

Improving nutrient use and manure management towards sustainable and resilient agricultural systems in the context of Ghana

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Sources of soil nutrients and manure in Africa



Organic sources:

Cattle manure

Poultry manure

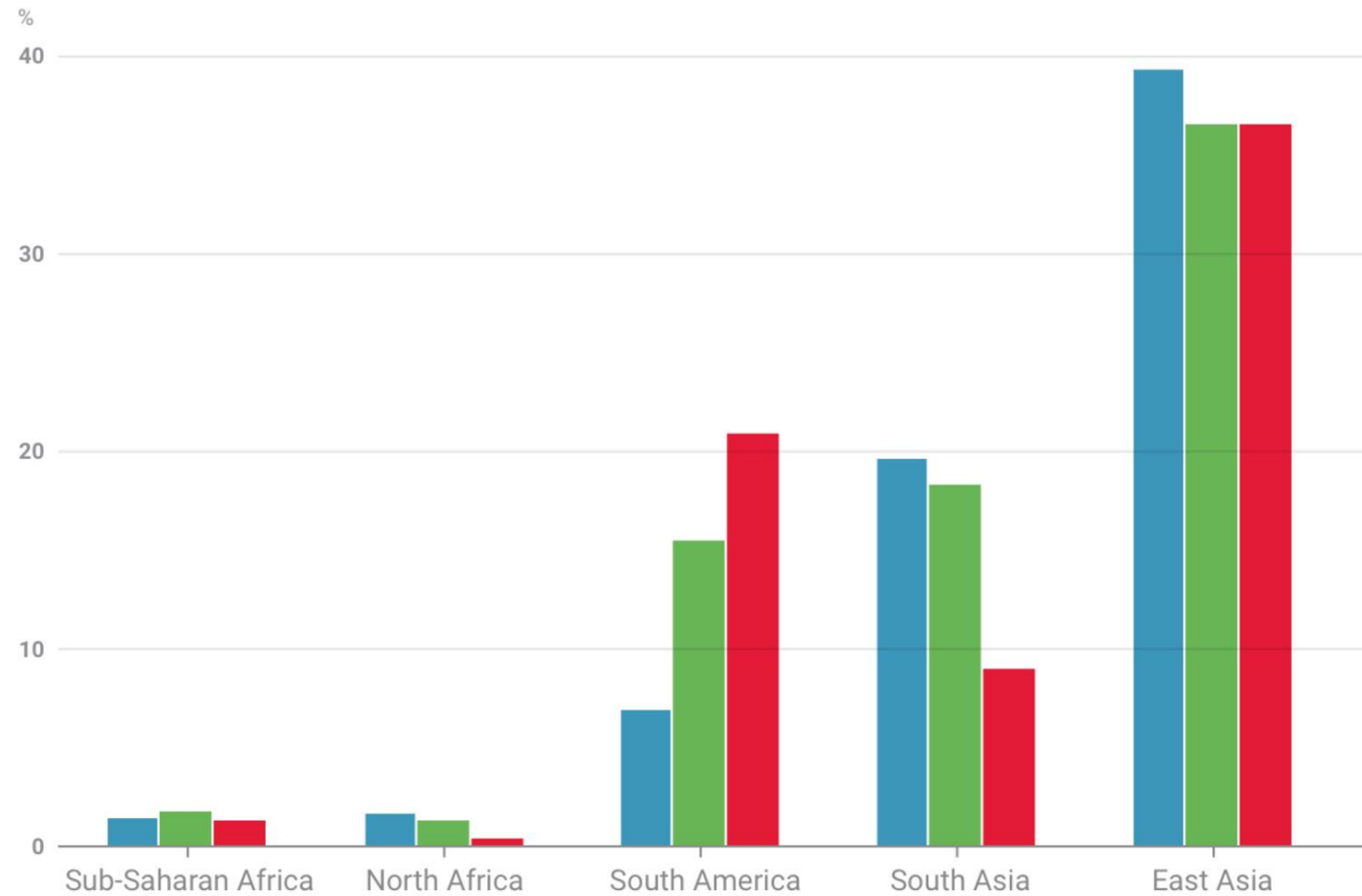
Crop residue

Inorganic sources:

Synthetic fertilizers

Fertilize use in selected regions

Share of Nitrogen, Phosphate, and Potash Consumption in Selected Regions (2015)



Share of Global Consumption

● Nitrogen ● Phosphate ● Potash

Source: FAO, Gro Intelligence

www.gro-intelligence.com

Reasons for low use of fertilizers in Africa

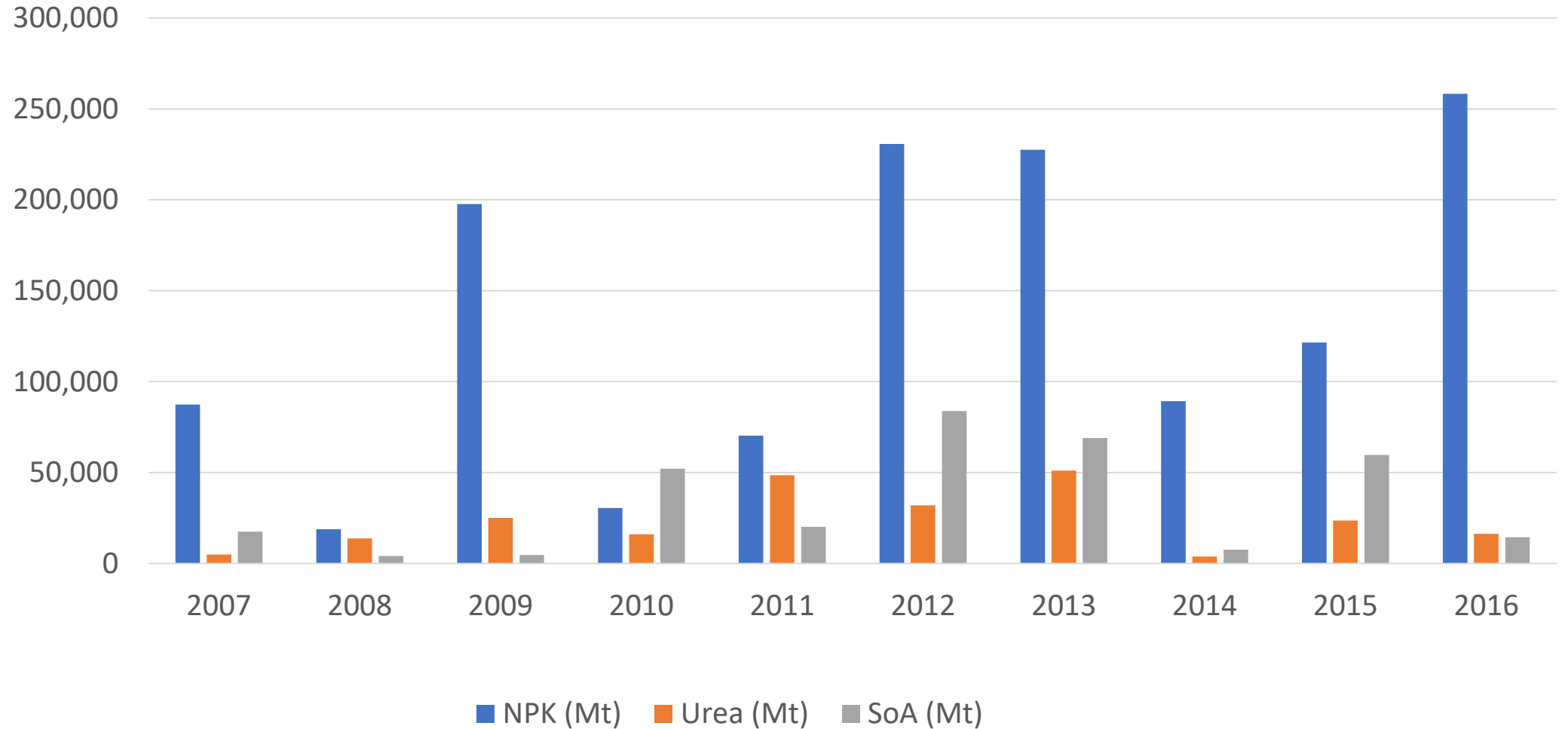
- Sub-Saharan Africa is the World's Most Expensive Fertilizer Market
- A 2011 study found that fertilizer costs in sub-Saharan Africa were at least four times more expensive than they were in Europe.
- High transportation cost
 - Ocean shipping
 - Inland trucking and rail cost
- Fertilizer production on the continent is low and difficult due to;
 - High cost of raw materials
 - High production energy requirement

