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Strengthening
coherence between
social protection and
productive
interventions

The case of Zambia

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Abbreviations and acronyms

7NDP	Seventh National Development Plan
CA	Conservation Agriculture
CAG	Cluster Advisory Group
CASU	Conservation Agriculture Scale-Up
CDDS	Children's Dietary Diversity Score
CSO	Central Statistical Office
CT	Cash transfer
EA	Enumeration area
FAO	Food and Agriculture Organization of the United Nations
FIES	Food Insecurity Experience Scale
FNS	Food and Nutrition Security
FRA	Food Reserve Agency
GPS	Generalized propensity score
GRZ	Government of the Republic of Zambia
Ha	Hectares
HGSF	Home Grown School Feeding
HH	Household
IFAD	International Fund for Agricultural Development
IPW	Inverse probability weighted (regression)
LCMS	Living Conditions Monitoring Survey
MA	Market access
MDD-W	Minimum Dietary Diversity indicator for Women
MoA	Ministry of Agriculture
MoCDSS	Ministry of Community Development and Social Services
MoFL	Ministry of Fisheries and Livestock
MoGE	Ministry of General Education
NFB	Non-farm business
P4P	Purchase for Progress
PFP	Public Food Procurement
RALS	Rural Agricultural Livelihoods Survey
SAG	Sector Advisory Group
SCT	Social cash transfer
SF	School feeding
TLU	Tropical livestock unit
WFP	World Food Programme
ZMK	Zambian Kwacha
WDDS	Women Dietary Diversity Score

Abstract

This country report brings together the results from three evaluations, each with a distinct approach, in an attempt to give a more integrated picture of the results of the Home Grown School Feeding (HGSF) programme and the Conservation Agriculture Scale Up (CASU) project in Zambia. The two programmes were implemented separately but overlapped in few areas, thus offering a chance to study their joint contribution to farm, food security and schooling outcomes. The aim here is to triangulate the findings and provide explanations in terms of the complementarities, or lack thereof, between the programmes or their components.

The research questions were defined across three areas of inquiry, namely *i)* productive activities and market engagement; *ii)* food and nutrition security; *iii)* educational indicators.

The quantitative evaluation gives an idea of the magnitude of the impacts of each of the two programmes taken in isolation and of their combination. The qualitative evaluation provided useful information on the broader context in which the households were operating during the time they were participating in the programmes, thereby shedding light on the processes that led to the end outcomes captured by the quantitative evaluation. The microsimulation study addresses issues related to *what-if* scenarios of national upscale of the two programmes, integrating the information from the quantitative household survey with nationally representative surveys.

The two programmes largely met their own objectives, although the evaluation highlights several issues of internal coherence of the HGSF programme, with the public food procurement component partly offsetting the effects of the school meals. The report also points to a missed opportunity in terms of coordinating the implementation of the HGSF and the CASU programmes more effectively.

1. Introduction

Rural areas host the vast majority of the poor, who live mostly off agriculture and are the recipients of large shares of social protection expenditure. However, agricultural and social protection interventions have traditionally targeted different populations in virtue of their distinct policy objectives.

Agricultural interventions normally seek to stimulate growth and manage vulnerability to shocks in the productive domain, while social protection programmes tend to pursue the twin objectives of reducing poverty and food insecurity and managing vulnerability to shocks in the domestic domain. Agricultural interventions have been more relevant to large-scale than smallholder farmers, often excluding the poor, considered not viable and left to the social protection domain.

Rising recognition of the potential synergies between social protection and agriculture to support pro-poor growth has led Governments to step up efforts to make agricultural interventions (output marketing and market access, skills training and knowledge transfers, postharvest handling and value addition) more readily available to the poor. Nonetheless, a lot remains to be done to conceptualize and operationalize these links in policy and practice to make agricultural programmes more 'socially protecting' and harness the productive potential of the poor through social protection (Homes et al., 2007).

Recent policy declarations at global and regional levels (for example, the 39th Session of the Committee on World Food Security or the 2014 Malabo Declaration on Accelerated Agricultural Growth and Transformation for Shared Prosperity and Improved Livelihoods) emphasize the combined role that agriculture and social protection can play in tackling poverty and hunger.

When agriculture and social protection interventions operate in the same context, by targeting the same community or the same households, they should ideally be consciously linked. Recent evidence has built up showing that agriculture is the sector with the highest potential for generating pro-poor growth, i.e., economic growth that increases mean income while reducing poverty (Valdes and Foster, 2010). However, numerous factors may keep poor households excluded from taking up new opportunities in agriculture.

Missing markets for credit and insurance discourage or forbid the uptake of more productive technology, often trapping households in low-risk low-return choices. In turn, social protection interventions have the potential to break risk- or liquidity-induced poverty traps, by easing liquidity constraints and improving farmer's ability to take on and manage risks (e.g. reduced risk-aversion, avoidance of negative coping strategies). By doing so, social protection interventions ease the bottlenecks that prevent poor smallholder farmers from contributing to and benefiting from economic growth.

However, the interplay between agriculture and social protection is complex, multilayered and with influence going in both directions. At the macro level, agricultural growth creates resources that can fund expansion of social protection, while single agricultural programmes support household

livelihoods, namely food and nutrition security and overall wellbeing if they do not compromise broad entitlements and welfare aspects in the household (child labor, education, food security). Certain agricultural policies, though useful for increasing domestic production, may inadvertently be unfavorable to small family farmers.

Restrictions on fisheries, introduced to protect fish stocks, can lead to displacement. By the same token, social protection interventions may also inadvertently have negative impacts on agriculture. Ill-timed public works programmes can draw participants away from working on their own farms during planting or harvesting seasons. School feeding that relies on imported staples can undermine local agricultural production (FAO, 2016).

Agriculture contributed around 10 percent on average of Zambia's gross domestic product (GDP) between 2006 and 2015, but it employs the overwhelming majority of people, especially in rural areas: 76.6 percent, or more than three fourths, according to the 2015 Living Conditions Monitoring Survey. Agriculture is recognized in the country's Revised Sixth National Development Plan (R-SNDP) as "a strategic area of focus in promoting economic growth, reducing poverty and creating employment", absorbing 9 percent of total government expenditure between 2000 and 2010. Despite its importance for the country's economy, overall poverty levels have remained extremely high, at around 61 percent, and inequality has been on the rise (FAO, 2015).

To counter the persistently high levels of poverty and rising inequality, there has been a growing interest in social protection measures in recent years. In 2005 the Government of the Republic of Zambia published the National Social Protection Strategy as a framework to guide and coordinate action towards poverty reduction (Holmes, 2007).

In 2015, the Fifth National Development Plan recognized social protection as an important ingredient for the country's fight against poverty and hunger. Although the number of social protection measures continued to grow, leading to the development of a National Social Protection Policy (NSPP) in 2014, the link between this emerging area and Zambia's agricultural policy and programmes had remained somewhat unclear (FAO, 2015).

In 2017, Zambia approved its Seventh National Development Plan (7NDP). The Plan not only emphasizes the government's commitment to the extension of social protection, including the expansion of coverage of the Social cash transfer (SCT) programme, but also calls for more integrated implementation of the SCT with other social assistance and livelihood programmes, social insurance, social security, and livelihood and empowerment interventions. There are examples, in fact, of attempts to coordinate and sequence social protection and agricultural programmes and to recognize the links between the two sectors, though many of these examples remain limited and mostly on paper. At the same time, it appears that Zambia's agricultural policy has not managed to achieve its desired impact in terms of poverty reduction and job creation, raising questions over how coherent the design and implementation of the policy has been in terms of its shared aims with social protection.

At the policy level, there are clear overlaps in the objectives of agriculture and social protection policy, most notably around the food and nutrition security, employment and income generation and strengthening livelihoods. Despite their overlapping policy goals and the formal existence of mechanisms for inter-sector planning, there has been limited dialogue at the national level between

the various actors in the agriculture and social protection public policy domains. Part of the reason are limited institutional incentives and interest on the side of the corresponding line ministries. The main institutional arrangement for cross-sector discussion on agriculture and social protection policy and programming were formerly the Sector Advisory Groups (SAG) for agriculture and for social protection. However, the SAGs seemed to function as more of a formal committee than an arena in which genuine issues of coordination and coherence could be discussed and agreed (FAO, 2015).

Following the introduction of the 7NDP, there has been a move towards the 'cluster' approach and budgeting. This has led to the establishment of Cluster Advisory Groups (CAG) as the main institutional arrangement for ongoing cross-sector discussion on agriculture and social protection. The CAGs comprise multiple sectors committed to the objective of enhancing the welfare and livelihoods of Zambia's poor and vulnerable population. As such, they are deemed to have a higher chance of success in pursuing common goals compared to the previous sectoral approach. The Poverty and Vulnerability Reduction Cluster is led by MCDSS. It is tasked with ensuring multi-sectoral strategic planning, budgeting and programme implementation to reduce poverty and vulnerability.

