

# **Regenerative Agriculture**

**Increase of Soil Health and  
Eliminating Problems with  
Pests and Diseases - Without  
Using Chemicals**



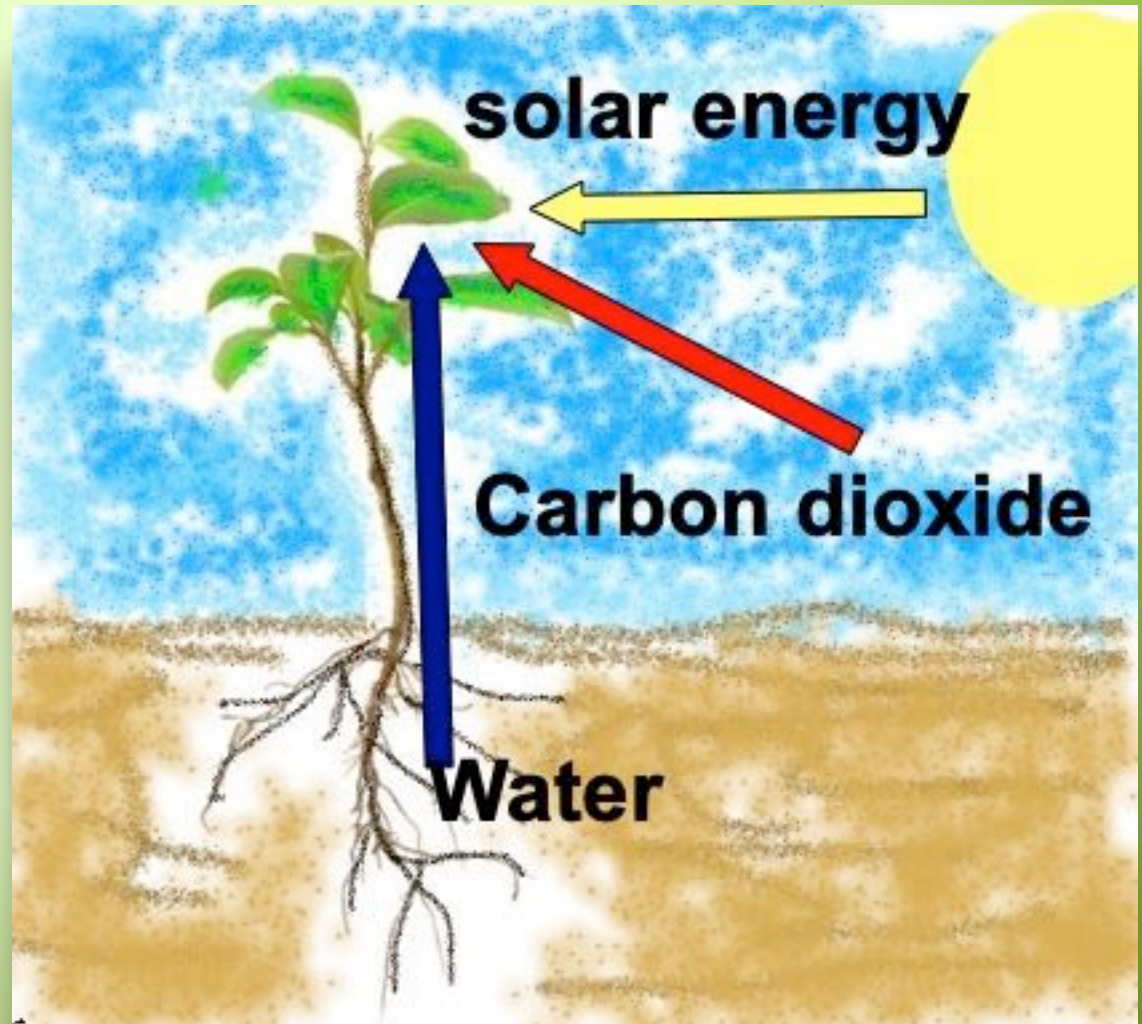
**André Leu**  
**International Director**  
**Regeneration International**

