Sustainable extensification: Breathing new life into Africa's Sleeping Giant

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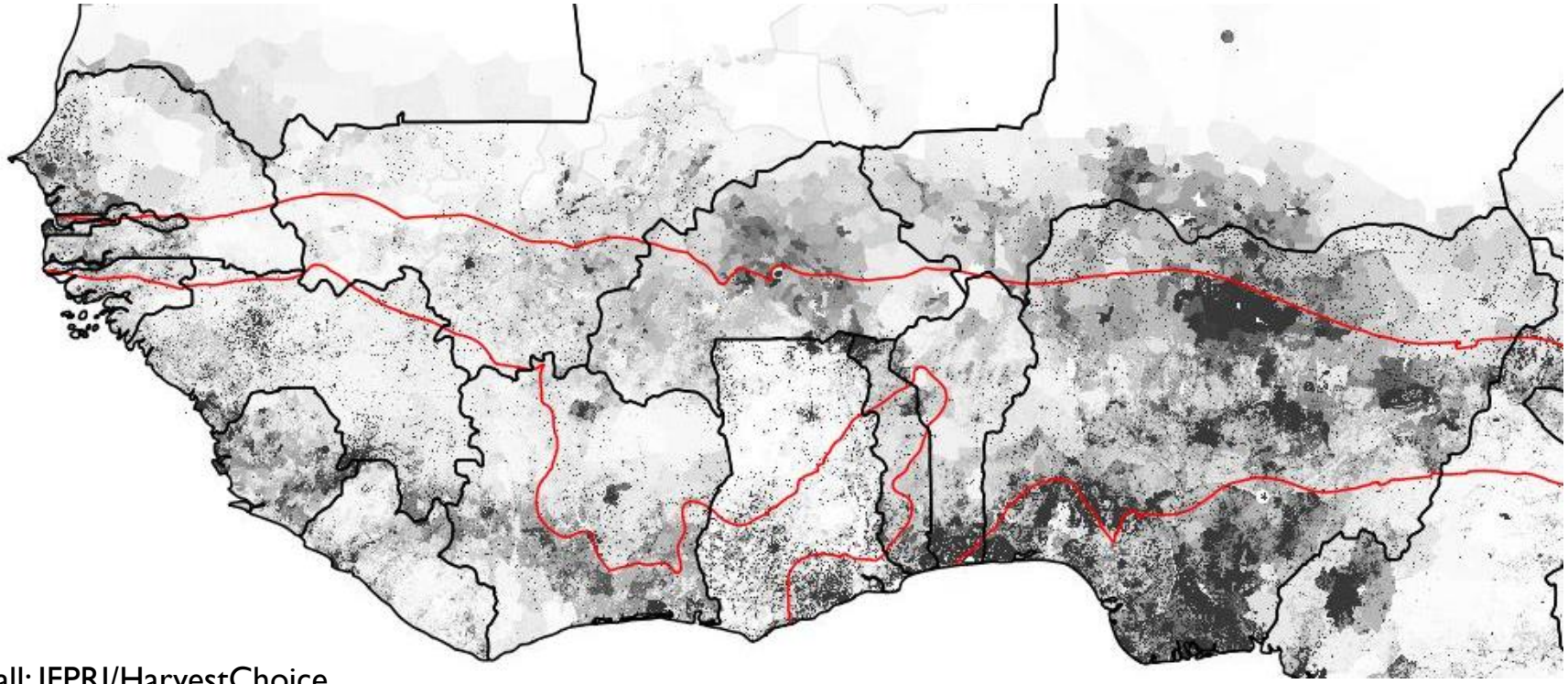
Africa's Sleeping Giant?

