Food and Agriculture Organization
of the United Nations

Baseline assessment of home-grown school feeding in Ethiopia

Baseline assessment of home-grown school feeding in Ethiopia

Ervin Prifti

Food and Agriculture Organization of the United Nations
Rome, 2023

Required citation:

Prifti, E. 2023. *Baseline assessment of home-grown school feeding in Ethiopia.* Rome, FAO. https://doi.org/10.4060/cc4312en

The designations employed and the presentation of material in this information product do not imply the expression of any opinion whatsoever on the part of the Food and Agriculture Organization of the United Nations (FAO) concerning the legal or development status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. The mention of specific companies or products of manufacturers, whether or not these have been patented, does not imply that these have been endorsed or recommended by FAO in preference to others of a similar nature that are not mentioned.

The views expressed in this information product are those of the author(s) and do not necessarily reflect the views or policies of FAO.

ISBN 978-92-5-137636-2

© FAO, 2023

Some rights reserved. This work is made available under the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 IGO licence (CC BY-NC-SA 3.0 IGO; https://creativecommons.org/licenses/by-nc-sa/3.0/igo/legalcode).

Under the terms of this licence, this work may be copied, redistributed and adapted for non-commercial purposes, provided that the work is appropriately cited. In any use of this work, there should be no suggestion that FAO endorses any specific organization, products or services. The use of the FAO logo is not permitted. If the work is adapted, then it must be licensed under the same or equivalent Creative Commons licence. If a translation of this work is created, it must include the following disclaimer along with the required citation: "This translation was not created by the Food and Agriculture Organization of the United Nations (FAO). FAO is not responsible for the content or accuracy of this translation. The original [Language] edition shall be the authoritative edition."

Disputes arising under the licence that cannot be settled amicably will be resolved by mediation and arbitration as described in Article 8 of the licence except as otherwise provided herein. The applicable mediation rules will be the mediation rules of the World Intellectual Property Organization http://www.wipo.int/amc/en/mediation/rules and any arbitration will be conducted in accordance with the Arbitration Rules of the United Nations Commission on International Trade Law (UNCITRAL).

Third-party materials. Users wishing to reuse material from this work that is attributed to a third party, such as tables, figures or images, are responsible for determining whether permission is needed for that reuse and for obtaining permission from the copyright holder. The risk of claims resulting from infringement of any third-party-owned component in the work rests solely with the user.

Sales, rights and licensing. FAO information products are available on the FAO website (www.fao.org/publications) and can be purchased through publications-sales@fao.org. Requests for commercial use should be submitted via: www.fao.org/contact-us/licence-request. Queries regarding rights and licensing should be submitted to: copyright@fao.org.

Cover photograph: © FAO/Giulio Napolitano

Contents

Acknowledgements vi
Abbreviations and acronyms vii
Executive summary viii

Introduction 1

Methodology and data 5
- Evaluation design 5
- Baseline sample formation 8

Descriptive statistics 11
- Sociodemographic characteristics 11
- Production inputs and assets 12
- Production outputs 17
- Welfare outcomes 27

Conclusions 35

References 39

Annex A: Statistical methods 41
Annex B: Tables 42

Tables

Table 1. Schools and *woredas* covered by the home-grown school feeding programme 2

Table 2. Distribution of sample households by treatment arm and *woreda* 9

Table A.1. Sample of primary sampling units 42

Table A.2. Household characteristics 43

Table A.3. Land 43

Table A.4. Input use 44

Table A.5. Livestock 45

Table A.6. Assets 46

Table A.7. Crop spread and land allocation 48

Table A.8. Crop harvest and value of production (Ethiopian birr) 49

Table A.9. Crop sector revenues (Ethiopian birr) 50

Table A.10. Livestock sector revenues (Ethiopian birr) 51

Table A.11. Non-farm businesses (Ethiopian birr) 51

Table A.12. Labour supply 52

Table A.13. Food consumption expenditure (Ethiopian birr) 53

Table A.14. Non-food consumption expenditure (Ethiopian birr) 54

Table A.15. Savings and debt (Ethiopian birr) 55

Table A.16. Participation in social protection programmes 55

Table A.17. Children's dietary diversity score 55

Table A.18. Food insecurity experience scale 55

Table A.19. Schooling 56

Figures

Figure 1. Theory of change for HGSF programmes 4

Figure 2. Design of the HGSF programme evaluation in Ethiopia 6

Figure 3. Geographical coverage of the study 9

Figure 4. Farmland ownership and rental, by treatment arm (hectares) 12

Figure 5. Distribution of land titles, by intra-household landholder 13

Figure 6. Input market engagement, by treatment arm 14

Figure 7. Farm input expenditure, by treatment arm (Ethiopian birr) 15

Figure 8. Livestock holdings, by treatment arm 16

Figure 9. Shares of households owning durable goods and productive tools, by treatment arm 17

Figure 10. Percentage of farmers cultivating major crops, by treatment arm 18

Figure 11. Land allocation among major crops, by treatment arm 18

Figure 12. Monetary value of production, by crop and treatment arm (Ethiopian birr) 19

Figure 13. Harvest of major crops, by treatment arm (kilograms) 20

Figure 14. Maize yields, by treatment arm (kilograms/hectare) 20

Figure 15. Shares of farmers engaging in output markets, by treatment arm and crop 21

Figure 16. Crop sale revenues, by treatment arm (Ethiopian birr) 22

Figure 17. Crop shares of sale revenues, by treatment arm 22

Figure 18. Livestock and livestock by-products market engagement, by treatment arm 23

Figure 19. Shares of farmers engaged in non-farm businesses, by treatment arm 24

Figure 20. Adult labour supply, by treatment arm 25

Figure 21. Total consumption expenditure, by treatment arm (Ethiopian birr) 26

Figure 22. Consumption expenditure, by treatment arm 27

Figure 23. Participation in PSNP social protection schemes, by treatment arm 29

Figure 24. Food security scores, by treatment arm 30

Figure 25. Children's dietary diversity scores, by gender of the household head and of the child 31

Figure 26. Children's dietary diversity scores, by household characteristics 32

Figure 27. Education outcomes, by treatment arm 33

Figure 28. School performance and household characteristics 34

Acknowledgements

The author of this report is very grateful to the following FAO colleagues for their comments and fruitful discussions on how to interpret the findings and how to use the data: Alejandro Grinspun, Mari Kangasniemi, Noemi Pace, Silvio Daidone, Cristina Scarpocchi, Andrea Polo Galante, Luana Swensson and Florence Tartanac. We would also like to thank Leulseged Yimer (Bureau of Education), Shawel Moreda (FAO), Mesfin Mekuria (World Food Programme [WFP]) and Akale Teklu (WFP) for their support in the implementation of the household survey; and Jane Shaw for her thorough proofreading work.

This study was made possible thanks to funding from the Government of Italy through the project *Policy Support for Public Food Procurement for Government-led Home-Grown School Food initiatives* (GCP/GLO/775/ITA).

All considerations expressed in the report are to be attributed solely to the author and do not express the views of FAO, the Government of Ethiopia or any other subject.

Abbreviations and acronyms

DID	difference-in-differences
FAO	Food and Agriculture Organization of the United Nations
ha	hectare
HGSF	home-grown school feeding
PFP	public food procurement
PSNP	Productive Safety Net Programme
SNNPR	Southern Nations, Nationalities, and Peoples' Region
TLU	tropical livestock unit
WFP	World Food Programme

Currencies

ETB	Ethiopian Birr

Executive summary

The scope of this evaluation is based on a memorandum of understanding signed in January 2018 between the World Food Programme (WFP) and the Government of Ethiopia represented by the Bureau of Education of the Southern Nations, Nationalities, and Peoples' Region (SNNPR). Under the memorandum, WFP was to transfer funds to the Bureau of Education for the purchase of food commodities from selected local smallholder farmer organizations to supply a group of schools located in SNNPR and covered by the home-grown school feeding (HGSF) programme. The pilot covered 148 schools for the period from January 2018 to June 2020.

The evaluation of the HGSF in SNNPR is based on a post-test-only, non-equivalent control group design with two waves of data collection: the first took place in June–July 2019, at the end of the school year; while the second was planned over the same period in 2020, but did not materialize due to the 2019 coronavirus disease (COVID-19) outbreak. The sample size was 1 229 households, split into three treatment arms: the public food procurement (PFP) arm (T1), benefiting from public food procurement but not school meals; the HGSF arm (T2), benefiting from both public food procurement and school meals; and the control arm (C), which was excluded from both public food procurement and school meals. The objective of this report is to provide descriptive statistics on the study sample by the treatment arm using data collected in the first wave, and to illustrate cross-arm differences.

With regard to the sociodemographic characteristics of the households, the researchers found that after proper reweighting, the three treatment arms are perfectly comparable with each other.

The outcome variables examined were farm production variables and food security and schooling indicators.

The control households farm considerably more land (1.1 ha) than the PFP (0.63 ha) and HGFS (0.83 ha) arms, with the significant differences driven mostly by the share of rented-in land farmed.

The three treatment arms recorded similar results in the share of surveyed households that engage in input markets, other than those for land rental and a few other inputs, but results differed considerably in terms of average total amounts spent on acquiring such inputs. On average, households in the control group spent almost three times as much on farm inputs as households in the PFP group did, and twice as much as those in the HGSF group, in both the crop and livestock sectors. This is related to the larger farm sizes in the control group.

Almost every household in the sample owns some livestock and average herd size was not statistically different across treatment arms. Cows and other cattle accounted for about 75 percent of total tropical livestock units (TLUs).

The general pattern that emerges tells a story of the control group being better equipped with agricultural tools than the other two groups and wealthier in terms of ownership of home durable goods.

Maize is the most cultivated crop across all three arms. Other important crops include enset, grown by 52 percent of farmers in the PFP group, and wheat (45 percent). Most crops are grown by similar proportions of farmers in the three treatment arms. Land allocations to the various crops are also similar, except for maize, which covers a smaller proportion of total land in the PFP group.

The value of crop production in the control group (at about ETB 20 000) is twice as high as in the other two groups, where the value of the harvest is about ETB 10 000. This is in line with previous findings indicating a larger farm size and higher farm input expenditure in the control arm. However, the larger production quantities and values in the control group are not solely the result of a larger scale of production. In addition, land productivity, measured from maize yields, is higher in the control group than in the other two.

The most widely sold crops are maize and wheat, both targeted by the HGSF programme. Commercialization, measured from the share of households that sell some maize in the market, is considerably higher in the control group (47.7 percent) than in the PFP (9.2 percent) and HGSF (20.2 percent) groups. Crop sale revenues in the control group (ETB 11 000) are almost twice as high as in the other two groups (about ETB 6 000).

Income from the livestock sector, both livestock trading and sales of livestock by-products, amounts to ETB 1 200–1 800 per year with no significant differences across arms.

Non-farm business activity is also distributed similarly across arms in terms of both incidence (12–18 percent) and profitability (ETB 2 100–3 000 per month).

Households spend 70–90 days per year working on their own farms. In the control group, households generate more value for each day employed in crop or livestock activities (own farm labour productivity) relative to the other two groups. Households in the HGSF group carry out more paid agricultural work (four months per year) relative to the other two groups.

The control group appears to be better off based in terms of higher absolute values of non-food expenditure and lower shares of food expenditure.

The share of households participating in the Productive Safety Net Programme (PSNP) public works scheme is significantly higher in the HGSF (10 percent) and PFP (6 percent) groups than in the control group (5 percent).

While the child dietary diversity score is similar in the control and PFP groups, it is significantly lower in the HGSF group. The food insecurity situation as measured by the food insecurity experience scale is significantly worse in the HGSF arm (with a score of 4.4) relative to the control (with a score of 2.3) and PFP (with a score of 2.5) arms.

School attendance rates are high in all three arms and range between 91 percent in the control group and 97 percent in the HGSF group. The share of students that pass the grade in the HGSF group (67 percent) is significantly lower relative to the control (84 percent) and PFP (79 percent) groups.

Introduction

With a population of 109 million, Ethiopia is the second most populated country in Africa and has one of the fastest growing economies in the region. In the last ten years Ethiopia's economy has experienced strong, broad-based growth averaging 9.9 percent a year, mainly from the construction and service sectors, while agriculture has made a lower contribution to growth. Agriculture is still the largest sector, employing 85 percent of the population and accounting for 37 percent of gross domestic product, but its contribution to overall growth began to shrink in the mid-2000s, when other sectors started to expand. Most of the agriculture sector is based on smallholder farmers. According to recent estimates, 94 percent of food crops and 98 percent of coffee are produced by smallholder farmers (Mersha and Ayenew, 2018).

High economic growth has led to higher average income (USD 790) and positive trends in poverty reduction, especially in urban areas. While urban headcount poverty declined from 36.9 percent in 2000 to 14.8 percent in 2016, rural poverty declined from 45.4 percent to 25.6 percent in the same period (UNDP, 2018). Food insecurity and poverty rates remain high, and an estimated 7 million school-age children are living in food-insecure parts of the country (WFP, 2018). For some years, the Government of Ethiopia has been stepping up efforts to achieve universal primary education, managing to bring the net enrolment rate for primary school to 85 percent in 2015 (UNESCO, 2019). The second Growth and Transformation Plan (2015–2020) gives priority to pro-poor spending, specifically on education, health and agriculture, by strengthening rural and urban social protection programmes aimed at lifting households out of poverty in the medium term (IMF, 2018). Efforts to deliver on the commitment to prioritizing pro-poor public spending include the expansion of home-grown school feeding (HGSF) programmes, which are social protection programmes that aim at improving food security, health and nutrition status and education outcomes for schoolchildren, while stimulating the rural economy and agricultural production through the local procurement of food.[1]

[1] Home-grown school feeding is a school feeding model designed to provide children in schools with safe, diverse and nutritious food sourced locally from smallholders (FAO and WFP, 2018).

School feeding programmes have been implemented in Ethiopia for 20 years through collaboration between the Ministry of Education and WFP. Over this period, the programmes have contributed to increases in school enrolment and attendance rates and improvements in the ability of pupils to concentrate during classes. About 450 000 pupils in 1 121 schools in four regions (Afar, Oromia, SNNPR and Somali) are covered by school feeding programmes, which provide almost a third of their daily caloric intake (WFP, 2018).

The new school feeding strategy for Ethiopia, under development since 2017, recognizes three strategic objectives for the HGSF programme:

- Improve the enrolment, retention and completion rates, and learning achievement, of pre-primary and primary school-age children by creating access to school meals.
- Alleviate short-term hunger in school, improve the health and nutrition status of schoolchildren and contribute to breaking the intergenerational cycle of malnutrition hunger and poverty.
- Provide a stable and predictable market and demand for local farmers as an incentive for increasing diversified agricultural production and productivity and creating employment opportunities for women and young people, thereby sustainably increasing their incomes.

The scope of this evaluation is set out in a memorandum of understanding signed in January 2018 between the Government of Ethiopia, represented by the Bureau of Education of the Southern Nations, Nationalities, and Peoples' Region (SNNPR) and WFP. The object of the memorandum was the transfer of funds from WFP to the Bureau of Education for the purchase of food commodities from selected local smallholder farmer organizations to supply a group of schools in SNNPR covered by the HGSF programme. To ensure a smooth transition of the programme to government ownership, WFP committed to providing a matching fund equal to 50 percent of the total budget in 2018, 40 percent in 2019 and 30 percent in 2020. The estimated total budget required to provide school meals for 65 000 students in 148 schools for the period January 2018 to June 2020 was USD 4.3 million.

The 148 targeted schools are located in five of SNNPR's 14 zones: South Omo, Guraghe, Silti, Sidama and Segen (see Table 1). Parts of the *woredas* not covered by the HGSF programme are covered by the emergency school feeding programme, which is funded fully by the Bureau of Education and uses the same food procurement mechanism to deliver the same meals as the HGSF. However, its coverage is decided each year depending on the occurrence of shocks.

TABLE 1. **SCHOOLS AND *WOREDAS* COVERED BY THE HOME-GROWN SCHOOL FEEDING PROGRAMME**

	South Omo zone	Guraghe zone	Segen zone	Silti zone	Sidama zone	Bench Maji zone
Number of *woredas* covered	6 (8)	2 (15)	1 (8)	1 (8)	2 (19)	-
Number of schools covered	120 (195)	10 (80)	5 (28)	5 (44)	8 (134)	47 (174)

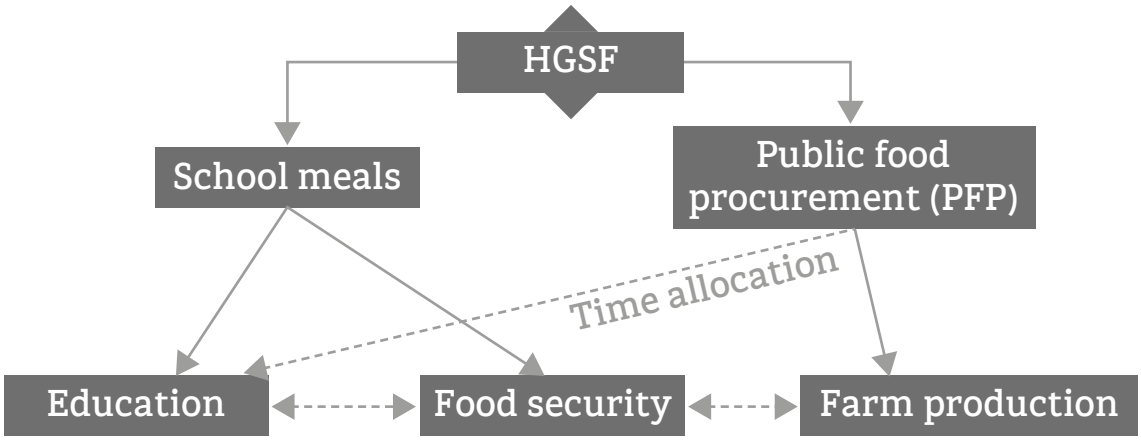
Source: Author's own elaboration. *Note*: Numbers in parenthesis indicate the total number of *woredas* or schools in the zone.

The Bureau of Education procures commodities for the preparation of meals in August through a request for quotation from cooperative unions, following a competitive process of awarding contracts. The winning cooperative union then buys the commodities from its member primary cooperatives, which in turn purchase from their member farmers. Aggregators have a central role in connecting smallholders to HGSF purchases. In Ethiopia, aggregation involves two stages: first at the primary cooperative level and then at the cooperative union level. The request for quotation specifies all requirements such as quantity, quality, packaging, markings, delivery terms, timing and payment. For the 2018/19 school year, the Bureau of Education procured maize, haricot beans, wheat and rice from the selected cooperative union. The bureau stipulates the content of meals, with the aim of providing children with at least 500 kcal per day. The main food menus are cracked maize with haricot beans, cracked wheat with haricot beans, maize flour with haricot beans, rice with haricot beans, and boiled maize with haricot beans. All menus contain iodized salt and fortified palm oil. Some fresh products (such as vegetables and fruits) are provided in schools with school gardens, but not consistently or systematically (Swensson, 2019) No fresh products are procured, but the government recognizes the importance of providing a more diversified menu with fresh products, especially given the aim of increasing the impact of the programme on the food security and nutrition status of schoolchildren and because of the potential for the procurement of fresh products to support diversified production and market access for smallholder farmers (Swensson, 2019).

When evaluating its impact, HGSF can be viewed as a single programme that combines two interventions: the provision of school meals, and the public procurement of food (PFP) for the meals from local farmers. The programme has multiple aims - in addition to nourishing children and encouraging them to attend school, it provides market access to smallholder farmers, strengthens the capacities of smallholder farmers and communities to produce foods, and contributes to rural transformation by supporting crop and dietary diversification. The impact evaluation was designed to capture the various impacts related to the specific objectives of both meal provision and PFP. Surveyed households fall into one of three treatment arms: the PFP arm (T1); the HGSF arm (T2); and the control arm (C).