**Farming Secrets, Webinar, Australia**  
**July 23, 2020**

# Maximize Solar Energy



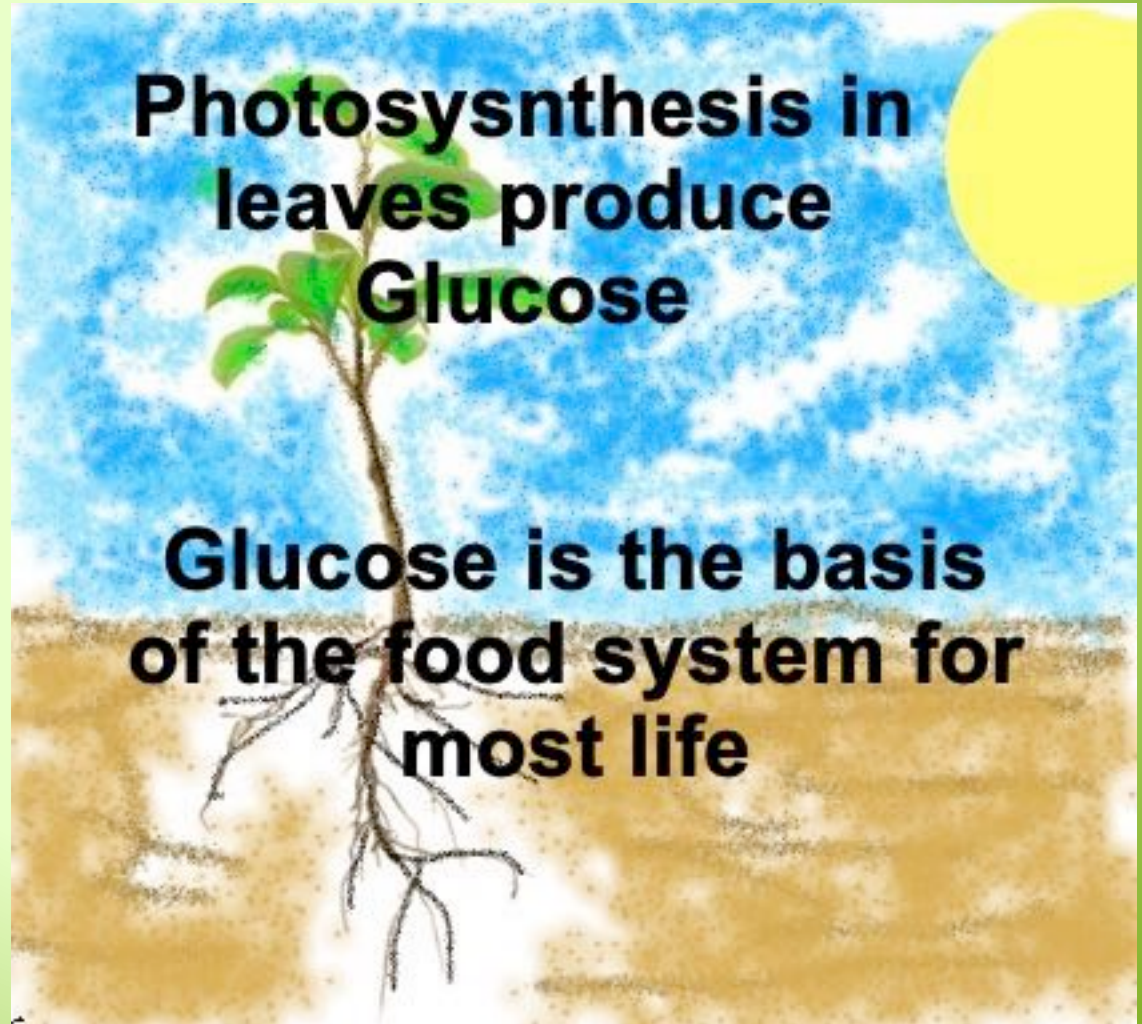
What is the most important thing we do when we farm?



