**AFRILAB-I/19/Report**

Food and Agriculture Organization of the United Nations

GLOBAL SOIL PARTNERSHIP

# Report of the First meeting of the African Soil Laboratory Network (AFRILAB)

Nairobi, Kenya, 21-24 May 2019

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FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

Rome, 2019

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# Table of Contents

Introduction ..... 6
Highlights and conclusions ..... 6
Status of participating laboratories ..... 6
Standard Operating Procedures (SOPs) ..... 8
Proficiency testing (PT) ..... 14
Development of a plan for building laboratory resilience ..... 14
Position of AFRILAB in GLOSOLAN ..... 16
Governance ..... 17
Venue and time of the next meeting ..... 17
Annex I. List of participants ..... 18
Annex II: Agenda ..... 20
Annex III: Terms of Reference for the positions of Chair and Co-Chair of AFRILAB ..... 24

# Introduction

Following the endorsement of the global implementation plan for Pillar 5 in June 2017 and the launch of the Global Soil Laboratory Network (GLOSOLAN) on 1-2 November 2017, the Regional Soil Laboratory Network (RESOLAN) for Africa was established through its first meeting in Nairobi, Kenya on 21-24 May 2019. The meeting was organized by the Global Soil Partnership (GSP) with the support of the British Geological Survey (BGS), United Kingdom. The meeting was opened by Mr. Gabriel Rugalema, FAO representative for Kenya, Mr. Siroj Loikov, donor representative, and Mr. Michael Watts from the British Geological Survey. Thirty-one lab managers attended the meeting. The list of participants is available in Annex I.

Linking to the objectives of GLOSOLAN, the African Soil Laboratory Network (AFRILAB) aims to:

1. Strengthen the performance of laboratories through use of standardized methods and protocols; and
2. Harmonize soil analysis results so that soil information would be comparable and interpretable across laboratories, countries and regions.

The objectives of the first AFRILAB meeting were to (i) establish the Regional Network, (ii) agree on the activities to implement in the region in 2019 as per the work plan of GLOSOLAN, and (iii) collect regional inputs on GLOSOLAN work.

# Highlights and conclusions

The meeting lasted four full days (see the agenda in Annex II) and consisted of presentations and group works to introduce the network, assess the status of laboratories participating in the meeting, explain technical concepts related to laboratory analysis and data and methods harmonization, and to define the work plan of AFRILAB as well as its position in GLOSOLAN.

## Status of participating laboratories

Participants were given the opportunity to present their laboratory as well as their country potential in soil analysis. In this regard, they were kindly asked to provide information on the number of routine and mobile laboratories in their country as well as the frequency of use of soil testing kits. Thereafter, they were kindly asked to look into the weaknesses and strengths of their own laboratory, and to report about their expectations on GLOSOLAN and AFRILAB. Individual laboratories' presentations are available on the AFRILAB webpage in the GSP, GLOSOLAN website.

Because laboratories showed to be consistently different in terms of perceived strengths and weaknesses, only general areas for improvement and laboratories' expectations are herewith reported.

Areas for improvement:

- Staff training, number and replacement. The replacement of retiring staff seems a sensitive issue in most of the presenting laboratories. This also links to the need for establishing a mentoring, training system extended to the use of new equipment
- Laboratory performance in soil analysis, including participation in proficiency testing and data management
- Implementation of harmonized Standard Operating Procedures

- Laboratory infrastructures, need for equipment and better facilities. Link to the maintenance/repair of laboratory equipment and the setup of laboratories rooms dedicated to specific laboratory activities like sample preparation and storage
- Sourcing reagents and other laboratory material. Link to the need for getting local suppliers
- Capacity building in dry chemistry, GIS and remote sensing. Link to the georeferentiation of the samples
- Quality audit. Link to the wish of laboratories to get ISO/IEC 17025 accreditation
- Spectroscopy technology so to make the analysis cheaper for farmers
- Data interpretation and the system for providing recommendations
- Soil fertility and fertilizers analysis including compost
- Laboratory health and safety. Link to waste management and disposal
- Installation of Local Area Network (LAN) and other software to facilitate and support laboratory's work such as the Laboratory Information Management Systems (LIMS) software

Summary of expectations:

- To participate in proficiency testing and get a better understanding of its utility
- To get to know different approaches for improving the performance of soil analytical laboratories
- To develop standard soil analytical protocols for laboratories
- Improve competency, accuracy and method development in soil, plant, water and fertilizer analytical services
- Improve regional and national networking for sharing experience and resources
- To internationally present African needs in terms of capacity building. Link to the need for assistance in maintaining laboratory equipment
- To facilitate laboratory certification and accreditation procedures
- To promote the use of spectroscopy for soil and plant diagnostic tests
- To explore opportunities where spectroscopy methods, protocols and data analysis can be standardized across globe as part of GLOSOLAN or global soil spectroscopy network
- To persuade national governments to invest in laboratories
- To increase laboratory opportunities for funding

Information on laboratories staff and facilities were also collected, see table 1.

