Food and Agriculture Organization of the United Nations

6th Meeting of the
Regional Soil Laboratory Network for Africa
(AFRILAB)

23 October 2024

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AFRILAB/NENALAB PT 2024 report & GLOSOLAN global PT 2025

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AFRILAB
AFRICAN SOIL LABORATORY NETWORK

Institut de Recherche pour le Développement FRANCE

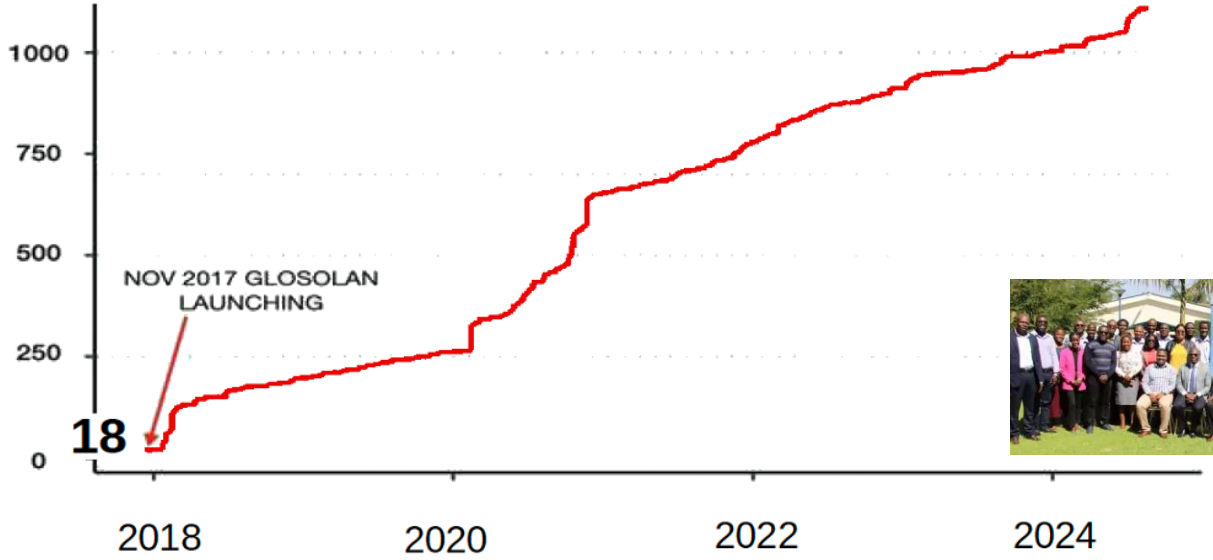
GLOBAL SOIL PARTNERSHIP

Preliminary comment…

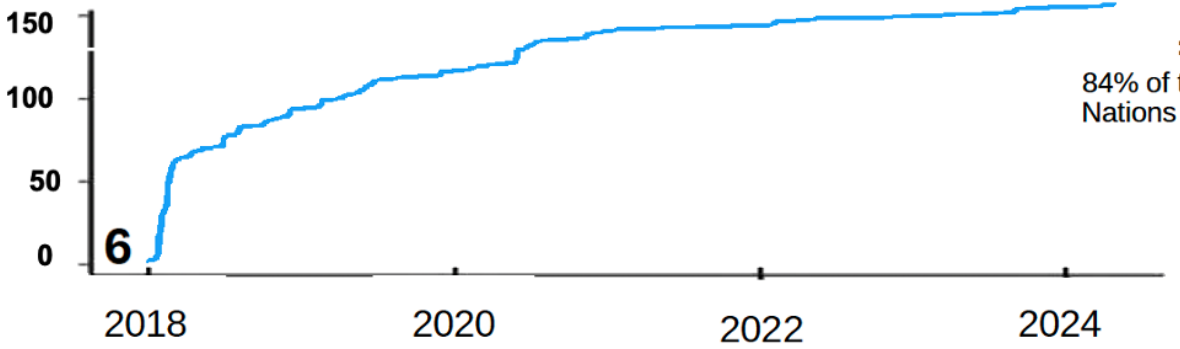
GLOSOLAN
GLOBAL SOIL LABORATORY NETWORK

Laboratories

1 116



Countries



163

=

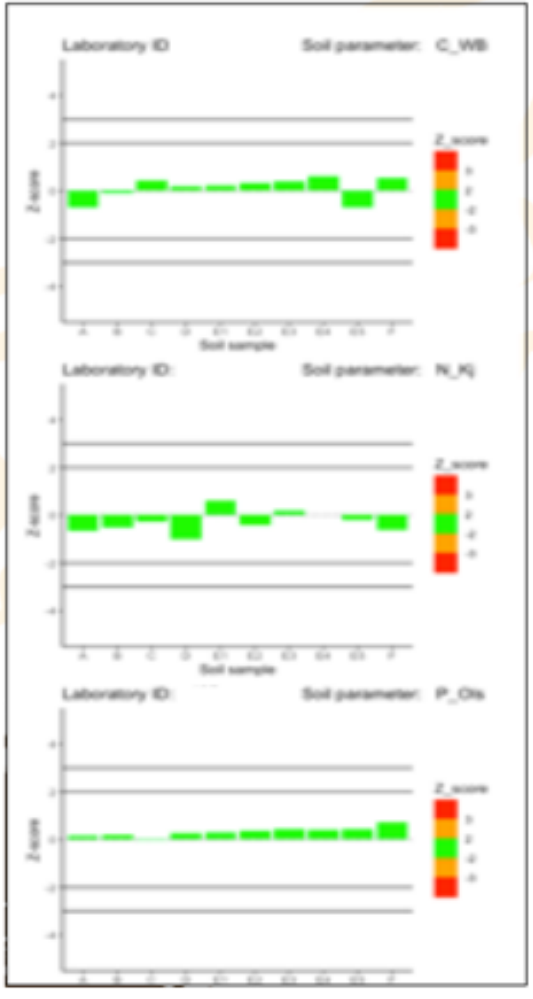
84% of the United Nations countries

Glinka Prize 2024
Supporting material

Mrs. Nopmanee Suvannang

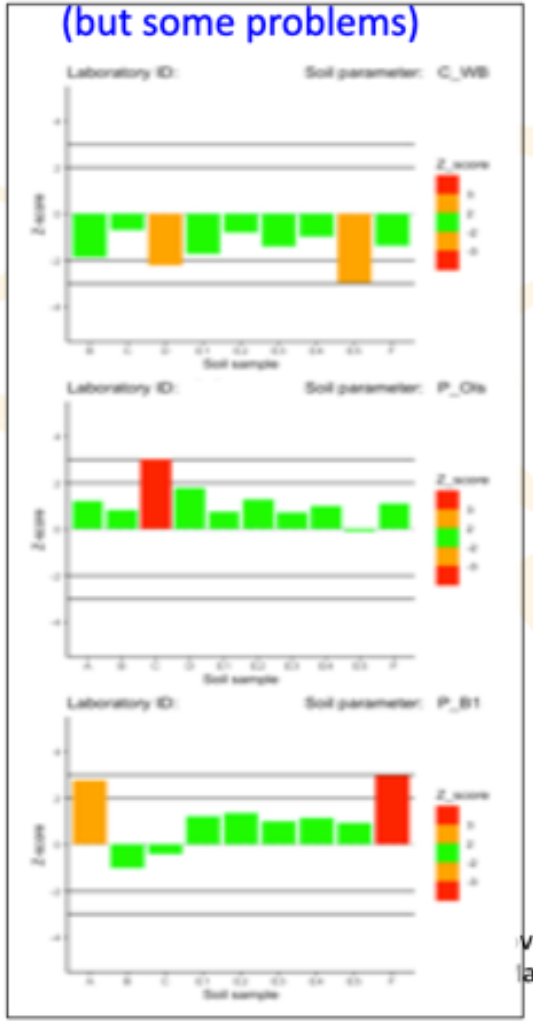
The leader of a silent and invisible revolution,
i.e. the development of a soil laboratories community
able to really support sustainable soil management.

High performance lab

