2015 INTERNATIONAL MEETING OF AFCOME

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African Fertilizer and Agribusiness Partnership

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October 21-23, 2015

www.afap-partnership.org

Our Challenge Today:

- The United Nations Food and Agriculture Organization estimates that about **805 million** people of the 7.3 billion people in the world, **or one in nine suffers from chronic undernourishment;**
- Around **26 percent** of those are mainly in sub Saharan Africa

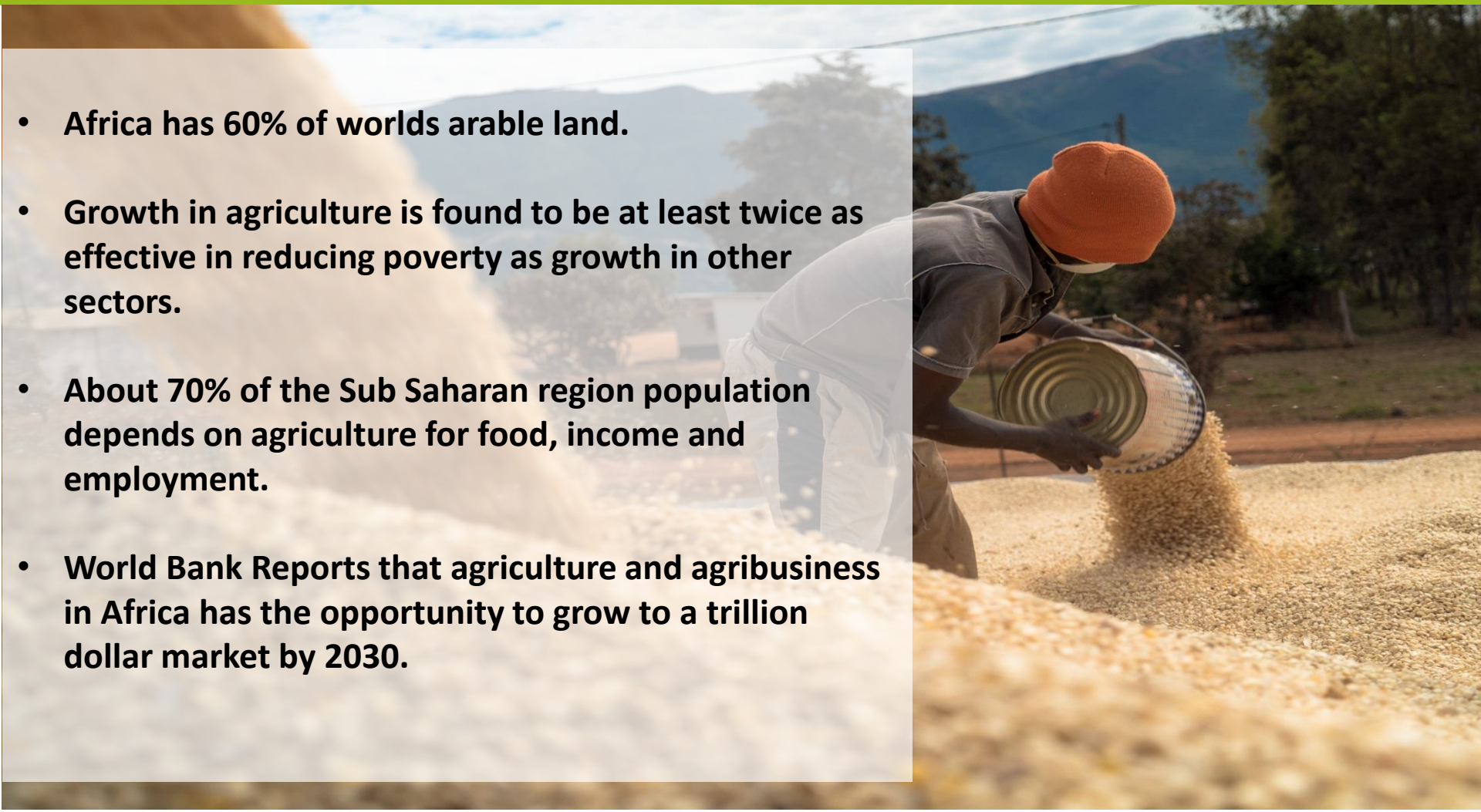
- Global population still on a rapid rise and set to hit 9.7 billion people by 2050
→ sub Saharan Africa's population would grow the fastest (+114%)

The Challenge

Feeding the world population of 9.7 billion people will require overall raising food production by some 70%

How can we sustainably secure food for the rapidly increasing population?

Agriculture and Food Security

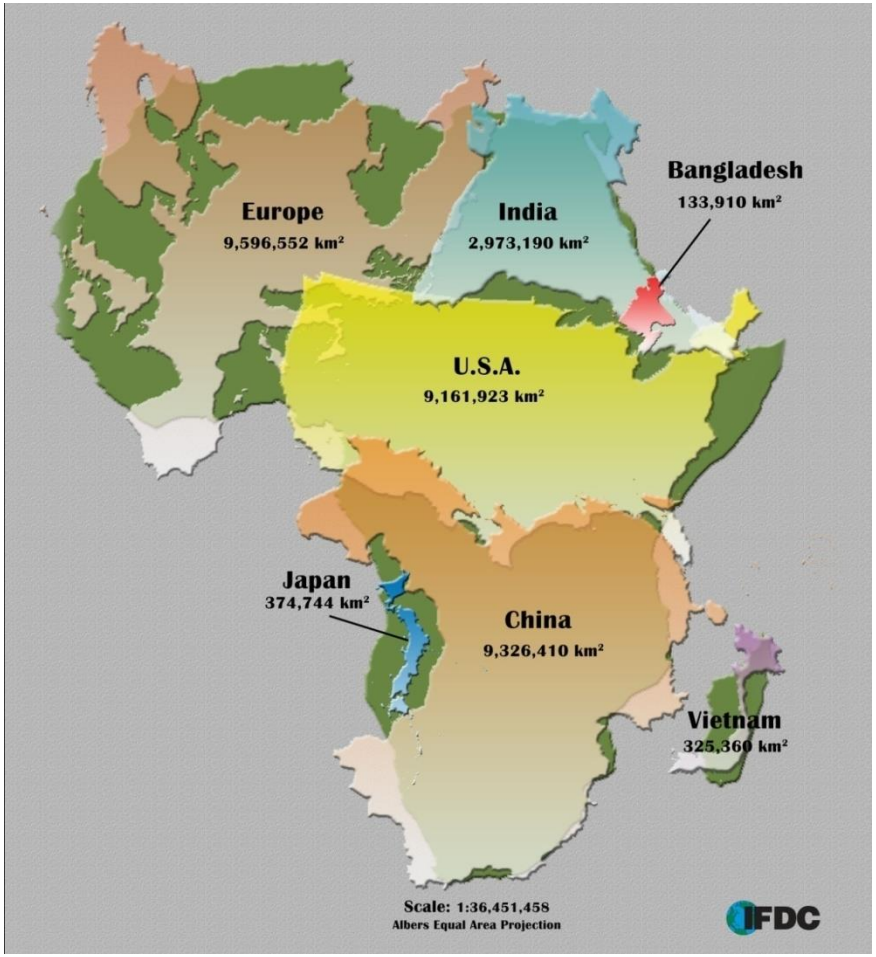


- Africa has 60% of worlds arable land.
- Growth in agriculture is found to be at least twice as effective in reducing poverty as growth in other sectors.
- About 70% of the Sub Saharan region population depends on agriculture for food, income and employment.
- World Bank Reports that agriculture and agribusiness in Africa has the opportunity to grow to a trillion dollar market by 2030.

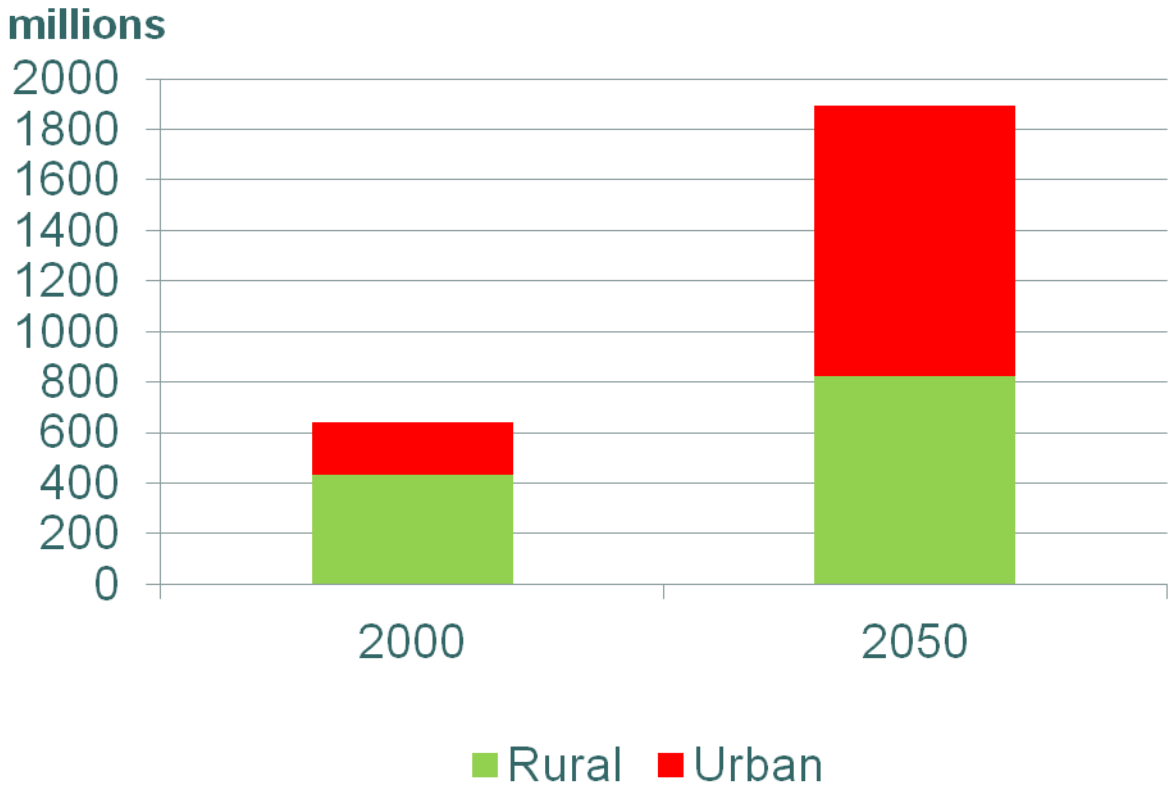
Challenges facing Agriculture

- With all this agricultural potential, the continent still spends on average $50 billion dollars, annually on food imports.
- Many countries still under-spend on agriculture- less than 1% on their agricultural GDP on Research and Development
- Climate Change- erratic weather patterns and conditions decreasing average yields.
- Smallholder farmers continue to have limited access to finance for improved inputs.