*Table 1. Statistics on staff and laboratories characteristics*

| | Laboratory information |
|---|---|
| Number of staff | ➢ <5 people: **7 labs**<br>➢ From 5 to 10 people: **8 labs**<br>➢ From 10 to 20 people: **5 labs**<br>➢ >20 people: **2 labs** |
| Experience of the staff in lab testing (in number of people per year of experience) | ➢ <2 years: **2 people**<br>➢ From 2 to 10 years: **7 people**<br>➢ From 10 to 20 years: **6 people**<br>➢ >20 years: **4 people**<br>➢ NA: **10 laboratories** |
| Experience of the staff in lab management | ➢ Little experience: **2 people**<br>➢ <2 years or not experience at all: **1 person**<br>➢ From 2 to 10 years: **5 people** |

| | |
|---|---|
| | ➢ From 10 to 20 years: **6 people**<br>➢ >20 years: **3 people**<br>➢ NA: **8 people** |
| Laboratory space (in $m^2$) | ➢ <20 $m^2$: **1 lab (inconsistent with the number of rooms)**<br>➢ From 20 to 100 $m^2$: **3 labs**<br>➢ From 100 to 200 $m^2$: **4 labs**<br>➢ From 200 to 300 $m^2$: **3 labs**<br>➢ From 300 to 500 $m^2$: **9 labs**<br>➢ From 500 to 1000 $m^2$: **1 lab**<br>➢ >1000 $m^2$: **1 lab** |
| Laboratory space (number of rooms) | ➢ From 1 to 5 rooms: **4 labs**<br>➢ From 5 to 10 rooms: **11 labs**<br>➢ >10 room: **4 labs**<br>➢ NA: **3 labs** |

To note that 50% of the laboratories declared to have participated in a proficiency testing programme organized by ZimLabs, AgLabs, Univertisity of Zimbabwe lab, University of Nottingham, British Geological Suvey, Chemistry and Soil Research Institute RS-DFID, WEPAL-ISE, WEPAL-IPE, University of Texas A&M, AgriLASA, BIPEA and CORESTA.

Two laboratories resulted to have the University of Texas A&M (testimony of satisfaction) certification and to be TUNAC accredited.

## Standard Operating Procedures (SOPs)

After agreeing on what a Standard Operating Procedure (SOP) is and why SOPs, and written SOPs especially, are important, participants were divided into 3 groups tasked to answer the following questions:

1. *What is quality assurance (QA)?*

Quality assurance refers to the measures taken to ensure that results are as close as possible to the true value (good SOP). Attributes: accuracy and precision, repeatable, unbiased and consistent.

2. *Do you have a policy for QA? How does it look like?*

Two-third of the members of the working group that answered this questions had a QA policy. The QA refers to the commitment of the top management of a lab to (i) provide quality services that satisfy customers, (ii) comply with a set of documented standards, and (iii) ensure regular management reviews for continuous improvement of laboratory performance.

3. *Do you implement Quality Control (QC)? How does it look like?*

QC is a procedure or set of procedures intended to ensure that a manufactured product meets a given set of standards. In this regard, the analysis is repeated to check its reproducibility: (i) execution of independent analysis, (ii) use of reference material and blanks, and (iii) documentation of the procedure (e.g. dilution factor, sample weight, etc.). A QC also looks at the following:

- EQUIPMENT AND GLASSWARE:
    - Standardization
    - Calibration
    - Maintenance and services
- REAGENTS:
    - Quality of reagents
    - Grade of analytical reagent
    - Standardization of volumetric solutions
- PERSONNEL:
    - Staff competencies (reference is made to staff performance)
    - Skills (identify skill gaps and remedial)

Afterward, participants were asked to provide inputs on the methods they use to measure organic carbon and inorganic carbon, soil moisture content, electrical conductivity and pH. The results of this survey are reported in Tables 2 and 3.

*Table 2. Laboratory methods of analysis for organic and inorganic carbon, and for soil moisture content*

| Representative | Organic Carbon | Inorganic Carbon | Moisture content |
|---|---|---|---|
| Mrs. Lesego Mooketsi-Selepe, SPAL, Botswana | W&B | NA | oven 105 C |
| Ms. Mfopou Mewouo Yvette Clarisse, LASPEE, Cameroon | W&B | NA | oven 105 C |
| Mme Namba Yotoudjim Fabienne, LASEP, Chad | W&B | NA | oven 105 C |
| Mr. Haile Fikre Mekuria, NSTC, Ethiopia | W&B | NA | oven 105 C |
| Mr. Sadick Adams, SRI-LAB, Ghana | W&B | NA | oven 105 C |
| Mr. Traore Fode Karamo, SENASOL, Guinea (République de guinée) | NA | NA | NA |
| Ms. Anne Muriuki, KALRO Soil Labs, Kabete, Kenya | W&B | NA | oven 105 C |
| Mr. Odipo Osano, University of Eldoret Biotech Center, Kenya | W&B | Tritimetric method | oven 105 C |
| Mr. Elvis Weullow, Mr. Erick Towett and Mr. Andrew Sila, ICRAF, Kenya | dry combustion and spectroscopy | dry combustion and spectroscopy | spectroscopy |

