

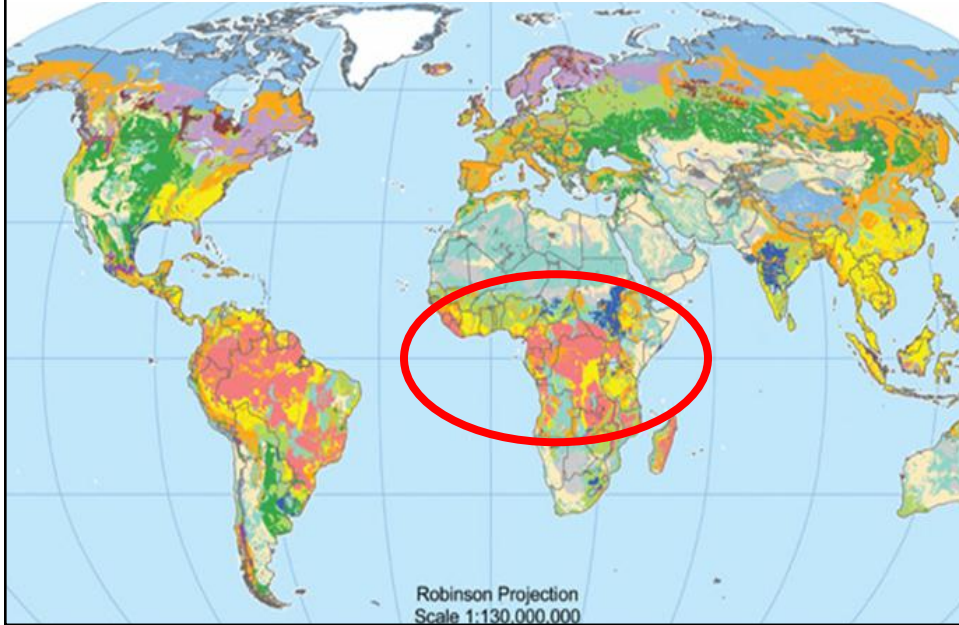
# Integrated Soil Fertility Management (ISFM) in Sub-Saharan Africa

Bernard Vanlauwe  
International Institute of Tropical Agriculture (IITA)  
Nairobi, Kenya  
b.vanlauwe@cgiar.org



**In sub-Saharan Africa,  
smallholder farming  
is a complex venture**

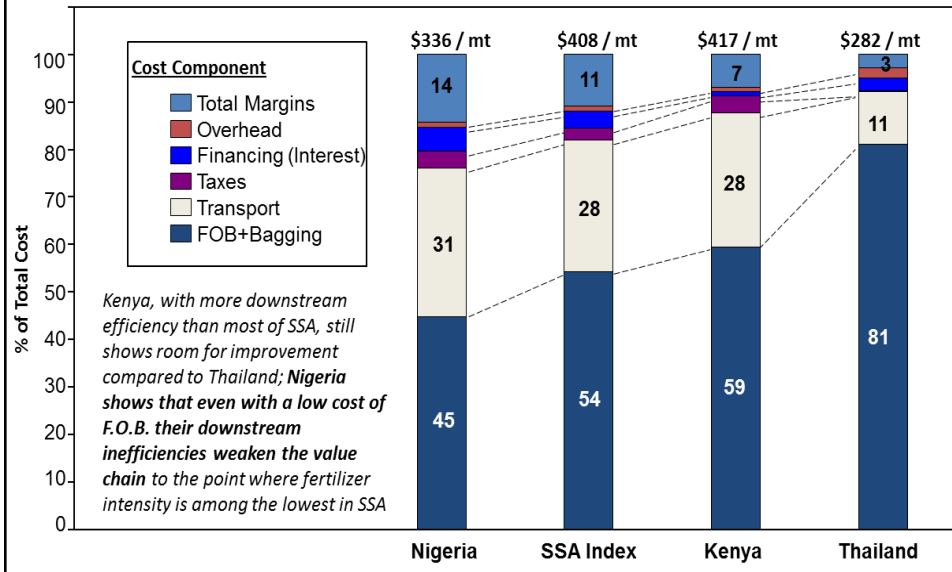
# Old and degraded soils...