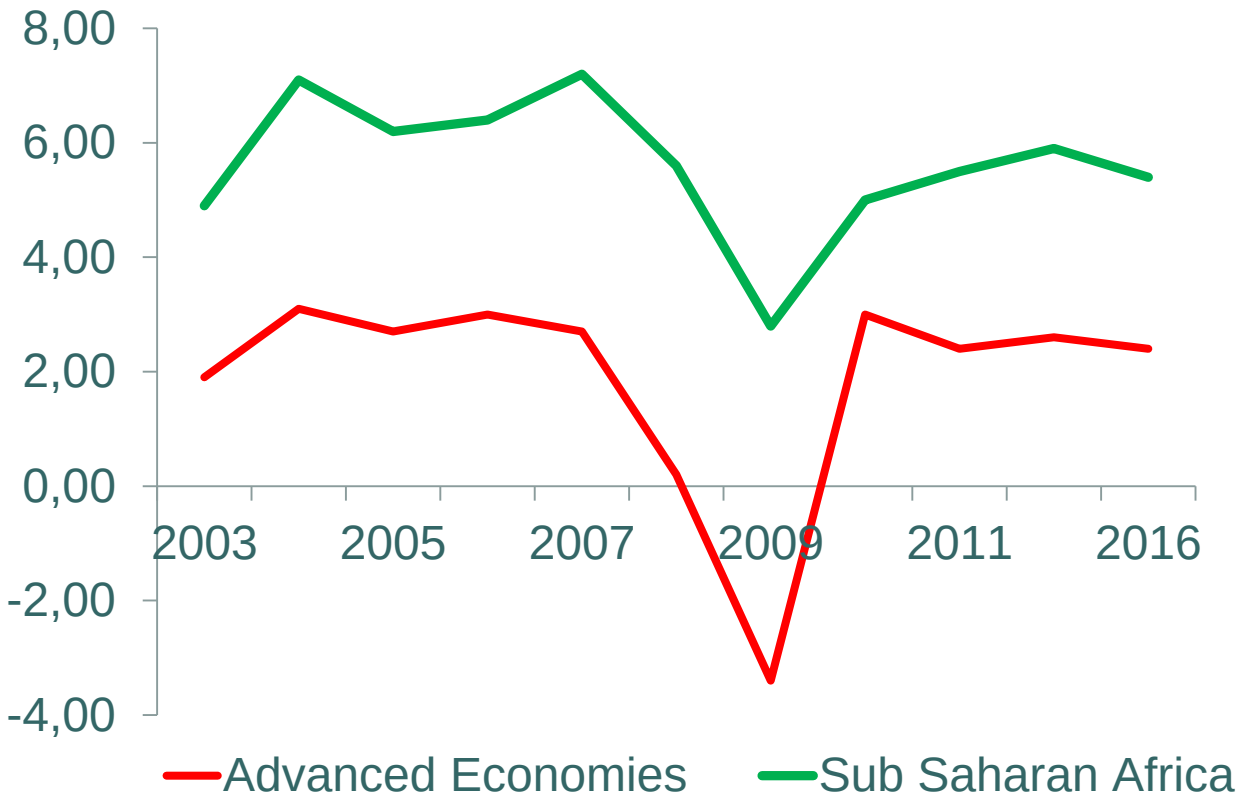
Geographic Size Comparison of Africa



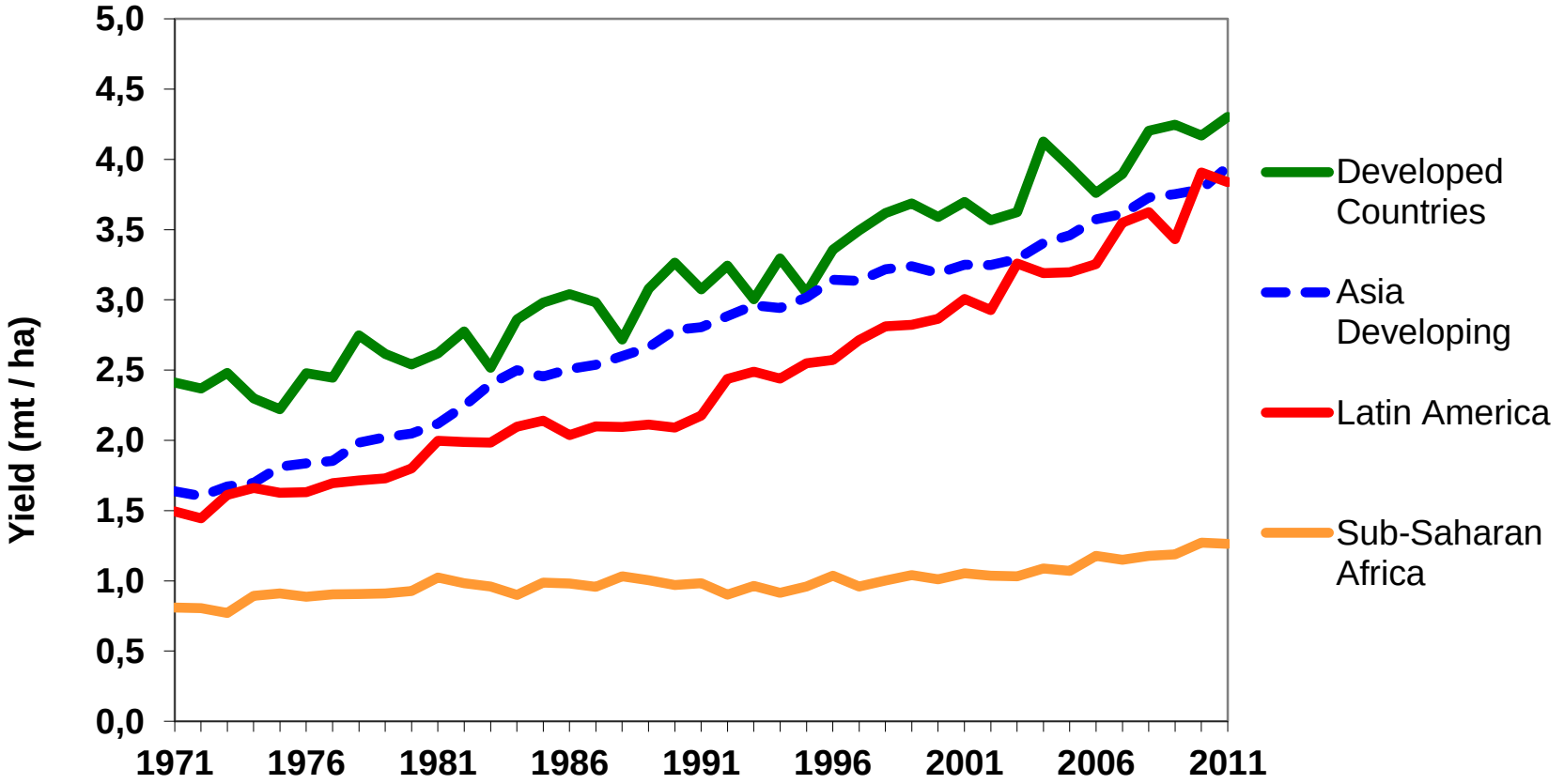
Population in Sub Saharan Africa – Rural Doubling, Urban Quintupling