The objective of this report is to provide descriptive statistics from the study sample by treatment arm using the first wave of survey data, collected in June–July 2019. The evaluation was designed with the aim of estimating three types of impact on farm production, food security and schooling: the impact of PFP alone; the impact of the HGSF programme as a whole; and the effects of school meals alone. The meals and the PFP may have a major impact on specific outcomes and only indirect second-order effects on others. PFP provides farmers with guaranteed sales of their produce, thereby providing predictable demand. This is likely to have an impact on farmers' productive choices and income, which in turn may have indirect second-order effects on food security and schooling indicators. On the other hand, the meals provided to schoolchildren are expected to have direct positive impacts on children's educational and food security outcomes and may only indirectly affect farm outcomes. Figure 1 shows schematically the theory of change behind the HGSF programme.

FIGURE 1. **THEORY OF CHANGE FOR HGSF PROGRAMMES**



Source: Author's own elaboration.

School feeding programmes affect educational outcomes directly by increasing school enrolment, attendance and completion. The provision of school meals gives an incentive for households to send children to school through a transfer (the daily meal) that is intended to help offset the financial and opportunity costs of schooling. On the farmers' side, purchases through the HGSF programme for the school meals are designed to encourage smallholder farmers to increase food diversification and production, as they provide stable market access through the purchase of food from smallholder farmers. Purchases through the HGSF programme can have three types of effects on farmers: output effects, distributional effects, and stabilization effects. The extra demand generated by the public purchase of food for the school meals can lead to increased production by beneficiary farmers. When combined with support for smallholder farmers in improving the quality and nutritional value of their food production, and the adoption of diversified menus, school food demand can also promote production diversification.

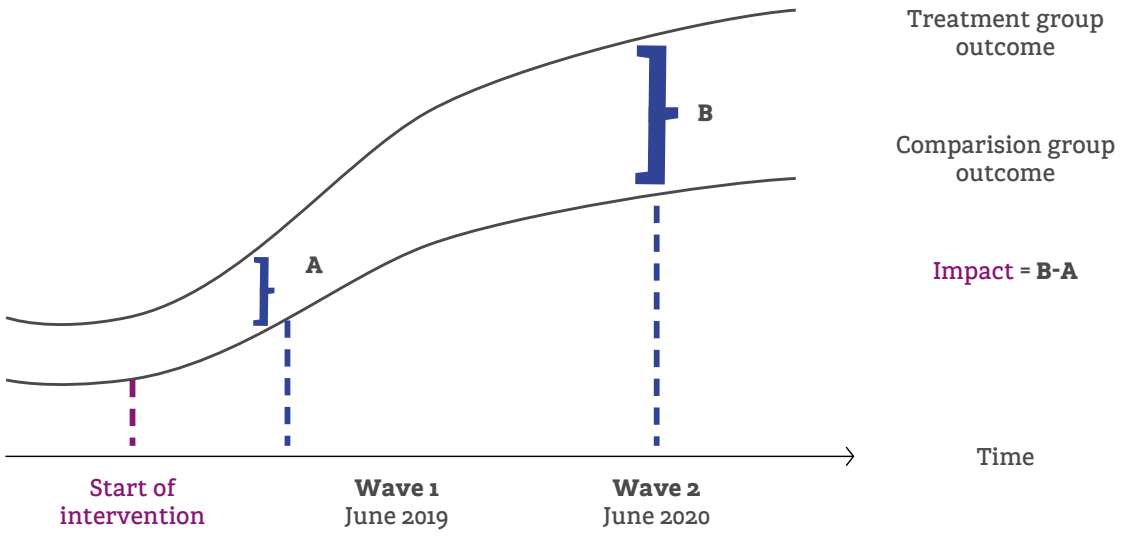
In addition, because the intervention targets at smallholders rather than large-scale farmers, it can also have distributional effects in the community, and by offering a stable and predictable source of income, food purchases may help stabilize farmers' expectations and their risk-taking behaviour.

Methodology and data

EVALUATION DESIGN

The evaluation of the HGSF programme in SNNPR is based on a post-test-only, non-equivalent control group design with two waves of data collection: the first was collected in June–July 2019, at the end of the academic year; and the second was planned to take place over the same period in 2020, but had to be postponed due to the restrictions imposed by the COVID-19 pandemic. In this evaluation design, there are no pre-intervention data and the impacts are computed as the differences in outcomes between the treated and comparison groups in the second wave minus the differences in the first wave. This design allows estimation of only the incremental impacts of the programme, i.e. the effects induced by the second year of programme implementation compared to those from the first year. The full impact of an intervention on its recipients is obtained from a comparison of the situation following the intervention and the situation without the intervention (Figure 2). This requires measurements from before the intervention is implemented (a pre-intervention survey) and after the intervention has started to produce most or all of its expected effects (a follow-up survey). In the absence of baseline data for this evaluation, two post-intervention surveys were carried out 12 months apart, allowing estimates of the marginal impacts of the programme between t and t + 1 years of exposure (Jason and Glenwick, 2016).

FIGURE 2. **DESIGN OF THE HGSF PROGRAMME EVALUATION IN ETHIOPIA**



Source: Jason and Glenwick, 2016.

The study design involved three treatment arms: the PFP arm (T1) is made up of households that benefit from the public procurement of food, but live in areas where local public primary schools are not covered by the school feeding programme; the HGSF arm (T2) comprises households that benefit from PFP and live in areas where school meals are provided to public schools; and the control arm (C) comprises households that do not benefit from PFP and live in areas without school feeding.

This design allows computation of double differences for the estimation of three types of impact: the impacts of the HGSF as a whole, through both PFP and the provision of meals to school-children, which are computed by comparing before–after differences in outcomes between T2 and C; the impact of the PFP alone, computed by comparing before–after differences in outcomes between T1 and C; and the effects of the school meals alone, calculated by comparing before–after differences in outcomes between T2 and T1.

The evaluation design was imposed by the characteristics of the programme. While the list of the schools receiving school meals was available months in advance, the competitive process for the selection of cooperatives that would benefit from the PFP scheme occurred in August 2018, only one month before the food was procured and delivered to the schools. This did not allow sufficient time to conduct a survey of the suppliers' member farmers before they started benefiting from HGSF purchases. Competitive food procurement procedures imposed other limitations on the study design, as they result in intrinsic uncertainty regarding the status of PFP beneficiaries, as farmers who benefit from PFP in one year might not win another public tender the following year. The intention of the evaluation team was to generate longitudinal data, but meeting that objective is contingent on having cooperatives win PFP tenders for two consecutive years. A repeated cross-section design was therefore a forced choice for this evaluation.

This report shows descriptive statistics by treatment arm for the sociodemographic characteristics of farm households and their production, education and food security situation. Details on the statistical methods used in the report are presented in Annex A. Sample averages are estimated for each treatment arm and statistical tests are carried out for cross-treatment arm comparisons. This method serves the purpose of assessing similarity across treatment arms. Ideally, the comparison group should be statistically equivalent to the treatment group in all observable and unobservable characteristics, except for exposure to the programme. This is only possible in a well implemented, randomized control trial. For this evaluation, treatment randomization was not feasible and the comparison group was selected through non-experimental means.

As the estimations are based on a double-difference approach, it is assumed that cross-arm differences in outcome will not bias the estimated impacts as long as the two arms involved in the comparison would have followed parallel paths in the absence of the programme. This hypothesis is known as the "parallel trends" assumption (Angrist and Pischke, 2009; Lechner, 2011). However, it is important that the "exogenous" sociodemographic characteristics do not differ between treatment and comparison households as they may affect both participation in the programme and the outcome of interest. The programme impacts presented in the follow-up report will be estimated by a combination of inverse probability of treatment weighting (IPTW) of regressions specified as difference-in-differences (DID). This strategy relies on the parallel trends assumption for the outcome variable (DID) while making sure that exogenous sociodemographic characteristics are equally distributed across treatment arms (inverse probability of treatment weighting). This report shows evidence of the similarity of the three treatment in terms of their sociodemographic characteristics before and after the use of inverse probability of treatment reweighting (section 3.1) and illustrates cross-arm differences in outcome variables (sections 3.2–3.4).

BASELINE SAMPLE FORMATION

The study sample was selected following a two-stage cluster procedure, using primary cooperatives as primary sampling units and households as secondary sampling units. Households for the HGSF and PFP arms were selected from primary cooperatives of the Melik Silte Cooperative Union, which won the competitive tendering procedure for the 2018/19 school year. The union has about 80 primary cooperatives, which are spread among most of the *woredas* of the Silte zone: Hulbarag, Dalocha, Silti, Alicho Wuriro, Sankura, Lanfuro, Merabazemet, Mserake Asmet, and Werabe Town. The HGSF arm was selected from primary cooperatives that operated in the *kebeles* where school meals were provided, while the PFP arm was selected from primary cooperatives in *kebeles* where school meals were not provided for the 2018/19 academic year. School meals are provided in only some *kebeles* in two *woredas* (Lanfuro and Sankura) in Silte zone.

For every primary cooperative and every school information is available on the *kebeles* that they cover, enabling the matching of information and identifying whether or not meals are provided in any given area. The control households were selected from the Walta Cooperative Union, which operates in the bordering zone of Gurage but did not benefit from PFP for the 2018/19 academic year. This union has 29 primary cooperatives spread across three of the 15 *woredas* in Gurage zone: Mareko, Meskan and Sodo. Walta member primary cooperatives were chosen from *woredas* in Gurage zone where no school meals were provided. School meals are provided in only certain *kebeles* in Mareko and Meskan and in none in Sodo. The control sample was selected in Mareko and Meskan as they border the treatment zone, while Sodo is located further away.

For the selection of the study sample it is important to keep in mind that the PFP component targets farmers through cooperative unions. Being a member of a union is therefore an eligibility criterion for inclusion in the sample, while the school meals component targets specific administrative units such as *woredas* or *kebeles*. Hence, the only eligibility criterion for inclusion in the sample of recipients of school meals is to be resident in one of those *woredas*. However, according to the memorandum of understanding between WFP and the Bureau of Education, only some of the schools in any *woreda* are provided with school meals, so there may be *kebeles* and schools not covered by the HGSF programme in the eligible *woredas*.

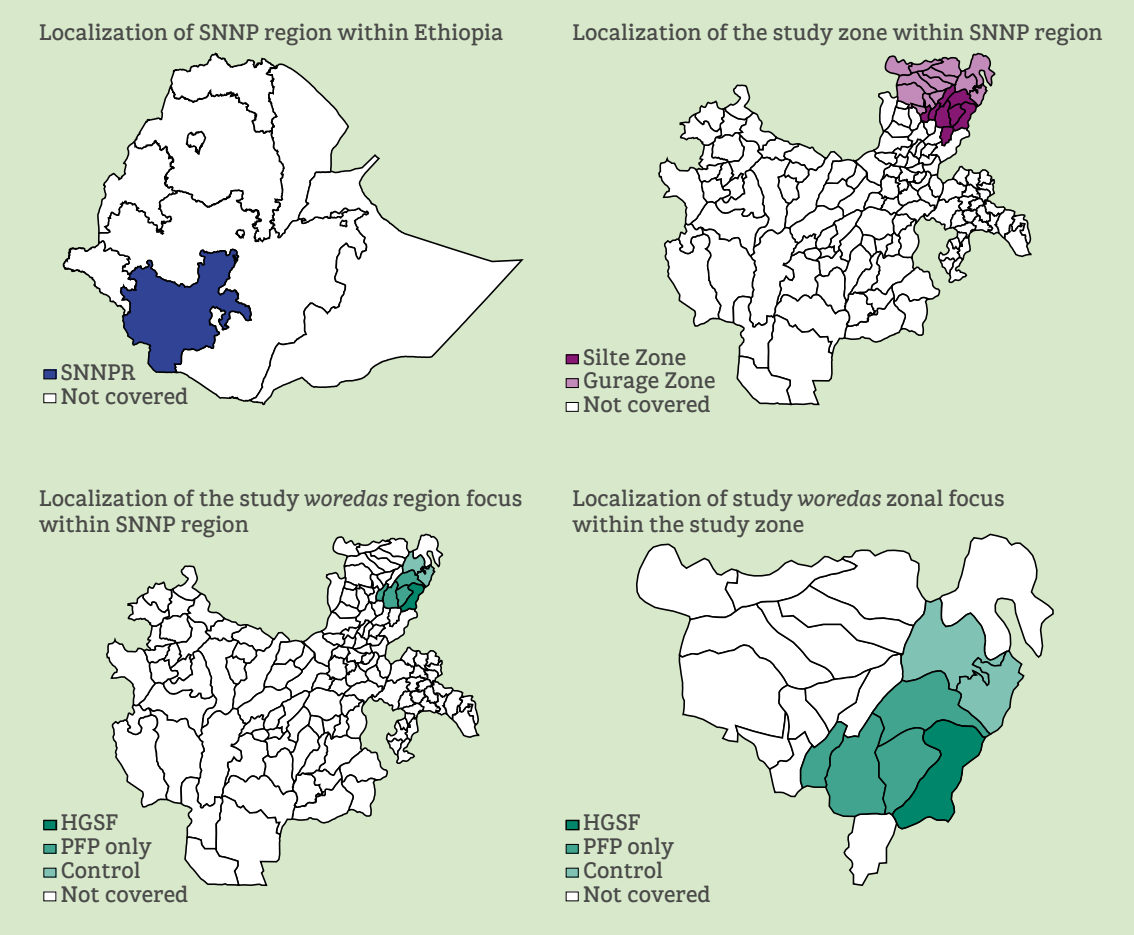
One of the basic eligibility criteria is that households in all three treatment arms must be members of a primary cooperative and a cooperative union. Membership of these is a minimum common denominator that makes the treatment (T1, T2) and control groups (C) comparable, but it comes at a cost in terms of external validity as it restricts the population to which the impacts can be generalized to that of cooperative members. The implications of such limited external validity become less severe as more farmers join cooperatives and cooperative unions. In Silte zone, where the T1 and T2 arms were selected, more than 65 percent of households are members of a cooperative.

Total household sample size was 1 229, with an expected 5 percent non-response rate. The total sample size was distributed among the three arms as follows:

- Comparison arm (C): 420 households.
- PFP arm (T1): 420 households.
- HGSF arm (T2): 389 households.

Table A.1 in Annex B lists the primary sampling units for each treatment arm, while Figure 3 shows the geographical distribution of the study sample among *woredas*.

FIGURE 3. **GEOGRAPHICAL COVERAGE OF THE STUDY**



Source: Adapted from Map No. 4188 Rev. 5 UNITED NATIONS, March 2012. Department of Field Support, Cartographic Section.

The distribution of the sample by *woreda* and treatment arm is shown in Table 2. The *woredas* of Mareko and Meskan are in Gurage zone, while the others are in Silte zone.

TABLE 2. **DISTRIBUTION OF SAMPLE HOUSEHOLDS BY TREATMENT ARM AND *WOREDA***

	Mareko	Meskan	Hulbarag	Dalocha	Silti	Mserake Azrnet	Lanfuro	Total
Control (C)	108	312						420
PFP (T1)			107	104	104	105		420
HGSF (T2)							389	389

Source: Author's elaboration from survey data.

Descriptive statistics

This section describes the cross-arm differences in sociodemographic characteristics and in the three groups of outcomes of interest: farm production, food security, and schooling.

SOCIODEMOGRAPHIC CHARACTERISTICS

Table A.2 in Annex B shows group averages and cross-group standardized differences before and after reweighting. Average household size is about six members to ensure sufficient labour capacity, and the average dependency ratio in the sample is about 1.3, or three members unfit to work for every adult fit to work, which is far lower than the threshold above which a household is considered labour-constrained. Household heads have an average of between two and three years of schooling, half of them are illiterate, their average age is 50 years, and about 12 percent of them are females. The average size of land owned is about 1 ha. Table A.2 also shows that most of the intrinsic characteristics of the households, which are usually taken to be exogenous determinants of production and welfare outcomes, are distributed evenly among treatment arms before reweighting, with a few exceptions. A certain variable is said to be equally distributed on average between two groups if the cross-group standardized difference is below 0.25. In the T1 versus C comparison, 4 out of 11 variables are unequally distributed in the original (raw) data. After reweighting, no variable is unequally distributed, as all standardized differences are below 0.25. In the T2 versus C and T2 versus T1 comparisons too, all differences disappear after reweighting. This guarantees that after reweighting, comparisons are made between groups of households that are similar in terms of the exogenous determinants of the outcomes, so differences in outcomes can be attributed to the HGSF programme itself rather than to measurable confounders.

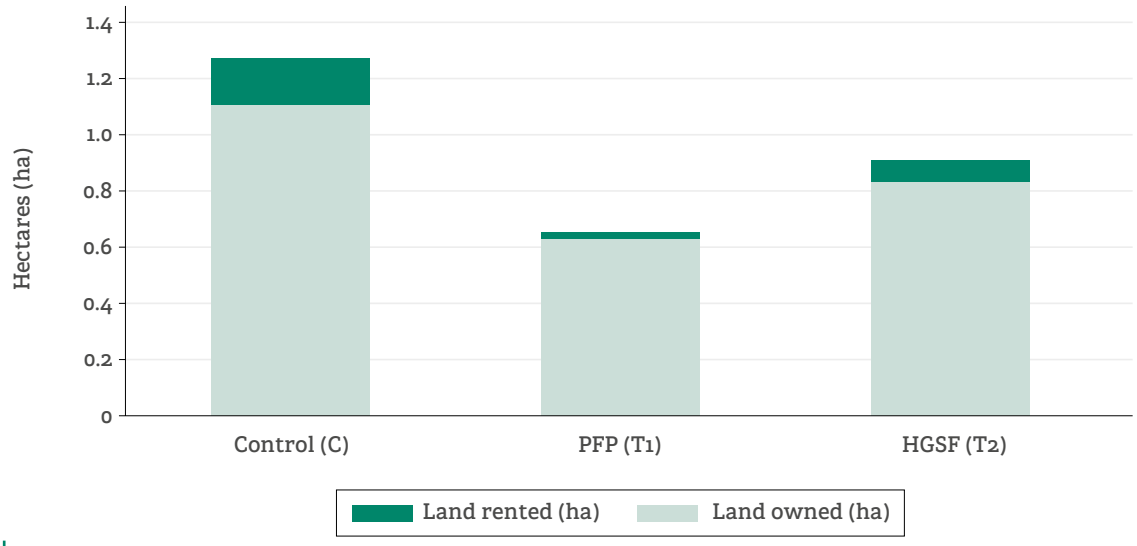
PRODUCTION INPUTS AND ASSETS

Land

Figure 4 shows the total area of operated land by treatment arm, broken down according to whether the land is owned or rented. The comparison households farm considerably more land (1.1 ha) than the PFP (0.63 ha) and HGSF (0.83 ha) households, with the significant differences driven mostly by the rented share of the land (Table A.3). Rental markets and sharecropping play an important role in the transferal of land to productive use and thereby improve efficiency. Although land rental is now permitted in Ethiopia, regions impose restrictions on the extent of land that can be leased or the duration of rental contracts (Nega, Adenew, and Gebre-Sellasie, 2003). SNNPR allows farmers to rent out up to 50 percent of their holdings. Previous research has found that many households are either completely excluded from the rental market or are unable to rent sufficient land to attain their optimum operational holding size (Holden, Shiferaw and Pender, 2001; Deininger and Ali, 2008); only 13 percent of the land farmed by the comparison group is rented, with even lower values in the PFP (3.8 percent) and HGSF groups (8.6 percent).