Against this background of increased awareness of the need to promote a more coherent approach and support initiatives that combine elements from both domains, this report presents results from the evaluation of a social protection and an agricultural programme that operated together in specific areas of the country. The report focuses on the impacts of the Conservation Agriculture Scale Up (CASU) project and the Home Grown School Feeding (HGSF) programme, both as standalone programmes and in combination with each other.

The CASU was an agricultural intervention implemented by FAO. It aimed at promoting food security through increasing farm production and income. The HGSF, in turn, is a social protection intervention implemented by the Government of Zambia, with the support of the World Food Programme (WFP), which pursues both *welfare* objectives through the provision of school meals and *productive* objectives through a public food procurement component (local purchases of pulses for the school meals). The two components of HGSF may create different incentives at the household level that can complement or cancel each other out, amplifying or reducing impacts on a certain outcome and therefore creating an issue of intra-programme coherence. The combination of the HGSF and CASU poses additional challenges in terms of cross-programme coherence and coordination. In some areas, HGSF beneficiary farmers could also benefit from productive support through the CASU project; conversely, CASU beneficiaries could benefit from the market access offered by HGSF's purchasing component.

The fact that CASU and HGSF overlapped in some areas, even though without ever intentionally targeting the same households, and the mixed nature of the HGSF programme offers an opportunity to study the potential synergies and overall coherence between programmes and within the two components of the HGSF. Coherence in this report is a means to an end, rather than an end in itself. It is as much about ensuring that potentially conflicting interactions between policies and programmes are avoided or minimized as it is about actively exploiting complementarities and synergies between agriculture and social protection schemes (FAO, 2016).

The report brings together findings from a quantitative (Prifti and Grinspun, 2019), a qualitative (Nesbitt-Ahmed and Pozarny, 2019) and a microsimulation study (Kangasniemi, 2019). The quantitative impact evaluation was designed with multiple treatment arms to capture the

complementarities between the HGSF and CASU. The quantitative study was based on a post-test only non-equivalent control group design, with only one wave of post-intervention data that were collected between October 2017 and January 2018. We identified four treatment arms: one with households that benefit from both HGSF and CASU; one with households that benefit only from HGSF; one with households that benefit only from CASU; and a control arm with farm households that benefit from neither of these programmes.

The microsimulation study is based on the estimated impacts from the quantitative evaluation and uses Zambia's nationally representative Rural Agricultural Livelihood Survey to simulate what would happen if the programmes were upscaled to a national level. The qualitative study contextualizes and deepens understanding of the quantitative findings. It was based on the same research design as the quantitative one, but data collection took place around April 2019. The three studies form part of a mixed methods approach to generating evidence that increases the chances of getting a full picture on the effectiveness of the programmes to reach their objectives, be it alone or in combination with one another.

2. Background of the programmes

School feeding (SF) is present in some 70 of 108 low- and lower-middle-income countries, typically with support from WFP. In Zambia, the WFP-supported School Meals Programme started in 2003, by providing a hot nutritious meal of High Energy and Protein Supplements to children enrolled and attending classes in targeted schools. In March 2011 this was transformed to maize meal, pulses and oil. HGSF is a SF programme that provides food produced and purchased within the country, to the extent possible. Since 2011 Zambia's SF programme has gradually transitioned to a HGSF programme. The programme uses WFP's Purchase for Progress (P4P) platform to procure the commodities that make up the school meal. The P4P is a pilot programme active in 35 countries that purchases staple food commodities (cereals, pulses and blended foods) from smallholders, which are later distributed as food assistance in the country of purchase or worldwide. P4P promotes the development of agricultural markets so as to give smallholders the chance to sell food surpluses at a fair price and increase their incomes. In Zambia, the P4P programme is implemented in 24 districts across six of Zambia's ten provinces.¹

Zambia's HGSF is currently managed and partly funded by the government, and provides nutritious cooked meals to almost one million schoolchildren. The food basket is limited to cereals, pulses and cooking oil, of which only pulses (beans and peas) are procured directly from Zambian farmers, oil being imported and cereals bought from the Food Reserve Agency.²

The main goal of Zambia's HGSF programme, as defined by the Revised Sixth National Development Plan, is to increase school attendance and retention for boys and girls. The second goal, as defined by the National Food and Nutrition Strategic Plan, is to reduce rural poverty by improving local household economies and providing ready markets for local agriculture. The HGSF programme provides one hot meal per day to every child enrolled in pre-primary and primary schools in the targeted districts, throughout the school year. A single ration contains 120 g per child/day of maize and 60 g per child/day of pulses. School meals are provided through HGSF in 38 out of 105 districts, in all 10 provinces of Zambia. These districts were selected based on three educational and three economic indicators: drop-out rate; net enrolment ratio; completion rate; extreme poverty rate; access to arable land; and proportion of total farmer households. The HGSF is implemented in both public and community schools.³ In 2016, the programme supported 977 000 beneficiaries in 2 591

¹ Table 67 in the appendix to the quantitative evaluation report shows the coverage by district of school meals and public food procurement under the HGSF programme. It also shows coverage of the CASU project. Figure 8 in the appendix shows a district map of Zambia illustrating the coverage of HGSF and CASU.

² In 20 schools of the country vegetables are also provided. Local procurement of vegetables is completely decentralized and each school procures the goods from local farmers. However, the implementation is still at an early stage. See the Appendix of the quantitative evaluation report for more details on the coverage of programmes and of the study sample.

³ These schools are typically free, run by parents, and often have far fewer resources – from books to trained teachers – than Zambia's government-run and private schools.

schools (out of more than 8 800 schools), accounting for approximately 25 percent of all children enrolled in primary and pre-primary schools, with parity between boys and girls.

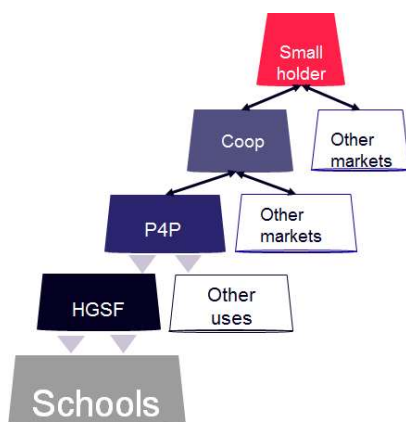
In summary, HGSF combines the provision of school meals with the procurement, through P4P, of supplies for the school meals from local farmers. The programme has multiple aims: in addition to feeding children and encouraging them to attend school, it provides market access to smallholder farmers. The commodities are procured through the WFP's P4P platform based on school enrolment numbers, ration size and number of feeding days. In 2016, only around 17 percent of P4P's purchases of pulses went to cover the demand coming from HGSF – namely 140 tons of beans (out of 2477 tons produced) and 663 tons of peas (out of 2217 tons produced). The share of P4P purchases earmarked for HGSF increased to around 35 percent in 2017; 1117 tons of beans (out of 3454 tons produced) and 991 tons of peas (out 2544 tons produced) went to cover HGSF. However, the share of HGSF is set to grow, as WFP is supporting the government in its goal of reaching two million children by 2020. The rest of the purchases through P4P cover in-kind transfers and represent another form of social protection. In fact, by seeking to offer a predictable and sustained income stream for HGSF suppliers, the local purchases through the P4P programme pursue mainly social protection objectives.⁴

Aggregators have a central role in connecting smallholders to HGSF purchases. In some districts, farmers' cooperatives act as aggregators by buying the produce from their members, while in other districts, agro dealers buy the produce from local farmers. Both types of aggregators sell the collected produce in different markets, one of which is WFP's P4P platform, which in turn uses the purchased produce partly for HGSF and partly for in-kind assistance, either in Zambia or abroad. Hence, in the districts where cooperatives act as aggregators, a minimum eligibility criterion for smallholders to benefit from the HGSF purchases is membership in a farmers' cooperative. Cooperatives that apply for the programme are further selected by WFP based on the cooperative's self-reported storage capacity, size, services offered to members, assets owned and financial aspects. There were, however, considerable challenges in implementing the programme as envisaged, which often forced farmers to use alternative buyers offering lower prices because of delays in collection of legumes and payments. Other challenges stemmed from the limited capacity of co-operatives, notably to aggregate contracted quantities and meet the conditions set in the contracts with WFP. These challenges are discussed later in the report.

Figure 1 illustrates the food supply chain, whereby connectors indicate an exchange of goods for money when represented by double-headed arrows and allocations of crops to alternative uses when represented by triangles.

