IMPACT STUDY

Evaluating How Root Capital's Client Businesses Impact Smallholder Livelihoods: Sorghum in Ghana

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ACKNOWLDGEMENTS

This study would not have been possible without the important contributions of many individuals and institutions. We would like to thank Faranaya and its employees for participating in this study and actively supporting its implementation. We would also like to thank the hundreds of smallholder sorghum farmers in Ghana who generously shared with us their time, perspectives, and opinions. We're grateful to the entire Participatory Development Associates (PDA) team and enumeration staff who coordinated and conducted household surveys, and to Ibrahim Ouattara for his excellent oversight of data collection. This study benefited greatly from the technical guidance of our independent advisor, Dan Stein. We also thank the numerous Root Capital staff whose work on this study was instrumental, including colleagues from our Lending, Advisory, Creative, and Impact teams. Finally, we'd like to extend our gratitude to the Mastercard Foundation, whose partnership and generous support made this study possible.

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EXECUTIVE SUMMARY

Root Capital

Root Capital invests in the growth of agricultural enterprises so they can transform rural communities. These businesses purchase crops such as coffee, cocoa, or grains from smallholder farmers. With growth, they become engines of impact that can raise incomes, create jobs, empower women and young people, and preserve vulnerable ecosystems. We supply these businesses with vital resources: access to capital, trade and technical partners, financial training, and conservation practices. We work in hard-to-serve geographies where others don't. To date, we've distributed $1.6 billion to improve the lives of 10 million people in farming communities.

The Mastercard Foundation-Root Capital Partnership

Since 2014, Root Capital and the Mastercard Foundation have partnered to bring essential financing and capacity building to agricultural businesses in West Africa. The latest phase of our partnership, *Expanding the Frontier of Agricultural Finance in West Africa*, began in 2016. Under this initiative, we aimed to achieve three main objectives:

1. Accelerate the bankability and growth of more than 100 high-impact, early-stage agricultural businesses with capital needs under $150,000 and/or business revenues under $300,000;
2. Pilot an expanded set of advisory services, including leadership development for agribusiness employees; financial literacy training for smallholder farmers; mobile technology and mobile money; and local microfinance institution empowerment programs to better serve the agricultural sector; and
3. Contribute to sector learning by developing a framework for documenting and analyzing the costs and impacts associated with early business growth in the agricultural sector.

Purpose of the Study

Under objective three, as part of our project learning agenda, Root Capital partnered with Participatory Development Associates (PDA)—a research and evaluation firm based in Ghana—to conduct evaluations with two Ghanaian businesses that Root Capital reached with the support of the Mastercard Foundation. These evaluations—conducted with Serendipalm, an oil palm aggregation and processing firm, and Faranaya, a domestic sorghum aggregator—

measure Root Capital's impact on the businesses, as well as each businesses' impact on their suppliers and communities. These enterprises represent diverse segments of Root Capital's portfolio and present a unique learning opportunity about Root Capital's impact.

Root Capital studied two aspects of our engagement with **Faranaya:** 1) the provision of loans and advisory services on various aspects of financial management and 2) the efficacy of Root Capital's Farmer Financial Literacy training, which sought to build farmers' basic understanding of financial management and farm profitability.[1] This impact report centers on the following research question: **To what extent does affiliation with an agribusiness supported by Root Capital's lending and advisory services improve the wellbeing of smallholder farmers?** In service of this research question, the study explores:

- The impact of affiliation with Faranaya on the production, income, and wellbeing of smallholder sorghum farmers;
- The particular effects of enterprise affiliation on women and youth in the sorghum industry; and
- The efficacy of Root Capital's engagement with Faranaya in supporting business outcomes and smallholder livelihoods.

This report provides insights directly from the business' supplying producers on whether and how Faranaya is meeting their needs and impacting their agricultural practices, production, and livelihoods. It also highlights important learnings for Root Capital and the Mastercard Foundation on how our partnership and approach creates value for agricultural businesses and smallholder farmers in West Africa, with insights on the challenges and enablers of our impact in the region.

Study Approach

This report focuses on the impact of affiliation with Faranaya on the farm production and wellbeing of sorghum farmers. We began the evaluation in 2018, an average of four years after the Faranaya suppliers involved in the study joined the enterprise. We collected two rounds of household survey data—in February 2018 and March 2020—from 196 Faranaya suppliers (the treatment group) and 212 sorghum farmers in the same region who did not supply to Faranaya (the comparison group). We asked farmers about their demographics, farm characteristics, agricultural practices, sorghum production, income, and overall quality of life, as well as the services they receive from Faranaya and other buyers. The 2020 survey also included

[1] The findings from our study on the Faranaya Farmer Financial Literacy training can be found at rootcapital.org/what-we-do/publications.

retrospective questions about farmer livelihoods prior to joining Faranaya (or seven years prior, for unaffiliated farmers), which corresponded with the period of time most Faranaya farmers had been affiliated with the business. We used data collected through household surveys to observe trends over time—at the retrospective period, 2017, and 2020—among and between treatment and comparison farmers.[2] The comparisons we present in this report should be considered observational, and not causal estimates.

We also conducted focus groups and interviews with Faranaya suppliers and staff to obtain a more holistic picture of gender and youth inclusion at the enterprise, key benefits of enterprise suppliership, and Faranaya's experience as a Root Capital client.

Root Capital and PDA co-implemented the evaluation, with each responsible for different aspects to ensure its successful completion. Root Capital staff led client engagement, provided guidance on data collection, and conducted methodological design, data analysis, and report writing. PDA staff assisted in methodological development, managed data collection in the field, conducted data analysis, and co-authored this report.

Main Findings

We found that, from the time they joined Faranaya to 2020, treatment farmers expanded their sorghum acreage by 75% and increased their sorghum production by 98%. Consequently, treatment farmers saw large increases in sorghum sales over the study period. Comparison farmers expanded their sorghum land holdings by 47%. However, they saw no significant increase in production or sales over the same time period—perhaps partly due to a decline in productivity among comparison farmers between the beginning and end of the study period. Treatment farmers also earned a higher price for their sorghum than did comparison farmers in both 2018 and 2020.

Faranaya suppliers were more likely than comparison suppliers to report receiving key services, including agronomic training, loans, prompt payments, crop weighing, equipment, and inputs for sorghum production. Faranaya suppliers also reported a high degree of satisfaction with the enterprise, indicating that it has helped them to increase their agricultural knowledge, production, and incomes.

[2] For the purposes of this report, the term 'non-suppliers' refers to individuals who are not Faranaya suppliers. These non-suppliers form our study's comparison group. However, it should be noted that these individuals may be suppliers of cooperatives or enterprises that are not affiliated with Root Capital.

We found that women in Ghana's Garu District, where Faranaya operates, face various challenges to their sorghum production, likely driven by male dominance over land and other farm inputs. Overall, women earned less income from sorghum production than men and produced less sorghum on smaller farms. However, treatment women appear to benefit from Faranaya's services and perform better on key outcomes—including sorghum production, income, and price—relative to comparison women. We found that youth across our sample performed on par with treatment individuals in terms of key production outcomes; however, youth still face challenges in the sorghum sector related to land and asset access.

INTRODUCTION

The Sorghum Industry in Ghana

Sorghum, a crop native to northeast Africa, ranks third after maize and rice in terms of production value and land area among all cereals produced in Ghana. Over the past decade, sorghum production in Ghana ranged between 280,000-350,000 metric tons per year; over the same period, the area under sorghum cultivation in Ghana has declined.[3] This decline is largely due to the replacement of sorghum with maize cultivation.

The sorghum value chain has significant potential for poverty reduction, improved food security, and local economic development in Ghana. Sorghum is cultivated in Ghana by 157,000 smallholder farmers across the five northern regions—Northern, North East, Savanna, Upper West, and Upper East—as well as northern Bono and Volta regions. With essential vitamins like iron and magnesium, sorghum is a significant source of nutrition for these farmers. It is also increasing in market value as an ingredient in beer, syrup, and other food products. Sorghum is widely consumed in the form of a beer called *pito*, which plays an important role in social and religious settings in Ghana. The formal brewery industry in Ghana aims to replace imported barley malt with sorghum in brewed beverages.[4] Sorghum is also more drought-tolerant than many grains, including maize, and is therefore an important crop in locations susceptible to climate change, such as Northern Ghana.[5]

Despite sorghum's potential as a cash crop, source of nutrition, and climate-resilient cereal variety, the industry has yet to receive sufficient funding or research support from policymakers to improve crop productivity and marketability.[6] Although the Ghanaian government has implemented programs to mechanize sorghum production and extend input subsidies to farmers, challenges abound in the sector—including limited access to tractor services, prohibitively expensive inputs, and the reuse of low-yield sorghum seed by subsistence farmers. Smallholder sorghum farmers require assistance to access tractors, fertilizer, certified

[3] IndexMundi, "Ghana Sorghum Production by Year," last accessed July 6, 2021, indexmundi.com/agriculture/?country=gh&commodity=sorghum&graph=production.
[4] European Commission, *Sorghum Value Chain Analysis in Ghana* (Brussels: European Commission, 2020).
[5] Feed the Future Climate-Resilient Sorghum Innovation Lab, "Why Sorghum?", last accessed July 6, 2021, sorghum.caes.uga.edu/why-sorghum.html.
[6] Kudadjie C.Y., Struik P.C., Richards P. and Offei S.K. (2004). "Assessing production constraints, management and use of sorghum diversity in north-east Ghana: A diagnostic study," *NJAS - Wageningen Journal of Life Sciences* 52 (3-4), 371-391.

seeds, and other inputs; the sector at large requires a supportive policy and regulatory environment to ensure that all stakeholders in Ghana's sorghum value chain can thrive.

Faranaya

Located in the Garu District of Ghana's Upper East Region, Faranaya Agribusiness Centre Ltd. was founded in 2012. Faranaya sells sorghum to one buyer, Guinness Ghana Brewery Ltd. (GGBL), a multinational brewery that has operated in Ghana for several decades. Since its relationship with GGBL began in 2012, Faranaya has directly supplied 7,000 metric tons of sorghum to the brewery. Faranaya sources sorghum from approximately 3,000 smallholder sorghum farmers, 40% of whom are women. Faranaya aims to provide its suppliers with consistent market access for their sorghum through its relationship with GGBL; the enterprise also promotes optimal sorghum production and community food security.

Faranaya offers its suppliers various programs to maximize their sorghum yields. The business performs on-farm internal inspections for over 75% of its suppliers, as well as centralized trainings on optimal sorghum practices for over half of suppliers. Faranaya began an input support program in 2011, which provides a segment of suppliers with inorganic fertilizer. For the past five years, Faranaya has assisted suppliers in obtaining microcredit and basic financial education from BESSFA Rural Bank, a local microfinance institution. The enterprise also provides suppliers with an alternative income generation program focused on vegetable production, as well as entrepreneurship programs for women and youth. Employees at Faranaya, meanwhile, benefit from health insurance and pension benefits.

Root Capital has delivered a variety of services to Faranaya since 2013, when we approved a $240,000 loan for general working capital. Between 2014 and 2019, Root Capital extended five additional loans to Faranaya. Since 2013, Root Capital has also advised the business on various topics related to financial management. The enterprise has also participated in Root Capital pilot projects on fertilizer provision and mobile weather alerts. The mobile weather alerts program involved a partnership with Ignitia—a global weather forecasting firm—whereby farmers received text messages regarding local weather updates.

