



**77<sup>th</sup> IFA ANNUAL CONFERENCE**  
**Shanghai, China, 25–27 May 2009**

**Challenges and Opportunities on Empowering Small-Scale  
Farmers in Africa with Novel Soil Fertility Management  
Technologies**

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*(as provided by the author for distribution in Shanghai)*



## Challenges and opportunities on empowering small scale farmers in Africa with novel soil fertility management technologies

Andre Bationo

*Director Alliance for a Green Revolution in Africa, West Africa office, Accra, Ghana.*

### The Urgency of Now: Africa Must End Perennial Food Crisis

- Rising food prices pose economic, social and political instability challenges
- Low income food deficit countries are most affected
  - Food imports increased from \$88 billion (2006) to \$ 119 billion (2007)
- Poor net-buyers of food are hurt the most
- Africa is a net-food importing region
  - Cereal imports increased by \$ 2.7 billion from 2006-2007
- Governments need to assure national security
  - Amartya Sen's theory (ability to access is key) – does it hold?
  - “Food self-sufficiency” versus “food security”



## Introduction...

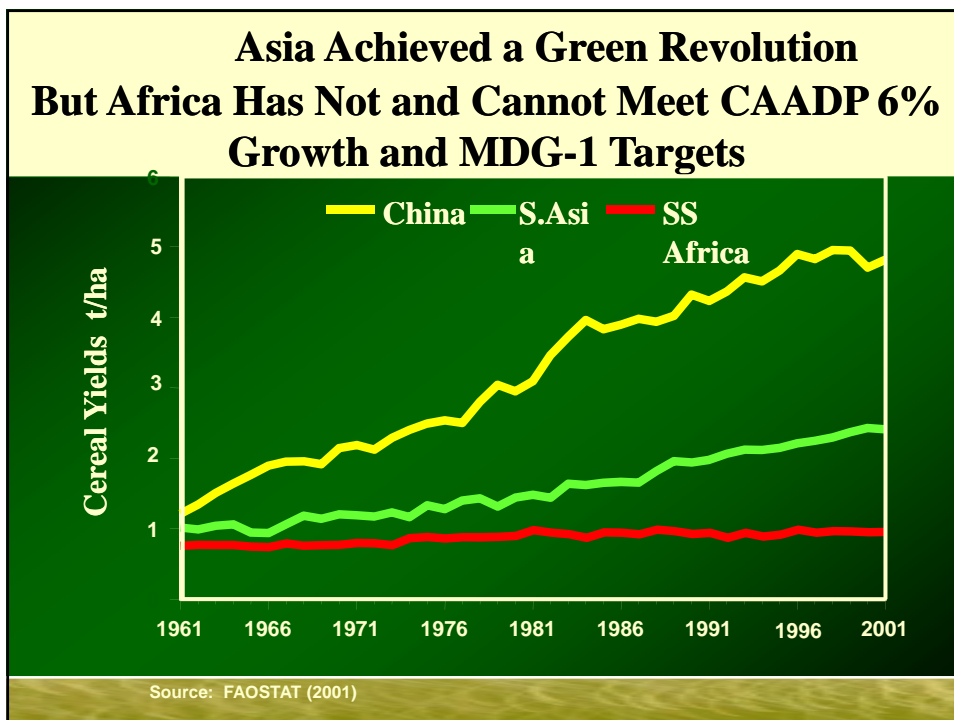
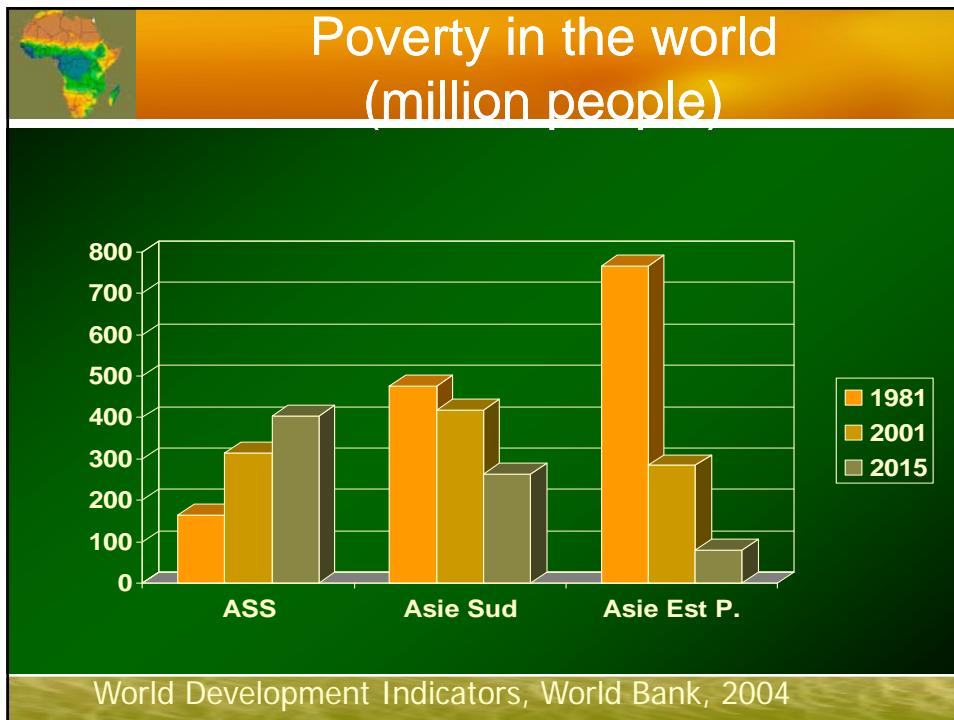
- Number of Africans living below the poverty line (<USD 1/day) has increased by 50% over the past 15 year
- 200 million people- over one third of the population- suffers from hunger
- The Number of undernourished children has also increased by 12% over the last 5 years