⁴ P4P also supports smallholder farmers with the necessary skills, information and training on topics such as best agricultural practices, post-harvest handling and business management and technology to transform the way they market their produce, directly access commercial markets and sell aggregated quantities of high-quality crops to increase income. This support seeks to increase market access, create price transparency for farmers, reduce the cost of doing business, and develop the value chain of rural agriculture markets.

Figure 1: Home Grown School Feeding (HGSF) food supply chain



The Conservation Agriculture Scale-Up (CASU) project covered 31 districts, 11 of which were in common with HGSF. It was implemented by the Ministry of Agriculture (MoA) with the support of FAO. It aimed at improving conservation agriculture (CA) capacities by training lead and follow farmers in CA practices, mechanization and business management. Extension officers of the MoA were trained in these three areas and transferred the training to the lead farmers, who in turn passed them down to follow farmers. Farmer-led demonstration plots enabled practical training and demonstration. The final objectives were to reduce hunger and improve food security and income by increasing crop production, diversification and productivity.

CASU follows the three principles of CA, which have been shown to increase productivity, help build resilience to climate shocks and protect the soil (Kassam *et al.*, 2017). These three principles are: 1) minimum mechanical soil disturbance; 2) maintenance of soil cover; and 3) crop rotation, usually with legumes (Kassam *et al.*, 2017). CA practices can increase food security through consumption of own-grown produce and boost farm production and income by improving productivity. CA is currently replacing both traditional and modern plough- and hoe-based agriculture at an annual rate of some 10 million ha globally, accounting for more than 157 million ha, which was about 11 percent of the world's cropland as of 2013 (Kassam *et al.*, 2017).

A total of 21 000 lead farmers were to be enrolled in the CASU project, each of whom would be responsible to conduct demonstrations for 10-15 follow farmers. The lead farmers were provided with e-vouchers for the purchase of bicycles to facilitate movement and for access to CA inputs, equipment and mechanization services. The project facilitated the involvement of suppliers to provide inputs through the e-voucher system. The CA-relevant products were registered and channeled through selected agro dealers in various locations for the follow farmers to be able to access these products. For the 2016-2017 agricultural season the project provided selected lead farmers with inputs falling under three voucher categories: input voucher for legume seeds, targeted mostly to female farmers; transport voucher for bicycles, targeted to farmers with more than one ha of land; credit voucher for inputs for seed production, targeted to farmers producing legume seed.

Programme implementers on both sides tried to coordinate and target the same areas, down to block level, to trigger the envisaged complementarities between the two programmes. According to CASU's project document, one of the aims of the project was to establish partnerships with aggregators and other partners, such as WFP, for collection of marketable surplus commodities, particularly of legumes, produced by CASU participants. The HGSP's public food procurement offered smallholder a secure market to sell to. Specifically, by providing a market for legumes, the public food procurement was meant to create an incentive for farmers to adopt conservation agriculture practices. At the same time, smallholder farmers were expected to be more likely to meet the extra demand from the HGSP when also benefiting from CASU's productive support. Nevertheless, the synergies between WFP's local purchases and FAO's CASU project envisaged at the programmatic stage were only partly followed by concrete coordination at the implementation stage. Overlap of the two programmes at the household level was not systematically pursued. As a result, some but not all farmers who participated in the HGSP programme also benefitted from CASU in a given farming block.

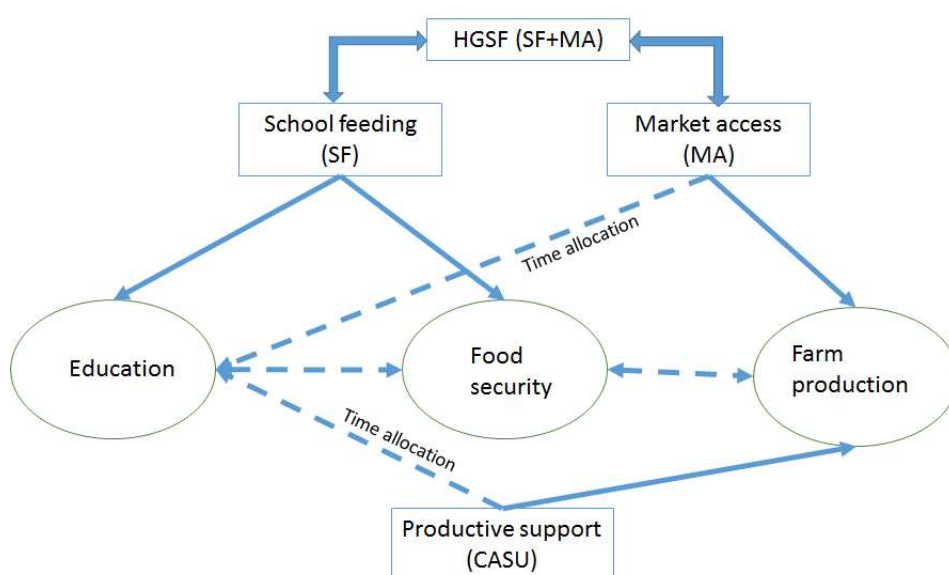
3. Theory of change

In this section we describe the pathways through which HGSF and CASU were expected to exert their influence on farm production, food security and educational outcomes, both separately and jointly by complementing each other. Figure 2 illustrates the theory of change by denoting programmes as rectangles, outcomes as ellipsoids, direct effects as continuous arrows and indirect or second order effects as dashed arrows.

School meals programmes affect educational outcomes directly by increasing 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 (forgone benefits of child work). Meals may also have an incentive effect on pupils actually wanting to go to school to receive food, rather than staying at home and missing out.

Meals can potentially have an impact on the food security status of other household members, which depends on the extent of food substitution effects within the household. Meals can be shared by children with other household members or can substitute (at least partly) for food normally consumed in the home.

Figure 2: Theory of change



Note: The continuous arrows indicate a direct effect, while the dashed arrows indicate an indirect influence. The double-headed arrows indicate a mutual influence.

On the farmers' side, crop purchases through the HGSF programme for the school meals were designed to stimulate farm production, as they provide stable market access to smallholders. Smallholders often do not have access to information regarding prices, which can therefore force them to sell at unfavorable farm gate prices to local traders. Small farmers acting individually due to limited scale have little bargaining power with traders, and will most often accept almost any price

offered. Purchases through HGSF seek to remedy this by keeping transaction costs low, minimizing risk and extending information to all players.

HGSF can have three types of effects on the farmers' side: output effects; distributional effects; and stabilization effects. The HGSF programme introduces additional demand for pulses in the community, which leads to a rightward shift of the demand curve for pulses. The likely effects of this shift include an increase in both production and prices, and hence of farm income for the farm households supplying HGSF. The amount by which production and prices will increase depends on the size of the demand shift and the elasticity of supply of pulses. The smaller the reduction in food consumption at home because of school feeding (substitution effect), the greater the shift in demand coming from HGSF will be.

On the supply elasticity of legumes, if farmers provide any additional food demanded by using current inputs more intensively and by quickly changing the use of fixed inputs (large supply elasticity), HGSF would have a large impact on output and a negligible impact on prices. If farmers are not able to provide the additional food demanded by HGSF (small supply elasticity), then most of the effect of HGSF will go into prices. The programme would have a positive impact on farmers' incomes via an increase in prices and food quantities produced.⁵ This increase in farm income may in turn indirectly affect food security and educational outcomes by allowing households to buy more food and afford school expenses. The programme also has a distributional impact, as it directs the extra demand to small farmers, leaving out larger farmers. Finally, by offering a stable demand and price the programme stabilizes income for small farmers, thus potentially reducing risk. This implies a reduction in the use of inefficient coping strategies, such as lower-yielding crops and precautionary savings, and an increase in productive investments and in the adoption of new technologies.

Within the HGSF, public food procurement and school meals can work in the same direction and reinforce each other's effects on a specific outcome. For instance, an increase in the availability of food in the household contributes to a healthier and more productive work force that is better able to respond to the extra demand from public food procurement, whose higher revenues can translate into higher food consumption and better diets in the household. However, the incentives created by the two components of HGSF may lead to contradicting effects on a certain outcome if the household, given its limited endowments in time and resources, compromises welfare aspects (e.g. increased child labor, productive reconversion) to meet the demand from the public food procurement.

CASU, in turn, consisted of training on CA and distribution of agriculture inputs. From the first adoption to its complete and stabilized use, CA development can be summarized as follows. First, no increase in farm output is foreseen at the initial phase; reductions of production costs will occur through decreases in labor, time, draught animal use or motorized power. An increase in agrochemical use, especially to control weeds, might be required. Second, an increase in yields and consequent increase in net farm income is expected after improvement of soil fertility. Third, the

⁵ The impact on consumers is less obvious. Depending on the size of the increase in prices, some households may have their welfare reduced as a result of the intervention.

diversification of crops should lead to increased and more stable yields and finally, production and productivity stabilize.