Objectives

This evaluation seeks to measure:

- The impact of affiliation with Faranaya on the production, income, and wellbeing of smallholder sorghum farmers;

- The particular effects of enterprise affiliation on women and youth (individuals 35 years of age or younger) in the sorghum industry; and
- The efficacy of Root Capital's engagement with Faranaya in supporting business outcomes and smallholder livelihoods.

By measuring these outcomes, this study aims to provide important learnings on the success of Faranaya's activities in improving farmer livelihoods. It also seeks to test Root Capital's theory of change—namely, that our financial and advisory support enables the growth and resilience of agribusinesses that offer key services to farmers in their communities.

METHODOLOGY

This study employed a mixed-methods approach to assess how affiliation with Faranaya impacts farmer livelihoods and gender-related barriers to agricultural productivity over time.

Quantitative Approach

DATA COLLECTION STRATEGY

In February 2018, we collected quantitative data from 401 farmers who belonged to Faranaya. The evaluation began at the onset of Root Capital's partnership with the Mastercard Foundation, an average four years after Faranaya farmers joined the enterprise. We also collected data from a group of 212 smallholder sorghum farmers who were not members of Faranaya; for comparison households, enumerators asked to speak with the individual in charge of sorghum production. We contacted these same farmers with a follow-up survey in March 2020 and reached 86.3% of farmers surveyed in 2018.[7] Surveys contained questions about farmer demographics, household characteristics, health and quality of life, farm and production characteristics, sorghum buyers, sorghum prices, income, services offered by buyers, and aspirations in sorghum production. We also asked respondents about a set of key demographic and production characteristics in the year prior to joining Faranaya (or seven years prior, for non-member respondents), in order to establish recalled baseline data on our outcomes of interest.

QUANTITATIVE ANALYTIC STRATEGY

We used data collected through household surveys to observe trends over time—at the retrospective period, 2018, and 2020—between treatment and comparison farmers. We removed from the sample any individuals who did not participate in the endline survey, and any individuals who did not farm sorghum in the retrospective period, to track outcomes related to sorghum production (income, price, etc.) in all periods. This process left a sample of 235 treatment farmers and 57 comparison farmers. We used this data to track how Faranaya farmers have progressed on key wellbeing indicators over time, relative to a group of

[7] Further detail on attrition is available on page 12.

comparison farmers in the region. We calculated means for each group for our key outcome variables in each period and compared the percent change over time for each group.

Originally, we intended to conduct a more rigorous analysis of the differences between Faranaya and comparison farmers using a matched comparison group design. Such an analysis would have employed a statistical matching algorithm to match Faranaya farmers and comparison farmers on baseline characteristics, thereby reducing the possibility that observed differences between treatment and comparison farmers are due to systemic differences between the two groups rather than Faranaya membership. However, we were unable to construct an adequately matched comparison group using our data—largely because many comparison farmers did not farm sorghum in the retrospective period, a baseline characteristic we identified as crucial for matching. The difficulty we encountered generating a matched comparison group indicates that there are likely important differences between the treatment and comparison samples that are unrelated to the treatment farmers' membership with Faranaya and could potentially influence our impact estimates. Therefore, any comparison we present in this report should be considered observational, not a causal estimate.

QUANTITATIVE METHODOLOGICAL CHALLENGES

We encountered difficulties throughout data collection and analysis that could influence our results. First, this study is limited by its small sample size. Nearly 15% of our 2018 survey respondents were not available for participation in our 2020 study—these missing respondents had passed away, moved from the study communities and were unreachable after attempts to locate them, or declined to participate. We found no statistically significant differences on variables relevant to our outcomes of interest by attrited status. However, our final sample is relatively small, which could create biases in our impact estimates.

Second, a limitation specific to the *retrospective* nature of our data collection process is the difficulty of accurately recalling retrospective data. Treatment farmers belonged to Faranaya for an average of four years when we collected retrospective data in 2020 (50% of farmers had been members three years or less). It is likely that some farmers were not able to accurately recall crucial information, such as income or sorghum production, in the year prior to joining Faranaya. In some instances, respondents simply could not recall the information, leaving our data with missing values. We also had to select a common timeframe for retrospective questions asked of comparison farmers, potentially creating misalignment in the response timelines of treatment and comparison participants. Based on the average membership tenure among Faranaya farmers, we asked comparison farmers to report retrospective data from seven years prior to 2020. It is likely that, in some cases, treatment and comparison farmers did not report retrospective data from the same year.

Qualitative Approach

DATA COLLECTION STRATEGY

To complement our quantitative data, we conducted focus groups with farmer-members and interviews with cooperative staff. These conversations allowed us to collect detailed narratives on key outcomes of interest—particularly gendered or youth-related trends in sorghum production or individual outcomes. They also provided an opportunity for Root Capital to solicit direct feedback about Faranaya from farmer-members and about our own services from Faranaya in a neutral environment. Finally, they helped us develop a stronger understanding of the social and economic context in which Faranaya and its members operate.

FOCUS GROUPS

Focus groups were primarily intended to collect data on men's, women's, and youth's experiences as sorghum producers and members of Faranaya; understand barriers to women's and youth's agricultural productivity and enterprise participation; and identify methods through which Faranaya or members themselves could better support female and youth producers. They included discussion questions on individuals' motivation for becoming sorghum farmers and Faranaya members; changes over time to sorghum production and income; services and benefits derived from Faranaya membership; vulnerabilities and future aspirations; and gender and youth dynamics in their households, enterprise, and communities.

Focus groups were disaggregated by gender; a focus group was conducted with women and another with men belonging to Faranaya, as well as with male and female comparison farmers. We also conducted a focus group comprised of youth treatment farmers, and another with youth comparison farmers. Focus groups contained 3-10 members each and were facilitated by trained associates of PDA. Participants were selected randomly for focus group discussions. In some cases, when randomly selected participants did not present themselves for the discussions, the consultant replaced them with non-randomly selected Faranaya members of the same gender.

ENTERPRISE INTERVIEWS

We conducted enterprise-level interviews to collect data on Faranaya's financial status; successes and challenges experienced by the enterprise; services Faranaya provides to farmers; and Faranaya's goals. Enterprise interviews also included questions about characteristics of the sorghum market in which Faranaya operates, as well as their experiences with, and suggestions for, Root Capital.

QUALITATIVE METHODOLOGICAL CHALLENGES

Focus groups provide a cost-effective method of obtaining qualitative data from a large number of participants. However, focus groups do not always allow respondents to provide detailed responses, as facilitators are tasked to hear from multiple people in a limited timeframe. Additionally, the presence of others can bias individual responses. To limit this kind of bias, we separated focus groups by gender. Facilitators were also instructed to limit the exposure of the focus group to non-participant observation or input.

FINDINGS

Summary Statistics

We found that treatment and comparison farmers in the sample used for analysis were similar on several demographic characteristics, as presented in Table 1. No differences are statistically significant unless otherwise noted.

A greater percentage of treatment farmers vs. comparison farmers were women; treatment farmers were also younger, on average. Seventy-eight percent of treatment farmers are male and 22% are female. Meanwhile, 89% of comparison farmers are male and 11% are female. The difference in gender composition between the treatment and comparison groups is statistically significant and may create underestimates of Faranaya's impact in our results—particularly given that female farmers, on average, see lower sorghum production and income in our sample. In 2020, the average age of treatment farmers was 51 and for comparison farmers was 56. This difference was statistically significant. The average household size for was 10 members for treatment farmers and 10.5 members for comparison farmers.

Educational levels were fairly consistent between the treatment and comparison groups; we found a statistically significant difference in high school completion, with treatment farmers six percentage points more likely than comparison farmers to have completed high school. The majority of farmers in the treatment group—69%—had no formal education; 15% completed primary education, 4% completed junior high school, 6% completed senior high school, 0.4% of farmers completed technical/vocational education, and 6% completed a bachelor's degree. In the comparison group, 79% of farmers had no formal education, 18% completed primary education, 2% completed junior high school, and the remaining 2% completed a bachelor's degree. No comparison farmers reported completing senior high school.

Treatment and comparison farmers were similar on marital status. Ninety-two percent of treatment farmers were married/cohabitating in 2020 and 2% were single, while 93% of comparison farmers were married/cohabiting and none were single. Across the sample, 97% of men were married, compared to just 72% of women.

Whereas treatment farmers have been farming sorghum an average of nine years, comparison farmers have been farming sorghum for an average of eight years. On average, treatment farmers had been members of Faranaya for five years at the time of the 2020 survey. In 2020, 16% of treatment farmers sold all their sorghum to Faranaya, 50% sold most of their sorghum,

8% sold less than half of their sorghum, and 3% sold very little sorghum to Faranaya. Twenty-three percent sold none of their sorghum to Faranaya.

In 2020, a greater share of treatment farmers (84%) were older adults whereas 16% were youth. Among comparison farmers, 91% were older adults and 9% were youth.

Table 1: Demographic Characteristics by Treatment Status, 2020

	Treatment Group		Comparison Group		T-Statistic
	Observations	Mean	Observations	Mean	
Male	235	0.78	57	0.89	**1.9152**
Age	235	51.04	57	56.32	**2.3981**
Household Size	235	9.85	57	10.53	-0.0583
No Formal Education	235	0.69	57	0.79	1.5518
Primary Education	235	0.15	57	0.18	0.4957
Junior High School	235	0.04	57	0.02	-0.8878
Senior High School	235	0.06	57	0	**-1.8937**
Technical Education	235	0.004	57	0	-0.4919
Bachelor's Degree	235	0.06	57	0.02	-1.2888
Single	235	0.02	57	0	-0.9901
Married/Cohabitating	235	0.91	57	0.93	0.3670
Divorced	235	0.02	57	0.04	0.8607
Widow/Widower	235	0.05	57	0.04	-0.5049
Years in Sorghum	235	8.94	57	8.09	-1.2344
Years Supplying Faranaya	235	4.60			
Youth	235	0.16	57	0.09	-1.4140

Farmer-Level Impacts

We identified several positive trends on key indicators of wellbeing for Faranaya members. This section describes our findings on farmer production, agricultural practices, buyer services, and quality of life, derived from quantitative household surveys and focus groups.

FINDING 1: Respondents devoted increasing shares of their total household land to sorghum production over the study period.

Treatment and comparison farmers expanded their farmland dedicated to sorghum production over the study period, with expansions plateauing by 2018—perhaps due to the steady market

for sorghum in the region. Gains in sorghum farmland were larger for Faranaya farmers than for comparison farmers (Figure 1). Between joining Faranaya and 2020, treatment farmers expanded their sorghum acreage by 75%; comparison farmers did so by 47%. Regardless, treatment and comparison respondents saw similar increases in the share of total land devoted to sorghum production over the study period—from 21% to 28% for comparison farmers, and from 22% to 30% for treatment farmers.[8] Sixty-one percent of treatment farmers who increased their sorghum land did so by converting land that they already owned to sorghum production—a practice encouraged by Faranaya. Twenty percent of treatment farmers purchased agricultural or cleared land for sorghum production.

Per Figure 2, treatment farmers increased their total land by 14% over the study period.[9] Comparison farmers, on average, saw negligible changes in their total household land over the study period, though land holdings were largely similar between the two groups.

