

# OPEN WEBINAR

## INDIGENOUS PASTURE PRODUCTION USING ROAD WATER HARVESTING IN AFRICAN DRYLANDS

**SPEAKERS: KEVIN &  
LUWIEKE**

**JUNE 12, WEDNESDAY:  
2PM CEST (3PM EAT)**

**TO ATTEND, AND FOR  
DETAILS, VISIT**

**[HTTP://WWW.THEWATERCH  
ANNEL.TV/WEBINARS](http://www.thewaterchannel.tv/webinars)**



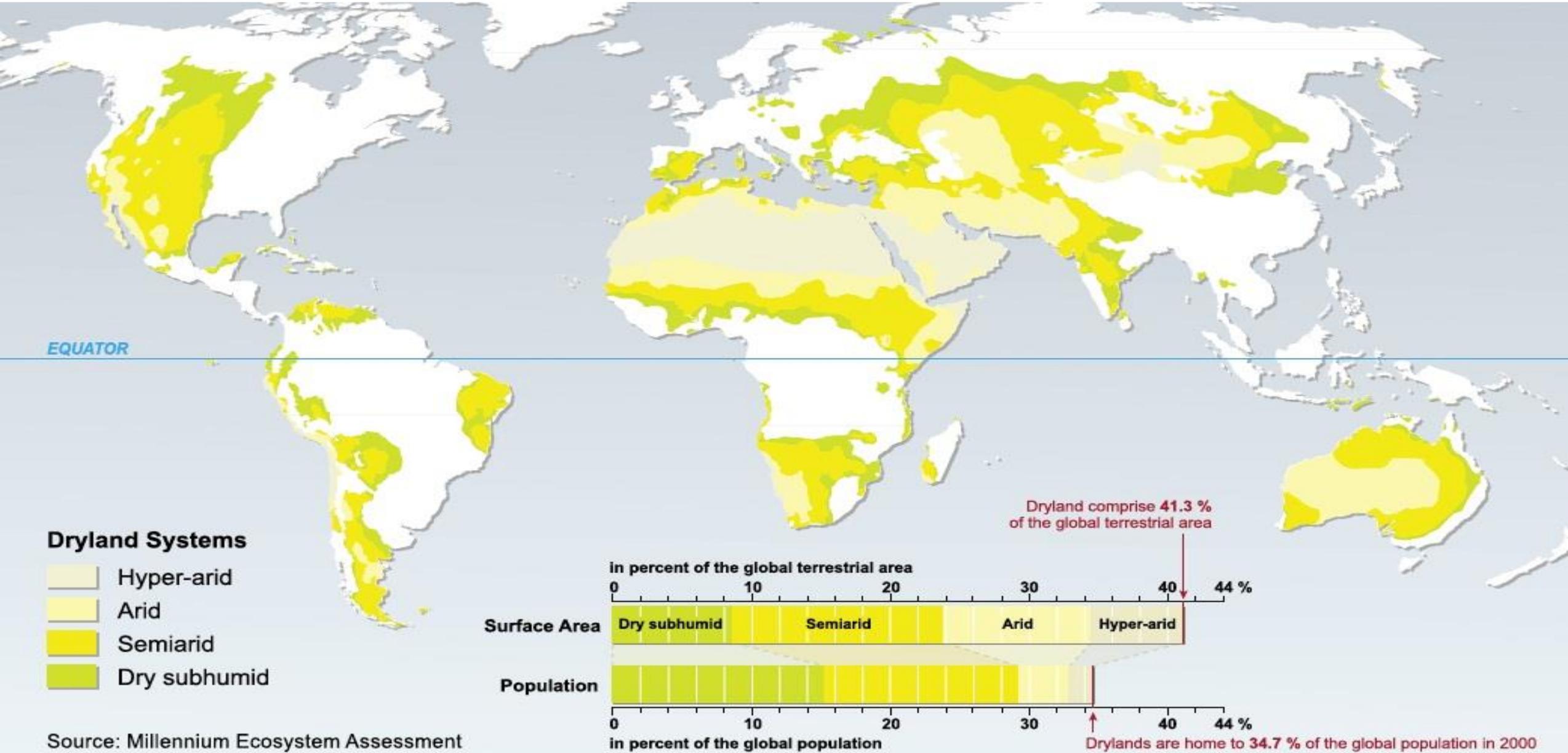
**Flood-Based Livelihoods  
Network Foundation**



