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)

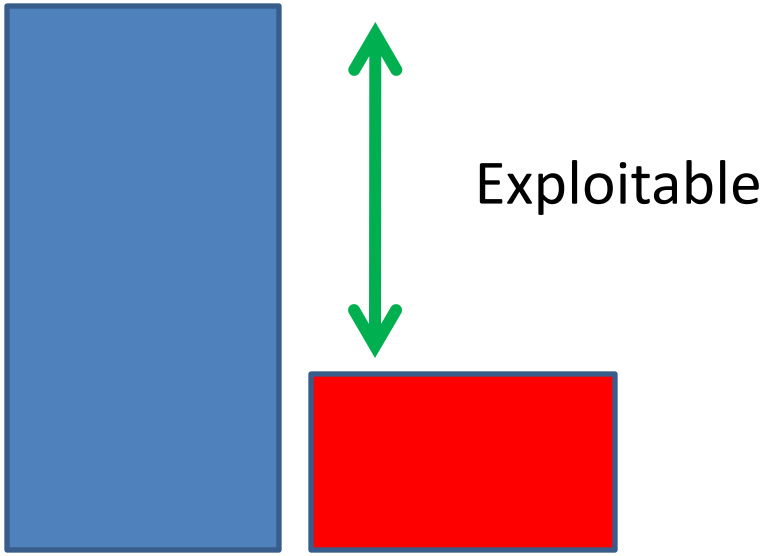
- Land preparation is mostly manual and excessively labour intensive

- 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!