# Poor infrastructure... ... expensive inputs!



# Poor infrastructure... ... expensive inputs!

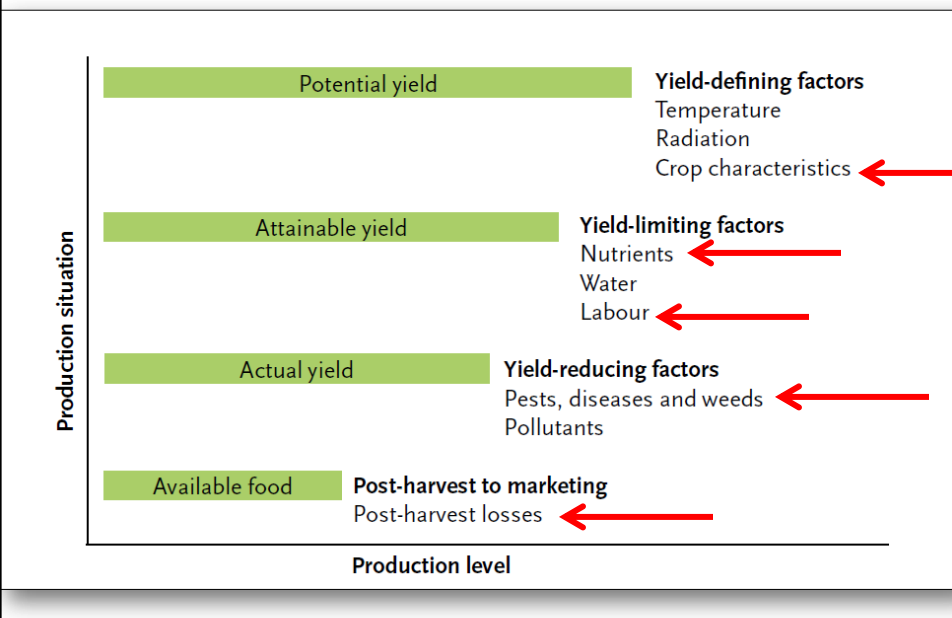


## Variability in soil fertility...

Same farm...  
Same variety...  
Same inputs...  
Same management...



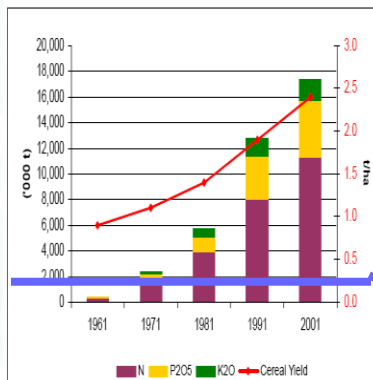
## Many factors affect crop yield...



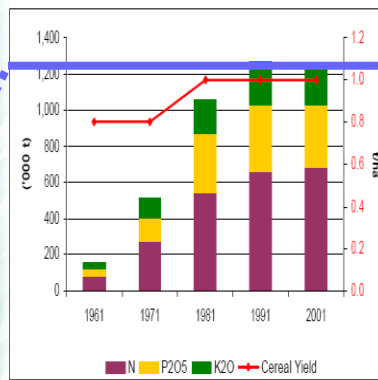
# We have solutions and fertilizers are a major component of these: The ISFM story