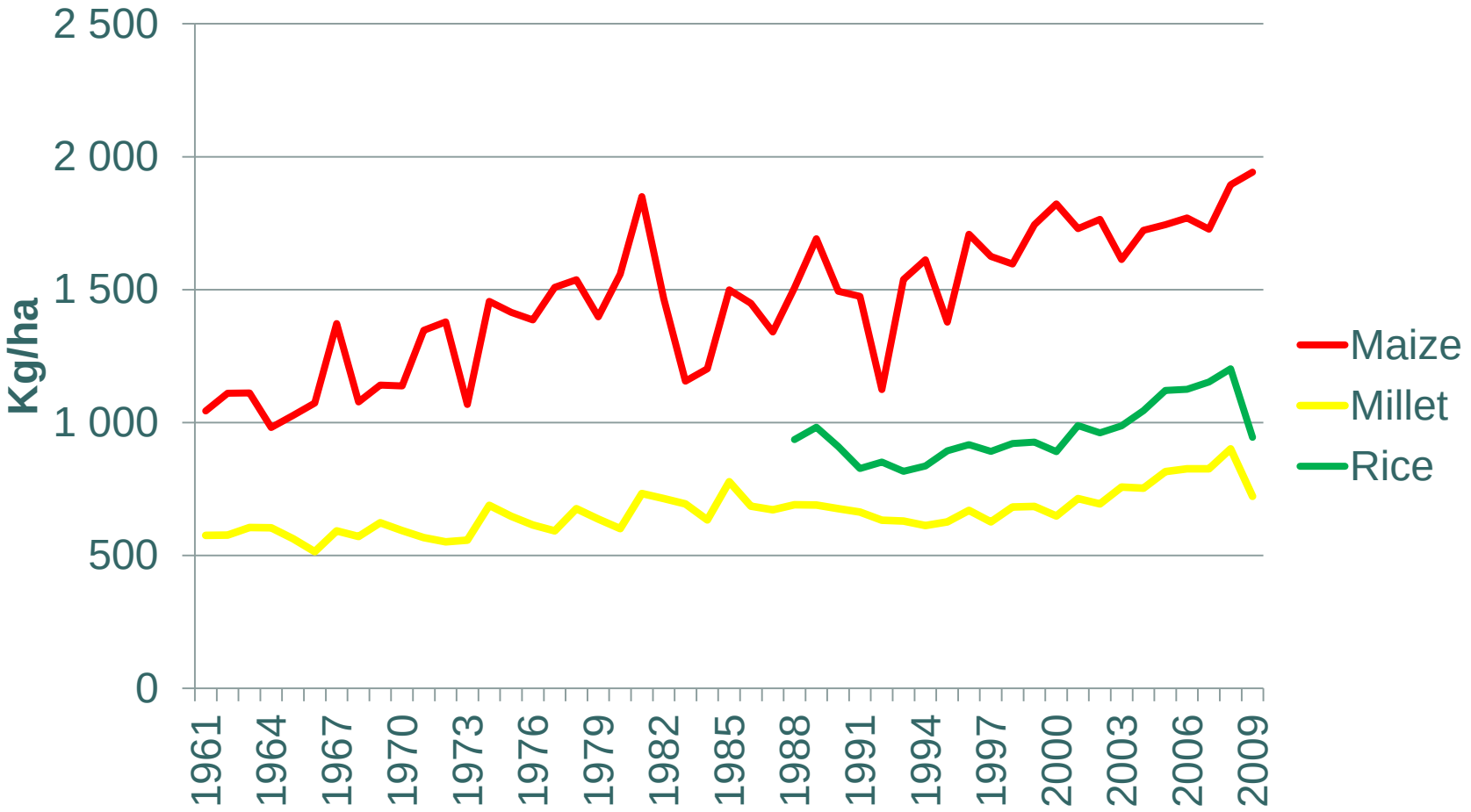
Real GDP Growth Rates - %



Comparison of Cereal Yields in Different Global Regions

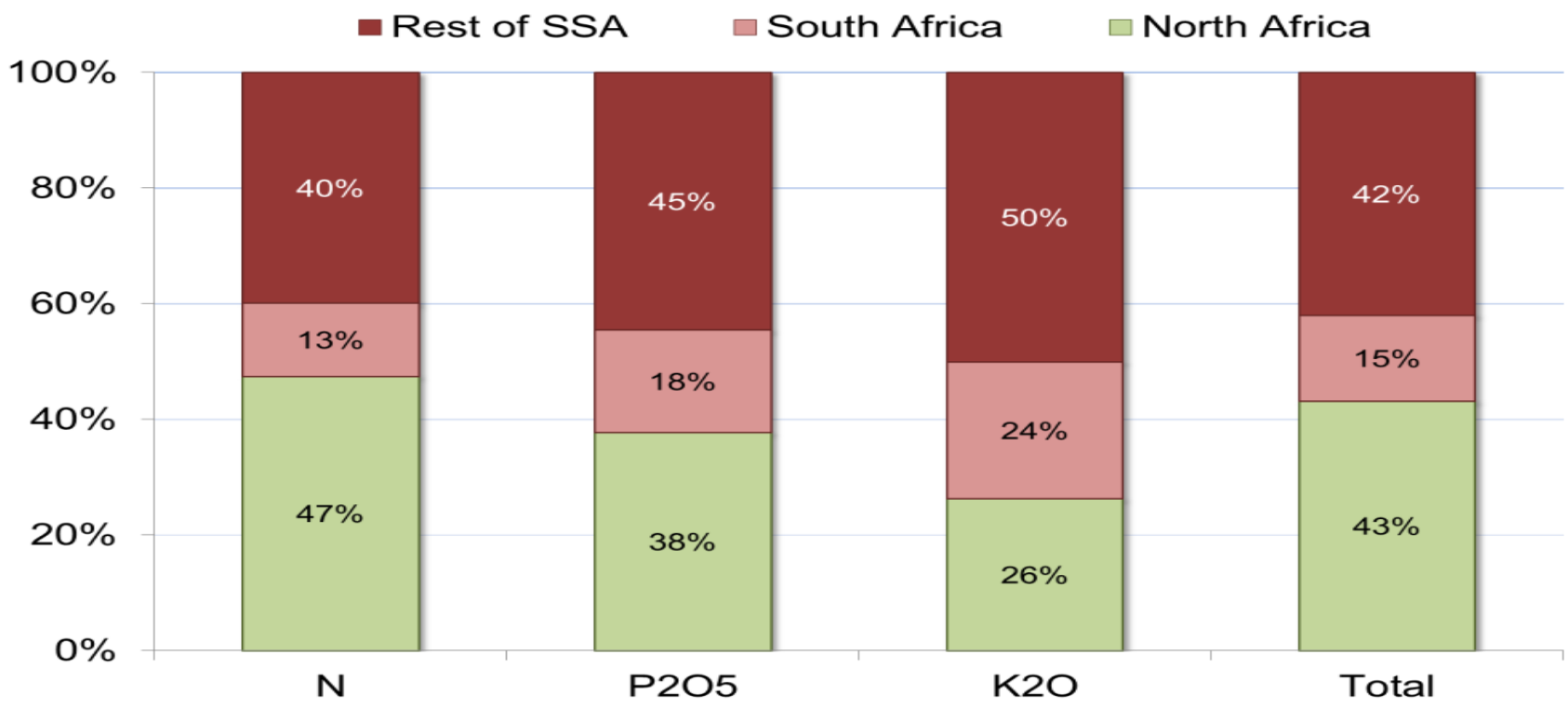


Yields of Selected Agricultural Commodities in Sub Saharan Africa

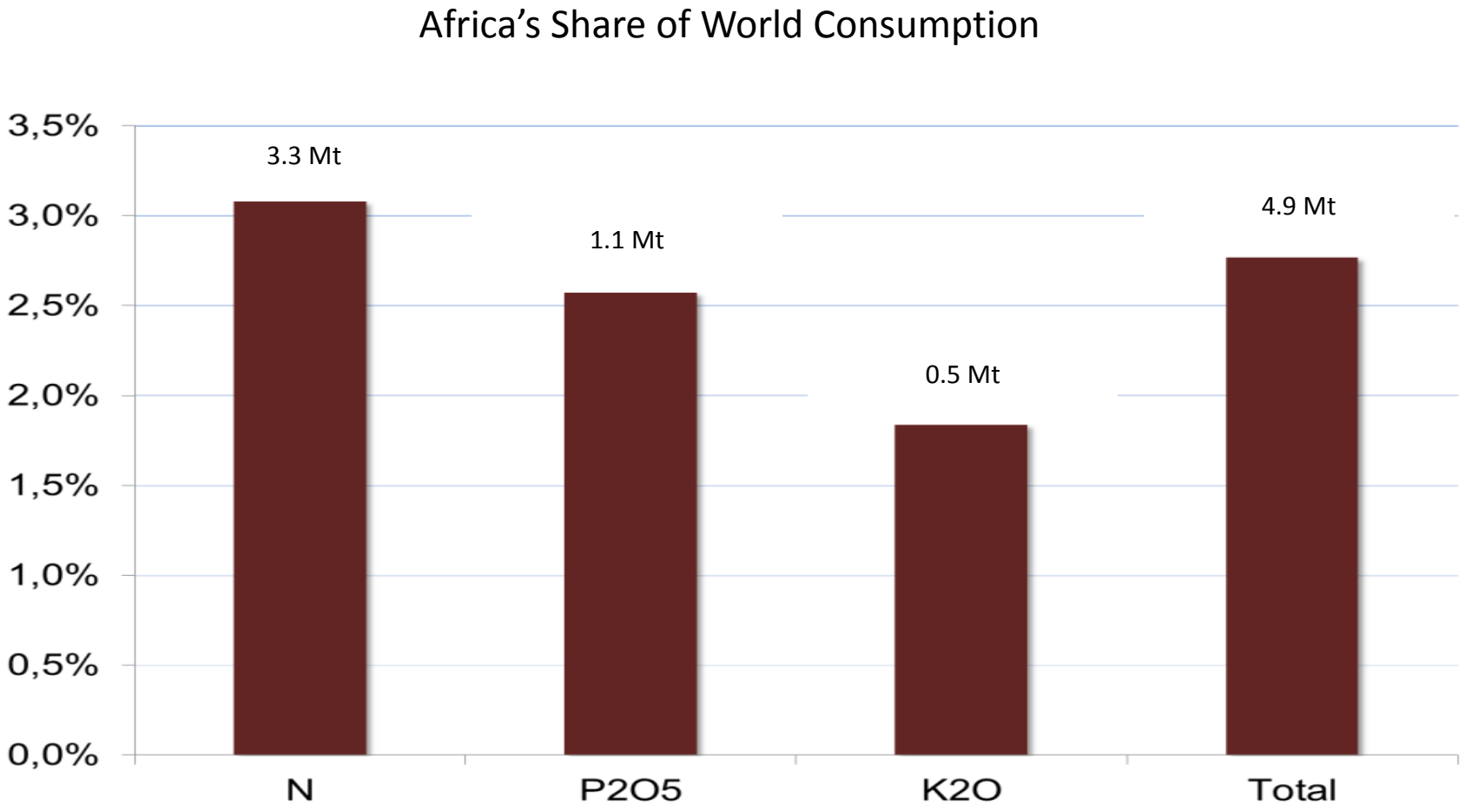


Fertilizer Consumption in Africa

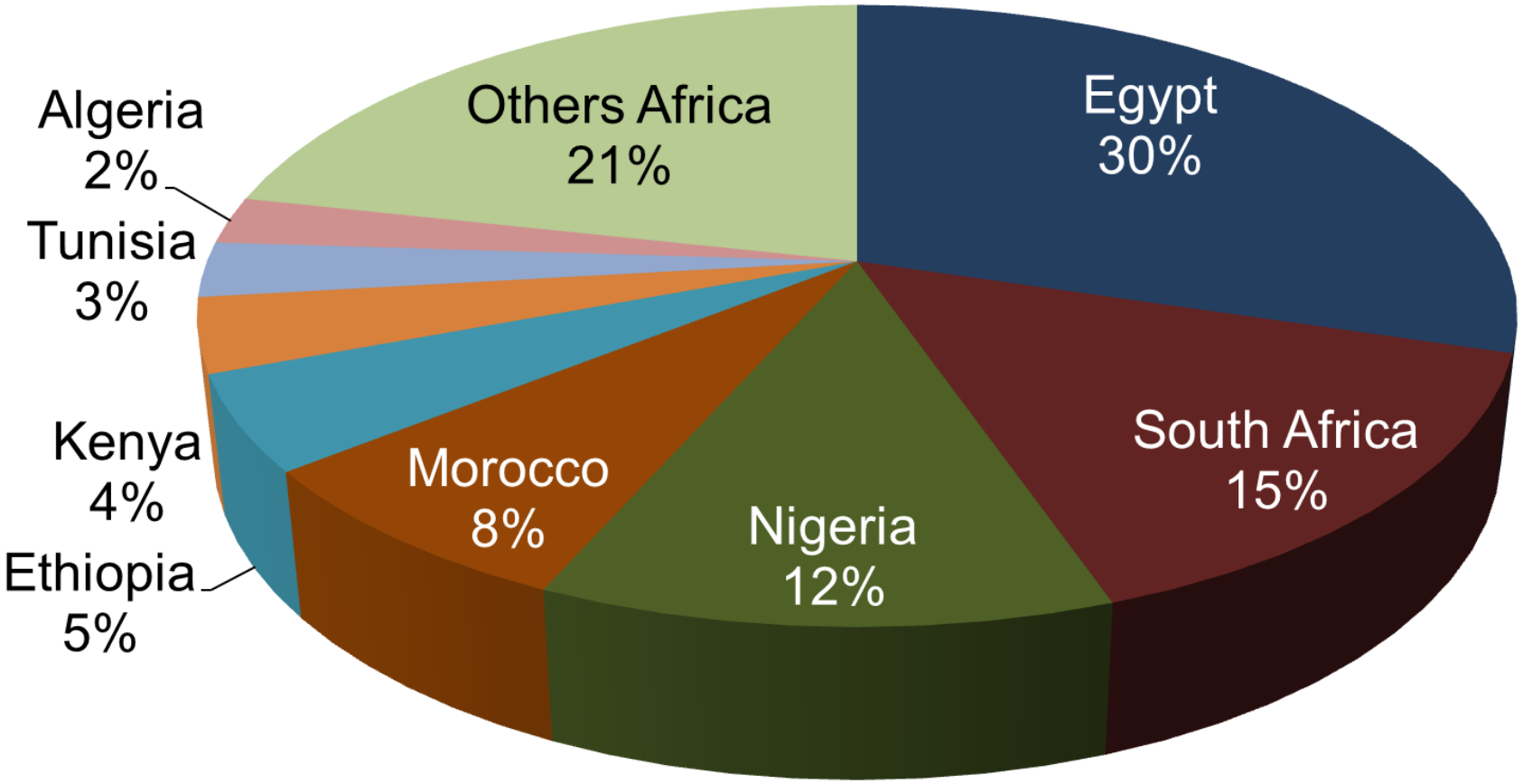
Contribution of the Sub-Regions
to African Consumption