Africa's ambitious targets for nutrient use

- AU Abuja declaration in 2006 encouraged the African Union Member States to increase the level of fertilizer use from average of 8 kilograms per hectare by then to an average of 50 kilograms per hectare by 2015. **This target has not been achieved.**
- Currently, fertilizer use in Africa is approximately 16 kg/ha compared with over 100 kg/ha for other regions
- In response to the Abuja declaration, the Government of Ghana introduced fertilizer subsidy programme since 2009 to improve fertilizer use and food productivity.
- This enabled fertilizer use to increase from an average of 7.4kg/ha by then to 20.9kg/ha in 2016.

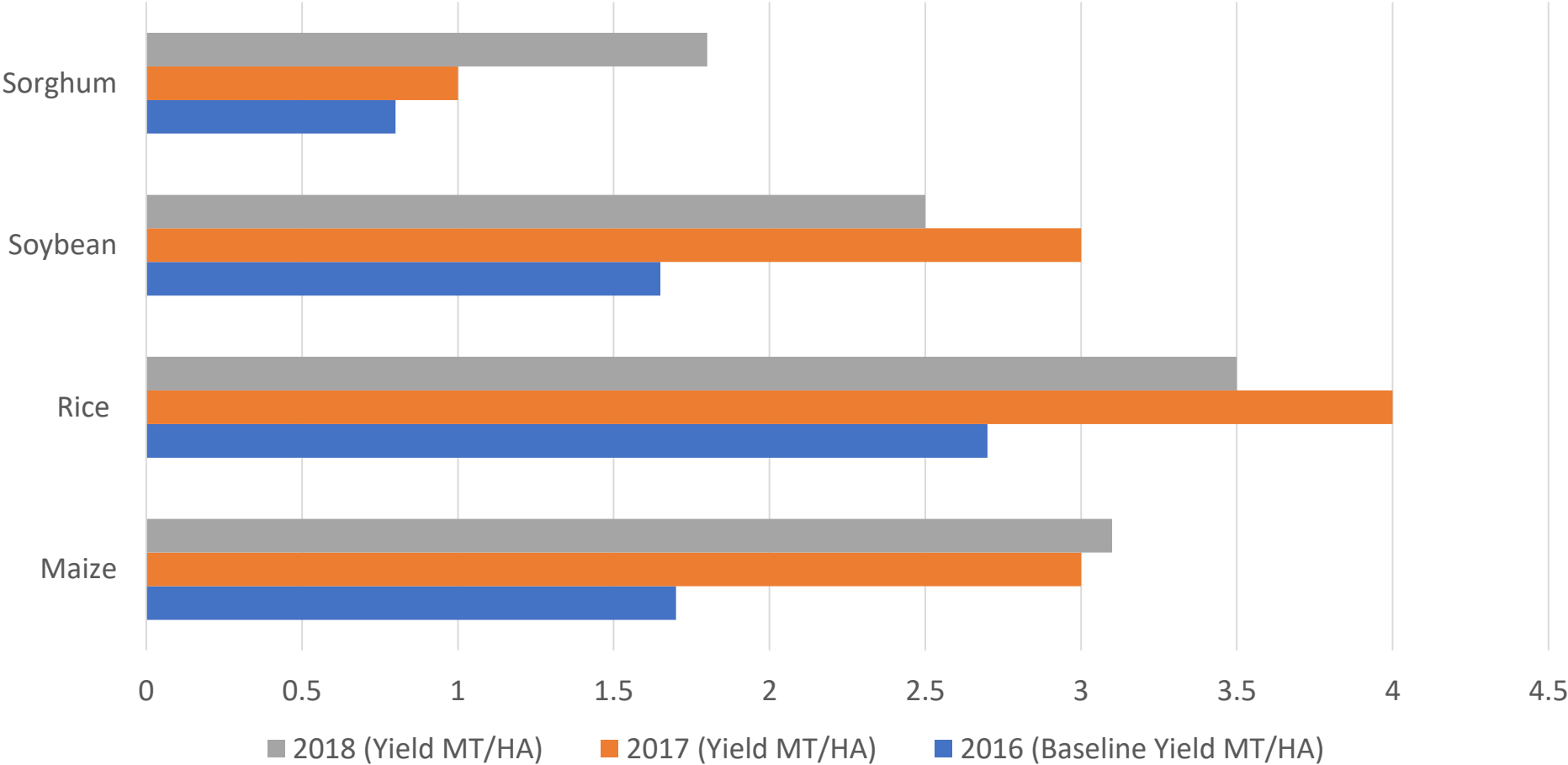