**Netherlands Organisation  
for Scientific Research**

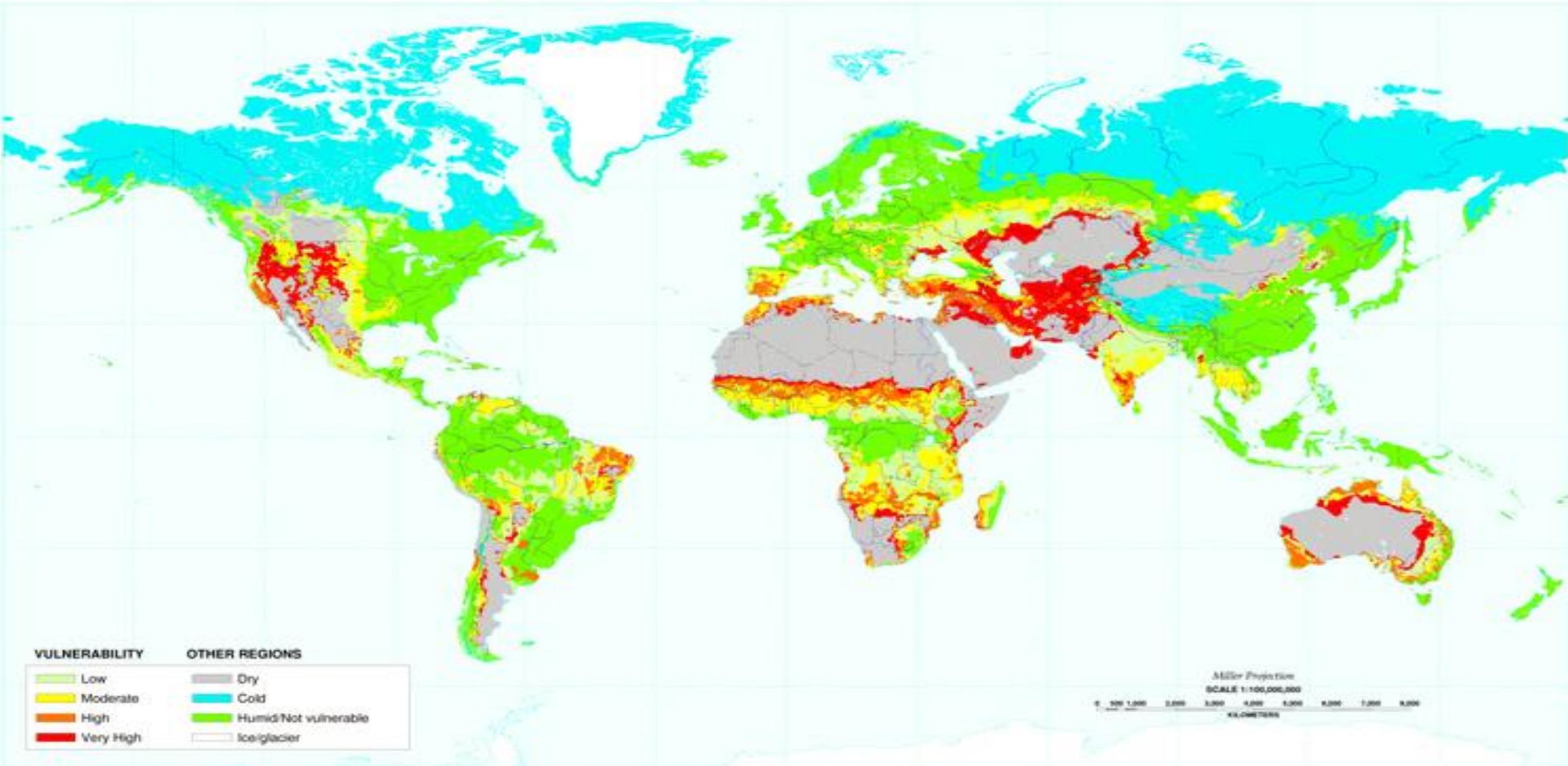


# Global Drylands Systems



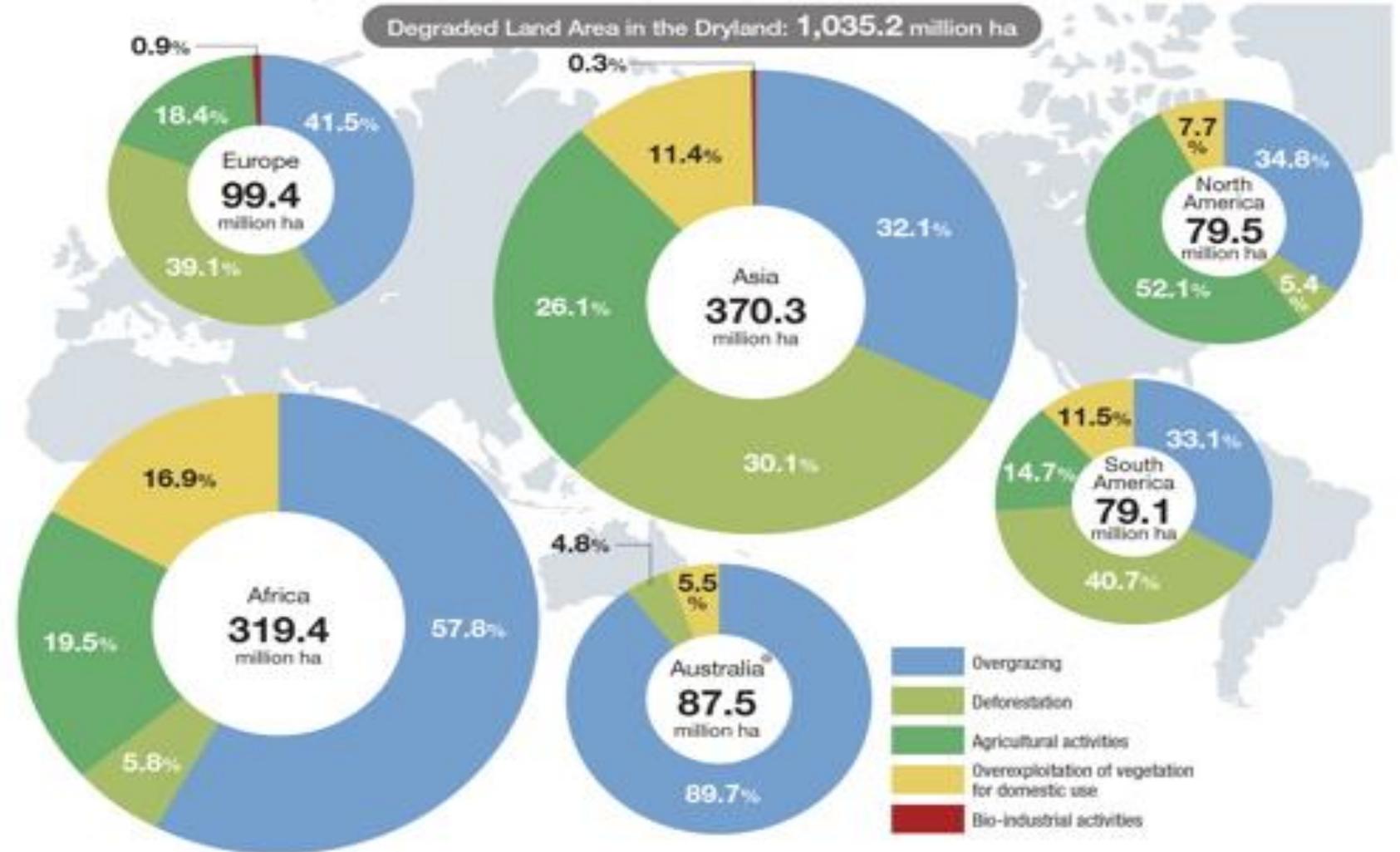
Source: Millennium Ecosystem Assessment

# Vulnerability of Drylands to Degradation



Source: USDA Natural Resources Conservation Service

# Causes of Land Degradation in the Drylands



Source: World atlas of land degradation, 2<sup>nd</sup> Edition (UNEP)

# Typical degraded landscapes in African drylands



## Major causes of such degradation in African drylands

- Overgrazing by free ranging livestock → bare soil
- Poor agricultural practices → deplete soil nutrients
- Climatic factors – droughts and floods → bare soil + erosion

# Soil Conservation and Rainwater Harvesting



# Indigenous Grass Reseeding Technology



*Eragrostis superba*



*Cenchrus ciliaris*



*Enteropogon macrostachyus*



# Combining sustainable land management strategies

## Grass reseeding

- Examples of grass species used



*Cenchrus ciliaris*  
(African foxtail grass)



*Enteropogon macrostachyus*  
(Bush rye grass)