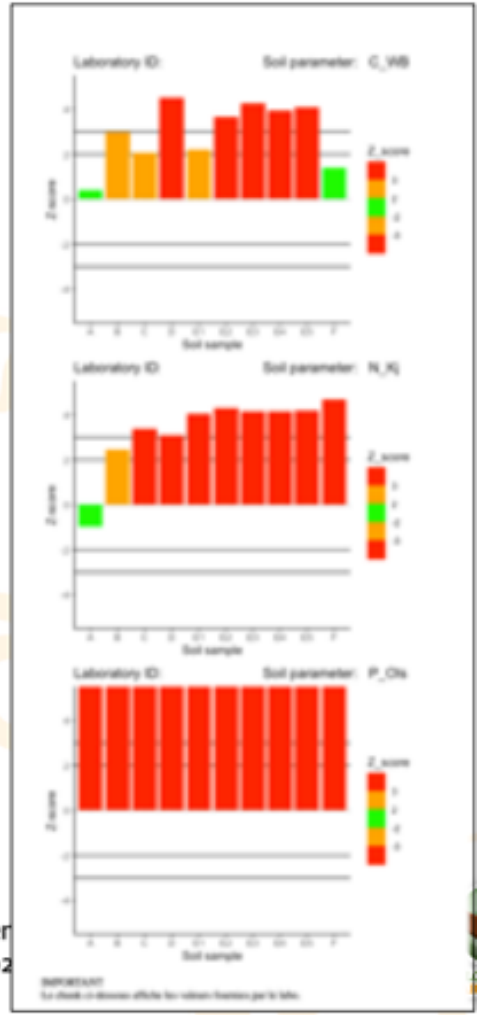


Good performance

(but some problems)



Low performance lab



Preliminary comment…

Terminolgy is important

PT = Profeciency Testing

ILC = Inter Laboratory Comparison

Ring test – Robin ring test

Common challenges amongst laboratories

Standardization of Methodologies

Soil laboratories use different methodologies for analysis, such as Bray PI and Mehlich I, emphasizing the need for harmonization to ensure consistent and comparable results across all labs

Equipment

Many laboratories face challenges in updating and maintaining their equipment due to budget constraints, while accredited labs typically follow stricter maintenance protocols

Proficiency test (PT)

Some laboratories cannot participate due to equipment shortages and lack of validated methodologies, unlike accredited ones

Reagents and consumable importations

Reagents importation is often delayed and burdened with complex bureaucratic procedures.