In terms of sorghum land and total land, treatment and comparison men performed according to their group average, while women lagged behind in their respective groups. Youth farmers' land holdings closely mirrored the treatment average, but declined slightly between 2018 and 2020.[10]

[8] Means and standard deviations for all continuous outcome variables discussed in these findings can be found in the Appendix.
[9] We did not collect a measure for total household land in 2018.
[10] Our treatment sample is comprised of 78% men and 22% women; our comparison sample is comprised of 89% men and 11% women. As such, trends for treatment and comparison men closely follow the group average; we present separate trendlines for women in each group. Eighty-eight percent of youth in our sample fall in the treatment group. As such, we do not present a separate trendline for youth; instead, we describe our findings on youth throughout this report, and in more detail in a separate section.

Figure 1: Sorghum Land (in acres) by Treatment Status and Gender

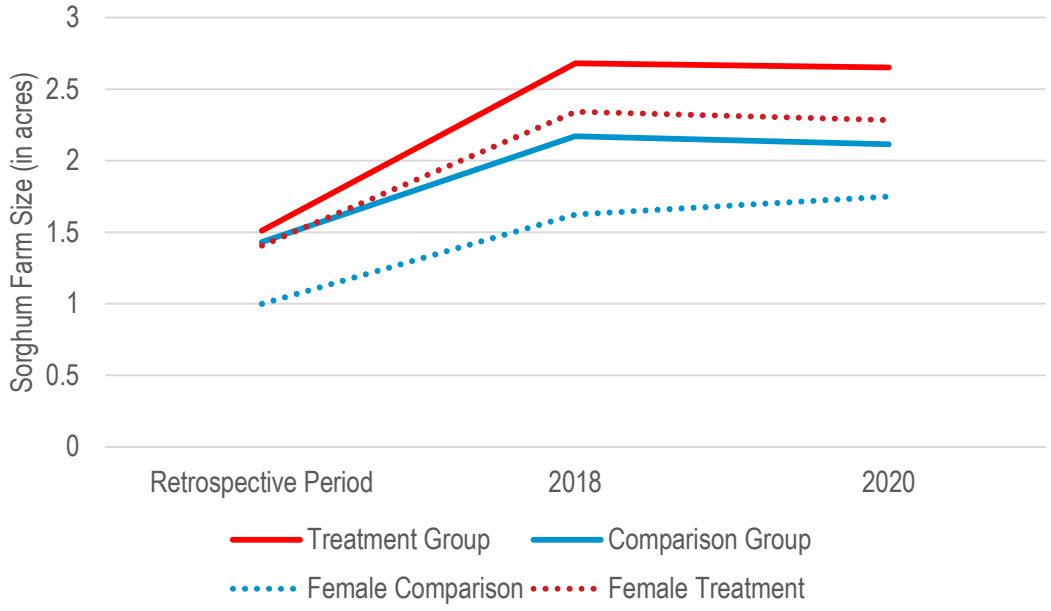
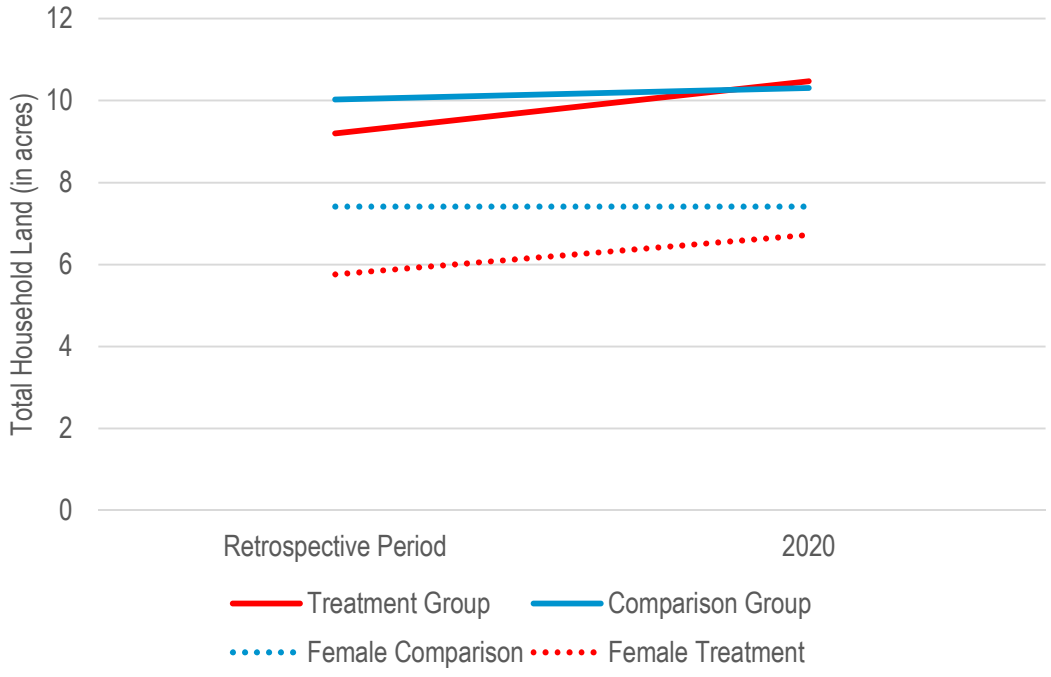


Figure 2: Total Household Land (in acres) by Treatment Status and Gender



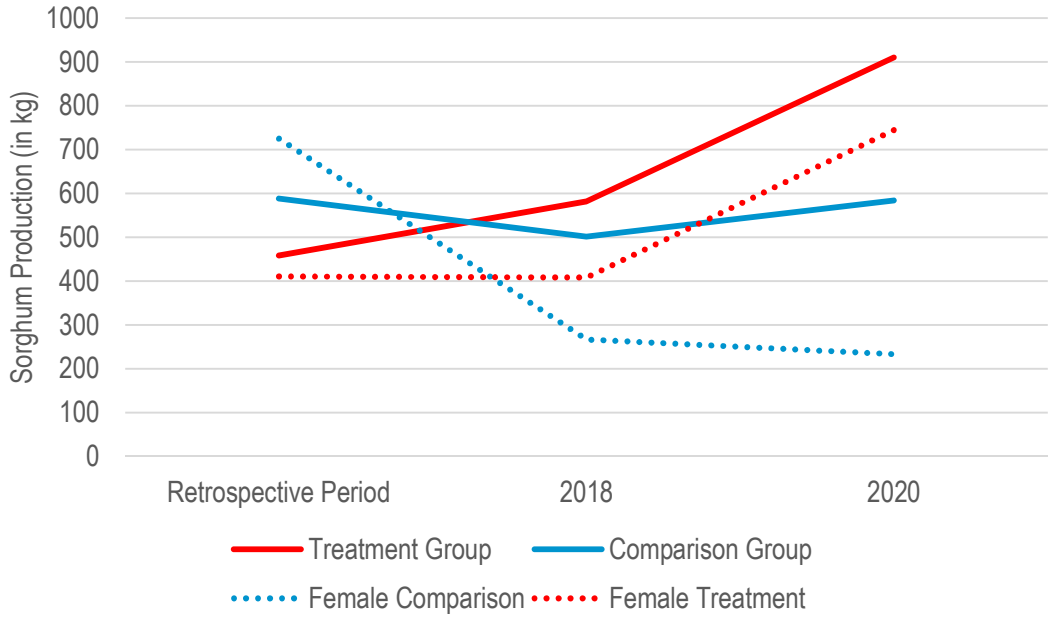
FINDING 2: Treatment farmers saw increasing sorghum production and sales over the study period while production and sales remained constant for comparison farmers.

Treatment farmers reported that their sorghum production increased by 98% between joining Faranaya and 2020, with production accelerating between 2018 and 2020. Production increases among treatment farmers were likely driven, in large part, by sorghum land expansions. Though comparison farmers reported producing more sorghum in the retrospective period than did treatment farmers, comparison farmers' sorghum production stagnated over the study period, as shown in Figure 3. Curiously, comparison farmers' increased sorghum land allocation do not appear to have led to increased production.

Increased production among treatment farmers likely led to their increased need for farm labor. In 2020, we found that treatment farmers hired 0.55 full-time workers each, on average, to work on their sorghum farms in the previous season, where comparison farmers hired none. Treatment farmers also hired 7.4 temporary workers each, on average, with comparison farmers hiring 6.9 temporary workers each. These averages amount to 131 full-time workers and 1,745 temporary workers hired by Faranaya farmers during the previous sorghum season.

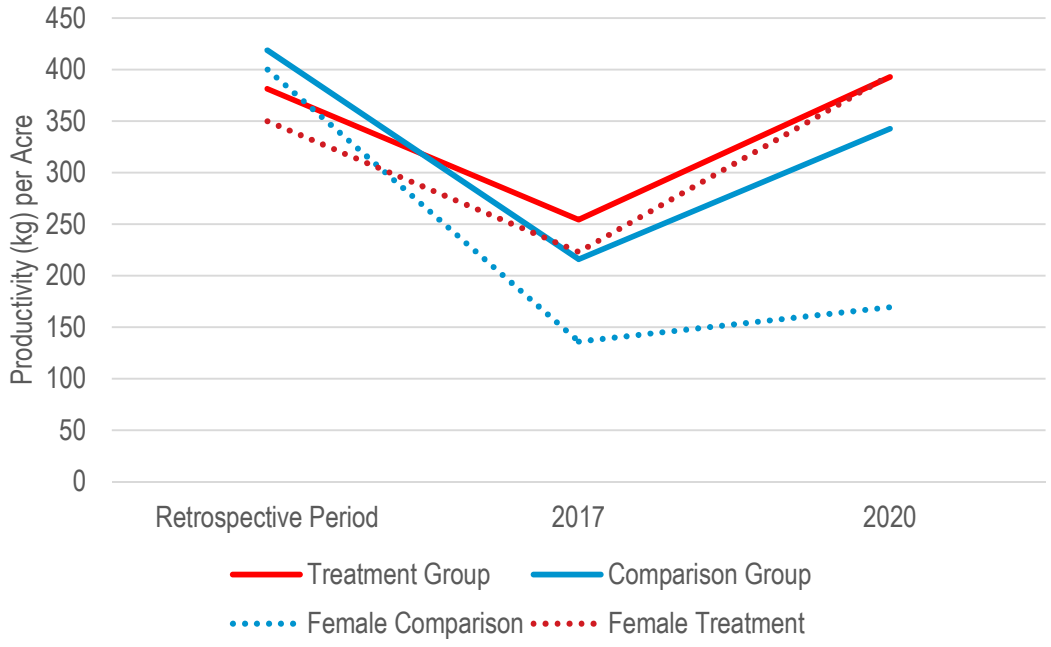
Within the treatment group, men, women, and youth followed similar trends in production over the study period. Although treatment women lagged behind treatment men in terms of production, they performed better than did comparison men in 2020. Women from the comparison group saw a steep decline in production over the study period, on average, though results on comparison women reflect just six individuals and are likely unrepresentative of this group as a whole.

Figure 3: Sorghum Production by Treatment Status and Gender



Farmers in the treatment and comparison groups did not see a significant change in sorghum productivity between the retrospective period and 2020; productivity dipped in 2018 and recovered to retrospective levels by 2020 (Figure 4). According to Root Capital's Ghana-based staff, the 2018 productivity decline was likely due to a severe drought that hit the region in 2017, as well as an outbreak of armyworms. Productivity recovered between 2018 and 2020 as those issues resolved.