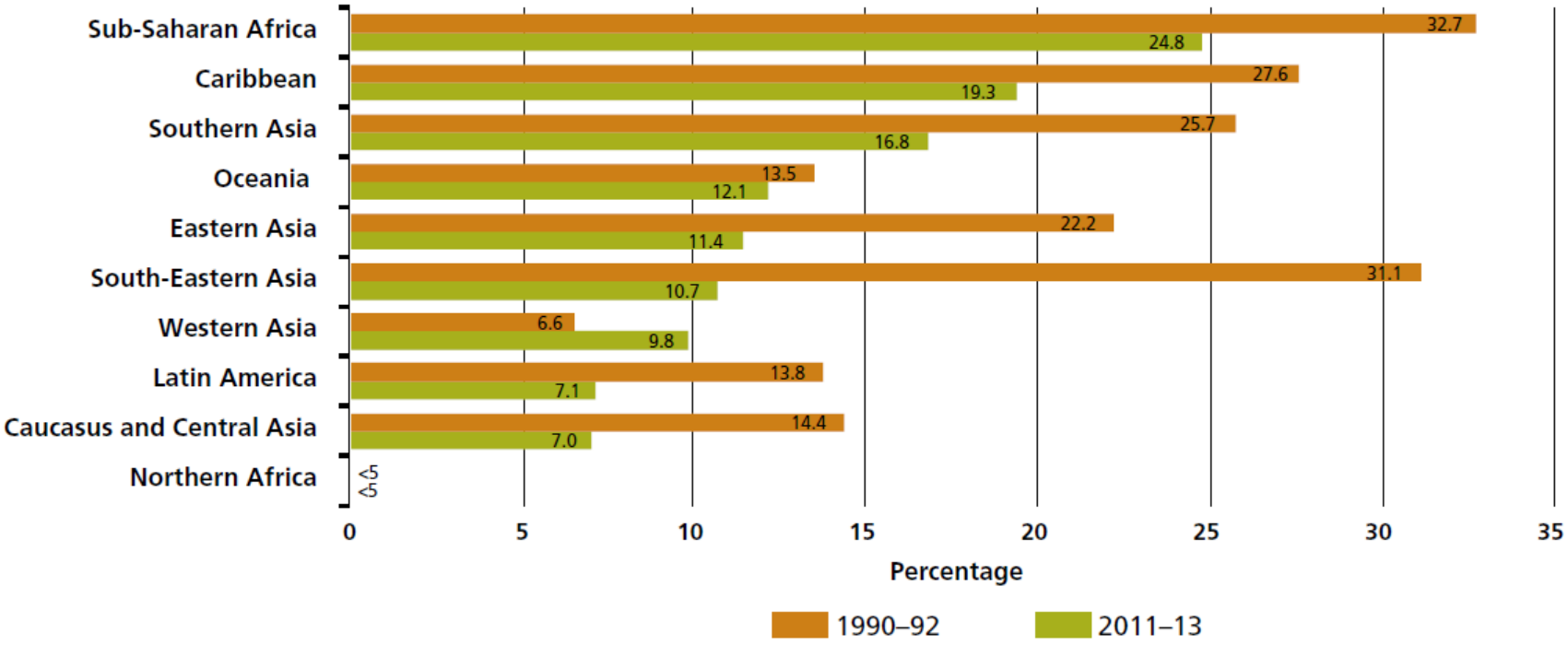
Fertilizer Consumption in Africa



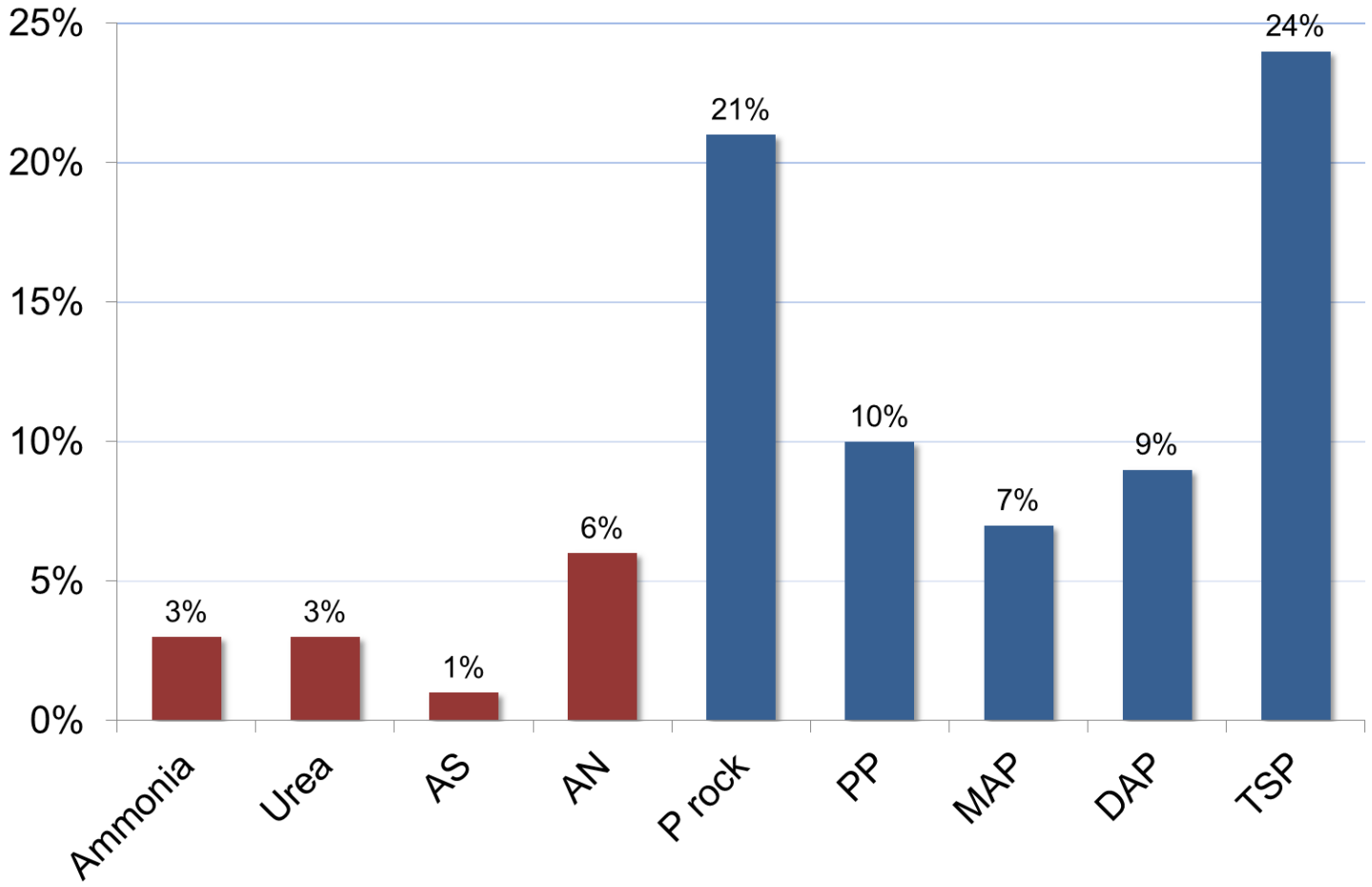
Main African Fertilizer-Consuming Countries



Undernourishment Trends by Region



Africa's Contribution to World Fertilizer Production in 2012



The AFAP Model

AFAP has two main goals for the countries in which it works

- **Substantially Increase the number of fertilizer users and usage in the countries it operates**
- **At least double total fertilizer use to reach, and exceed Abuja Declaration on Fertilizer for a Green Revolution Goal.**

