



Soil for Grazing

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BIGG Conference 2020

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Soil Management Plan

- Soil Capacity
- Soil is a Capital Asset
- Maximising Performance
 - Soil chemistry: Soil Physics: Soil Biology
- Understanding soils to their layers
- Soil is influenced by cycles (C:N:H₂O)

Comparing Productivity & Profitability

- **Productivity** is defined as the relationship **between** input and output needed to create a product.
- **Profitability** is determined by how much money is left over after a product is produced and all expenses have been paid

Soil Capacity



Soil Productivity

is generated from the 0-30cm

Seed planted : Plant
Emergence

Biomass production



Soil Profitability

is generated from the 30-100cm

Subsoil moisture storage

Perennial species



Soil Accounting 101 (Land Bank)



pH

Interest on your Overdraft



Sodicity

Mortgage Interest



Nutrient Management

Credit Card



Soil Carbon

CPI Inflation




Soil Biology

R & M Budget

Land Class & Suitability

Land Class (LC)	Key features	Options
1-2 Arable land suited to intensive (LC 1) and regular (LC 2) cultivation	<ul style="list-style-type: none"> • Arable • Higher fertility • Minimal erosion risk • Non-acid (pH above 5)* 	<ul style="list-style-type: none"> • For pasture and crop production when rainfall is adequate • High input / high output systems work well
3 Grazing land suited to cultivation for pasture improvement and/or occasional cropping	<ul style="list-style-type: none"> • Lower to middle slopes • Semi-arable • Lower natural fertility • Moderate acidity (pH 4.5-5)* • Moderate erosion risk 	<ul style="list-style-type: none"> • Groundcover and pasture persistence is important • Maintain pasture base through direct drill options • Occasional cropping
4 Land suited to grazing but not for cultivation	<ul style="list-style-type: none"> • Middle to upper slopes • Non-arable • Low fertility, shallow soils • Acidic (pH below 4.5)* • Moderate to high erosion risk 	<ul style="list-style-type: none"> • Only suited to permanent pasture • Manage to maintain pasture stability and groundcover • Best suited to lower input management systems • Generally not suited to introduced perennial grasses
5 Land suited to lighter grazing only	<ul style="list-style-type: none"> • Steep upper slopes • Non-arable • Low fertility, shallow soils • Acidic (pH below 4.5)* • Subject to erosion 	<ul style="list-style-type: none"> • Leave natural or revegetate • Lightly graze to maintain existing pasture / groundcover • Potential conservation areas

