

Are contract farming schemes a solution to improving maize productivity and profitability?

Catherine Ragasa, Isabel Lambrecht, Doreen Kufoalor
Research Fellow, International Food Policy Research Institute

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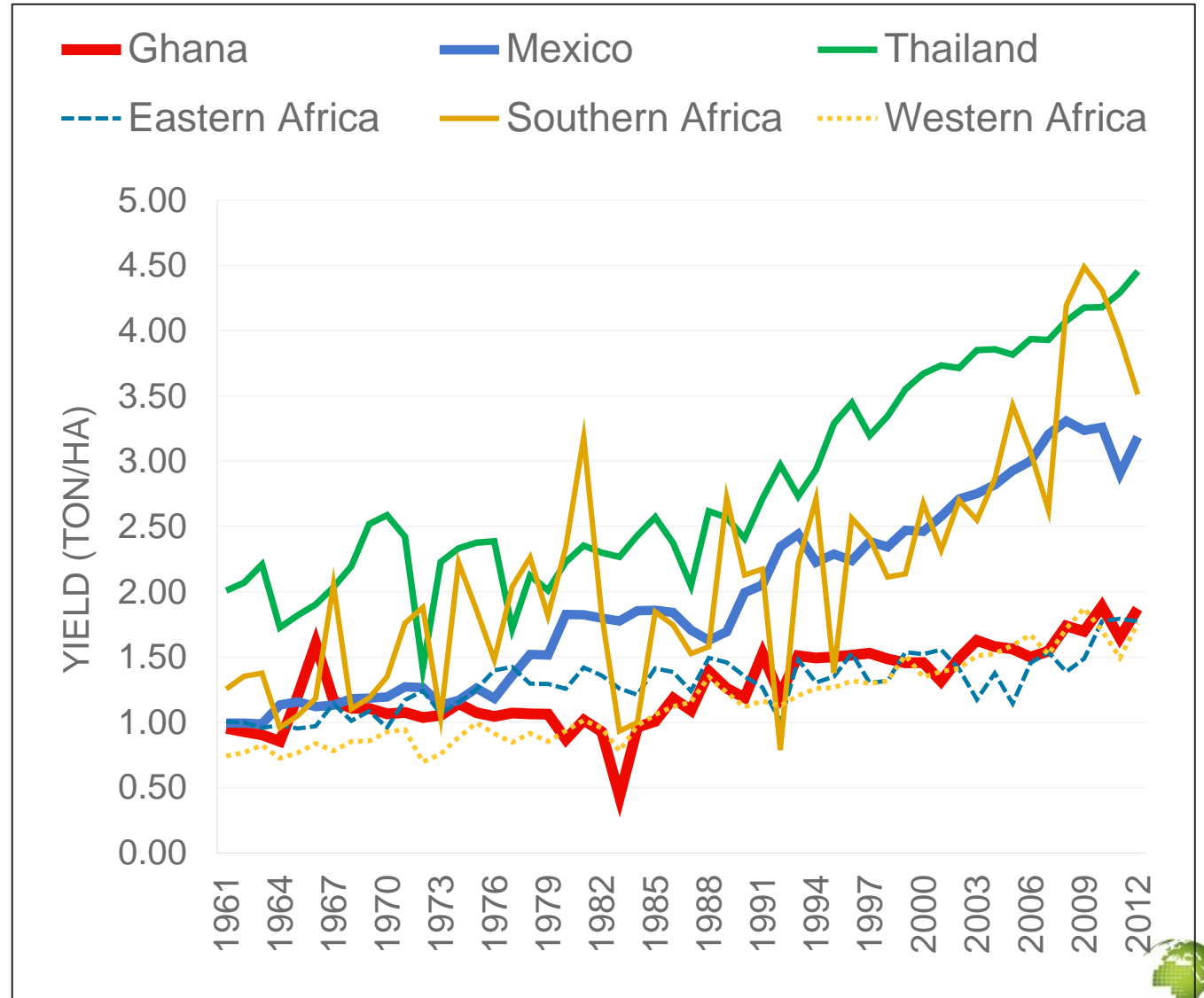
Key findings

- **Contract farming (CF) schemes are strongly associated with increased use of inputs and improved maize yields**
- **But, production costs under CF were much higher on average than those without**
- **Yield increases under CF did not compensate for these higher costs**
- **Profit margins under CF were lower on average than those without**
- **CF schemes were not profitable to farmers on average (2014/15 seasons)**



Policy Issues

- Maize = most important staple crop; >50% of total cereal production
- Also critical for the downstream industries
- Major investments in the sector, but persistently low yields
- Access to and adoption of improved technologies?