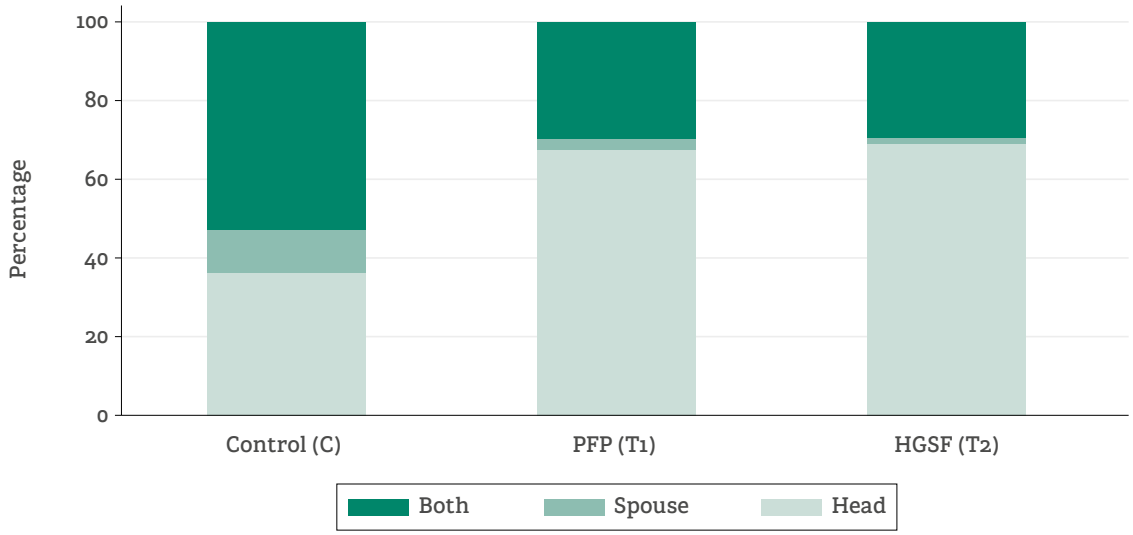
Almost all land parcels are registered and farmers have titles to land. However, the intra-household distribution of land titles various among the three treatment arms (Figure 5). With the share of parcels registered in the name of both spouses being highest (55 percent) in the control group, indicating a more balanced power relationship between the household head and spouse. In the PFP and the HGSF arms, about 65 percent of parcels are registered in the name of the household head, who is typically male (85 percent). The share of parcels registered exclusively in the name of the spouse is small in all three arms, but larger in the comparison group relative to the other two groups.

FIGURE 4. **FARMLAND OWNERSHIP AND RENTAL, BY TREATMENT ARM (HECTARES)**



Source: Author's elaboration from survey data.

FIGURE 5. **DISTRIBUTION OF LAND TITLES, BY INTRA-HOUSEHOLD LANDHOLDER**



Source: Author's elaboration from survey data.

Variable farm inputs

This section examines the use of agricultural inputs purchased from the market. Figure 6 shows the shares of farm households that purchased seeds and fertilizers (organic and chemical) from the market, and of those that hired labour to work on their farms. In all treatment arms, almost 90 percent of those interviewed purchased fertilizers in the last two growing seasons,[2] with no significant differences among groups (Table A.4). High levels of access to input markets are also observed for seeds, with between 75 and 95 percent of farm households purchasing seeds from the market, with no statistically significant differences among groups. The remaining share procures seeds without engaging in markets, either from their own production or through in-kind transfers (private or public). About one third of the households hire some labour for farm activities, with no significant differences among arms. Combined with information on low dependency ratios and a modestly developed rental market for land, this finding might suggest some development of market-oriented farm production.

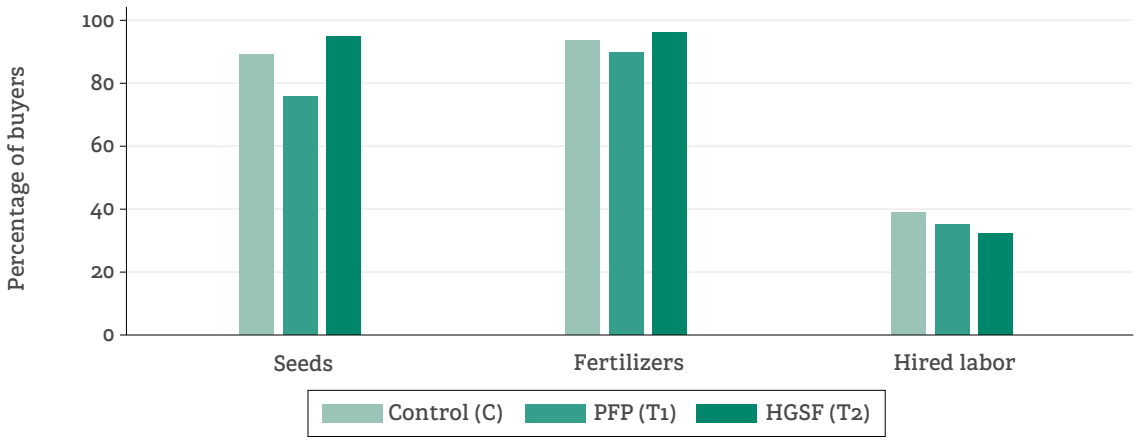
Results for other farm inputs are shown in Table A.4 in Annex B. For most inputs there are no significant differences among groups, except for the shares of households renting land and those buying storage space. Land rental is more common in the comparison (18 percent) and HGSF (17 percent) arms than in the PFP group (4.3 percent). The share of households purchasing storage services is significantly higher in the PFP (6 percent) and HGSF (14 percent) group, probably because of their engagement in the HGSF programme, as farmers may need to store their produce until it is collected by the cooperative union.

[2] In Ethiopia, there are two growing seasons during the year, the *meher* and the *belg*. All the productive outcomes discussed in this report refer to the last 12 months and include both seasons.

Figure 7 shows farm input expenditure for crops and livestock and overall, by treatment arm. Households in the comparison group spend almost three times as much on farm inputs on average as do those in the PFP group and twice as much as the HGSF group. In terms of sectoral composition, livestock plays a bigger role in the farm economy in the comparison arm (19.6 percent) than in the PFP (12.6 percent) and HGSF (4.3 percent) groups. At the national level, the livestock sector contributes 39 percent of agricultural gross domestic product, making the areas in the study more crop-oriented than the average for the country. The lower panel of Table A.4 shows results for the single items that make up crop and livestock expenditure. For the majority of items, households in the comparison group spend considerably more than those in the other groups, especially on fertilizers, pesticides, transportation and hired labour.

Overall, the three treatment arms are similar in terms of the share of households that engage in input markets, except for land rental and a few other inputs. However, they differ considerably in the average amounts spent on acquiring such inputs, although these amounts are absolute values and may be related to the fact that average farm size measured by land farmed is somewhat larger in the comparison group relative to the other two groups. To examine whether there are differences in the degree of commercialization in input markets, a relative measure was used for each sector: total crop input per hectare of farmed land and total livestock expenditure per tropical livestock unit (TLU).[3] As the last two rows of Table A.4 show, there are no significant cross-arm differences in the relative measures of input market engagement. The differences observed in Figures 6 and 7 are driven by the different scales of production in the three arms. The comparison group seems to be spending more on farm inputs in absolute terms, but not when capital (land and TLUs) is factored in.

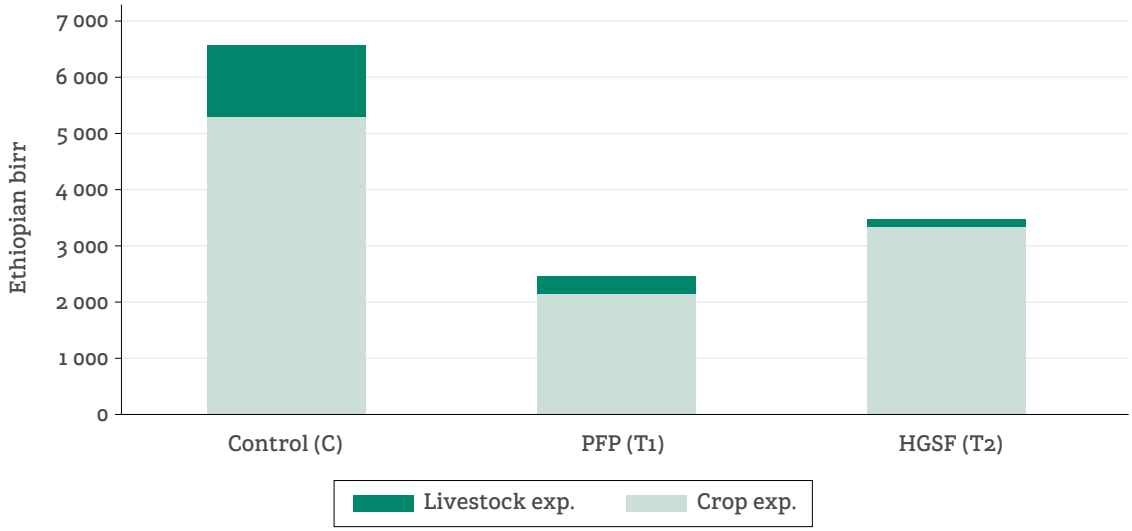
FIGURE 6. **INPUT MARKET ENGAGEMENT, BY TREATMENT ARM**



Source: Author's elaboration from survey data.

[3] TLUs convert livestock numbers into a common unit to allow comparisons of the numbers and density of livestock grazing in agriculture. The following TLU conversion factors were used: cattle = 0.70, sheep and goats = 0.10, pigs = 0.20, and chickens = 0.01.

FIGURE 7. **FARM INPUT EXPENDITURE, BY TREATMENT ARM (ETHIOPIAN BIRR)***



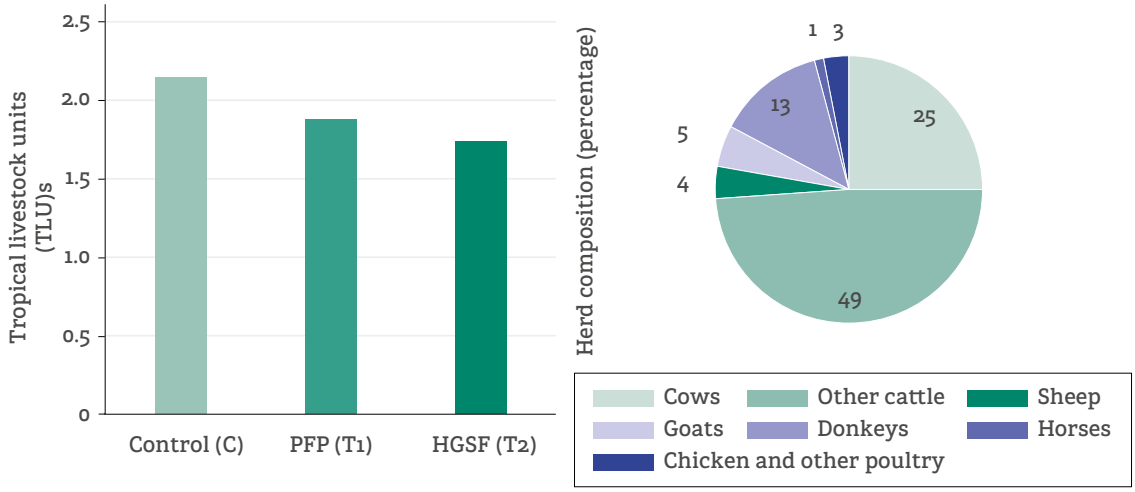
* ETB 1 = approximately USD 0.019.
Source: Author's elaboration from survey data.

Livestock holdings

Almost every household in the sample owns some livestock and average herd size is not statistically different across treatment arms (Table A.5). The left-hand graph in Figure 8 shows that households own between 1.7 and 2.1 TLUs on average. Cattle dominates smallholder livestock holdings in terms of both herd composition and income generation, with meat and milk production for domestic uses being the most important component (ILRI, 2017). About 75 percent of total TLUs is made up of cows and other cattle, as shown in the right-hand graph of Figure 8. The rest of the herd consists of donkeys and small ruminants.

Table A.5 provides more details on the distribution of types of animal by treatment arm.

FIGURE 8. **LIVESTOCK HOLDINGS, BY TREATMENT ARM**



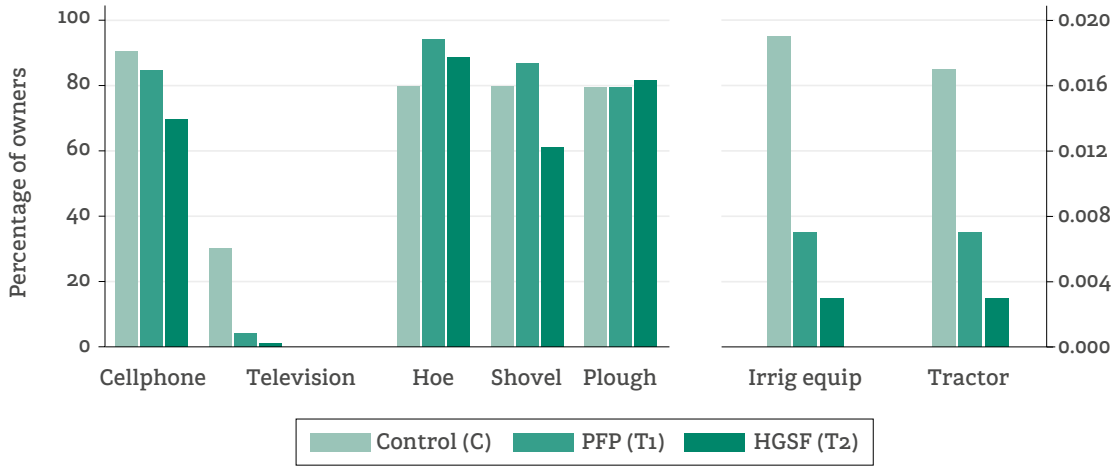
Source: Author's elaboration from survey data.

Assets, durable goods and tools

Ownership of durable goods is a proxy for a household's wealth and well-being. By this measure, comparison households seem wealthier than those in the other two groups, and PFP households seem better off than those in the HGSF group (Figure 9). About 90 percent of households in the comparison group own a mobile phone and a third own a television set. Mobile phones are owned in 84.5 percent of the PFP households and 69.7 percent of the HGSF households. In terms of agricultural tools, a smaller share of comparison group households own simple manually operated tools such as hoes (80 percent) and shovels (80 percent) relative to the PFP group (95 percent and 87 percent, respectively). Such tools are even less common in the HGSF group. Ploughs, by contrast, are evenly spread (80 percent) across all three arms.

Most smallholders in Ethiopia continue to rely on animal traction for the preparation of land plots, despite a recent acceleration in agricultural mechanization (Berhane *et al.*, 2017). In the sample, tractor use is very low (0.4–1.6 percent), but with considerable cross-arm differences. Households in the comparison group are three times as likely to use a tractor than those in the PFP group and twice as likely as those in the HGSF group (Figure 9). Table A.6 in Annex B shows the results for a longer list of goods. The general pattern that emerges shows the comparison group being better equipped with agricultural tools and wealthier in terms of home durable goods relative to the other two groups. Significant differences also emerge when comparing the PFP and HGSF groups, with the former coming across as slightly better off.

FIGURE 9. **SHARES OF HOUSEHOLDS OWNING DURABLE GOODS AND PRODUCTIVE TOOLS, BY TREATMENT ARM**



Source: Author's elaboration from survey data.

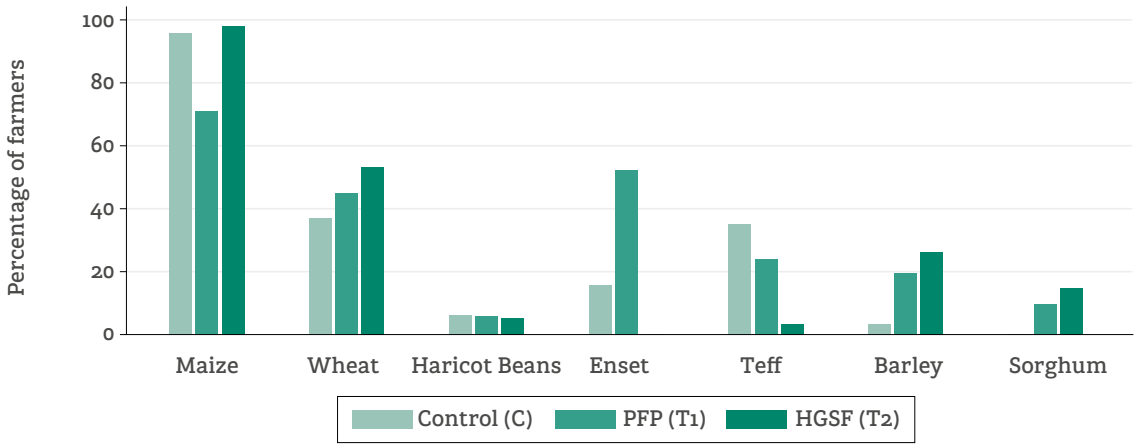
PRODUCTION OUTPUTS

Crop production and diversification

In Ethiopia, cereals (teff, wheat, maize, sorghum and barley) are the most important crop group, grown on 73.4 percent of the cultivated area, followed by pulses. Coffee and chat are major cash crops, but account for only 2.7 and 1.3 percent of total cultivated area, respectively (Taffesse, Dorosh and Gemessa, 2013).

Figure 10 shows the shares of farmers cultivating a given crop by treatment arm. Maize is the most commonly cultivated crop in all three arms. In the comparison and HGSF arms, almost everyone cultivates maize, while only about 70 percent of farmers in the PFP group do. For the comparison group, the most common crops beyond maize are wheat (37 percent) and teff (35 percent). In the PFP group, enset is the second most common crop (52 percent), followed by wheat (45 percent). In the HGSF group, wheat (53 percent) and barley (26 percent) are the most common crops after maize. The majority of these differences among treatment arms are not statistically significant (Table A.7), and most crops are similarly distributed in the three arms.

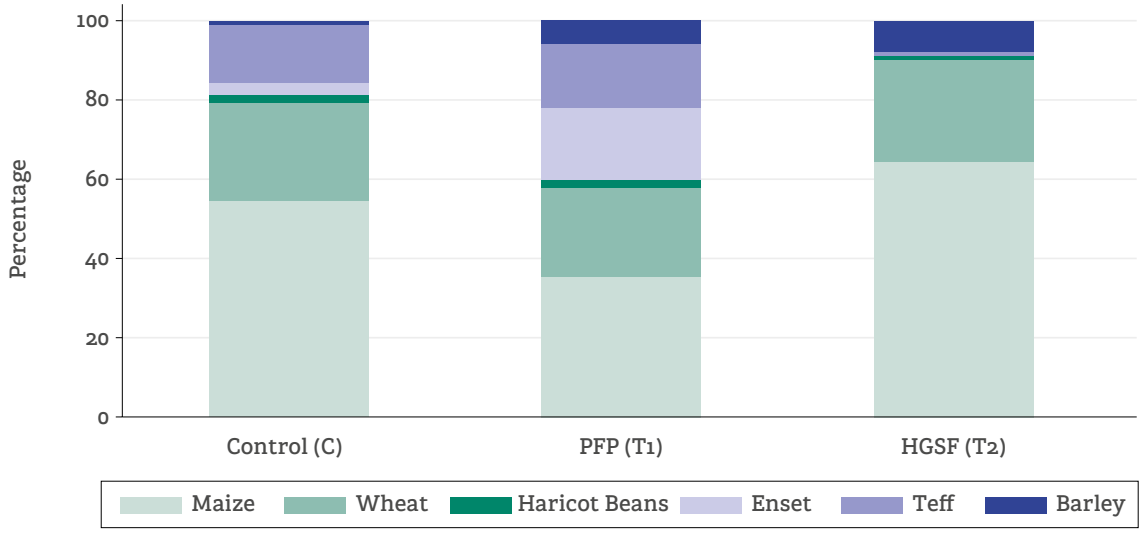
FIGURE 10. **PERCENTAGE OF FARMERS CULTIVATING MAJOR CROPS, BY TREATMENT ARM**



Source: Author's elaboration from survey data.