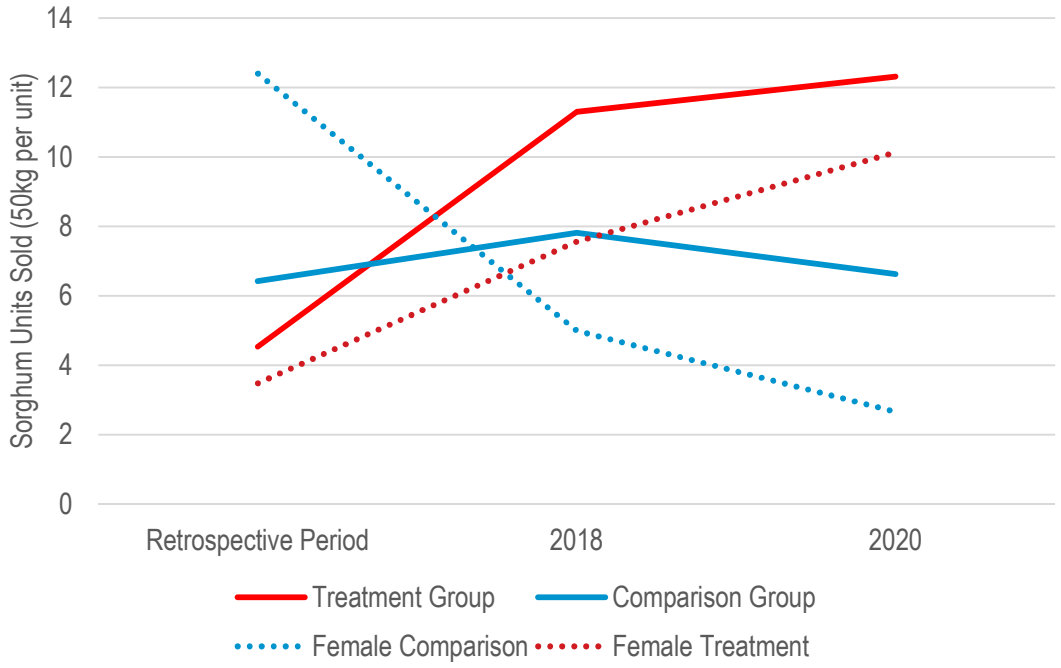
Figure 4: Sorghum Productivity by Treatment Status and Gender



Treatment farmers increased their sorghum sales by 54% over the study period. As with sorghum production, however, comparison farmers' sorghum sales stagnated between the retrospective period and 2020 (demonstrated in Figure 5).

The increase in sales among treatment farmers is likely due, in part, to increased sorghum production; however, treatment farmers also sold increasing portions of their total sorghum crop over the study period (with the rest kept for household consumption) relative to comparison farmers. In the retrospective period, treatment and comparison farmers sold approximately 36% of their sorghum crop; by 2020, treatment farmers sold 61% of their crop, while comparison farmers sold just 44%. The impact of this trend on household welfare is somewhat ambiguous. Treatment farmers are selling more sorghum and likely earning more income. At the same time, lower household sorghum reserves could have negative implications for family food security—as could the conversion of other farmland (that previously grew maize or vegetables) to sorghum production. However, as discussed in Finding 6, we found no significant differences by treatment status on food security or dietary diversity that suggest such consequences of treatment farmers' increased sorghum sales.

Figure 5: Sorghum Sales by Treatment Status and Gender



FINDING 3: Prices increased in the sorghum market in Garu over the study period, and treatment farmers reported earning a higher price from Faranaya than other buyers on the local market.

Average sorghum prices increased for all groups over the study period, perhaps due to increased demand for sorghum in the region. Prices increased by 78% for members of the treatment group, with men and women at parity for much of the study period. Gains were less dramatic for comparison farmers; the average price increased by 27% for members of the comparison group. Female comparison members also saw an increase, but they obtained a lower average price than male comparison members for the entire study period (Figure 6). Youth performed on par with members of the treatment group

Fifty-one percent of treatment farmers sold to Faranaya only; others sold to a combination of Faranaya and other buyers. As per Table 2, Faranaya farmers reported earning a higher price from Faranaya than they did from other buyers in 2018 and 2020. Faranaya prices also exceeded the average price reported by comparison farmers in both periods.

Figure 6: Sorghum Price by Treatment Status and Gender

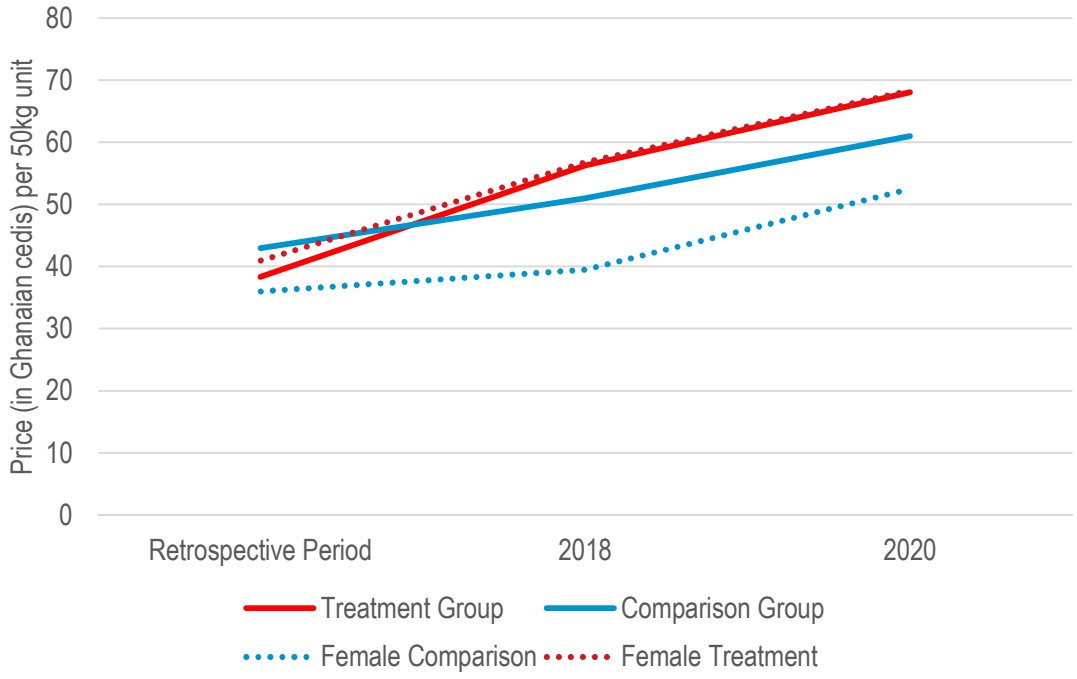


Table 2: Price by Source and Treatment Status

	2018		2020	
	Faranaya Price	Other Buyer Price	Faranaya Price	Other Buyer Price
Treatment Group	57.67586	54.27586	70.22619	57.89362
Comparison Group		50.9569		60.98571

Box 1: Side-Selling

In this study, 17% of treatment suppliers sold crops to other buyers instead of, or in addition to, Faranaya—a practice called "side-selling." Side-selling occurs when farmers engaged in formal or informal purchase agreements with a cooperative or other enterprise sell to alternative buyers. Farmers generally side-sell due to a lack of liquidity. Farmers face cash constraints during the harvest season: they incur most of their production costs during the harvest months, yet they have little savings remaining from the previous production season. If a local intermediary offers a higher price upon delivery than their enterprise, farmers may opt for immediate cash over the higher future price provided by the enterprise. Transportation costs, loyalty to the enterprise, and product quality can also influence side-selling behaviors. Side-selling rates identified in this study were low relative to those found in other studies of Root Capital clients, which have ranged from 14-53%. It may be that Faranaya's higher prices and purchase guarantees encourage significant farmer loyalty to the enterprise.

FINDING 4: We did not find notable differences between treatment and comparison farmers in the application of good agricultural practices over the study period.

We asked farmers about their application of optimal sorghum practices on their farms in 2018 and 2020 (a full list of practices can be found in Box 2). Per Figures 7 and 8, we found few significant differences in practice application between treatment and comparison farmers. Nearly all farmers engaged in row planting, minimum tillage, use of fertilizer, and weeding; more than 40% used purchased or early maturing seeds, applied crop residue to their farms, and used a method of bird protection. In 2020 and 2018, comparison farmers were more likely than treatment farmers to apply crop residue; treatment farmers were more likely to apply pesticides in both periods. We found a 20 percentage point increase in the likelihood of using minimum tillage in the treatment and comparison groups between 2018 and 2020—the only notable change in practice application between the study periods.

As described in Finding 5, stagnancy in agricultural practices among treatment farmers over time may be due to the low coverage of technical assistance services from Faranaya. The enterprise also provides a weather and agronomic messaging program to most suppliers and the broader Garu community; it is possible that this service could contribute to similarities in agricultural practice application among treatment and comparison farmers.

Figure 7: Use of Agricultural Practices by Membership Status, 2020

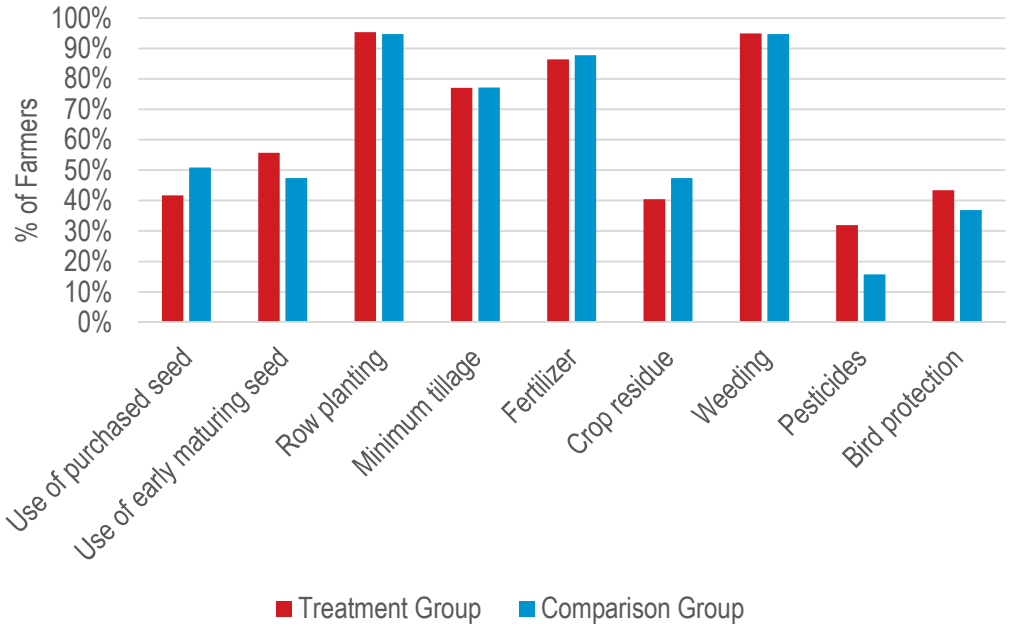
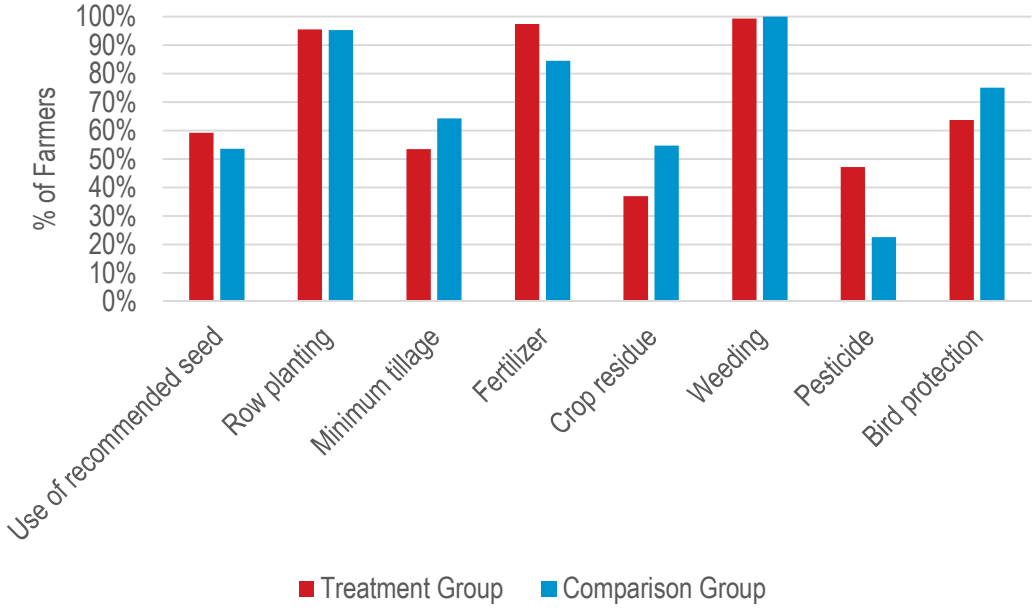


Figure 8: Use of Agricultural Practices by Membership Status, 2018



Box 2: Surveyed Agricultural Practices

We asked farmers about their use of agricultural practices designed to conserve soil and water, maximize agricultural yield, and improve sorghum crop quality. These practices and their definitions are listed below.