Therefore, the CASU programme is expected to increase farmers' incomes by boosting yields and production through greater and better input utilization and new technology adoption. Furthermore, it is also likely to have a positive impact on food security by increasing food consumption for the beneficiary farm households, both through higher incomes and from their own production. There is evidence that agricultural interventions can improve the diversity of food produced, which can contribute to better diets (Dewbre *et al.*, 2015 for Lesotho; Escobal and Ponce, 2015 for Colombia). Considering that CA practices are knowledge-intensive, CASU can also increase human capital, by means of training group members in new skills, as well as promote social capital through the strengthening of cooperatives and the broadening of their networks and partnerships, including with the private sector. The indirect effects on food security and schooling outcomes of productive support through CASU are similar to those illustrated above for HGFS's market access.

As shown in Gavrilovic *et al.* (2016), coordinated agricultural and social protection interventions such as CASU and HGFS can complement and mutually reinforce each other. Secure market access through the HGFS programme can increase incentives for farmers to produce more and more efficiently and make them more prone to adopting the production technologies taught through the CASU programme. At the same time, farmers with access to CASU training and inputs would be better suited to reap the benefits from the increased market access than similar farmers who do not benefit from CASU. Moreover, the effects on farm production, food security and education from the joint implementation could be greater than the sum of the effects of each programme applied in isolation (synergic effects).

4. Analytical Methods

4.1 Quantitative Impact Evaluation

The evaluation is based on a post-test only non-equivalent control group design, with only one wave of post-intervention data (Prifti and Grinspun, 2019). The household and community surveys for the evaluation of the programmes took place between October 2017 and January 2018. The total sample size is 3 636 households and a total of 72 community interviews were also conducted.

There are four treatment arms in this study: HGSF-only arm: households benefiting from HGSF but not from CASU; CASU-only arm: households benefiting from CASU but not from HGSF; HGSF+CASU arm: households benefiting from both HGSF and CASU; Control arm: households benefiting neither from neither HGSF nor CASU. The design is illustrated in Figure 3.

Figure 3: Scheme of an “After only Non-equivalent Control Group” design

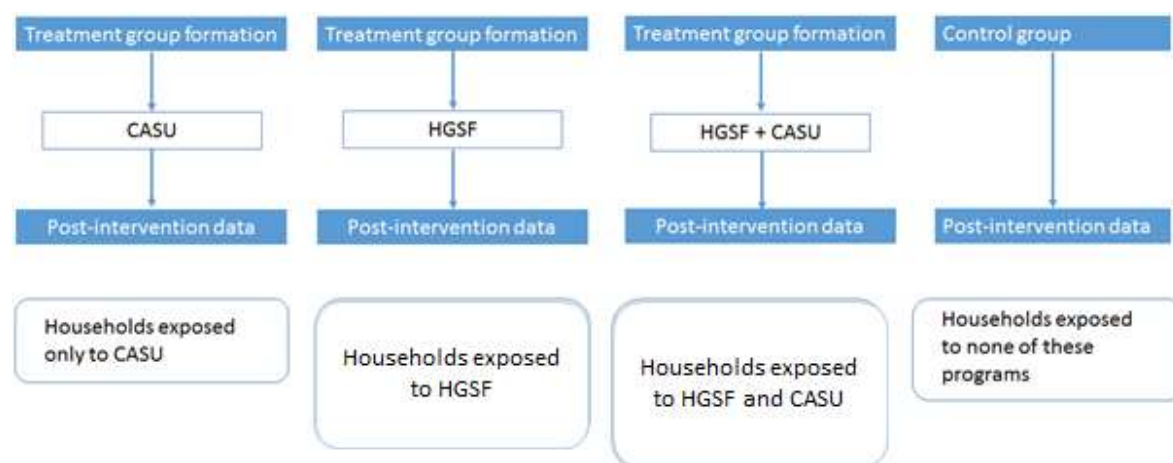


Table 1 shows the sample size for each treatment arm and the geographical distribution in terms of districts.

Table 1: Sample size by treatment arm and district

		DISTRICT (Count)								
		Chibombo	Chongwe	Kawambwa	Luwingu	Katete	Kafue	Kasempa	Mporokoso	TOTAL
HOUSEHOLD TYPE	CASU Only	404	363	0	0	0	0	0	0	767
	HGSF Only	0	0	612	200	0	0	0	0	812
	HGSF + CASU	0	0	0	0	467	0	0	0	467
	Control HGSF eligible	0	0	0	0	0	275	312	238	825
	Control CASU eligible	0	0	0	0	0	186	159	154	499
	Ineligible	13	5	57	112	0	38	10	34	269
	TOTAL	417	368	669	312	467	499	481	426	3,639

Since participation in the programme was not randomized, households either self-selected into treatment or were cream skimmed into it by programme implementers. Deliberate selection of this sort can lead to biased impact estimates due to pre-treatment differences between beneficiaries and controls. The study used multivalued treatment regression with inverse probability reweighting (IPW). The linear regression allows to compare the conditional mean of outcomes across the four treatment arms, so that the impact of the CASU-only programme on a given outcome variable is estimated as the difference between the conditional post-intervention average outcome for the CASU-only group and the conditional post-intervention average outcome for the control group. The reweighting removes observable pre-treatment differences between the treated subjects and the controls. This method approximates an experiment as it ensures only the elimination of observed pre-intervention differences among the treatment arms (balanced covariates), but relies on the assumption that the groups are otherwise equivalent, on average, in terms of unobserved or hidden characteristics. The weights are given by the generalized propensity score (GPS), i.e., the conditional probability of receiving a certain treatment level that is estimated through a multinomial logit specification. The final estimating equation is based on a Weighted Least Squares.

4.2. Qualitative Impact Evaluation

The qualitative study was designed with the objective of helping contextualize the findings of the quantitative impact evaluation. The aim was to explore the effects of each programme in isolation and, where both were operating, to gain insights into the ways in which their implementation could have contributed to the impacts observed in the quantitative evaluation (Nesbitt-Ahmed and Pozarny, 2019).

The study was comparative analysis conducted in two sites: a HGSF-only site in Luwingu district and a CASU and HGSF site in Katete district. These overlapped with the quantitative study. In each site, two blocks were randomly selected as sample sites, and in each, camps were selected randomly. There were three main areas of research enquiry: (i) changes around income generating and farming systems; (ii) changes in food and nutrition security; and (iii) programme operations and implementation.

The qualitative methods used to obtain views, experiences, perceptions and opinions in relation to the areas of inquiry included: Focus Group Discussions (FGDs), Key Informant Interviews (KIIs), and in-depth household case studies. The study adopted an open-ended, iterative and inductive approach. This is central to qualitative analysis, in order to broaden the understanding of intended and unintended impacts on different actors, and capture the types and complexity of processes leading to their decisions (Pozarny, 2017).

One challenge of the study centered on embedding the qualitative study directly in the quantitative study sampling frame. In Katete district, while the list was meant to contain only farmers in co-operatives supplying to HGSF and engaging in CASU, few farmers on the list and in the randomly selected blocks and camps were in both programmes. This often meant that FDG numbers were smaller than planned for, to factor in the criteria of only interviewing farmers in co-operatives supplying to HGSF and engaging in CASU. This could be due to time as the CASU programme had been completed during the period of the qualitative study. Similarly, in Luwingu, while the list was meant to contain only farmers in co-operatives supplying to HGSF, it turned out that all farmers

were in co-operatives, but not everyone on the list had supplied to HGSF via co-operatives only. This could be due to farmers' being unable to provide the full quantity of legumes to WFP.

It is important to note that the qualitative and quantitative studies occurred at different periods, between October 2017 and January 2018 for the quantitative and between April and May 2019 for the qualitative. Participants in the latter were asked to discuss their experiences based on 2017/18, when the quantitative study took place. This means that the findings of the qualitative study are based on the respondents' perceptions of changes over time (before and after programme), without comparing them with changes over time for a control group. This differs from the benchmark used in the quantitative study, which is based on control districts where neither programme was implemented. These differences in method can help understand and reconcile seemingly divergent findings from the two studies.

4.3. Microsimulation Study

The aim of the microsimulation study was to explore the distributional impacts on poverty and income of Zambia's HGSF and CASU, complementing the findings from the quantitative impact evaluation, which only allows estimation of the average impact (Kangasniemi, 2019).

It is likely that the two interventions benefit different groups of the population. In the case of HGSF's public food procurement, despite reaching more smallholders than untargeted procurement, such modalities may cut off the most vulnerable farmers who are not members of organizations. Moreover, due to the uneven incidence of adoption and the heterogeneity of impacts, the actual impact of conservation agriculture practices may vary across the income distribution. The direct impacts of interventions may be poverty-reducing and food security-enhancing for programme beneficiaries but, depending on who benefits, they can also accentuate income inequalities in some parts of the rural population.