Figure 11 shows how land is allocated among the various crops in each treatment arm. In the comparison and HGSF groups, most of the planted area (about 60 percent) is allocated to maize, while in the PFP group, only 35 percent of land is planted with maize. The reason for this is that PFP farmers allocate a considerably larger share of land to enset (18 percent) compared to the other two groups. Almost the same share of land (25 percent) is dedicated to wheat in all three arms. Beyond maize and wheat, the comparison and PFP groups allocate considerable shares of land to teff (15 percent). However, except

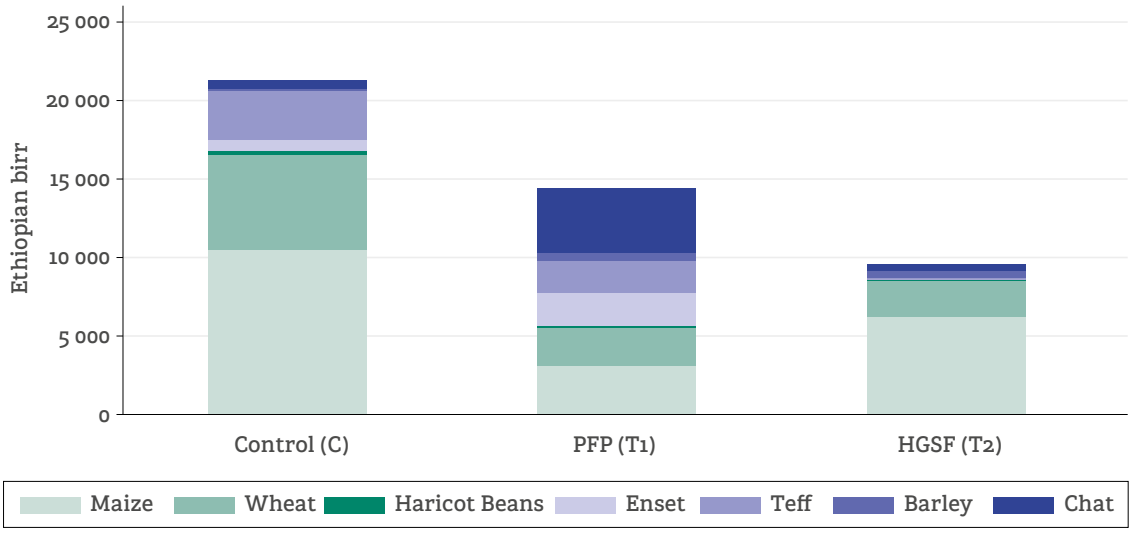
FIGURE 11. **LAND ALLOCATION AMONG MAJOR CROPS, BY TREATMENT ARM**



Source: Author's elaboration from survey data.

for maize, the majority of comparisons lead to statistically insignificant differences and land allocation among crops is similar in the three arms.

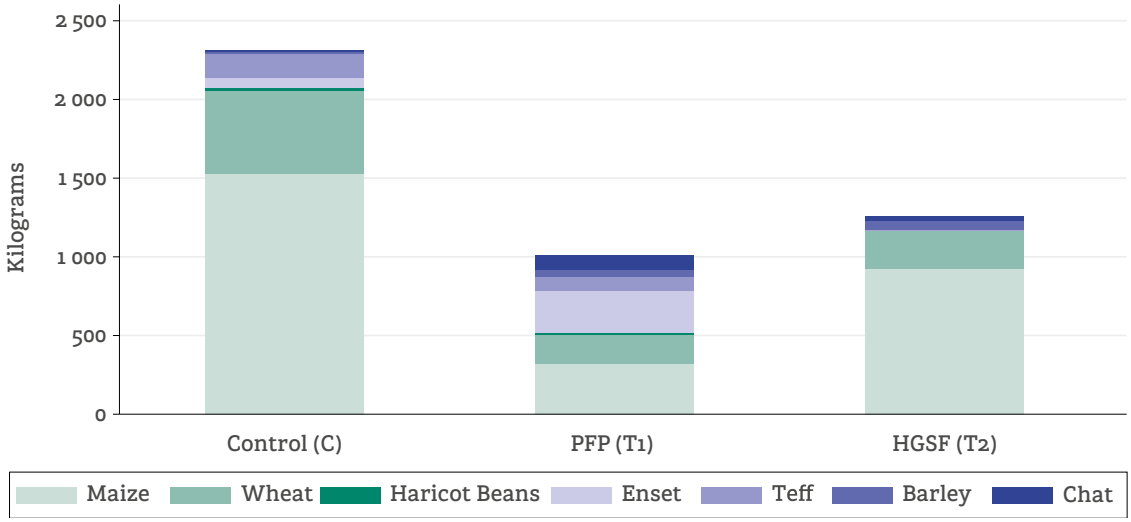
FIGURE 12. **MONETARY VALUE OF PRODUCTION, BY CROP AND TREATMENT ARM (ETHIOPIAN BIRR)**



Source: Author's elaboration from survey data.

Figure 12 shows how the total value of crop production (self-)evaluated at market prices is distributed among the different crops in each treatment arm. The value of crop production in the comparison group (about ETB 20 000) is twice as high as in the two other groups, where the value of the harvest is at about ETB 10 000–14 000. This is in line with the previous findings indicating larger farm size and higher expenditure on farm inputs in the comparison arm. In the comparison arm, most of the value of the harvest derives from maize (49 percent), wheat (28 percent) and teff (15 percent). In the PFP arm, the value of crop production is more uniformly spread across maize (22 percent), wheat (17 percent), enset (15 percent) and teff (14 percent), the most important crop for this group. In the HGSF group, crop value is concentrated in maize (65 percent) and wheat (24 percent). Figure 13 repeats the analysis for the harvested amounts of the major crops in kilograms. Cross-arm differences are larger for quantities than for values. This is because prices are higher where supply is low and vice versa, thus levelling the value of production across arms. Overall, the PFP and HGSF groups are very similar in terms of both the total value of crop production and the crop mix. There are statistically significant differences between the comparison group and the other two groups, driven by barley, sorghum and coffee (Table A.8).

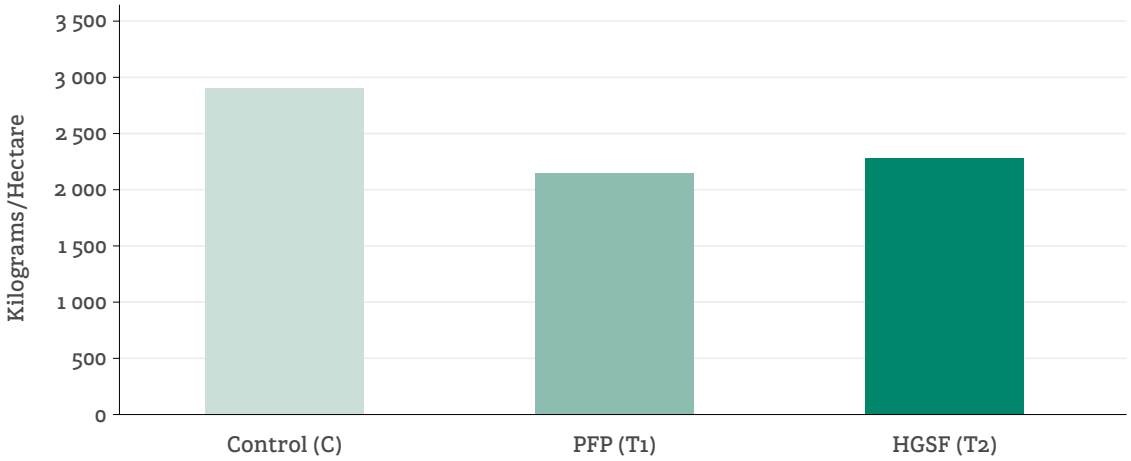
FIGURE 13. **HARVEST OF MAJOR CROPS, BY TREATMENT ARM (KILOGRAMS)**



Source: Author's elaboration from survey data.

The larger production quantities and values in the comparison group are not the result only of a larger scale of production. Figure 14 shows that maize yield, in general the most important crop, is higher in the comparison group relative to the other two. It can be concluded that higher production in the comparison group is the result of both larger farm size and higher yields. The latter could be driven by the relatively higher use of fertilizers and pesticides in the control group, or other productivity boosting factors such as higher use of mechanization services. Comparison group households are generally more

FIGURE 14. **MAIZE YIELDS, BY TREATMENT ARM (KILOGRAMS/HECTARE)**



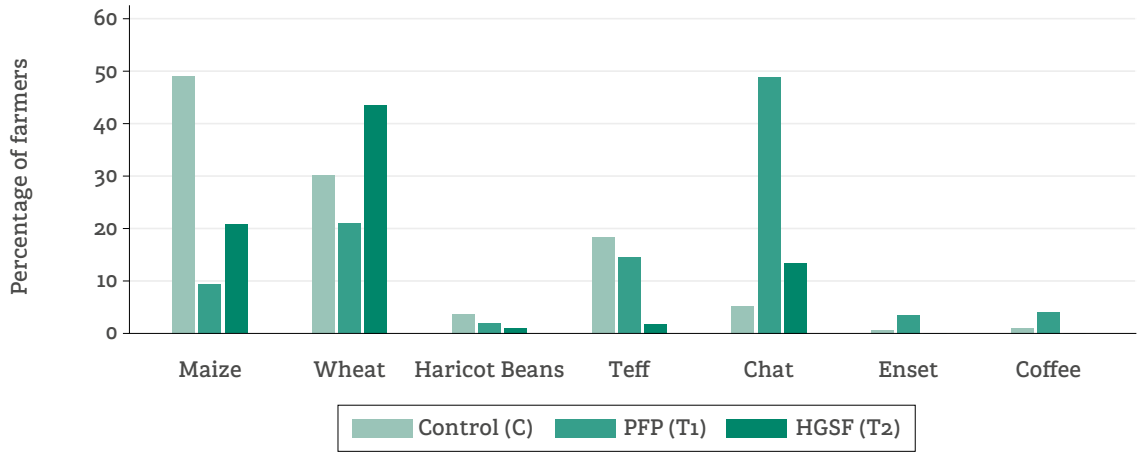
Source: Author's elaboration from survey data.

likely to use tractors and spend more on this service, but no statistically significant evidence for this could be found, probably because of the low absolute numbers of farmers who use tractors (Table A.4).

3.2 Sales of crops and livestock by-products

Output market commercialization – the shift from household production for self-consumption to production for sale in the market – is considered a means of improving smallholder farmers' income and reducing rural poverty. Through its PFP component, the HGSF programme aims at securing a reliable market for smallholders and increasing market income. Figure 15 shows the shares of farmers selling selected crops by treatment arm. The most widely sold crops are maize and wheat, both targeted by HGSF. The share of comparison group households that sell some maize (47.7 percent) in the market is considerably higher relative to the PFP (9.2 percent) and HGSF (20.2 percent) groups. Between 20 and 42 percent of households sell wheat in the market, and the cross-arm differences are not significant. In the HGSF group, wheat is the most widely sold crop, while PFP households sell mostly chat (47.6 percent).

FIGURE 15. **SHARES OF FARMERS ENGAGING IN OUTPUT MARKETS, BY TREATMENT ARM AND CROP**

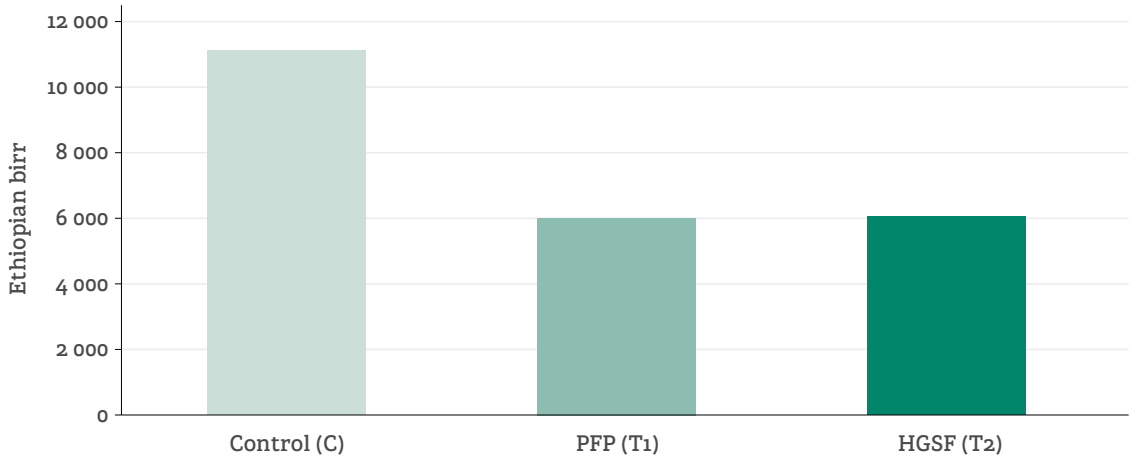


Source: Author's elaboration from survey data.

Crop sale revenues in the comparison group (ETB 11 000) are almost twice as high as in the other two groups, as shown in Figure 17. This reflects the larger size of farms in the areas where comparison group households operate, and probably a more advanced stage of agricultural development. Revenue composition differs among the groups. While households in the comparison and HGSF groups derive 80 percent of their crop sale revenues from maize and wheat, those in the PFP group rely on chat for more than 70 percent of their crop sale revenues (Figure 17). The latter finding is in line with the

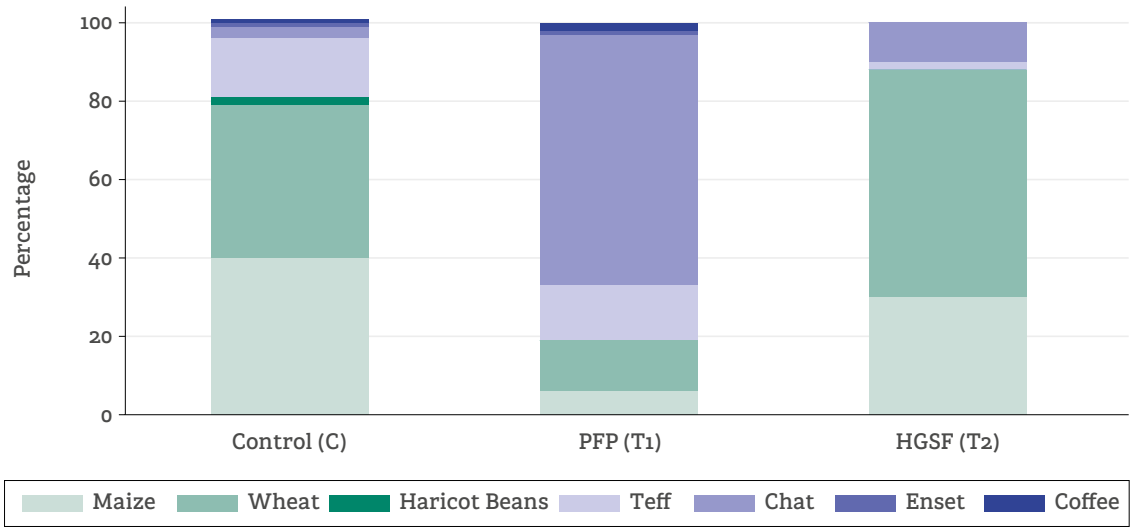
productive specialization of the PFP group, which generates most of its crop value from chat, as seen in the previous subsection. Chat has some importance for the HGSF group, where it accounts for about 10 percent of revenues. Teff is also a relatively important source of revenue for the comparison and PFP groups, accounting for about 10 percent of total crop revenues.

FIGURE 16. **CROP SALE REVENUES, BY TREATMENT ARM (ETHIOPIAN BIRR)**



Source: Author's elaboration from survey data.

FIGURE 17. **CROP SHARES OF SALE REVENUES, BY TREATMENT ARM**

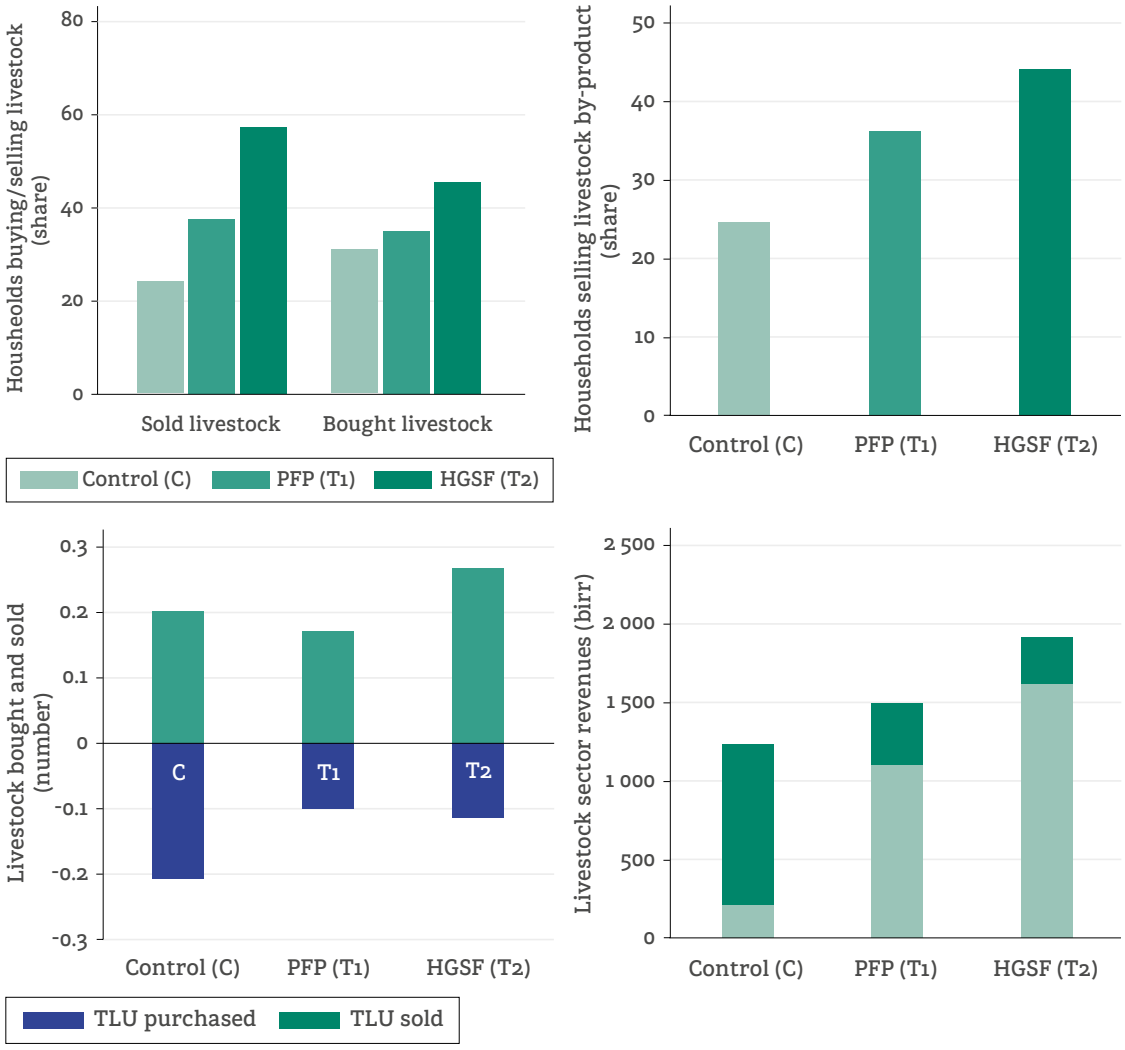


Source: Author's elaboration from survey data.

Ethiopia's smallholder livestock sector is characterized by low productivity from local breeds, and only a small share of produce is sold for income, leading to a low level of output market commercialization (ILRI, 2017). Figure 18 shows the degree of commercialization of livestock and related by-products by treatment arm. The upper left-hand graph shows that the shares of households selling livestock in the PFP (35 percent) and HGSF (45 percent) arms are higher than that in the comparison group (31 percent), and the difference is statistically significant. The same is true of households buying livestock. Hence, a higher share of farmers engage in the livestock sector in these two treatment arms.