Soil conservation practices

- **Crop residue application:** the practice of applying crop residues (plant material from pruning or crop harvest) to sorghum plots to provide soil coverage, helping to prevent soil erosion and increase water retention.
- **Minimum tillage:** a tillage system in which at least 30% of the soil surface is covered by plant residue after planting to reduce soil erosion.

Productivity and pest control

- **Bird protection:** birds destroy sorghum in the field and farmers use various types of control methods to mitigate this issue, including the use of scarecrows.
- **Use of early-maturing seed:** local varieties of sorghum seed are rainfall-dependent and mature over 7-8 months, resulting in low productivity in drought-stricken areas. Improved, early-maturing varieties can provide better yields with less moisture requirements.
- **Fertilizer:** organic or inorganic compounds that supplement nutrients needed for crop growth. Fertilizers can improve soil fertility and, if organic, offer a critical input for long-term soil health and resilience.
- **Row planting:** the practice of planting sorghum seeds in organized rows (either in single or twin rows), which allow for optimal cultivation.
- **Pesticides**: organic or inorganic substances that kill unwanted insects or other organisms harmful to crops
- **Weeding:** the practice of removing vegetation and weeds manually or using herbicides to improve optimal plant growth

FINDING 5: Faranaya offers some valued services to farmers and satisfaction with the enterprise is high; however, the enterprise could offer key services to farmers—such as training and credit—with greater frequency.

Buyer Services: Faranaya vs. the Local Market

We asked treatment farmers about the services offered to them by Faranaya in 2018 and 2020; we also asked comparison farmers about the services they receive from their primary buyers. As shown in Figures 9 and 10, a majority of treatment members indicated that Faranaya offers entire crop purchase, proper crop weighing, higher prices than the local market, and loans. Faranaya farmers reported receiving these services with greater frequency than comparison farmers in both periods. In 2020, 68% of Faranaya farmers reported that their buyer (Faranaya) properly weighs their crop, compared to just 48% of comparison farmers; Faranaya farmers were more than 50 percentage points more likely to report proper crop weighing and higher prices. Faranaya farmers were also more likely than comparison farmers to report receiving loans, partial payment upon delivery, input assistance, equipment, and training than comparison farmers, though the availability of these services appears to have declined for Faranaya farmers between 2018 and 2020. In 2018, 50% of comparison farmers reported receiving no services from their sorghum buyer—a figure that declined to 40% in 2020. By comparison, less than 6% of treatment farmers reported that they received no services in both periods.

In qualitative interviews, Faranaya employees reported that the enterprise offers on-farm agronomic visits to most farmers and agronomic extension on soil fertility and rejuvenation, water conservation, row planting, compost, and the use of certified seeds. However, just 24% of treatment farmers reported receiving training from Faranaya on sorghum production in 2020. Either Faranaya's service is not available to all farmers or many farmers are not able to participate in service offerings. The low coverage of Faranaya technical assistance could contribute to the stagnancy of optimal agricultural practice application over the study period, as identified in Finding 4. Regardless, no control farmers reported receiving training from their sorghum buyers, though control farmers did note in focus groups that a local agricultural organization runs a demonstration farm. They also reported that they receive agronomic messages via the radio.

Faranaya employees confirmed that the enterprise offers higher prices than the local market and also purchases larger crop volumes than other local buyers. Faranaya employees indicated that the enterprise has provided subsidized inputs to farmers, including fertilizer and seeds, though they noted that just 5-10% of producers benefited from this program. They also provide farmers with training on financial management and credit, and have offered training on

climate resilience and environmental stewardship through partner organizations. Faranaya operates several thrashers that farmers can use, for a fee, to process their sorghum—employees noted that this resource is particularly popular among young people and has increased the quality of sorghum sold to the enterprise. The enterprise offers internships and a sorghum business development program for local youth. It maintains a policy that prohibits gender discrimination and sexual harassment, offers trainings on gender relations (on topics including household decision making, childcare, and marital counseling) to all members, and ensures that at least 40% of participants in all enterprise projects are women. The enterprise also offers an entrepreneurship training program on sorghum processing to a group that is 80% women. In addition to the benefits it offers suppliers, Faranaya provides a pension plan, health insurance, family leave, and transportation for its employees.

According to employees, Faranaya also offers services to the broader community in Garu. The enterprise runs an agronomic and weather messaging program for 13,500 farmers (with most Faranaya farmers participating), offering tips and news regarding upcoming weather events—a program launched with the support of Root Capital. Faranaya also partnered with its buyer, Guinness Ghana, to construct ten boreholes for communities in the region to improve local water quality.

Figure 9: Buyer Services by Treatment Status, 2020

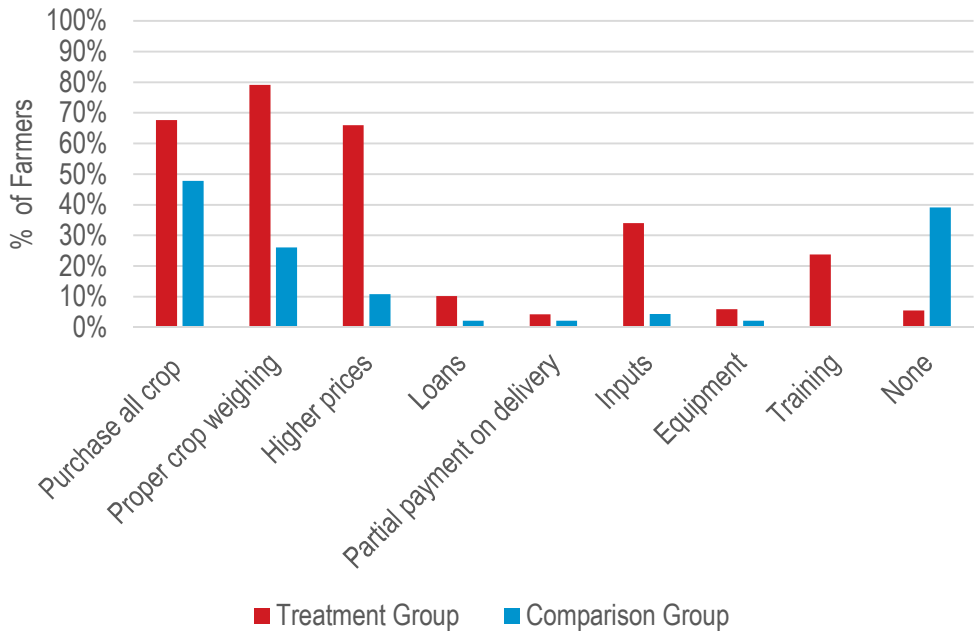
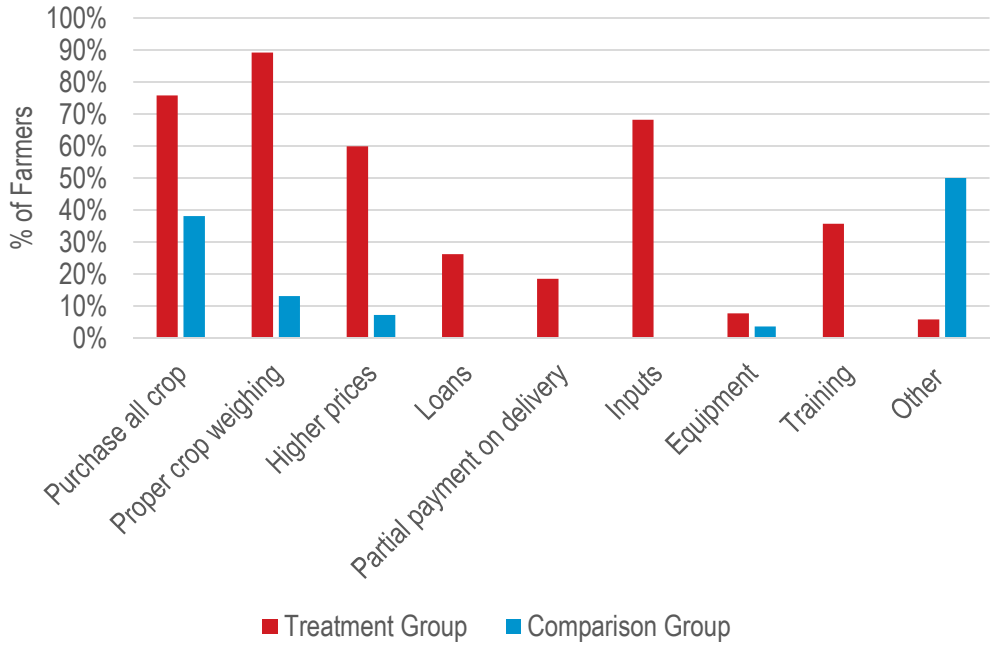


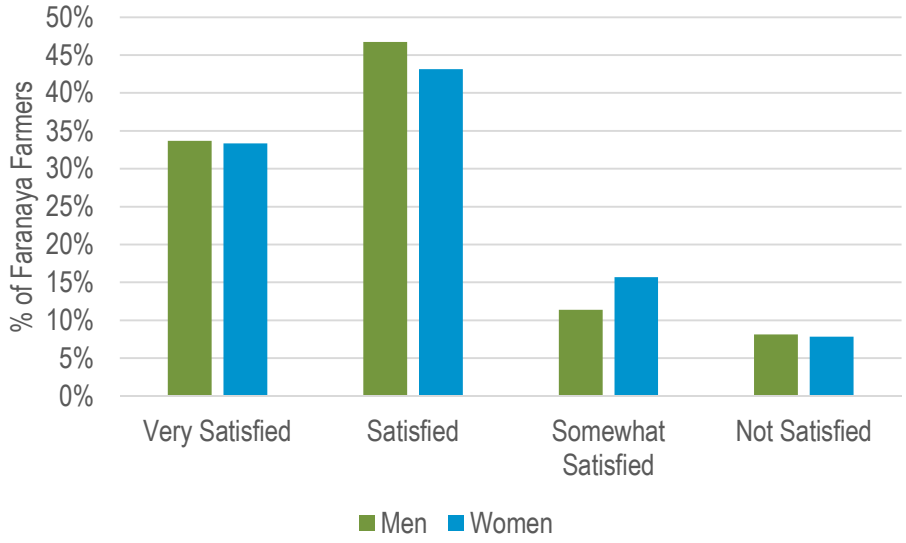
Figure 10: Buyer Services by Treatment Status, 2018



Benefits of Faranaya Membership

We asked Faranaya members about the key benefits they derive from their engagement with the enterprise, as well as their overall satisfaction with Faranaya. Thirty-three percent of treatment farmers reported that they are very satisfied with Faranaya; over 40% of treatment farmers reported that they are satisfied. Less than 15% of farmers reported that they are somewhat satisfied, and less than 10% were not satisfied. Per Figure 11, levels of satisfaction did not vary significantly by gender.