## No fertilizer, no intensification...

India: Evolution of Fertilizer Consumption and Cereal Yields



SSA: Evolution of Fertilizer Consumption and Cereal Yields



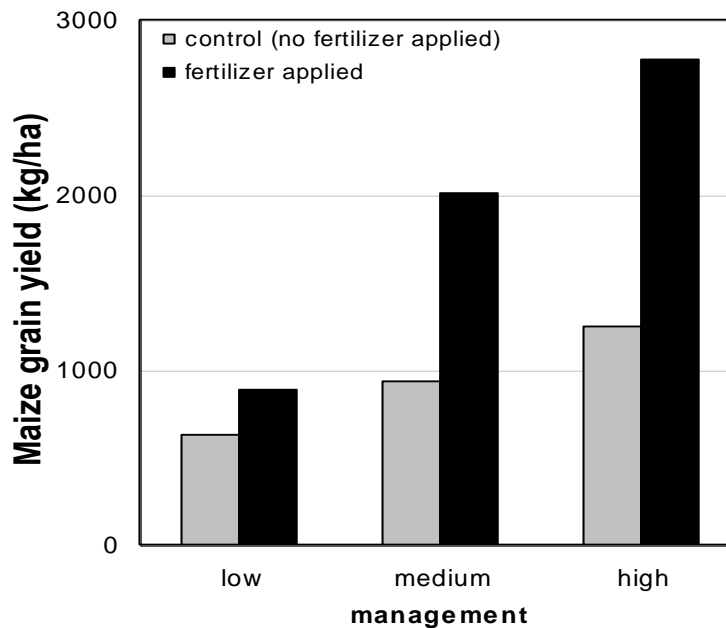
IFA, 2001

# Crops do respond to fertilizer in Africa!

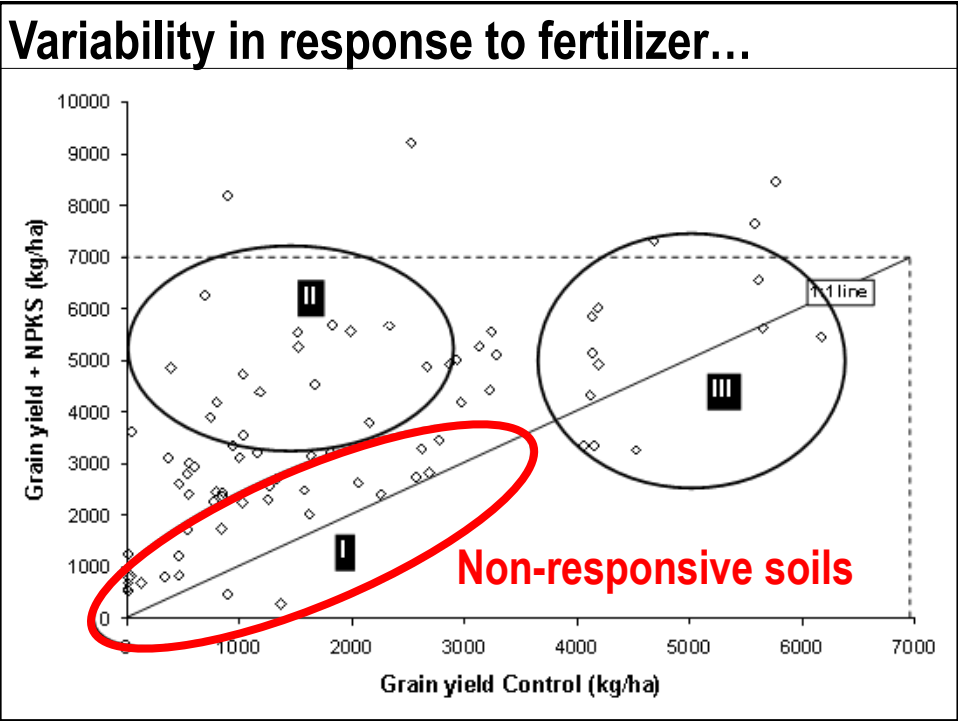
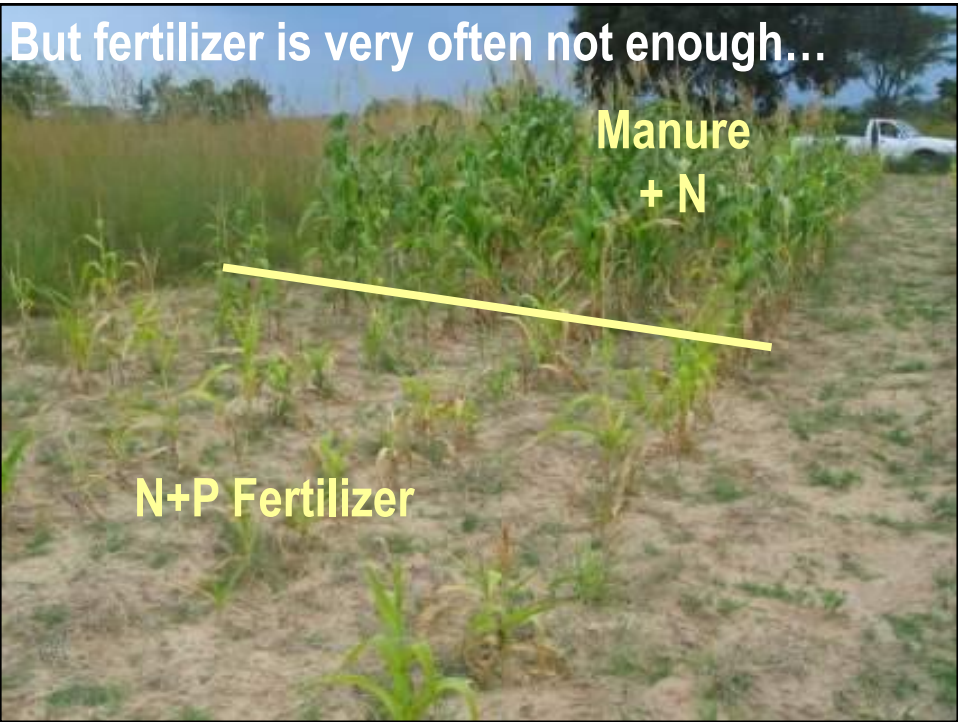