## Effect of global price increases on import costs, SSA

	2005	2006	2007	2008 <sup>*</sup>	Increase 2007 to 2008
	(US\$ billion)				
Rice	1.82	1.94	2.07	5.76	278 %
Maize	0.57	0.71	9.49	14.3	151 %
Wheat	2.09	2.63	3.49	4.96	142 %
Fertilizer	1.30	1.33	1.90	3.69	194 %
<b>TOTAL</b>	<b>5.78</b>	<b>6.61</b>	<b>16.98</b>	<b>28.71</b>	<b>169</b>

Note: Physical quantities of imports held constant across all years

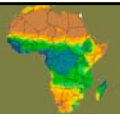
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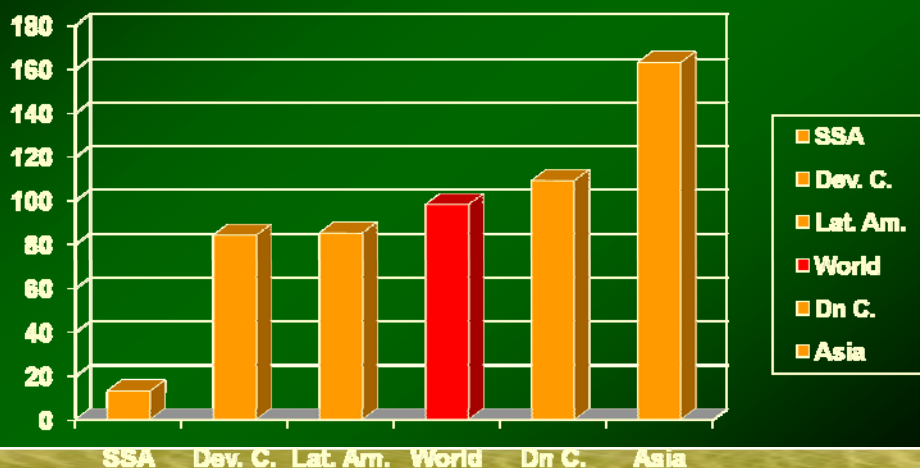