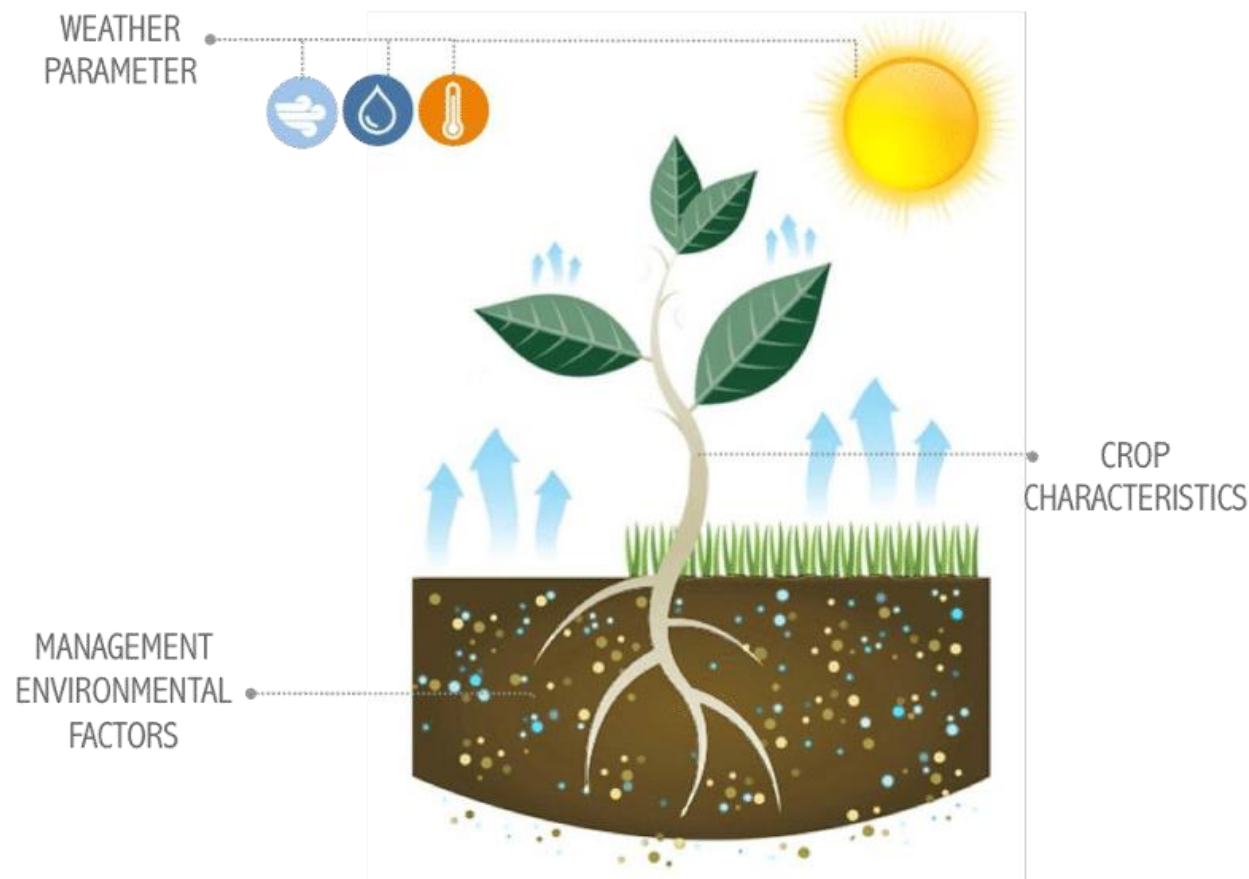
* All pH measured by CaCl₂



Source: MLA Making more from Sheep

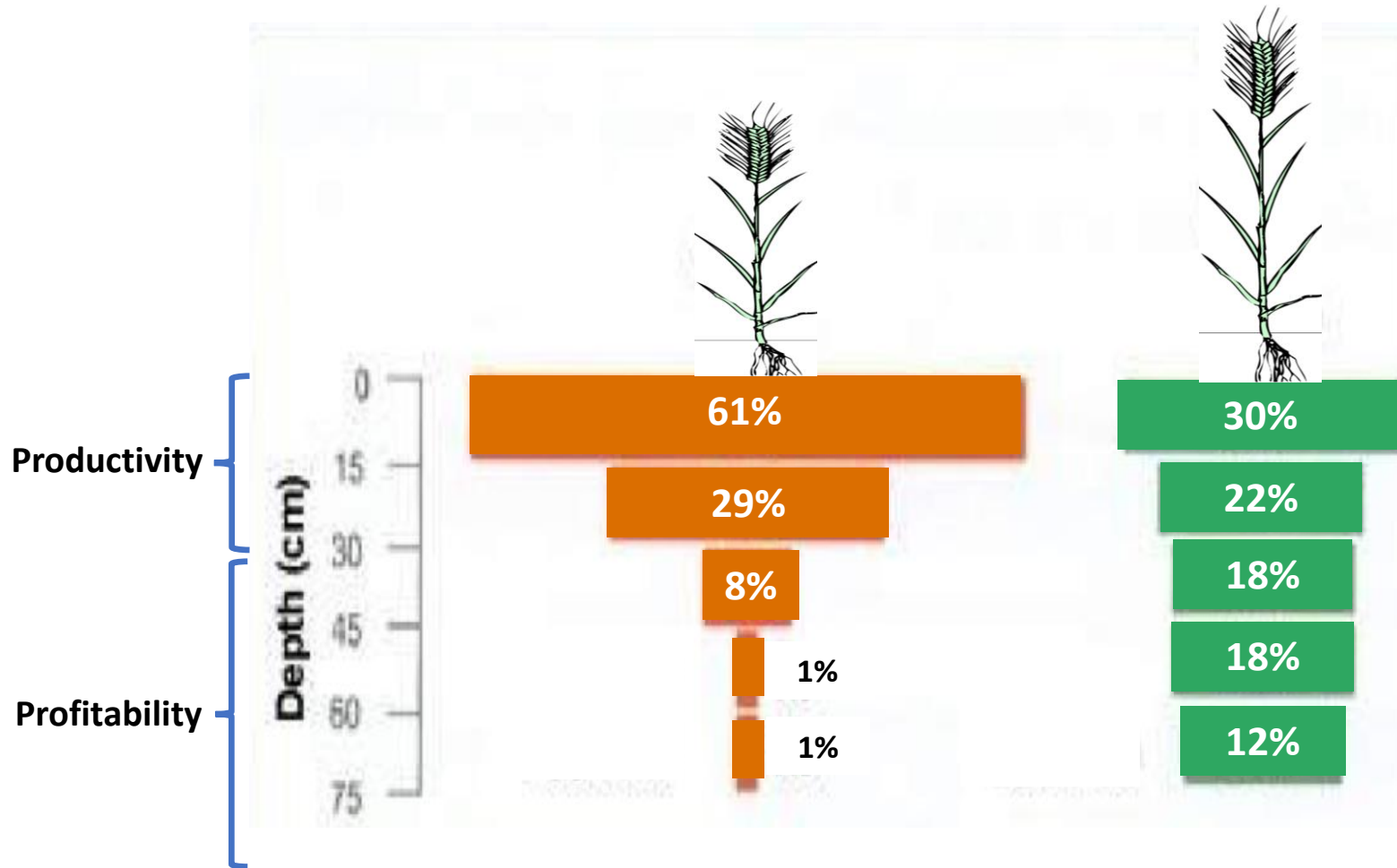
Dynamic Data Layers

- Soil
 - Distribution
 - Utilisation
- Water
 - Application
 - Utilisation
- Nutrients
 - Application
 - Utilisation

