

# roots

## REGENERATIVE®

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### ROOTS REGENERATIVE AGRICULTURAL PRINCIPLES

Regenerative Agricultural principles across soil health and grazing management are listed and described below.

#### SOIL HEALTH PRINCIPLES:

1. Maximise Groundcover
2. Minimise Soil Disturbance
3. Maximise Plant Diversity
4. Maintain Living Roots
5. Regenerative Grazing of Livestock

#### 1. Maximise Groundcover

Groundcover is crucial for building soil health as it helps provide all the core necessities, food, water, oxygen and shelter. Along with these necessities groundcover also provides numerous other benefits for soil health:

- Protects the soil from wind and water erosion
- Increases water infiltration
- Provides food and habitat for macro and microorganisms
- Prevents moisture evaporation from the soil
- Moderates soil temperature (cooler in summer and warmer in winter)

#### 2. Minimise Soil Disturbance

Soil disturbance is classified in three categories: Physical, Chemical and Biological. Soil disturbance is thought of as any activity that can disrupt the soil food web function.

- Physical disturbance can include:
  - Tillage
  - Tree clearing
- Chemical disturbance can include:
  - Over application of synthetic fertilizers, fungicides, and herbicides
  - Pest management programs using excessive pesticides and insecticides
- Biological disturbance can include:

- Overgrazing of pastures preventing carbon and nutrient cycling within the soil

### 3. Maximise Plant Diversity

Maximising pasture diversity is crucial to establishing a healthy mix of root systems within the soil. Diversity in pasture types results in root systems operating at different depths, providing the vital nutrients necessary for the below-ground ecosystem. Diversity in pastures also leads to a healthier diet for herbivores. A nutrient-dense diet is only achieved through consuming a range of different plants, which provide rich phytochemicals which help protect animals from diseases and pathogens. The diversity of plants promotes healthier soils, which in turn promote healthier plants and healthier animals.

The Jena experiment (<http://the-jena-experiment.de/>) is one of the longest-running biodiversity experiments in the world and shows us that there is a strong positive relationship between plant diversity and ecosystem processes (<http://the-jena-experiment.de/index.php/main-experiment/>).

The ROOTS program will include producers from northern Summer rainfall regions (tropical) to southern Winter rainfall regions (temperate) with a combination of native and introduced plant species used in grazing systems from rangelands to incorporated cropping systems.

Some examples of plants commonly found on Australian properties are:

- Warm Season Grass –
  - Perennial natives – Mitchell grass, Speargrass, Kangaroo, Bluegrass and introduced species – Buffel, Rhodes, Digit, Panicums, Urochloa, Couch, Kikuyu
- Warm Season Broadleaf – native legumes, medics and forbs, and introduced species eg. lucerne, stylo, cow pea, lab lab, sunflower, and soybean.
- Cool Season Grass –
  - Native grasses and introduced species eg., prairie, fescue, phalaris, ryegrass, wheat, oat, barley, and rye.
- Cool Season Broadleaf – native legumes and medics, and introduced clovers, vetch, , pea, chickory, plantain, and brassicas.

### 4. Maintain Living Roots

Living plants are the main source of Soil Organic Carbon through litter production (shoots and roots), root exudates and via symbiotic mycorrhizal fungi relationships. (Dignac et al., 2017) Generally the longer the plants are photosynthesising, the more soil carbon is being sequestered.

Our native grassland systems typically grow cool or warm-season annual or perennial pastures, which have a dormant period relating to moisture availability. Northern Australia

generally receives more rainfall in the warmer months, resulting in greater pasture growth & groundcover than in the dryer cooler months. The opposite is true for much of Southern Australia. By focusing on extending the growing season by growing a mix of warm and cool-season pasture species, microbes beneath the surface are supplied nutrients via root exudates and in return deliver nutrients back to the plants for more of the year.

The longer a grazer can maintain this nutrient cycling activity throughout the year, the healthier the soil becomes.