# Maximize Solar Energy



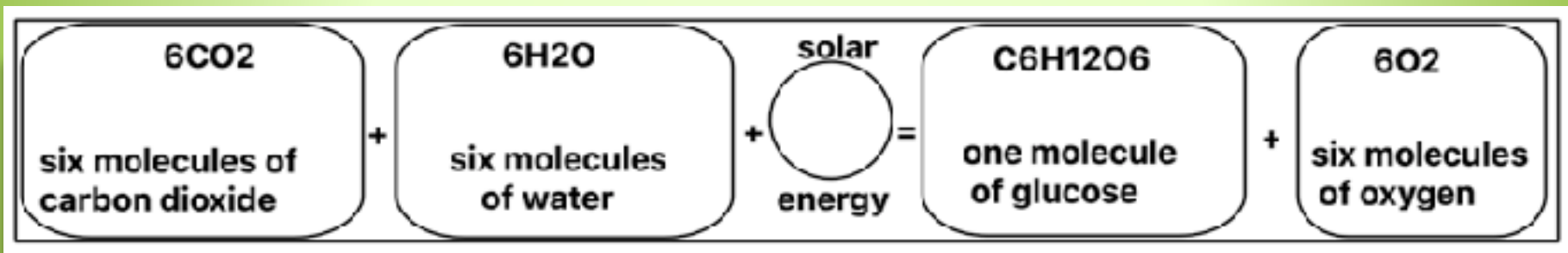
We use  
solar energy  
to power  
photosynthesis  
to create the  
Molecules of Life