## Introduction...

- Average cereal yield is 1.3t/ha in Africa compared to 3.4 t/ha in Southeast Asia
- Cereal yield grew by 0.7% only in SSA compared to upto 2.3% in other developing countries



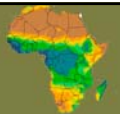
## Fertilizer Use (kg/ha)





## Reasons for low food production

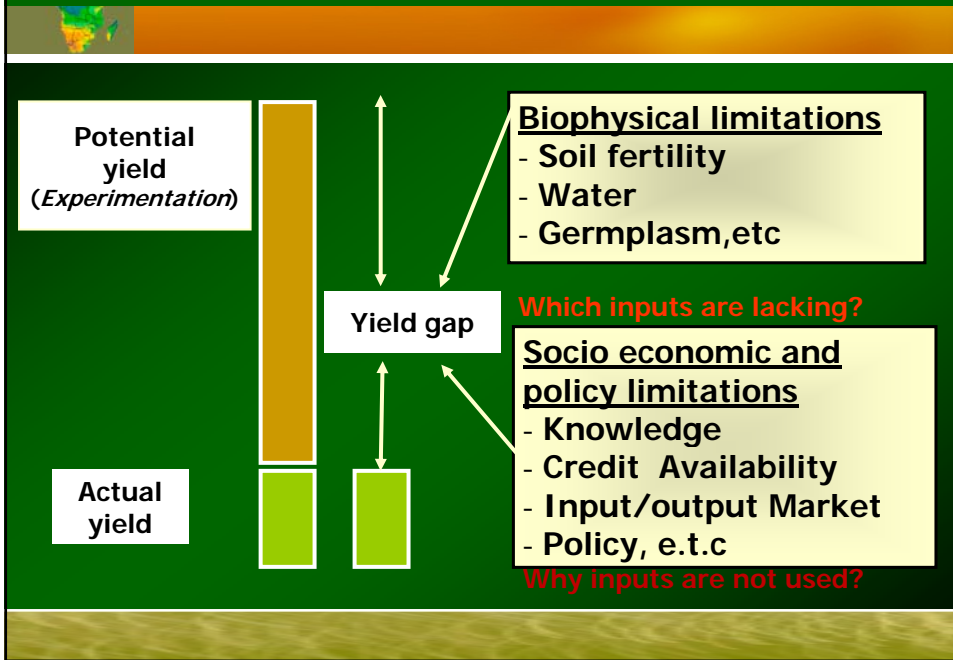
- Soils are low in nutrients, organic matter and have poor water holding capacity
- SSA uses one tenth of the worlds level of fertilizer, mainly due to:
  - Accessibility and affordability of fertilizers
  - Lack of knowledge to combine mineral and organic fertilizers
  - Counter-productive policies



