Environmental Indicators Framework

A Guide to Building Resilient Environments

Sustainability rests on the principle that we must meet the needs of the present without compromising the ability of future generations to meet their own needs.

Why is this so important? In the future, it is predicted we will see a drying climate and more climate variability and extremes. Drought conditions are predicted to be more frequent and more severe with a significant impact on the environment. Healthy ecosystems build resilience to droughts.

Where do I start? The Farm Business Resilience Program in WA aims to build resilient farm businesses with the capacity to adapt. This guide is about helping you identify the environmental indicators on your farm. It is about knowing what you can do to create healthy ecosystems and create resilience to drought by way of natural resource management.

The Environmental Indicators Framework was developed by reviewing contemporary literature and consultation with community groups and industry experts to improve our ecosystems' drought resilience. Ultimately this benefits all land users.

IMPACTS

Our climate is getting hotter and drier.

- Dry seasons are likely to become more frequent and more severe in
- South Western Australia.
  2002, 2006, 2010, and 2019 were classified as drought years.
- South West of WA has experienced a 20% decline in rainfall in the last
- 60 years.
  Australia's Environment Explorer shows how exposed soil is more
- severe the year after drought, compared to the year of drought. The Australian National University and TERN have more information
- available on their websites:
  - Landscape Data Visualiser https://maps.tern.org.au
  - Australia's Environment Explorer http://wenfo.org/ausenv

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Building Drought Resilience

Healthy soils build drought resilience.

Soil provides essential ecosystem services that contribute to Australia's economic, environmental, and social well-being. The importance of soil health to human health and environmental issues is widely acknowledged across the globe.

Measuring and protecting soil health supports sustainable agriculture.

Farm management challenges for soil health in WA include:

- Acidifying soils;
- Dryland salinity;
- Soil loss from wind and/or water erosion;
- Compaction and structural decline;
- Off-site impacts including leaching;
- Water repellence;
- Extended periods of water logging and inundation;
- Intense heat from bushfires.

LAND MANAGEMENT

Soil health underpins land management and is critical to supporting a productive and sustainable agriculture industry.

- *Do you classify your soils as healthy?*
- *What measures do you use?*

VEGETATION & BIODIVERSITY

Healthy ecosystems reduce the severity and impact of severe weather events like drought.

- *Have you assessed vegetation and biodiversity health on your farm?*
- *Have you fenced vegetation to prevent entry from livestock?*

WATER

Water resources are precious, especially with declining rainfall. Careful planning and management are needed.

- *Are you self-sufficient in water needs?*
- *How much water do you use each year?*
- *How much water do you need for spraying, livestock and household?*

SOIL HEALTH - THINGS TO CONSIDER

- Managing soil pH;
- Increasing soil organic matter (WA soils are ancient and inherently low in social organic carbon);
- Protecting ground cover to minimise water loss.

Key Elements

WATER SUSTAINABILITY

Water is considered the most critical resource for sustainable agricultural development worldwide.

Agriculture is expected to face increasing water risks in the future. Farmers in many regions will face increasing competition from non-agricultural users due to rising urban population density, and water demands from the energy and industry sectors. This is increasing the need to become self-reliant for on-farm water resources.

WHAT CAN YOU DO?

- Become self-sufficient in water sustainability;
- Improve on farm water resources;
- Use new technologies (evaporation controls; shades and covers; polymers and plastics to improve run-off; create surface water; desalination plants).

Vegetation and biodiversity provide vital ecosystem functions:

- Soil fertilisation
- Carbon sequestration
- Nutrient recycling
- Pest and disease regulation
- Erosion control
- Crop and tree pollination

Protect, Improve and Expand

Current and future land use practices need to be evaluated concerning trade-offs between food production, and the provision of biodiversity and other environmental services.

Protect and improve existing vegetation and biodiversity

- Fence vegetation and protect from livestock;
- Undertake weed control in remnant vegetation;
- Feral animal control.

Expand on existing vegetation and biodiversity

- Revegetate low and non-productive land;
- Create and link biodiverse corridors.
- Tree planting for carbon credits;
- Fence off and revegetate riparian areas.

Increasing Soil Health

There are four key management practice principles for increasing soil health:

Minimise disturbance

- Minimum or no tillage
- Review of chemical inputs
- Livestock rotation
- Cell grazing

Maximise soil cover

- Stubble retention
- Cover crops
- Organic mulch

Maximise biodiversity

- Plant a range of cover crops
- Have diverse crop rotation
- Combine livestock

Maximise living roots

- Plant a range of cover crops
- Have diverse crop rotations
- Reduce fallow

Building Drought Resilience in the Environment

The priorities for on-farm environmental health and building drought resilience are founded on the fundamentals of land management, water availability, and ensuring ecosystems are healthy and vibrant for the utility of communities.

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