The microsimulation study looks at: 1) The nationwide distributional consequences of the CASU and HGSF programmes, given the participation decisions and the impacts on income estimated from the evaluation data; 2) the nationwide impact of school feeding and the potential increase in school attendance rates in rural areas under different scenarios of school feeding coverage; and 3) the possible distributional impact of the transfer of income in the form of school feeding.

Microsimulation is a methodology used for generating and assessing the outcomes resulting from a projected or hypothetical change such as a policy intervention, based on microdata. The outcomes of interest are simulated for each agent separately. In this study, the income impacts of CASU and institutional procurement were drawn from the impact evaluation study presented earlier, while their incidence in the population was estimated by using a selection model. In the case of school feeding, household behavioral responses are also a focus of interest, i.e. decisions made as a response to the interventions and subsequent changes in incomes, school attendance and food consumption.

The simulation used data both from the impact evaluation and from two nationwide data sets, the Rural Agricultural Livelihoods Survey (RALs)⁶ and the Living Conditions Monitoring Survey (LCMS).⁷ The methodology for estimating the poverty impacts of CASU and HGsf involved using the impact evaluation data to identify the likely beneficiaries, estimating the parameters for the impact on gross household income and applying these estimated impacts to the identified beneficiaries in the RALS data. The analysis of school feeding used the LCMS.

⁶ IAPRI. 2016. 2015 Rural Agricultural Livelihood Survey (RALs). Lusaka, Zambia.

⁷ CSO. 2016. 2010 and 2015 Living Conditions Monitoring Surveys (LCMS). Lusaka, Zambia.

5. Evaluations results

The findings from the quantitative and qualitative impact evaluations will be presented together for each group of outcomes, considering their similar scope and object of analysis, i.e. quantifying and explaining in depth programme impacts on the recipients. In turn, the microsimulation findings on distributional impacts from a hypothetical national upscale of the programmes will be presented in a separate section, since they focus on different outcome variables and concern the macro environment as a whole instead of the household domain.

Before diving into the analysis of the impacts on single outcomes, we present briefly an overview of the overall quantitative impacts of the programme in figure 4, focusing only on their direction for the time being. For farm production outcomes, the CASU and its combination with the HGSF produce mostly positive impacts, while the HGSF features mixed impacts. The adoption of conservation agriculture practices was a success in the two arms where these practices were promoted. For food security and schooling indicators, we highlight the positive impacts of offering meals on both groups of outcomes. However, when zooming in and considering the impacts of the HGSF as a whole, including the exposure to the public food procurement component, the impacts on schooling are nullified and those on food security become negative. The CASU had positive impacts on food security, while not affecting schooling decisions, as expected. The combination of CASU and HGSF led to positive impacts on food security and some negative impacts on schooling.⁸

For all groups of outcomes, we analyze whether the effects of CASU and HGSF went in a synergic direction by reinforcing each other or whether competing factors were at play, resulting in trade-offs on specific outcomes. Both programmes are expected to have a direct effect on production decisions. For the welfare outcomes in the schooling and food security domains, we can analyze coherence aspects both between HGSF and CASU and between HGSF's components themselves, since the provision of meals is expected to only affect school and food security but not the production domain. Moreover, meals are expected to have a direct impact on FNS and schooling outcomes, while the purchases from HGSF farmers could have indirect effects through their influence on household income.

⁸ Meals are expected to have a direct impact on FNS and schooling outcomes, while the purchases from HGSF farmers would have indirect effects through their influence on household income. Therefore, we believe it is of interest to study the impacts of the school meals separately from those of the local purchases from farmers enrolled in the HGSF programme. Despite the fact that the study was not designed to disentangle such effects, we can still address them by limiting the sample to HGSF-only farmers and using a self-declared dummy variable that records whether a household is sending any children to a school that provides school meals.

Figure 4: Summary of quantitative results

	CASU	HGSF	Both	Meals
Farm production	++	+/-	++	
Crop production	+/-	+/-	+/-	
Crop sales	+/-	++	+/-	
Livst. production	++	- -	++	
Tot. gross income	0	- -	++	
CA adoption	+++	0	+++	
FNS	+++	- - -	++	++
Schooling	0	0	- - -	++

Legend:

+++ Majority of impacts are positive; - - - Majority of impacts are negative

0 No Impacts; +/- Mixed impacts

The majority of the quantitative findings are confirmed by the qualitative study, although there are areas of disagreement among the two due to the different ways in which the methodologies define impacts. This question will be discussed in the corresponding section.

5.1 Farm-household production outcomes

In figure 5, we recap the impacts in the production domains of each programme taken as standalone and of their combination. The graph helps compare the pattern of impacts across programmes in terms of sign, magnitude and significance. In the remainder of the section we focus on three broad areas, namely, crop production and sales, livestock production and sales and gross household income.

The story that emerges from the quantitative estimates is that the HGSF improved production and sales of beans and to some extent cowpeas, but at the cost of decreased income from other sources. The increased sales revenues from legumes induced by participation in HGSF's purchasing programme were not enough to compensate for reductions in revenues from other sectors, which ultimately led to an overall deterioration of total gross income (Prifti and Grinspun, 2019).

The reasons for these findings, as discussed in more detail later, seem to revolve around farmers' constrained access to the resources needed to meet the extra demand coming from HGSF as well as shortcomings in programme implementation. In turn, the CASU produced mostly positive impacts in terms of production and sales of crops and livestock, although we found no impacts on total gross income. Importantly, the programme met its immediate objective of spreading the adoption by

farmers of conservation agriculture practices. The combination of both programmes produced a similar pattern of results to CASU, and in many cases the impacts were better than those of either programme taken in isolation. This lends support to the view that the two programmes may have operated synergically for certain outcomes in the production domain (Prifti and Grinspun, 2019). Most of the findings from the quantitative analysis are confirmed by the qualitative study, though with a number of caveats that will be presented later in the report.

5.1.1. Crop production and sales

Maize is the most widely grown crop in the CASU, the combined CASU and HGSF and the control groups. In the HGSF arm, beans are the most widely grown crop, with 89.7 percent of households growing some, while maize ranks second as 79.2 percent of farmers grow it. Other crops that stand out are groundnuts, which are grown by 18-54 percent of households in the sample.

The CASU led to an increase in the **share of farmers cultivating** maize compared to the control group, which represents the counterfactual situation for our treatment arms – i.e. what would have been observed in absence of the programmes. Other noticeable increases are observed for groundnuts, cowpeas and sweet potatoes. The wider spread of these crops is compensated for by a diminished diffusion of beans, cassava and sorghum. By contrast, the pattern of impacts is reversed in the HGSF arm (Prifti and Grinspun, 2019). The HGSF led to a considerable increase in the number of bean growers and a reduction of maize growers. The qualitative study confirmed the changes in crop production, with the increase in the spread of beans (due to P4P), as well as of other crops which farmers did not attribute to HGSF. There was also a noticeable increase in the spread of groundnuts and cassava among HGSF beneficiaries. In the combined arm, the impacts are similar in sign and magnitude to those observed for the CASU-only arm for virtually all crops. In fact, as explained during an interview with the former chairperson of a co-op in Eastern Block, Kamphambe camp,

“Once HGSF came, we now concentrated on cowpeas because it was giving us something, we found a market. Cowpeas generally don’t have a market, but it came [with HGSF] and we had a ready market” (Nesbitt-Ahmed and Pozarny, 2019).

Maize, the farmers’ staple food, was also produced widely.