| | | | |
|---|---|---|---|
| Mr. Malefetsane Khesuoe, SOILS LAB, Lesotho | W&B and dry combustion | NA | oven 105 C |
| Mr. Emmanuel Mbewe, SPARL, Malawi | W&B | NA | oven 105 C |
| Mr. Moses W. Munthali, ChiSoLab, Malawi | W&B | NA | oven 105 C |
| Mr. Luca Desideri, FES – Agricultural Laboratory, Malawi | NA | NA | NA |
| Mr. Cheikh Ahmed El Moctar, L.P.F., Mauritania | W&B | NA | oven 105 C |
| Mr. Momade Ibraimo, LRASP, Mozambique | W&B | NA | oven 105 C |
| Ms. Ella Shiningayamwe, Agricultural Lab – Soil Lab Section, Namibia | W&B | NA | oven 105 C |
| Mr. Abdourahaman Moustapha, LASEVE, Niger | W&B | Bernard method to extract CaCO3 & titration method | oven 105 C |
| Mr. Williams Egbe, KADUNA SOIL LAB., Nigeria | W&B | NA | oven 105 C |
| Mr. Uponi Joseph, ASLAB-IBADAN, Nigeria | W&B | NA | oven 105 C |
| Mr. Sirikare N. Sylvere, ALSP, Rwanda | W&B | NA | oven 105 C |
| Mr. Ani E. Sekou Samuel, SEVE, Togo | W&B | NA | oven 105 C |
| Ms. Belinda Kaninga, ZARI, Zambia | W&B | NA | oven 105 C |
| Mr. Misi Amos Manyanga, CSRI-LAB, Zimbabwe | W&B | NA | oven 105 C |
| Mr. Takesure Tendayi, SSAE-UZ Laboratories, Zimbabwe | W&B | titration method | oven 105 C |

*Table 3. Laboratory methods of analysis for electrical conductivity and pH in water, $CaCl_2$ and KCl*

| | | pH | | |
|---|---|---|---|---|
| **Representative** | **Electrical conductivity** | **In water** | **In $CaCl_2$** | **In KCl** |
| Mrs. Lesego Mooketsi-Selepe, SPAL, Botswana | saturated method | | 1 to 2.5 | |
| Ms. Mfopou Mewouo Yvette Clarisse, LASPEE, Cameroon | conductivity meter ratio 1:5 | 1 to 5 | | 1 to 5 |
| Mme Namba Yotoudjim Fabienne, LASEP, Chad | conductivity meter ratio 1:5 | 1 to 5 | | 1 to 5 |
| Mr. Haile Fikre Mekuria, NSTC, Ethiopia | conductivity meter ratio 1 to 2.5 | 1 to 2.5 | 1 to 2.5 | 1 to 2.5 |
| Mr. Sadick Adams, SRI-LAB, Ghana | conductivity meter TBC | 1 to 2.5 | 1 to 2.5 | 1 to 2.5 |
| Mr. Traore Fode Karamo, SENASOL, Guinea (République de guinée) | NA | NA | NA | NA |
| Ms. Anne Muriuki, KALRO Soil Labs, Kabete, Kenya | saturated method ratio 1:1 and 1:2.5 | 1 to 1 and 1 to 2.5 | | |
| Mr. Odipo Osano, University of Eldoret Biotech Center, Kenya | conductivity meter ratio 1:2.5 [TBC] | 1 to 1 | TBC | TBC |
| Mr. Elvis Weullow, Mr. Erick Towett and Mr. Andrew Sila, ICRAF, Kenya | 90% dry chemistry and 10% wet chemistry | 90% dry chemistry and 10% wet chemistry by 1 to 2.5 | | |
| Mr. Malefetsane Khesuoe, SOILS LAB, Lesotho | ratio 1:2.5 | 1 to 2.5 | 1 to 2.5 | 1 to 2.5 |
| Mr. Emmanuel Mbewe, SPARL, Malawi | ratio 1:2 | 1 to 2.5 | 1 to 2.5 | |
| Mr. Moses W. Munthali, ChiSoLab, Malawi | TBC | 1 to 2.5 | 1 to 2.5 | 1 to 2.5 |
| Mr. Luca Desideri, FES – Agricultural Laboratory, Malawi | NA | NA | NA | NA |
| Mr. Cheikh Ahmed El Moctar, L.P.F., Mauritania | conductivity meter | 1 to 2 | | 1 to 2 |
| Mr. Momade Ibraimo, LRASP, Mozambique | ratio 1:2.5 | 1 to 2.5 | | 1 to 2.5 |
| Ms. Ella Shiningayamwe, Agricultural Lab – Soil Lab Section, Namibia | saturated method and ratio 1:1 | 1 to 2.5 | | 1 to 2.5 |
| Mr. Abdourahaman Moustapha, LASEVE, Niger | ratio 1:2.5 | 1 to 2.5 | | 1 to 2.5 |

