The SMaRT Approach: Delivering Balanced Fertilizers to Smallholders

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Why are balanced fertilizers important?

- Fertilizers replace nutrients removed in harvested products, and therefore sustain high productivity.
- Most fertilizers supplied to farmers supply only NPK.
- Small amounts of secondary and micronutrients can greatly improve yields, but are rarely available to farmers.

5 Mt/ha maize removes:

- 100 kg N
- 45 kg P₂O₅
- 120 kg K₂O
- 13 kg Ca
- 20 kg Mg
- 13 kg S
- 0.25 kg Zn
- 0.25 kg B
- 0.70 kg Mn
- 0.40 kg Fe
- 0.10 kg Cu

...in grain and stover
Commercial farmers

Soil/plant analyses

Professional recommendation

Custom Fertilizer (requires large volume to manufacture economically)

The smallholder farmer reality

Full analyses often costly, not accessible

Crop-specific interpretations often not available for multiple crops

Small soil and crop-specific volumes cannot be economically produced
The challenge

Bring better fertilizers to smallholder farmers, most of whom

- cannot afford or access analytical services
- are purchasing in small volume
- are growing a variety of crops under different soil conditions
From soil analysis to smallholder fertilizer use: The SMaRT approach

**Soil Analysis**

**Mapping**

**Recommendations development**

**Transfer to farmers**

- Full quality soil analyses throughout region of interest
- Map nutrient deficiencies and soil acidity constraints
- Validate and refine better fertilizers (vs current): yield, financial returns
- Scale up production and distribution
- Adjust fertilizer regulations and policy to accommodate balanced fertilizers into a competitive market
Soil analysis and Mapping

- **Full soil analysis** throughout the region of interest
  - Use highest quality analysis available
  - Complete analyses are required to capture all nutrients
  - Samples must be geo-referenced for mapping

- **Mapping** shows the geographic distribution of deficiencies and soil acidity constraints
  - Helps target fertilizer products and lime
  - Guides fertilizer suppliers on targeting products
  - Influences policy: for example, on best products to subsidize
Soil test pH, S, Zn, and B: Rwanda and Burundi
Recommendations development

• Soil analysis indicates likely deficiencies. **It is not a prescription.**

• Fertilizer formulations need to be developed and **field validated.**

• Validation provides the economic proof of better formulations.

• Goal: A better fertilizer, not the perfect fertilizer

• Must be done in partnerships with fertilizer producers
Validation of balanced fertilizers

Balanced fertilizer

Balanced fertilizer

Balanced fertilizer

Balanced fertilizer
Transfer to farmers

• Farmer sensitization though demonstrations, fertilizer and lime small packs
• Extension support
• Should be facilitated through a fair subsidy environment if subsidies exist
Policy and regulations

• In Kenya, vibrant private sector and quality blenders exist
• Regulations facilitate rapid product entry

However,
• Subsidized blanket fertilizers are preferred by smallholders due to cost
• Either a fair subsidy environment or elimination of subsidies is necessary to facilitate widespread use of better fertilizers
Progress and challenges in Kenya

• Lots of soil analyses, but maps not generally available and gaps exist; many analyses are not complete or not geo-referenced for mapping.

• Over 40 balanced fertilizer products available, but not widely used by smallholders.

• Successful but limited validation of new products.

• Cooperation between the public and private sectors is required to
  • Create an enabling environment regarding subsidies
  • Develop and validate better fertilizers and lime
  • Increase farmer awareness
Thank you!

NPK

NP +S Zn B