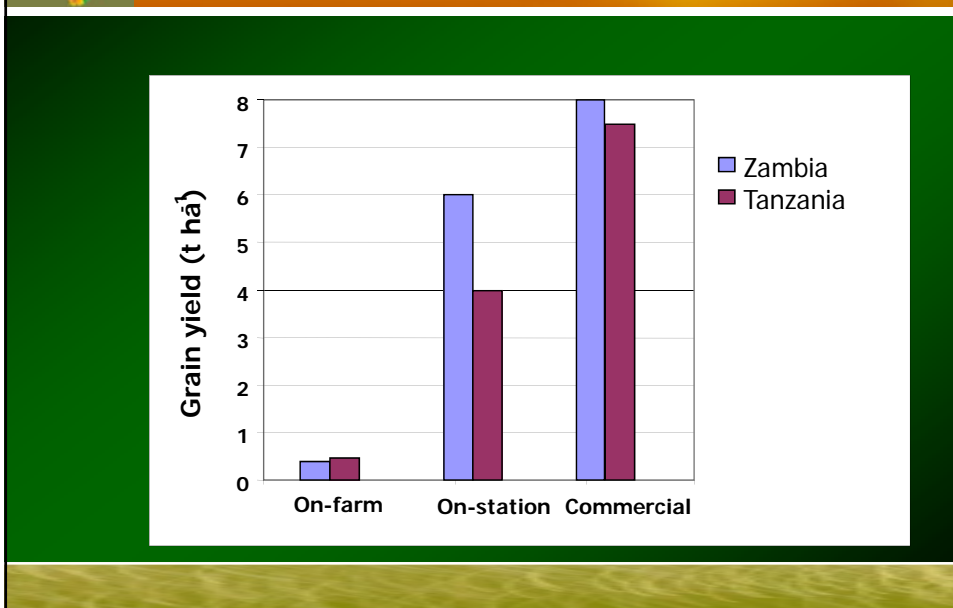
## Introduction

- 69 million smallholder farmers in SSA do not have access to effective and affordable inputs, appropriate technology and information and functioning markets
- *The soil nutrient losses in SSA are an environmental, social and political time bomb unless we work up soon and reverse these disastrous trends, the future viability of African food systems will indeed be imperiled*  
**Dr. Norman Borlaug**

## The yield gap and the limitations that cause it





## The Yield Gap: Some observations from sub-Saharan Africa







 Maize response to N & P fertilizers



The complex block features a title bar with a map of Africa on the left and the text 'Maize response to N & P fertilizers' on a yellow-to-orange gradient background. Below the title bar, there are two photographs of maize plants in a field. The left photograph shows a healthy, dense crop of maize plants with green leaves and developing tassels. The right photograph shows a sparse, struggling crop of maize plants with yellowing leaves and stunted growth, indicating a response to fertilizer application. The background of the lower section is a solid green color.



## Past work and leadership experience

- Pioneered the development and promotion of several profitable soil fertility management technologies
- Over 250 publications including several books
- Contributed to capacity building- PhD (20), MSc (40), BSc (100) and on-the-job training for numerous African researchers (300), supervision of several Post Docs and visiting scientists
- Resource person in Abuja African heads of state fertilizer Summit
- Led and contributed to write-up of Soil Health Consultation Reports of the Gates Foundation

*Experience*

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## Past work and leadership experience...

- Received **The Highest Civilian Award** from the Government of Niger
- Since I joined CIAT-TSBF,
  - rated as **outstanding staff** by CIAT (6 years)
  - received the **Principal Staff Achievement Award** for the year **2004** from the CIAT board
  - nominated as **International Scientist of the year for 2004** by the International Biographical Centre of Cambridge, England
- Member of several international Panels, Boards and Committees (GLP, Desertification –Oasis-, AFRICANESS, Strategy dev'pt of CORAF, IPN, ...)

*Experience*

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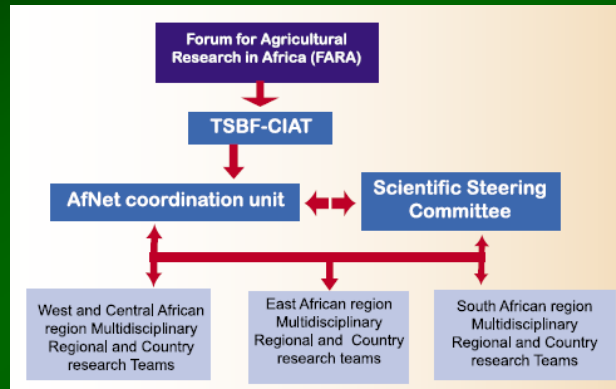






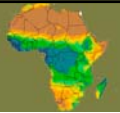
## Past work and leadership experience...

- Steered growth of AfNet, from a membership of 100 in 2000 to over 450 members in 23 African countries presently
- Restructured AfNet to a cornerstone Pan-African network



*Experience*

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## Past work and leadership experience...