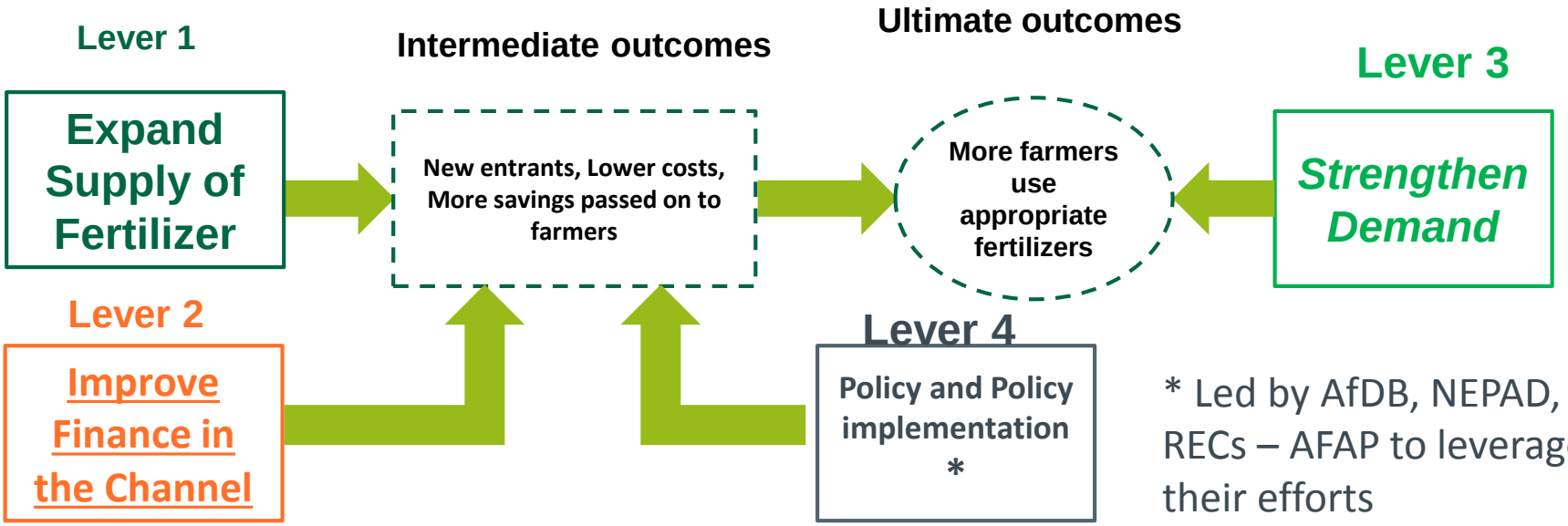
Why Fertilizer

- Fertilizer use is responsible for 40 to 60 percent of global food supply
- Fertilizer remains the “king pin” in enhancing food production
- Proper use of fertilizers on soils of low natural fertility makes it possible to grow a wider variety of crops
- The most important constraints to crop growth are those caused by inefficient and imbalance use of plant nutrients in form of fertilizers

Conditions for Change & Key Levers

To increase affordability & access and stimulate markets, AFAP address the following:

Production	Importation	Processing	Distribution	Agrodealer	Smallholder Farmer	Output Market
• Increased focus from major fertilizer producers to develop SSA market	• Importer credit • Holding warehouses to improve timely availability • Improved port infrastructure and efficiency • Liberalized fertilizer trade	• More local blending & granulation	More financing for inventory and storage	• More financing for inventory and storage • Timely availability closer to farmers	• *Education on fertilizer use best practices* • *Output market access to increase farmer profitability* • Improved subsidy schemes	• *Market development* • *Value added processing* • *Storage*



* Led by AfDB, NEPAD, RECs – AFAP to leverage their efforts

Fertilizer Developments in SSA

2006

In 2006 African Leaders adopted the Abuja Declaration on Fertilizer which called for increasing average fertilizer use in SSA from less than 10kg/ha to at least 50kg/ha by 2015

2014

Malabo Declaration: African leaders renew their commitment to increasing fertilizers users and usage in the continent

Estimated average fertilizer application rate in SSA (without South Africa) (Source: IFA, FAO)

Currently

Average fertilizer application rates in SSA (not including South Africa) have been increasing rapidly in recent years, from **6-7 kg/ha** in 2008 to **11kg/ha in 2014** with expectations to **reach 12kg/ha in 2015**

International Fertilizer Industry Association

Leading fertilizer markets in SSA

AFAP & IFA Engagement

- AFAP and IFA signed an MoU in 2014 in efforts to improve Africa's agricultural development and bridge the continent's productivity gap, during the IFA Strategic Forum held in Marrakesh, Morocco.

- Both organizations continue to collaborate on a number of joint activities to engage and support private and public sector initiatives to identify, enable and deliver improvements in the fertilizer value chain that will strengthen availability and the value-cost ratio of fertilizer for farmers

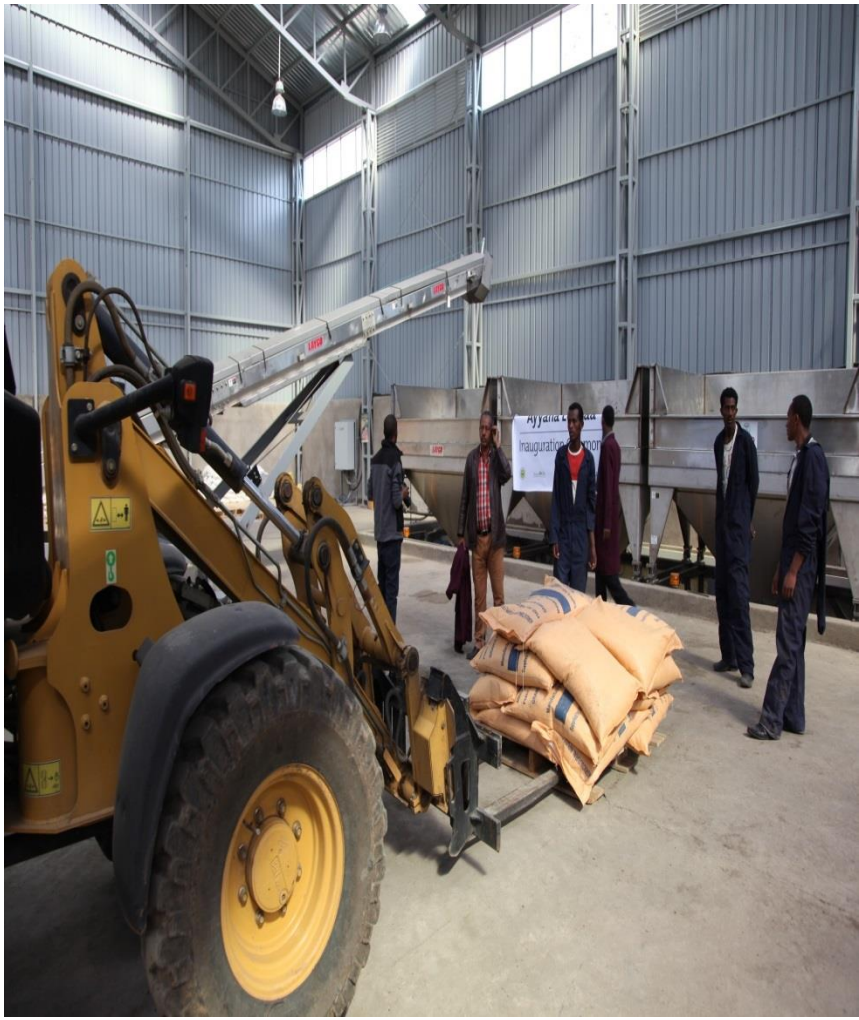
- Prior to this, the organizations had partnered on 2014 on the Smallholder's Access to Fertilizers campaign, a call to African leaders to unlock fertilizer markets

- AFAP and IFA also partnered to launch the African Fertilizer Volunteers' Program, an initiative aimed at mobilizing global expertise in support of increasing smallholder fertilizer users and usage.

Case Study: Ethiopia

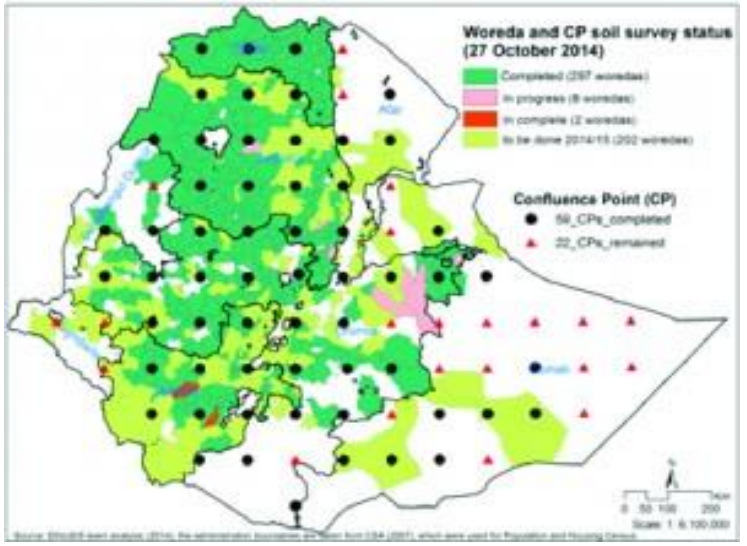
Establishment of Five Fertilizer Blending Facilities in Ethiopia - Brief History

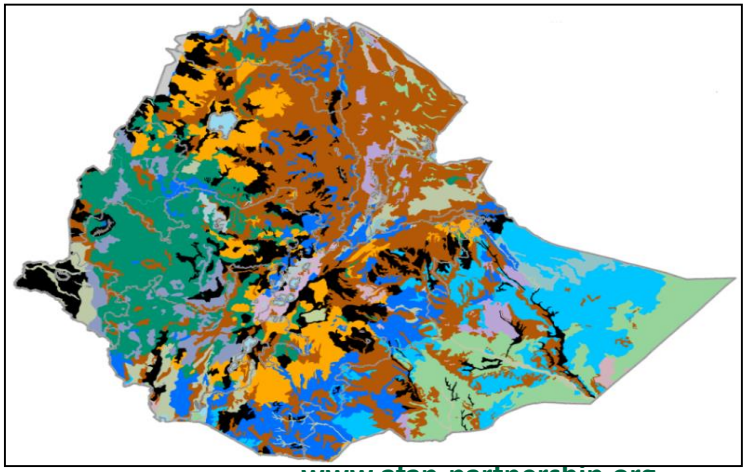
- Ethiopian Soil Information System (EthioSIS) established in 2011
- To Address:
  - Low crop productivity
  - Land degradation
  - Complete removal of crop residue from fields
  - Imbalanced inorganic fertilizer use
  - Lack of comprehensive soil fertility information



Case Study: Ethiopia

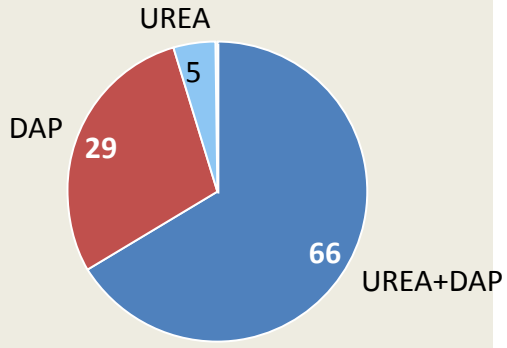
- As of September 2015, soil fertility mapping has been conducted in 375 woredas, using geo-statistical predictions to produce digital soil maps.
- Of these, fertilizer recommendations have been finalized for 316 woredas.
- Mapping was done by modeling the relevant variables in relation to the soil analysis results determined by wet-chemistry and spectral techniques and other environmental variables called “covariates”. Covariates can explain the landscape and other features of a woreda.
- Modeling helps to assess the soil nutrient status of individual woredas and therefore identify their deficiencies. Preliminary findings have led to the recommendation of 14 types of fertilizer (13 blended and 1 compound) to modify the fertility status of soil in 205 woredas



