

WORLD BANK

World Soil Day  
St. Petersburg  
5 December 2018

# SOIL SCIENTISTS

## AND WHERE TO FIND THEM IN AFRICA

by  
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*Imperfect understanding is often  
more dangerous than ignorance ..."*

J.K. Rowling

# Problem statement

- The Eurasian Center for Food Security (ECFS) has brought to the attention of the World Bank the seemingly diminishing capacity in soil expertise and stagnant or shrinking job market for soil experts within the countries of Africa.
- This observation largely reflects the perception of the trend voiced by many African soil science professors and post-graduate students who gathered at the RUFORUM meeting in Cape Town in 2016; it was reiterated at meetings organized by ECFS in Moscow in celebration of World Soil Day (2016 and 2017) that discussed the future of soil science.



World Soil Day, Moscow  
2016 and 2017



# Objectives

The objectives of this report are to focus on the perceptions of soil science individuals and those working with soil scientists to provide an overview of:

- the status quo of human capital in soil science in Africa,
- the current need for soil scientists in Africa, and
- soil science education and training at tertiary level.

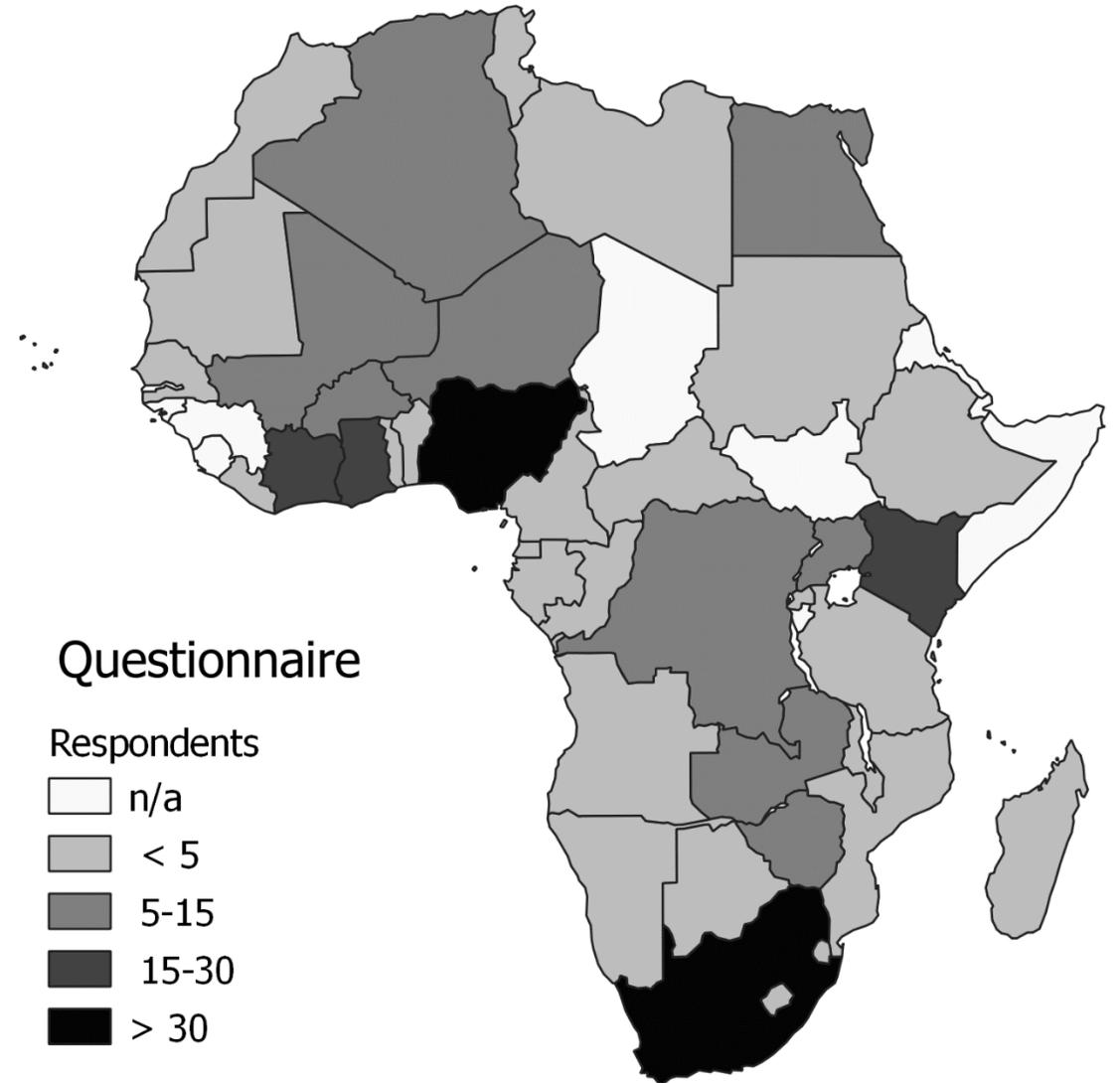
# HUMAN CAPITAL AND LABOUR ECONOMICS

A degree in Soil Science is an investment.  
In Africa it is an investment by

- the student who sacrifices four to five years of possible work experience and income,
- the parents who have to carry the cost of the student's upkeep during these years of deferred remuneration, and
- the state that heavily subsidizes tertiary education in every African country.

