

Cultivating knowledge: Agriculture across the disciplines

Presented in collaboration with the
USask Agriculture Signature Area of Research



SIGNATURE AREA
AGRICULTURE

Agriculture and Gender

Sabine Liebenehm

October 2, 2024



**QUEEN
ELIZABETH**
Scholars

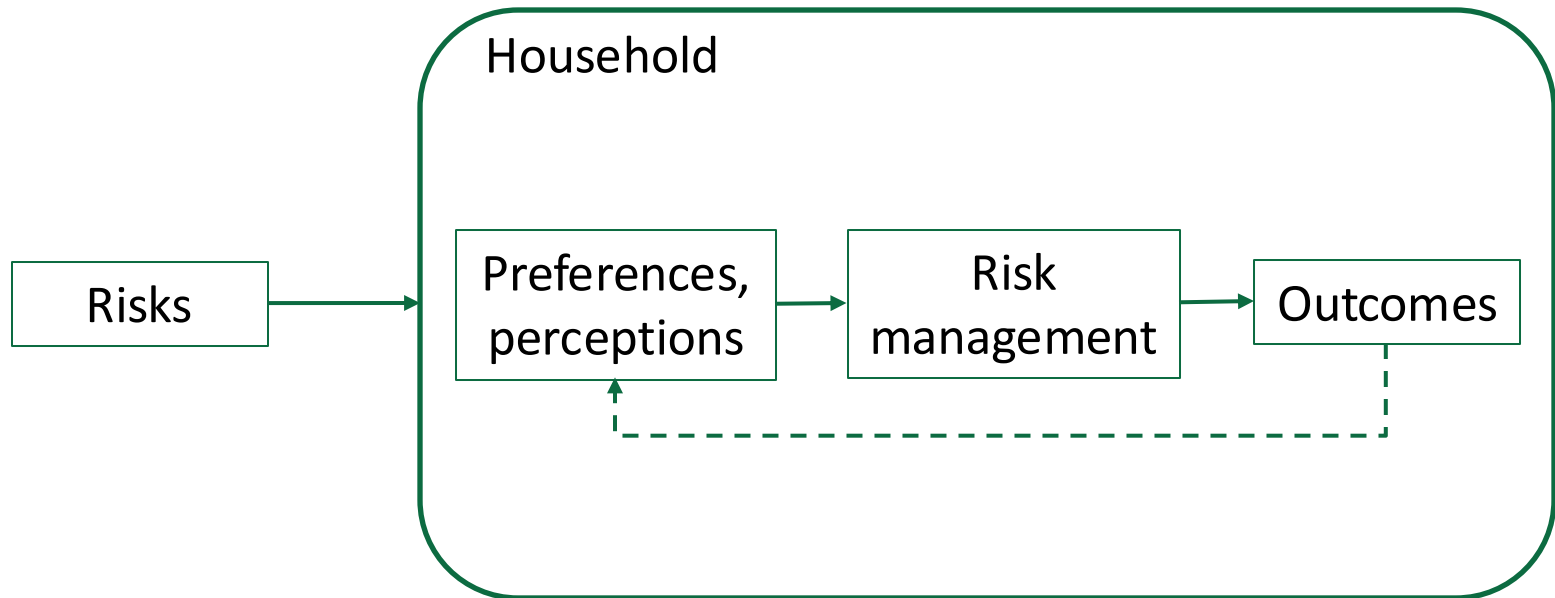


My research program



Research program: Overall objective

To improve our understanding of the economic decision-making among households living in rural and remote settings often exposed to an adverse environment with limited access to formal safety net mechanisms



Research program



- Environmental shocks

- Migration

- Water security

**QUEEN
ELIZABETH**
Scholars

- Farmer-led irrigation

- Farm performance

QES-AS West Africa

- Climate-smart ag. practices



Case: Gender Productivity Gap in Farmer-Led Irrigation in the Upper East Region of Ghana

with Mercy Abarike



UNIVERSITY FOR
DEVELOPMENT STUDIES

QUEEN
ELIZABETH
Scholars

QES-AS West Africa



Gender Productivity Gap in Farmer-Led Irrigation

- Informal small-scale irrigation systems play a significant role in Ghana's irrigated agriculture (MOFA 2021)



This study aims to

- Investigate whether and to what extent gender inequalities exist in FLI vegetable production in the UER
- Quantify mechanisms of inequalities that can be attributed to differences in resource use and differences in returns to resources between women and men FLI practitioners