# Maximize Solar Energy

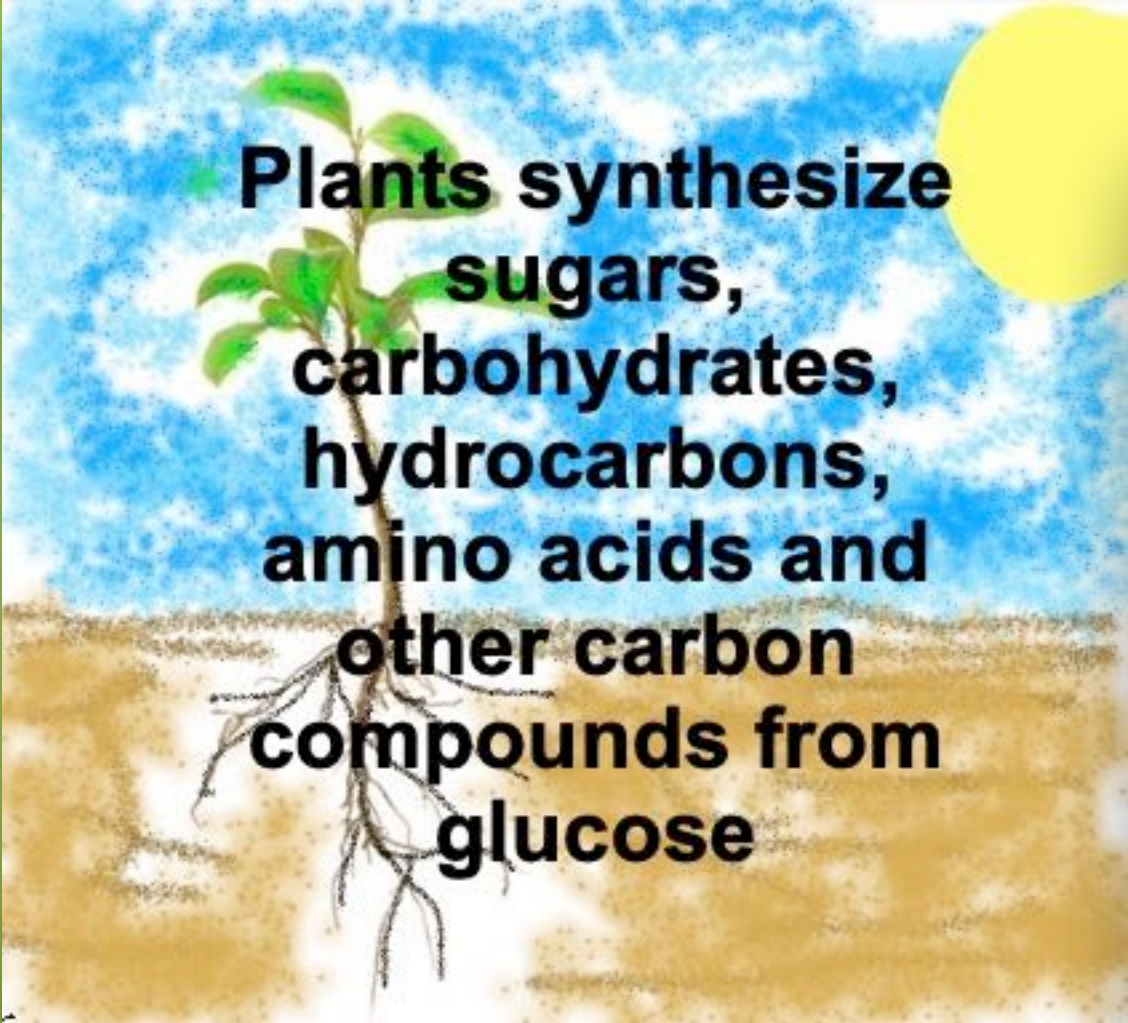


## Use Photosynthesis to make the key Molecule of Life



- Between 95% and 98% of a plant's biomass come from water and carbon dioxide using the energy from photosynthesis to make glucose

# Maximize Solar Energy



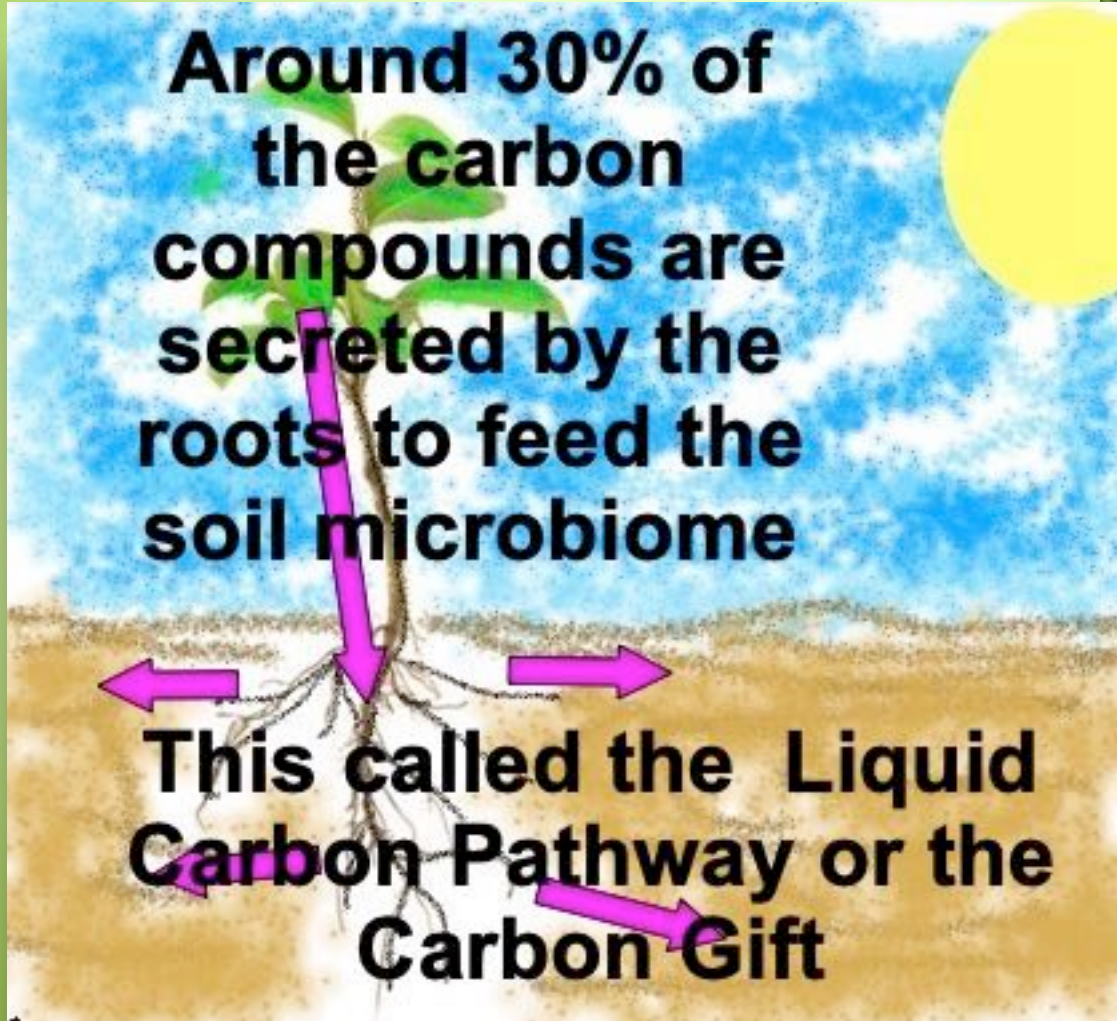
**Plants synthesize  
sugars,  
carbohydrates,  
hydrocarbons,  
amino acids and  
other carbon  
compounds from  
glucose**