- Drought tolerant
- Indigenous grasses
- Perennial species
- Livestock feed

## Rainwater harvesting

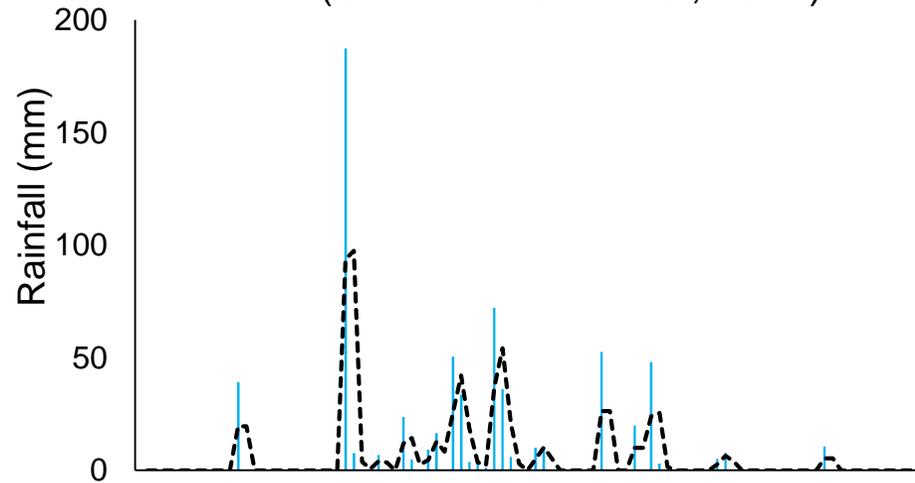


Trench bunds

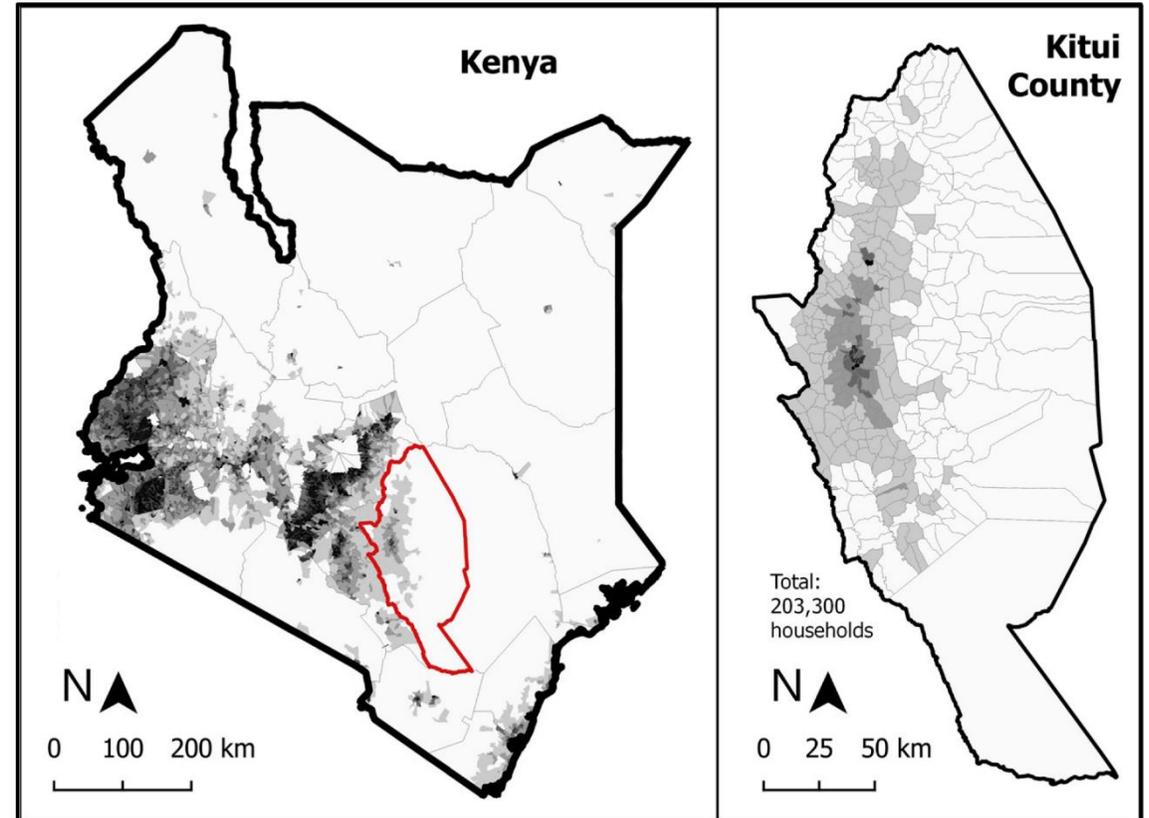
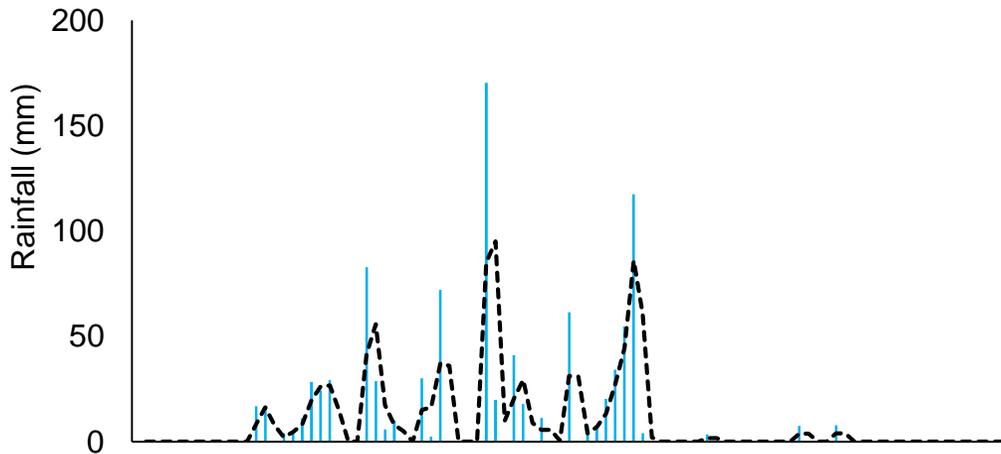


# Rainfall distribution pattern

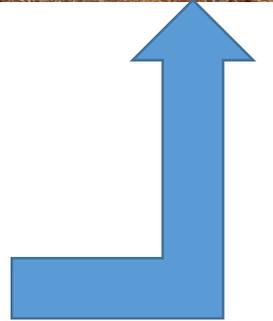
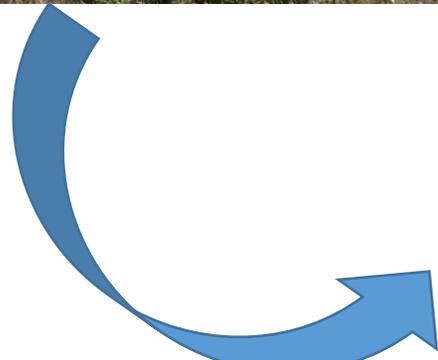
Rainfall distribution pattern - short rains  
(October-December, 2017)