| | | | | |
|---|---|---|---|---|
| Mr. Williams Egbe, KADUNA SOIL LAB., Nigeria | conductivity meter ratio 1:2 and 1:2.5 | 1 to 2 and 1 to 2.5 | 1 to 2 and 1 to 2.5 | 1 to 2 and 1 to 2.5 |
| Mr. Uponi Joseph, ASLAB-IBADAN, Nigeria | 1 to 2.5 | 1 to 2.5 | 1 to 2.5 | 1 to 2.5 |
| Mr. Sirikare N. Sylvere, ALSP, Rwanda | conductivity meter ratio 1:2.5 | 1 to 2.5 | | 1 to 2.5 |
| Mr. Ani E. Sekou Samuel, SEVE, Togo | conductivity meter ratio 1:5 | 1 to 2.5 | | 1 to 2.5 |
| Ms. Belinda Kaninga, ZARI, Zambia | saturated method | 1 to 2.5 | 1 to 2.5 | |
| Mr. Misi Amos Manyanga, CSRI-LAB, Zimbabwe | conductivity meter 1:5 | | 1 to 5 | |
| Mr. Takesure Tendayi, SSAE-UZ Laboratories, Zimbabwe | conductivity method, saturated paste and up to 2.5 | related to saturated paste and ratio 1:2.5 | 1 to 5 | |

Ultimately, participants got to work on the four SOPs GLOSOLAN is harmonizing in 2019:

- SOP on inorganic carbon: because only 4 laboratories declared to measure inorganic carbon, the decision not to discuss this SOP was made.

- SOP on organic carbon by Walkley and Black: Ms. Caon gave to participants the anonymous data collected by the GSP Secretariat on the Walkley and Black procedures used by laboratories worldwide to harmonize. Participants used the harmonized SEALNET[1]-LATSOLAN[2] SOP on Walkley and Black as a baseline to prepare the first draft of the GLOSOLAN SOP on Walkley and Black.

- SOP on total carbon by dry combustion: because only one laboratory declared to work on dry combustion, the work on harmonizing this SOP at the regional level was not implemented.

- SOP on soil sample pre-treatment: participants were divided into groups and asked to draft their harmonized SOP for Mr. Watts and Mr. Charles Gowing (British Geological Survey) to consider when drafting the GLOSOLAN SOP on sample pre-treatment. See figure1

[1] SEALNET: Asian Soil Laboratory Network
[2] LATSOLAN: Latin American Soil Laboratory Network