**Glucose is the key  
Molecule of Life**

It is the basis of all  
the other  
**Molecules of Life,**

the compounds that  
all living entities  
need to grow,  
reproduce and  
to stay alive!

# Maximize Solar Energy



# The Rhizosphere



## Plant Roots and The Rhizosphere

- The majority of microbes live around plant roots
- This is called 'The Rhizosphere'
- They feed off root exudates and have important roles in releasing nutrients and protecting plants from diseases
- ***Roots and microbes release enzymes, acids and other compounds that dissolve nutrients from rocks***
- Roots build soil structure
- Deep roots build deep soils

# Maximize Solar Energy



## The Liquid Carbon Pathway - the Carbon Gift

- Soils are created through the biological activity of the microbiome/soil food web/rhizosphere - mediated by roots
- Soil creation and resultant plant available nutrients are primarily due to biological processes rather than chemical or mechanical weathering processes
- **The greater the amount of food that can be provided to the microbiome/soil food web, the greater the soil and plant available nutrients can be produced.**
- Plants - **correctly managed** - increase soil nutrient levels rather than depleting them.



# MANAGING GROUND COVERS

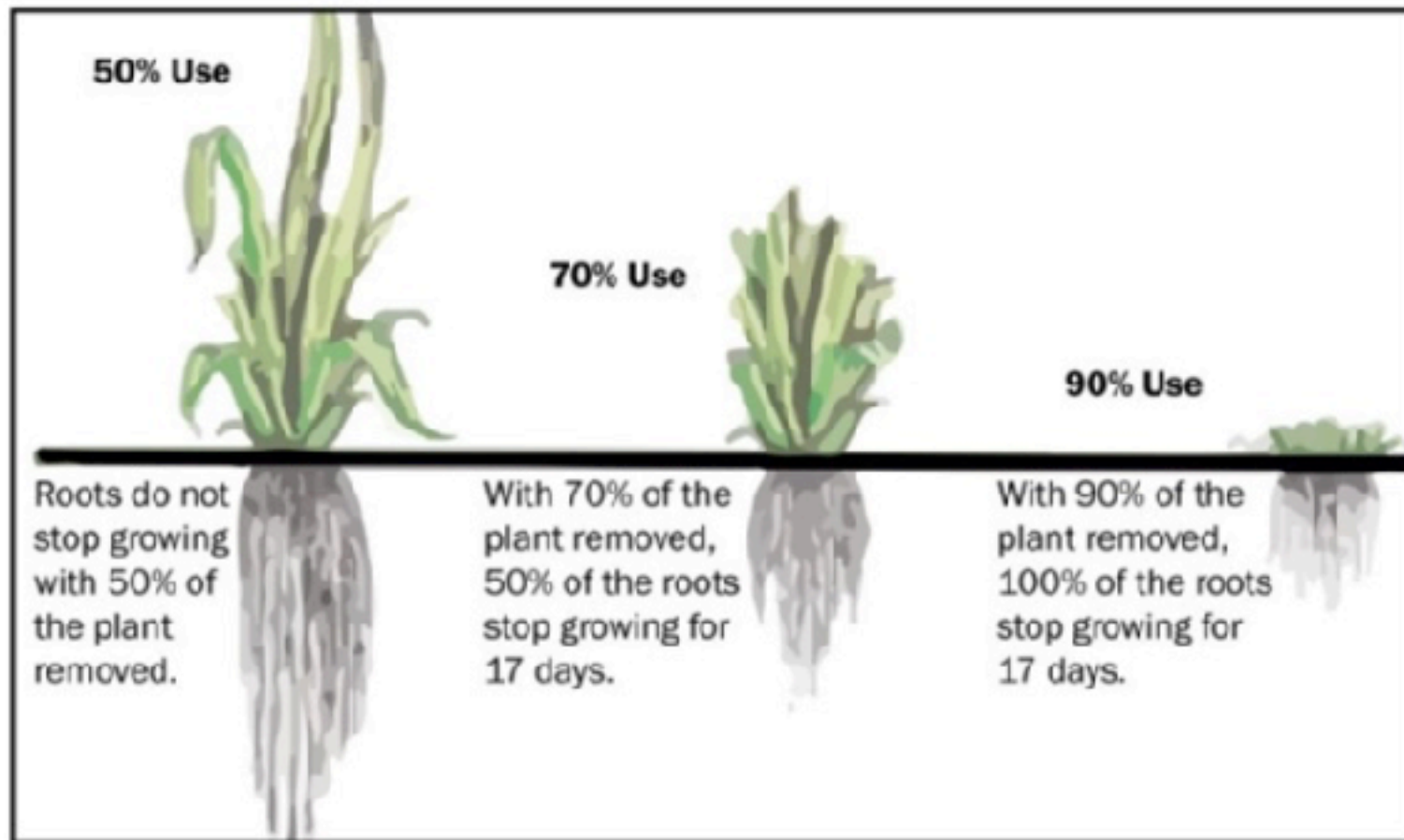
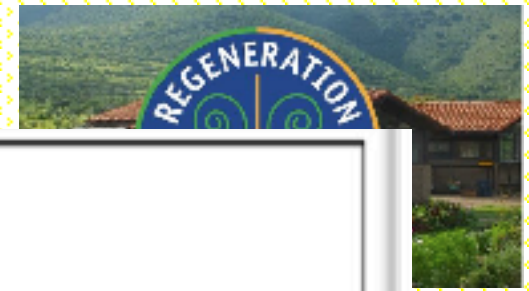