# Methodology

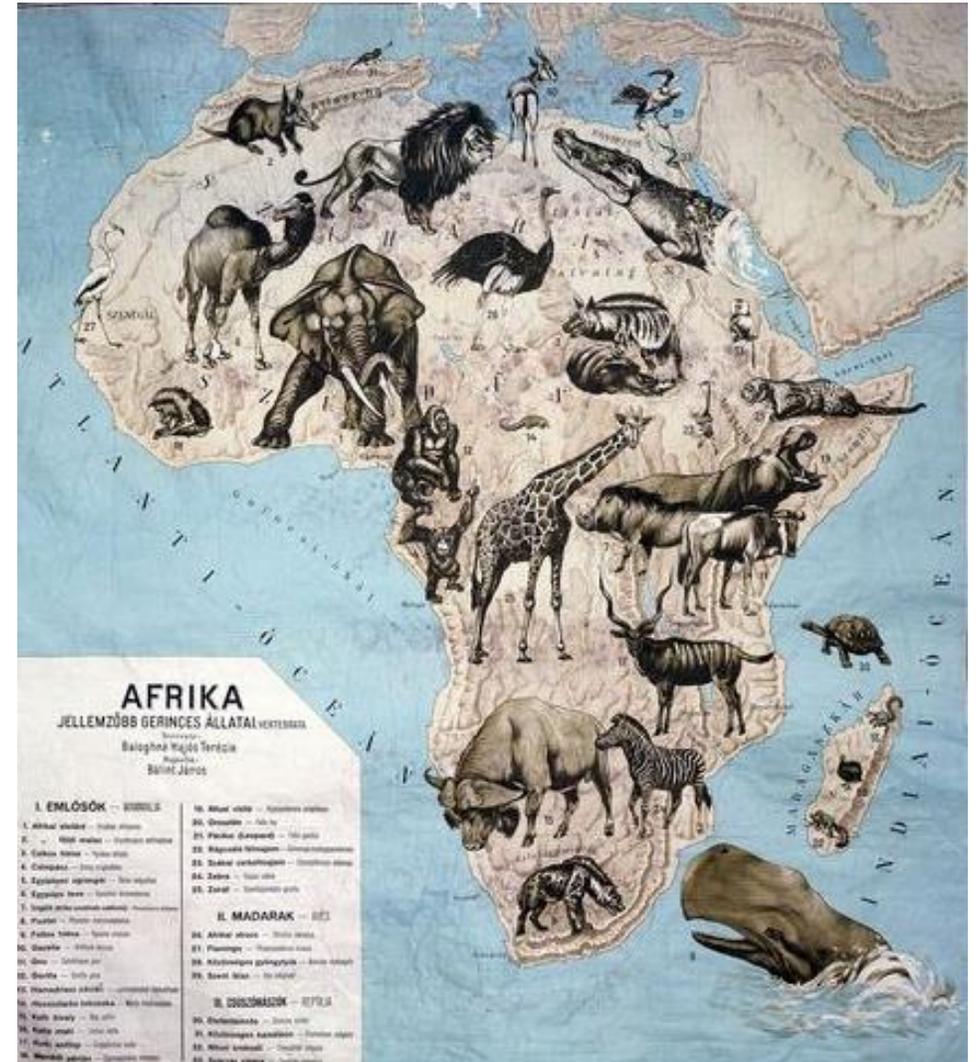
- Contact made via IUSS and national soil science societies.
- Only 6 operational soil science societies in 54 African countries.
- Responses collected on-line  
January – September 2018
- 381 responses
- In addition: 445 LinkedIn contacts analyzed



