic.gov.au/dpi/vro/vrosite.nsf/pages/soil_health_land_class

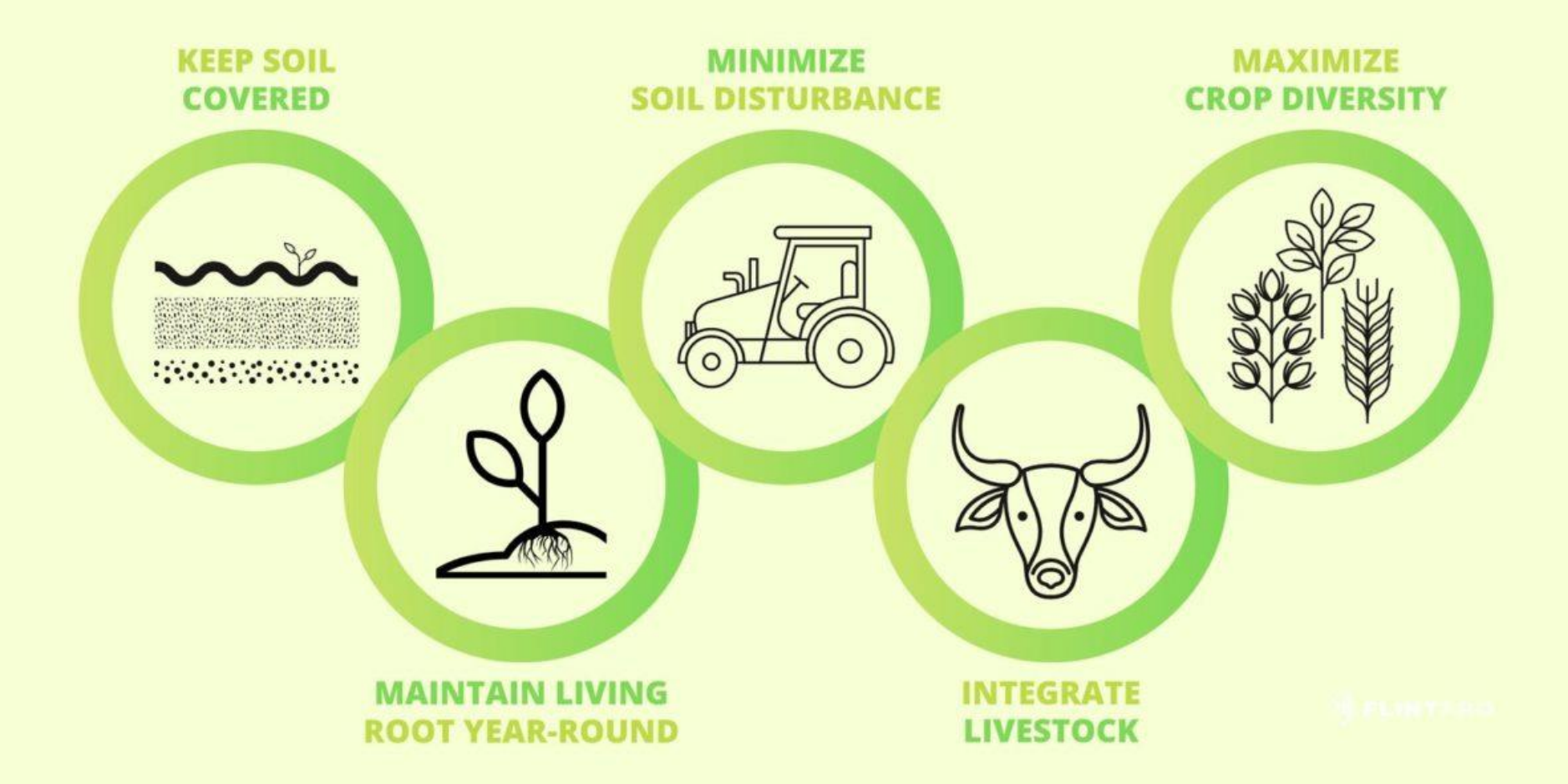
Reduce the use of pesticides

- Understanding the ecosystems you operate in
- Use management systems rather than chemical interventions
  - Systems thinking approach to farm and land management
- Use of pesticides only when other solutions have failed
- Reduce amounts required through targeted application processes
  - Cut and paint
  - Specialist equipment

Management systems that can bring these ideas together

- Regenerative Agriculture
- Agroecology
- Permaculture Design
- Savory Holistic Management
  - And many others, but we will touch on today in the pollinator context.