Policy Issues

- **Contract farming**
 - Block farming; SADA project
 - USAID-ADVANCE; USAID-ADVANCE/GAMSAP
 - Masara scheme; Akate scheme; Numerous other schemes, mainly with aggregators
- **Existing literature: mixed results, methodological challenges; focus on high-value crops**
- **Research questions:**
 - What is the effect of CF participation on smallholder farmers' maize yields and profits in a poor, remote region?
 - How can resource-poor farmers benefit more from these CF schemes?
 - What strategies to make CF schemes more profitable and sustainable?



Masara scheme

- Wienco; Yara; Masara N'arziki association
- From 2,900 farmers (2009) to 10,000+ farmers (2015)
- Written contract; fixed input package
- All grains harvested MUST be sold to Masara

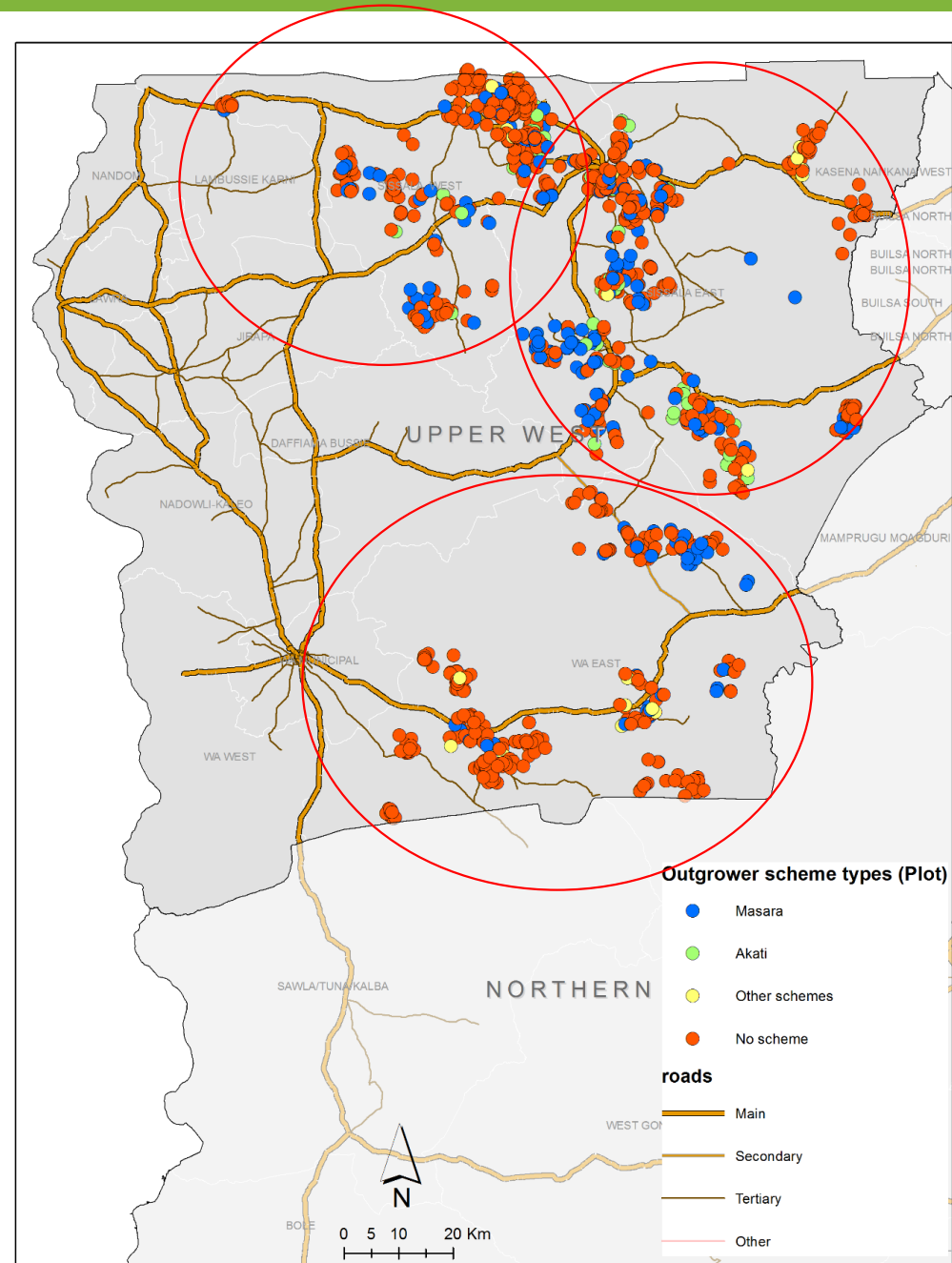
Akate farm scheme

- From 156 farmers (2011) to 695 farmers (2015)
- Consistent supply of quality maize for its poultry farm
- Similar to Masara scheme (some flexibility, offers tractor services, no requirement for surplus)

Aggregator schemes

- 20 to 600 maize outgrowers each
- Informal (no written contract); and flexible depending on the need of farmers



