GYGA Zambia

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Copper vs maize!

• 1960s through 80s – copper mining centre of economy
• Little investments then in agriculture (< 20% of GDP), as main emphasis was put on production and export of copper
The game has changed!
Agriculture sustains livelihoods now!

- The agricultural sector in Zambia supports livelihoods of 85% of the population.
- maize is the principal crop (>65% of cropped land)
• Land preparation is mostly manual and excessively labour intensive

• returns to labour require intensified crop production
Intensification can happen through mineral fertilizer use

But other pro-poor alternative pathways are required..
Limitations not complex — solvable easily!
Where are the yields gaps perched

- *Small-scale farmers*, who are the majority, cultivate less than five hectares of land, using few external inputs.
- *Medium-scale farmers* cultivate between 5-20 ha. They use improved seeds and fertilizers and sell most of their production.
- *Large-scale commercial farmers* plant over 20 ha. These farmers apply high levels of purchased inputs and use oxen or machinery for farm operations (4% of farmers).
Agro-ecological zones and soils

- three major agro-ecological regions which are primarily based on rainfall characteristics but also incorporate soils and other climatic characteristics
  - **Regions I**: Semi-arid includes southern, eastern and western areas. Rainfall 600 to 800 mm, growing season is relatively short (80-120 days)
  - **Regions II**: Includes much of central Zambia, with the most fertile soils and most of the country's commercial farms. Rainfall 800-1000 mm, and the growing season is 100-140 days long.
  - **Regions III**: high-rainfall area >1000 mm, growing season ranges from 120-150 days.
    - characterized by extreme acidity
    - Al toxicity
Zambia climate zones
Climate zonation for Zambia
Long term weather data (> 20 years)

Chipata
Choma
Kabwe
Kasama
Livingstone
Mansa
Mongu
Mpika
Mumbwa
Crop management data for maize, millets, sorghum, rice

• Cultivars and growth duration
• Planting dates
• Plant populations (optimum under different agro-ecologies)
• Nutrient management
Production and yield

• Maize yields about 1.5 t/ha and stagnant over the past 20 years
• Sorghum national average yields 0.55 t/ha
• Millet national average yields 0.65 t/ha
Yield gap analysis

• Crop production principally based on rainfed
• Yield gaps = Simulated water limited yields ($Y_w$) - mean actual yields
maize
Millets
rice
Partners in Zambia

• Interacted with national research system (ZARI)
• University of Zambia (UNZA)
• Related projects – SIMLEZA, Africa RISING
Communicating yield gaps

• Southern zone: constrained by rainfall
  – Little investments in fertilizers
  – easy to explain yield gaps

• Wide difference in potential and actual yields in the northern zone
  – Good rainfall, good soil depth
  – Bad soil chemistry (Al-related problems)