## Universal principles of nutrient management

**Management intensity**  
(planting date, crop density, time of P application);  
Tinfouga, Mali



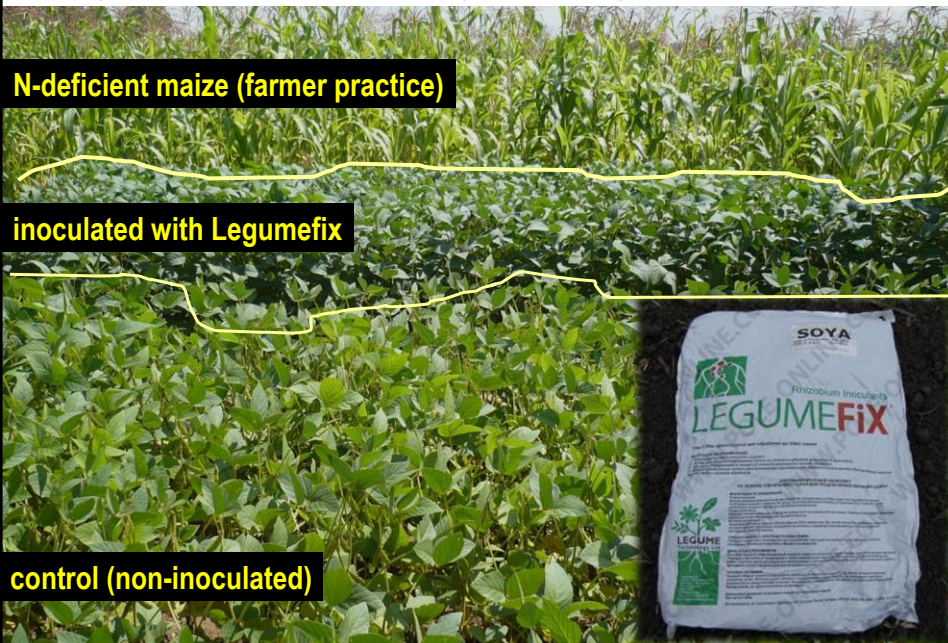
Bationo et al., 1997



# We have tools for organic input production...



# Integrated Soil Fertility Management

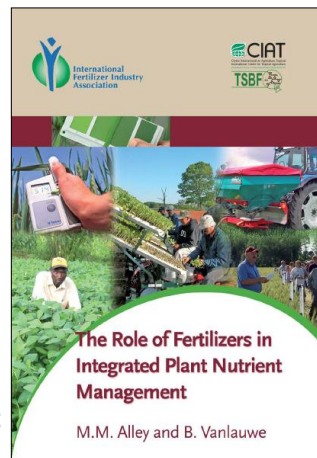
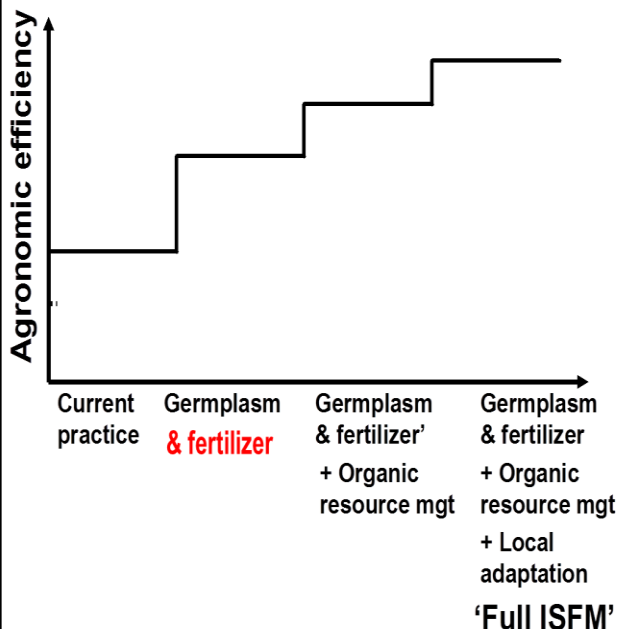