Capacity building

Laboratories need strengthening in administrative areas and accreditation training, including ISO 17025, Health and safety, and risk management.

Procurement plan

THE APPROACH

Comprehensive capacitation	Automation	Local context	Going green
• Wet chemistry • Physical • Biological • Proximal sensing	• Improved efficiency • User friendly	• Filling the gaps • Compatibility • Backup service • Maintenance • Calibration services	• Low energy consumption • Reduced chemical usage • Reduced waste

Intervention

Needs driven laboratory equipment list

Smart reagents and laboratory consumables

Target technologies

Sample preparation

- Efficient, safe and contamination free process
- Making use of stainless steel, fibreglass and heat resistant materials

Dissolution and digestion

- Microwave technology
- Dry combustion (CNS Elemental analysers)

Analyte quantification

- ICP MS Finish
- Automated UV/Vis and titration technology

Proximal sensing

- Vis-NIR – DRS
- MIR – DRIFTS
- Cosmic Ray Nuetron sensors

3 key benefits of Inter Laboratory Comparisons (ILCs):

Quality Assurance:

ILCs help ensure that laboratories produce accurate and reliable results by comparing them to other labs, identifying errors, and improving techniques.

Standardisation:

ILCs promote harmonization and consistency of analytical methods across labs, which is crucial for generating comparable data globally.

Accreditation:

ILC participation is often required for lab accreditation, proving that the laboratory meets international standards of performance.

2021 : GLOBAL ILC

6 soils : A => F ; sample E had 5 replicates

Repeatability & reproducibility

INTRA-lab dispersion **INTER-lab dispersion**

2024 : AFRILAB ILC

6 soils : A => F

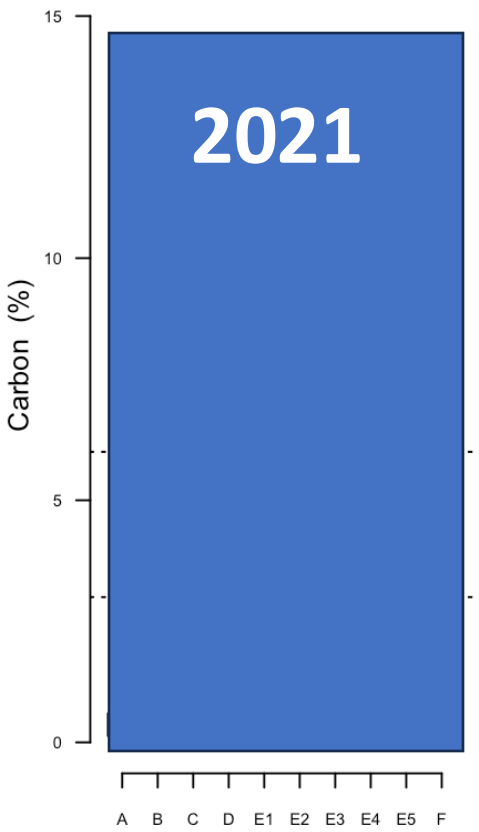
What my slides will look like:

2021 ILC : only AFRICA & NENA results

taken out from Global results

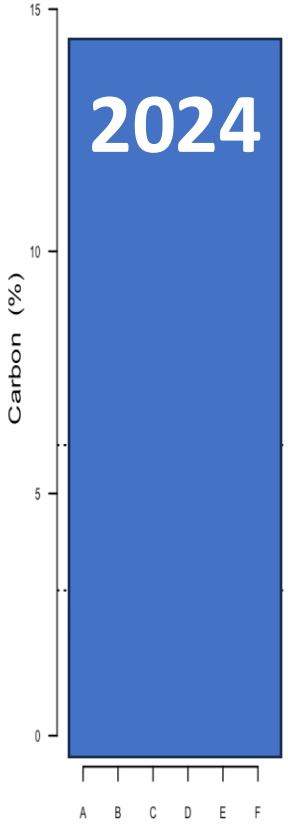
2024 ILC : AFRICA & NENA results

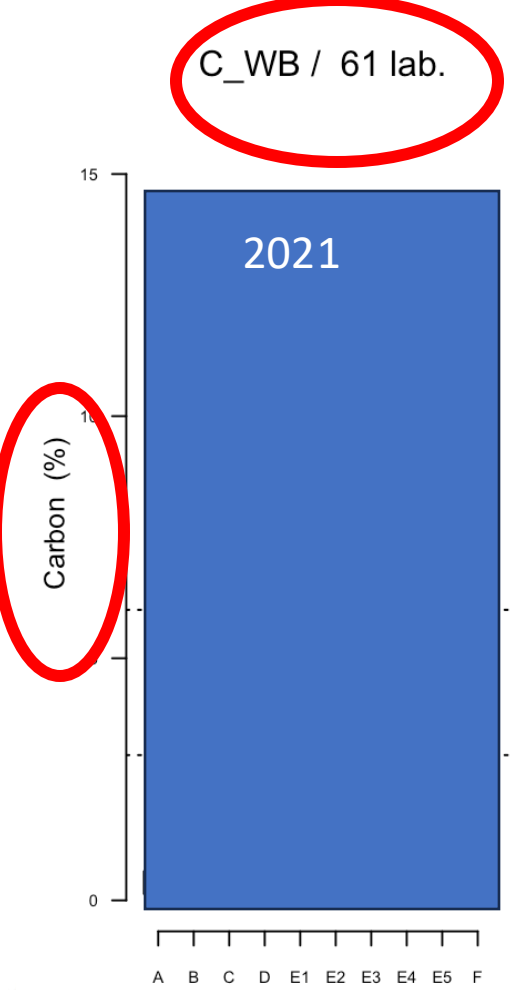
C_WB / 61 lab.

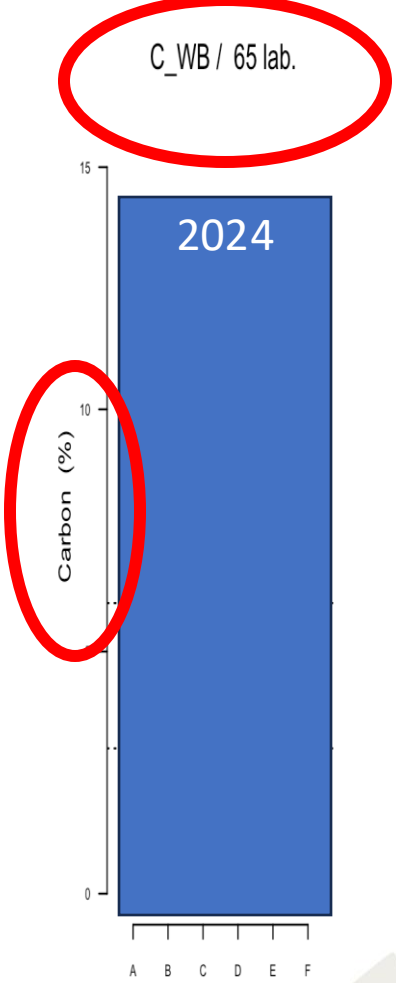


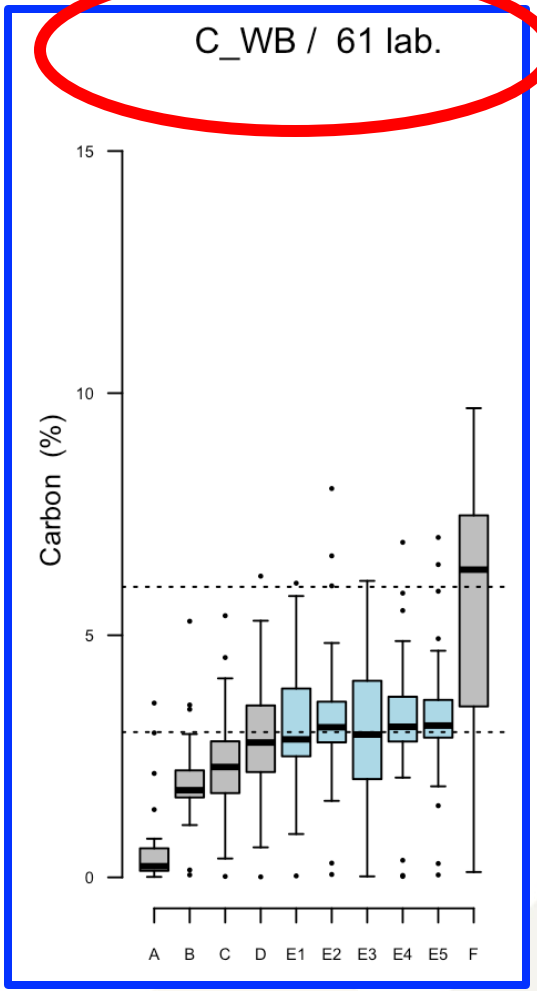
BOXPLOTS

C_WB / 65 lab.