### Symposium on Green Revolution in Africa

- The symposium was attended by 230 participants drawn from 20 African countries

### Themes:

- Factors that limit access to and adoption of innovations by poor farmers
- Potential and feasibility of use of external inputs and improved soil and water management
- Best-fit innovations approaches and their scaling up/out
- Needs for capacity building for the African Green Revolution

*Experience*

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## Grey to Green



4 kg P per ha  
with millet seed

### 'Coke Cap' Microdosing

*Value chain approach*

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## Statement 1

Research work on soil in SSA has generated numerous outputs but very few have been translated into adoption to improve the livelihoods of the smallholder farmers

***This is the biggest challenge we need to address within the Soil Health Program of AGRA***



## Statement 2

Whereas in the developed world, excess application of fertilizer and manure is sometimes blamed for damage to the environment, the low use of inorganic fertilizer is one of the main causes for environmental degradation in Africa



## Statement 3



My dream is to have a continent where children do not go to bed on empty stomachs



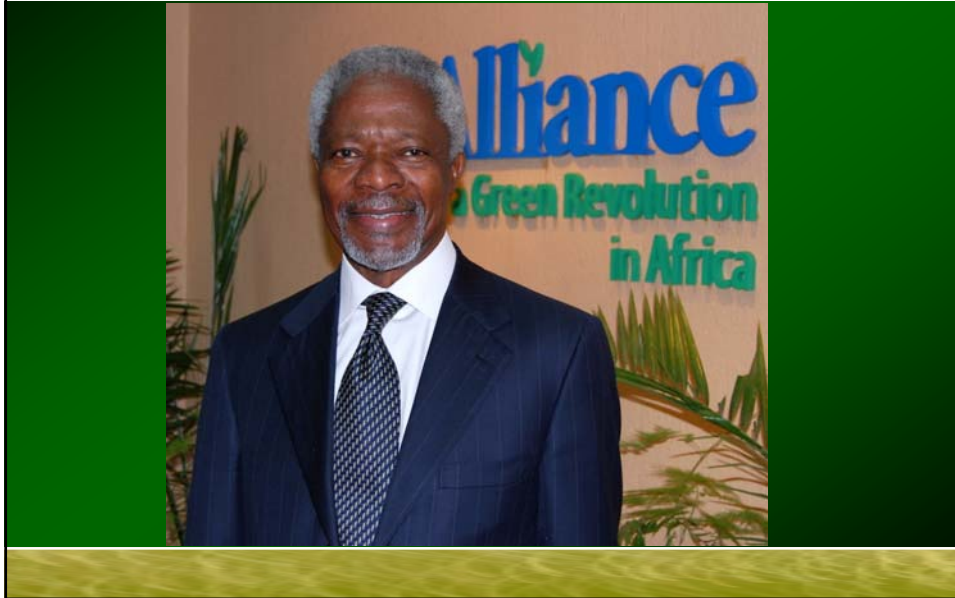
## *Achieving the African Green Revolution*

### *What is AGRA?*

*A dynamic partnership working across Africa to help millions of small-scale farming families lift themselves out of poverty and hunger.*