Rainfall distribution pattern - long rains  
(March-May, 2018)



# Road water harvesting preparations in the field

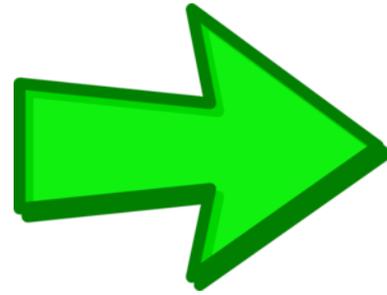




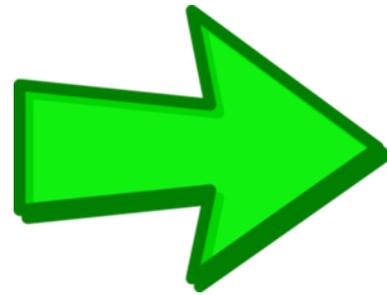
**Result: increased grass coverage and retention of water and soil**



# Examples after reseeding and rainwater harvesting



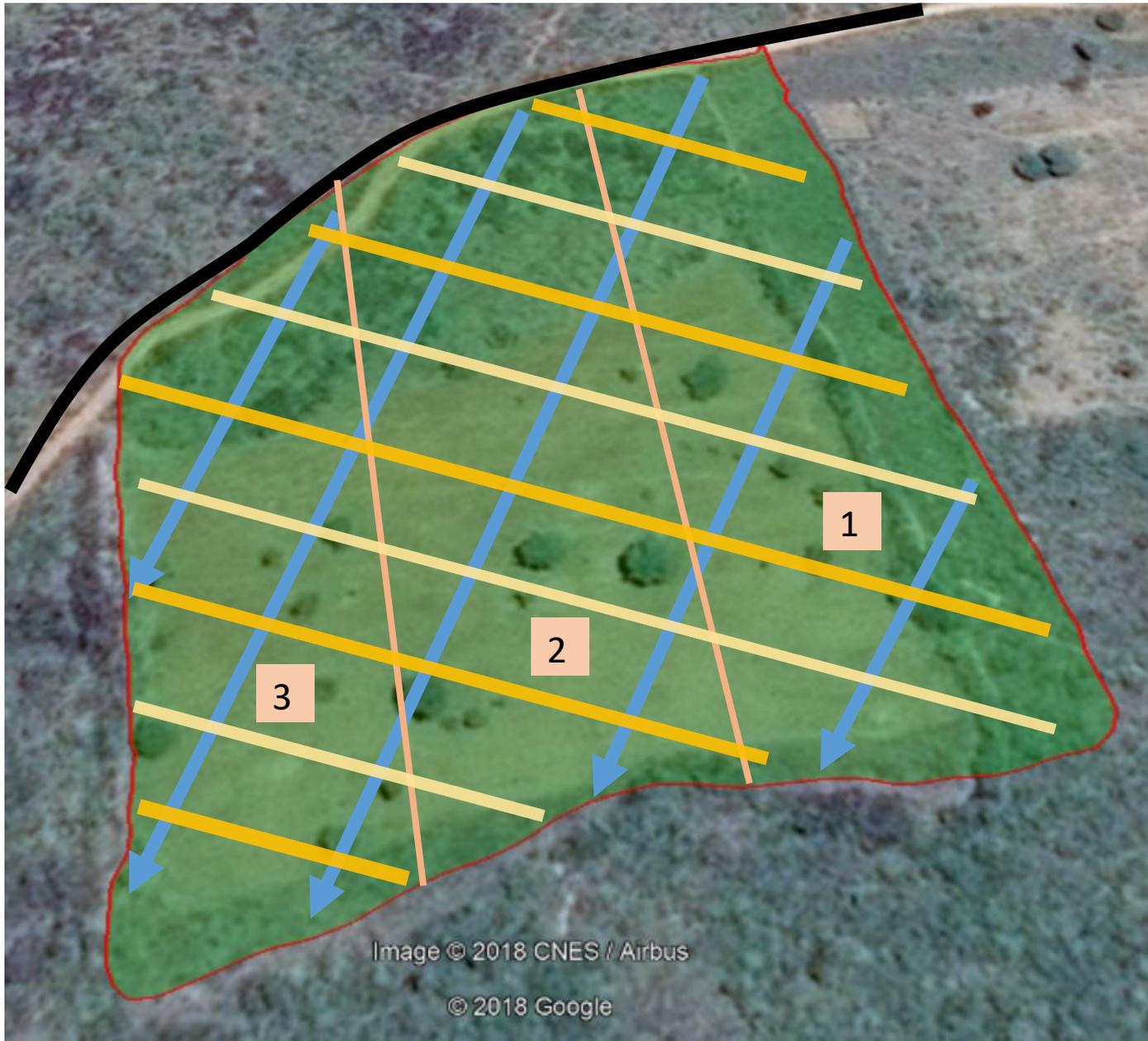
**reseeding  
+  
rainwater  
harvesting**