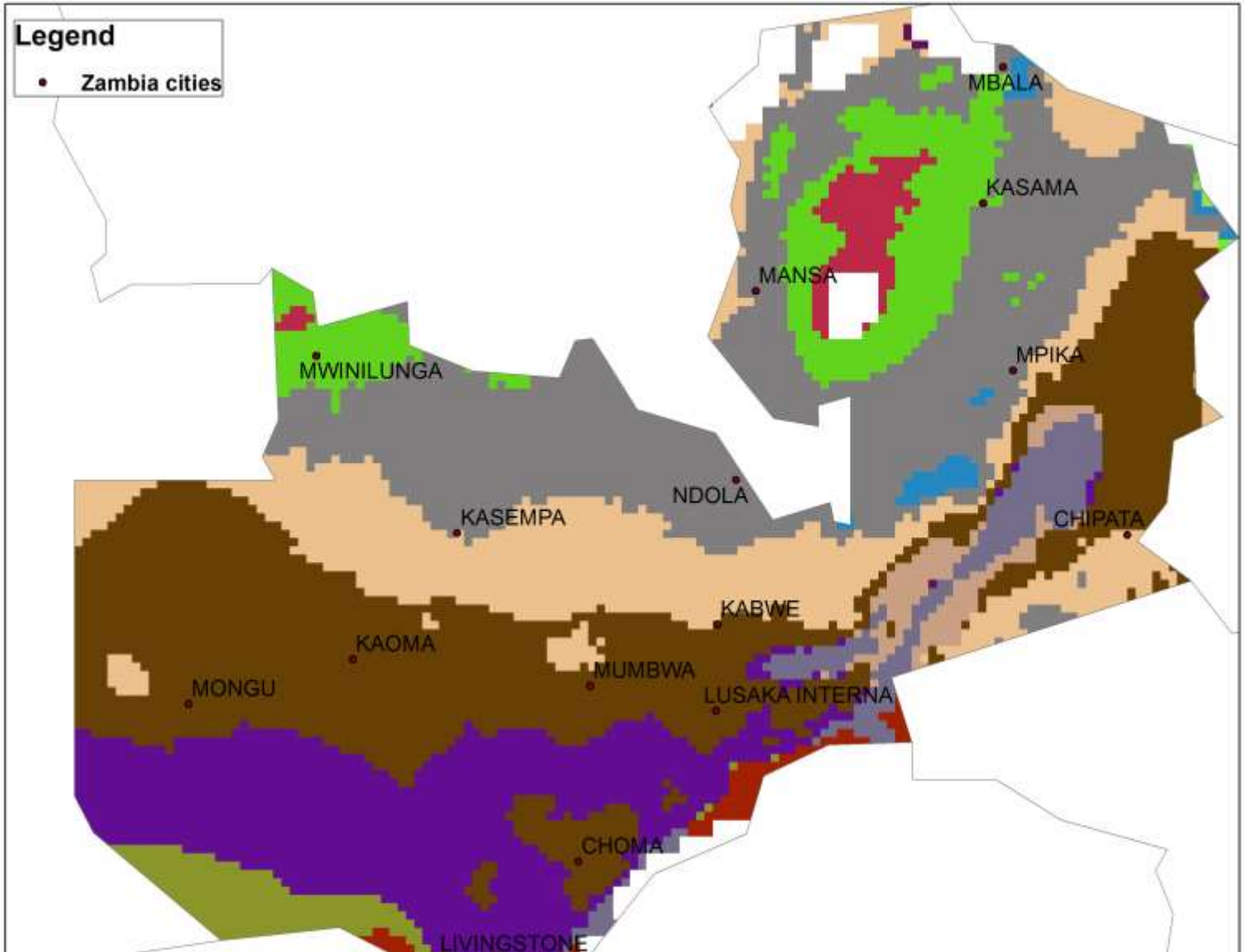
Where are the yields gaps perched

- *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).

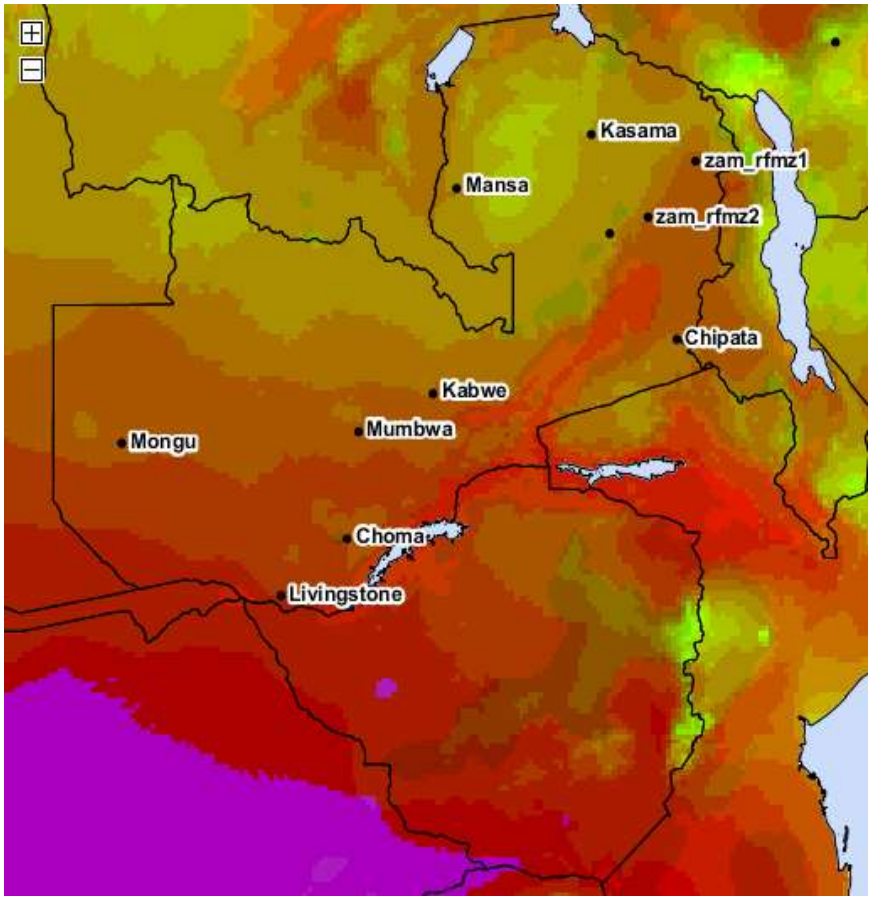
Agro-ecological zones and soils

- 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:I** ncludes 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