Regenerative Agriculture



Source: coolfarmtool.org/2020/12/regenerative-agriculture-and-climate-change/

Agroecology

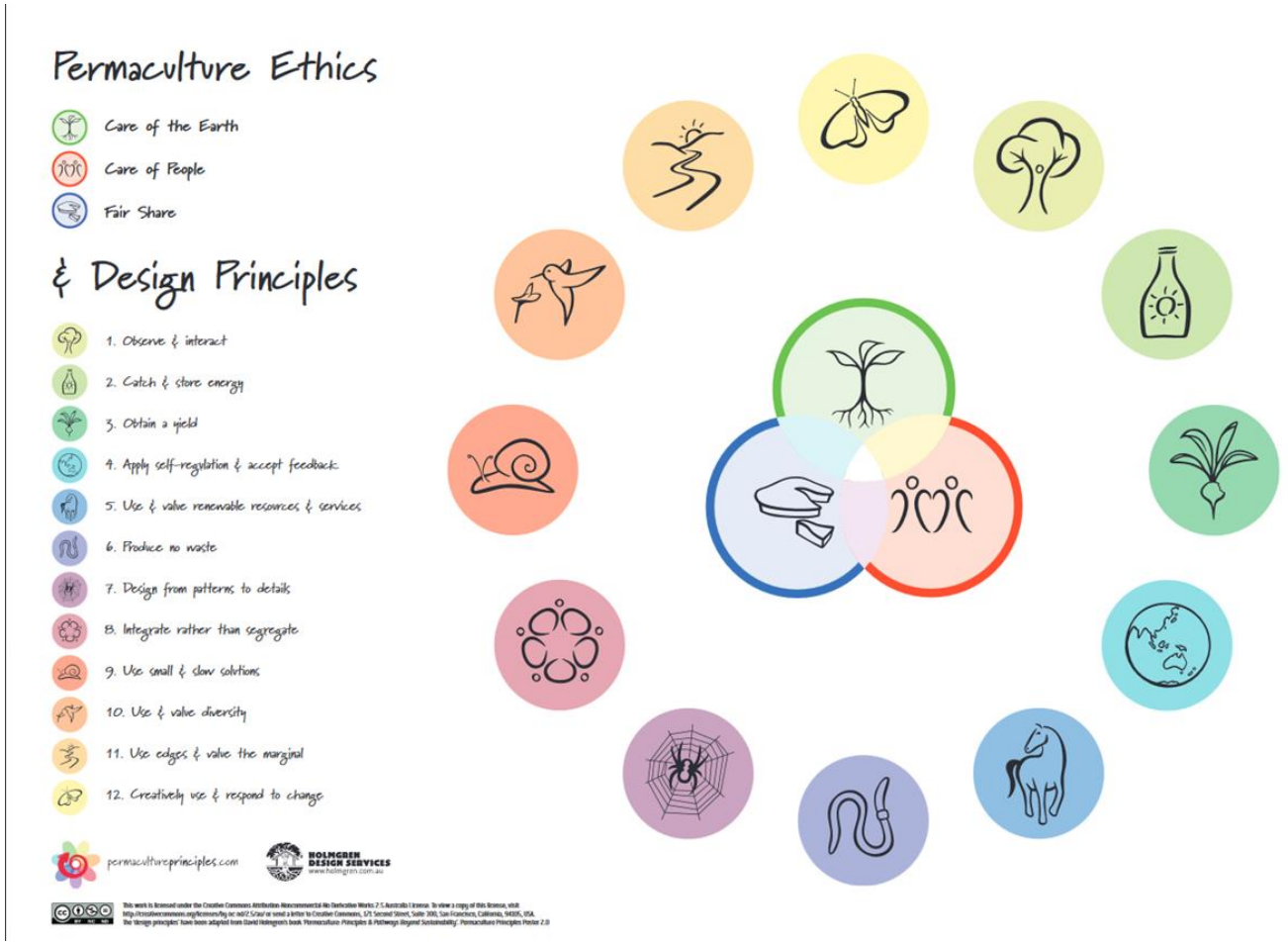
- "Agroecology is a holistic and integrated approach that simultaneously applies ecological and social concepts and principles to the design and management of sustainable agriculture and food systems. It seeks to optimize the interactions between plants, animals, humans and the environment while also addressing the need for socially equitable food systems within which people can exercise choice over what they eat and how and where it is produced."