**BEFORE**

**AFTER**

# Experimental field lay-out

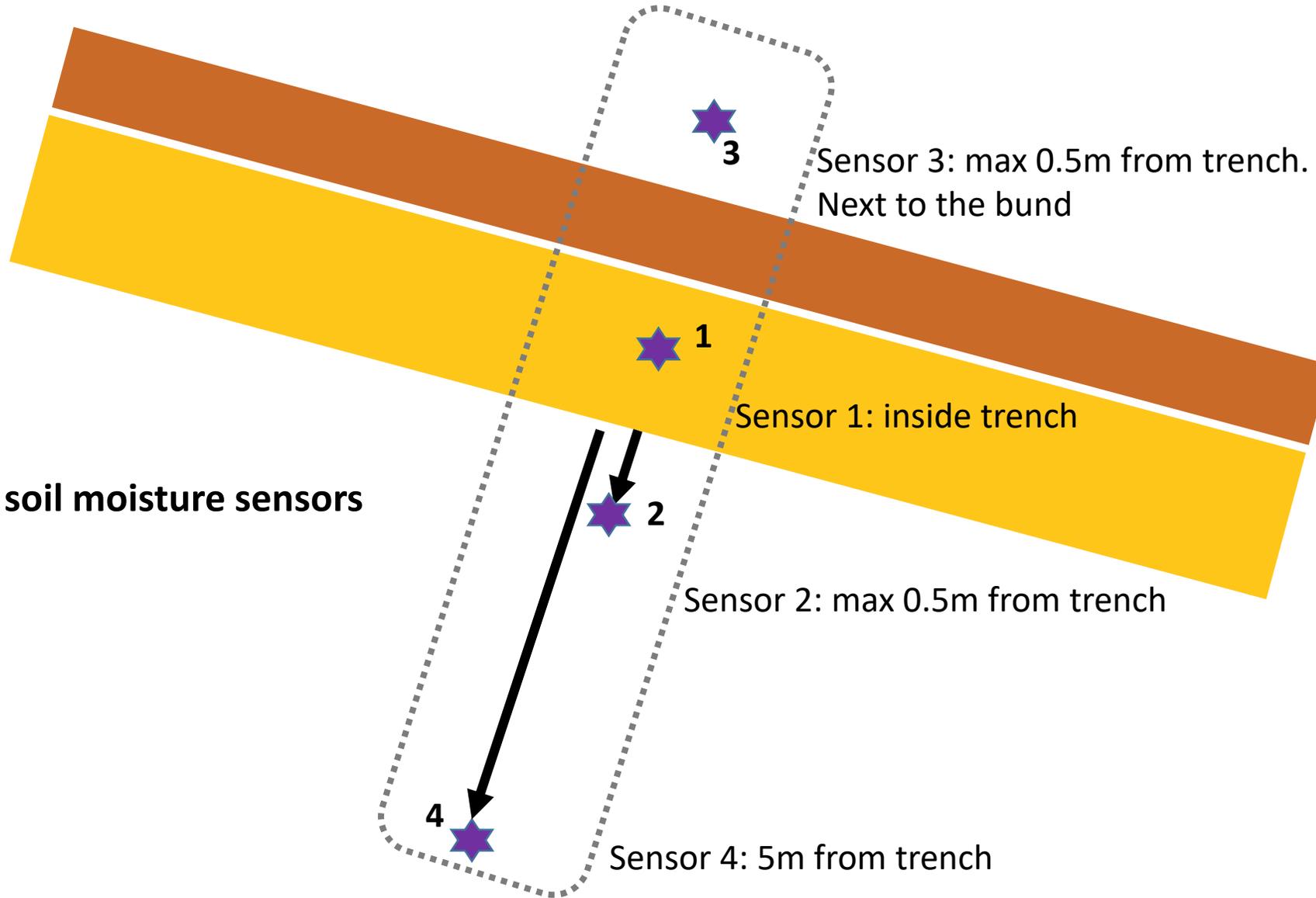


3 grasses planted  
5 contour trenches – connected to road  
5 small trenches with bund in between  
4 points of soil moisture measurement

- |   |                              |
|---|------------------------------|
| 1   | Eragrostis Superba           |
| 2   | Cenchrus Ciliaris            |
| 3   | Enteropogon<br>Macrostachyus |
|  | Deep Water harvesting trench |
|  | Small trench with bund       |
|  | Slope direction              |