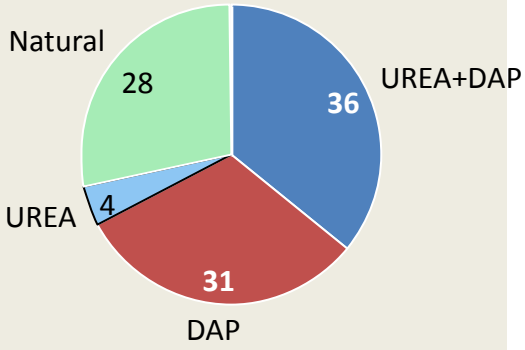


Historically, limited in-depth soil fertility information has constrained fertilizer policies/recommendations

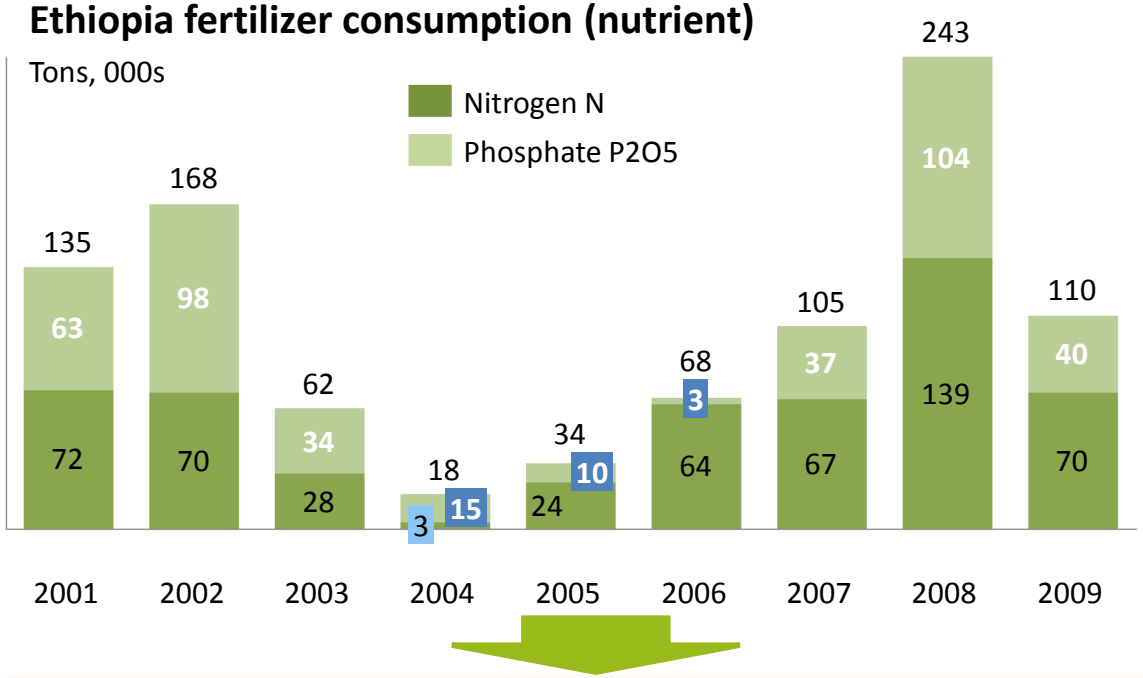
Fertilizer consumption by volume 2010, 100% = 5.2 million quintals



Fertilizer consumption by area 2010, 100% = 6.7 million hectares



Ethiopia fertilizer consumption (nutrient)

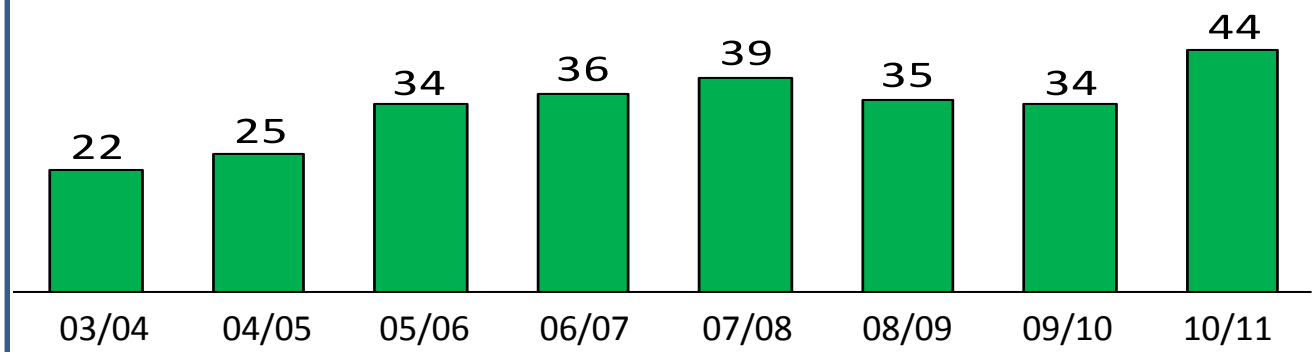


- **Ethiopian farmers need to significantly increase N utilization and a greater variety of nutrients** to enable high yields
- **Policymakers needed more information on soil nutrient status to make better-informed decisions on fertilizer policies and procurement**

SOURCE: CSA Agricultural Sample Survey 2010/2011 (2003 E.C.); Africa Fertilizer; FAO

Fertilizer use in Ethiopia increased in 10 year period, but yields did not increase commensurately

Total fertilizer applied for cereal crop
0000' tones from 2003/04-2010/11

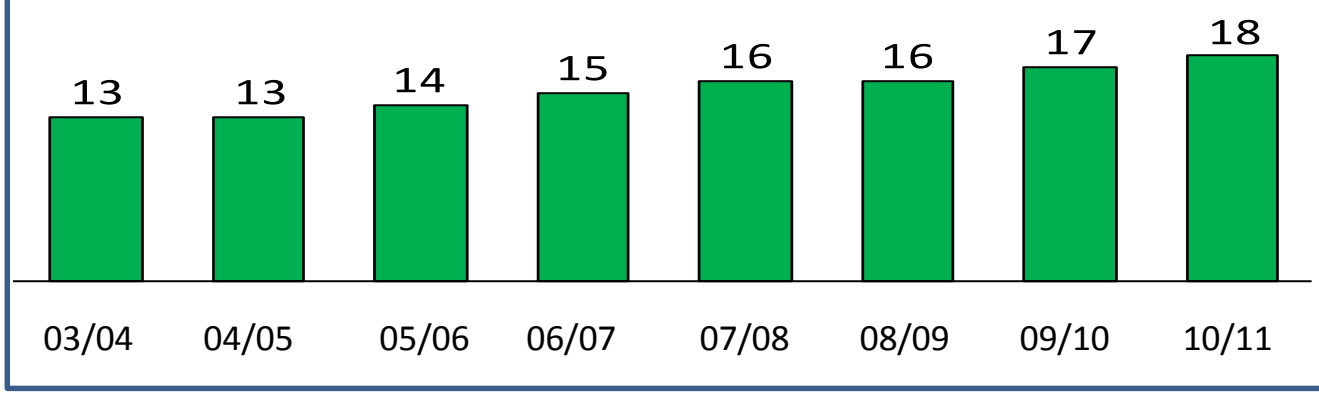


Annual Growth Rate (CAGR)

2003/04-10/11

≈ 10%

Total cereal yield
Qt/ht from 2003/04-2010/11



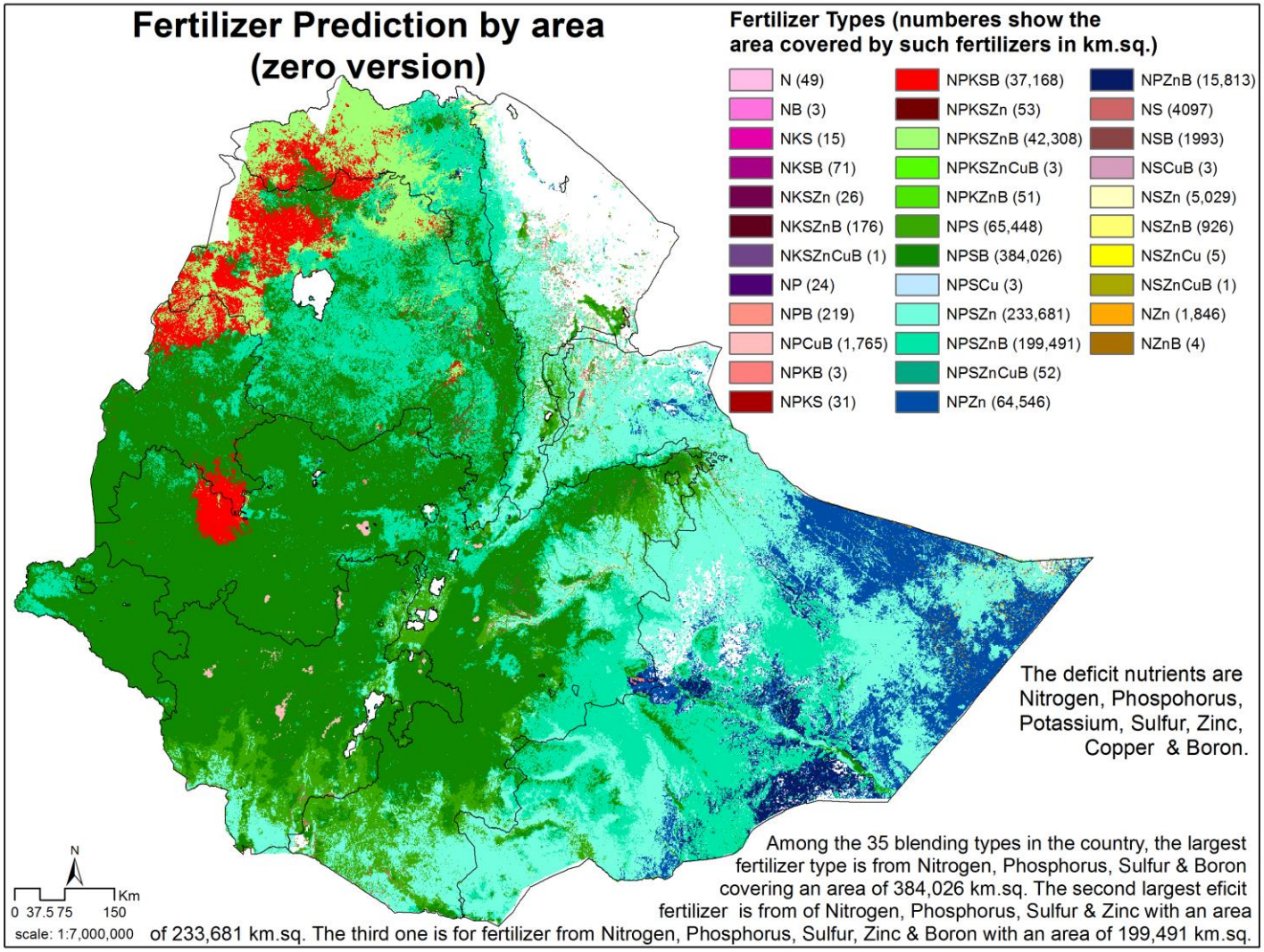
Annual Growth Rate (CAGR)