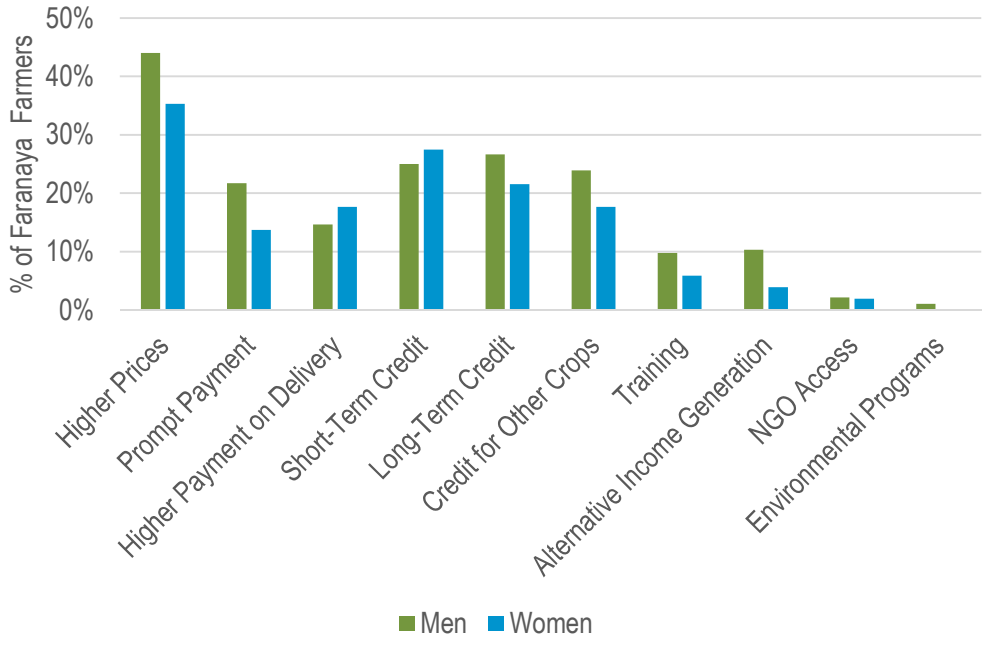
Figure 11: Satisfaction with Faranaya by Gender, 2020



Satisfaction with Faranaya is driven by a variety of factors. Male and female producers reported higher prices, short-term credit, and long-term credit as the primary benefits of Faranaya membership in 2020. In focus groups, producers reported that they joined the enterprise for higher prices, accurate crop weighing (many farmers reported that produce is under-weighed on the local market), Faranaya's purchase guarantee, and training. Some farmers reported that their productivity has improved as a result of Faranaya's training and input provision. In focus groups, Faranaya suppliers reported that they now know when to begin sowing their seeds, as well as how to apply compost, properly dry their sorghum, space sorghum rows, and manage larger sorghum farm sizes, thanks to Faranaya's assistance. Others indicated that the fertilizer support service has been a key determinant in their increased productivity. These details suggest that while treatment and comparison farmers implement similar practices on their farms, such as fertilizer application, Faranaya's technical assistance might be helping treatment farmers implement these practices with greater precision or optimal techniques.

Farmers also indicated that they have saved time and money as a result of Faranaya's crop transport service. One member reported in focus groups that Faranaya's on-time payments were a motivator for greater production. Employees observed that Faranaya farmers have graduated from subsistence farming to semi-commercial farming over time, and some have been able to buy new assets and upgrade their homes.

Figure 12: Benefits of Faranaya Membership by Gender, 2020



Farmer Feedback for Faranaya

Farmers reported in focus groups that they face numerous challenges in their sorghum production. Birds, pests, and crop diseases destroy sorghum in the fields, and farmers often lack equipment to protect harvested sorghum from rainfall as it dries. Farmers also contend with low yields and difficulty accessing key farming equipment. As a result, farmers offered numerous suggestions for Faranaya in focus groups, with most centered on the consistency of Faranaya's services. Many farmers indicated that Faranaya's fertilizer benefit has been inconsistent, with farmers in focus groups reporting that they have not received fertilizer in the last two years. Fertilizer is a key production input that is very expensive on the local market, and farmers indicated that their yields suffer when fertilizer is not available through the enterprise. Farmers similarly reported that Faranaya could provide more seeds and that, though Faranaya maintains a tractor for farmer use, they only have one machine and it does not reach all farmers in time. Additionally, while Faranaya employees indicated that the enterprise had purchased tarps to assist farmers with drying, it appears that not all farmers have received this benefit, as farmers requested drying tarps in focus groups.

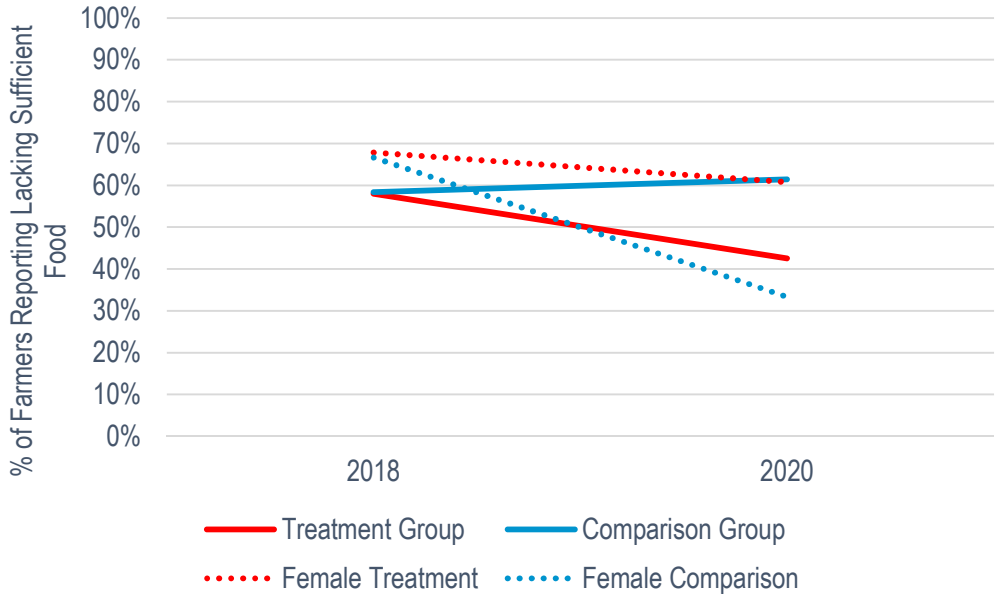
Though many farmers reported rapid payment timing as a key benefit of their work with Faranaya, some farmers indicated in focus groups that they find Faranaya's payment timing to be inconsistent. They requested more consistent payment timing and higher prices. Others requested more training from Faranaya, particularly on more efficient weeding methods.

FINDING 6: We found few differences by treatment status on food security or aspirations in sorghum farming over the study period.

Food Security

In each survey, we asked farmers whether there were months in the previous year in which their households lacked sufficient food. Per Figure 13, fewer treatment farmers reported food insufficiency in 2020 than in 2018, while rates of food insufficiency remained constant in the comparison group during this period. We did not collect this data point in the retrospective profile; as a result, we do not know whether treatment and comparison farmers were operating on similar trends prior to 2018.

Figure 13: Hunger by Treatment Status and Gender, 2020

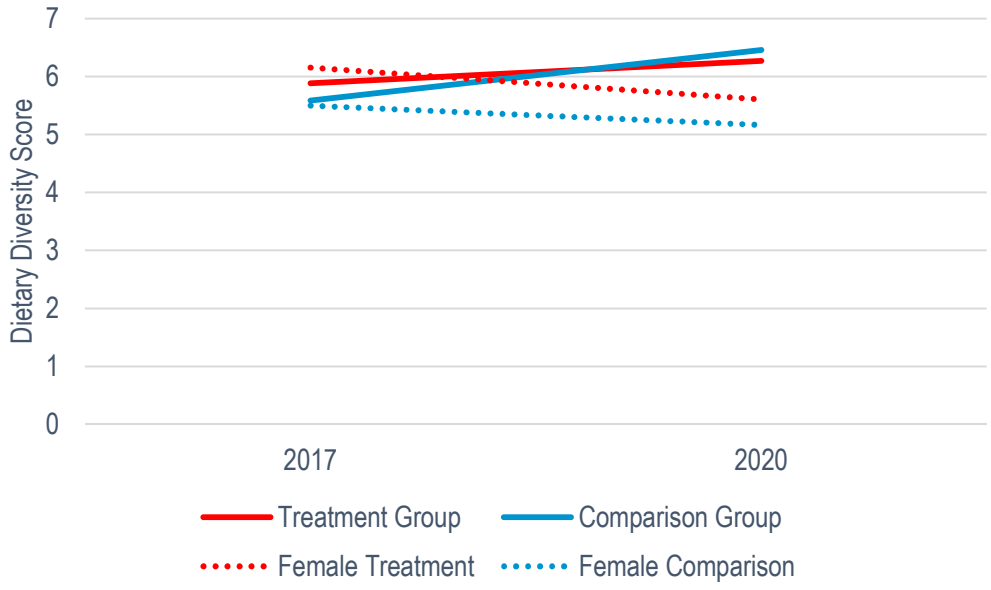


We also asked farmers about their household's diet quality. Figure 14 provides data on Household Dietary Diversity Scores (a 0-12 ranking of dietary diversity) for treatment and comparison respondent households in 2018 and 2020.[11] Treatment and comparison respondents reported similar levels of dietary diversity in their households in 2018 and 2020, with respondents reporting slight improvements in household dietary diversity over this period,

[11] The Household Dietary Diversity Score reflects the economic ability of a given household—not an individual—to access to a variety of foods. The measure counts food groups consumed by a household in the preceding 24 hours. Food and Agriculture Organization of the United Nations, *Guidelines for Measuring Household and Individual Dietary Diversity* (Rome: FAO, 2013).

on average. Women in both the treatment and comparison groups, however, reported a slight decline in household dietary diversity.

Figure 14: Dietary Diversity by Treatment Status and Gender, 2020



Aspirations

We asked farmers to report whether they would still like to be farming sorghum in five years' time. In 2020, over 98% of farmers in our sample reported that they would like to continue farming sorghum into the future. Both treatment and comparison farmers reported that sorghum produces greater yield than other staple grains, like maize; is drought-resistant; and provides a good living for their families. One control farmer said that "farming sorghum has eradicated poverty" in his community.

We also found little variation on whether farmers would prefer their children to farm sorghum—over 85% of treatment and comparison farmers reported in 2020 that they would like their children to farm sorghum in the future.