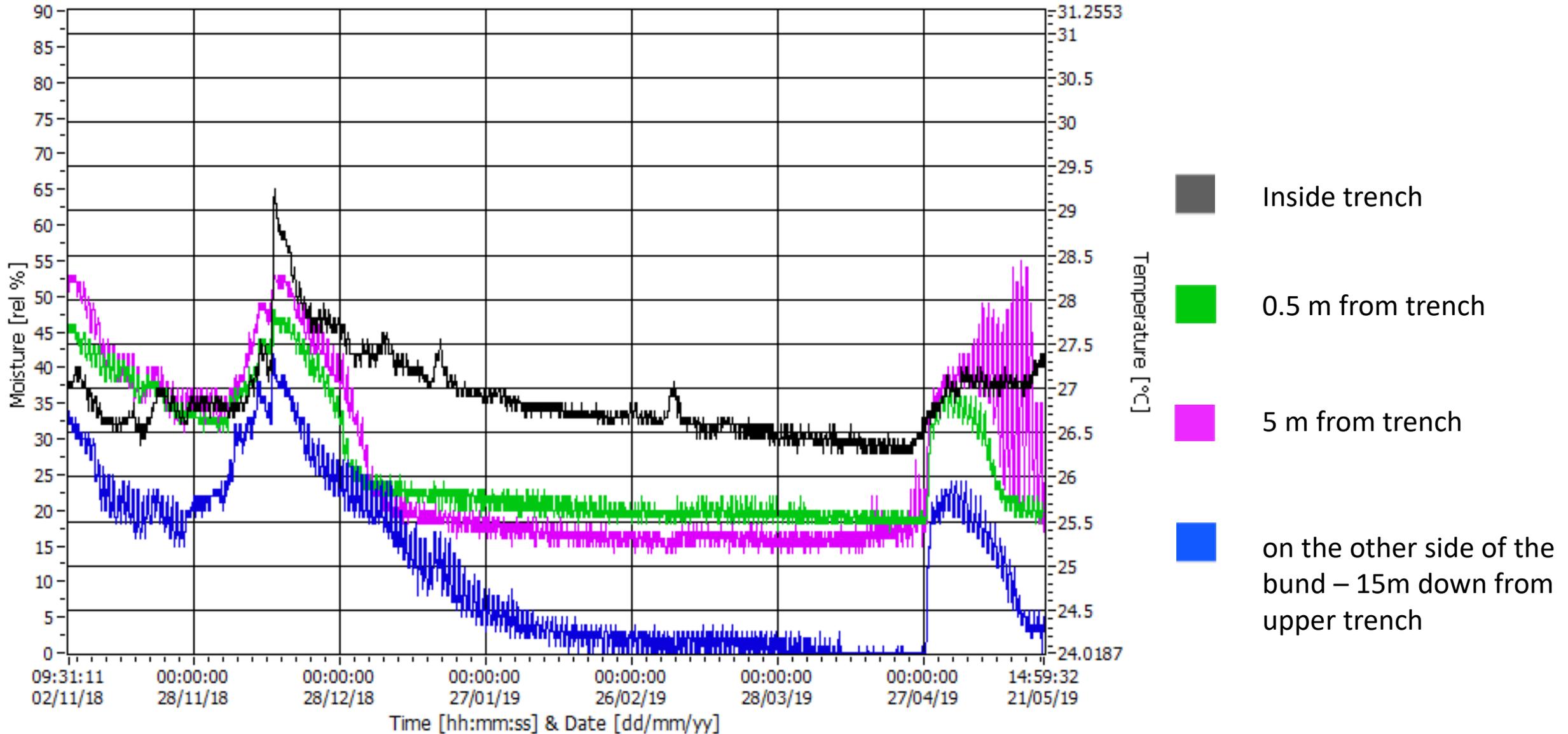
# Experimental field lay-out

Positioning of soil moisture sensors  
2 feet trench

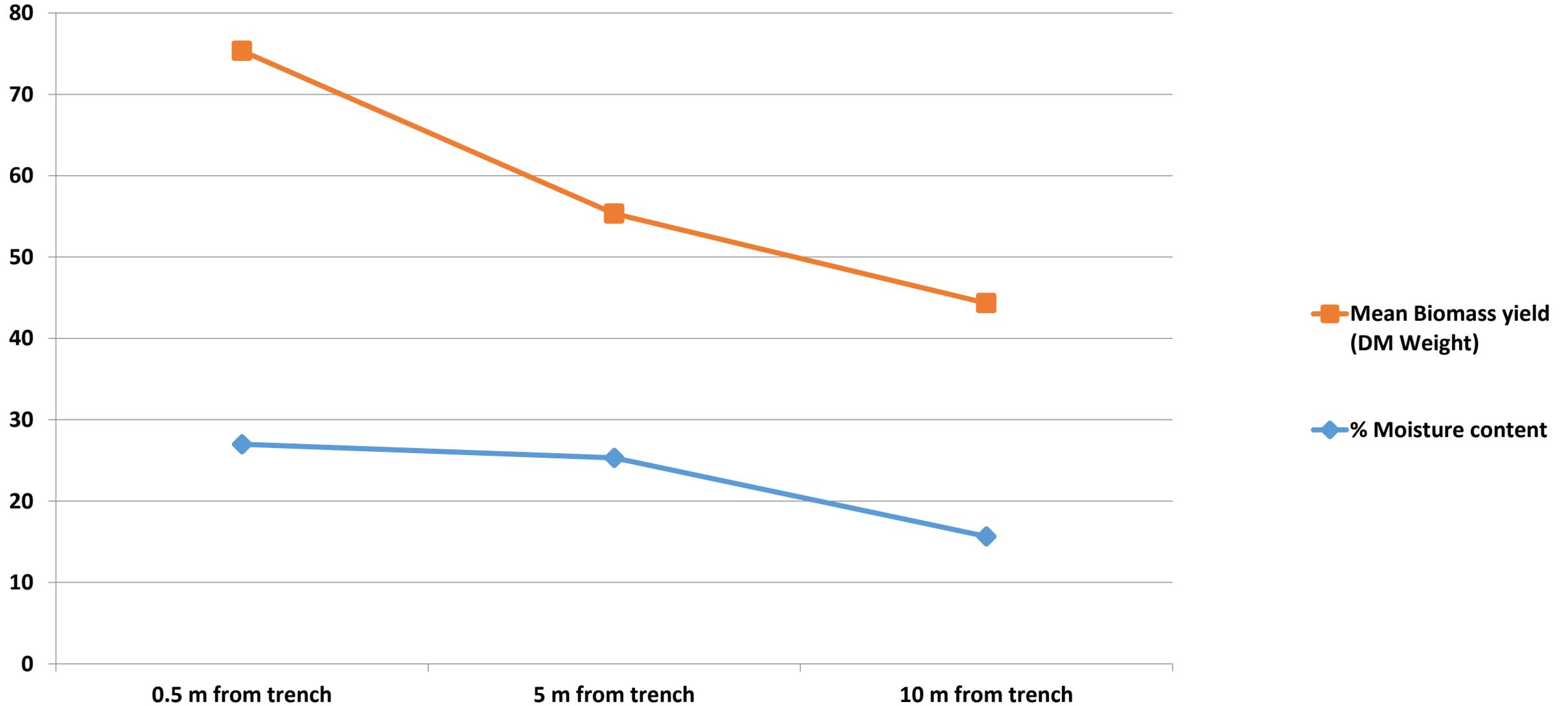


Sensor depth:  
= 40cm  
depth  
S 1-4

# Contribution of road water harvesting to soil moisture

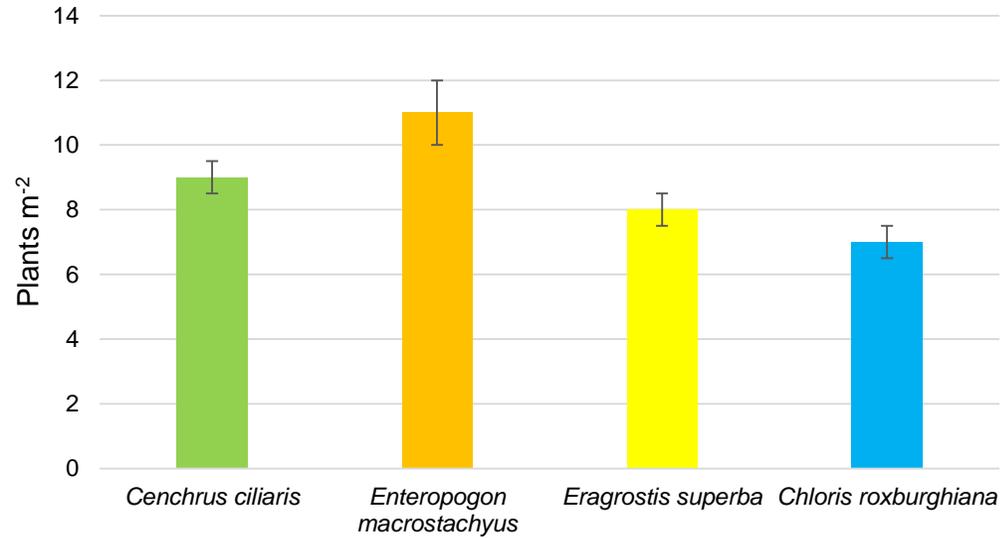


# Relation moisture content and biomass yield

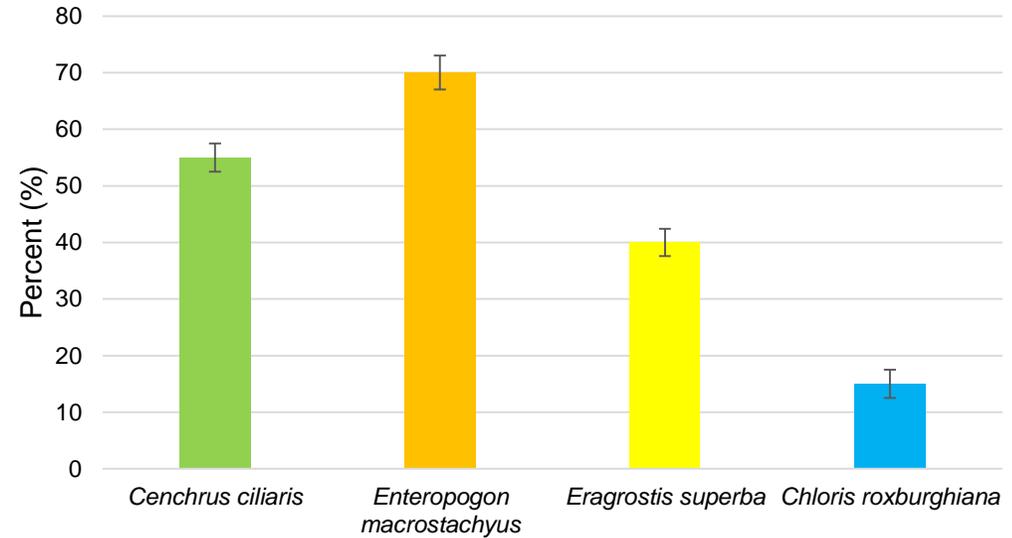


# Morphoecological characteristics of the grasses

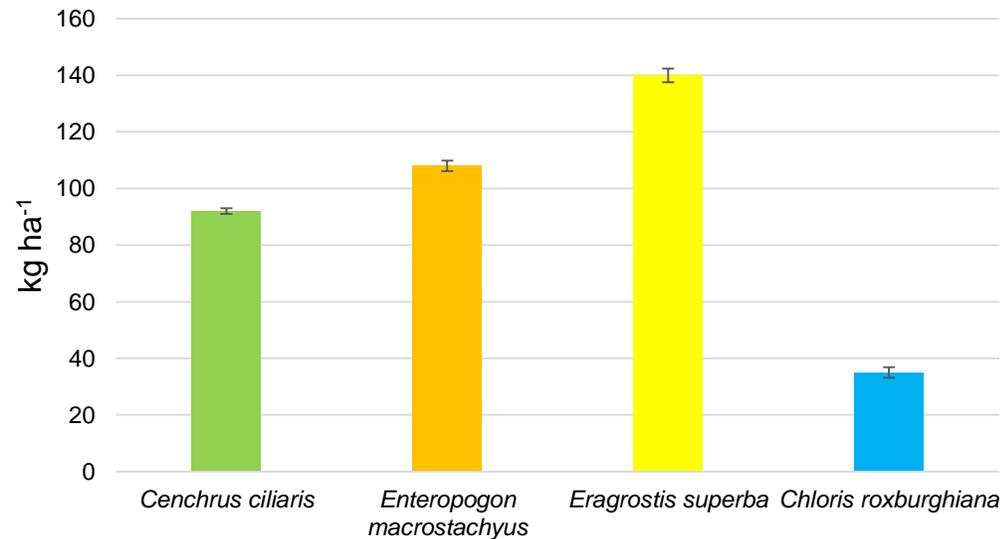
## Plant density



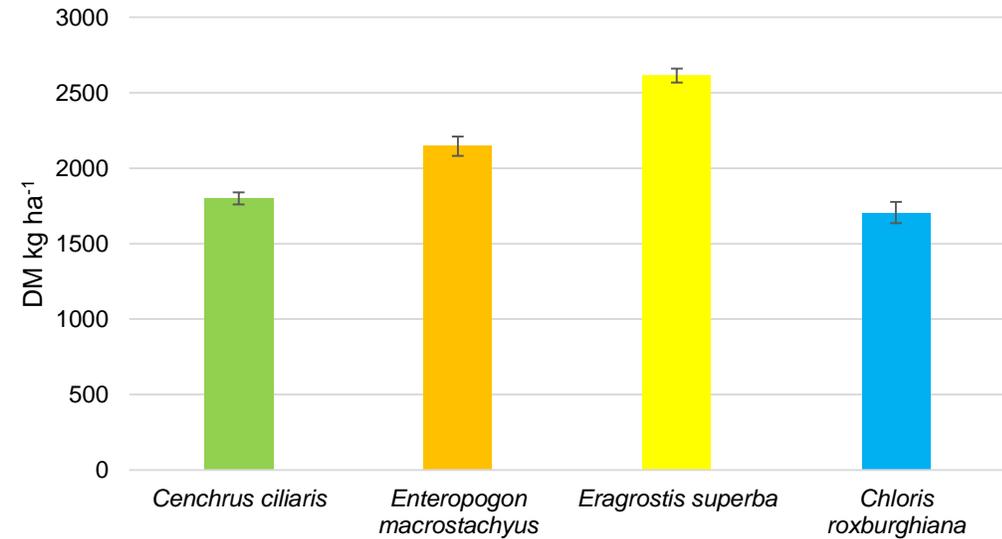
## Plant cover



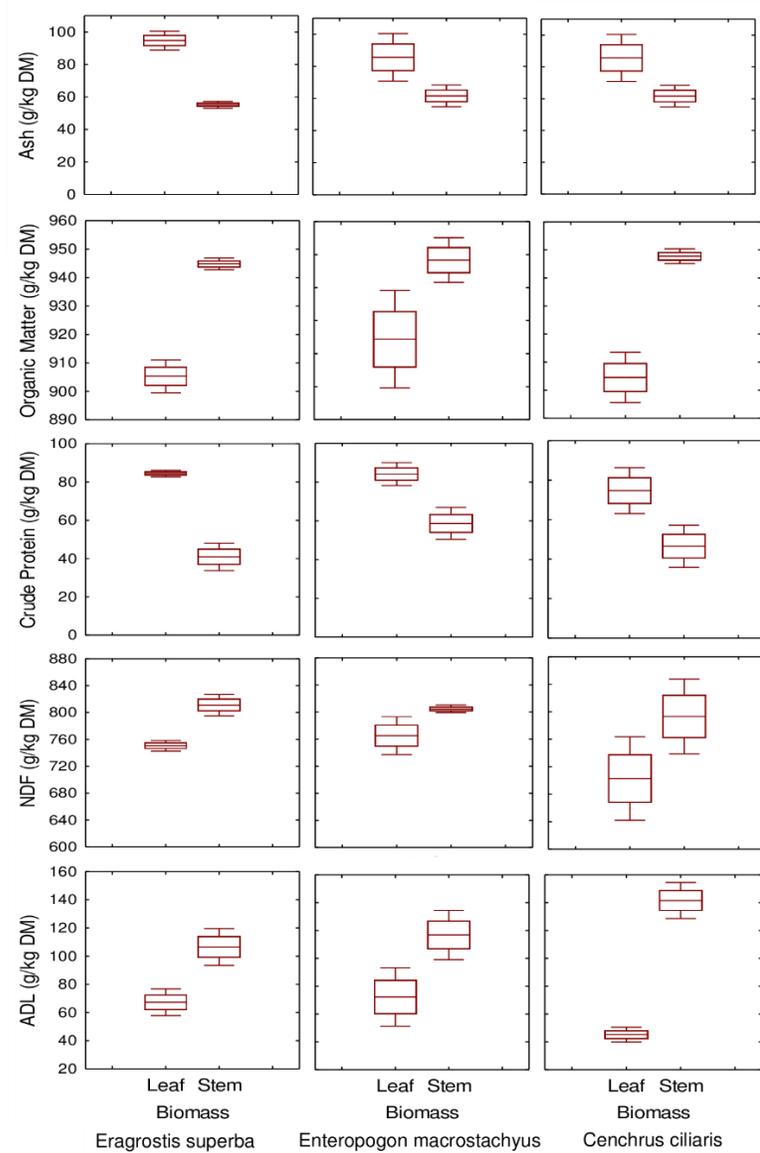
## Seed Production



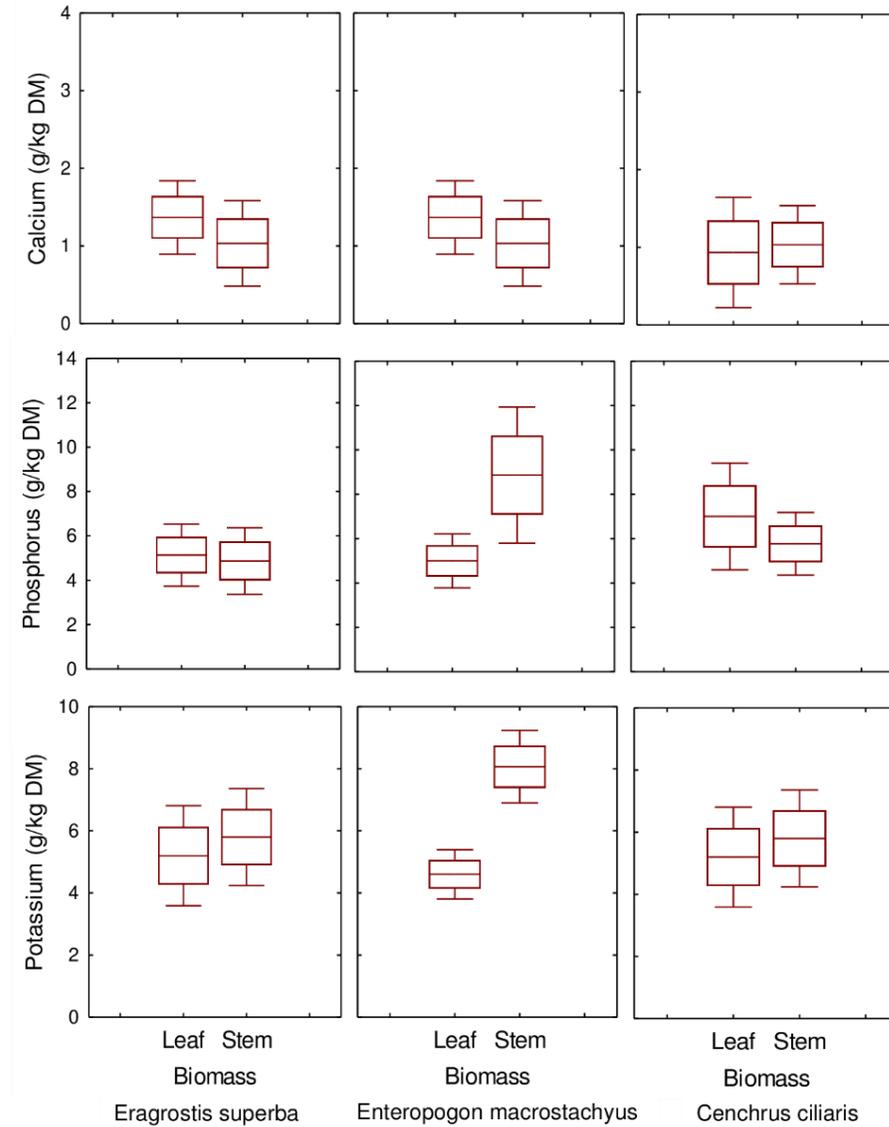
## Biomass Yields



# Nutritional value of leaf and stem biomass



**Fig. 1.** Chemical components in leaf and stem biomass fractions of the selected grasses indigenous to dryland Africa. All displayed results represent arithmetic means of 15 (leaf and stem biomass) replicates per species (n=15).



**Fig. 2.** Mineral content in leaf and stem biomass fractions of the selected grasses indigenous to dryland Africa. All displayed results represent arithmetic means of 15 (leaf and stem biomass) replicates per species (n=15).