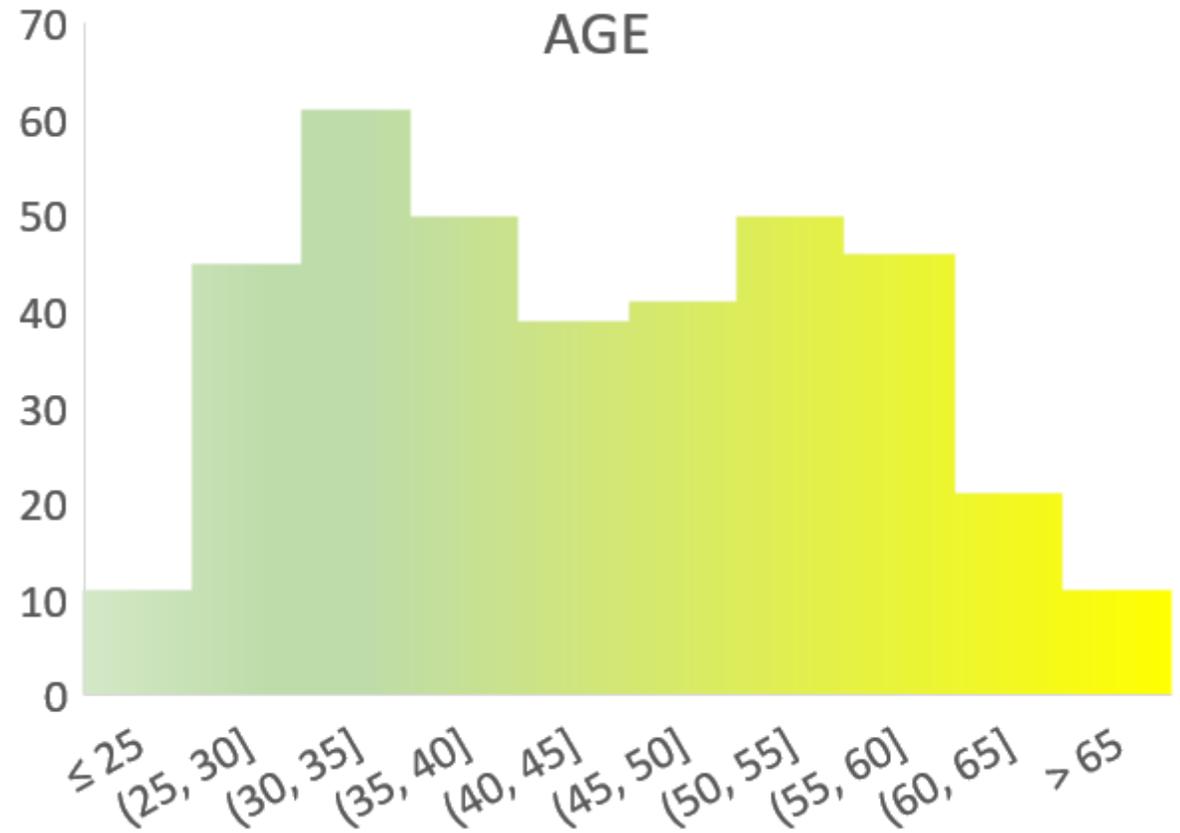
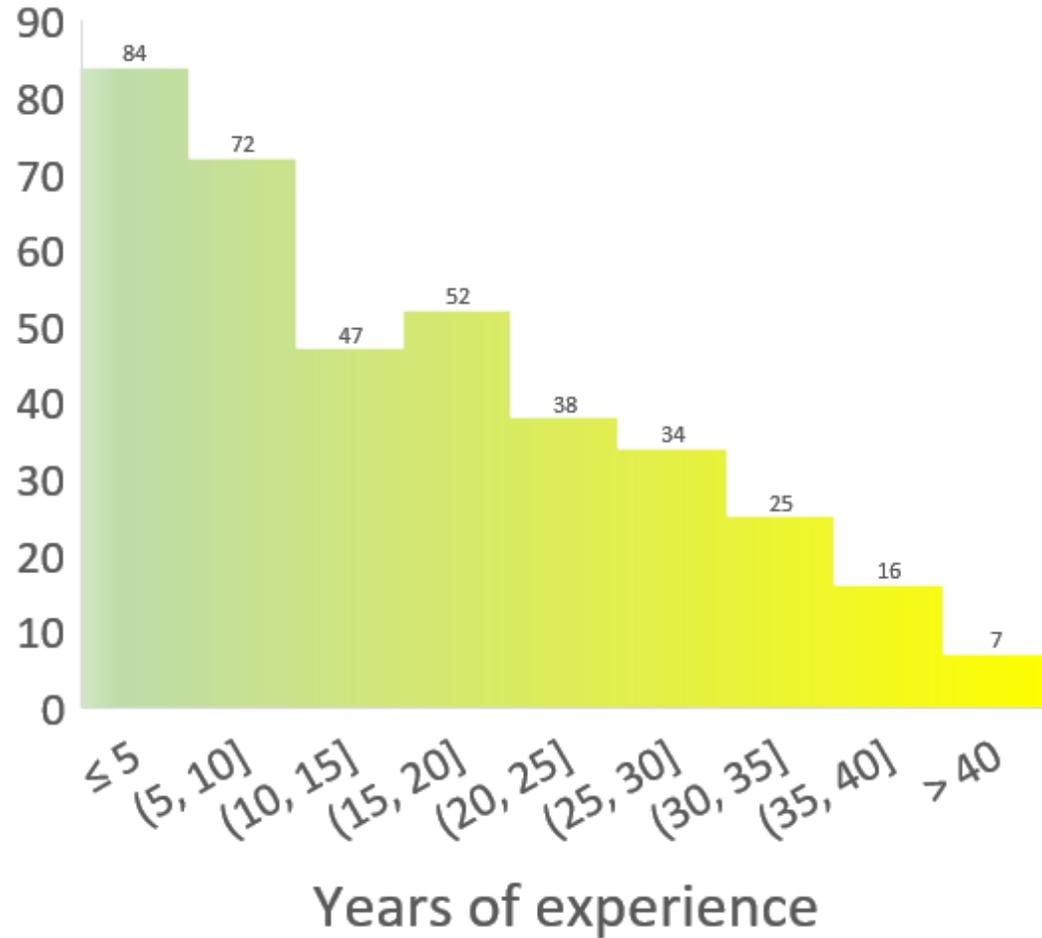