2003/04-10/11

≈ 5%

Source: CSA; Agricultural Sample Survey 2003/04-11,

Country-wide results indicate Ethiopian soils are deficient in N, P, S, B, Zn, K, Cu



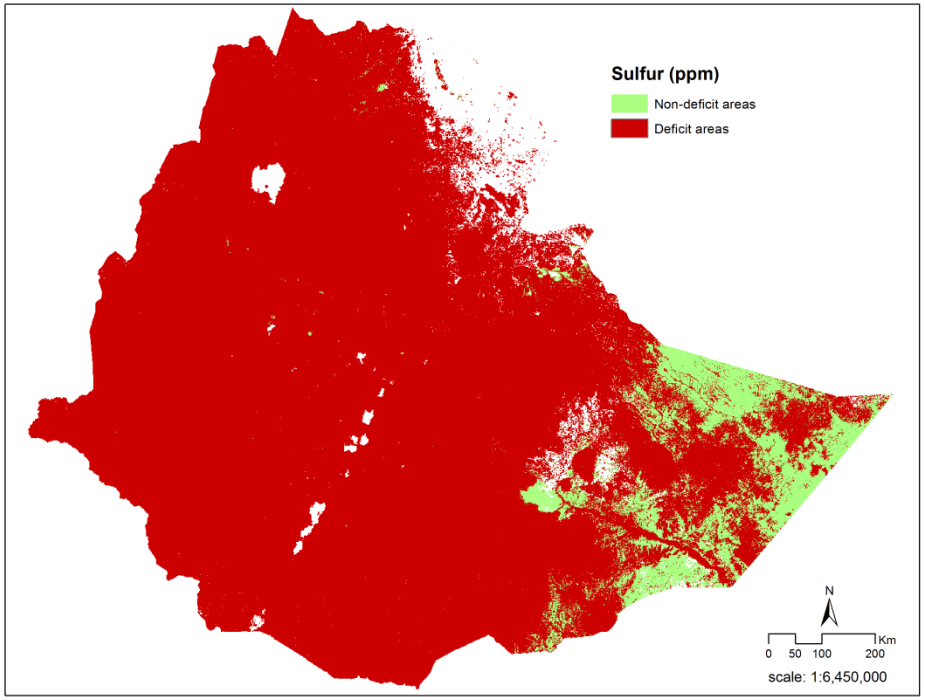
Nutrient deficiencies

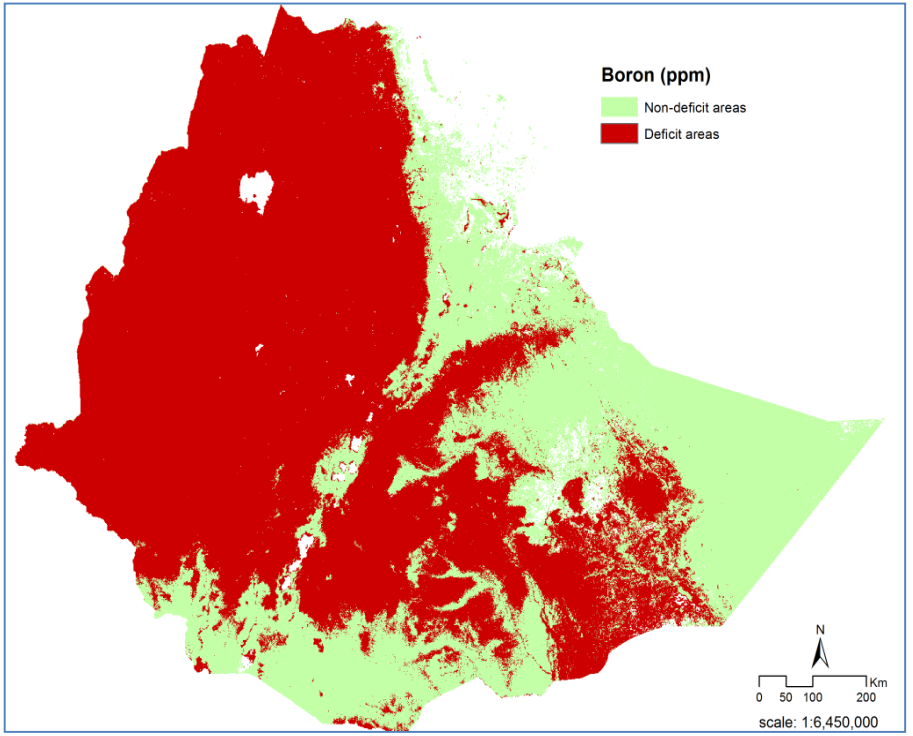
(% of deficient area in Ethiopia)

N	86%
P	99%
K	7.5%
S	92%
Zn	53%
B	65%
Cu	0.2%

Sulfur and Boron are the Most Deficient Soil Nutrients in Ethiopia

92 % of the country is Sulfur deficit area

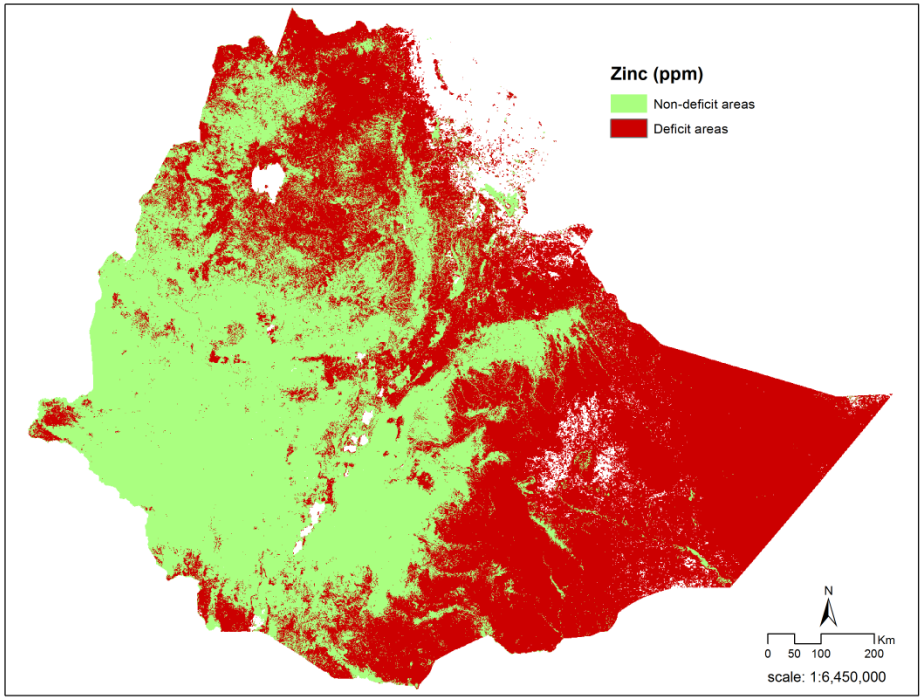


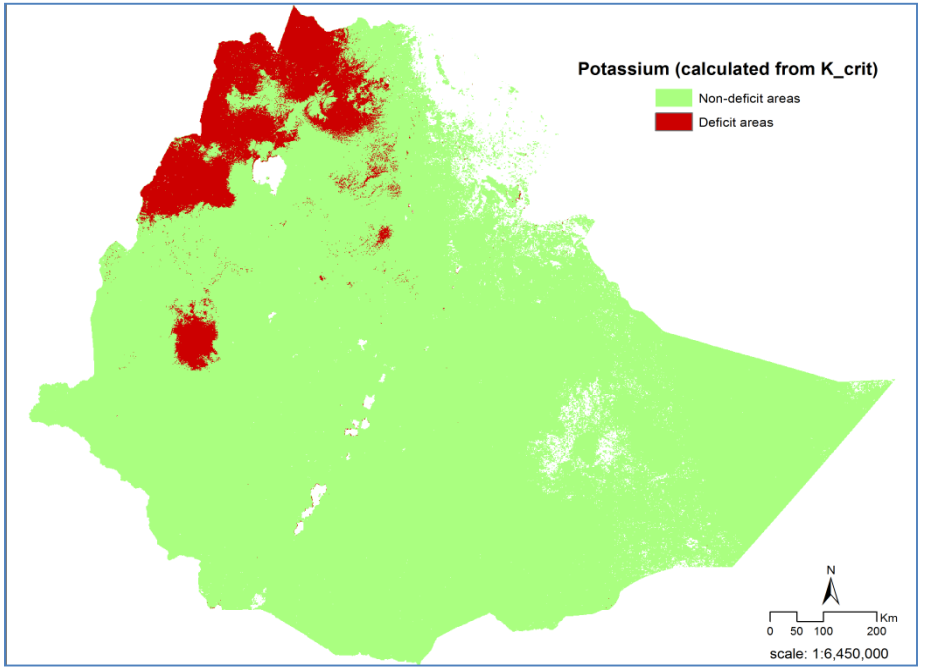


65 % of the country is Boron deficit area

Zinc and Potassium Deficiencies in Ethiopia

53 % of the country is Zinc deficit area





7.5 % of the country is Potassium deficit area

More than 30,000 Demonstration Plots Established in 2013 & 2014 to Compare Results of Blended Fertilizers with DAP applications

Region	Woreda / FTC	Farmers				FTCs			
		Crop				Crop			
		Wheat	Teff	Maize	Barley	Wheat	Teff	Maize	Barley
Tigray	**17**/170	3,235	3,370	2,101	948	240	250	190	70
Amhara	**91**/750	3,285	3,415	2,475	1,280	222	225	225	65
Oromiya	**101**/737	1,965	2,390	1,349	849	115	115	120	40
SNNPR	**45**/390	1,015	905	762	485	50	50	50	20
TOTAL	**253/2047**	**9,500**	**10,080**	**6,687**	**3,562**	**627**	**640**	**585**	**195**

It was estimated that at an average of 100 farmers visited each site, thereby awareness created to more than 3 million farmers across the four regions.