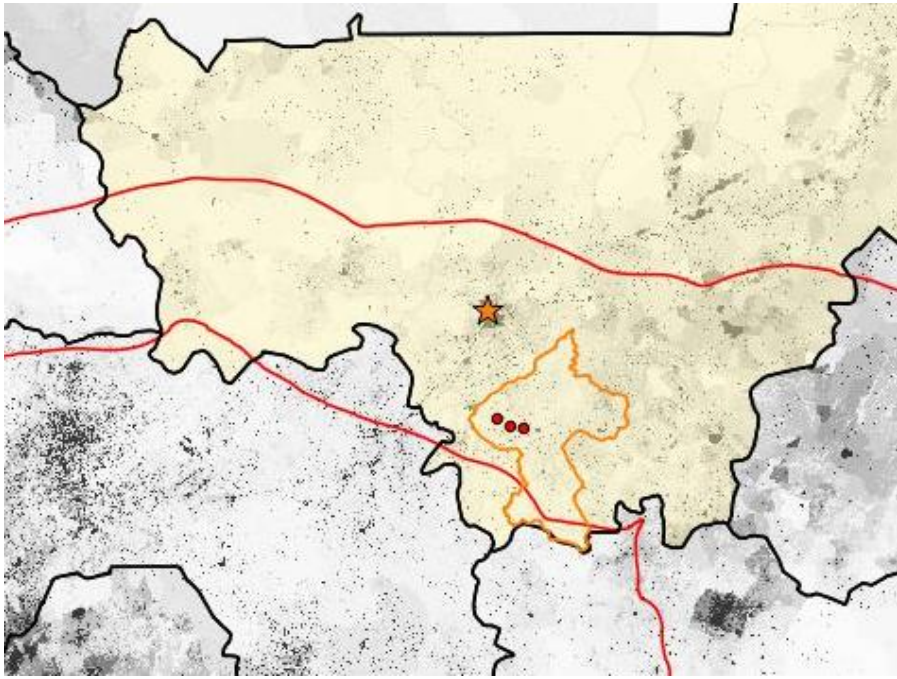
- Guinea Savannah zone has high potential for agriculture-driven growth (World Bank, 2009)
- Rainfed agriculture can be a pathway from poverty only if farmers can grow and market high-value crops, or if land expansion is possible (Harris and Orr 2014)



Rainfall: IFPRI/HarvestChoice,
Borders: FAO, Population density: WorldPop

Case Study: Bougouni, Mali

- Rainfall 1200 mm/year,
  - May-October
- Population density: 26 people per sq. km.
- Main crops: cotton, maize, groundnut
- Fertilizer availability tied to cotton production



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Can intensification or extensification of rainfed agriculture lift farmers in Bougouni out of poverty?