The light green bars in the lower left-hand graph of Figure 18 indicate the number of TLUs sold, while the maroon bar show TLUs bought. About 0.2 TLUs are bought and sold by households in the comparison group, which translates into a herd turnover of 10 percent. The numbers of TLUs sold or bought in the other two groups are slightly smaller but not significantly different from the comparison

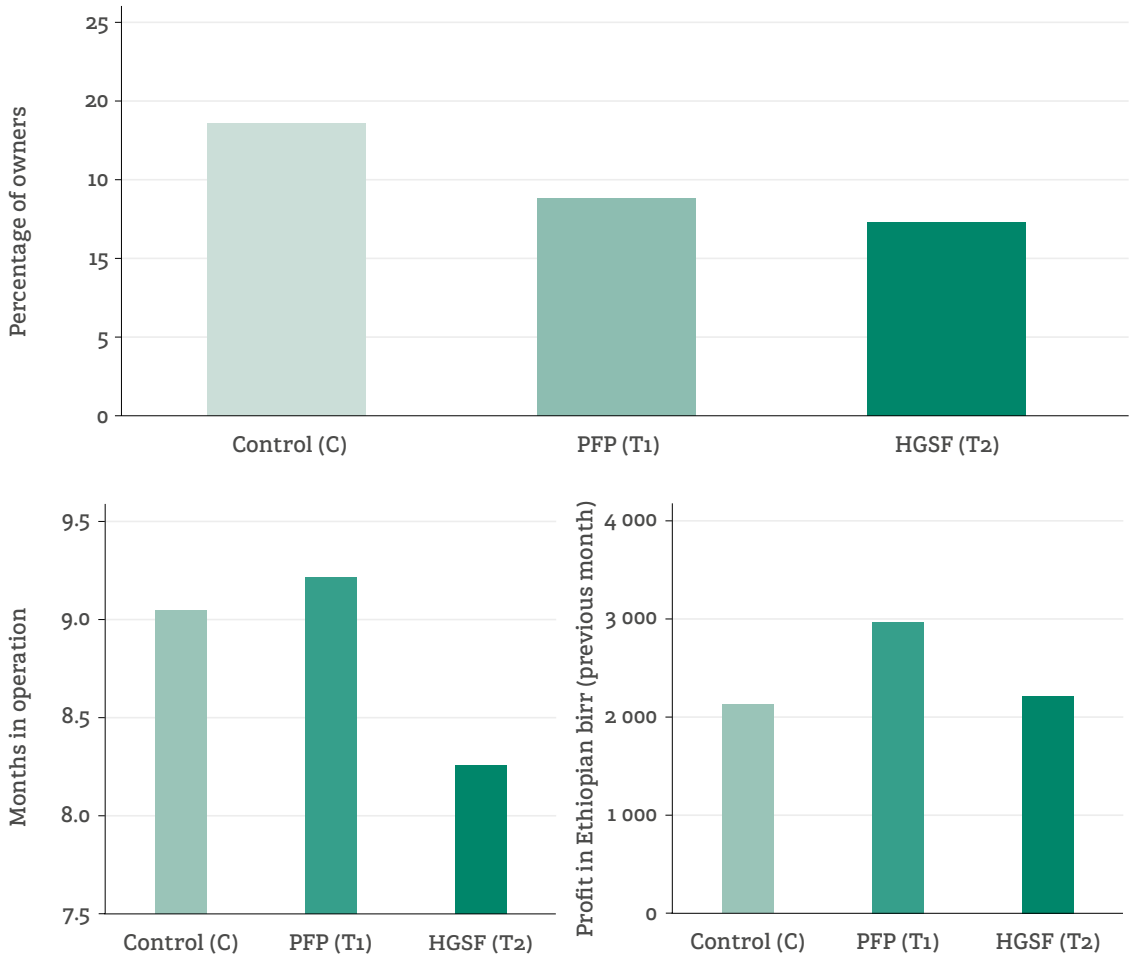
FIGURE 18. **LIVESTOCK AND LIVESTOCK BY-PRODUCTS MARKET ENGAGEMENT, BY TREATMENT ARM**



Source: Author's elaboration from survey data.

group (Table A.10). The upper right-hand graph in Figure 18 shows that between 24 and 44 percent of farmers sell by-products and that the two treatment groups are slightly more engaged in these markets relative to the comparison group. The lower right-hand graph shows the net revenues from livestock trading as the difference between revenues from TLUs sold and expenditure for TLUs bought during the preceding 12 months (in light green), and gross revenues from the sale of by-products (in dark green). Farmers earn between ETB 1 200 and 1 800 a year from the livestock sector and there are no significant differences among arms, in terms of both the total and its single components (Table A.10). It can be concluded that overall, the three arms are similar in terms of their degree of engagement in livestock markets, and the corresponding income earned from the sale of livestock products.

FIGURE 19. **SHARES OF FARMERS ENGAGED IN NON-FARM BUSINESSES, BY TREATMENT ARM**

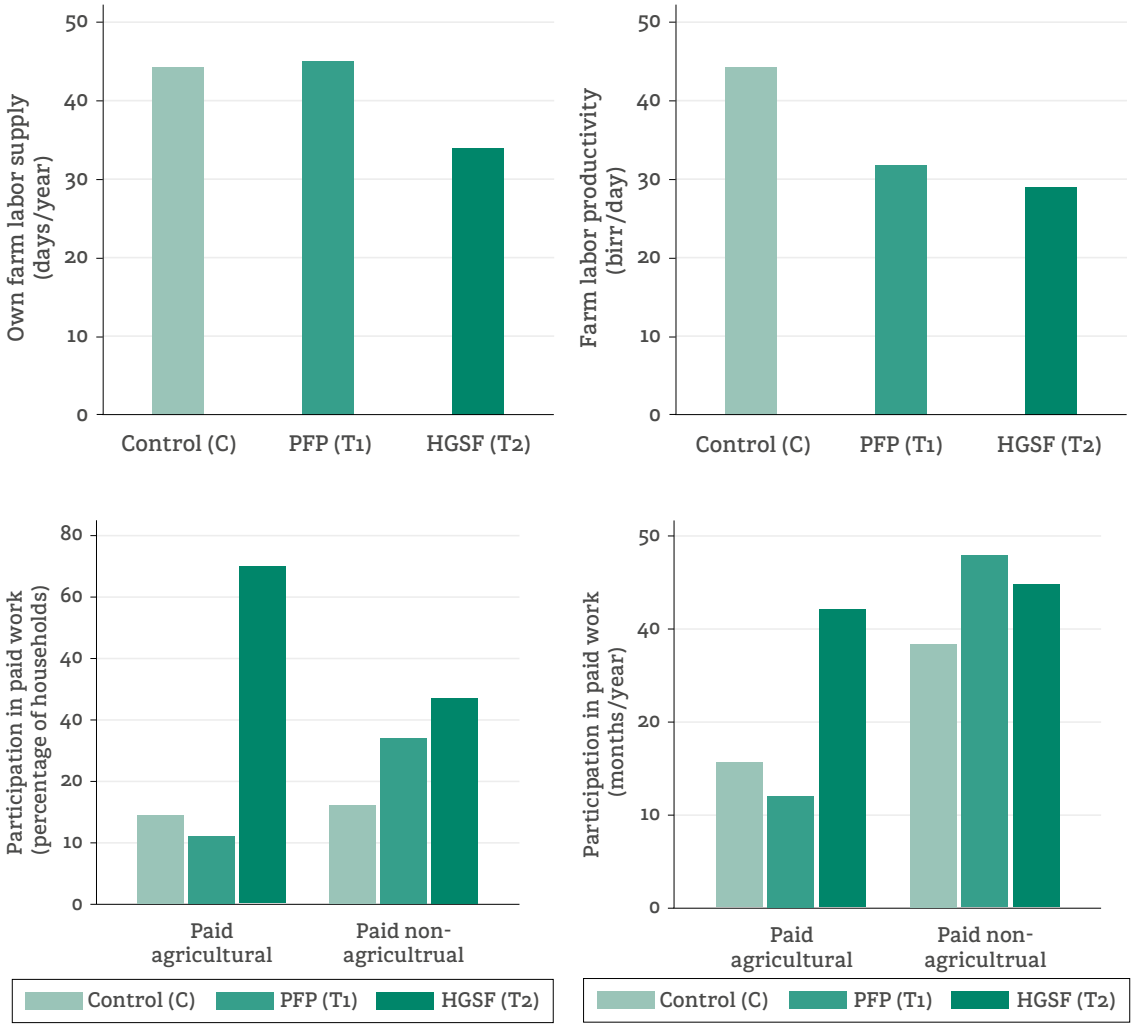


Source: Author's elaboration from survey data.

Non-farm business

Figure 19 shows that between 12 and 18 percent of the households surveyed own some form of non-farm business, with no significant differences among treatment arms (Table A.11). Between 37 and 45 percent of the businesses are owned by the head of the household, but in the comparison group the share of businesses owned by the spouse is higher relative to the other two groups. This is in line with earlier findings on the intra-household distribution of land titles. Households operated these businesses for eight to nine months in the previous year, with no cross-arm differences. The average monthly net profit from a non-farm business ranges between ETB 2 100 and 3 000, with no significant differences among arms. To put these numbers in perspective, it is worth noting that monthly net profit from non-farm businesses is only slightly lower than annual net revenue from the whole livestock sector.

FIGURE 20. **ADULT LABOUR SUPPLY, BY TREATMENT ARM**

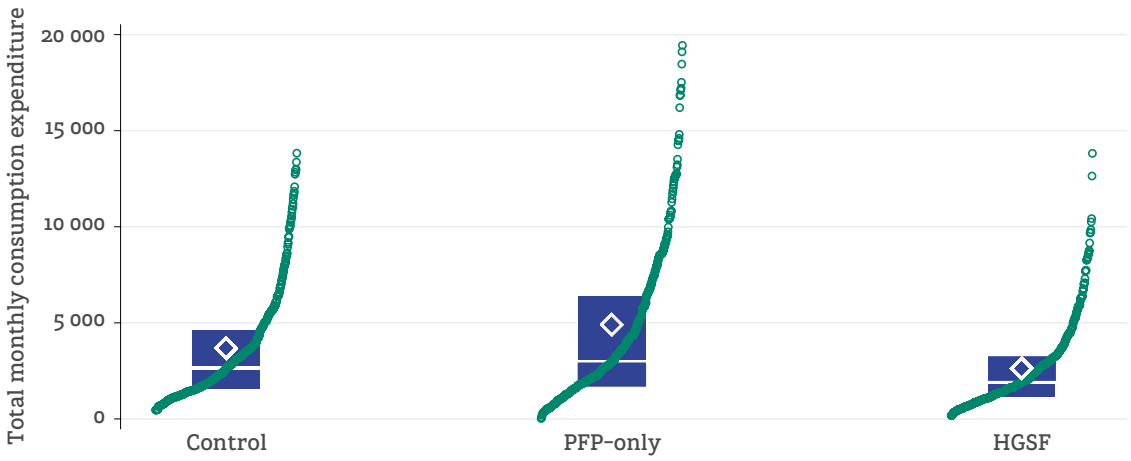


Source: Author's elaboration from survey data.

Labour supply

Figure 20 shows results regarding adult labour supply at the household level for own-farm work and paid work. The upper left-hand graph shows that in an average household, adults spend a total of between 70 and 90 days per year working on their own farms. Households in the comparison and PFP groups spend more time doing farm work relative to the HGSF group. The upper right-hand graph shows a rough proxy for own-farm labour productivity, computed by dividing the total value of production (crop value + livestock sector revenues) by the total number of days worked by the household members during the year to generate that value in the crop or livestock sector. In the comparison group, households generate more value from each day employed in crop or livestock activities. A similar pattern is seen for land productivity measured in terms of maize yields (Table A.12). The reasons for the two phenomena may be similar and depend on a higher capital intensity of production (higher mechanization or fertilizer use) or may be related to a household's human capital endowment (level of education, technical knowledge, etc.).

FIGURE 21. **TOTAL CONSUMPTION EXPENDITURE , BY TREATMENT ARM (ETHIOPIAN BIRR)**



Note: Boxes show the median and the quartiles, while the diamond marks show the mean of the distribution.

Source: Author's elaboration from survey data.

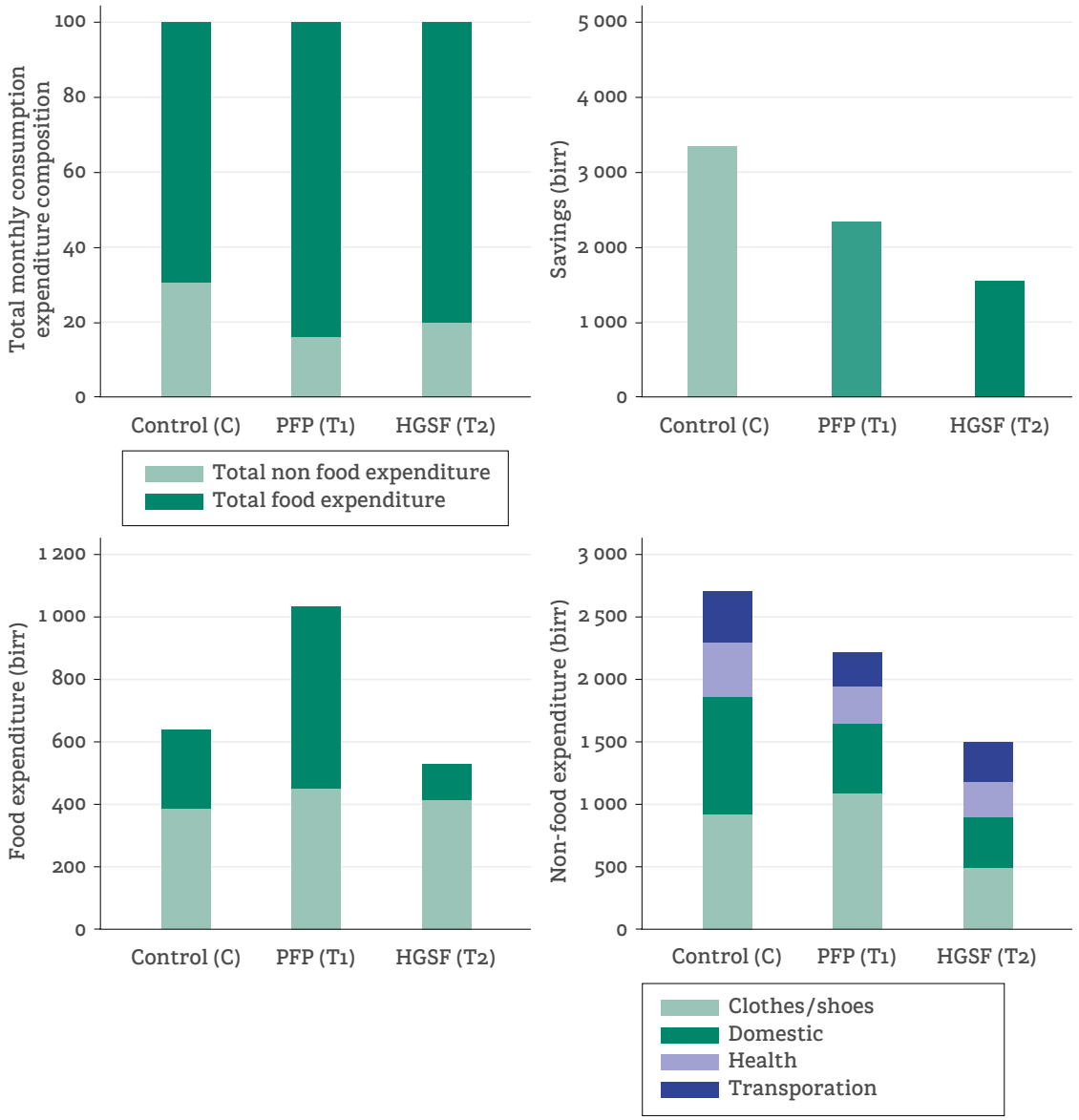
The lower left-hand graph of Figure 20 shows participation in paid agricultural and non-agricultural work. Five times as many households in the HGSF group (11 percent) do some paid agriculture work as in the other two groups. Paid agricultural work is considered a means of last resort, as it usually involves working for low pay in other farmers' fields. Households resort to it only to meet stringent liquidity needs. Participation in paid non-agricultural work is more uniform across groups and ranges between 3 percent in the comparison group and 6.7 percent in the HGSF group. The lower right-hand graph shows the intensity of participation in paid agricultural and non-agricultural work in terms of the

number of months in which at least one of the adults in the household has been employed. Households in the HGSF group work more in paid agricultural work (four months/year) relative to the other two groups. On average, the adults in a household are employed for a total of about four months in paid non-agricultural work, with no significant cross-arm differences.

WELFARE OUTCOMES

Consumption, savings and participation in social protection programmes

FIGURE 22. **CONSUMPTION EXPENDITURE, BY TREATMENT ARM**



Source: Author's elaboration from survey data.

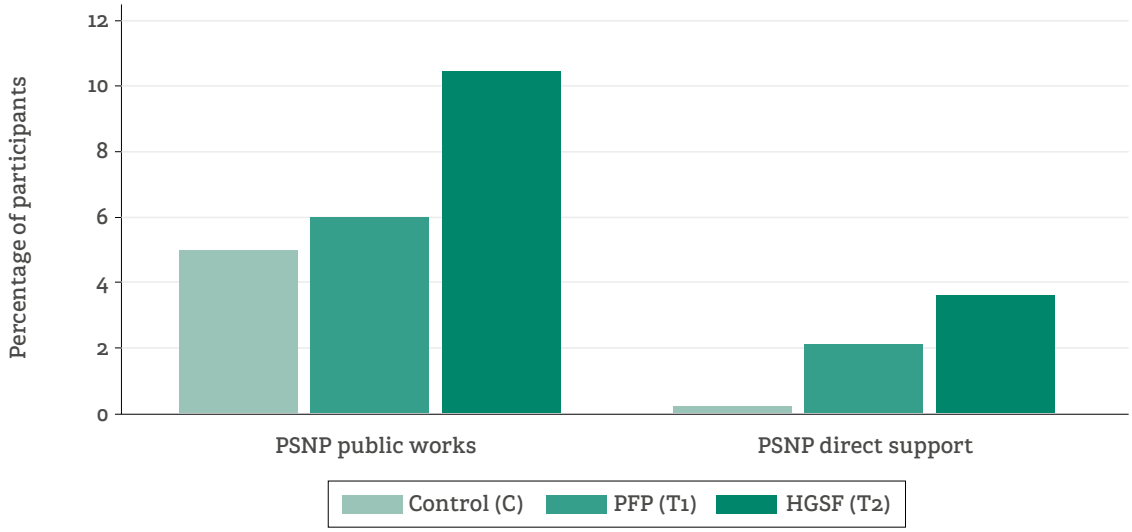
Consumption expenditure is used as a proxy for living standards. Figure 21 shows the cumulative distribution of total monthly consumption expenditure in green with the mean of the distribution shown in red diamond-shaped markers. There are no significant differences in the mean across groups (Table A.13), but the PFP arm has a higher share of high spending households than the other arms.

It is important to look deeper to see if there are significant differences in the types of expenditure. In fact, the share of non-food expenditures tends to grow and the share of food expenditure tends to decrease as households become richer. In Ethiopia, the share of non-food consumption expenditure has increased considerably over time, reaching 52 percent in 2011 (Hassen *et al.*, 2016). By this measure, living standards in the study sample are low compared to the national average, as the share of non-food expenditure in the sample ranges between 15 and 30 percent. Comparison households are clearly better off: they spend a smaller share of their income on food and are able to save considerably more relative to the other two groups, as shown in the upper right-hand graph in Figure 22. Non-food expenditure on major items is also higher in the comparison group relative to the other two groups as shown in the lower right-hand graph in Figure 22, while expenditure allocation to non-food items – clothes, health, transportation and domestic expenses – is similar across arms.

The lower left-hand graph in Figure 22 shows total food expenditure in the last seven days and its breakdown between animal and non-animal sources of food. PFP households spend more on food relative to the other two groups (Table A.13), which might be the reason for the longer tail of the distribution of total consumption expenditure. They also allocate a higher share of food expenditure to animal products, mainly flesh or organ meat, relative to the rest of the sample. This finding is not in line with evidence that puts the PFP group in a relatively worse-off position, but it could be due to higher prices of animal products in the area where the PFP lives, or to differing preferences. The upper right-hand graph shows that the control households are able to save considerably more than the other two groups (Table A.15). It can be concluded that the comparison group is better off, based on the higher absolute values of its non-food expenditure and the lower share of food expenditure, while households in the PFP arm are poorer relative to the other arms, based on the same grounds.