# SCARCE SKILLS & ENDANGERED SPECIES

FACTS	FIGURES
Land area	30,36 million sq.km
Sahara	9.2 million sq.km
Tropical forests	3.6 million sq.km
Population	1.216 billion
University Enrolment (2010)	5.2 million
Practicing soil scientists (2018)	4-12 thousand
Buffalo	900 thousand
Elephants	415 thousand
Lions	20 thousand
Rhinoceros	20 thousand
Leopard	4 thousand
Mountain gorilla	400

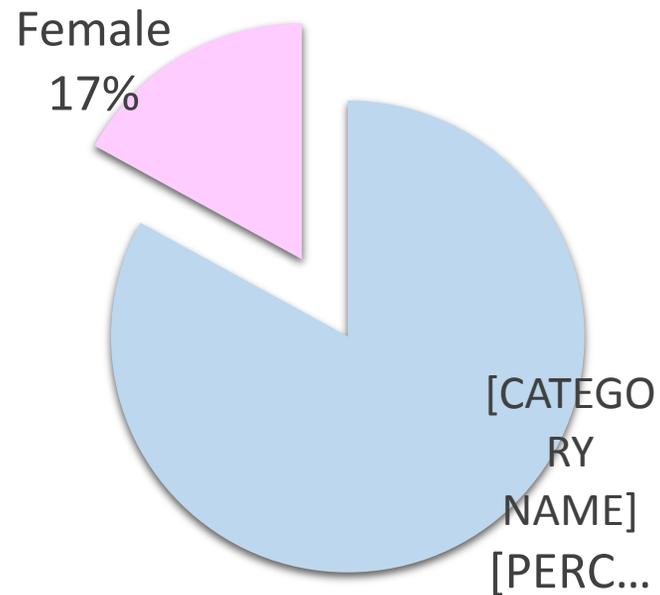


# AGE AND EXPERIENCE

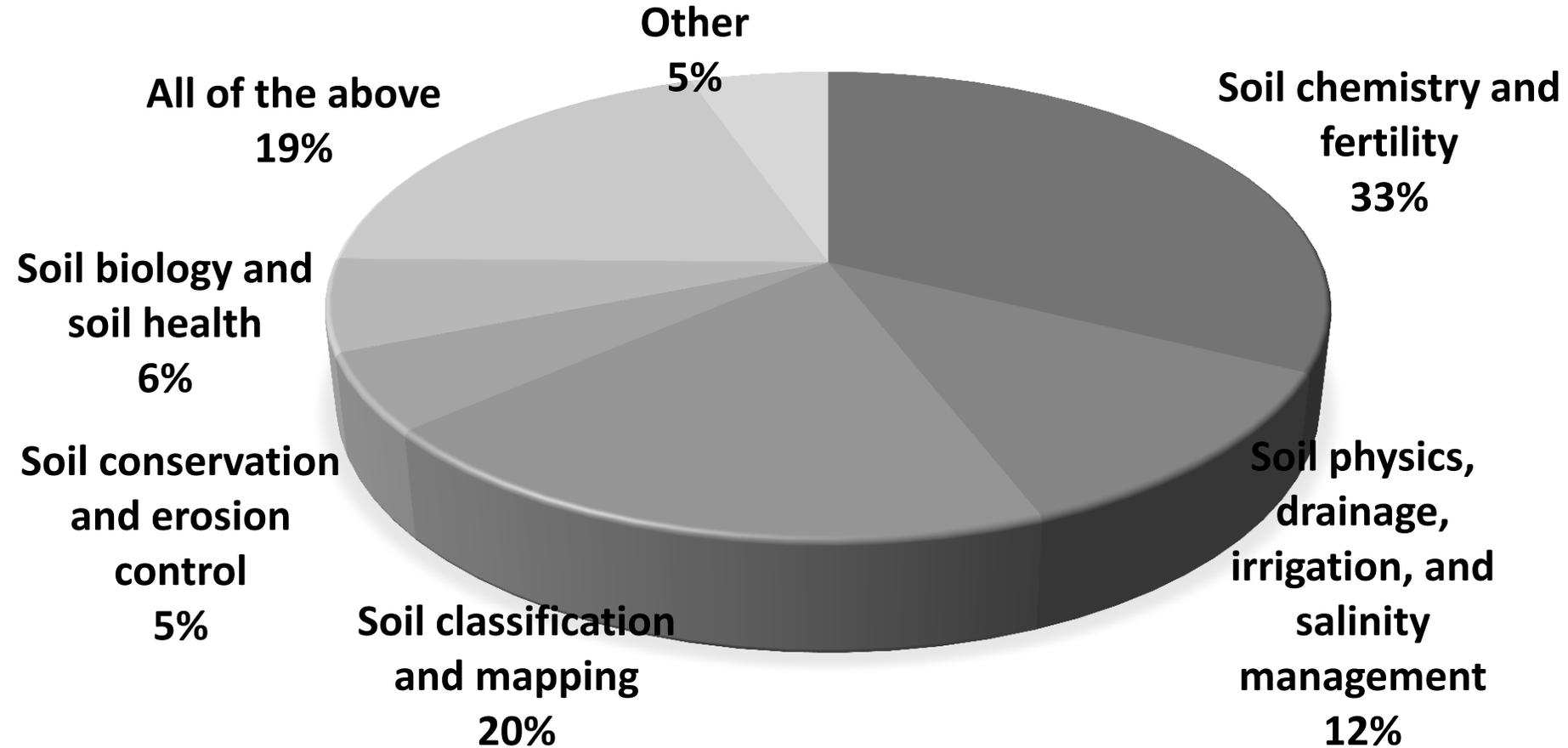


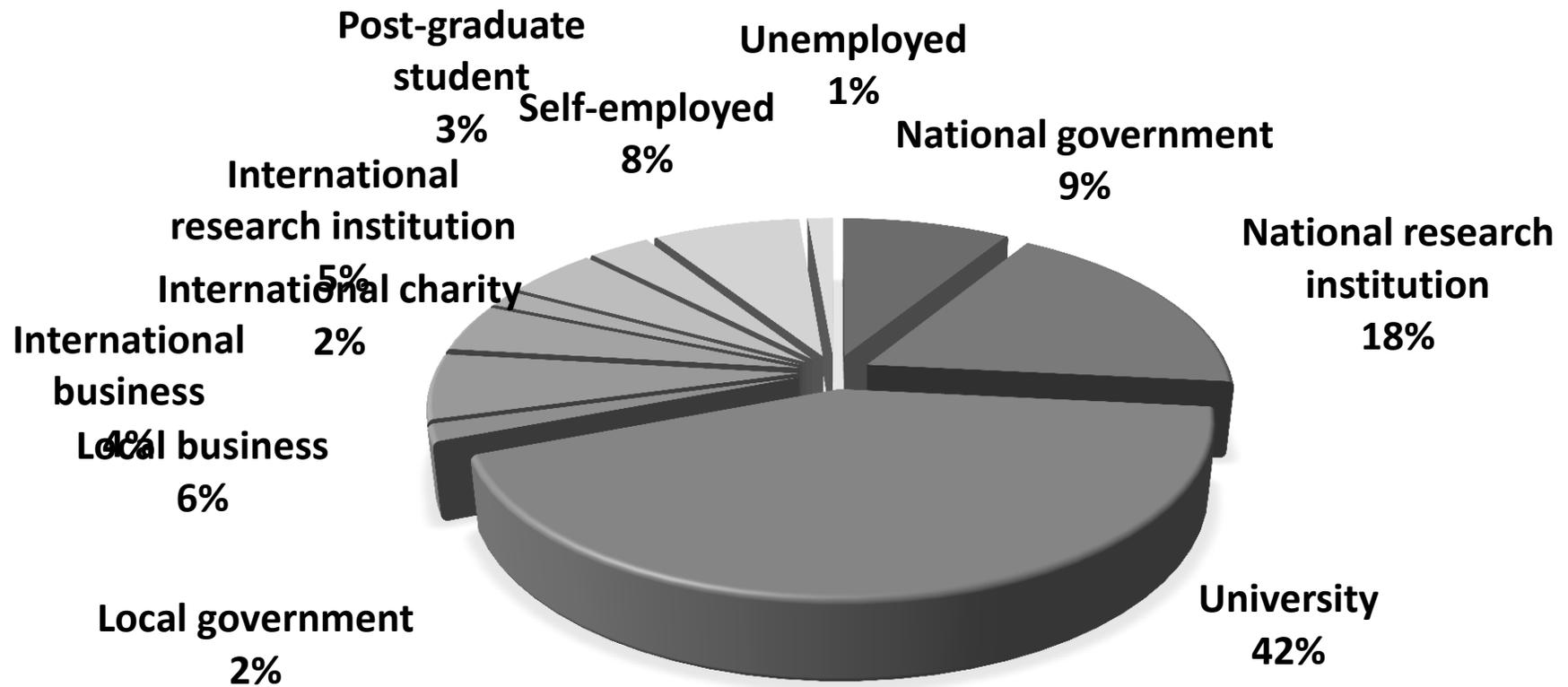
# ABOUT WOMEN

- Few African soil scientists are women
