Potassium status in some soils: A case of Northern, Central and Eastern zones

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Background

- Low crop productivity in Tanzania (maize - 1.2 t/ha, rice 2 t/ha and beans 0.9t/ha Vs 6t/ha, 8t/ha and 1.5 – 3t/ha)

- Low soil fertility (N <0.2%, P < 7mg/kg, OM <2%)
- Nutrient depletion
- Erosion
- Leaching
- Mining - 30 kg/ha (Henao and Baanante, 2006)

Background

- Focus mainly on N & P
- K deficiency symptoms on some crops – beans, sisal (Bresser, 2014, ARI Mlingano, …)
- Limited information on soil K to guide targeting fertilizer recommendation

Objectives

- Establish K status of some major soils in the Eastern, Northern and central zones

- Identify areas needing interventions

Materials and methods

Study location

Northern zone – Kilimanjaro, Arusha and Manyara regions

Eastern zone – Coast, Dar es salaam, Tanga, Morogoro regions

Central zone – Dodoma, Singida regions

Materials and methods

Review of secondary data from

-Papers, Reports, data bases

-Focus – Soils

-under crop production

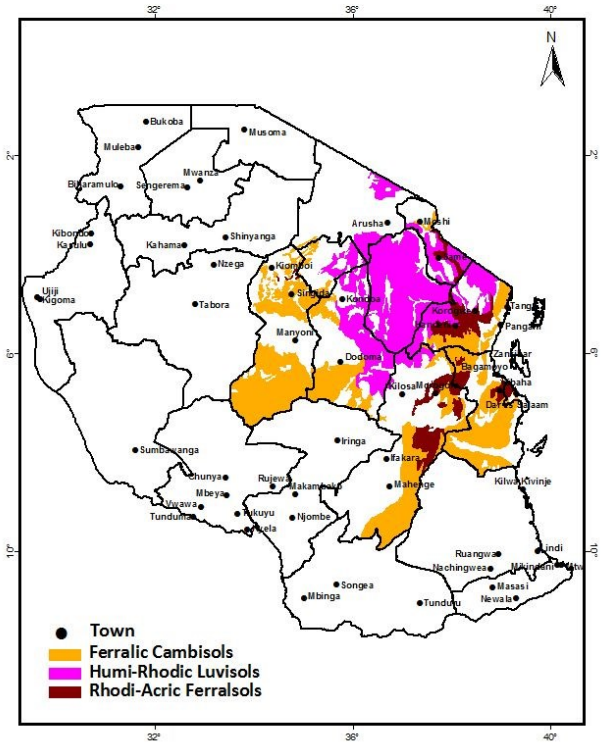
- Large coverage

-- 3 soils selected

-Ferralic Cambisols (35%)

-Chromic Luvisols (28%)

-Rhodic Feralsols (



Major soils in the Nothern, Central & Eastern zones

Materials and methods

- Exchangeable K of the topsoil (0- 20 cm) used

- Soil K levels categorized basing on criteria in Table 1.

Table 1. Guide for rating soil exchangeable K

me/100 g	Very low	Low	Medium	High
K (clayey soils)	<0.20	0.20-0.40	0.41-1.20	1.21-2.00
K (loamy soils)	<0.13	0.13-0.25	0.26-0.80	0.81-1.35
K (sandy soils)	<0.05	0.05-0.10	0.11-0.40	0.41-0.70

Source: NSS (1987)

Results

Amount of data varies between zones – extent of soil research

Eastern zone Vs Others

Data: 1974 – 2015

Few data for recent years

Results

Table 2. Distribution and K levels in Ferralic Cambisols

Zone	Region	Representative sites		K levels
Central	Singida	Singida, Iramba		(0.7) Medium
	Dodoma	Dodoma, Manyoni, Mpwapwa		
Eastern	Morogoro	Ulanga, Kilombero		(0.5) Medium
Eastern	Coast	Mkuranga, Rufiji, Kisarawe, Kibaha		(0.1) Very low
	Dar es Salaam	Temeke, Ilala		
	Tanga	Pangani, Mkinga		
	Morogoro	Morogoro rural		

Results

Table 3. Distribution and K levels in Chromic Luvisols

Zone	Region	Representative sites	(n)	K levels
Northern	Arusha	Simanjiro, Moduli, Kiteto		(1.86) High
	Manyara			
	Kilimanjaro	Mwanga, Same		
Central	Dodoma	Kondoa, Kongwa, Dodoma, Rufiji, Mpwapwa		(0.62) Medium
Eastern	Tanga	Handeni, Muheza		(0.87) Medium
	Morogoro	Kilosa		

Results

Potassium status in Luvisols on various physiographic units

EF	EM	EPa	HM
0.31 – 0.91	0.07 – 3.29	0.17 – 2.05	0.48 – 1.03
0.61	0.83	0.89	0.75
m	m	m	m
	(30% - l)	(16% - low)	

Key

Foot hills (EF), Mountain block foot slopes (EM)

Mountains (HM) Semi arid plains (EPa)

Results

Table 2. Distribution and K levels in Rhodic Ferralsols

Zone	Region	Representative sites	(n)	K levels
Eastern	Morogoro	Morogoro rural, Mvomero		(0.64) Medium
	Tanga	Mkinga, Pangani, Tanga, Muheza, Korogwe, Handeni		(0.09 - Low – Medium
	Coast	Kibaha, Bagamoyo, Kisarawe		medium

Challenges

- Limited soil information in some parts of study area
- Limited recent information
- Some data lack coordinates of the sites

Conclusions

- Indication of:
  - high level of K in the Northern zone
  - Medium levels in the Central zone, some parts of Tanga and Morogoro regions (Kilombero, Kilindi)
  - Variable in the eastern zone
    - Low in the coast region, Muheza, Korowe, Pangani and Mkinga districts in Tanga region, Morogoro rural and Mvomero
- Variability due to physiographic position, Land use – need for soil analysis

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