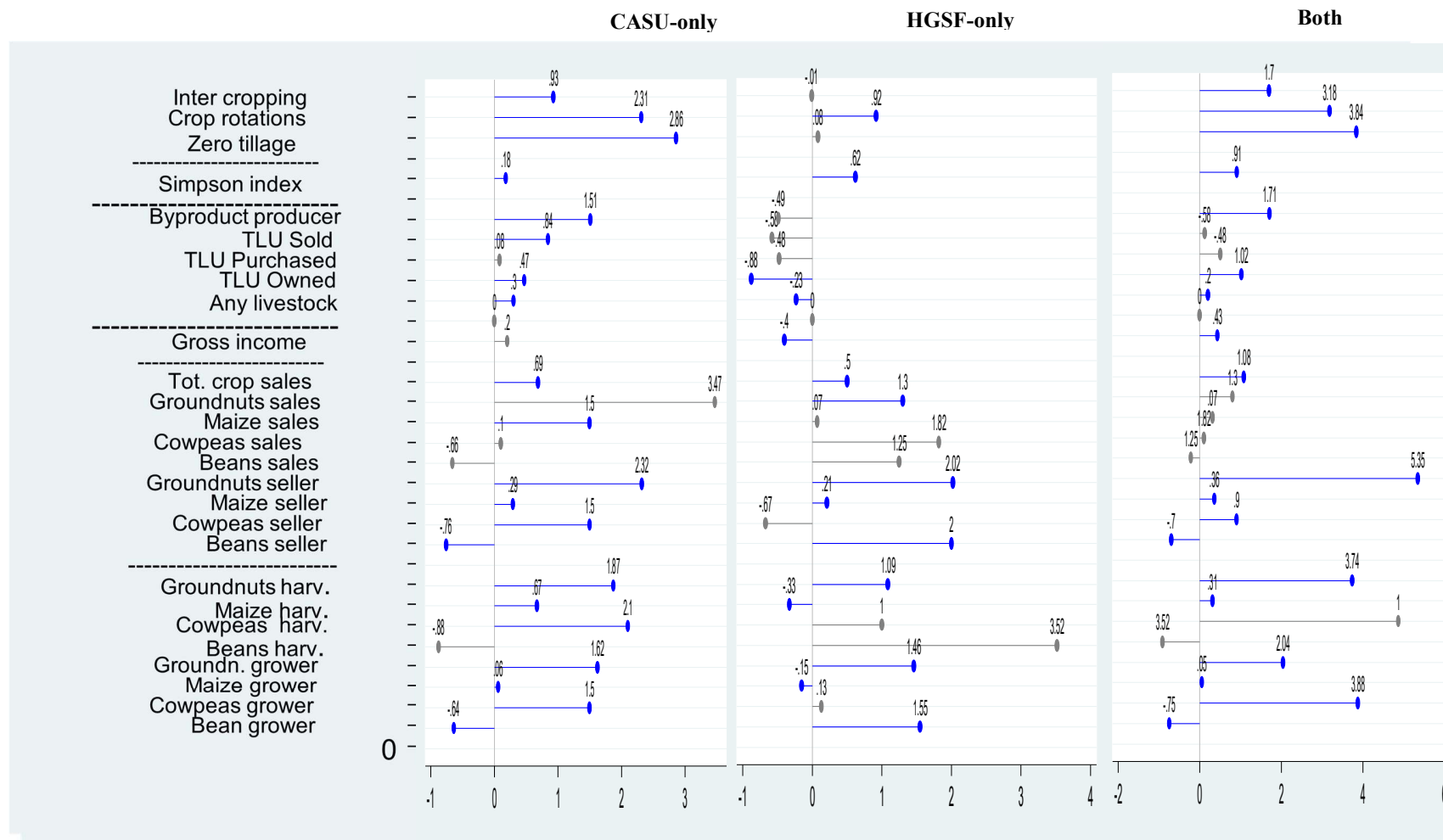
In terms of **harvested quantities**, maize, beans and groundnuts are the most important crops in all treatment arms. Each household harvested between 1.3 and 3.4 tons of maize, while beans production was especially high in the HGSF arm, at 877 kg, because of the demand coming from the P4P, but varies between 32 and 103 kg for the other arms. In terms of impacts, participating in CASU is associated with an increase in the production of maize, groundnuts and cowpeas, but a decrease in the production of cassava and sorghum. The HGSF increases production of groundnuts, but no statistically significant increase of beans and cowpeas was detected. Maize production declined, along with sorghum. The qualitative study reports findings of increased maize and beans production, but the interviewees did not always attribute them directly or exclusively to the HGSF programme.

The seemingly divergent findings from the quantitative and the qualitative studies are likely due to the different ways in which each defines change. In the quantitative study, change is defined relative to a counterfactual situation proxied by the control group, in which there is no incentive provided by

the HGSF purchasing programme for legumes but other market arrangements exist instead. These could consist in the presence of cross border “suitcase traders” or the Food Reserve Agency (FRA) offering to buy maize, which provides farmers with different incentives. While farmers in the HGSF group produced more maize over time, the increase was less than what they would have experienced if they had not had access to HGSF beans purchases. This shows in the negative difference with the control group households, who are similar to the HGSF group in all aspects but lack access to the HGSF purchases.

In short, the findings from the quantitative and qualitative studies are not necessarily incompatible. Both shed light on different aspects, with the quantitative study highlighting the opportunity cost of not accessing the HGSF platform while the qualitative findings offer reassuring evidence that the negative impact observed in the quantitative analysis could be interpreted more as a missed opportunity to grow more than an actual reduction in output. The fact that the quantitative study could only rely on a post-treatment wave of data with no baseline precludes the possibility of tracing the dynamic profile of each outcome, which would give an idea of changes over time and across treatment arms.

Figure 5: Summary of quantitative impact estimates on the production side



Note: Blue (grey) bars indicate statistically (in)significant impacts. The first panel from top refers to CA practice adoption. The second panel has an indicator of crop diversification. The third panel to livestock production and sales. The fourth panel has gross income and the last two panels refer to crops sales and production, respectively.

In the combined group, impacts for harvested quantities are similar to those of the CASU group. For maize, the impact of the combined interventions lies halfway between the impact of the CASU intervention alone and that of the HGSF. The expansion in the production of groundnuts, soybeans and sunflowers is larger in the combined arm than in the single programme groups. The combination of programmes is associated with a reduction in the production of millet and sorghum. However, the complementarities between CASU and HGSF in terms of beans and cowpeas production did not live up to expectations. Given the training provided by HGSF, which focused specifically on pulses, coupled with the secured market access for the participating farmers, the results of the combined group could have been expected to look more similar to those of the HGSF-only group, at least for these crops. The significant positive impacts of the combined programmes observed for the spread of cowpeas are not confirmed for the harvested amounts. However, the FGDs at district level cited in the qualitative study reveal that

“CASU introduced crop rotation and hybrid cowpea seeds, but demand [of cowpeas] was because of WFP.”

This indicates the value-added of the presence of both programmes in Katete for increasing crop production (Nesbitt-Ahmed and Pozarny, 2019).

To explore the impact of the programmes on measures of **farmers’ commercialization**, the report looks at both the *extensive* (selling some produce in the market) and *intensive* (sales revenues) aspects of selling. Maize and groundnuts are the most widely sold crops in the sample. Other crops play an important role only for specific arms. The most prominent case concerns beans in the HGSF-only arm, where the overwhelming majority of farmers sell them (Prifti and Grinspun, 2019). Soybeans and sunflowers are extensively sold in the combined arm. CASU is associated with an increase in the **share of maize sellers** and a reduction in the share of farmers selling beans. Moreover, CASU leads to an increase in the number of farmers selling groundnuts, soybean and sweet potatoes, while the number of households selling millet and sorghum falls to zero. The **share of beans sellers** almost doubles as a result of the HGSF programme, as expected, and the number of maize sellers increases too. The programme is also associated with positive impacts in the share of farmers selling groundnuts, while the share of those selling sorghum shrinks to zero.

The qualitative study found evidence that there was already a robust trade in beans, but these were mostly traded with neighboring countries via informal means. Moreover, the absence of formal pricing of the beans exposed farmers to exploitative trading practices. In addition to selling to WFP, beans are still sold to traders from Zambia’s Copperbelt and the Democratic Republic of Congo. However, there are now more secure and higher prices for beans, due to pricing mechanisms put in place by WFP (Nesbitt-Ahmed and Pozarny, 2019).

The impacts of the combined programmes are similar to those of CASU, insofar as they lead to a greater share of maize sellers but a smaller share of beans sellers. Impacts are larger for some crops, however, compared with each programme in isolation. For instance, the increase in the number of maize and groundnuts sellers is considerably larger than the impacts observed for the single programmes. For

beans, we find no evidence of complementarities between HGSF and CASU. The two programmes have opposing effects when applied individually, with CASU leading to a reduction in the share of farmers selling beans. This effect apparently prevails when the two programmes are implemented jointly in the same block. By contrast, there is an increase in the share of sellers of cowpeas in the combined arm. The qualitative study confirms these findings through the words of the former chairperson of a co-op in Eastern Block, Kamphambe camp, cited earlier in this report. Other interviews bring further elements that suggest there was some degree of complementarity between CASU and HGSF in the combined areas. The perception of the interviewees was that due to CASU,

“the district saw an increase in hectarage of cowpeas and soya beans. For maize, hectarage has been the same, but productivity improved as farmers were able to use better farming methods... CASU introduced crop rotation and hybrid cowpea seeds, but demand [of cowpeas] was because of WFP” (Nesbitt-Ahmed and Pozarny, 2019).