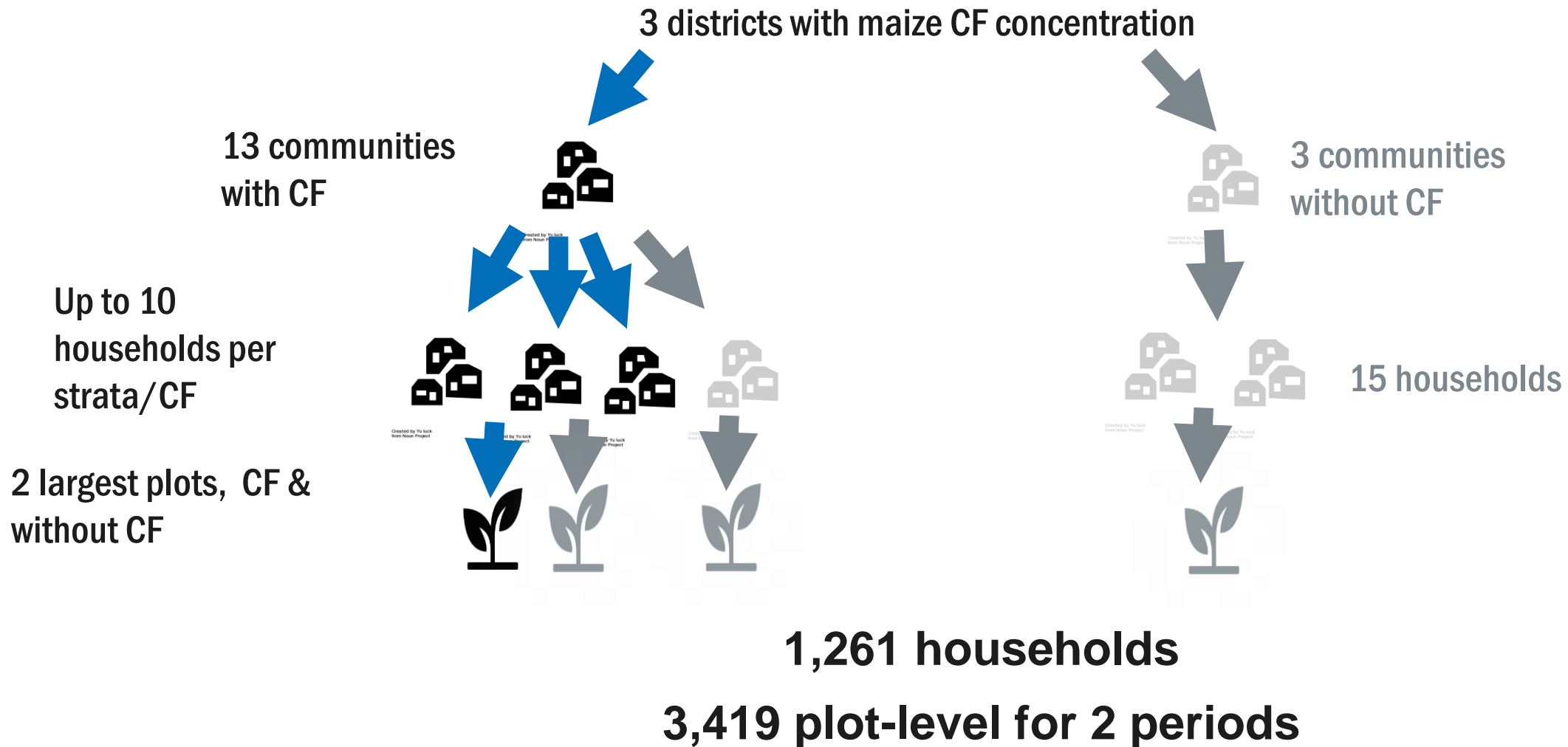


- CF schemes were concentrating
- Relatively higher yields
- Dry climate (more easily dried and preserved maize)
- Highest level of poverty in Ghana (71% below the poverty line)
- Remote, making CF attractive



Details of the Study

Household survey implemented in February-March 2016
(cross-sectional data , with 1-year recall, 2014-2015)



Additional data collection

- **Community-level survey**
- **In-depth interviews with firms and aggregators operating the maize CF schemes**
- **In-depth interviews with poultry and aqua feed processors**



Methods

Matching methods

- Kernel, Nearest Neighbor, Inverse-probability-of-treatment weighting
- Rosenbaum bounds to check how sensitive the results are to hidden bias due to unobserved heterogeneity
- Critical value for bias from unobserved heterogeneity is high (more than 10 in most cases), indicating that the results are not sensitive to hidden bias caused by unobserved heterogeneity

Instrumental variable approach

- Instrumented for participation in scheme
- Proportion of scheme j participants in the village, minus the farmer under consideration, i
- Migrant to the village



Difference in characteristics (with and without CF)

- **Small difference between those with-CF and without-CF plots and HHs**
 - > female farmers among those without-scheme, implying some gender-related constraint in scheme participation
 - Not clear if wealthier HHs are more likely to participate in schemes and whether “better quality” plots are selected or not for schemes
- **Some differences across schemes**
 - Wealthier farmers are more likely to participate in the Masara scheme
 - Poorer households are more likely to participate in other schemes
 - Farmers under the Masara and Akate schemes have larger landholdings
 - “Better plots” appear more likely to be under Masara and Akate



Outcomes Being Studied

- Input use (fertilizer, hybrid seeds, improved practices)
- Yield
- Cost per unit of maize harvested
- Profit margin