- Prejudice of employers and industry customers



# Fields of specialization



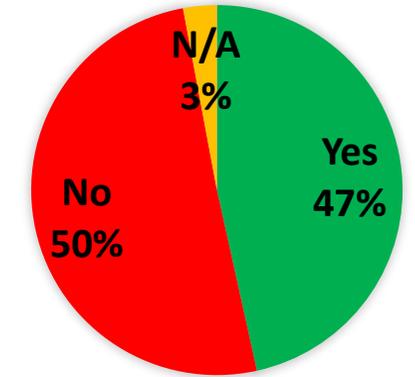


# Job, support services and pay satisfaction

- Soil scientists love their job!
- They complain about research and commercial laboratories, scarce funding, etc., but are generally satisfied with their salaries and lifestyle.



Do soil scientists have to generate funding?



# Universities

Many African universities offer degrees in soil science within the agricultural curriculum.

The quality of education is not discussed here and may vary widely depending on the staff and equipment available at each individual unit.

The universities are also the main soil research centres on the continent along with national and international institutes

International co-operation plays an important role in research funding and production of research outputs.



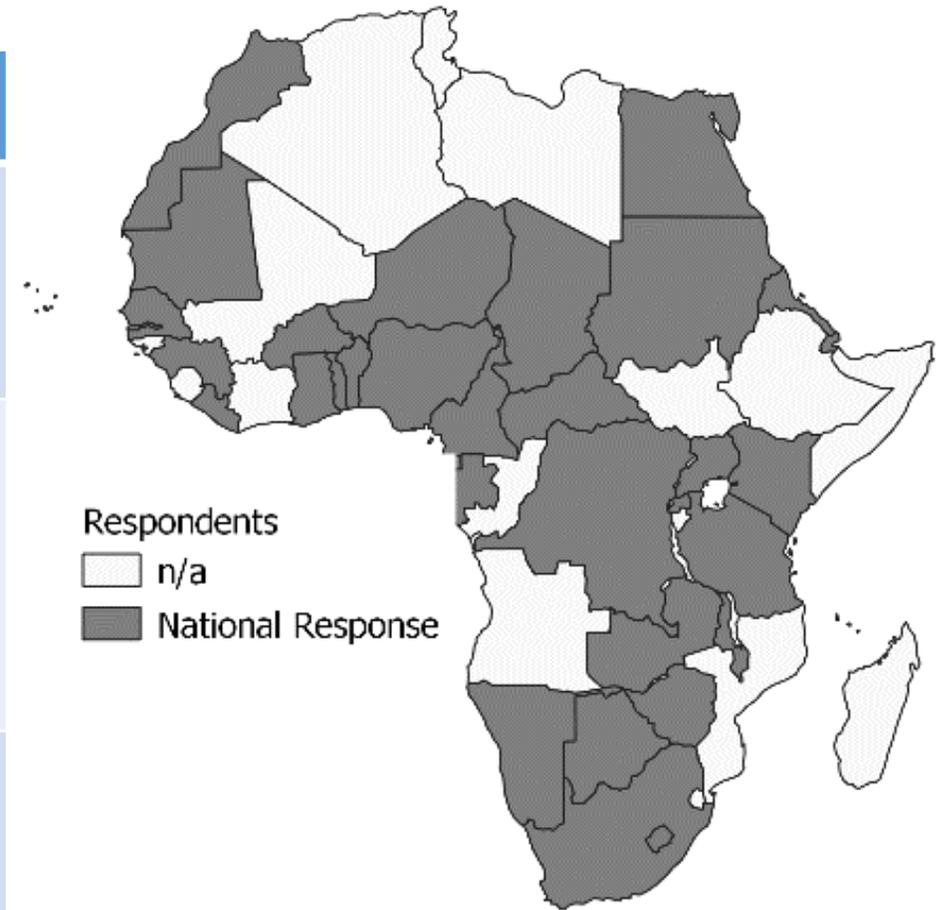
# DIGGING DEEPER

- Are there sufficient soil research and extension services?
- Do farmers have sufficient knowledge of sustainable soil management?
- Are more soil scientists needed per country and how many?
- What are they needed for and where?
- Are capable, experienced soil scientists easy to find?