In terms of the intensive margin, the CASU programme is associated with an increase in average **sales revenues** from maize and a reduction from beans sales. In this arm, revenues from the sales of groundnuts, seed cotton, soybeans and sweet potatoes also increased substantially. The HGSF programme led to an increase only in revenues from the sale of beans and groundnuts (Prifti and Grinspun, 2019). There are no impacts for all other crops, apart from sorghum, the sales of which fall to zero. According to findings of the qualitative study, the selling of beans to WFP meant that farmers did not need to only wait for the Food Reserve Agency (FRA) to sell their maize. As explained during FGDs with male farmers in Chungu Block, Mufili camp, income from the sale of beans increased due to the improved prices of legumes. Another added value of the available market from HGSF for the sale of beans was that farmers were now able to sell crops *“when the price is good, at the right season”*, as reported by HGSF co-op leaders in Chulungoma block, Kapisha camp (Nesbitt-Ahmed and Pozarny, 2019).

Results for the combined group show a similar pattern to that of the CASU group: a significant reduction in revenues from beans sales and an increase in sales revenues from groundnuts, seed cotton, soybeans and sweet potatoes.⁹ For most of the crops grown by farmers in the combined treatment arm, the impacts are stronger than in any of the two standalone arms. **Total revenues** increased in all three groups, which is generally sustained by the qualitative study when it reports that households have changed their use of harvests, from mostly keeping products for household consumption to now being able to consume and also sell. However, the impact for the HGSF group is half of that for the combined group, where total crop revenues almost double in value.

⁹ In the qualitative study, by contrast, farmers often reported an increase in revenues from the sale of beans. But they often attributed such outcomes to the support they received from other development programmes and agents operating locally, and not to the P4P purchases per se.

The qualitative study may explain why the positive sales results in the HGSF group were hampered. The study identifies two circumstances that may have contributed to HGSF farmers selling their legumes at below-market prices. First, as WFP often arrived late, farmers were sometimes forced to sell to traders right after harvest at lower prices as they were under pressure to meet various domestic needs, and so were not able to hold back and wait for the better price from WFP. Second, with time, supply outstripped demand. Specifically, when the programme started, WFP did not get enough supply, but after two years farmers produced more than what the programme could take. As a result, farmers ended up not finding a ready market and selling instead at lower prices in alternative markets. Similar findings about HGSF operations emerge for the combined group. The PFP is reported to have improved the market for cowpeas, offering higher prices, but farmers reported that sales to PFP were infrequent and late in the season, which led some of them to sell at lower prices. However, this did not show up in the quantitative impact study, since cowpeas represented only a small fraction of total crop sales in the combined treatment group, while beans contributed most of the crop sales revenues in the HGSF group.

5.1.2. Livestock production and sales

The **share of farmers engaged in raising livestock** is around 80 percent in the CASU-only and the combined arm; it falls to 60 percent in the control arm and to an even lower share of 43 percent in the HGSF group. As a result, the average number of Tropical Livestock Units (TLU) in the HGSF group is also relatively low, at 0.5 animals per household, which corresponds to one cattle (Prifti and Grinspun, 2019). The qualitative findings further indicate that livestock was limited in the HGSF arm as they were not traditionally raised in the area. In the CASU arm, the programme led to an increase in the share of farmers raising livestock, driven by milk cows and chicken. The **average herd size** also increased by 0.5 TLUs. For the HGSF arm, impacts of a similar magnitude were observed, but in the opposite direction compared to CASU. There was a reduction in the spread of livestock activities and in the average number of animals owned, especially of cattle other than milk cows, goats and chicken.

In the HGSF arm, the reduced livestock production may be related to the incentive of the market access component to produce and sell pulses, which may have attracted farmers to these crops and away from maize and livestock or even other income-generating activities. However, the qualitative study reports that a limited number of participants perceived an increase, albeit small, in the number of livestock in their households, particularly cows. These were, however, not attributed to the HGSF programme. While there may have been improvements in a restricted number of cases, these were likely not systematic or attributable to the programme, which is likely why they were not captured in the quantitative study.

The impacts in the combined arm are a mixed pattern between those of the CASU and the HGSF: even larger changes in herd size were observed, driven by milk cows and other cattle, counterbalanced by a decrease in the number of goats owned. The increased livestock production in the two arms where CASU was implemented may be related to complementarities that CA stimulates between crop and livestock production. The qualitative findings are aligned with the quantitative ones insofar as they show an increase in livestock, notably cattle and goats, broiler and village chickens, as well as pigs. While, as

explained during the district level interviews, there was “no deliberate focus on livestock in CASU”, respondents did observe that “farmers could [now] afford vaccination”, which they linked to the increased productivity from CASU. This was echoed during male FGDs in Southern Block, Chilembwe camps, where farmers explained how animals would die from diseases in the past. With training from extension officers, they now know how to care for animals and, with increased income from the combined programmes, they “can buy chemicals and treat animals”. Finally, during FGDs with female HGSF co-op members and CASU farmers in Southern Block, Chilembwe camp, they explained that trees, such as moringa, were being planted due to training from the agriculture extension officer on how to plant trees (Nesbitt-Ahmed and Pozarny, 2019).

Engagement in **livestock by-product production** is relatively low in the study sample, but varies between 12 percent in the CASU arm and 1.6 percent in HGSF. Both the CASU and the combined programmes led to considerable increases in the share of farmers dealing with by-products, while the HGSF produced no significant results for this outcome (Prifti and Grinspun, 2019).

The analysis also looks at farmers’ involvement in **livestock markets** in terms of spread and sale revenues. The most traded animals are goats and chickens. Between 10 and 23 percent of farmers sold small ruminants in the 12 months preceding the surveys (Prifti and Grinspun, 2019). CASU increased the beneficiaries’ market engagement, as they sold more cows, goats and chickens. The HGSF programme is associated mainly with a reduction in the sale of animals. The largest sales reductions are for cattle and pigs, which dropped to zero. In the combined group, there are mixed signals on market engagement, with cows trade increasing and goats being sold less. In terms of **total revenues from livestock sales**, the CASU programme is associated with a significant increase of revenues, while there was a reduction in the HGSF arm. The findings on livestock sales are in line with the impacts of the programmes on livestock production, which expanded under CASU and contracted under HGSF. The combined arm is half way between the positive impacts of the CASU and the negative impacts of the HGSF, showing no significant impacts in terms of revenues from livestock sales.

5.1.3. Total income

This section focuses on **gross income**, defined as the sum of the market value of all crops, the income from wage labor and the revenues from sales of livestock and livestock by-products, as well as sales from non-farm businesses (NFB). This indicator, which considers the parts of income from the various sub-sectors that are gross of production costs, is only a measure of the volume of economic activity, instead of net monetized profits that can actually be used to sustain consumption or investments.

The quantitative study found that the HGSF programme led to a reduction in gross income of 40 percent (Prifti and Grinspun, 2019). The decrease can be attributed to the negative effects of the programme on livestock income and on wage income. The impact on total income is confirmed to some degree by the qualitative study, reflected in one interviewed farmer who affirms that “*harvest is more, they are selling more, but the purchasing power of the money is less*”. However, for the most part, the qualitative study cites farmers’ perceptions of increased income thanks to the HGSF and increased spending capacity for food. With respect to the reduction in wage income, the qualitative study found that farmers in co-ops

selling to WFP reduced the amount of piecework they used to do themselves on others' farms in order to work on their own farms. This was largely because they no longer needed immediate cash and could now actually hire others in on their own farms. The increased demand for labor is testified by another farmer, who says:

"I never needed help, but due to increase on my field, I now need to hire labor, but labor is becoming short in supply" (Nesbitt-Ahmed and Pozarny, 2019).

CASU had no statistically significant impact on gross income, but it did lead to an increase in livestock income. The combined treatment increased gross income by around 43 percent, driven mostly by the crop sector and non-farm business sales. The qualitative study found that there was also an increase in ownership of small businesses (groceries, taxis for hire, etc.). Overall, there was a perception of an increase in gross income¹⁰ due in part to the improved production from CASU interventions, as well as from new income generating activities. While HGSF provided a new source of income through the sale of cowpeas, this was only to a limited extent as very few households engaged in the P4P intervention. The qualitative study also highlights a reduction in piecework that farmers do themselves on others' farms, accompanied by a reduction in the time spent on their own farms. As explained during a KII with the Co-op inspector at Ministry of Commerce,

"CASU came in with introduction of herbicide, which reduced labor [requirements]. So, no more weeding needed. And ploughing which was so tiring was substituted for reaping" (Nesbitt-Ahmed and Pozarny, 2019).

A household's **non-food expenditures** are a good proxy of its spending capacity and well-being. CASU was associated with a substantial increase in total non-food expenditure. The specific items on which CASU farmers spent more include children's clothing, charcoal, public transport, oil for transportation vehicles and mobile phone top-ups. HGSF, in turn, was associated with reduced non-food spending. HGSF farmers reduced spending on charcoal, mobile phone top-ups and public transportation, while the combined treatment had no significant impact on total non-food spending.