10 year Imported inorganic fertilizers

Fertilizer Imports



National average productivity of selected crops under seed and fertilizer subsidy programme - Ghana

Average Yield response to seed and fertilizer subsidy programme



Crop productivity targets

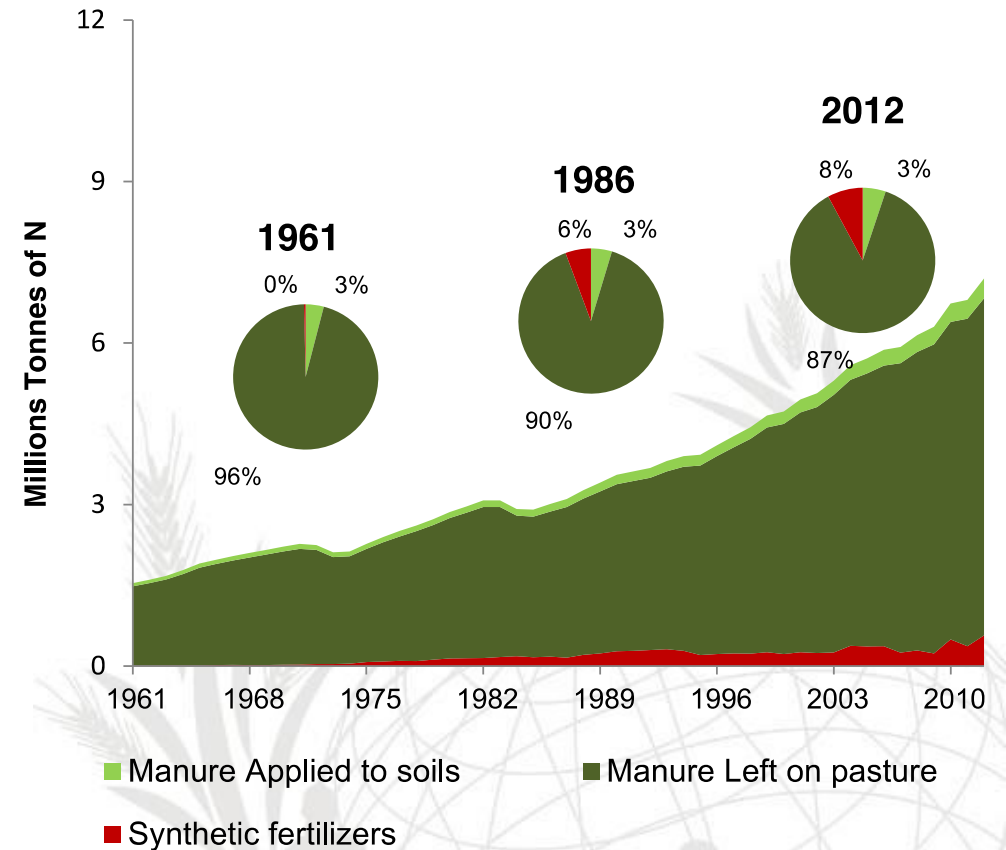
Crop	Yield target Mt/ha
Sorghum	2
Soybean	3
Rice (Paddy)	6
Maize	5.5

Data source: MoFA, PFJ 2019

Manure production and use in West Africa

- ✓ Fertilizers increased exponentially in the last 50 years (more than 100 times)
- ✓ Still, they only accounted for 8% of the total N input in 2012
- ✓ Manure left on pasture was the main source of N and accounted for about 87% in 2012
- ✓ Limited amount of manure is applied to soils