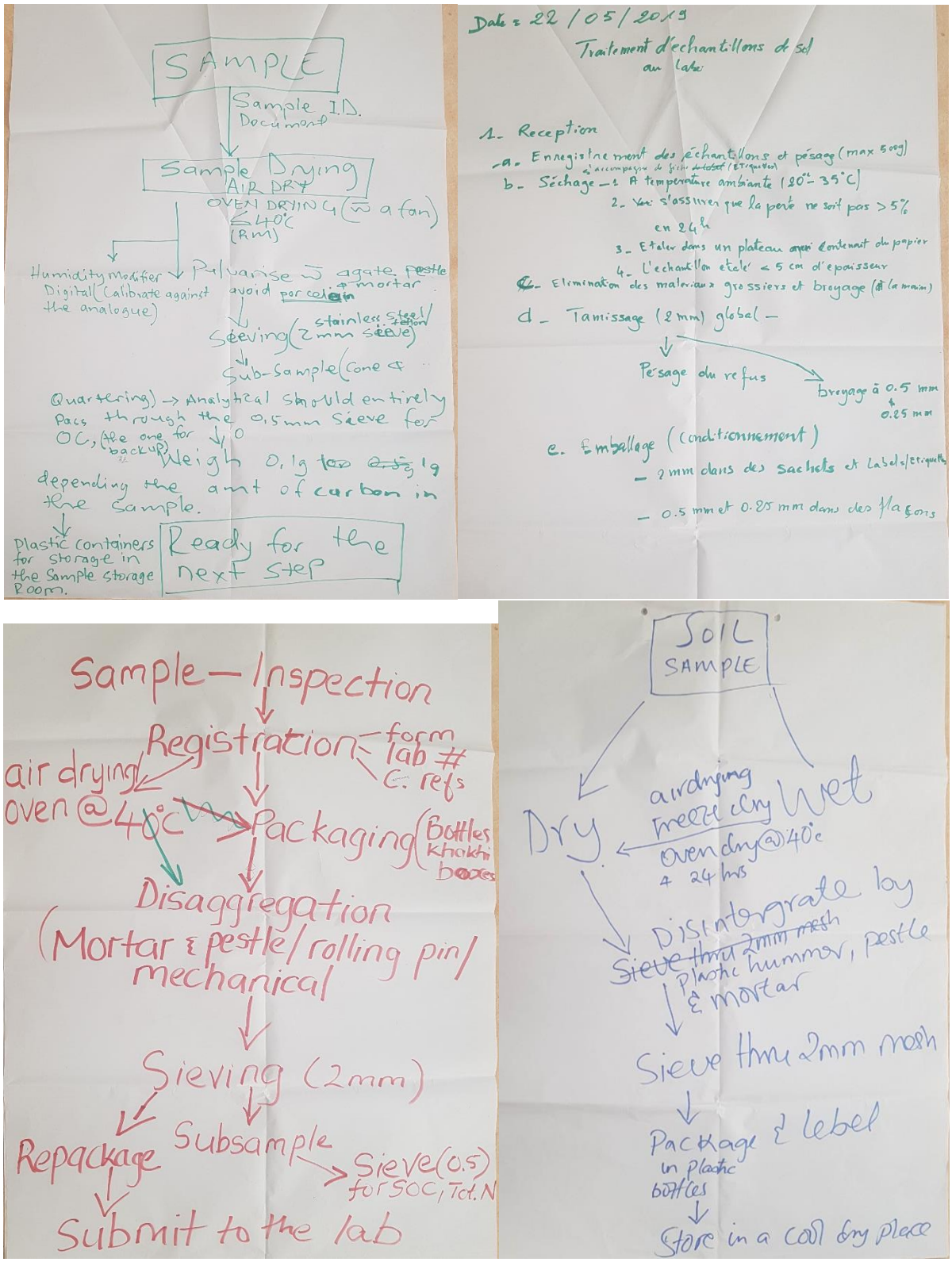


*Figure 1. Results of the group work on the harmonization of the SOP on soil sample pre-treatment*

## Proficiency testing (PT)

In order to prepare participants to the discussion, Mr. Watts presented about quality assurance and reference materials on behalf of Mr. Charles Gowing (BGS), Mr. Odipo Osano (the University of Eldoret Biotech Center) presented on quality management systems, and Mr. Takesure Tendayi (Soil Science & Agricultural Engineering Laboratories) and Mr. Emmanuel Mbewe (Soil And Plant Analytical Research Laboratory) reported about their experience in making reference material and round robin PT. Mr. Tendayi and Mr. Mbewe also guided participants through an exercise to judge the metrics of data from a PT scheme.

Ultimately, participants were given a set of three soil samples of 100g each to bring back home and analyze as part of the GLOSOLAN PT 2019.

## Development of a plan for building laboratory resilience

Once more, participants were divided into groups and asked to revise the status of their laboratory (what works and what does not work). Building on this assessment, participants developed a work plan for change and set targets. When executing this exercise, participants also looked into the business plan of their laboratory considering that (1) they cannot allow themselves to run out of reagents and lab material. Otherwise, they need to order these items as soon as they notice that they are running out of them. (2) They should include maintenance costs and those related to the purchasing of new equipment in the price of soil analysis. To make clients pay just as much as the analysis cost is not rentable.

- Group 1

"Status"

- Undocumented procedures – missing of an alignment with updated SOPs
- No data management procedures, no archiving
- Obsolete equipment
- No quantitative validation of data
- No laboratory check and balances
- We have human resources in terms of knowledge base but need to be improved
- We start to network through AFRILAB and GLOSOLAN

"What does not work"

- Instruments are old
- SOPs are not standardized
- Bureaucracy in lab management (e.g. procurement of equipment)
- Poor data management (no data capture, handling and storage)
- No modern infrastructure

"Change"

- Communication is key (networking)
- Funds raising and funds generation
- Exchange programmes among lab personnel

- Need for a data management system
- Lobbying in the government for support
- Internal lab assessment and audit
- Quality assurance and quality control
- E-learning material for laboratory staff
- Critical thinking and innovations

➢ Group 2

"Status"

- Experienced and committed staff
- Sample management system in place
- Manual and/or digital record system in place
- Final report dependent on personal experience
- Quality control| No QA
- Experienced staff
- Procurement done by administration

"What does not work"

- Little to no QA
- Poor equipment maintainance
- Misallocation of resources
- Lack of reinvestment in laboratories
- Inappropriate pricing of service
- Lack of inter-laboratory exchanges
- Lack of mentorship
- Poor remuneration

"What to do"

- Internship programmes
- Improve remuneration
- Introduce QA within 2 years
- Appropriate pricing of services
- Proper involvement in procurement

➢ Group 3

"Status"

- Offer a service at a fee
- Serving our mandate
- We collaborate with other institutions
- We are at times funded by the government

All the above works but much more can be done

"What to do"

- Planning according to capacity (financial, training and maintenance and replacement of equipment)
- Setting targets
- Market survey and marketing
- Motivation of staff to influence mindset change

➢ Group 4

| Target points | Identified problems | Possible solutions |
|---|---|---|
| Managerial system | Top-down | Participative methods |
| | Nomination based on skills | Apolitical system |
| | Rigidity | Flexibility |
| | Problems of dialogue | Dialogue promotion |
| Staff competences | Insufficient number of technicians | Quantitative and qualitative appointment |
| | Team spirit | Team work spirit |
| | Lack of initiative | |
| | Lack of training | Regular training of staff |
| Institutional aspects | Unfit legal documents | Appropriate legal documents |
| Performance of the equipment | Insufficient or inappropriate equipment | Provide good equipment |
| | Poor quality equipment | Purchase of good quality material |
| | Maintenance problems or inadequate maintenance | Maintenance on regular basis |
| Infrastructures | Inadequate or deteriorated buildings/facilities | Rehabilitation |
| | Bad environmental working conditions | |
| Communication | Lack of publicity | Leaflet and printed material |
| | | Marketing |
| Follow-up and evaluation | Insufficient or inappropriate maintenance problems | Elaboration of a system for periodic management and evaluation |

## Position of AFRILAB in GLOSOLAN

Ms. Lucrezia Caon (GLOSOLAN Coordinator, GSP Secretariat) introduced participants to GLOSOLAN and asked for their opinion on:

- The Standard Operating Procedures (SOPs) GLOSOLAN should work on harmonizing in 2020.