Gender differences can be due to

- Different quantities and/ or qualities of inputs
- Differences in input use
- Differences in opportunity costs of time
- Differences in risk preferences → different crop choices



Our expectation: Lower yields on women's irrigated plots may be explained by gender differences in the level and returns of production factors

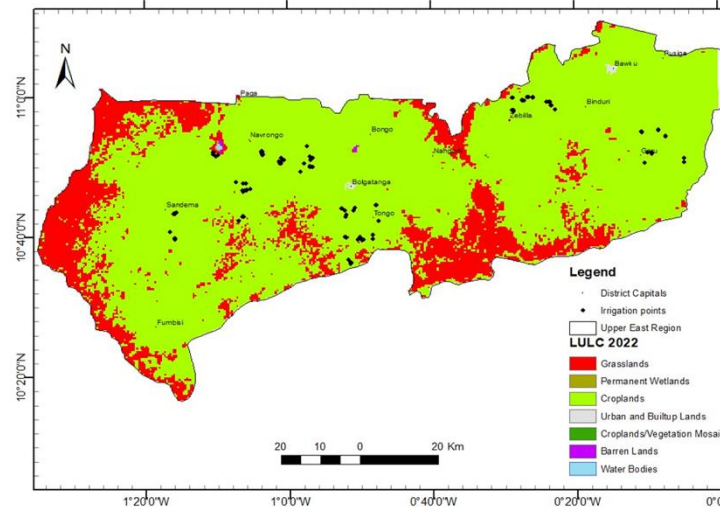


Study area

Upper East Region

Multi-stage sampling:

- 5 districts purposively sampled
- Identification of villages with dominant FLI system and random selection of 1-3 villages per system
- Snow-ball sampling to identify FLI practitioners
- Total of 250 farmers in 24 villages interviewed between August 2022-February 2023
- 58 women and 192 men



Descriptives

Productivity measures	Pooled	Men	Women	Diff in Means
Harvest value (USD/ha)	1,845.29	2,074.37	1,086.95	987.42***
Farm characteristics				
Land size (ha)	2.16	2.25	1.84	0.41***
Irrigation technology				
Manual	0.18	0.12	0.34	-0.22***
Pump	0.70	0.77	0.50	0.27***
Gravity	0.10	0.09	0.14	-0.04
Other	0.02	0.02	0.02	0.00
Observations	250	192	58	



Descriptives

Agricultural input use	Pooled	Men	Women	Diff in Means
Water (USD/ha)	221.71	231.76	188.44	43.32**
Equipment (USD/ha)	89.25	91.21	82.77	8.44***
Labor (USD/ha)	788.57	873.83	506.35	367.48***
Use family labor (binary)	0.70	0.66	0.83	-0.17**
Use hired labor (binary)	0.57	0.58	0.53	0.04
Inputs (USD/ha)	498.27	488.04	532.11	-44.06
Other (USD/ha)	369.86	395.07	286.38	108.69
Number of crops grown	1.56	1.62	1.36	0.26**
Observations	250	192	58	

Note: Monetary values are measured in 2022 PPP USD (1USD = 6.8GHC). Differences in means between Men and Women are based on Wilcoxon rank-sum test and the Fisher's exact test. Alpha = 0.05. ***, **, * denote $p < 0.01$, 0.05, and 0.1, respectively.



Main findings from empirical analysis

- Unadjusted gender gap in FLI of 76.1% (~ \$987.42/ha)
- 58.39% of average FLI gender gap is due to differences in resources (endowment effect), while 41.61% can be attributed to structural differences in returns to resources
- Endowment effect > Structural effect (except for the lowest productivity percentile)
- Statistically significant gender productivity gap ranges between 56.9% and 103.3% and prevails up to the 70th productivity percentile
- Land size increases the gender gap especially among more productive FLI practitioners (>50th percentile)



Main findings from empirical analysis

- More productive women have higher returns to factors such as labor, education/knowledge (from extension services), capital (credit, off-farm employment), and social networks
- Less productive women exhibit negative returns to these factors
- Irrespective of women's productivity, being divorced or widowed, number of crops grown, experience in irrigation, being mainly engaged in rain-fed farming work towards an increasing gender gap



Policy implications

- Empower women by easing barriers to access affordable, readily available credit to enable them to cultivate larger areas of land
- Strengthen productive women and ease barriers to access knowledge, capital, and labor beyond own family pool
- Facilitate exchange and collaboration between more productive and less productive practitioners, e.g., through self-help groups
- Deliberately direct community interventions at empowering resource-poor and vulnerable groups, including single mothers, widowed, or divorced women.