## **5. Regenerative Grazing of Livestock**

Regenerative grazing is all about raising animals for the benefit of the land, it's a focus on utilising cattle to grow pastures rather than using pastures to grow cattle. It is a planned approach to the movement of cattle through paddocks based on the availability of feed and rainfall. The purpose of deliberately moving is to optimise the ability of grass to continually be in a growth phase for the mutual benefit of groundcover, soil health, carbon sequestration and animal wellbeing.

Regenerative Grazing requires the use of a grazing chart to manage the movement of livestock. Grazing charts enable graziers to make informed decisions about restocking or destocking cattle according to rainfall, the actual and forecast growth rate and required rest periods of pastures. The grazing chart will facilitate the assessment for grazing density (i.e. the stocking rate) which is typically calculated via SDH/100mm (stock days per hectare per 100mm of rain). Producers will either use an offline paper grazing chart or an online grazing management tool.

### **REGENERATIVE GRAZING PRINCIPLES:**

1. Develop a Grazing Plan
2. Match Stocking Rate to Carrying Capacity
3. Plan Paddock Rotations
4. Manage Pasture Rest Periods
5. Maximum Density for Minimum Time

#### **1. Develop a Grazing Plan**

A grazing chart is a management tool that graziers can use to plan for paddock rotations, paddock yields, rest periods, grazing severity, forecast and actual rainfall, stocking rates relative to carrying capacity and more. The grazing chart allows producers to plan up to 12 months ahead for all grazing activities. Furthermore, once the overall plan has been set, the grazing chart becomes essential for monitoring and adjusting the plan according to seasonal conditions.

## 2. Match Stocking Rate to Carrying Capacity

The stocking rate is the number of animals that are utilising an area of land at any one time. The Carrying Capacity is the capacity of a land area to support grazing animals.

The purpose of matching stocking rate to carrying capacity is to maximise efficiency and effectiveness of grazing whilst also promoting optimum productivity of paddocks. The grazing chart will facilitate the assessment for grazing density (i.e. the stocking rate) which is typically calculated via SDH/100mm (stock days per hectare per 100mm of rain). Producers will either use an offline paper grazing chart or an online grazing management tool.

## 3. Manage Paddock Rest Periods

Plants need adequate rest after grazing in order to grow. This growth cycle has three phases, the first is characterised by short roots and short leaf area. The second phase is characterised by an abundance of green leaf area and an actively growing plant and roots. The third phase is where plants start the lignification process and stop growing.

Phase two of grass growth is the prime time for grazing the plant and short graze periods will significantly extend this phase. Plant production is at its optimum as is animal production. The goal of regenerative grazing is to manage the plants for this phase with the strategic use of grazing animals.

## 4. Plan Paddock Rotations

Grazing charts allow producers to map out all of their paddocks and track the movement of their herd relative to paddock rest periods. Deliberately planning paddock rotations gives graziers confidence that they are maximising animal and plant productivity and preventing over-grazing.

Planning rotations also allows for graziers to reserve certain areas for crucial times, such as calving, and indicate on the chart how animals will move to and from.

## 5. Maximum Density for Minimum Time

Animals that remain bunched in a single herd are more effective at chipping the soil surface with their hooves and trampling down plant material to cover the soil so that air and water enter, and new plants can grow.

If animals are left in any one place too long, or if returned to it too soon, they will overgraze plants and compact and crush soils.

- *References for how to develop a Regen grazing plan:*
  - <https://savory.global/wp-content/uploads/2017/02/about-holistic-planned-grazing.pdf>
  - <https://www.rcsaustralia.com.au/rcs-regenerative-grazing-principles/>

## ANIMAL WELFARE

- Five freedoms
  - Freedom from hunger and thirst
  - Freedom from discomfort
  - Freedom from pain, injury, or disease
  - Freedom to express normal behaviour
  - Freedom from fear or distress
- Low-stress animal handling
  - <https://www.lss.net.au/about.htm>
  - <http://www.grandin.com/references/new.corral.html>