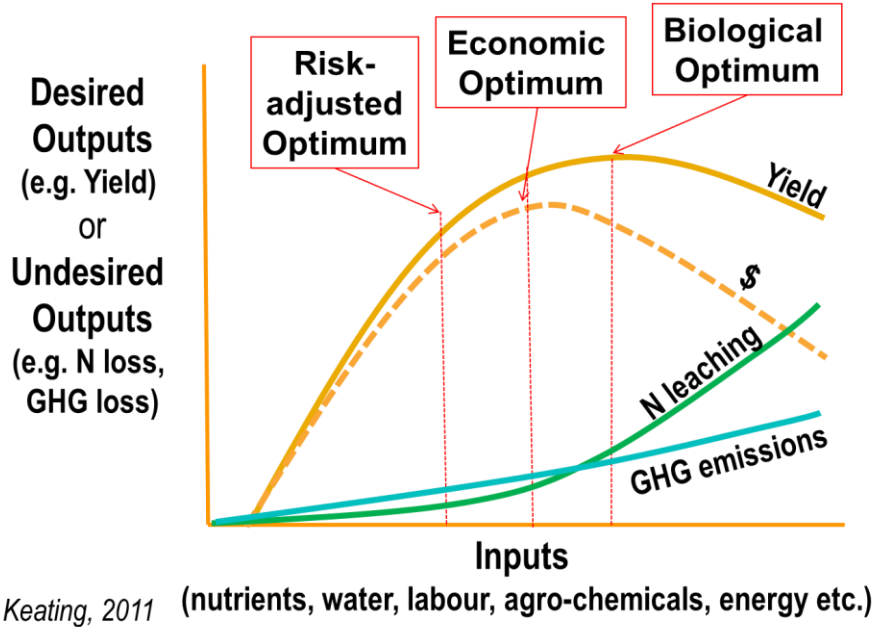
# Integrated Soil Fertility Management

‘The application of soil fertility management practices, and the knowledge to adapt these to **local conditions**, which **maximize** fertilizer and organic resource **use efficiency** and crop productivity. These practices necessarily include appropriate **fertilizer and organic input** management in combination with the utilization of improved **germplasm**’

# Integrated Soil Fertility Management



## Agro-ecological intensification



**Implementation of ISFM:  
Important components  
and challenges**

# Diagnosis of constraints



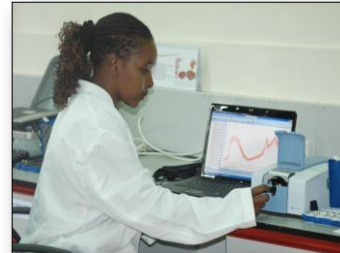
**Laboratory**  
Cost!  
Time!

**Infrared spectroscopy**

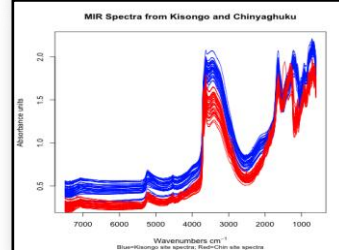
Quick!  
Cheap!