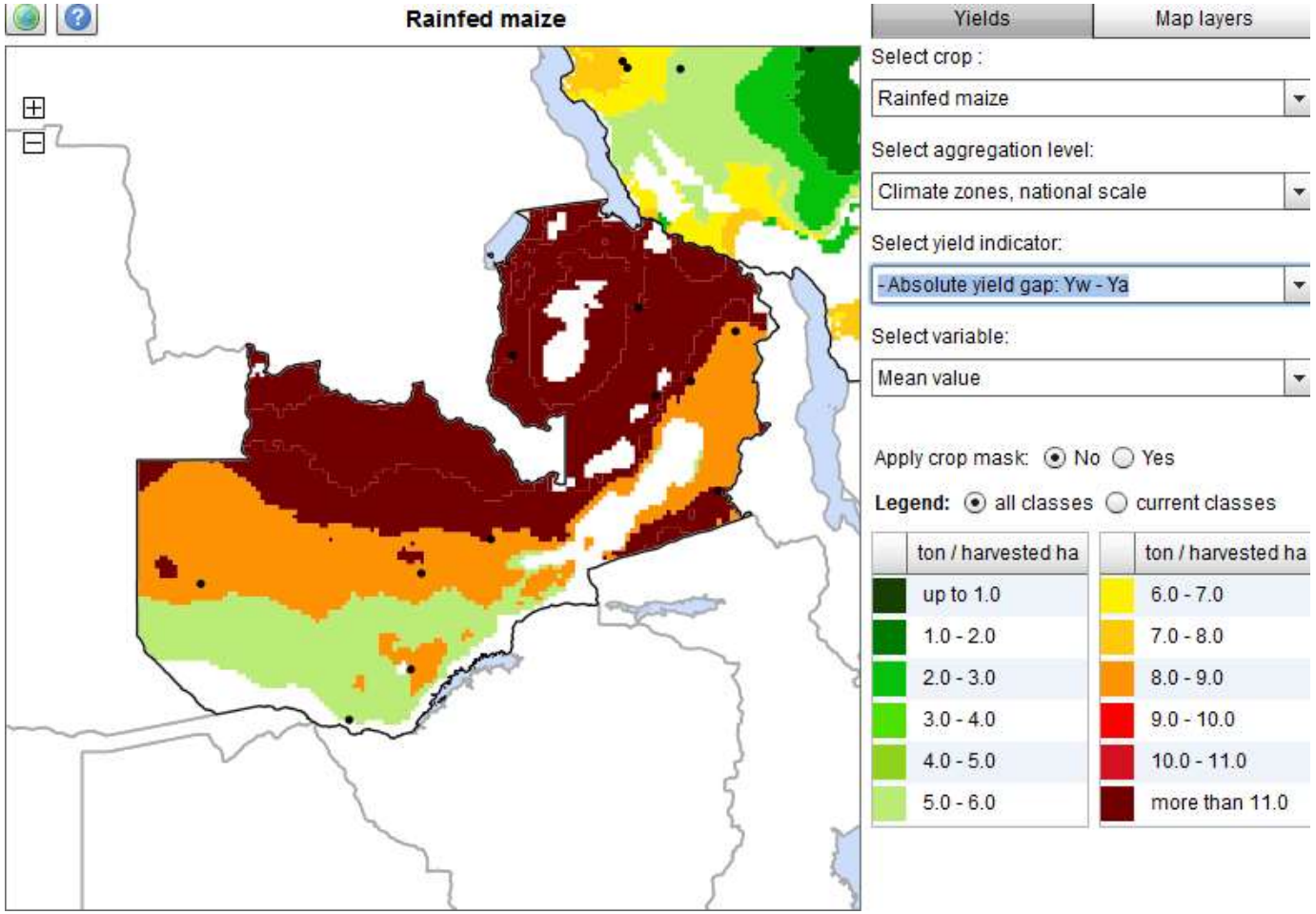
Production and yield

- 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

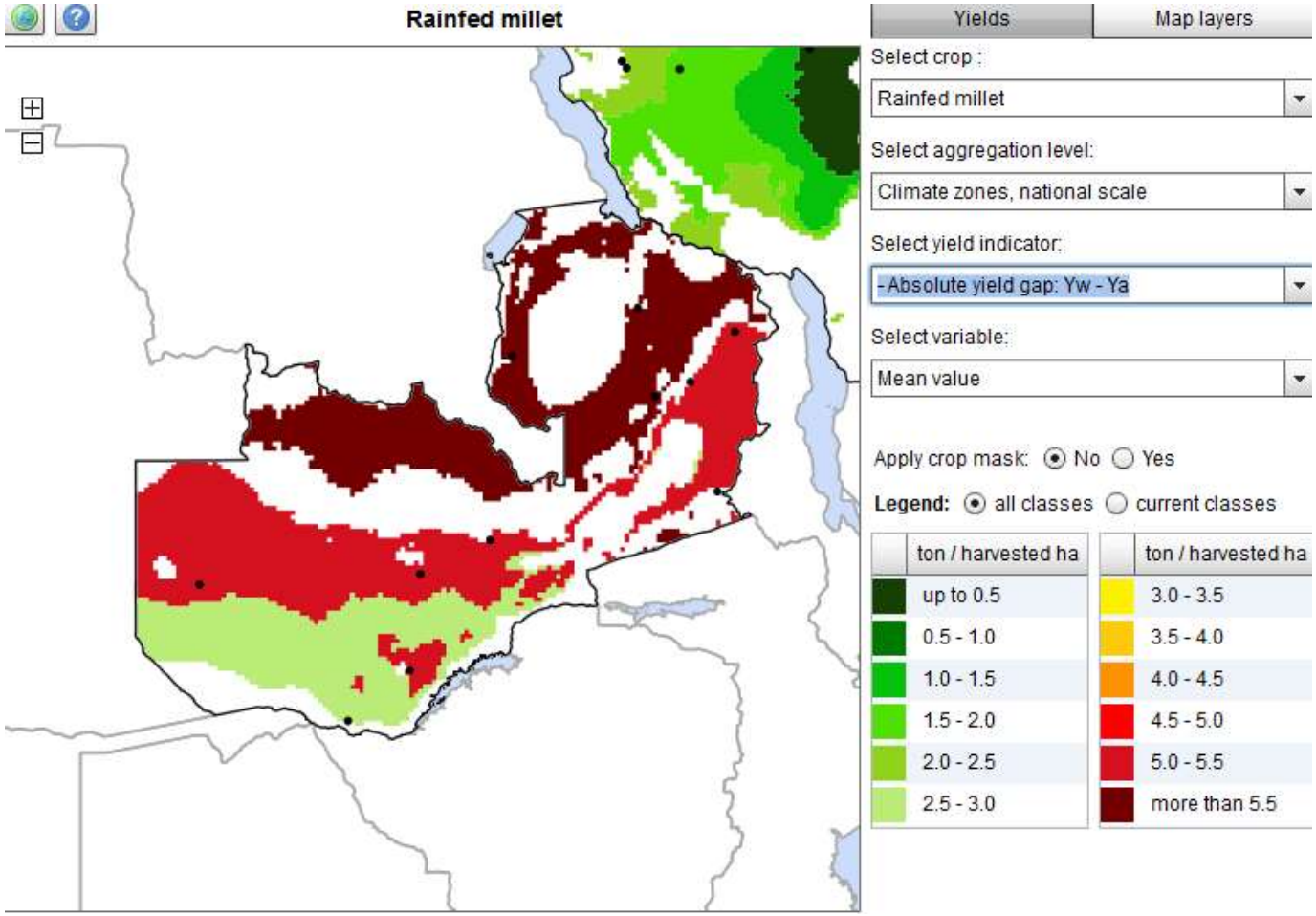
Yield gap analysis

- Crop production principally based on rainfed
- Yield gaps = Simulated water limited yields (Yw) - mean actual yields