This conclusion is supported by data on the participation in social protection programmes of the various arms. The Productive Safety Net Programme (PSNP) is Ethiopia's flagship social protection programme and one of the largest in Africa (Ministry of Agriculture, 2014). It has two main components: a cash-for-work scheme (public works) for households with some labour capacity; and an unconditional cash transfer scheme (direct support) for households with no labour capacity. The scheme target food-insecure and poor areas of the country, so the share of households participating in the PSNP public works scheme is significantly higher in the HGSF group (10 percent) and slightly higher in the PFP group (6 percent) than in the comparison group (5 percent). The differences are greater in the direct support scheme, with the share of control households under the scheme being only a tenth of the share in the other two treatment arms. Table A.16 shows that the average period that households participate in the PSNP is considerably higher in the HGSF and PFP areas than in the comparison area. A household in the HGSF arm participates in the public works scheme for an average of 16 months and one in the PFP group for almost ten months, against a seven-month average for the comparison group. Differences are larger for participation in the PSNP direct support scheme.

FIGURE 23. **PARTICIPATION IN PSNP SOCIAL PROTECTION SCHEMES, BY TREATMENT ARM**



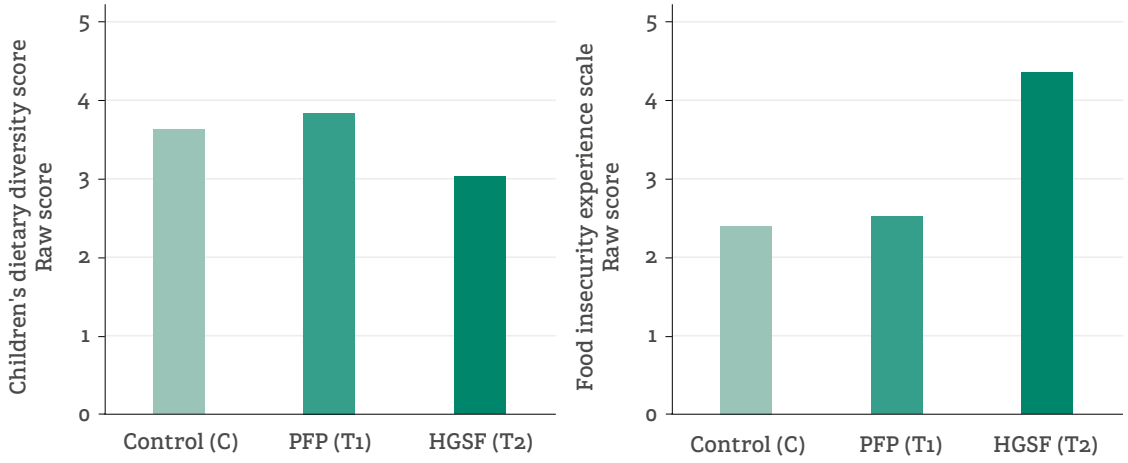
Source: Author's own elaboration.

Food security

Dietary diversity is a qualitative measure of food consumption that reflects household access to a variety of foods and serves as a proxy for the nutrient adequacy of the diet of individuals (Kennedy, Ballard and Dop, 2011). This section analyses the food security situation in each study arm by using the children's dietary diversity score and the food insecurity experience scale. The children's dietary diversity score consists of a simple count of the food groups that a child has consumed over the preceding 24 hours. There are nine food groups aggregated from 16 types of food: starchy staples; dark-green leafy vegetables; other vitamin A-rich fruits and vegetables; other fruits and vegetables; meat; fish; eggs; legumes, nuts and seeds; milk and milk products.[4] The potential score range is therefore from 0 to 9, but threshold numbers of food groups that indicate adequate or inadequate dietary diversity are not stipulated, so Figure 24 shows only the raw score, which indicates the number of food groups consumed. The left-hand graph in Figure 24 shows that while the children's dietary diversity score is similar in the comparison and PFP groups, it is significantly lower in the HGSF group (Table A.17).

[4] The original 16 food groups are cereals; white roots and tubers; orange roots and tubers; dark-green vegetables; other vegetables; orange fruits; other fruits; organ meat; flesh meat; eggs; fish; legumes; milk; oil; sweets; and spices.

FIGURE 24. **FOOD SECURITY SCORES, BY TREATMENT ARM**



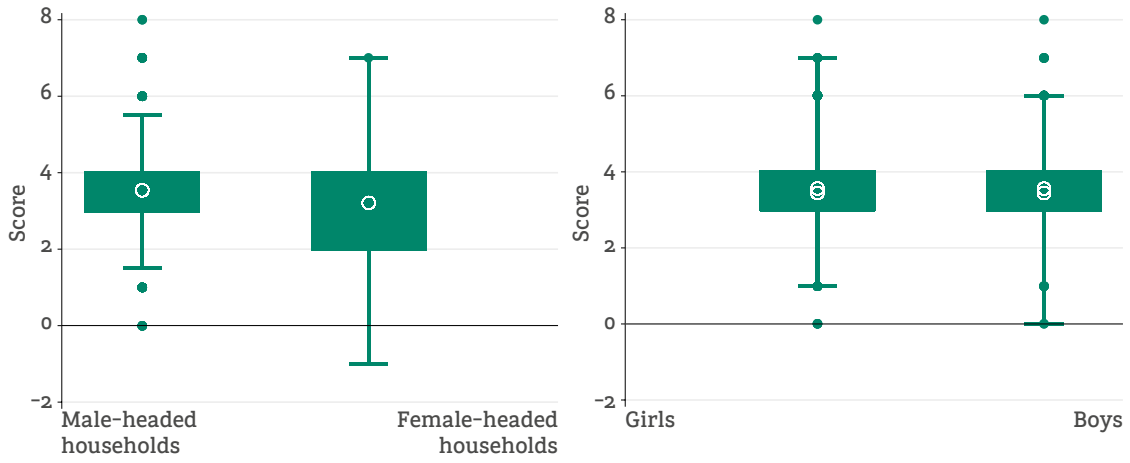
Source: Author's elaboration from survey data.

The food insecurity experience scale is based on eight questions with yes/no responses (Ballard, Kepple and Cafiero, 2013). It is a statistical scale designed to capture the degree of severity of food insecurity as reported by household respondents over a one-year period. The questions focus on self-reported, food-related behaviour and experiences associated with increasing difficulty in maintaining access to food owing to resource constraints. The first yes/no question is, "During the last 12 months, has there been a time when, because of lack of money or other resources, you were worried you would not have enough food to eat?" and the eighth and last one is, "During the last 12 months, has there been a time when, because of lack of money or other resources, you went without eating for a whole day?".[5] Possible scores range from 0 to 8, with higher scores indicating greater food insecurity. The picture that emerges is similar to the one based on analysis of the children's dietary diversity score. The food insecurity situation is significantly worse in the HGSF arm (score 4.4) than in the other two groups (scores 2.3 and 2.5).

Figure 25 explores gender-related nuances in the child food security situation. The left-hand graph shows how the child dietary diversity score varies by the sex of the household head. The score is significantly lower in female-headed households, probably because of the greater hardships those households face owing to their limited labour capacity and access to resources. The right-hand graph shows the mean children's dietary diversity scores for male and female primary school children aged 5–12 years in the sample. There are no statistically significant differences in child dietary diversity between males and females, indicating the equal treatment of children of both sexes.

[5] For more information on the food insecurity experience scale, please see: **http://www.fao.org/in-action/voices-of-the-hungry/fies/en/**.

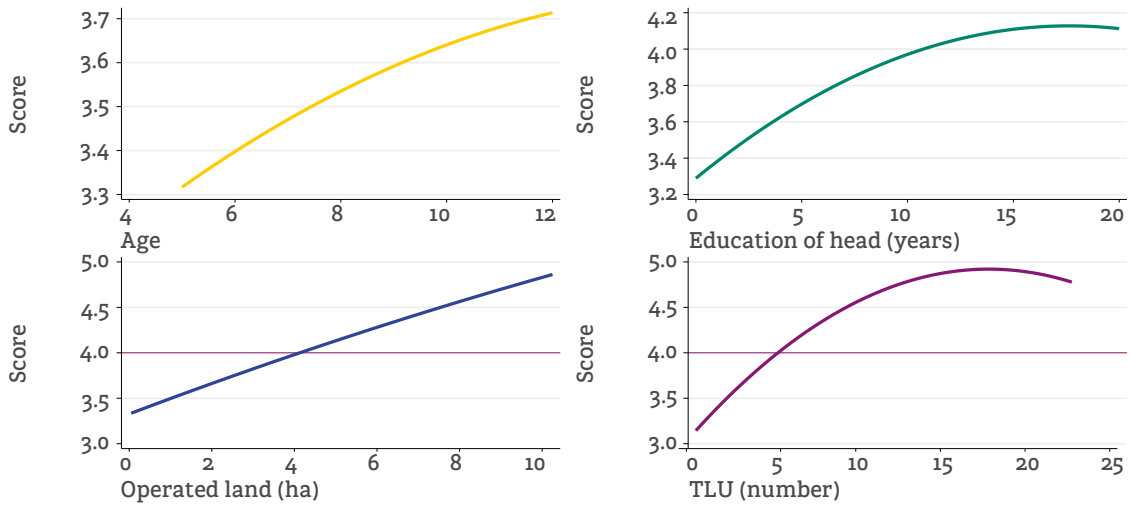
FIGURE 25. **CHILDREN'S DIETARY DIVERSITY SCORES, BY GENDER OF THE HOUSEHOLD HEAD AND OF THE CHILD**



Source: Author's elaboration from survey data.

Figure 26 shows how the children's dietary diversity score varies among selected household characteristics. The upper left-hand graph illustrates a positive relationship between the score and the child's age. Older children tend to have better dietary diversity than younger ones. The number of years of schooling of the household head also seems positively correlated with children's dietary diversity, although the relationship is not very strong as one additional year of schooling for the household head increases the score by only 2 percent. The lower left-hand graph shows the relationship between the children's dietary diversity score and the area of land that a household operates. Children living in households with larger farms have more diverse diets than those in households with smaller farms. One additional hectare of land increases the children's dietary diversity score by 5 percent. A similar pattern emerges for livestock, shown in the lower right-hand graph. Children living in households with larger herds enjoy better and more diversified diets than those with smaller herds. One additional TLU improves the children's dietary diversity by about 4 percent.

FIGURE 26. **CHILDREN'S DIETARY DIVERSITY SCORES, BY HOUSEHOLD CHARACTERISTICS**

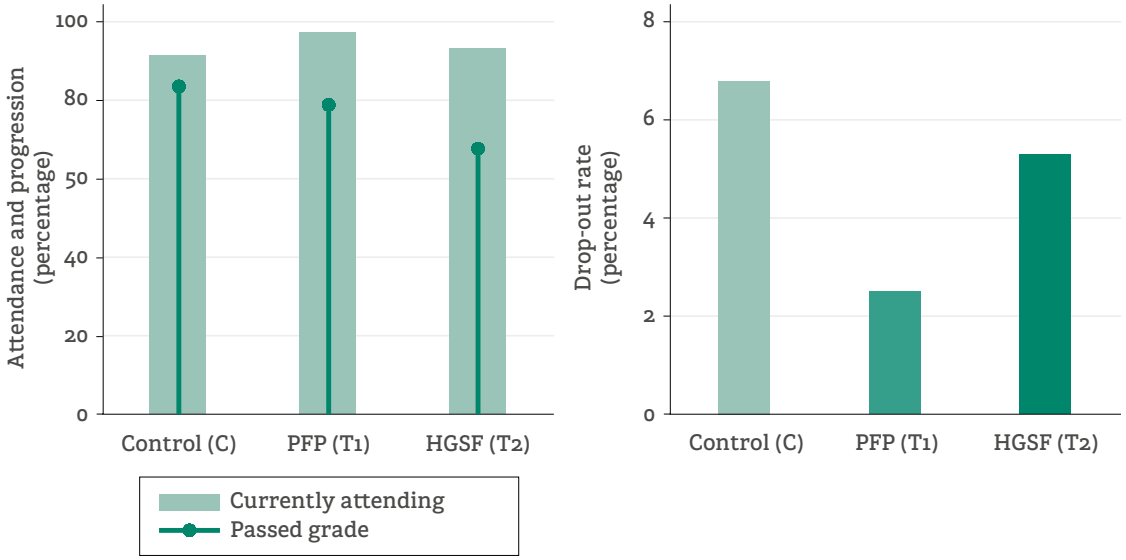


Source: Author's elaboration from survey data.

Schooling

Figure 27 shows schooling indicators by treatment arm for primary school children aged 5–12 years. The left-hand graph measures the shares of children attending school (bars) and passing the grade (drop-down lines). Attendance rates are high in all arms and range between 91 percent in the comparison group and 97 percent in the PFP group, with the control group having a slightly lower percentage of children attending school relative to the rest of the sample. Grade progression is also high in all three arms. However, the share of students who pass the grade in the HGSF group (67 percent) is significantly lower than in the comparison (84 percent) and PFP (79 percent) groups. The relatively poorer schooling performance of children from HGSF households could be the reason for targeting those areas for the HGSF programme in the first place. Drop-out rates differ slightly among groups (right-hand graph), with the share of children dropping out between years being higher in the HGFS and control groups than the PFP group (Table A.19).

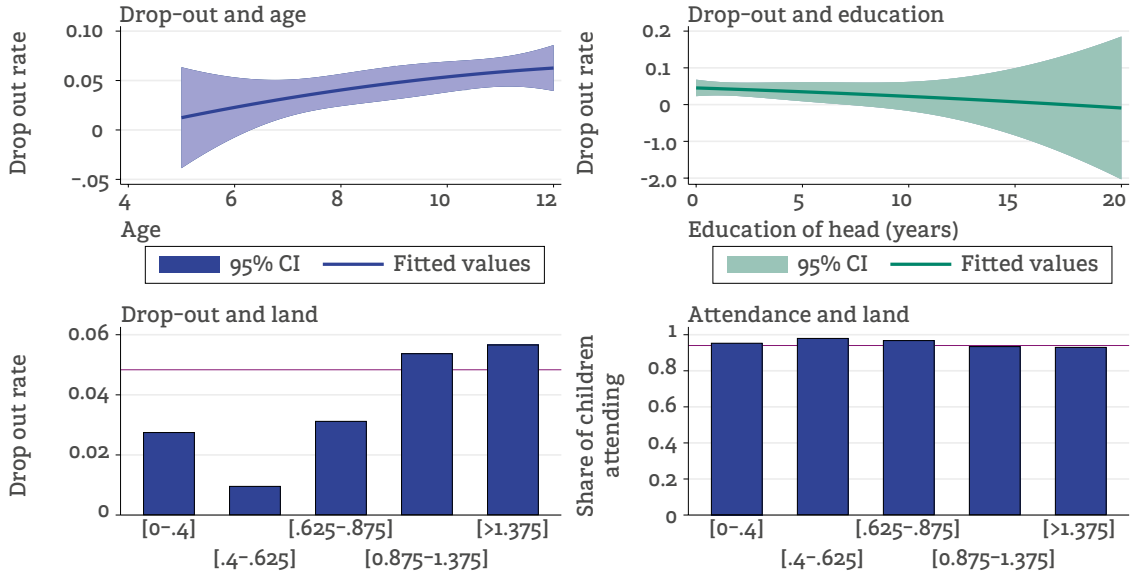
FIGURE 27. **EDUCATION OUTCOMES, BY TREATMENT ARM**



Source: Author's elaboration from survey data.

Figure 28 illustrates the relationship between school performance and selected characteristics of the farm household in the study sample. The upper left-hand graph shows that the drop-out rate increases with the age of the student, although the gradient is not very steep. An additional one year of age increases the likelihood of dropping out of school by less than 1 percent. The upper right-hand graph shows that the children of parents with more years of schooling are less likely to drop out of school. An increase in one year of schooling of the household head reduces the probability of a child dropping out by half a percentage point.

FIGURE 28. **SCHOOL PERFORMANCE AND HOUSEHOLD CHARACTERISTICS**



Source: Author's elaboration from survey data.

The lower left-hand graph in Figure 28 shows how the drop-out rate varies with the area of land farmed by the household, and is low for children from households in the bottom three quintiles of the land distribution. Children living in households in the upper two quintiles farming more than 0.875 ha of land are more likely to drop out than those in the rest of the sample: their drop-out rate is above the mean for the whole sample, household indicated by the horizontal line. The share of children attending school shows less variability with the area of land farmed, but is slightly above the mean among children living in households in the lower three quintiles of the land distribution. In households with larger farms children's attendance rate is slightly below the sample average and lower relative to children in households with smaller farms. Land area farmed might determine the likelihood of children helping out in the farm.

Conclusions

This report provides evidence from the baseline quantitative survey for an impact evaluation of the home grown feeding programme in the SNNP region of Ethiopia. The survey was carried out between June and July 2019. The number of interviewed households was 1 229, split into one control group and two treatment groups.

The evaluation relied on a quasi-experimental approach. A non-equivalent control group design with two waves of post-intervention data. Given that treatment was not randomly assigned, some differences in household characteristics and outcome variables were to be expected. In order to generate reliable estimates of the programme impacts, it is important that the intrinsic sociodemographic characteristics of the farm households were equally distributed among treatment arms. The weighting procedure followed ensured that this criterion was satisfied.

In this first wave of data, differences in outcome indicators pertaining to farm production, food security and schooling do not undermine the possibility of obtaining reliable information on programme impacts because the estimation approach is based on difference-in-differences. In fact, cross-arm differences were documented in several outcome indicators. Overall, the comparison group has larger farms, as shown by the area of land farmed. This leads to differences in variable input expenditure (seeds and fertilizers) and in the amount and value of the crops harvested, with sale revenues being higher for the comparison group, as expected. However, differences in farm size explain only part of the higher production activity in the comparison group relative to the other two groups. Other reasons may be related to higher land and labour productivity, which in turn could be driven by differential access to mechanization services and other yield-increasing and labour-saving technologies, or better farm management practices. Despite the statistical significance of the cross-arm differences in production activities, the comparison group indicators are still low in absolute value, and the area of land farmed in the control group is about 1 ha.

The control group is also better off in terms of wealth and welfare indicators. The general pattern that emerges tells a story of the comparison group being wealthier in terms of home durable goods relative to the other two groups. Control households spend a lower share of their income on food items

and have a higher absolute value of non-food consumption expenditure. The amounts of savings that households are able to set aside are also higher for the control group. Moreover, a lower share of the control households is enrolled in the PSNP, which targets mainly poor and food-insecure households. In contrast, the HGSF group lags behind in terms of food security indicators relative to both the control and the PFP groups. In most schooling indicators, the HGSF group is also a weaker performer relative to the other two groups. The reason for this is that the areas under HGSF are selected from those with a poor food security situation and under-performing schooling indicators.

The report also highlighted the importance of gender as a cross-cutting aspect in both farm-related aspects and welfare outcomes. For instance, the control group appears to have more balanced power dynamics in access to the means of production between the head of household and the spouse relative to the other two groups. An indication of this is the distribution of landownership titles. Gender of the head of the household also seems to influence the food security situation of the children, with female heads consistently disadvantaged in securing a diversified diet for their children. No evidence of gender-differentiated treatment of children in terms of dietary diversity was found. The relationship between human and physical capital endowments on the one hand and food security and schooling on the other was also studied, evidence of a positive influence of the education of household head on food security and school attendance rates was found.