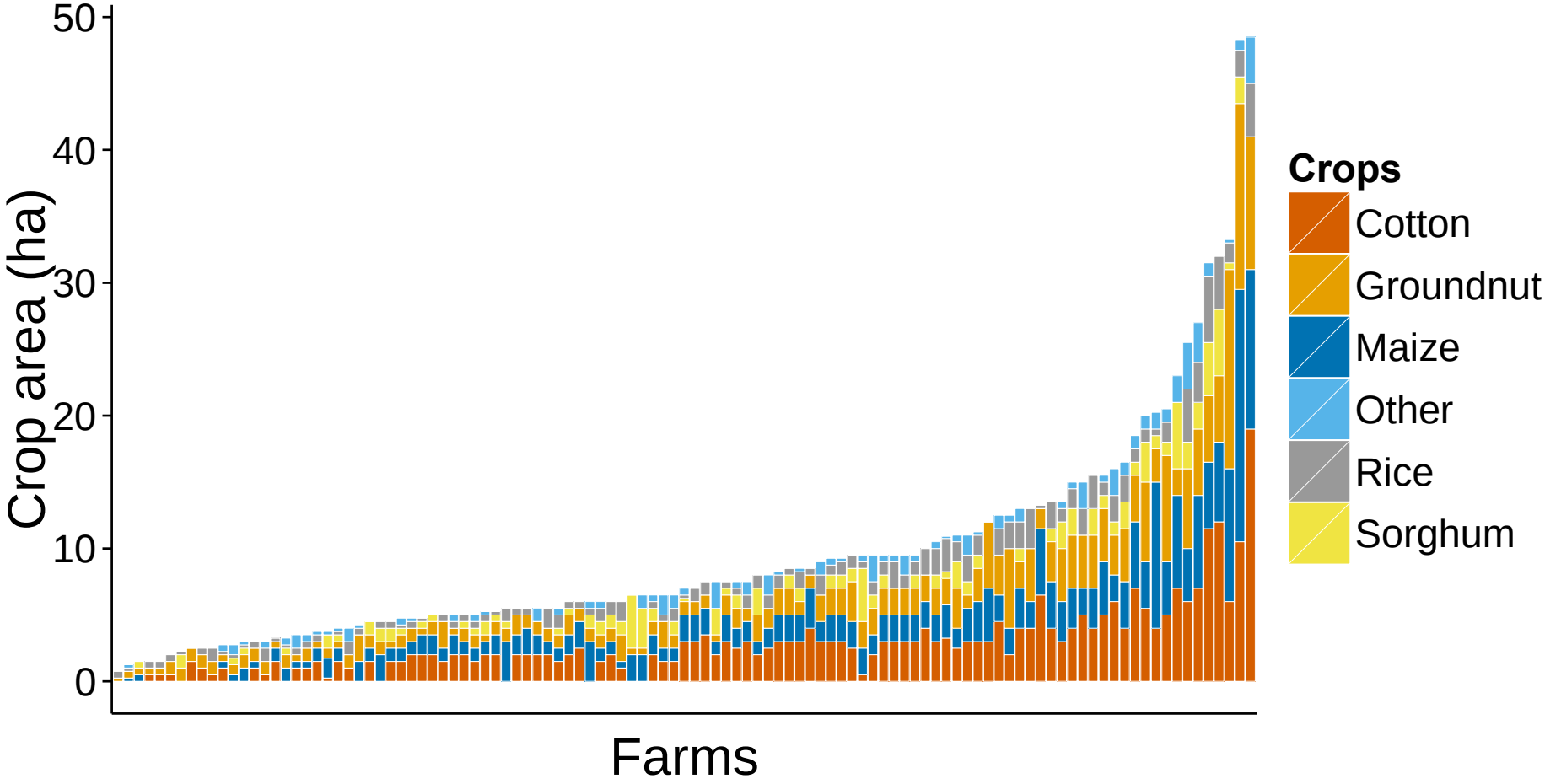
Simple scenarios, exploring a solution space

- Many scenarios, using limited data, to quickly explore options
- Input data:
  - Household survey at district level for yields, input costs (AfricaRISING baselines), market survey for crop prices
  - Rapid characterization of population of 109 farm households in 3 villages (crop areas, livestock and equipment)
  - Calculated income from crops and food self-sufficiency for each farm based on 50th and 90th percentile yields