Thank you for your attention!

Questions & comments?

sabine.liebenehm@usask.ca

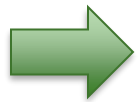


Agriculture in Sub-Saharan Africa



Agriculture in SSA is characterized by

- Small scale: on average < 2ha and non-contiguous (Samberg et al. 2016)
- High vulnerability to climate change: 34% decrease in productivity since 1961 (Adelekan et al. 2022)
- Low tech, low extent of irrigation: 3.8% of crop land (Lal et al. 2015)
- Infertile soils (Otter et al. 2007)
- Low fertilizer application: on average 22kg/ha/year (FAO 2020)
 - Limited availability of and access to fertilizer
 - Lack of extension services



Relative yield gap: min 20% ([Global Yield Gap Atlas 2024](#))



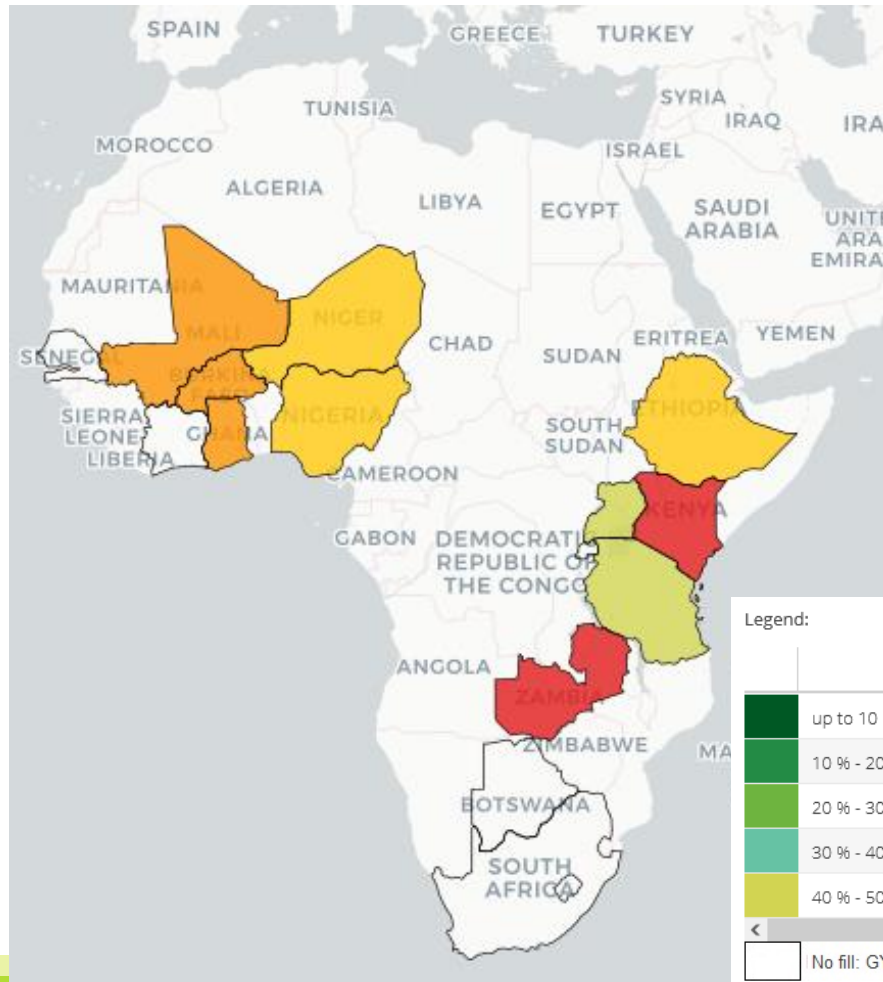
Factors associated with agronomic practices use in SSA

- Wealth and wealth-related factors (farm assets, land size, livestock, access to credit)
- Tenure insecurity and land fragmentation
- Gender differentials
- Information access and social capital incl. farm groups
- Infrastructure conditions (Source: [Arslan et al. 2022](#))
- Downside risk (Adelekan et al. 2022)
 - Shift from productivity enhancing to damage control inputs
(Alem et al. 2010; Kusunose et al. 2020; Jagnani et al. 2020)



Relative Yield Gap

Rain-fed millet



Rain-fed maize