  AFRILAB agreed for GLOSOLAN to work on harmonizing the SOPs for moisture content, electrical conductivity and pH in 2020 but proposed the network to work also on available phosphorous (P)

by Mehlich III, P Olsen and Bray I and Bray II. Looking at the other methods in the GLOSOLAN work plan, participants stated not to use ammonium lactate to measure available P.

Mr. Takesure Tendayi from the Soil Science & Agricultural Engineering Laboratories of Zimbabwe volunteered to lead the harmonization of the GLOSOLAN SOP on pH

Mr. Abdourahaman Moustapha from the Laboratoire Sol, Eau, Plante et Engrais of Niger volunteered to lead the harmonization of the GLOSOLAN SOP on soil moisture
Ms. Lesego Mooketsi-Selepe from the Soil and Plant Analytical Laboratory of Botswana volunteered to lead the harmonization of the GLOSOLAN SOP on Bray I

Ms. Mfopou Mewouo Yvette Clarisse from the Laboratoire d'Analyses Des Sols, Plantes, Eaux Et Engrais (Laboratory Of Soils, Plants, Water And Fertilizer Analysis) of Cameroon volunteered to lead the harmonization of the GLOSOLAN SOP on Bray II

Mr. Uponi Joseph from the International Institute of Tropical Agriculture of Nigeria, Mr. Emmanuel Mbewe from the Soil And Plant Analytical Research Laboratory of Malawi, and Mr. Thembinkosi Mbedzi from the Soil Science & Agricultural Engineering, University of Zimbabwe, Mt. Pleasant, Harare volunteered to lead the harmonization of the GLOSOLAN SOP on Mehlich III

- Other activities GLOSOLAN should implement in 2020 or include in its work plan for the years to come:
    - Establishment of exchange programmes between laboratories
    - Launch a survey to assess the status of laboratory equipment and the availability of local suppliers. The survey should also ask about the method to georeferenced soil samples. In this regard, awareness raising campaigns on open access Apps for georeferencing samples should be promoted

## Governance

Mr. Uponi Joseph from the International Institute of Tropical Agriculture of Nigeria was nominated Chair of AFRILAB. Ms. Lesego Mooketsi-Selepe from the Soil and Plant Analytical Laboratory of Botswana was nominated vice-Chair of AFRILAB for the English speaking countries in the region. Mr. Abdourahaman Moustapha from the Laboratoire Sol, Eau, Plante et Engrais of Niger was nominated vice-Chair of AFRILAB for the French speaking countries in the region. The Terms of Reference for the position of Chair and Vice-chair of the network are available in Annex III.

## Venue and time of the next meeting

The second AFRILAB meeting will be organized in 2020. Venue and time to be confirmed.

## Annex I. List of participants

Mr. Gabriel H.R. Rugalema, FAO Representative for Kenya

Ms. Lucrezia Caon, Global Soil Partnership Secretariat, FAO HQ

| Participant | Laboratory Official Name | Country |
|---|---|---|
| Ms. Lesego Mooketsi-Selepe | Soil And Plant Analytical Laboratory | Botswana |
| Ms. Mfopou Mewouo Yvette Clarisse | Laboratoire d'Analyses Des Sols, Plantes, Eaux Et Engrais (Laboratory Of Soils, Plants, Water And Fertilizer Analysis) | Cameroon |
| Mme Namba Yotoudjim Fabienne | Laboratoire d'Analyse Des Sols Eaux Et Plants | Chad |
| Mr. Haile Fikre Mekuria | National Soil Testing Center | Ethiopia |
| Mr. Sadick Adams | Soil Research Institute Analytical Services Laboratory | Ghana |
| Mr. Traore Fode Karamo | Laboratoire National d'Analyse De Sols, Des Engrais, Des Végétaux Et Eaux Du Services National Des Sols | Guinea (République De Guinée) |
| Ms. Anne Muriuki | National Agricultural Soil Laboratories | Kenya |
| Mr. Njeru Gachini | National Agricultural Soil Laboratories | Kenya |
| Ms. Catherine Kibunja | National Agricultural Soil Laboratories | Kenya |
| Mr. David Kamau | National Agricultural Soil Laboratories | Kenya |
| Mr. Odipo Osano | University Of Eldoret Biotech Center | Kenya |
| Mr. Elvis Weullow | ICRAF | Kenya |
| Mr. Erick Towett | ICRAF | Kenya |
| Mr. Andrew Sila | ICRAF | Kenya |