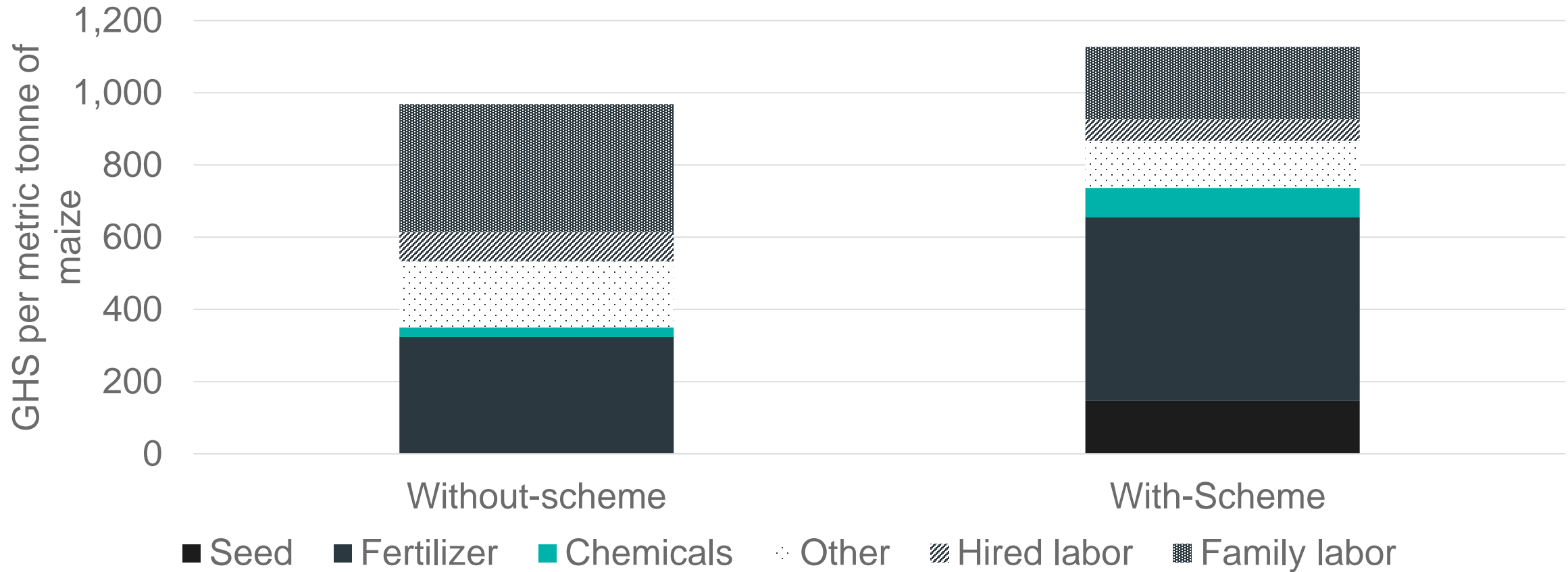


Results

- **Input use: CF schemes are strongly associated with increased use of inputs and improved maize yields**
 - Fertilizer: 118 kg without scheme compared to 230 kg under Masara/Akate schemes and 150 kg under informal schemes
 - Certified seed: 12% farmers without scheme versus 100% under Masara/Akate scheme and 75% under informal schemes
 - Improved practices: 21% without scheme versus 78% under Masara/Akate scheme and 48% under informal schemes
- **Yield: CF schemes are strongly associated with improved maize yields**
 - 660 kg/acre compared to 1,230 kg/acre under Masara/Akate scheme and 720 kg/acre under informal schemes
 - Average treatment effects of CF participation on yields were 480-780 kg/acre



- **Cost to produce 1 mt of maize was higher under CF**



- Production costs under CF were so much higher than with CF
- Yield increases did not compensate for these higher costs on average



Results

- **Average profit margins are lower under CF schemes**
 - 205 GHS/acre without scheme compared to 2 GHS/acre under Masara/Akate schemes and 12 GHS/acre under informal schemes
 - Average treatment effects of CF participation on PM were – GHS178 to – GHS 248
 - **Further, profit margins were squeezed because contract terms often leave farmers with less than market prices**
 - 30-40 GHS/bag maize prices under schemes versus 40-50 GHS/bag market price
 - 100-125 GHS/bag of fertilizer under schemes compared to 90 GHS/bag market price