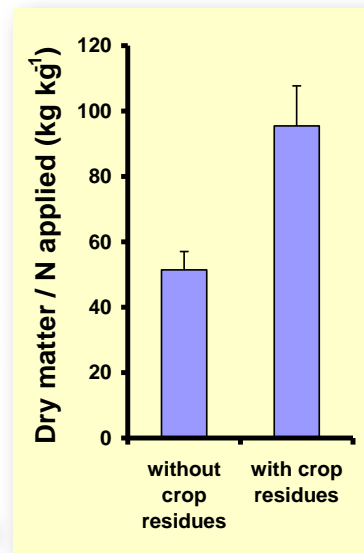
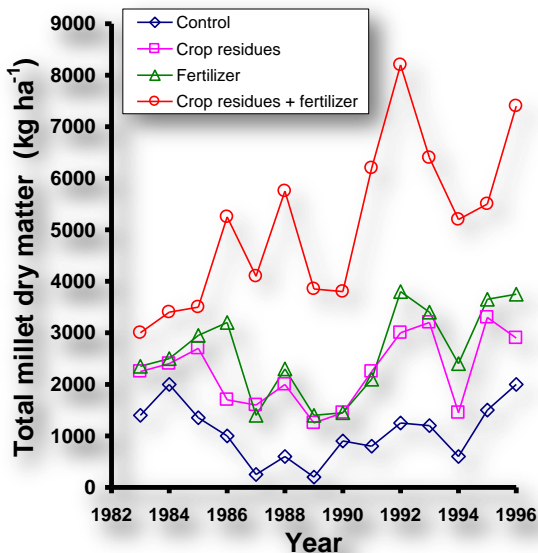
**Test kits**  
Accuracy?  
Cost?



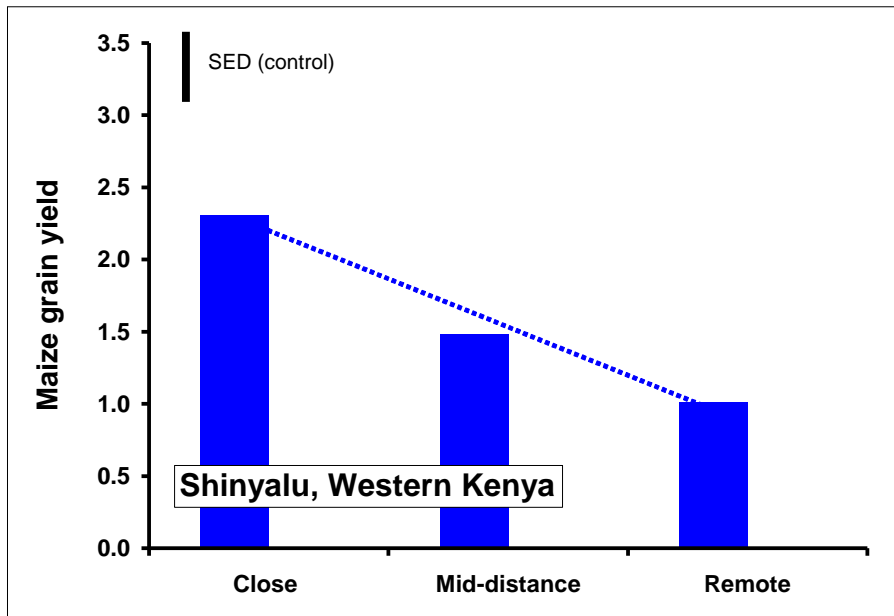
**Local indicators**  
Sensitivity?  
Extrapolation?