| | | |
|---|---|---|
| Mr. Malefetsane Khesuoe | Soils Laboratory | Lesotho |
| Mr. Emmanuel Mbewe | Soil And Plant Analytical Research Laboratory | Malawi |
| Mr. Moses W. Munthali | Chitedze Soils Laboratory | Malawi |
| Mr. Luca Desideri | FES – Agricultural Laboratory | Malawi |
| Mr. Cheikh Ahmed El Moctar | Laboratoire De Pédologie Et Fertilisation | Mauritania |
| Mr. Momade Ibraimo | Laboratorio Regional De Analise De Solos E Plantas | Mozambique |
| Ms. Ella Shiningayamwe | Analytical Services And Product Development Of Ministry Of Agriculture, Water And Forestry | Namibia |
| Mr. Abdourahaman Moustapha | Laboratoire Sol, Eau, Plante Et Engrais | Niger |
| Mr Williams Egbe | National Soil Laborotory, Federal Ministry Of Agriculture And Rural Development Kaduna, Nigeria. | Nigeria |
| Mr. Uponi Joseph | International Institute Of Tropical Agriculture | Nigeria |
| Mr. SIRIKARE N. SYLVERE | Analytical Laboratory For Soil And Plant | Rwanda |
| Mr. Ani E. Sekou Samuel | Laboratoire Des Sols, Eau, Végétaux Et Engrais | Togo |
| Ms. Belinda Kaninga | ZARI | Zambia |
| Mr. Misi Amos Manyanga | Chemistry And Soils Research Institute Laboratory | Zimbabwe |
| Mr. Takesure Tendayi | Soil Science & Agricultural Engineering Laboratories | Zimbabwe |
| Mr. Simba Eben Chipungari | Department Of Research & Specialists Services Chemistry & Soil Research Institute, Harare | Zimbabwe |
| Mr. Thembinkosi Mbedzi | Soil Science & Agricultural Engineering University Of Zimbabwe Mt. Pleasant, Harare | Zimbabwe |
| Mr. Michael Watts | British Geological Survey (BGS) | United Kingdom |
| Mr. Siroj Loikov | Phosagro | Russia |

## Annex II: Agenda

### Tuesday, 21 May 2019

8:30 – 9:00 **Registration**

9:00 – 9:20 **Item 1. Opening**

Mr Gabriel H.R. Rugalema, FAO Representative for Kenya

9:20 - 9:30 **Item 2. Tour de table and Endorsement of the agenda**

### Session 1: National profiles. *Moderator: Ms. Lucrezia Caon, FAO*

9:30 – 9:45 **Item 3. Overview on the status of laboratories in RESOLAN-Africa**

*Ms. Lucrezia Caon, GSP Secretariat*

9:45 – 10:30 **Item 4. National laboratories' presentation (in alphabetic order)**

- **Botswana**, Soil And Plant Analytical Laboratory, Lesego Mooketsi-Selepe
- **Cameroon**, Laboratory Of Soils, Plants, Water And Fertilizer Analysis, Mfopou Mewouo Yvette Clarisse
- **Chad**, Laboratoire D'analyse Des Sols Eaux Et Plants, Namba Yotoudjim Fabienne
- **Djibuti**, Laboratoire De Pédologie, Mohamed Nasser
- **Ethiopia**, National Soil Testing Center, Haile Fikre Mekuria
- **Ghana**, Soil Research Institute Analytical Services Laboratory, Sadick Adams
- **Kenya**, National Agricultural Soil Laboratories, Anne Muriuki
- **Kenya**, University Of Eldoret Biotech Center, Odipo Osano
- **Kenya,** ICRAF, Elvis Weullow
- **Lesotho**, Soils Laboratory, Malefetsane Khesuoe
- **Malawi**, Soil And Plant Analytical Research Laboratory, Emmanuel Mbewe
- **Malawi**, Chitedze Soils Laboratory, Moses W. Munthali
- **Malawi**, Luca Desideri, FES – Agricultural Laboratory

*Moderator: Ms. Lucrezia Caon, GSP Secretariat*

10:30 – 11:00 **Tea break and group picture**

11:30 – 12:30 **Item 4. National laboratories' presentation (in alphabetic order) – continuation**

- **Mauritania**, Laboratoire De Pédologie Et Fertilisatio, Cheikh Ahmed El Moctar
- **Mozambique**, Laboratorio Regional De Analise De Solos E Plantas, Momade Ibraimo
- **Namibia,** Analytical Services and Product Development, Ella Shiningayamwe
- **Niger**, Laboratoire Sol, Eau, Plante Et Engrais, Abdourahaman Moustapha
- **Nigeria**, National Soil Laborotory, Federal Ministry Of Agriculture And Rural Development Kaduna, Williams Egbe
- **Nigeria**, International Institute Of Tropical Agriculture, Uponi Joseph
- **Rwanda**, Analytical Laboratory For Soil And Plant, Sirikare N. Sylvere
- **Togo**, Laboratoire Des Sols, Eau, Végétaux Et Engrais, Ani E. Sekou Samuel
- **Zambia,** ZARI, Belinda Kaninga
- **Zimbabwe**, Chemistry And Soils Reasearch Institute Laboratory, Misi Amos Manyanga
- **Zimbabwe,** Soil Science & Agricultural Engineering Laboratories, Takesure Tendayi

*Moderator: Ms. Lucrezia Caon, GSP Secretariat*

12:30 – 13:00 **Item 5. Wrap up and discussion**

13:00 – 14.00 **Lunch and group picture**

14:00 - 15:30 **Item 6: Introduction to the Global Soil Laboratory Network (GLOSOLAN) and compilation of regional inputs on the network**

Ms. Lucrezia Caon, FAO

15:30 – 16:30 **Item 7: Poster exercise on Standard Operating Procedures and Quality Assurance**

Give each group one challenge question to answer on the board. Each group should have 1 reporter.