## Mr Kofi A Annan, Chairman of AGRA



### Home Grown Policy: Malawi adopts “smart subsidies” and achieves a revolution

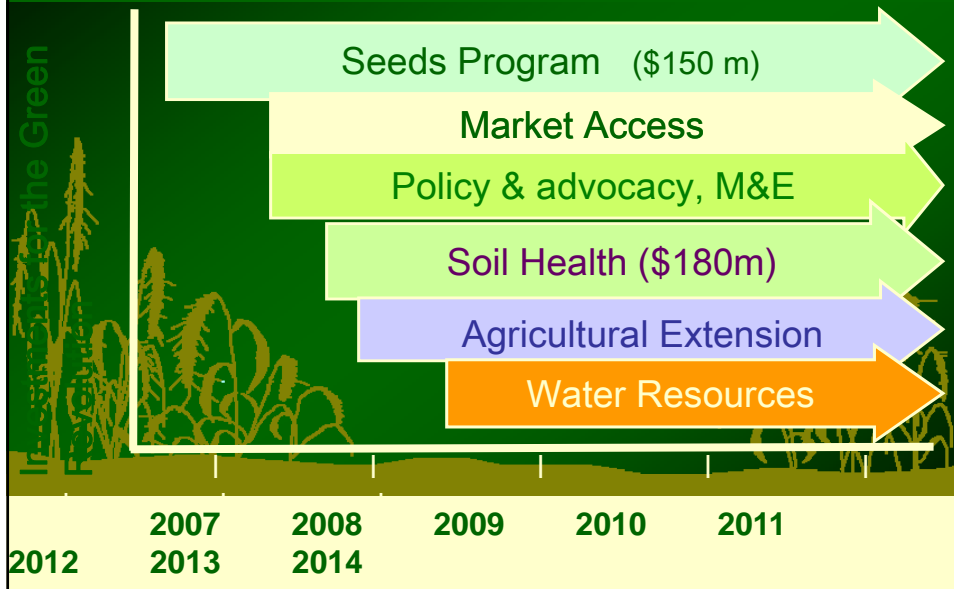
- 2005/06: \$50 Million subsidy with Government distribution
- 2006/07: \$60 Million “smart subsidy”
- 2006/07: Private sector distribute inputs for the 1<sup>st</sup> time  
→ *Private sector sold \$25 million of seeds and fertilizers*
- **Maize green revolution**
  - 400,000 MT surplus in 2005/06
  - 1.3 Million MT surplus in 2007
  - Exports \$ 160 million of maize
  - Donates 10,000 MT of maize to Lesotho and Swaziland!