Source: Team analysis

Additions of Potassium and Sulfur to DAP + Urea showed positive results in most samples across different regions and crops

Location	Crop	Number of farm samples	Percent increase Min	Max	Average increase in yield
Debre Birhan	• Barley	• 30	0	73	14%
	• Wheat	• 21	45	100	20%
Gimbichu	• Wheat	• 14	0	100	25%
		• 14	0	57	19%
Adaa	• Teff	• 5	0	33	21%
		• 5	13	62	38%

Visual Results of the Multi-nutrient Blended Fertilizers to DAP

Blended fertilizer demonstration

- **Location:** Amhara , Region , Dangilla woreda, farmers' field
- **Crop:** Maize (BH-660 variety)
- **Fertilizer:** Blended fertilizer vs. DAP+Urea
- **Planting:** Both plot planted at the same day

Maize on plot with blend grew faster than the one with DAP + Urea, planted at the same day

Source: Team analysis

Two key approaches were considered for Fertilizer Use Changes in Ethiopia

APPROACHES FOR DIVERSIFYING FERTILIZER USAGE

1 Locally blended fertilizers

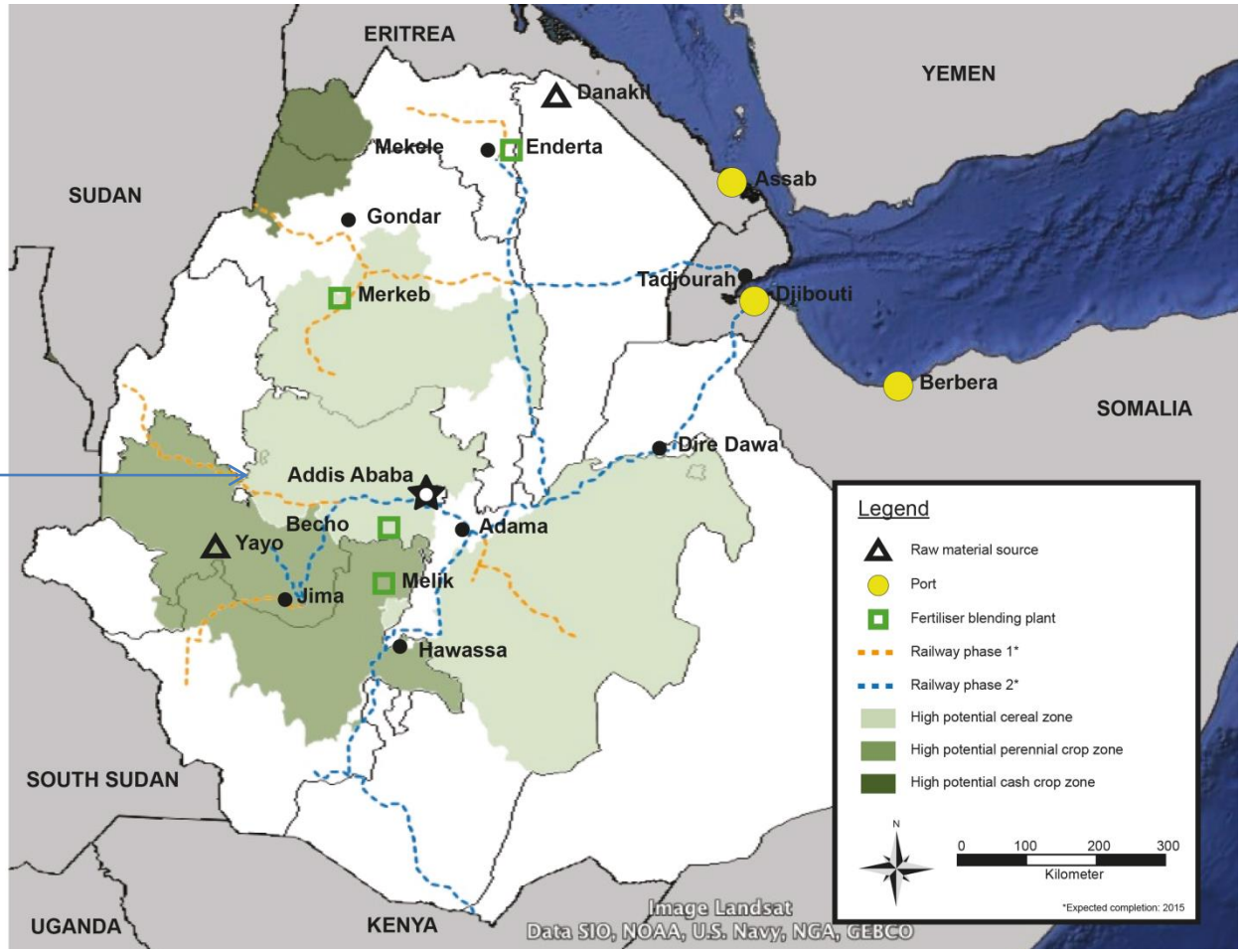
What is it?	Blends are mixes of fertilizers at appropriate ratios to supply multiple nutrients for a crop
Coverage	Available on the **four regions** where plants will be built
Advantages	• **Flexibility** to define formulas • Develops **local industry**
Risks	• Limited production **capacity** • Plant **construction** delays

2 Straight application of compounds

What is it?	Application of compound fertilizers directly imported from the international market
Coverage	Imported compounds can be made available **nationwide**
Advantages	• **Readily available for import** • **Similarity to Urea/DAP** • **Less cost**
Risks	• **Not optimized** for real needs

Five Fertilizer Blending Facilities Locations at Cooperative Unions within Four Major Agricultural Regions

Nekemte
Location here



Requirement for high capacity fertilizer blending equipment

- Produce for the demand requirement for each geographic location
  - 15,000 to 50,000 mt
- Address the short period of production between receipt of ingredients and delivery of blended products to local (primary) cooperatives
- Production window to meet peak planting period is very small: 3 months

5 Blending Units were tendered and procured in 2013 – 2014

- All blending units are horizontal declining weight machines with single line bagging units
- Blending capacity of each unit: 90 to 110 metric tons per hour
- Bagging capacity: 45 to 50 mt per hour
- Actual output based on other variables is approximately 30 mt per hour, but can be improved
- Limiting factor is capacity to open bagged ingredients to charge the blender

Sources of Blending & Bagging Equipment Installed in Ethiopia

- Yargus Manufacturing Inc. – USA
  - One blending and bagging unit funded by USAID
  - Location: Becho Woliso Farmers Cooperative Union
    - Tulo Bolo, Oromia Region
  - Commissioned June 2014

Sources of Blending & Bagging Equipment Installed in Ethiopia

- European Machine Trade (EMT) - Netherlands
  - 4 blending and bagging units funded by World Bank via the Ethiopian Agricultural Transformation Agency (ATA), Locations:
  - Enderta FCU, Mekele, Tigray Region
  - Merkeb FCU, Bahir Dar, Amhara Region
  - Melik FCU, Worabe, Southern Region
  - Gibe Dedesa FCU, Nekemte, Oromia Region
  - All 4 commissioned in 2015, May to July

Farmers Cooperative Union's Completed Concrete and Civil Works

Upper Building Structures and Blending Equipment Funded by World Bank

Primary Start-Up Problems with Blending Facilities

- **Delays in Establishment of Four Facilities Due to Procurement Issues within the ATA – Minstry of Agriculture**
  - **Procurement of building structures and blending equipment delayed by almost one year**
- **Farmers Unions Require Extensive Training to Understand How to Operate Facilities as Business**
  - **Unions typically have little commercial business experience**
  - **Contracting firm is currently on each site for management assistance**
- **Gross Profit Margins on Blends are Determined by Regional Agricultural Bureaus; not based on cost of operations**
  - **Aim of Ministry of Agriculture is to keep blended fertilizer prices comparable to DAP, though yield increases from blends are more than sufficient to offset additional cost/higher price**
  - **Price of various blended products is virtually the same, regardless of ingredient content**

Primary Start-Up Problems with Blending Facilities

- **Importation of Inferior Quality Ingredients, Specifically Boron, Has Caused Serious Problems with Blending Equipment and Quality of Blends**

Primary Start-Up Problems with Blending Facilities

- **Production Bottlenecks: bagging capacity is less than blender output; manual opening of bagged ingredients (500 mt of blend production requires handing & opening of 10,000 bags)**

Primary Start-Up Problems with Blending Facilities

- **Large Volume of Fertilizer Ingredient and Urea imports, coupled with logistical constraints, constricts peak blending and distribution period to approximately 4 months**
  - **2015 Importation of approximately 550,000 mt of ingredients and 400,000 mt of Urea**
  - **Some ingredients did not arrive on time for blending and distribution**

Activity items	Stakeholders / Organizations	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Fertilizer demand assessment	MoA,FCUs and RBoA												
Production planning for blends	FCUs, MoA												
Procurement of blending ingredients	MoA												
Procurement of DAP and Urea	MoA												
Import blends ingredients	AISE												
Import Urea	AISE												
Stocking and production of blends	FCUs												
Stocking of DAP and Urea	FCUs												
Marketing and Distribution of blends	FCUs through their PCs												
Distribution DAP and Urea	FCUs through their PCs												
Planting Season													
Main planting season													
Short rain planting season													

Ethiopia Blending Initiative: Other Issues and Future Considerations

- Capacity and Location of 5 Blending Facilities is Insufficient to Meet Overall Farmer Demand
  - MOA estimates the need of 18 blending facilities to meet estimated future demand of 750,000 mt (plus) of blended products
  - Example: No blending facility locations in the major wheat production area
  - Default position is to provide basic NP product with S, Z, and/or B (i.e., NPS)
- Need to Increase Ingredient and Finished Blend Product Storage at Blending Facility Sites
- Need to Consider Conversion to Bulk Handling Systems to Improve Handling Efficiency and Output
- Large Scale Commercial Farmers Need More Access to Blends and Expertise in the Production of Prescription Mixes
- More Private Investment Should be Considered for Operating Blending Facilities and for Import and Distribution of Ingredients
- Logistical Need for More Rail Transport of Fertilizer in the Future

Thank You.

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