 - **Farmers would voluntarily get into contract only if they make higher profits**
- 22% dropout rates from Masara and 46% from informal schemes in 2015



Options for increasing farmer's profits under CF

(1) Adjusting contract design → some + effect on farmers' profits

- GHS 510–770/acre in-kind credit valued at market prices while the required repayment is GHS 810–1100/acre after five to six months during harvest season
- 29–59% imputed interest rate
- Increased average treatment effect from – GHS246 to + GHS39

(2) Reintroducing fertilizer subsidy (50%) → large + effect on farmers' profits

- Increased average treatment effect from – GHS246 to + GHS150

(3) Improving technologies being promoted in CF schemes (Pioneer 30Y87, > 50% higher yields) → large + effects on farmers' profits

- Increased average treatment effect from – GHS246 to + GHS280



Conclusions and Policy Lessons

- CF schemes are critical for downstream industries
- CF offers good profits to firms and aggregators
- CF schemes were not profitable for smallholder farmers on average during 2014-2015 seasons
- Profit margins of smallholder farmers were lower on average under CF than without
- What are some options?
 - Negotiation among farmers and firms for better, fairer contract terms *
 - Fertilizer subsidy, but there are also high social cost, leakage, and implementation challenges **
 - Much-improved technologies (better performing hybrids, for example, the Pioneer 30Y87) ***



Thank you