**Rootmass activity stimulates nutrient availability in soil by:**

- Root exudates that feed microbe communities
- Root enzymes and acids extract minerals from rocks
- Builds soil structure and deepens soils
- Generates soil carbon and nutrients for the crop through correct management



# MANAGING GROUND COVERS



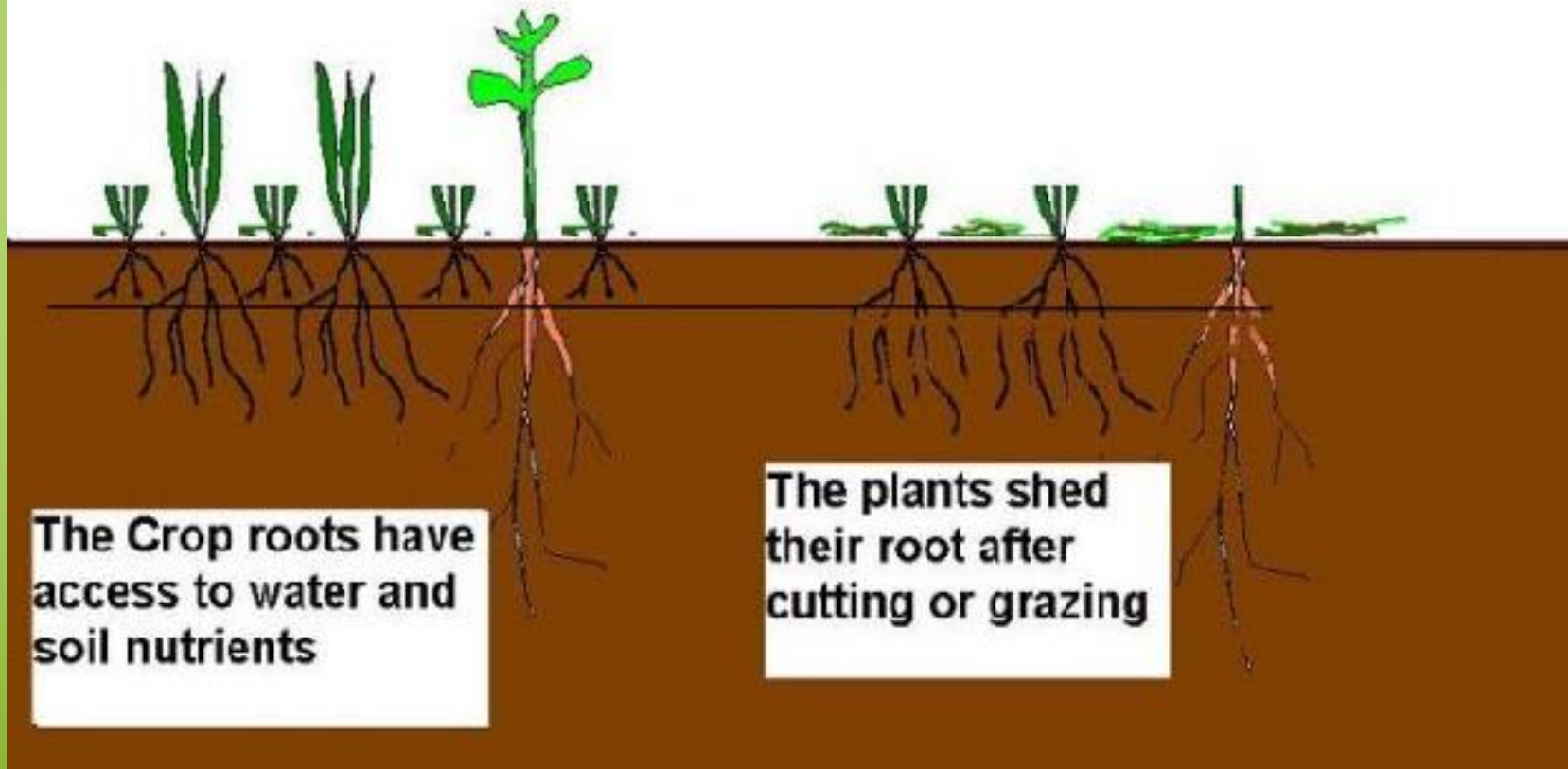
Growth of both tops and roots is significantly impaired if more than 50 percent of the green leaf is removed in a single grazing event (10).