Source: FAOSTAT 2015



Food and Agriculture Organization
of the United Nations

Challenges with manure use in Africa



Exposure to high temperatures leading to loss of nutrients

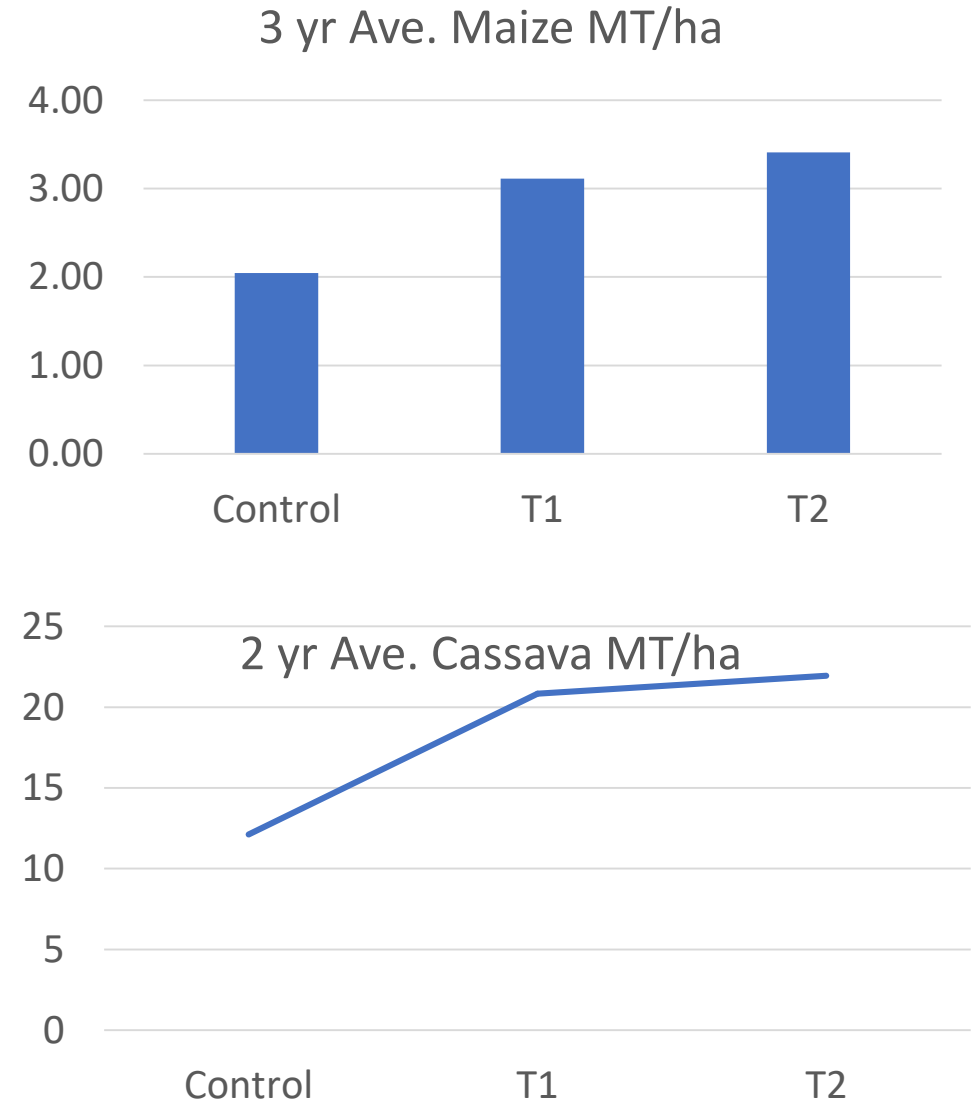


Fire

Nutrient for improved soil health and crop productivity

- Manure is the main input of carbon into the soil
- Use of manure restores productivity of degraded soils
- Mineral fertilizer alone could not restore productivity of degraded soils