Scenarios with current crop allocation

- Baseline: 50th percentile yields
- Yield gap reduction: 90th percentile yields



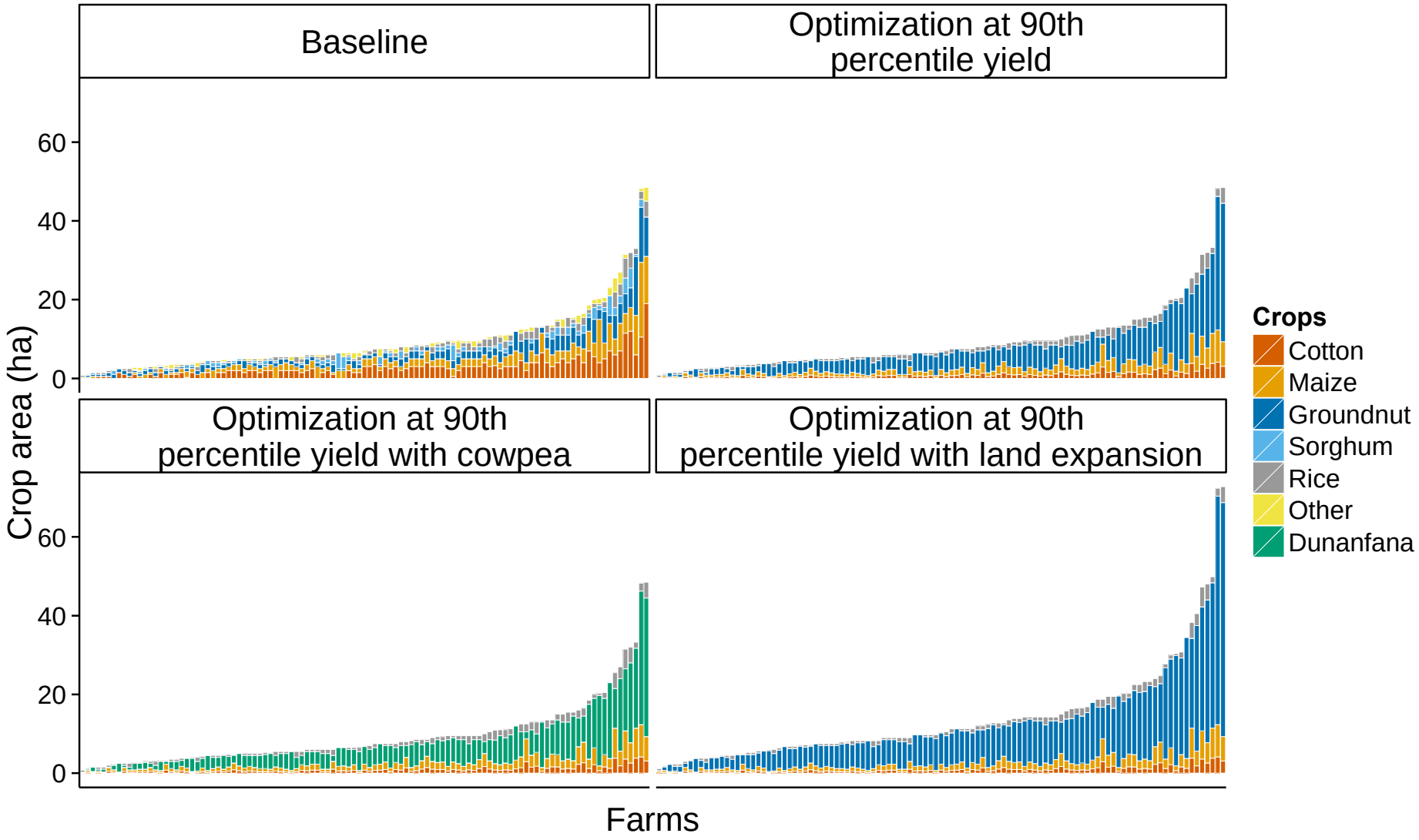
Optimization Scenarios

Maximize gross margins by re-allocating crop areas subject to constraints:

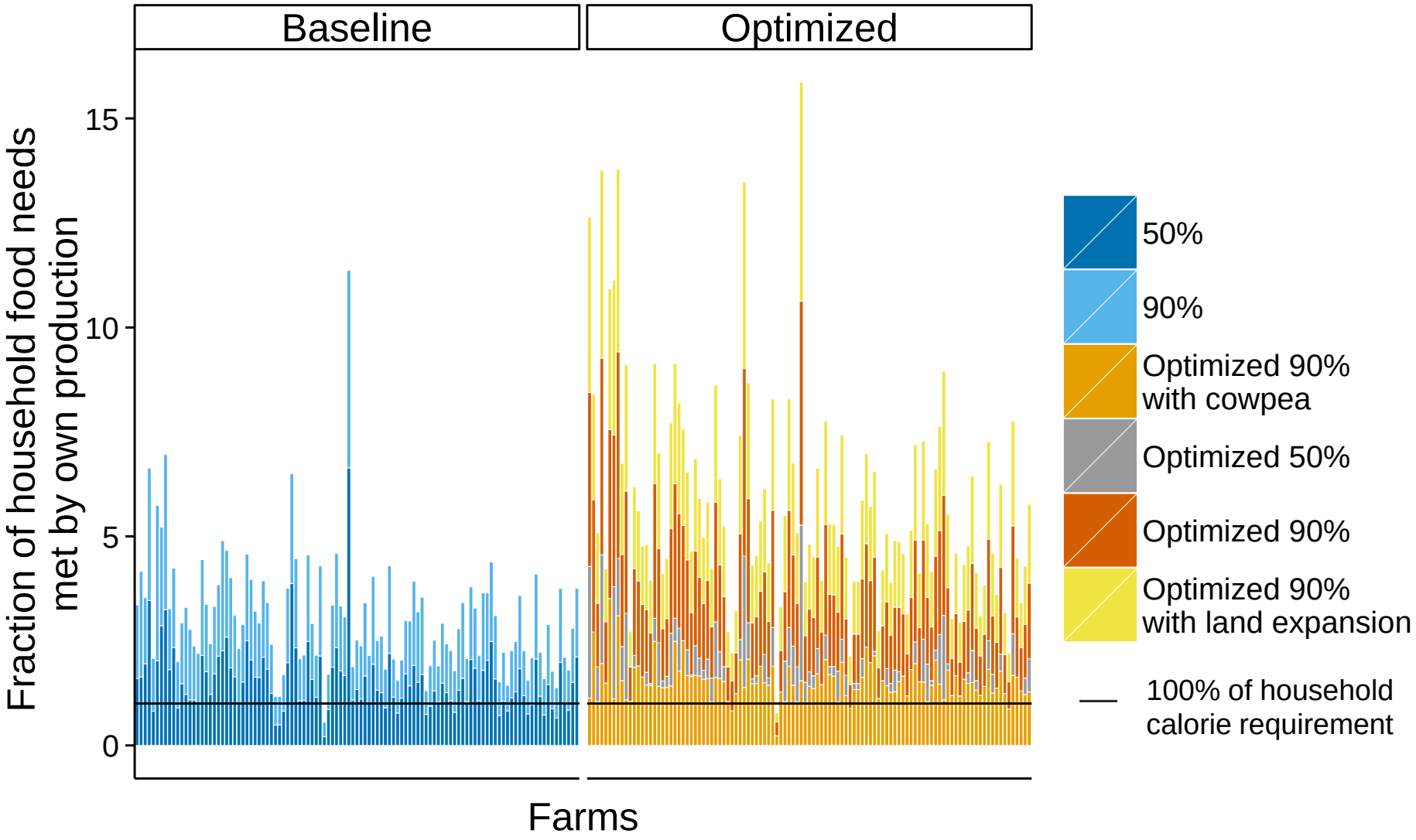
- Meet household calorie requirements with staple grains
- Maize area < twice cotton area (fertilizer availability constraint)
- Total cropped area constrained to current area (or a factor thereof)

1. With 50th percentile yields
2. With 90th percentile yields
3. Including cowpea, with 90th percentile yields
4. Allowing 50% land area expansion with 90th percentile yields