C_WB / 61 lab.
2021
Carbon (%)
15
0
A B C D E1 E2 E3 E4 E5 F


C_WB / 65 lab.
2024
Carbon (%)
15
10
0
A B C D E F

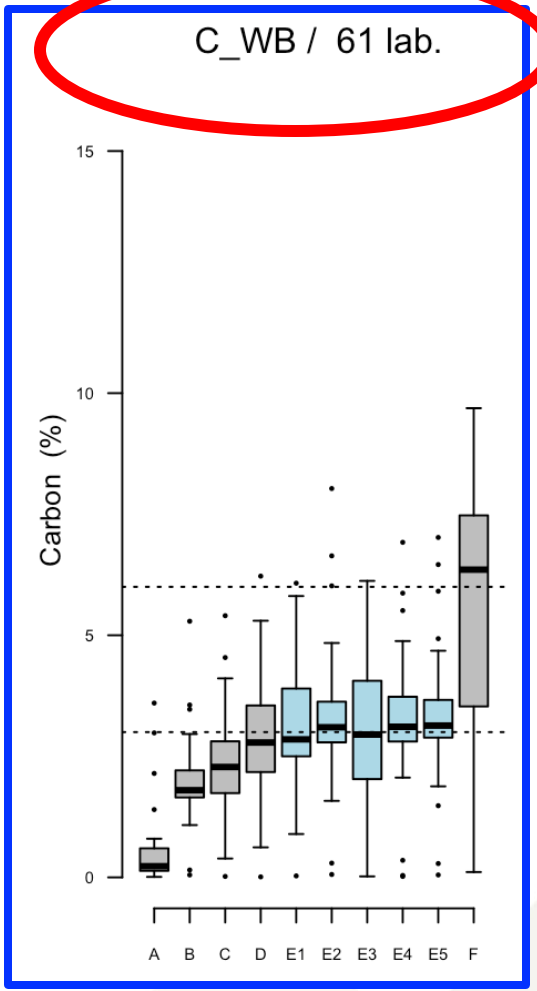


2021

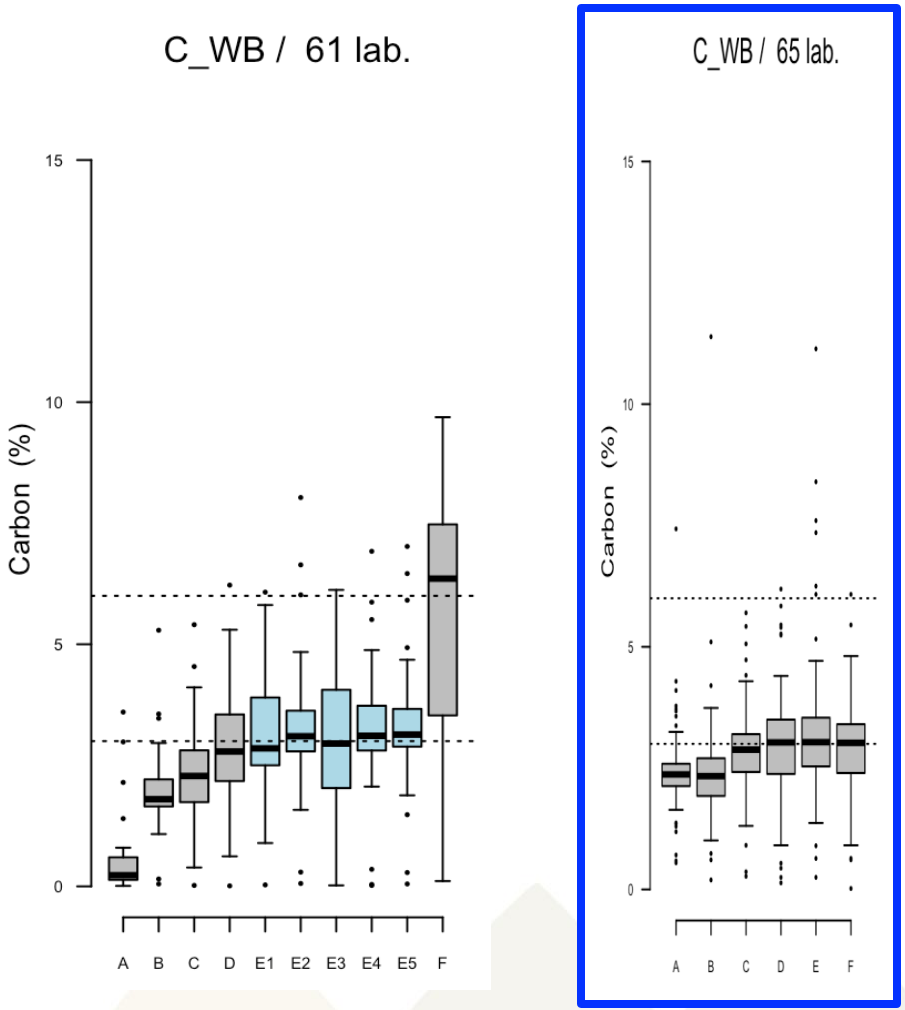
High dispersion (length of the rectangle)

outliers

Repeatability☹ (5 blue boxplots)



and in 2024 ?



Lower dispersion
(length of the rectangle)

Outliers: still present

Repeatability

IMPROVEMENT: congratulations to all !