## **Constraint:** Lack of knowledge

**Elizabeth:** “I tell people to get the seeds and plant, so they will notice the difference. One person wanted to uproot the grass during the rain period, so he could plant crops on his farm. I explained the importance of planting the grass.”

## **Farmer's opinion**





**Mwova:** “If I collect that water here, downwards on the farm it will have water through the trench. Now my farm is ever green, during dry and rainy periods.”

“Really water harvesting can change our farms”

**Constraint:** semi-arid climate & unreliable rainfall

**Opportunity:** road water harvesting – prolonging moisture



**Jackson:** “This season I harvested 40 kgs of seeds. I sell seeds for 800 Kes per 1 kg, instead of the normal price of 1000 Kes. Because I want people to start planting grass. And I am not so much after money, I want to specialize in this.”



**Opportunity:** selling of seeds

**Kavindu:** “Per acre I can get 200 bales, minimum. If the season is good with more rain, you can get more. Even up to 500 per year. 1 bale goes for 300 KES.

Most of the time we have crop failure, because of the rains. But with grass you never have a failure. Plus the returns, when you compare milk and hay, you always get more than maize and beans.”

**Opportunity:** sales of hay bales & milk production





**Opportunity:**  
fattening of  
animals and  
trading

**Jackson:** “I do animal fattening. On the market I can buy skinny cows for around 15k, I fatten them and can fetch 22-25k when selling. On average I can make 5k for each cow, with 10 cows that is a 50k profit. Essential is the grass.”

# Grass farmers earning millions, making a difference in the ASALs

Posted by Nairobi Digest on 24th October 2012 by Caleb Mutua



...“Traditionally, farmers would keep livestock and sell them during dry spells to buy food. But since we started growing grass, our livestock have enough quality forage....”

...“When I first started growing grass, people thought I was **“crazy”** because grass grows naturally. But with time and because of the progress I have made, my neighbouring farmers have joined me...”

# Success of the grass reseeding and rainwater harvesting from roads in African drylands

- a. Target diverse **biophysical** and **socioeconomic** contexts in dryland ecosystems.
- b. Allow for **adaptation** to specific agroecological conditions.
- c. Create avenues for **resilience** in the midst of environmental and climatic changes.
- d. Create a '**win-win**' **scenario** for the target group(s).