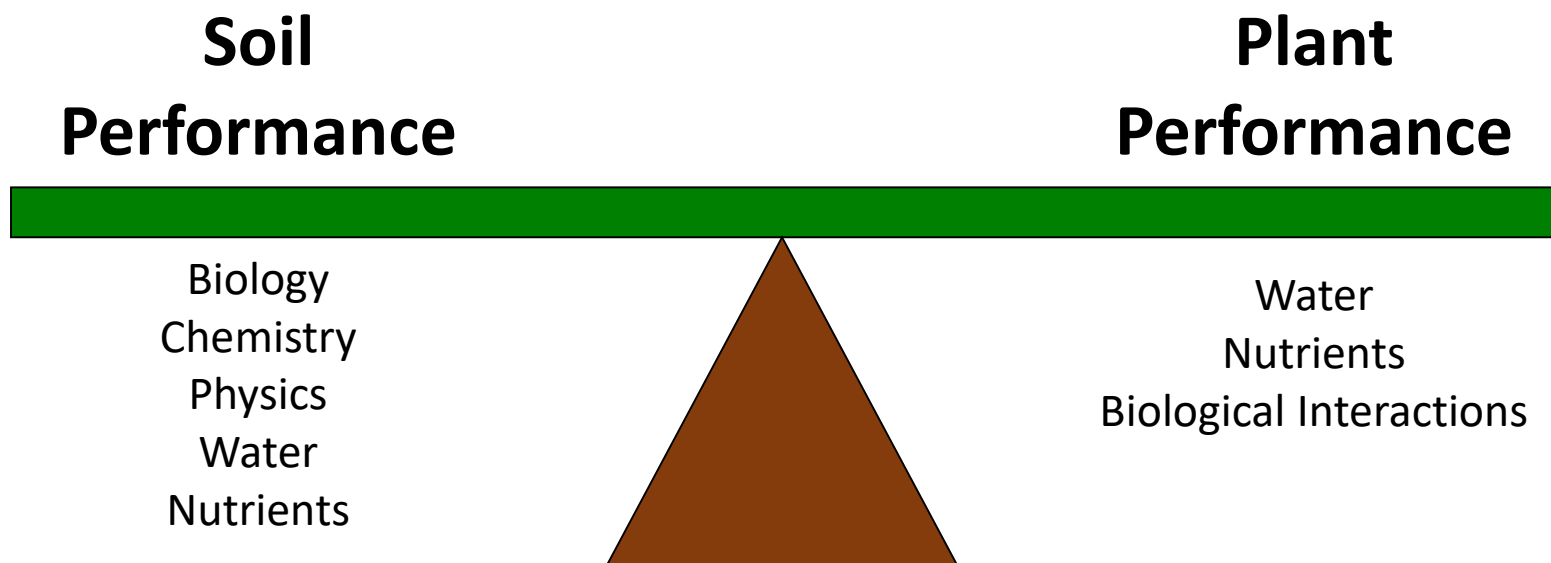


Soil Use Efficiency

Improve plant efficiency by using more soil to greater depth

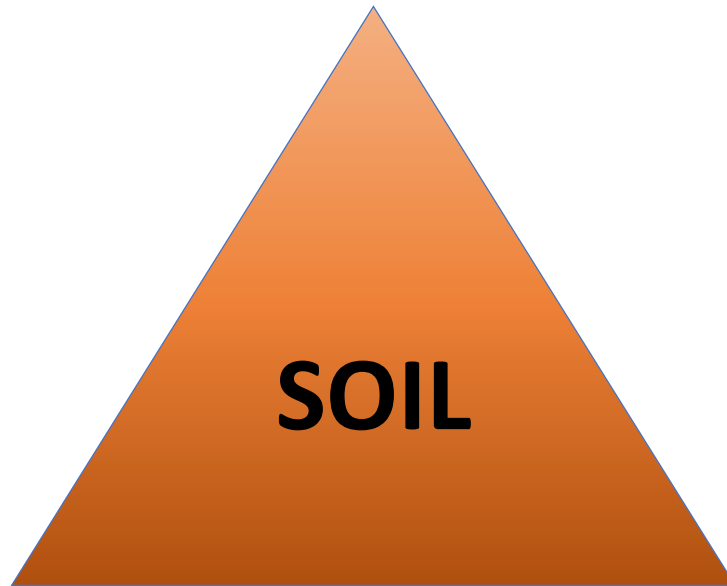


Building Efficiency in your Soils





Physical

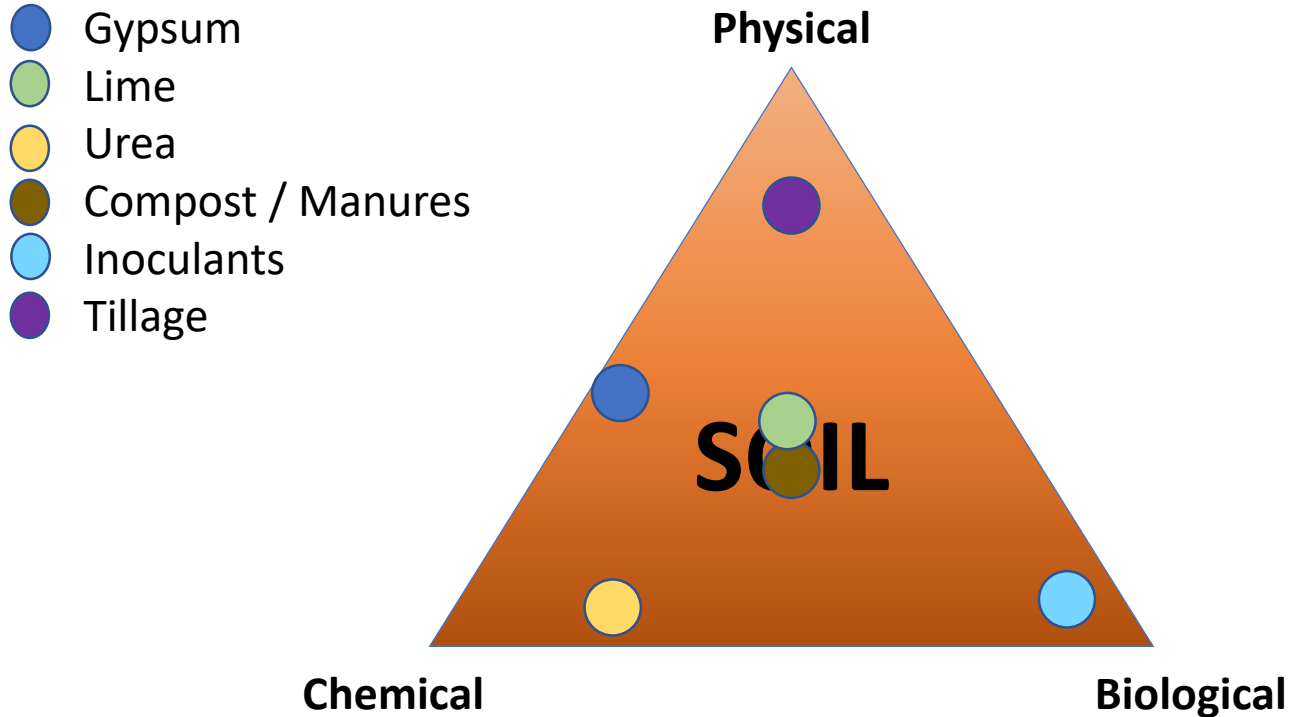


Chemical



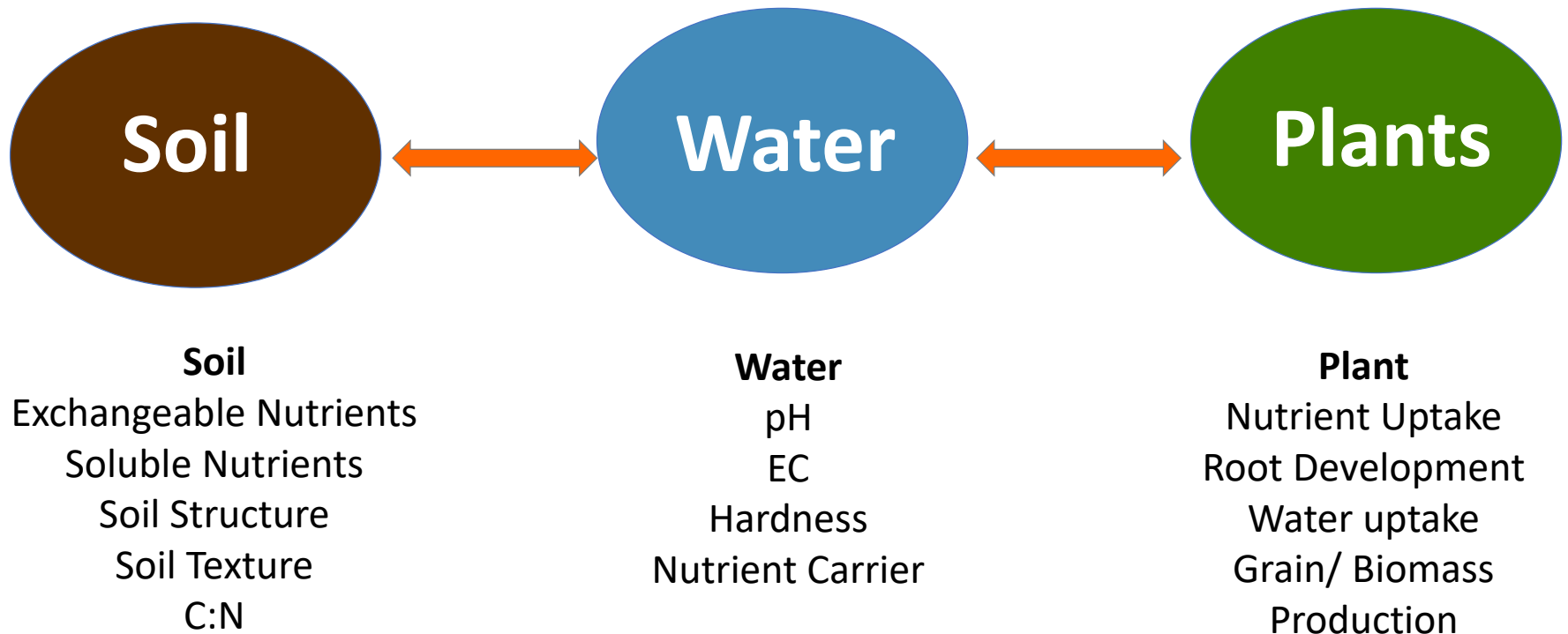
Biological

Managing your inputs for your desired outputs