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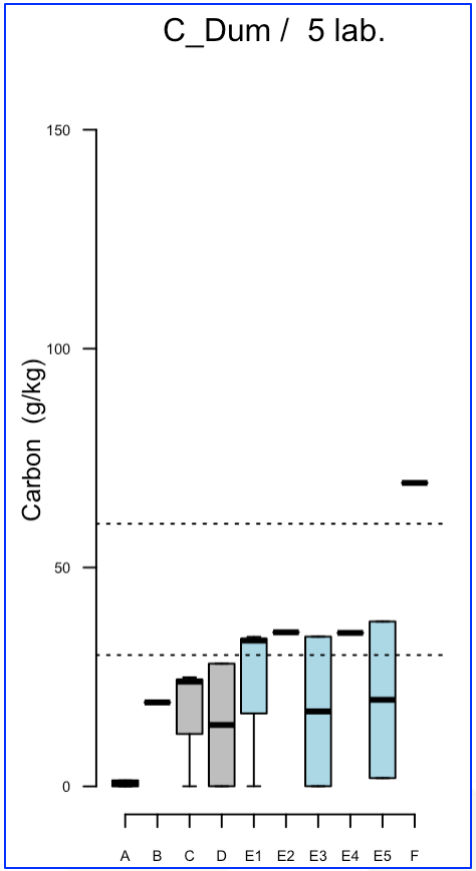
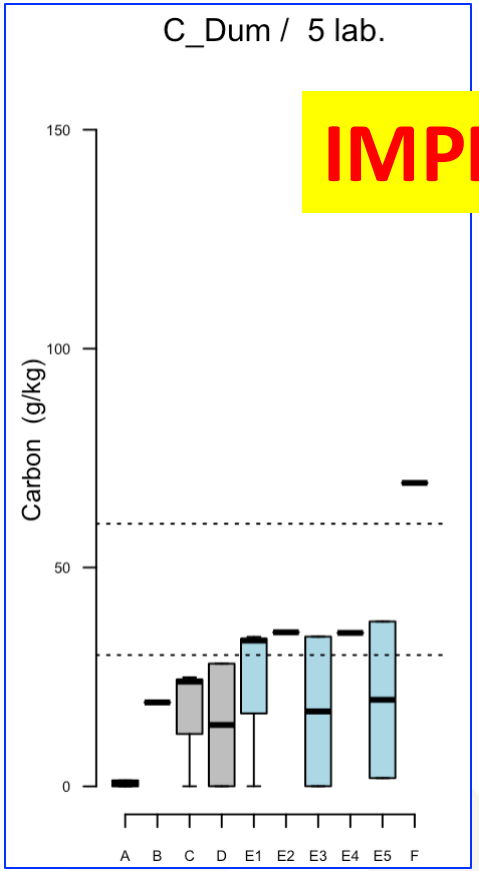
GLOBAL SOIL PARTNERSHIP

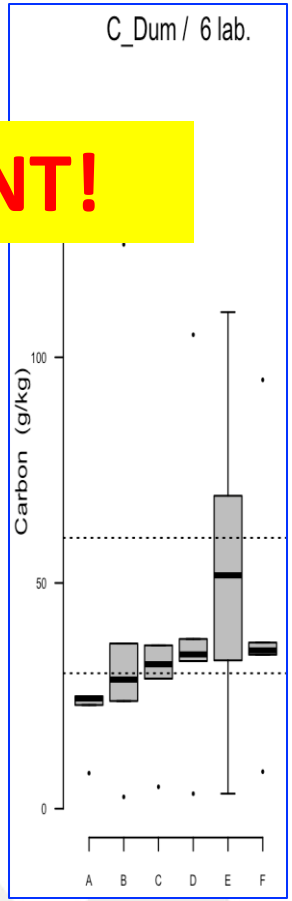
NOT ENOUGH LABS TO MAKE STATISTICAL ANALYSIS



NOT ENOUGH LABS TO MAKE STATISTICAL ANALYSIS



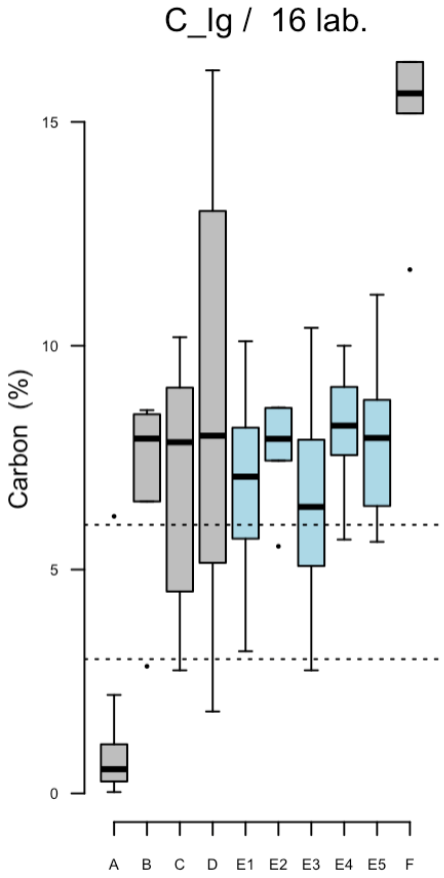
IMPROVEMENT!



