Cattle as technological interventions: The gender effects of water demand in dairy production in Uganda

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Research completed with funding from the National Science Foundation

Abstract

Smallholder dairy production dominates the country of Uganda, with over 90% of the national herd owned by smallholders. To reduce hunger, malnutrition, and raise families out of poverty, agricultural development interventions in Uganda have focused on increasing milk production through the introduction of improved dairy cow breeds. Development actors, such as the East Africa Dairy Development (EADD) program in Uganda, see crossbreed dairy cows as a key technological intervention for improving production. Drawing on a multi-method study (spatial analysis, surveys, and qualitative interviews) of dairy smallholders, our paper examines the gendered effects of the introduction of crossbreed dairy cows. To ensure peak performance, improved breeds require more inputs (e.g., water, feed, and medicine), which are labor and time intensive with specific gendered outcomes. Our findings reveal that both men and women identify fetching water as one of the greatest challenges in maintaining dairy cows, but women and children disproportionately fetch the water and women have higher reported rates of time poverty. Water quality is also an issue, with smallholders struggling to provide clean water to cows, and our basic water testing reveals water sources with high nitrate levels that can be harmful for children and dairy cows.

Highlights

- We analyzed the introduction of dairy cow crossbreeds as technological interventions
- There are several negative effects of introducing crossbreeds:
  - Crossbreeds require more water to survive
  - Women and children disproportionately carry the burden of water collection for households, with variations by age (see Fig. 4)
  - Women report higher instances of time poverty
- Water sources used included ponds and open wells, boreholes, covered wells, protected springs, and rainwater collection
- There were several water-related concerns:
  - Water scarcity
  - Breaking down of boreholes
  - Some sources sampled had nitrate levels above recommended amounts
  - Women disproportionately contributed to water source upkeep

Methods

- Household surveys (172)
- Individual surveys (318)
- GPS coordinates
- GPS tracks (measuring distance to water sources)
- In-depth interviews
- Basic water quality testing (pH and nitrate/nitrite)

Survey Sites

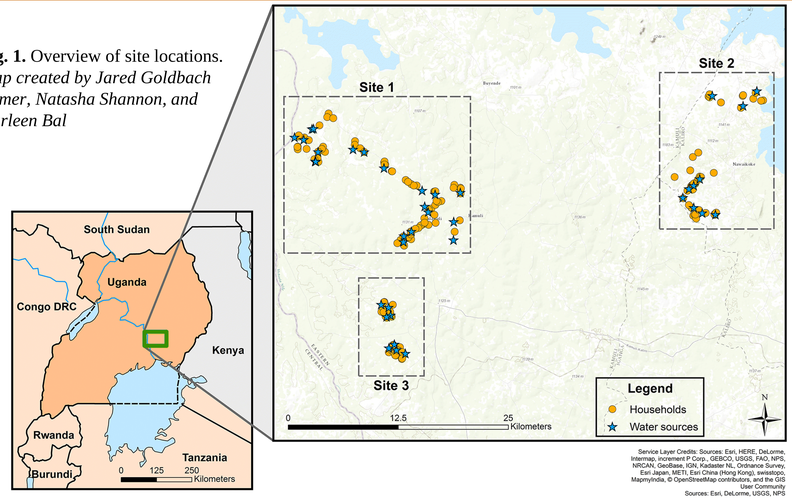

Fig. 1. Overview of site locations. *Map created by Jared Goldbach Ehmer, Natasha Shannon, and Harleen Bal*

Fig. 2. Borehole well and jerry cans used to hold and transport water. *Photo taken by Harleen Bal*