## Wednesday, 22 May 2019

## Session 2: Standard Operating Procedures

| | |
|---|---|
| 8:30 – 9:30 | Item 8: Introduction to Standard Operating Procedures (SOPs) |
| | Moderator: Michael Watts, British Geological Survey, United Kingdom / Odipo |
| 9:30 – 10:30 | Item 9: Implementing GLOSOLAN – Harmonization of SOPs on sample pre-treatment |
| | Moderators: Mr. Michael Watts and Ms. Lucrezia Caon |
| 10:30 - 11:00 | Tea break |
| 11:00 – 13:00 | Item 10: Implementing GLOSOLAN – Harmonization of SOPs on inorganic carbon |
| | Moderators: Mr. Michael Watts and Ms. Lucrezia Caon |
| 13:00 – 14:00 | Lunch |
| 14:00 – 16:00 | Item 11: Implementing GLOSOLAN – Harmonization of SOPs on organic carbon |
| | Moderators: Mr. Michael Watts and Ms. Lucrezia Caon |
| 16:00 – 16:30 | Item 12: Review of the work and discussion |
| | Moderators: Mr. Michael Watts and Ms. Lucrezia Caon |

## Thursday, 23 May 2019 - Field Trip

**Visit to the ICRAF Soil-Plant Spectral Diagnostics Lab, UN Compound**

- Welcome address and introduction to ICRAF work
- Short lecture on spectroscopy by ICRAF
- Visit to the laboratory and demonstration of use of spectroscopy equipment
- Lunch break

**Visit to National Agricultural Soil Laboratories (KALRO Soil Labs, Kebete) P.O. Box 14733 00800, Nairobi, Kenya [TBC]**

## Friday, 24 May 2019

## Session 3: Proficiency Testing

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|---|---|
| 8:30 – 9:30 | **Item 13: What is a Good Laboratory Practice?**<br><br>Mr. Michael Watts, British Geological Survey, United Kingdom |
| 9:30-10:30 | **Item 14: Why is a Quality Management System useful?**<br><br>Prof. Odipo Osano, University of Eldoret Biotech Center , Kenya |
| 10:30 – 11:00 | **Coffee break** |
| 11:00-13:00 | **Item 15: Proficiency Testing (PT) exercise**<br><br>i) What is a PT / Reference Material (RM)<br>ii) How is a RM made?<br>iii) Experience from an African network in making a RM and round robin PT<br>iv) Exercise to judge the metrics of data from a PT scheme.<br><br>Mr. Michael Watts, British Geological Survey, United Kingdom |
| 13:00 – 14:00 | **Lunch** |
| 14:00 – 15:00 | **Item 16: Poster exercise on the development of a plan for improvement aimed at building resilience**<br><br>- What they are currently do, what works/does not work, how are they going to change? Set targets. |
| 15:00 – 15:30 | **Item 17: Delivery of samples and closure of the meeting** |

## Annex III: Terms of Reference for the positions of Chair and Co-Chair of AFRILAB

**Terms of Reference for the Chair of the Regional Soil Laboratory Network for Africa (**AFRILAB**)**

The Chairperson of the Regional Soil Laboratory Network for Africa (AFRILAB) will:

i) Ensure that the Pillar 5 Implementation Plan, Section "Soil Sampling and Analysis", is implemented and the SEALNET is established under GLOSOLAN;
ii) Ensure that the African Soil Partnership Implementation Plan for Pillar 5, Activity 5.3.3, is implemented;
iii) Chair the AFRILAB meetings, and oversee the respective African Soil Partnership Implementation Plan and GLOSOLAN Roadmap, thus ensuring their work objectives and deliverables are met in time, and updated when necessary;
iv) Maintain active communication between AFRILAB and GLOSOLAN, the GSP Secretariat and the Pillar 5 Working Group, in relation to the implementation of the AFRILAB activities as documented in the Roadmap agreed upon at the launch of the AFRILAB;
v) Participate in the Pillar 5 Working Group at global level (see ToR for the Pillar 5 WG in the Pillar 5 Implementation Plan);
vi) Represent AFRILAB at official national and international meetings;
vii) Report (jointly with the GSP Secretariat, the ITPS Chair and the GLOSOLAN Chair) to the GSP Plenary Assembly about the AFRILAB progress;
viii) Advocate for the mobilization of resources to execute the AFRILAB activities, supported by the working group for AFRILAB.

The appointment of the Chair of the AFRILAB will take place during the annual meeting of AFRILAB. The term for the Chairperson is two years after election, extendable via AFRILAB decision to a second term. The Chair is, whenever possible, supported by a Co-Chair in all activities and tasks.