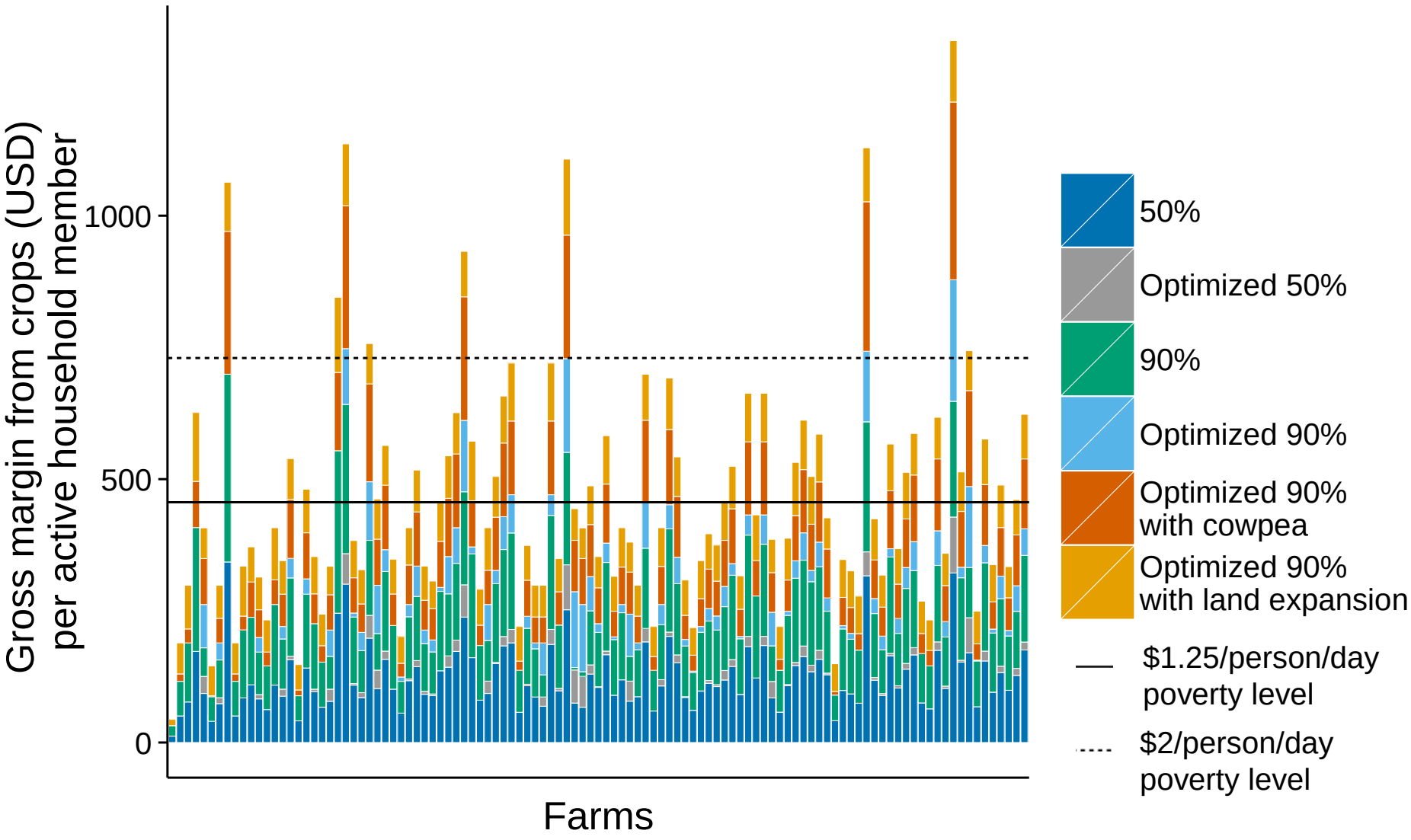
Results: Crop Area



Results: Food Security



Results: Gross Margins



What can we learn from simple scenarios?

- "Rapid prototyping" of farm designs to explore potential
- Intensification and cropland expansion improve food security, help some farms move out of extreme poverty
- … but that's it
- Optimizing dysfunctional systems vs. system redesign
- Need to consider other income sources, e.g. livestock and non-farm income

Thank You

IFPRI ARBES team
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Africa Research in Sustainable Intensification for the Next Generation

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