**Build your
own Soil
Health
Triangle**

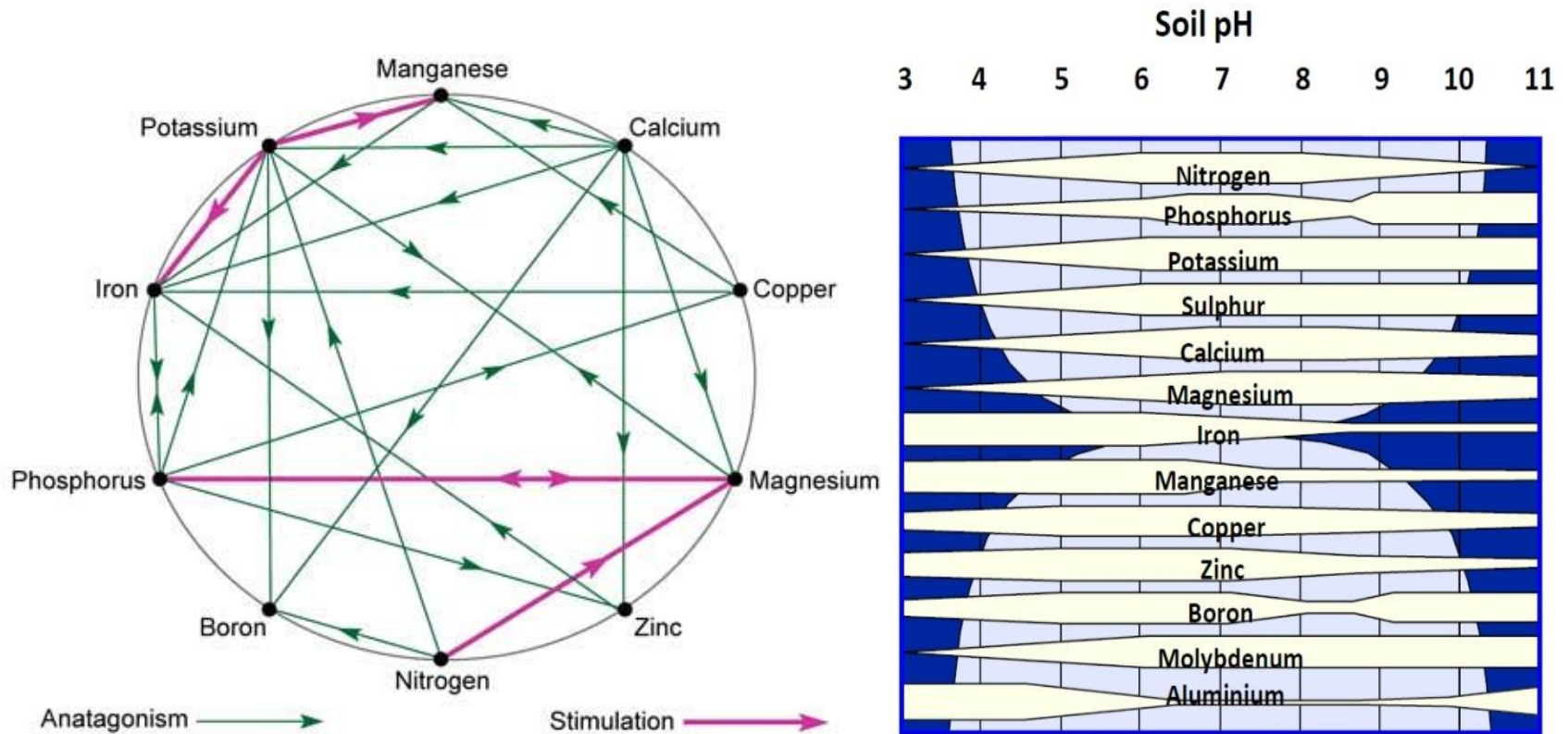
Link Soil to Water to Plant



Soil pH



Nutrient Availability & Interactions



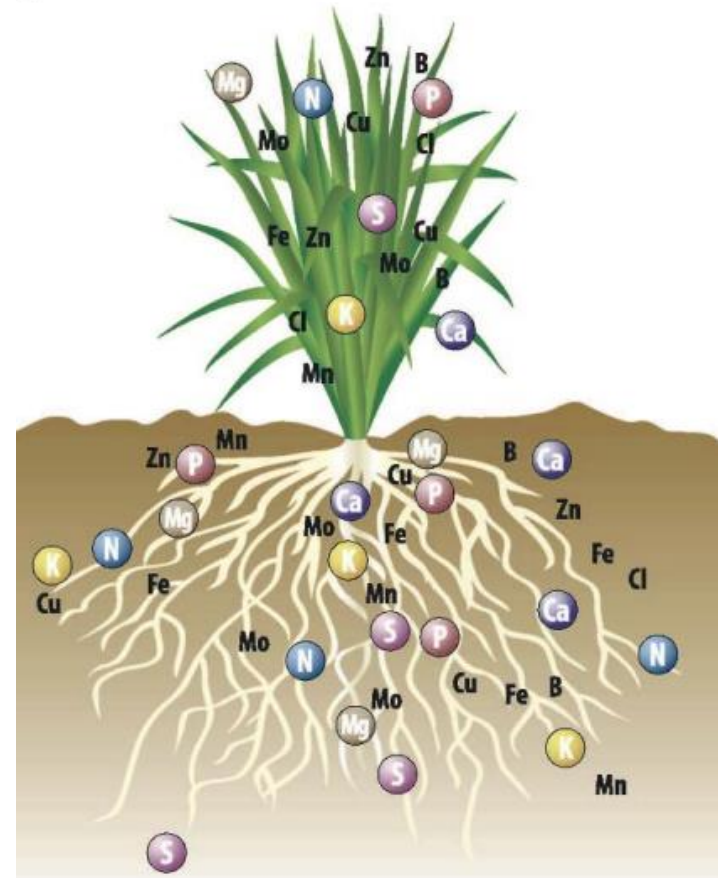
Mulders Chart - 1950s

Linking Soils to Plants

Once we have the nutrients – how do we get the nutrients

Movement of nutrients to root system

- Mass flow
- Diffusion
- Root interception
- Relies on Porosity & Moisture



Triage management approach for Soil Health

Especially in a drier climate

- Is water going into my soil?
 - Is there any sign of life: worms/termites/smell?
 - Are my crops/pastures germinating well?
 - Are my crops/pastures recovering well after grazing?
 - Are my pastures struggling with weed pressure
 - Do my crops/pastures perform best with lots of small rains or still perform well on large intermittent rains?



Increase Productivity 0-30cm



pH – Liming (Increase pH above 5.5 CaCl)



Sodicity (surface crusting/ poor surface structure)– Gypsum (Decrease Exchangeable Sodium Percentage ESP% below 5)



Nutrient Management (C:N:P:K:S: Micros)