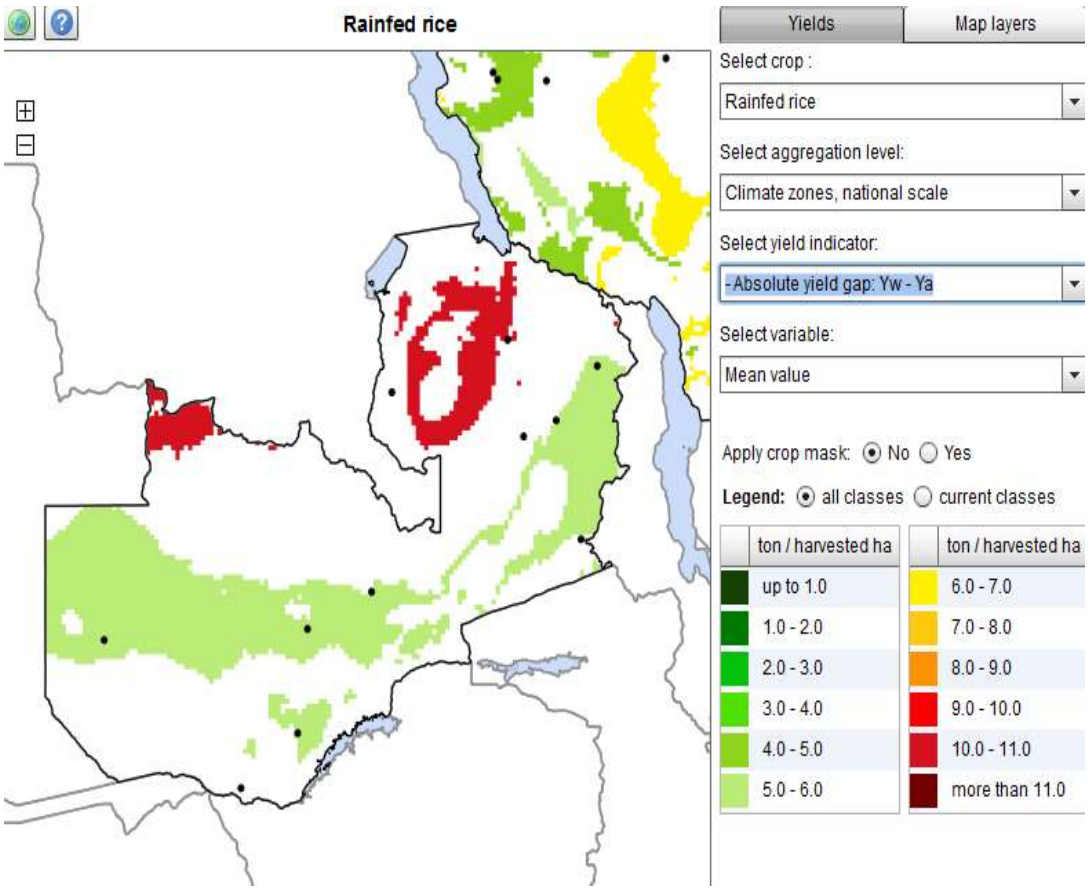
maize


Rainfed maize
Yields
Map layers
Select crop :
Rainfed maize
Select aggregation level:
Climate zones, national scale
Select yield indicator:
- Absolute yield gap: Yw - Ya
Select variable:
Mean value
Apply crop mask: No Yes
Legend: all classes current classes
ton / harvested ha
up to 1.0
1.0 - 2.0
2.0 - 3.0
3.0 - 4.0
4.0 - 5.0
5.0 - 6.0
ton / harvested ha
6.0 - 7.0
7.0 - 8.0
8.0 - 9.0
9.0 - 10.0
10.0 - 11.0
more than 11.0

Millets


Rainfed millet
Yields
Map layers
Select crop :
Rainfed millet
Select aggregation level:
Climate zones, national scale
Select yield indicator:
- Absolute yield gap: Yw - Ya
Select variable:
Mean value
Apply crop mask: No Yes
Legend: all classes current classes
ton / harvested ha
up to 0.5
0.5 - 1.0
1.0 - 1.5
1.5 - 2.0
2.0 - 2.5
2.5 - 3.0
ton / harvested ha
3.0 - 3.5
3.5 - 4.0
4.0 - 4.5
4.5 - 5.0
5.0 - 5.5
more than 5.5

rice


Rainfed rice
Yields
Map layers
Select crop :
Rainfed rice
Select aggregation level:
Climate zones, national scale
Select yield indicator:
- Absolute yield gap: Yw - Ya
Select variable:
Mean value
Apply crop mask: No Yes
Legend: all classes current classes
ton / harvested ha
up to 1.0
1.0 - 2.0
2.0 - 3.0
3.0 - 4.0
4.0 - 5.0
5.0 - 6.0
ton / harvested ha
6.0 - 7.0
7.0 - 8.0
8.0 - 9.0
9.0 - 10.0
10.0 - 11.0
more than 11.0

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)