Productive endowments as measured by land area and herd size appear to have a positive influence on food security, but they can be detrimental to school performance as larger farms may require greater engagement of children in production. These results may be an indication of the need for more holistic approaches to the alleviation of poverty and food insecurity by supporting both the productive and the welfare aspects of the farm household through integrated inter-sectoral interventions that give a more central role to inter- and intra-programme coherence. Specific support is needed for smallholder farmers' participation in the HGSF process, helping them to achieve the minimum levels of capacity and reliability to deliver the required quantities and quality of food on time. The results may also suggest the need to support farmers through targeted interventions that help them to adapt and respond to the extra demand generated by the HGSF programme without compromising the welfare of the farm household, as concluded in similar studies (Prifti and Grinspun, 2021). The differences in outcomes between the control group and the other two treatment groups documented in this report highlight that the former is consistently better off in terms of both production and welfare outcomes. This situation may be the combined result of two processes. First, as the data were collected after the programme had been in place for several months, differences may reflect some of the effects of the programme. Observed differences are larger than would have been expected if the data had been collected before the start of the programme for indicators that measure positive changes such as output or dietary diversity, and smaller for negative changes such as drop-out rates or the food insecurity experience scale). The second process is a direct consequence of the non-experimental selection of the control group, which was based on two criteria: geographical proximity to the treated group, and meeting of eligibility criteria such as membership of a primary cooperative and a cooperative union. As a result, the differences in outcomes may reflect pre-existing conditions in the three areas where the samples for each arm were collected. More specifically, it seems likely that the main reason for the differences in outcomes is that

the PFP and HGSF farm households or the communities in which they live have been targeted by the HGSF programme because they were doing worse than other communities in terms of production, food security and schooling indicators . In short, the cross-arm differences highlight the limitations of the lack of both an experimental control group and pre-intervention data.

In these circumstances, a double differencing approach to estimation allows unbiased estimation of the programme effects, although this requires more stringent assumptions and can be achieved only for the marginal impacts of the programme as it progresses from t years to t + 1 years of exposure, rather than for the full impact. Overall, considering the similarity of the groups in terms of basic demographic characteristics, especially after reweighting, and the robustness of having two waves of data, it will be possible to capture reliable estimates of the marginal effects of the HGSF programme.

References

Angrist, J. & Pischke, J.S. 2009. *Mostly Harmless Econometrics. An Empiricist's Companion*. Princeton, New Jersey, United States, Princeton University Press.

Ballard, T.J., Kepple, A.W. & Cafiero, C. 2013. *The food insecurity experience scale: development of a global standard for monitoring hunger worldwide.* Technical Paper. Rome, FAO. **http://www.fao.org/economic/ess/ess-fs/voices/en/**

Berhane, G., Dereje, M., Minten, B. & Tamr, M. 2017. *The rapid – but from a low base – uptake of agricultural mechanization in Ethiopia: Patterns, implications and challenges.* ESSP Working Paper No. 205. Ethiopia Strategy Support Program (ESSP), Ethiopian Development Research Institute and International Food Policy Research Institute. **http://ebrary.ifpri.org/utils/getfile/collection/p15738coll2/id/131146/filename/131357.pdf**

Central Statistical Authority. 1997. *Annual regional statistical abstract (1997 E.C.).* Addis Ababa.

Deininger, K. & Ali, D.A. 2008. Do Overlapping Land Rights Reduce Agricultural Investment? Evidence from Uganda. *American Journal of Agricultural Economics*, 90(4): 869–882.

FAO. 2015. *The State of Food and Agriculture: Social protection and agriculture: breaking the cycle of rural poverty.* Rome. **http://www.fao.org/publications/sofa/2015/en/**

FAO. 2017. *Nutrition-sensitive agriculture and food systems in practice. Options for intervention.* (revised edition) Rome. 82 pp. **https://www.fao.org/publications/card/en/c/9ca3cf89-6109-4a38-855f-6e218eae543b/**

FAO & WFP. 2018. *Home-Grown School Feeding Resource Framework.* Rome, FAO and World Food Programme (WFP). **https://www.fao.org/documents/card/en/c/CA0957EN/**

Giunti, S., Aurino, E., Masset, E. and Prifti, E. 2022. *Impact evaluation of home-grown school feeding programmes – Methodological guidelines.* Rome. FAO.

Hassen I.W., Dereje, M., Minten, B. & Hirvonen, K. 2016. *Diet transformation in Africa: The case of Ethiopia.* ESSP Working Paper No. 87. Ethiopia Strategy Support Program (ESSP), Ethiopian Development Research Institute and International Food Policy Research Institute. **https://images.agri-profocus.nl/upload/1604_diet_transformation_in_Ethiopia-_IFPRI1471606945.pdf**

Holden, S., Shiferaw, B. & Pender, J. 2001. Market Imperfections and Land Productivity in the Ethiopian Highlands. *Journal of Agricultural Economics,* 52(3): 53–70.

ILRI. 2017. *Ethiopia livestock sector analysis.* Addis Ababa, International Livestock Research Institute (ILRI). **https://cgspace.cgiar.org/bitstream/handle/10568/92057/LSA_Ethiopia.pdf?sequence=3&isAllowed=y**

IMF. 2018. *Federal Republic of Ethiopia. 2018 Article IV Consultation.* IMF Country Report No. 18/354. Washington, DC, International Monetary Fund (IMF).

Jason, L.A. & Glenwick, D.S. 2016. *Handbook of Methodological Approaches to Community-Based Research Qualitative, Quantitative, and Mixed Methods.* Oxford, UK, Oxford University Press.

Kennedy, G., Ballard, T., Dop, M. 2011. *Guidelines for measuring household and individual dietary diversity.* Rome, FAO. **https://www.fao.org/documents/card/en/c/5aacbe39-068f-513b-b17d-1d92959654ea**

Lechner, M. 2011. The Estimation of Causal Effects by Difference-in-Difference Methods. *Foundations and Trends(R) in Econometrics,* 4(3): 165–224

Mersha, D. & Ayenew, Z. 2018. Financing challenges of smallholder farmers: A study on members of agricultural cooperatives in Southwest Oromia Region, Ethiopia. *African Journal of Business Management*, 12(10): 285–293. **https://doi.org/10.5897/AJBM2018.8517**

Ministry of Agriculture. 2014. *Productive Safety Net Programme Phase IV Programme Implementation Manual.* Addis Ababa. **https://www.usaid.gov/sites/default/files/documents/1866/psnp_iv_programme_implementation_manual_14_dec_14.pdf**

Nega, B., Adenew, B. & Gebre-Sellasie, S. 2003. Current land policy issues in Ethiopia. *Land Reform, Land Settlement, and Cooperatives,* 11(3): 103–124.

Prifti, E. & Grinspun, A. 2021. *Impact evaluation of the Home Grown School Feeding and Conservation Agriculture Scale-up programmes in Zambia.* Rome, FAO. **https://doi.org/10.4060/cb1841en**

Swensson, L.F.J. 2019. *Aligning public procurement rules and practices to support the implementation of home-grown school feeding (HGSF) initiatives: The case of Ethiopia.* Rome, FAO. **https://www.fao.org/3/CA3614EN/ca3614en.pdf**

Taffesse, A.S., Dorosh, P.A. & Gemessa, S.A. 2013. Crop Production in Ethiopia: Regional Patterns and Trends. In: P. Dorosh and S. Rashid, *Food and Agriculture Ethiopia: Progress and Policy Challenges,* chapter 3, pp. 53–83. University of Pennsylvania Press.

UNDP. 2018. *Implementation of the Third United Nations Decade for the Eradication of Poverty (2018–2027).* Addis Ababa, United Nations Development Programme (UNDP). **https://digitallibrary.un.org/record/1640259?ln=en**

UNESCO. UNESCO Institute for Statistics database. United Nations Educational, Scientific and Cultural Organization (UNESCO). **http://data.uis.unesco.org/**

WFP. 2018. *Final Evaluation of WFP'S USDA McGovern-Dole International Food for Education and Child Nutrition Programme's Support in Afar and Somali Regions in Ethiopia 2013–2017.* Rome. **https://www.wfp.org/publications/ethiopia-school-feeding-programme-evaluation**

Annex A: Statistical methods

In order to assess the comparability of outcome variables among the control group and the two treated groups, simple t-tests are carried out for each variable. T-tests are used to determine whether there are any statistically significant differences between the means of the two groups, including in the design of evaluation of the HGSF programme. Specifically, it tests the null hypothesis:

$$H_0: \bar{x}_i = \bar{x}_{j \neq i} \; i,j \in \{T_1, T_2, C\}$$

where $\bar{x}_i$, $\bar{x}_j$ are the group means for the three treatment arms. If the t-test returns a statistically significant result, the alternative hypothesis that the two group means are statistically significantly different from each other is accepted. All three possible cross-arm comparisons are performed. All tables showing differences in outcomes are organized in the same way. The first three columns show the averages of the C, T1, T2 arms, while the last three columns show the cross-arm differences in means T2 versus C, T1 versus C, and T2 versus T1.

Standardized differences are computed for the intrinsic sociodemographic characteristics of the households. The standardized difference is defined as:

$$d = \frac{\bar{x}_i - \bar{x}_{j \neq i}}{\sqrt{\frac{s_i^2 - s_{j \neq i}^2}{2}}}$$

where s_i^2 and s_j^2 denote the respective sample variances of a variable in the two groups. The standardized difference describes the difference in means in units of standard deviation. According to common practice, a variable is considered to be not equally distributed if the standardized difference is above 0.25.

The inverse probability weighting procedure is aimed at making sure that after reweighting, the three treatment arms are more similar to each other in terms of intrinsic sociodemographic characteristics than before reweighting. Weights are computed based on a multinomial logit:

$$P(t=k|X) = \exp(\mu_k) \Big/ \sum_{s=1}^{J} \exp(\mu_s)$$

where μ is a linear combination of all sociodemographic characteristics, t denotes the treatment group, and $s, k \in \{T_1, T_2, C\}$.

Stabilized weights given by: $S\varpi = \frac{P(t)}{P(t|X)}$

are used, where $P(t|X)$ is the generalized propensity score and $P(t)$ is the unconditional density of treatment.

Annex B: Tables

TABLE A.1. **SAMPLE OF PRIMARY SAMPLING UNITS**

Cooperative union/zone	Primary coopera-tive (PC) name	Kebele	*Woreda*	# member house-holds in PC	School Meals provided in area	# *kebeles* covered by PC	Arm
Walta/Gurage	Jole	Jole 01	Meskan	252	No	?	C1
Walta/Gurage	Koshe Aka	Koshe 01	Mareko	306	No	?	C1
Walta/Gurage	Enseno	Enseno	Meskan	343	No	?	C1
Walta/Gurage	Mekicho	Mekicho	Meskan	255	No	?	C1
Melik/Silte	Worabe Datie	Datie	Hulbarag	1 085	No	2	C2
Melik/Silte	Gola Shemeto	Gola Kurie	Dalocha	574	No	1	C2
Melik/Silte	Weleya Agode	Kibet	Silti	839	No	4	C2
Melik/Silte	Lay Adazer	Lay Adazer	Mserake Azrnet	218	No	1	C2
Melik/Silte	Shofodie	Mito	Lanfuro	6 931	Yes	6	T
Melik/Silte	Shanqa Balchi	Shanqa Balchi	Lanfuro	2 539	Yes	3	T

Notes: C: control; T1: PFP; T2: HGSF.

Source: Author's own elaboration.

TABLE A.2. HOUSEHOLD CHARACTERISTICS

				T2 vs C		T1 vs C		T2 vs T1	
	C	T1	T2	Raw	Weighted	Raw	Weighted	Raw	Weighted
Household size	6.098	5.310	6.201	0.17	0.041	**-0.406**	-0.006	0.234	-0.036
Members 15-65 years	3.571	2.912	2.997	**0.435**	0.018	**-0.285**	0.007	-0.18	-0.027
Members 5-15 years	1.826	1.667	2.219	-0.084	0.028	-0.25	0.01	0.344	-0.039
Members > 65 years	0.126	0.207	0.177	-0.169	0.022	0.133	0.038	0.031	-0.064
Members < 5 years	0.574	0.524	0.807	0.166	-0.065	-0.121	0.089	0.189	0.059
Dependency ratio	1.062	1.171	1.535	-0.254	0.005	-0.091	0.015	0.339	-0.022
Female-headed	0.119	0.152	0.113	-0.045	0.001	0.11	-0.061	-0.071	0.063
Single-headed	0.126	0.117	0.087	0.073	-0.025	0.032	0.049	-0.114	-0.027
Education of head	3.760	2.036	1.802	**0.511**	-0.114	-0.24	0.072	-0.321	0.035
Age of head	49.293	52.140	49.638	-0.136	0.053	0.217	0.025	-0.079	-0.081
Head can read	0.619	0.452	0.432	**0.366**	-0.065	-0.161	0.119	-0.209	-0.059
Land area owned (ha)	1.105	0.629	0.831	**0.579**	0.011	**-0.629**	0.107	-0.073	-0.134

Notes: Cross-group standardized difference below 0.25 indicate that the variable is equally distributed.

Significant differences are shown in bold. C: control; T1: PFP; T2: HGSF.

Source: Author's own elaboration.

TABLE A.3. LAND

	C	T1	T2	T2 vs C	T1 vs C	T2 vs T1
Household owns land (y/n)	0.998	1.000	0.992	-0.005	0.002	-0.008***
Land owned (ha)	1.105	0.629	0.831	-0.274	-0.476**	0.202
Land rented (ha)	0.168	0.025	0.079	-0.089**	-0.143***	0.054***
Land operated (ha)	1.273	0.654	0.910	-0.363	-0.619**	0.256
Observations	418	415	388	1 221	1 221	1 221

Notes: * p < 0.05; ** p < =.01; *** p < 0.001. ha: hectares. C: control; T1: PFP; T2: HGSF.

Source: Author's own elaboration.

TABLE A.4. **INPUT USE**

	C	T1	T2	T2 vs C	T1 vs C	T2 vs T1
a) Household purchased goods/services						
Seeds	0.893	0.758	0.949	0.056	-0.134	0.190
Fertilizers	0.936	0.9	0.961	0.026	-0.036	0.061
Hired labour	0.39	0.352	0.324	-0.067	-0.038	-0.028
Rented land	0.186	0.043	0.17	-0.016	-0.143***	0.127***
Storage	0.002	0.06	0.141	0.139***	0.057**	0.082***
Transportation	0.353	0.213	0.234	-0.119	-0.140	0.021
Fodder	0.026	0.06	0.018	-0.008	0.034	-0.042**
Manufactured feed	0.146	0.086	0.057	-0.089**	-0.059	-0.030
Veterinary services	0.095	0.163	0.19	0.095**	0.067	0.028
Rented tractor	0.036	0	0.005	-0.031	-0.036	0.005
Rented cultivator	0.002	0.002	0.003	0.000	0.000	0.000
Rented planter	0	0.002	0	0.000	0.002	-0.002
Rented animals	0.06	0.053	0.049	-0.011	-0.007	-0.004
b) Expenditure, in Ethiopian birr						
Seeds	984.535	485.737	757.666	-226.869	-498.798*	271.929
Fertilizers	1 916.888	1 003.297	1 694.578	-222.309	-913.591**	691.282**
Hired labour	1 354.272	521.029	445.347	-908.925**	-833.243**	-75.682
Pesticides and herbicides	228.776	94.234	53.265	-175.511**	-134.541	-40.970
Rented land	1 002.322	52.033	288.123	-714.199***	-950.289***	236.090***
Storage	1.074	3.158	26.853	25.779***	2.084	23.696***
Transportation	166.391	120.61	39.977	-126.415**	-45.781	-80.633
Fodder	65.823	42.99	28.792	-37.032	-22.833	-14.199
Manufactured feed	601.504	82.249	38.946	-562.558*	-519.255*	-43.303
Veterinary services	26.668	24.01	20.29	-6.378	-2.659	-3.719
Rented tractor	130.788	0	7.712	-123.076	-130.788	7.712
Rented cultivator	9.547	3.589	0.386	-9.161	-5.958	-3.203
Rented planter	0	2.153	0	0.000	2.153	-2.153
Rented animals	98.926	36.962	72.314	-26.612	-61.964*	35.352*
Total crop expenditure	5 282.557	2 150.181	3 325.656	-1 956.902**	-3 132.376***	1 175.475**
Total livestock expenditure	1 289.271	310.098	148.594	-1 140.678***	-979.174***	-161.504
Total input expenditure	6 587.513	2 472.05	3 474.249	-3 113.264***	-4 115.463***	1 002.199
Commercialization (crops)	4 174.076	3 561.443	3 665.930	-508.146	-612.633	104.487
Commercialization (livestock)	1 401.601	238.901	62.131	-1 339.469	-1 162.700	-176.769*
Observations	419	418	389	1 226	1 226	1 226

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. C: control; T1: PFP; T2: HGSF.

Source: Author's own elaboration.

TABLE A.5. **LIVESTOCK**

	C	T1	T2	T2 vs C	T1 vs C	T2 vs T1
a) Herd characteristics						
Household owns livestock	1	1	1	0.000	0.000	0.000
TLU owned	2.148	1.88	1.74	-0.408	-0.267	-0.141
TLU sold	0.203	0.172	0.269	0.066	-0.031	0.097**
b) Household owns animals						
Cows	0.743	0.835	0.578	-0.165**	0.092	-0.257***
Other cattle	0.866	0.857	0.796	-0.070*	-0.010	-0.061
Sheep	0.369	0.417	0.307	-0.062	0.048	-0.110
Goats	0.217	0.308	0.598	0.381***	0.092	0.290**
Mules	0	0.01	0.017	0.017*	0.010*	0.007
Donkeys	0.412	0.544	0.67	0.259***	0.132	0.127
Horses	0.056	0.112	0.031	-0.025	0.056	-0.081
Chickens	0.473	0.607	0.788	0.314***	0.134*	0.181***
Beehives	0.027	0.107	0.059	0.032**	0.080**	-0.048*
c) Number of animals owned						
Cows	1.15	1.097	0.626	-0.524***	-0.053	-0.471**
Other cattle	2.222	1.731	1.662	-0.560**	-0.491	-0.069
Sheep	0.984	0.879	0.606	-0.378	-0.105	-0.272
Goats	0.655	0.68	1.581	0.926**	0.025	0.901**
Mules	0	0.007	0.017	0.017*	0.007	0.009
Donkeys	0.457	0.602	0.844	0.386***	0.145	0.242
Horses	0.059	0.109	0.022	-0.036	0.050	-0.087
Chicken	9.15	2.333	2.388	-6.761	-6.817	0.056
Beehives	0.059	0.316	0.095	0.036	0.257**	-0.221*
Observations	374	412	358	1 144	1 144	1 144

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. TLU: Tropical Livestock Units. C: control; T1: PFP; T2: HGSF.

Source: Author's own elaboration.