Water Management – Infiltration & Drainage



Minimise tillage: Maximise tillage positive affect



Grazing management – Surface structure, overgrazing

Increase Profitability 30-100cm



Understand your subsoil constraints



Sodicity



Acidity



Alkalinity



Salinity

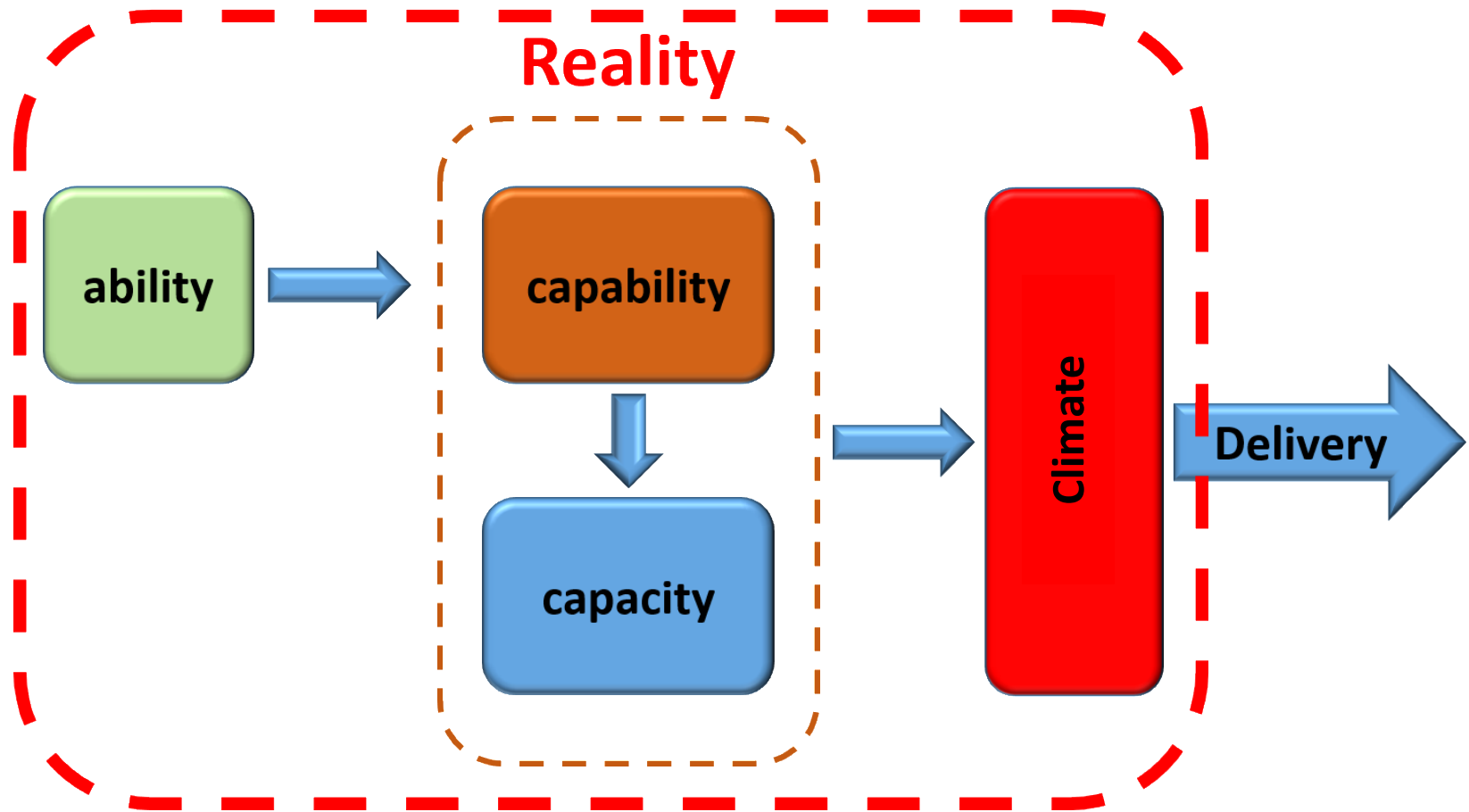


Plant rooting depth



Managing sub-soil root development (perennial pastures, trees)

Capability : Capacity : Climate



Tools in the Toolbox



Soil improvements are capital expenses not an annual variable expense



Soil Assessment

In-field eg. pH, EC, Structure, Texture

Laboratory Tests



Soil Pits

Understand your soil to layers

Plant rooting depth



Understand Why the variability exists



Soil Moisture Monitoring



Soil Infiltration Monitoring



Calibrate your Senses/ Sensors



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