FINDING 7: For treatment farmers, sorghum income and total household income increased significantly over the study period; comparison farmers saw only modest income gains.

Before presenting our results on income, it is important to note the complexity of measuring income among rural and low-income households. Numerous research institutions, including the World Bank, caution that values reported for income in rural household surveys are likely to be

misestimated.[12] It is difficult for surveyed individuals to remember the correct prices and quantities of sales of multiple crops over long periods. Respondents may also purposefully misstate their income so as not to alert neighbors or other community members as to their income level, or to conceal informal employment.[13] Although we made our best attempts to estimate household income—by breaking down responses by income type (i.e., crop income, remittances, etc.) and validating responses through calculations, where possible—our measures for income may contain errors that could bias our results. Table 3 in the Appendix demonstrates the means and standard deviations for income data in our sample; standard deviations on both sorghum and total income exceed the means, indicating a high degree of variation in these data.

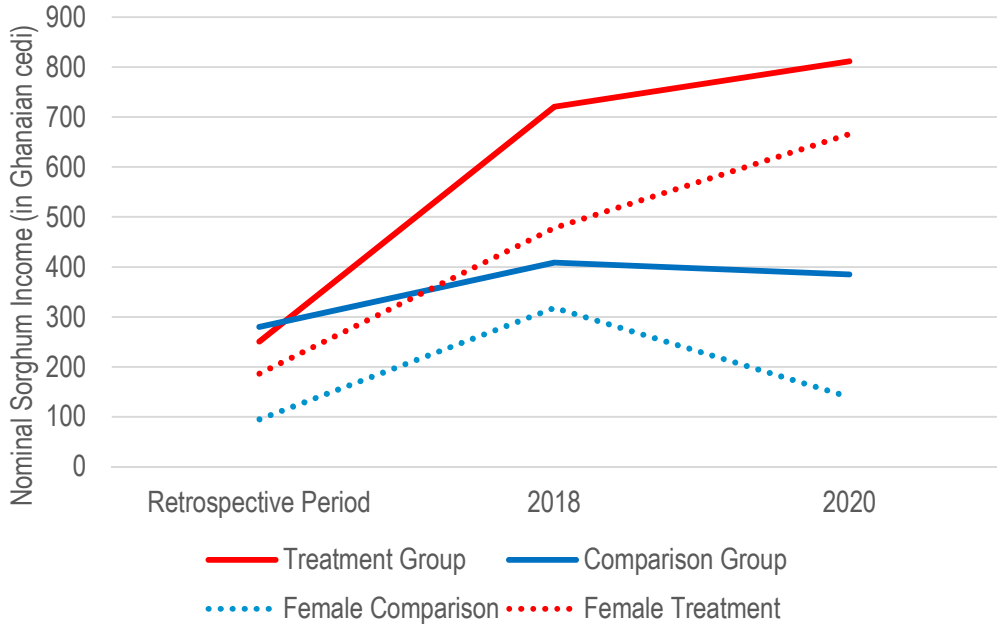
As per Figure 15, treatment farmers' annual sorghum income increased considerably since joining Faranaya. Treatment farmers reported earning 250 Ghanaian cedis per year from sorghum sales in the retrospective period and 811 cedis in 2020—a nominal increase of 224% and a real income increase of 33%, or approximately USD $95 over the period of approximately seven years. We found similar nominal sorghum income gains over time for treatment men (217%) and treatment women (250%), though treatment women consistently earned approximately 20% less income than treatment men (nearly 200 cedis, or USD $35).

Despite reporting a similar level of income in the retrospective period to treatment farmers, comparison farmers' nominal sorghum income did not increase significantly over the study period. Between the retrospective period and 2020, comparison farmers registered an increase in nominal sorghum income of just 37%—a 44% decrease in real sorghum income. As with treatment farmers, male comparison farmers earned more sorghum income than did female comparison farmers.

Youth performed similarly to the average treatment farmer in terms of sorghum income, though youth farmers reported a slight decline in sorghum income between 2018 and 2020.

[12] World Bank Group, "Measuring Poverty," in *Introduction to Poverty Analysis* (Washington, DC: World Bank Group, 2005).
[13] Ibid.

Figure 15: Nominal Sorghum Income (in Ghanaian cedi) by Treatment Status and Gender

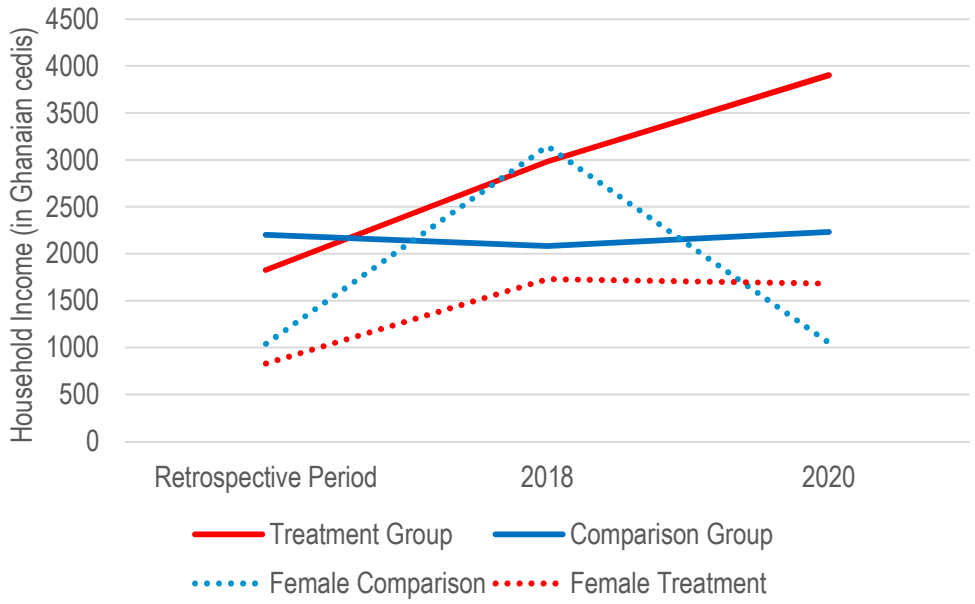


Treatment farmers also increased their total household income (in nominal terms) over the study period. By 2020, treatment farmers were earning 112% more household income per year than they did in the year prior to joining Faranaya; this difference represented a 12% decline in real income.

Male treatment farmers were on par with the treatment group average for household income, while treatment women earned significantly less than members of other groups for the majority of the study period. Though comparison farmers earned a similar level of income as treatment farmers in the retrospective period, their nominal annual household income remained stagnant over the study period, and declined by 58% in real terms.

Nominal household income among youth farmers increased over the study period; in fact, youth farmers were the highest earners in the entire sample. Study participants under 35 years of age earned 130% more household income in the retrospective period, 55% more income in 2018, and 41% more income in 2020 than did other individuals in the sample.

Figure 16: Nominal Total Household Income (in Ghanaian cedis) by Treatment Status and Gender



Summary of Farmer-Level Impacts by Gender

A key objective of this study was to examine the impacts of Faranaya suppliership by gender and understand the barriers and opportunities faced by women in sorghum-producing communities. While we mentioned many of these findings in the sections above, this section offers additional context for these results drawn from focus groups and interviews with enterprise suppliers and staff. Overall, we identified several barriers that inhibit the full participation of women farmers in the sorghum value chain in Ghana—though women in the treatment group appear to benefit from Faranaya's services.

FINDING 8: Women face various challenges to their sorghum production, likely driven by male dominance over land and other farm inputs.

Women produced less sorghum on smaller plots of land than did men in our sample. Focus groups indicated that a key driver of differences between male and female outcomes in both the treatment and comparison groups is land inheritance. Respondents reported that land inheritance is patrilineal in Garu. As a result, women must be given land by their fathers, husbands, or brothers. Many farmers reported that this practice results in women receiving small or infertile pieces of land, if any. Similarly, focus groups reported that men exhaust productivity-enhancing resources in the community, such as plows or drying space, such that

women are not able to take advantage of them. Respondents also indicated that women face physical challenges that prevent their full participation in sorghum production (e.g., they may struggle to lift bags of harvested sorghum) and may lack the support of their families in managing their sorghum land. One respondent indicated that women help their husbands work their land, but that husbands typically do not help their wives in the same manner.

FINDING 9: Treatment women appear to benefit from Faranaya's services, performing better on key outcomes relative to comparison women.

Despite the overall differences observed between the genders, women in the treatment group performed at a higher level in 2018 and 2020 than did comparison men and women on outcomes like sorghum production and sorghum income—on the same upward trajectory as treatment men.[14] We also found near-parity on sorghum price for men and women in the treatment group over time, with comparison farmers earning a lower price, on average, than treatment farmers, and comparison women lagging behind comparison men. To the extent that positive outcomes among treatment members are driven by their affiliation with Faranaya, it may be that the enterprise's services are helping to alleviate gender barriers to agricultural participation in Garu. Pay parity for male and female Faranaya farmers indicates that the enterprise does not price discriminate by gender and that significant quality differences are not affecting the prices received by either group.

Female participants noted that Faranaya's prices, agronomic trainings, input provision programs, and payment structure have helped to increase their production capacity, and treatment women reported a high degree of satisfaction with the services they receive from Faranaya. One focus group participant reported that women take advantage of trainings more often than do men. Still, it is clear that gender barriers to women's equal participation in the sorghum sector remain and that outcomes differ between male and female Faranaya suppliers. Faranaya would do well to disrupt trends which prevent women from accessing land and

[14] Our sample contained 184 male Faranaya suppliers, 51 female Faranaya suppliers, 51 male comparison group suppliers, and 6 female comparison group suppliers. Our study was not powered to measure the statistical significance of differences among these small groups, and these small sample sizes could create bias in our comparisons of gender by treatment status.

inputs, and the enterprise could explore why treatment women report low levels of total household land and income relative to other groups.

Box 3: Root Capital's Women in Agriculture Initiative (WAI)

In 2012, Root Capital launched our Women in Agriculture Initiative (WAI) to recognize and promote gender-equitable practices among our client enterprises. Through the WAI, Root Capital strengthens gender equity in agricultural businesses and the agricultural sector more broadly. We accomplish this through gender-inclusive lending and advisory services, the creation of women-designed products and services, and by generating and sharing evidence to close gender gaps in agriculture. More specifically, we:

- **GROW:** Seek out and invest in businesses committed to inclusion of women;
- **CULTIVATE:** Build women's financial and agricultural knowledge so they can thrive, personally and professionally;
- **INNOVATE:** Encourage and support women-led design of new products and services that benefit the whole community, and;
- **AMPLIFY:** Demonstrate a model for investing in women to help catalyze gender-smart changes in policy and practice.

Summary of Farmer-Level Impacts by Youth

Another key objective of this study was to examine the impacts of Faranaya suppliership by age and understand the barriers and opportunities faced by young people in sorghum-producing communities.

FINDING 10: Youth performed similarly to treatment farmers on numerous key outcomes.

Our quantitative data indicated that youth farmers—those age 35 and younger, in both the treatment and comparison groups—performed largely on par with treatment farmers over the study period. Youth production increased consistently over the study period (by 55%), even while their sorghum land declined slightly between 2018 and 2020. Youth farmers were also the highest earners in our sample over the study period in terms of total household income.

FINDING 11: Despite their physical advantages over older producers, youth producers may face challenges in sorghum land ownership and asset acquisition.