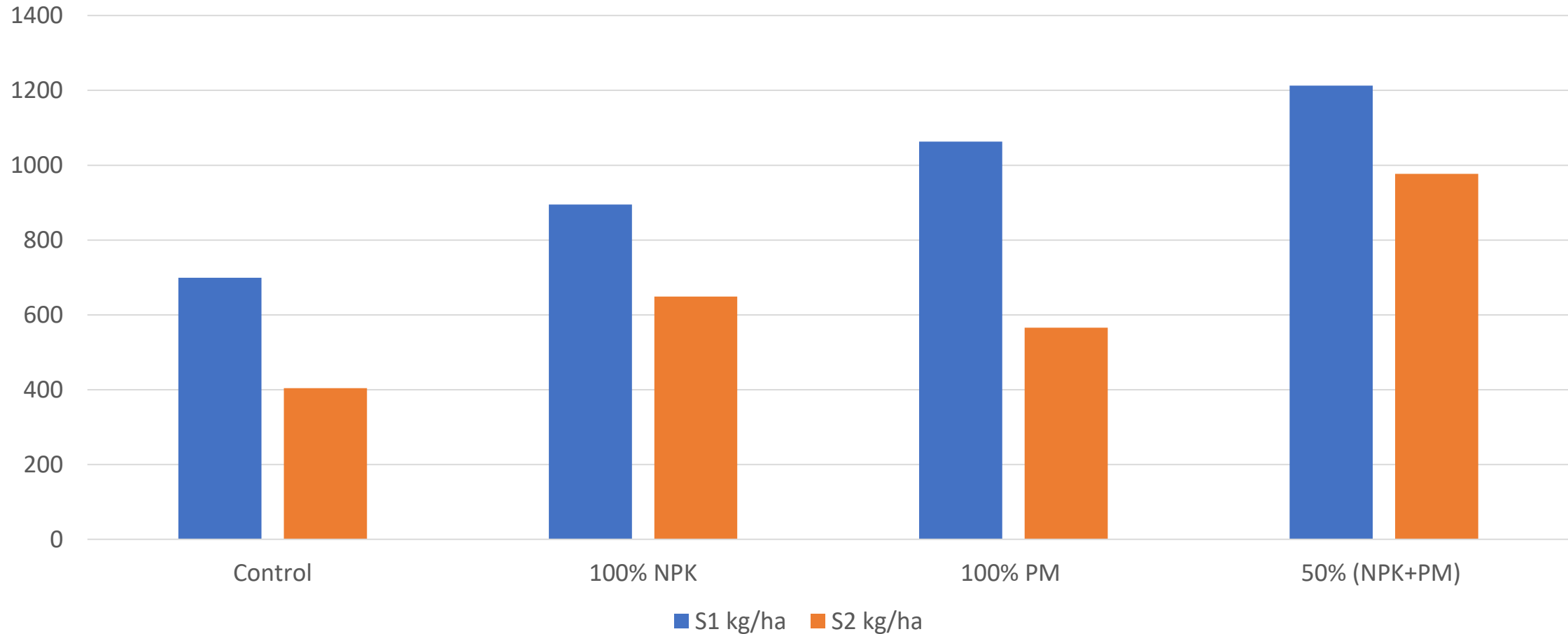
T1- residue left +4t/ha Poultry manure (approx.:100-50-64NPKkg/ha)
T2- residue left + 4t/ha Poultry manure +low NPK (30-20-20NPK kg/ha)
(Quansah et al., 1998a)



Integrated plant nutrient management

2014: Maize yield response to NPK (90-60-60), Poultry Manure (3MT/ha) and 50% rate of NPK+PM:

Trial of Soil nutrient amendment on maize yield



Source: Department of Crop and Soil Sciences, KNUST, Kumasi, Ghana

Key Messages

- Low use of fertilizer in Ghana and Africa is mainly due to high cost.
- To increase nutrient use, the costs of fertilizers, among other factors, needs to come down substantially
- Numerous research has demonstrated that integrated use of fertilizer and manure is key for increased crop yields and minimizing land degradation and GHG mitigation
- Support scale of improved soil health and productivity good practices and proven technologies in Ghana,
- To increase fertilizer use to the levels of aspired to by the Abuja Declaration, there will have to be a meaningful increase in regional production and lower transportation costs