GLOBAL SOIL PARTNERSHIP

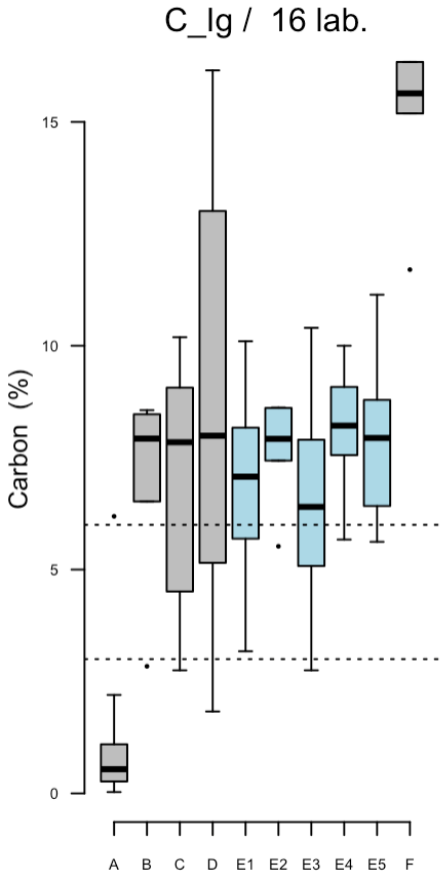
Dispersion too high

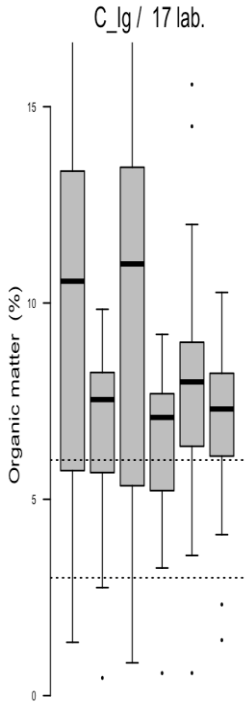
(low reproducibility)



Dispersion SIMILAR = too high

(low reproducibility)



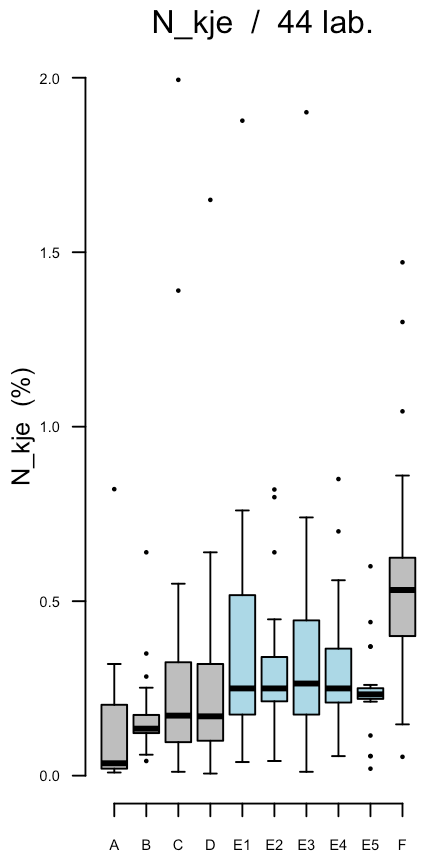


Lack of SOP?

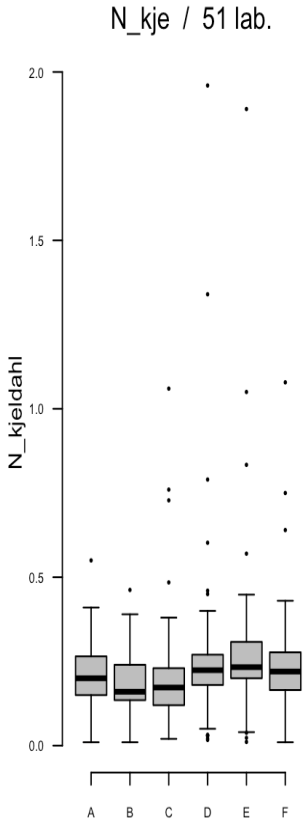
NITROGEN

Dispersion too high

(low reproducibility)