Fig. 3. Cattle traveling along rural road. *Photo taken by Harleen Bal*

Survey Results

	EADD 400s (high performing)		EADD 500s (low performing)		Non-EADD 600s		
	No.	%	No.	%	No.	%	Total for all HHs
HH surveys	75	43.60	46	26.70	51	29.70	100%
Woman-headed households	14	18.70	4	8.70	8	15.70	15%
Average household size (number of individuals)	8	—	8.6	—	7.2	—	7.9
Working own farm/raising livestock[a]	60	82	41	91	46	96	89%
Percentage of HH with crossbreed dairy cows	—	65	—	11	—	59	48%
Primary flooring							99%
Earth/mud floor[b]	40	53	24	53	19	37	49%
Concrete/cement[b]	34	45	21	47	31	61	50%
Primary cooking fuel							
Firewood[b]	72	96	44	98	50	98	97%
Primary light source							82%
Lanterns/candles[b]	29	39	15	33	37	73	47%
Solar[b]	30	70	20	44	10	20	35%

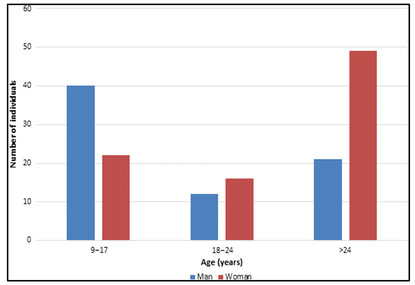

Fig. 4. Gender and age of primary person fetching water from source.

Table 1. Demographic information of households surveyed.
Note: HH, household; EADD, East Africa Dairy Development.
[a]Out of a subset of 166 of the total sample of 172 due to individuals who did not identify an occupation due to illness or old age.
[b]Out of 45HH in EADD Eastern.

Water Quality

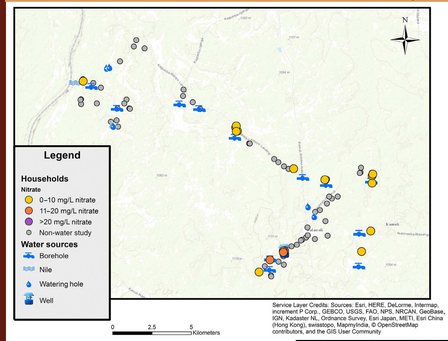

Fig. 5. Nitrate levels of water sources, East Africa Dairy Development 400s (site 1).

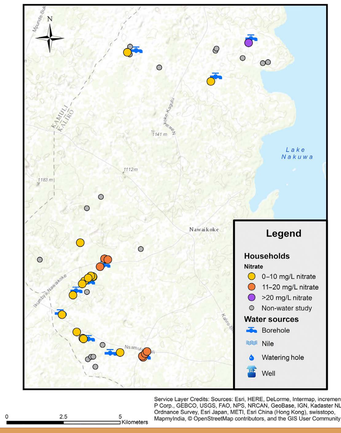

Fig. 6. Nitrate levels of water sources, East Africa Dairy Development 500s (site 2).

Conclusions

We concluded that the technological intervention of introducing dairy cow crossbreeds, while aimed at reducing poverty and gender inequality, ultimately had several unintended consequences despite increasing milk production. The increase in demand for water for the livestock created a disproportionately large strain on women's time and labor, thus increasing their health risks and time poverty. Additionally, the difficulties of collecting water were compounded by water scarcity experienced in the dry season, the breakage of boreholes, and the poor quality of several water sources tested.

This study serves as a beginning point for further exploration; other studies have examined the differences in ways water is collected (via bikes, head, hands, etc.) and the social scene surrounding water sources, both of which tend to negatively impact women and children. In this study, we have outlined that time poverty is gendered in Uganda, as women and children provide the majority of dairy cow-related labor. Thus, future projects utilizing technological interventions such as crossbreed dairy cows should address the social, political, and environmental contexts in which they take place.

Acknowledgements

Funding for this project was provided by the National Science Foundation, Sociology Program, Division of Social and Economic Sciences, Directorate of Social, Behavioral, and Economic Sciences, Award number 1458989. We would like to thank all of the farmers who took the time to participate in our research, the staff of the EADD/Heifer Uganda office, and Research Associates of Uganda for their assistance with fieldwork. Special thanks also to Jared Goldbach Ehmer, Taylor Holden, and the other staff of the Spatial Analysis Lab at UR for assistance with the spatial data, and Emily Southard at Iowa State University for her research assistance. Finally, thanks to two anonymous reviewers for their valuable feedback on an earlier draft of this manuscript.