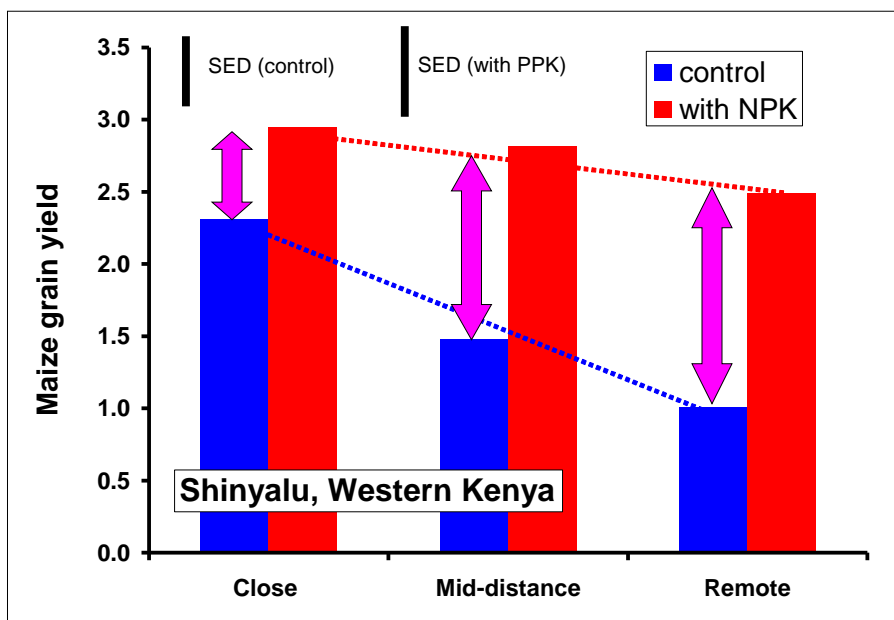
# Optimal use of crop residues



## Site-specific formulation

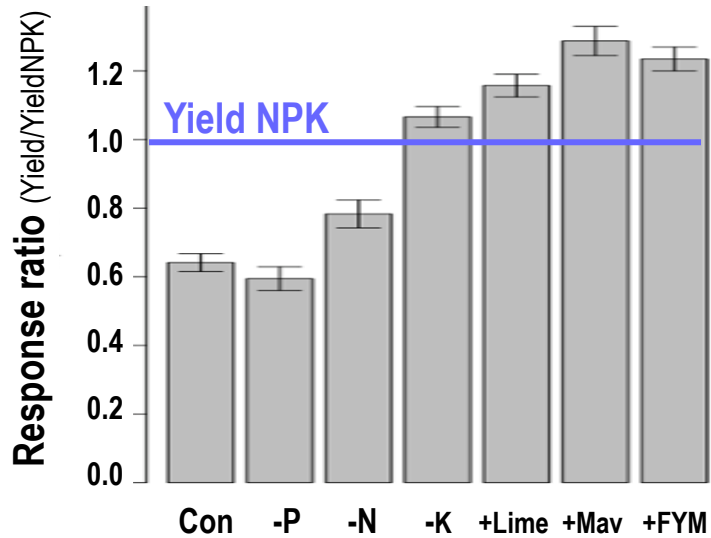


## Site-specific formulation


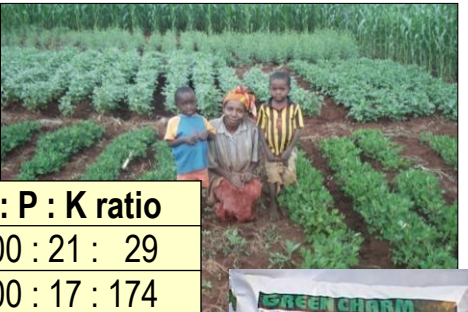

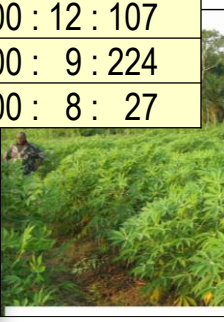



# Site-specific formulation


Responsive soils that respond to  
 1. NPK and  
 2. application of lime, Mavuno, and FYM