# Global Soil Partnership (GSP) perspectives:

Question	Yes	No
1. Are there sufficient soil research and extension services?	5	29
2. Do farmers have sufficient capacity and knowledge of SSM and relevant practices?	0	34
3. Are more soil scientists needed in your country?	32	2 <sup>b</sup>



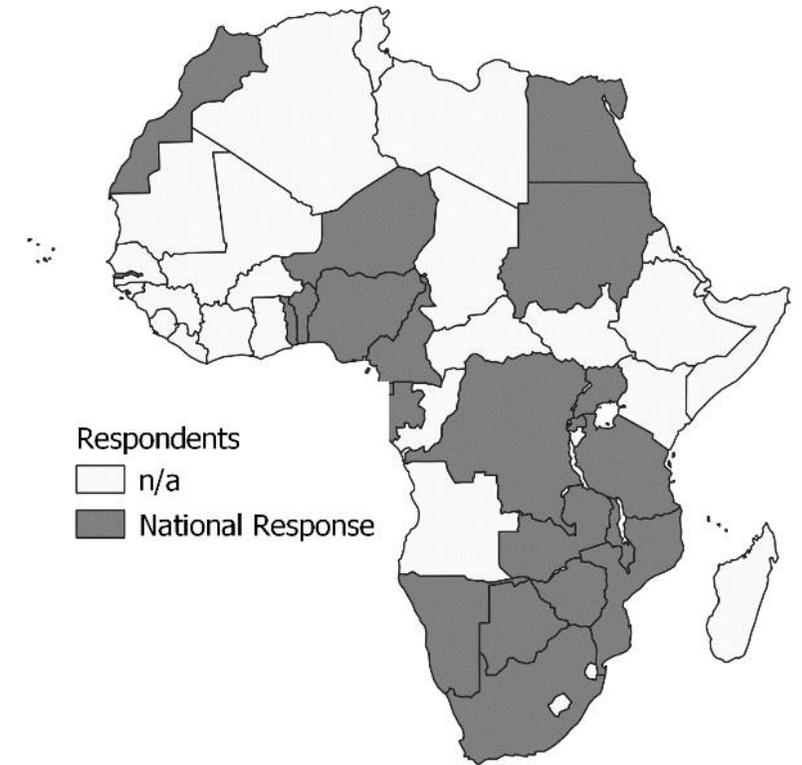
34 Responding countries

<sup>b</sup> Democratic Republic of Congo, Egypt

# GSP continued:

How many more soil scientists are needed?

Country	
Democratic Republic of Congo	None
Malawi	7
Botswana	9
Equatorial Guinea	35
Morocco	Annually: 60
Sudan	400 - 500
Uganda	Next 5 years: 731
Nigeria	Next 5 years: 1000
Rwanda	Difficult to estimate