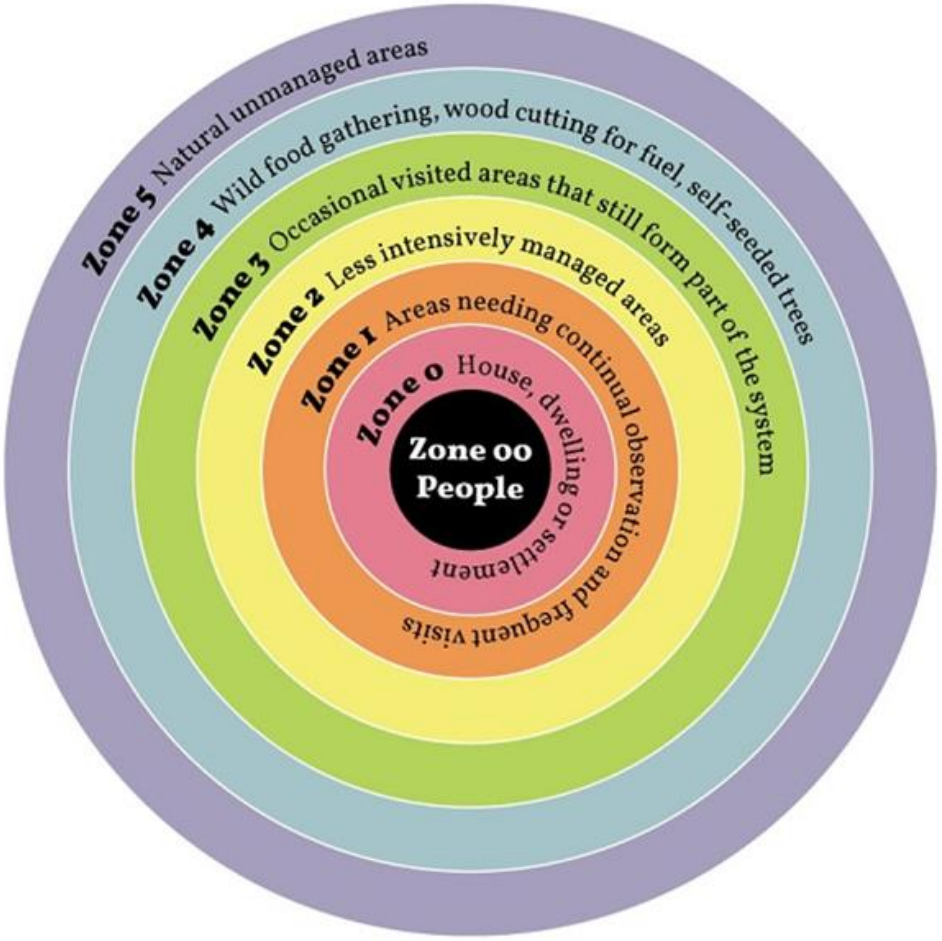
  Source: www.fao.org

- Applying ecological processes to agricultural systems.

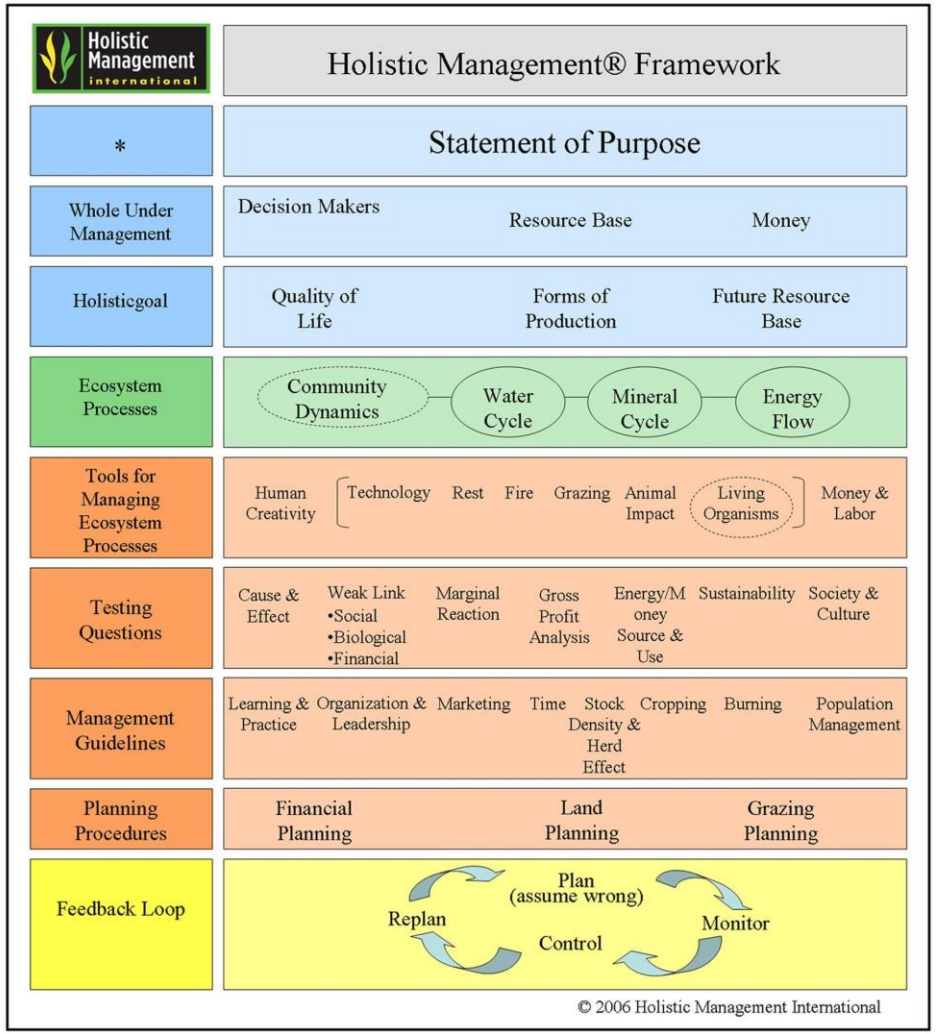
  Source:CSIRO

Permaculture Design





Savory Holistic Management



"Human beings have fabricated the illusion that in the 21st century they have the technological prowess to be independent of nature. Bees underline the reality that we are more, not less, dependent on nature's services in a world of close to 7 billion people"

- Achim Steiner,
Executive Director UN
Environment Programme (UNEP)

Questions?