Dispersion has decreased

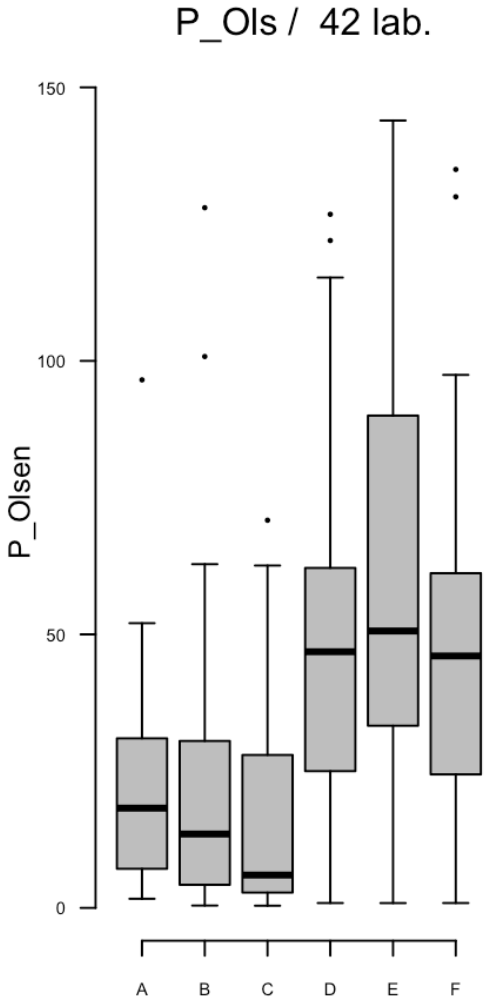


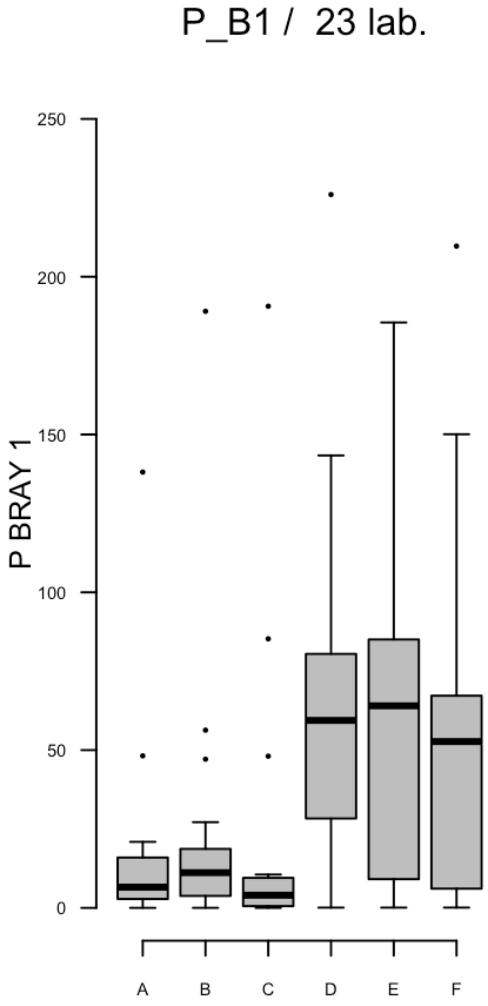
IMPROVEMENT!

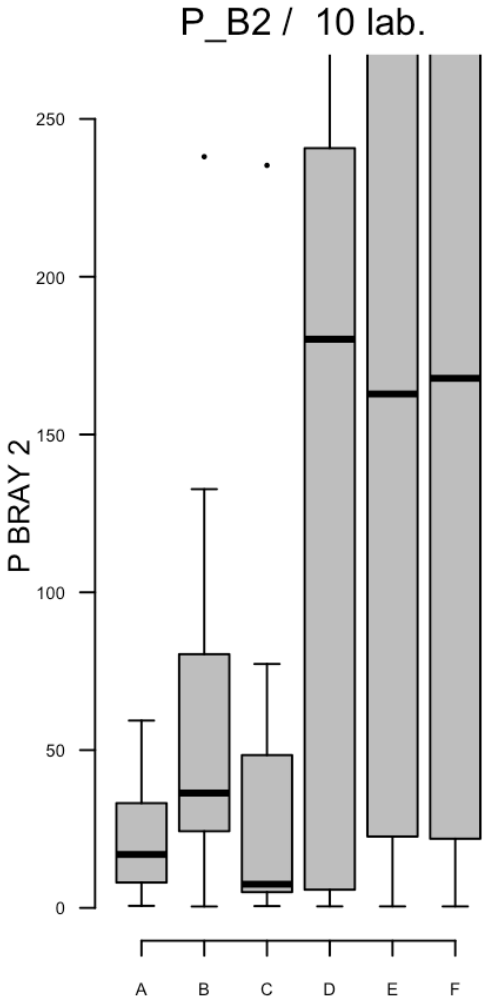
N Dumas : only 3 / 4 labs

Statistical analysis is not possible

Phosphorous


P_Ols / 42 lab.
P_Olsen
150
100
50
0
A
B
C
D
E
F


P_B1 / 23 lab.
P BRAY 1
250
200
150
100
50
0
A
B
C
D
E
F


P_B2 / 10 lab.
P BRAY 2
250
200
150
100
50
0
A
B
C
D
E
F

Conclusion

IMPROVEMENT!

kind to trainings!

we need to continue

Food and Agriculture Organization of the United Nations

AFRILAB

AFRICAN SOIL LABORATORY NETWORK

Thank you

GLOBAL SOIL PARTNERSHIP