**This information can be used for management decisions**

# MANAGING GROUND COVERS



**Crop has access to Sunlight**



**The Crop roots have access to water and soil nutrients**

**The plants shed their root after cutting or grazing**

# MANAGING GROUND COVERS



# Building Topsoil

Soil organic matter increased from 1% to av. 6% in 11 years

- pH 4.5 to 6.5

The Total Exchange Capacity from 6.66 to 24.78.

- Available N from 46 kg/ha to 123 kg/ha.
- Calcium 534 ppm to 3696 ppm,
- Magnesium from 101 ppm to 391 ppm,
- Potassium from 45 ppm to 230 ppm,
- Phosphorous from 123 ppm to 1561 ppm.



# Pasture Cropping

Sowing annuals into perennial pastures



Oats Sown into Pasture  
Only a little bit of phosphate  
was added due to deficient soils

Gives the same yield as intensive plowing  
and fertilizers, at a fraction of the cost  
Animals can go back on pasture after harvest-  
giving two crops and double income

Pictures: Colin Seis

# Pasture Cropping



Dr Christine Jones has conducted research at Colin Sies's property in Australia

**An average increase of 8 tons/ha of SOM per year**

## **Increases in soil nutrients**

*Calcium 177%, Magnesium 38%, Potassium 46%, Sulphur 57%, Phosphorus 51%, Nitrogen 48%, Copper 102%, Zinc 86%, Cobalt 79%, Boron 56%, Molybdenum 51%, Selenium 17%*



## **SOIL CARBON**

- 0 - 10cm  
150%
- 10 - 20cm  
243%
- 20 - 30cm  
317%
- 30 - 40cm  
413%
- 40 - 50cm  
157%

*Soil Comparison between Winona and nearby property. Picture: Dr Christine Jones*

# Soil Health



Wheat grown on  
compost treated  
field does not have  
rust

Wheat grown  
with  
chemical  
fertilizers  
requires  
spraying with  
fungicide  
for rust





**Wheat infested with stripe rust and sprayed with fungicides – gave yield of 1.6 t/ha (1,600 lbs per acre)**



**Wheat grown on composted soil  
resists the rust – gave yields over 6.5 t/ha  
(6,500 lbs per acre)**



# Soil Health



**Insect damage controlled by improving soil nutrition and organic matter levels leading to plant health**

**Healthy plants have a greater ability to beat pests and diseases**



# Thank You