TABLE A.6. **ASSETS**

	C	T1	T2	T2 vs C	T1 vs C	T2 vs T1
a) Household owns assets						
Bike	0.055	0.024	0.018	-0.037	-0.031	-0.006
Motorcycle	0.021	0.005	0.026	0.004	-0.017	0.021**
Tractor	0.017	0.007	0.003	-0.014**	-0.010	-0.005
Vehicles	0.014	0.012	0	-0.014***	-0.002	-0.012
Mobile phone	0.905	0.845	0.697	-0.208***	-0.060	-0.149***
Television	0.3	0.04	0	-0.300***	-0.260***	-0.040
Radio	0.474	0.519	0.252	-0.222***	0.045	-0.267***
Land phone	0.002	0	0	-0.002	-0.002	0.000
Personal computer	0.007	0	0	-0.007***	-0.007***	0.000
Satellite	0.274	0.036	0	-0.274***	-0.238***	-0.036
Fridge	0.052	0.005	0	-0.052**	-0.048**	-0.005
Jewellery	0.143	0.052	0.023	-0.120***	-0.090**	-0.029
Hoe	0.798	0.94	0.887	0.089**	0.143***	-0.054**
Axe	0.907	0.931	0.781	-0.126**	0.024	-0.149***
Shovel	0.798	0.867	0.612	-0.186***	0.069	-0.255***
Plough	0.795	0.795	0.817	0.022	0.000	0.022
Irrigation equipment	0.019	0.007	0.003	-0.016**	-0.012	-0.005
Maize sheller	0.002	0.002	0	-0.002	0.000	-0.002
Crop sprayer	0.083	0.083	0.051	-0.032	0.000	-0.032
Scotchcart	0.274	0.029	0.064	-0.210***	-0.245***	0.036
b) Number of assets owned						
Tractor	0.019	0.007	0.003	-0.016**	-0.012	-0.005
Vehicles	0.014	0.012	0	-0.014***	-0.002	-0.012
Mobile phone	1.862	1.429	0.928	-0.934***	-0.433**	-0.501**
Television	0.31	0.04	0	-0.310***	-0.269***	-0.040
Radio	0.474	0.524	0.27	-0.204***	0.050	-0.254***
Land phone	0.002	0	0	-0.002	-0.002	0.000
Personal computer	0.007	0	0	-0.007***	-0.007***	0.000
Satellite	0.279	0.036	0	-0.279***	-0.243***	-0.036
Fridge	0.057	0.005	0	-0.057**	-0.052**	-0.005
Jewellery	0.343	0.093	0.051	-0.291***	-0.250***	-0.041
Hoe	1.648	1.781	2.388	0.741**	0.133	0.607*
Axe	1.467	1.338	1.17	-0.297*	-0.129	-0.168

	C	T1	T2	T2 vs C	T1 vs C	T2 vs T1
Shovel	0.924	1.043	0.679	-0.245***	0.119**	-0.364***
Plough	0.94	0.886	0.879	-0.061	-0.055	-0.007
Irrigation equipment	0.021	0.007	0.003	-0.019**	-0.014	-0.005
Maize sheller	0.002	0.002	0	-0.002	0.000	-0.002
Crop sprayer	0.093	0.083	0.051	-0.041*	-0.010	-0.032
Scotchcart	0.283	0.031	0.067	-0.216***	-0.252***	0.036
Observations	420	420	389	1 229	1 229	1 229

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. C: control; T1: PFP; T2: HGSF.

Source: Author's own elaboration.

TABLE A.7. CROP SPREAD AND LAND ALLOCATION

	C	T1	T2	T2 vs C	T1 vs C	T2 vs T1
a) Household planted						
Maize	0.959	0.711	0.982	0.023	-0.247	0.271*
Wheat	0.37	0.451	0.534	0.164	0.082	0.083
Haricot beans	0.063	0.058	0.052	-0.011	-0.005	-0.006
Teff	0.35	0.24	0.034	-0.316**	-0.110	-0.206
Barley	0.032	0.197	0.262	0.230***	0.165	0.065
Sorghum	0.002	0.097	0.149	0.147***	0.095	0.052
Peas	0.027	0.061	0.021	-0.006	0.034	-0.040
Horse beans	0.017	0.08	0.084	0.067	0.063	0.004
Chat	0.058	0.505	0.144	0.086*	0.446**	-0.361**
Enset	0.158	0.522	0	-0.158	0.364	-0.522**
Coffee	0.083	0.061	0.005	-0.077**	-0.022	-0.055
Cabbage	0.039	0.041	0.076	0.037**	0.002	0.035*
b) Area planted (ha)						
Maize	0.543	0.175	0.418	-0.125	-0.368***	0.243**
Wheat	0.247	0.111	0.168	-0.079	-0.135	0.057
Haricot beans	0.016	0.008	0.006	-0.010	-0.009	-0.001
Teff	0.143	0.079	0.007	-0.136*	-0.064	-0.072
Barley	0.007	0.032	0.049	0.042***	0.025	0.017
Sorghum	0	0.02	0.02	0.020**	0.020	0.000
Peas	0.011	0.008	0.002	-0.009	-0.003	-0.006
Horse beans	0.002	0.007	0.007	0.005	0.005	0.001
Chat	0.007	0.062	0.021	0.013***	0.055**	-0.041*
Enset	0.025	0.091	0	-0.025	0.066	-0.091*
Coffee	0.004	0.005	0	-0.004***	0.001	-0.005
Cabbage	0.002	0.003	0.005	0.003	0.002	0.002
Observations	411	412	382	1 205	1 205	1 205

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. ha: hectares; C: control; T1: PFP; T2: HGSF.

Source: Author's own elaboration.

TABLE A.8. **CROP HARVEST AND VALUE OF PRODUCTION (ETHIOPIAN BIRR)**

	C	T1	T2	T2 vs C	T1 vs C	T2 vs T1
a) Quantity harvested						
Maize	1 527.567	318.095	924.28	-603.287	-1 209.472***	606.185*
Wheat	522.345	185.947	235.249	-287.097	-336.399	49.302
Haricot beans	23.669	9.612	5.22	-18.449*	-14.057	-4.392
Teff	150.533	84.381	4.188	-146.344*	-66.152	-80.193
Barley	10.341	45.352	59.791	49.450***	35.011	14.439
Sorghum	0.122	27.427	24.725	24.603***	27.306	-2.702
Peas	9.745	6.505	1.165	-8.580	-3.240	-5.340
Horse beans	2.757	8.507	3.916	1.160	5.751*	-4.591
Chat	14.063	90.311	25.94	11.877	76.247**	-64.371*
Enset	62.942	272.934	0	-62.942	209.993	-272.934
Coffee	8.2	5.454	0.183	-8.016***	-2.746	-5.271
b) Value of harvest, birr						
Maize	10 473.71	3 111.602	6 192.644	-4 281.066*	-7 362.109***	3 081.042
Wheat	6 013.401	2 377.408	2 339.777	-3 673.624	-3 635.994	-37.630
Haricot beans	266.569	151.092	61.414	-205.156	-115.477	-89.679
Teff	3 140.000	2 051.371	78.927	-3061.073*	-1 088.629	-1 972.445
Barley	97.324	455.133	497.107	399.784***	357.810	41.974
Sorghum	1.825	275	181.649	179.824***	273.175	-93.351
Peas	152.616	104.83	17.801	-134.815	-47.785	-87.029
Horse beans	49.185	125.097	66.885	17.700	75.912*	-58.212
Chat	593.36	4 163.626	399.476	-193.884	3 570.266	-3 764.150*
Enset	722.063	2 089.265	0	-722.063	1 367.201	-2 089.265*
Coffee	580.633	254.393	10.733	-569.900**	-326.239	-243.660
Total value of production	22 342.95	15 673.42	9 904.882	-1.24e+04***	-6 669.534*	-5 768.535**
Maize yield (kg/ha)	2 901.864	2 149.962	2 280.456	-621.408**	-751.902***	130.494
Observations	394	293	375	1 062	1 062	1 062

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. C: control; T1: PFP; T2: HGSF.

Source: Author's own elaboration.

TABLE A.9. **CROP SECTOR REVENUES (ETHIOPIAN BIRR)**

	C	T1	T2	T2 vs C	T1 vs C	T2 vs T1
a) Household sold						
Any crops	0.759	0.765	0.859	0.100	0.005	0.094
Maize	0.477	0.092	0.202	-0.275*	-0.385***	0.109
Wheat	0.294	0.204	0.424	0.130	-0.091	0.220
Haricot beans	0.036	0.019	0.010	-0.026	-0.017	-0.009
Teff	0.178	0.141	0.018	-0.159	-0.037	-0.122
Barley	0.010	0.058	0.045	0.035***	0.049*	-0.014
Sorghum	0.000	0.002	0.005	0.005***	0.002	0.003
Chat	0.051	0.476	0.131	0.080*	0.425**	-0.345**
Enset	0.007	0.034	0.000	-0.007	0.027	-0.034*
Coffee	0.010	0.039	0.000	-0.010*	0.029	-0.039
b) Revenue						
Total	11 121.229	6 006.408	6 062.589	-5 058.640	-5 114.821	56.181
Maize	3 943.881	319.539	748.822	-3 195.059***	-3 624.342***	429.283
Wheat	3 810.973	731.796	1 452.105	-2 358.869	-3 079.177	720.309
Haricot beans	147.701	23.908	7.644	-140.057	-123.793	-16.264*
Teff	1 439.112	760.146	45.550	-1 393.562	-678.966	-714.596
Barley	16.302	106.432	80.733	64.431***	90.130**	-25.699
Sorghum	0.000	4.369	4.450	4.450***	4.369	0.081
Chat	283.333	3616.165	262.827	-20.506	3 332.832*	-3 353.338*
Enset	52.920	42.597	0.000	-52.920	-10.323	-42.597*
Coffee	82.847	127.791	0.000	-82.847	44.945	-127.791*
Observations	411	412	382	1 205	1 205	1 205

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. C: control; T1: PFP; T2: HGSF.

Source: Author's own elaboration.

TABLE A.10. LIVESTOCK SECTOR REVENUES (ETHIOPIAN BIRR)

	C	T1	T2	T2 vs C	T1 vs C	T2 vs T1
Share buying	0.241	0.376	0.573	0.332***	0.136***	0.196**
Share selling	0.310	0.350	0.455	0.145**	0.039	0.106*
TLU purchased	0.207	0.1	0.114	-0.093	-0.107	0.014
TLU sold	0.203	0.172	0.269	0.066	-0.031	0.097**
Revenue livestock	3 448.511	2 310.049	2 723.352	-725.159	-1 138.462	413.303
Expenditure livestock	3 243.949	1 210.888	1 109.179	-2134.770**	-2 033.061***	-101.710
Net revenue livestock	204.561	1 099.16	1 614.173	1 409.612	894.599	515.013
HH-produced livestock by-products	0.246	0.362	0.441	0.195***	0.116	0.080
Revenue livestock by products	1 026.706	399.709	305.601	-721.105	-626.997	-94.108
Observations	374	412	358	1 144	1 144	1 144

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. TLU: tropical livestock units; HH: household; C: control; T1: PFP; T2: HGSF.

Source: Author's own elaboration.

TABLE A.11. NON-FARM BUSINESSES (ETHIOPIAN BIRR)

	C	T1	T2	T2 vs C	T1 vs C	T2 vs T1
Household owns non-farm business	0.186	0.138	0.123	-0.062	-0.048	-0.015
Months in operation	9.064	9.224	8.25	-0.814	0.160	-0.974
Profit	2 125.385	2 971.379	2 211.458	86.074	845.995*	-759.921
Observations	78	58	48	184	184	184

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. NFB: non-farm business; C: control; T1: PFP; T2: HGSF.

Source: Author's own elaboration.

TABLE A.12. **LABOUR SUPPLY**

	C	T1	T2	T2 vs C	T1 vs C	T2 vs T1
a) Individual participated in						
Paid agricultural work	0.029	0.022	0.11	0.081***	-0.007	0.088***
Paid non-agricultural work	0.032	0.054	0.067	0.035**	0.022	0.013
Any paid work	0.061	0.076	0.177	0.116***	0.015	0.101***
b) Months per year of						
Paid agricultural work	0.195	0.15	0.401	0.206**	-0.046	0.251**
Paid non-agricultural work	0.355	0.474	0.435	0.080	0.119	-0.040
Any paid work	0.55	0.624	0.836	0.285	0.074	0.212
c) Days per month of						
Paid agricultural work	0.398	0.309	1.473	1.075***	-0.089	1.164***
Paid non-agricultural work	0.7	0.951	1.022	0.322	0.251	0.071
Any paid work	1.098	1.259	2.495	1.397***	0.162	1.235**
Monthly pay	174.802	254.355	506.193	331.392***	79.554	251.838***
d) Own farm work						
y/n	0.763	0.781	0.835	0.072	0.018	0.054
Months per year	6.55	6.648	4.967	-1.584***	0.098	-1.682***
Days per month	13.536	13.554	13.7	0.164	0.019	0.146
Observations	1 290	1 115	1 017	3 422	3 422	3 422

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. C: control; T1: PFP; T2: HGSF.

Source: Author's own elaboration.

TABLE A.13. **FOOD CONSUMPTION EXPENDITURE (ETHIOPIAN BIRR)**

	C	T1	T2	T2 vs C	T1 vs C	T2 vs T1
Total monthly expenditure	3 678.296	4 909.996	2 635.504	-1 042.793	1231.699	-2 274.492
Total food expenditure (week)	640.632	1 032.413	529.604	-111.028	391.781	-502.809
Cereals	94.333	186.464	261.614	167.281**	92.131*	75.150
White roots	32.54	28.005	4.666	-27.875***	-4.536	-23.339*
Orange fruits	5.657	3.864	0.668	-4.989***	-1.793	-3.196
Dark-green vegetables	25.011	27.419	7.815	-17.196***	2.408	-19.604**
Other vegetables	45.757	36.402	28.347	-17.410***	-9.355	-8.055
Orange vegetables	1.293	1.843	0.889	-0.403	0.550	-0.953
Other fruit	0.71	0.543	0.226	-0.483	-0.167	-0.317
Organ meats	0.493	24.429	3.239	2.746	23.936	-21.189
Flesh meats	241.202	538.048	107.823	-133.380	296.845	-430.225
Eggs	2.052	6.871	2.1	0.048	4.819***	-4.771**
Fish and seafood	0	0.071	0	0.000	0.071	-0.071
Legumes and nuts	33.136	29.229	6.545	-26.591***	-3.907	-22.684**
Milk products	12.326	12.079	2.905	-9.421***	-0.248	-9.174***
Oils and fats	56.295	49.955	45.589	-10.707*	-6.340	-4.366
Sweets	19.586	24.62	11.524	-8.061**	5.035	-13.096**
Spice	70.24	62.571	45.653	-24.588***	-7.669	-16.918***
Observations	420	420	389	1 229	1 229	1 229

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. C: control; T1: PFP; T2: HGSF.

Source: Author's own elaboration.

TABLE A.14. **NON-FOOD CONSUMPTION EXPENDITURE (ETHIOPIAN BIRR)**

	C	T1	T2	T2 vs C	T1 vs C	T2 vs T1
Total non-food consumption	3 347.304	2 341.03	1 551.262	-1 796.041***	-1 006.274	-789.768
Cigarettes	3.357	3.81	8.817	5.460	0.452	5.008
Cloths (adults)	335.345	379.262	225.308	-110.037	43.917	-153.953
Cloth (children)	323.095	448.952	173.56	-149.535	125.857	-275.392**
Footwear (adults)	142.524	112.238	51.015	-91.508***	-30.286	-61.223
Footwear (children)	118.307	142.695	38.201	-80.107***	24.388	-104.495***
Charcoal	127.064	33.393	2.853	-124.211***	-93.671**	-30.539
Fuelwood	93.44	37.179	12.674	-80.767**	-56.262	-24.505
Rent	24.657	9.679	2.185	-22.472	-14.979	-7.493
Kerosene	14.167	7.114	5.604	-8.563	-7.052	-1.510
Public transport	353.055	272.483	312.622	-40.433	-80.571*	40.139*
Fuel (vehicles)	62.976	0.571	8.522	-54.454**	-62.405**	7.950
Mobile (top-ups)	282.852	209.112	126.902	-155.950***	-73.740	-82.210*
Internet	1	2.238	0	-1.000*	1.238	-2.238
Medicines	140.462	163.826	128.558	-11.904	23.364	-35.268
Fee, doctors	150.714	103.448	125.751	-24.964	-47.267	22.303
Fees, hospital	142.262	25.833	14.242	-128.020	-116.429	-11.592
Fees, traditional	5.762	3.929	14.674	8.912	-1.833	10.745*
Utilities	169.1	70.552	94.843	-74.257**	-98.548*	24.291
Soap	222.195	192.743	159.879	-62.316***	-29.452	-32.864
Social expenditure	634.968	121.973	45.051	-589.916***	-512.995***	-76.921
Observations	420	420	389	1 229	1 229	1 229

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.C: control; T1: PFP; T2: HGSF.

Source: Author's own elaboration.

TABLE A.15. SAVINGS AND DEBT (ETHIOPIAN BIRR)

	C	T1	T2	T2 vs C	T1 vs C	T2 vs T1
Savings	4 444.802	1 477.21	637.165	-3 807.637***	-2 967.593**	-840.044
HH saved (y/n)	0.279	0.264	0.296	0.018	-0.014	0.032
Bought on credit (y/n)	0.16	0.088	0.317	0.157***	-0.071	0.229***
Household indebted	0.212	0.126	0.253	0.041	-0.086**	0.126***

Notes: * p < 0.05; ** p < 0.01; *** p < 0.001. C: control; T1: PFP; T2: HGSF.

Source: Author's own elaboration.

TABLE A.16. PARTICIPATION IN SOCIAL PROTECTION PROGRAMMES

	C	T1	T2	T2 vs C	T1 vs C	T2 vs T1
PSNP (public works)	0.05	0.06	0.105	0.055*	0.010	0.046
Duration	7.038	9.645	16.262	9.224**	2.607	6.617
PSNP (direct support)	0.002	0.021	0.036	0.034***	0.019*	0.015
Duration	0.445	3.39	5.632	5.187***	2.945*	2.242

Notes: * p < 0.05; ** p < 0.01; *** p < 0.001. PSNP: Productive Safety Nets Programme; PW: public works; ds: direct support; C: control; T1: PFP; T2: HGSF.

Source: Author's own elaboration.

TABLE A.17. CHILDREN'S DIETARY DIVERSITY SCORE

	C	T1	T2	T2 vs C	T1 vs C	T2 vs T1
(raw score)	3.627	3.842	3.032	-0.594***	0.215	-0.809***
Observations	308	284	309	901	901	901

Notes: * p < 0.05; ** p < 0.01; *** p < 0.001. C: control; T1: PFP; T2: HGSF.

Source: Author's own elaboration.

TABLE A.18. FOOD INSECURITY EXPERIENCE SCALE

	C	T1	T2	T2 vs C	T1 vs C	T2 vs T1
Worried	0.481	0.508	0.815	0.334***	0.027	0.307***
Unable to eat	0.481	0.5	0.781	0.300***	0.019	0.281***
Ate few meals	0.467	0.496	0.787	0.320***	0.030	0.290***
Skipped meals	0.209	0.236	0.554	0.345***	0.027	0.318***
Ate less	0.349	0.289	0.606	0.257***	-0.060	0.317***
Ran out of food	0.192	0.205	0.411	0.219***	0.012	0.207***
Hungry	0.139	0.18	0.33	0.191***	0.041	0.150***
Not eating	0.091	0.112	0.082	-0.008	0.021	-0.030
Scale	2.398	2.519	4.36	1.962***	0.121	1.841***
Observations	420	420	389	1 229	1 229	1 229

Notes: * p < 0.05; ** p < 0.01; *** p < 0.001. C: control; T1: PFP; T2: HGSF.

Source: Author's own elaboration.

TABLE A.19. **SCHOOLING**

	C	T1	T2	T2 vs C	T1 vs C	T2 vs T1
Never attended	0.294	0.179	0.326	0.033	-0.114**	0.147***
Grade completed	2.766	2.394	1.822	-0.944***	-0.372**	-0.572***
Currently attending	0.915	0.973	0.932	0.017	0.057	-0.041***
Attended previous year	0.86	0.834	0.781	-0.079***	-0.026	-0.052**
Days attended	16.042	17.689	15.861	-0.181	1.646	-1.827**
Passed grade	0.838	0.788	0.677	-0.161***	-0.050	-0.111***
Dropped out	0.068	0.025	0.053	-0.015	-0.043	0.028*
Observations	586	534	699	1 819	1 819	1 819

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. C: control; T1: PFP; T2: HGSF.

Source: Author's own elaboration.

Home-grown school feeding programmes have seen a considerable growth around the world in recognition of their crucial role as boosters of children's health and educational outcomes as well as a nation's overall future growth potential, while also stimulating current economic activity and developing markets through local procurements. The rigorous evaluation of the effects of these programmes on children's and local economy's outcomes poses several challenges due to the presence of multiple treatment arms, complex targeting criteria and the difficulties from lack of treatment randomization. This work is the application of the FAO methodological guidelines to the specific case of one region in Ethiopia. The data relate to the baseline assessment only as it was not possible to proceed with the second wave of data collection due to the COVID-19 pandemic. However the data are still very relevant and can bring interesting findings about the topic.

ISBN 978-92-5-137636-2

9 789251 376362

CC4312EN/1/02.23