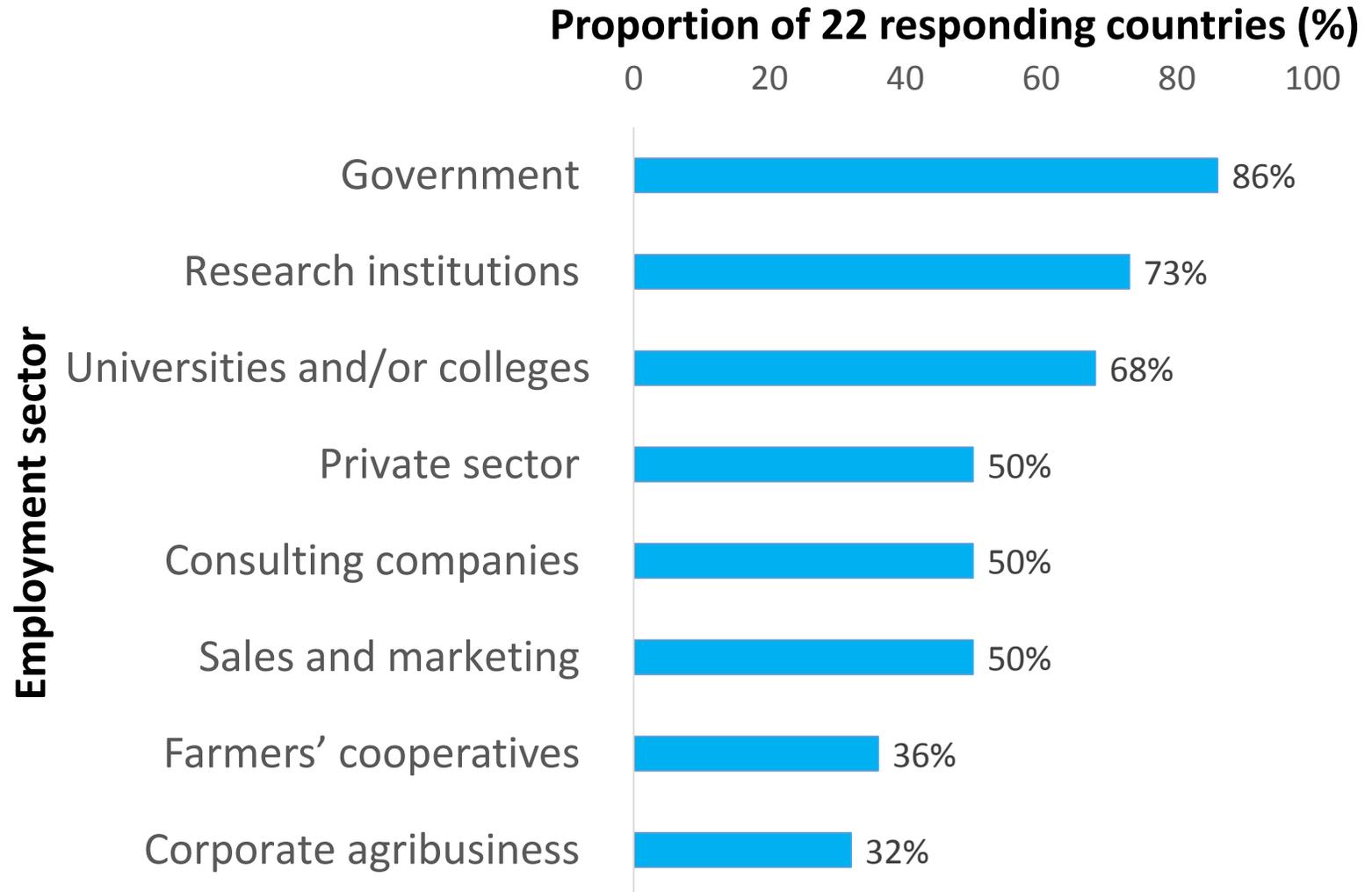
22 Responding countries

# More soil scientists:

## 1. What for?

- Soil survey and mapping
  - Specific training in GIS, digital soil mapping, geostatistics, etc.
- Research and advisory services
  - Link with extension and farmers, training and education
- Assessing soil health and fertilizer requirements
- Design research
- Etc.

## 2. Where:



# Are capable, experienced soil scientists easy to find?

- “Properly trained soil scientists are not many—and the younger generation does not really seem to be attracted to the profession. I envisage a shortage in the near future” (CIMMYT)
- “Capable and experienced soil scientists are very rare in Africa now because the lack of funding in soil related issues have reduced drastically the number of students in soil departments in many universities and high schools.” (IITA)
- “There is no shortage in general, expertise in certain areas of soil science (e.g., soil biology, digital soil mapping) is a bit more difficult to find.” (CIAT)
- “Very rare and many are too academic” (IFAD)

# RECOMMENDATIONS

1. Countries should embark on their **own assessment** of human capital in soil science and **formulate strategic measures to align human capital with development objectives** related to food security, agricultural development, and economic growth
2. We recommend **closer interaction between investors** in agricultural projects and **national soil experts** to maximise the benefits of locally available knowledge to **optimize appropriate land use and management for appropriate soils.**

# RECOMMENDATIONS

3. The continent has **many universities offering soil science** degrees. Countries without such services are served by **regional** and international training facilities. This **cooperation** should be **maintained and strengthened** as **current priority**.
4. There is a need for **investment in job creation** for soil scientists in agricultural consulting (both public and private) and research institutions require significant support to maintain infrastructure and outputs through an **uninterrupted flow of research projects addressing national development and food security priorities**.

# RECOMMENDATIONS

- 5. Employers** of soil scientists should **continuously invest** in their soil science employees by **broadening the range of skills** and equipping staff with modern tools and methods (such as digital soil mapping, earth observation, remote sensing, statistics, in-depth training in systems, etc).

# Acknowledgement

Thank you to all respondents to online surveys, email communication and skype conversations.



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