Data from focus groups indicate that, in many ways, youth have advantages over older farmers. Respondents reported that young people have more energy and physical capacity to manage larger plots of land. One farmer reported that young people typically produce sorghum for sale and have more funds available to purchase inputs, while older producers primarily produce sorghum at a smaller scale for their own consumption. They indicated that youth are entering the sector due to the readily available market for sorghum and that youth migration from the region has decreased as a result.

However, youth farmers who belong to Faranaya reported some difficulties in their participation in the sorghum sector. They mentioned in focus groups that older producers typically own land and farming assets, like oxen for plowing, and that young people may struggle to obtain their own plots. Others mentioned that Faranaya does not provide special opportunities for young people and requested many of the same services from the enterprise (e.g., more consistent fertilizer and inputs) as did older producers. Faranaya could perhaps expand the marketing of its youth programming to ensure that youth are aware and have access to the employment and entrepreneurship opportunities that the enterprise offers.

Box 4: Root Capital's Next-Generation Jobs Strategy

"Jobs for the Next Generation" is a key focus of Root Capital's strategy to build both the bankability and resilience of agricultural businesses around the world. To date, we have placed nearly 90 young people in first-time roles within agricultural enterprises through our Talent Partnerships program; awarded 22 resilience grants to enterprises to enable youth-positive development; and provided HR management training to help our clients integrate over 60 young people successfully into their businesses.

Looking ahead, we will build upon this experience—much of it undertaken in partnership with the Mastercard Foundation—to formalize our global strategy for Jobs for the Next Generation. Within five years, we hope to enhance employment pathways for youth into agricultural enterprises, promote opportunity for career advancement and fulfilling work, and catalyze innovative career paths for youth in agriculture. Through continued engagement with valued partners such as the Mastercard Foundation, we will refine our approach to accelerating youth inclusion in agricultural businesses, paving the way for a future engagement strategy that centers agricultural businesses in strategies aiming to increase meaningful employment for young people in rural communities.

Business-Level Impacts

As mentioned in previous sections, the main focus of this study is the farmer-level impact of affiliation with Faranaya. However, we also collected information on Faranaya's interactions with Root Capital, as well as employee perceptions of Root Capital's services and impact. This section details our findings on the business-level impacts of Root Capital's engagement with Faranaya.

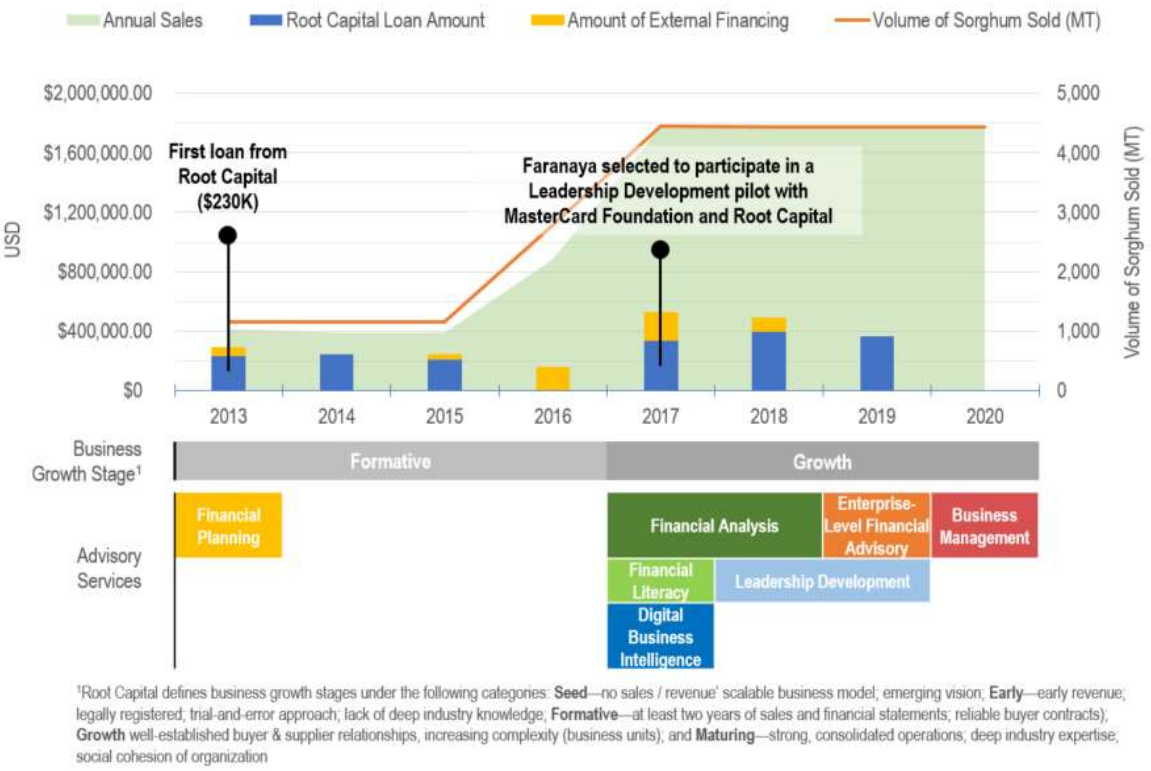
FINDING 12: According to enterprise employees, Root Capital financing and training has enabled Faranaya to meet many business goals.

Root Capital has provided Faranaya with a variety of services since 2013, when we approved a $240,000 loan for general working capital. Since then, we closed additional loans with the enterprise from 2014 to 2019. We were unable to close a loan with Faranaya in 2020; due to the COVID-19 pandemic, the business' primary buyer did not purchase from Faranaya as expected, which disrupted Faranaya's cash flow and their ability to fulfill the obligations of their 2019 loan. We extended the maturity date of Faranaya's 2019 loan, and approved a new loan with the enterprise in 2021.

We also began providing Faranaya with advisory services in 2013. As of this report's publication, our advisory team has provided employees with 46 total days of training on financial analysis, financial literacy and governance, financial planning, accounting systems, and information technology needs assessment. In 2018 and 2019, Faranaya also participated in Root Capital's Talent Partnerships program, through which interns are placed in roles within local agricultural enterprises—both to provide youth with exposure to the sector and to fill key staffing needs at rural enterprises. Both Faranaya and the intern found the placement to be a positive experience, and the intern now works for the enterprise in a full-time position.

Faranaya's sales have grown sevenfold over our engagement, as shown in Figure 17, from $275,000 in 2012 to $1.77M in 2018. Its supplier base has also increased dramatically from 1,500 to 4,120 suppliers over the same period.

Figure 17: Faranaya's Engagement with Root Capital



[1]Root Capital defines business growth stages under the following categories: **Seed**—no sales / revenue' scalable business model; emerging vision; **Early**—early revenue; legally registered; trial-and-error approach; lack of deep industry knowledge; **Formative**—at least two years of sales and financial statements; reliable buyer contracts); **Growth** well-established buyer & supplier relationships, increasing complexity (business units); and **Maturing**—strong, consolidated operations; deep industry expertise; social cohesion of organization

Enterprise interviews indicated that these services have been important to Faranaya's growth and community impact. Employees reported that Root Capital financing has allowed the enterprise to pay farmers on time and enabled it to purchase assets. This change has directly benefited Faranaya's suppliers, many of whom report prompt payments as a key benefit of affiliation with the enterprise. Employees noted that Faranaya's partnership with Root Capital has also facilitated the development of other relationships that have offered benefits to producers.

Employees also emphasized the advantages they have received from Root Capital's advisory services. They noted that Root Capital trainings have supplied helpful guidance on interest and cash flow management. Root Capital's trainings for Faranaya's producers, meanwhile, have helped farmers directly by providing instruction on budgeting, developing crop calendars and business plans, calculating income and profits, and applying for credit. These services set Root Capital apart from other lenders in the region. Faranaya employees noted that they prefer financing through Root Capital because of our emphasis on business advisory.

Faranaya sees great room for improvement in its suppliers' incomes, and employees view Root Capital as a key partner in reducing poverty in the region and helping sorghum farmers reach higher levels of commercialization and mechanization.

"Root Capital has a unique [model] of business monitoring and business support. They are able to identify your shortcomings at a very fast rate and they put in measures to mitigate those [sic] not only for the company but also the clients of the company, the farmers."

– Faranaya leadership

FINDING 13: Enterprise staff requested longer-term financing, lower interest rates, and more training from Root Capital.

Faranaya employees noted that they would like to see Root Capital offer longer-term financing; employees indicated that the enterprise is cash-constrained, particularly during the three months each year when sorghum is out of season. As a result, the enterprise pays employees near minimum wage and lacks the ability to make necessary upgrades to transportation vehicles or reach a majority of farmers with input provision programs. Employees suggested that longer-term loans would allow them to make such investments, hire more employees, and engage in alternative income-generation programming during the off-season. They indicated that they would also like financing for female entrepreneurship programming, farmer credit programs, mechanization technology, and warehouses, as well as a lower interest rate. Given that Faranaya has worked with Root Capital for many years, employees reported that they would like to see a faster process for loan applications.

CONCLUSION

This study reveals promising findings as to the impacts of Faranaya on farmer livelihoods in the Ghanaian sorghum sector. We found that Faranaya suppliers saw greater increases to their sorghum production, land, sales, and income than did comparison farmers over the study period. Faranaya suppliers also received higher prices for their product. While women lagged behind men on many key outcomes, gender differences were less pronounced in the treatment group than in the comparison group.

Farmers affiliated with Faranaya reported in focus groups that Faranaya membership has had numerous positive impacts on their incomes and quality of life. Focus group participants expressed that working with Faranaya has saved them time and money, and allowed them to purchase new household assets and better manage their sorghum farms. Faranaya employees, meanwhile, noted that partnership with Root Capital has helped the enterprise grow and make an impact on the broader community. Root Capital loans have enabled the enterprise to pay farmers on time and acquire new equipment and inputs for farmers. Employees also reported Root Capital trainings have provided helpful guidance on various financial management topics.

At the same time, this study exposed numerous areas for further attention and research. We did not find significant improvements in farmer productivity over the study period, nor did we find differences in good agricultural practice application by treatment status. Farmers face vulnerabilities related to birds, pests, and diseases, and lack key farm equipment. They offered numerous suggestions for Faranaya in focus groups, with most centered on the consistency of Faranaya's services. It is also evident that women and youth face barriers that impede their full participation in sorghum production. Faranaya might consider specific initiatives to assist female and youth producers in acquiring land and sorghum inputs.

Overall, this study largely validates the key premise of Root Capital's model—that agricultural enterprises can generate positive outcomes for rural communities with the right investment and targeted training. We hope to continue our relationship with Faranaya, as the enterprise confronts the challenges and opportunities that affect its business and the lives of its suppliers.

APPENDIX

Table 3: Farm Characteristics, Production, and Income by Treatment Status, 2020

	Treatment Group			Comparison Group		
	Observations	Mean	Standard Deviation	Observations	Mean	Standard Deviation
Sorghum Land	235.00	2.65	1.90	57.00	2.11	1.26
Total Land	234.00	10.47	6.86	57.00	10.31	5.68
Sorghum Production	235.00	909.66	766.91	57.00	583.51	522.89
Productivity per Acre	219.00	392.81	247.77	52.00	342.31	295.39
Total Quantity Sold	231.00	12.31	13.53	57.00	6.63	9.47
Price per Kilogram	191.00	68.04	6.84	35.00	60.99	12.81
Sorghum Income	233.00	811.67	897.05	57.00	384.81	532.00
Total Household Income	229.00	3902.62	4746.18	56.00	2232.96	2639.07