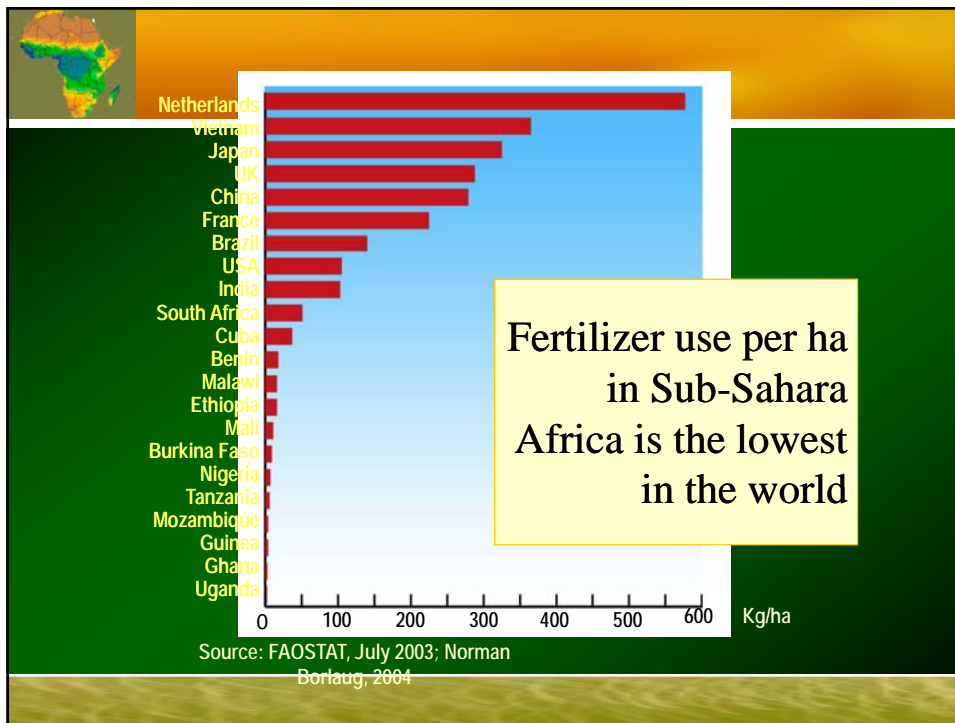






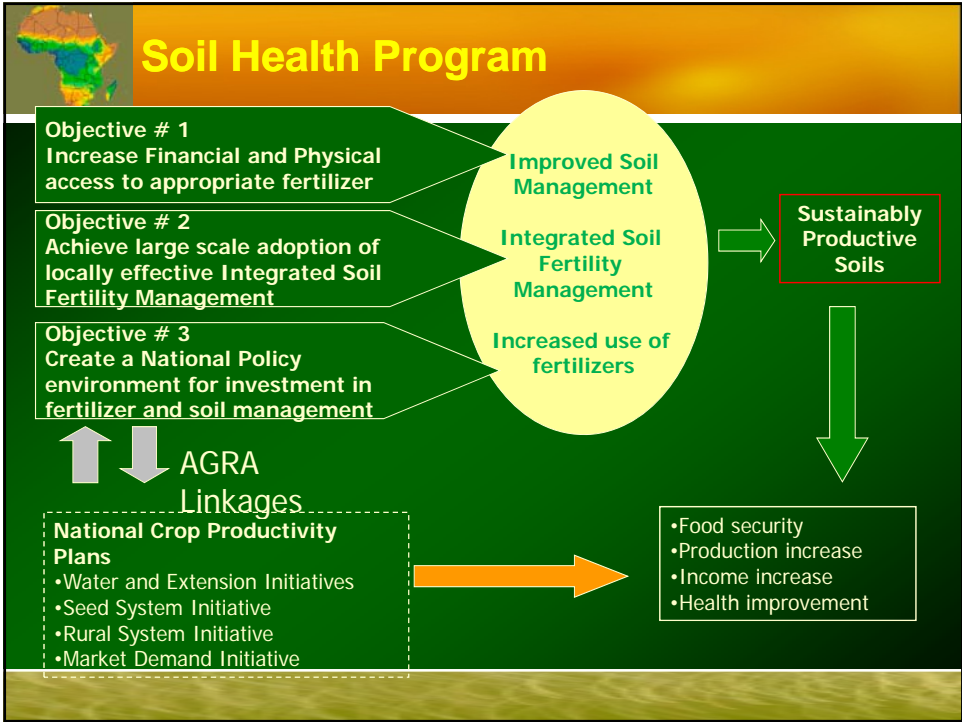
## AGRA interventions can solve problems along the value chain





# The Soil Health Program

Increasing small scale farmers productivity through improved inputs and management systems



## **SHP Sub-Programs**

### **1. Fertilizer Supply Program (FSP)**

- Focuses on the production and distribution (i.e. importing and wholesale) elements of the fertilizer supply chain

### **2. Soil health training sub-program (SHTP)**

- Seeks to work with national governments to invest in African extension workers, technicians and scientists to facilitate the development and extension of new and existing ISFM technology packages

## **SHP Sub-Programs**

### **3. Soil health research sub-program (SHRP)**

- Focuses on supporting the development, adaptation and fine-tuning of ISFM technologies

### **4. Soil health extension sub-program (SHEP)**

- Focuses on scaling up ISFM technological packages to thousands of farmers



## **Achieving an African Green Revolution: AGRA and the Fertilizer Procurement Program**

**Andre Bationo**

## **Lack of Infrastructure Is Killing Africa**



### **Kilometers of paved roads per million people in selected countries**

	<u>Km</u>		<u>Km</u>
USA	20,987	Guinea	637
France	12,673	Ghana	494
Japan	9,102	Nigeria	230
Zimbabwe	1,586	Mozambique	141
South Africa	1,402	Tanzania	114
Brazil	1,064	Uganda	94
India	1,004	Ethiopia	66
China	803	Congo, DR	59

Source: Encyclopedia Britannica, 2003



## Increase financial and physical access to appropriate fertilizer

### Goals

- Development of the fertilizer supply chain
- Improvement by 20% of fertilizer agronomic efficiency
- Package at affordable cost
- Price reduction at the farm gate by 15%



### Investment Options for Objective 1

Specific blending, local small packaging & quality certification

Support to wholesale, retail and co-operative networks to increase distribution

Creation of a fertilizer market information and trading system

Improvement of Procurement production capacity and policy





**The paradox of markets in rural Africa:**  
*"We don't want Coca Cola, we are looking for seeds and fertilizers"*



**Sitting on blocked capital:** *Poorly developed markets limit income growth from commercialization of technical changes in agriculture*

**A better, more secure future:  
A new, efficient, dynamic and competitive agricultural  
sector will unlock hope for millions of children!**