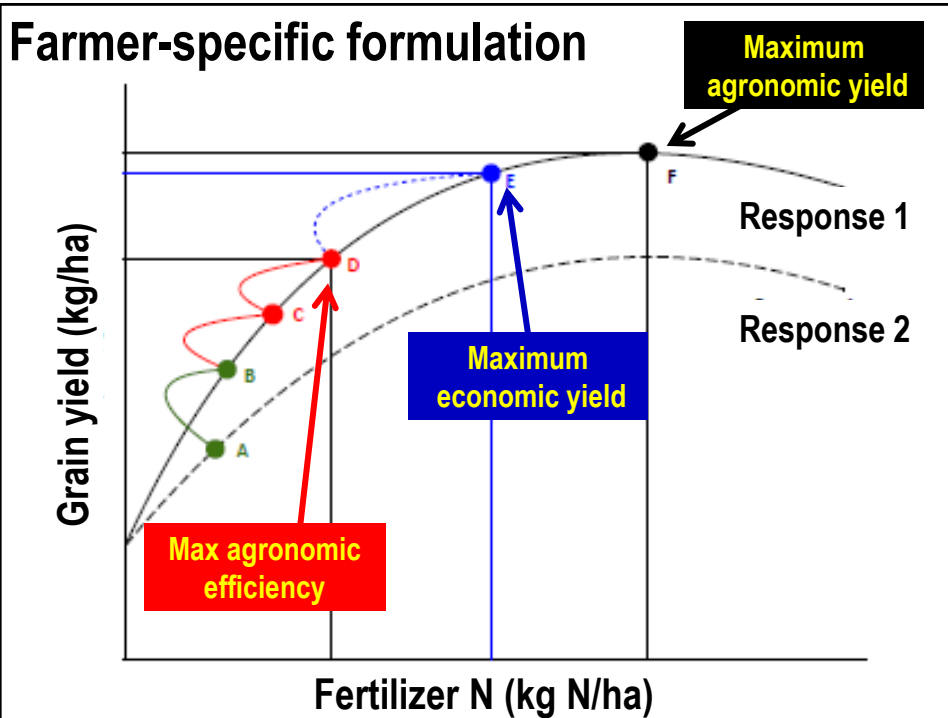


# Crop-specific formulation

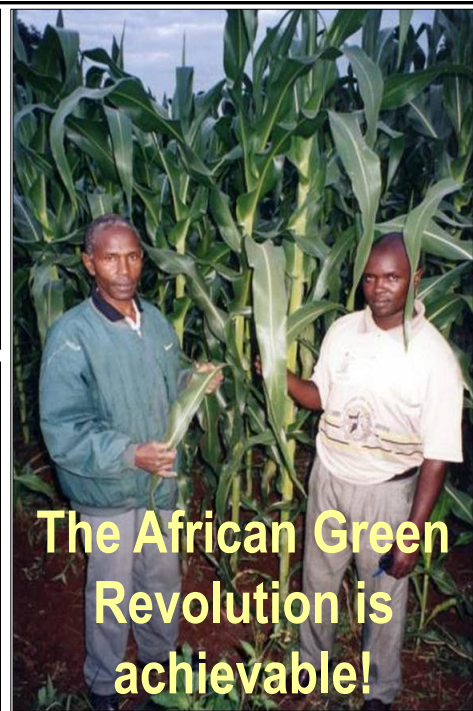
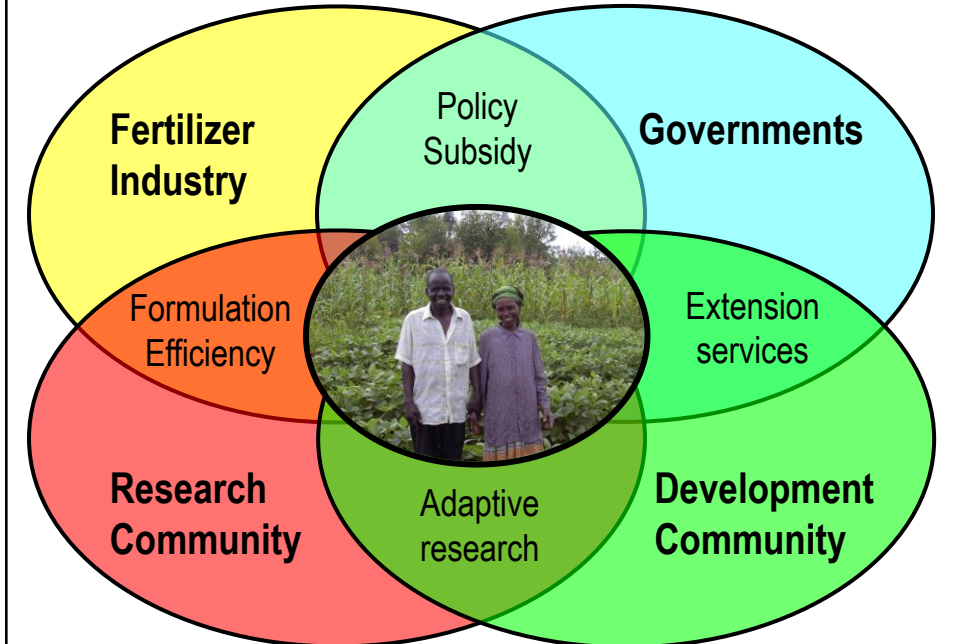






Crop	N : P : K ratio
Maize	100 : 21 : 29
Cassava	100 : 17 : 174
Yam	100 : 12 : 107
Plantain	100 : 9 : 224
Soybean	100 : 8 : 27





# Creating an enabling environment





**Thank you!**  
**Merci beaucoup!**  
**Asante sana!**