5.1.3. Operational aspects

The qualitative study brought to light several important elements related to the operational aspects of the HGSF and its combination with the CASU. The major finding in the HGSF sites was that, due to the low quality of farmers' produce and weak aggregation capacity in the co-operatives, not all legumes produced were sold to WFP. Moreover, due to WFP delays, they were often sold to other buyers at a lower price than set by WFP. Participants in the FGDs with female farmers in Chungu Block, Mufili camp felt "the process was okay, price was good, and it encouraged farmers". Male farmers in the same Block

¹⁰ Gross income is the sum of the market value of all crops, the income from wage labour and the revenues from sales of livestock and livestock by-products as well as sales from non-farm businesses.

were fine with the prices, but felt that “distances to some places where they were getting the beans were far” (Nesbitt-Ahmed and Pozarny, 2019).

The qualitative study provides details on the requirements that co-operatives had to meet in order to participate in the district:

“They needed to have at least a shed and warehouse. Some were involved in Frontier Development Project and already trained in marketing and bulk management. They needed to have members and business activity and 50 percent of farmers in the co-op should be into cowpeas growing and have annual meetings, and have a minimum of K10,000 in their account to ensure they can pay the underprivileged members in their account (elderly and orphans) when they start aggregating. So, if vulnerable farmers bring 1 kg at aggregator’s centers, and can’t wait for 7-21 days to be paid, they get paid instantly” (Nesbitt-Ahmed and Pozarny, 2019)

The most significant reasons for defaulting on contracted quantities were linked to suppliers’ capacity. This included side-selling, linked to price increases between the signature and delivery of the contract, low aggregation capacity closely tied to limited trust within farmers’ organizations, and lack of appropriate post-harvest handling storage and equipment. Poor quality of beans produced was an additional reason for defaults on contracts.

Another challenge was described by one key informant from the CASU programme as an “issue of marketing”, of timely communication and implementation on HGFS’s side. In Katete, it was explained, WFP provided CASU programme staff some information (“their model of aggregation was clear [and] the prices and requirements for crops and quantities... [but] when they were buying from the programme” was not clear. Farmers also explained that, due to poor quality or moisture content, their produce was often turned down by the independent contractor after inspection, which often meant not being paid for their produce. Storage would have to be used by co-ops when WFP delayed their collection of produce. This meant that farmers needed to pay for the storage space for their produce and also had to pay for pesticides. A few farmers complained about the distance from their farms to the collection points, and the resulting transportation costs they had to bear to get their often bulky produce to the bulking points, warehouse and storage facilities.

There were also challenges to the implementation process by WFP. For example, during an FGD in Chulungoma block, Kapisha camp, farmers explained that they once had to wait four months for WFP to arrive. With time, their “beans started rotting and we had to throw most of the beans away”. In cases of severe delays, farmers in other FGDs explained that they would also aim to sell their produce elsewhere at a lower price (Nesbitt-Ahmed and Pozarny, 2019).

In the combined HSGF and CASU sites, some informants reported that there did not seem to be a deliberate link between the two programmes. According to a former camp extension officer in Eastern Block, Kamphambe camp, “administratively there was no link between CASU and HGSF, but I presume at a higher level there was a link as they both promoted legumes.” Moreover, not all CASU farmers were in HGSF. Key informant interviews with HSGF and CASU programme staff at the national level provide

further insight into the implementation challenges required to link the two programmes. During a KII with CASU programme staff in Lusaka, it was discussed that there was great potential for linking the two programmes, particularly in the beginning, as “the ideas were matching: CASU does production and WFP does marketing”. This echoes similar sentiments expressed during district level FGDs in Katete, where it was explained that after one year of CASU implementation, farmers had a challenge with finding a market for cowpeas, which points to potential complementarities with WFP purchases. Once WFP’s P4P started, CASU sensitized the farmers about the fact that WFP was in town (through camp officers).

Over time, however, “things fell apart”, according to a key informant for CASU. This breakdown was attributed to the fact that the programmes were not “married by design in the beginning”, which led to a push to “make it work and co-exist ... search[ing] for these overlaps.” An example was given around the selection of farmers, as “CASU’s selection with beneficiaries had nothing to do with HGSF selection criteria”. This may help explain why not all CASU farmers were members of co-operatives that sold legumes to WFP. In short, the qualitative study provides ample evidence of missed opportunities to increase farmer incomes and livelihoods through more intentionally combined programmes (Nesbitt-Ahmed and Pozarny, 2019).

5.2 Welfare outcomes

The other major area of inquiry focused on the impact of HGSF, CASU and their combination on schooling and food security. In figure 6, quantitative impacts for each programme are shown for a selected group of welfare outcomes. The highlight from the quantitative study is that the provision of meals led to an improvement of school attendance and dietary diversity among children, but when the HGSF is evaluated as a whole, including its public procurement component, these positive effects vanish or become negative. The findings on food security, however, are not confirmed by the qualitative study, which found that households in the areas under HGSF were consuming more and better food. In turn, CASU led to positive impacts on dietary diversity and did not affect educational outcomes, which is an encouraging result for a productive intervention. The combination of programmes had negative impacts on attendance and dietary diversity, whereas the qualitative study suggests that there were improvements in the diet of households. These seemingly contradictory findings are reconciled below (Prifti and Grinspun, 2019).

The null or negative or impacts of the HGSF could be the result of the way in which its components interact, which could lead to trade-offs instead of complementarities on certain outcomes. The lack of inter-programme coherence could also be the reason for the negative effects on schooling and food security of the combination of HGSF and CASU. Several explanations for these results are given in the discussion section at the end of this report.

5.2.1. Food security

Dietary diversity is a measure of food consumption that reflects household access to a variety of foods and is also a proxy for the nutrient adequacy of the diet of individuals (FAO, 2011). The analysis will focus on the children's and the women's dietary diversity score (CDDS and WDDS, respectively), first by looking into the effects of the provision of school meals and then of the HGSF as a whole, the CASU and their combination. Meals have a positive impact on child dietary diversity. Although school meals are not supposed to directly affect the diet adequacy of women, they may lead to more food being available at home for other family members. The WDDS shows that one in every four women has a sufficiently adequate diet and that the meals improve their dietary diversity.

The quantitative study found that the HGSF had a negative impact on children's dietary diversity. This contrasts with the positive impact of the provision of school meals on the same indicator, pointing to a possible detrimental impact of the public food procurement component of the HGSF programme. CASU, as well as its combination with the HGSF, strongly improve children's dietary diversity. A similar pattern is observed for WDDS, with the HGSF reducing women's dietary diversity and CASU and the combination improving it. The fact that households that only participate in the HGSF experience negative impacts on food security, which nonetheless turn positive when also given access to the CASU, suggests the existence of possible complementarities in the production domain between the two programmes (Prifti and Grinspun, 2019).

The Food Insecurity Experience Scale (FIES) is designed to capture the severity of **food insecurity** at the household level on a scale ranging from 0 to 8. CASU is associated with reductions of food insecurity across all severity levels. HGSF, by contrast, worsened food insecurity in the household. The combination of both programmes mostly had no impact. Here too, the combination of the programmes made it possible to soften the negative impacts of the HGSF on food security, possibly by triggering some productive complementarities between the two.

The findings of the qualitative study diverged somehow from those of the quantitative impacts for the HGSF group. The study found that in the HGSF sites, dietary patterns were perceived to have improved, in quantity and quality, with households eating up to three, and sometimes four times a day. As mentioned during an FGD with women farmers in Chulungoma Block, Kapisha Camp,

"Now they don't eat only beans, beans, beans alone and every day, as there's also more variety in their diet" (Nesbitt-Ahmed and Pozarny, 2019)

People explained how in the past, they would have two meals, while now they were able to afford breakfast too. Again, the apparent misalignment can be attributed to the different ways in which the quantitative and qualitative studies define change. In the quantitative study, the negative impact would indicate a smaller improvement in the HGSF group relative to the comparison group, where different production and market arrangements existed due to the absence of the HGSF's purchasing programme. For the combined group, the qualitative findings are in line with the quantitative impacts. In fact, during FGDs, farmers mentioned a change over the course of engaging in HGSF and CASU from eating once or twice a day to three or four times a day. Dietary diversity was also reported to have improved, as

farmers went from eating only *nshima* and pumpkin leaves to now having porridge, buns, tea with sugar for breakfast, and lunch and supper consisting of *nshima* with beans, tomatoes, meat, and chicken.

CASU did not have a significant influence on **food consumption expenditure**. In the case of the HGSF, there was a reduction in total food expenditure, caused by less spending for legumes and meat, probably due to increased consumption from home production. In turn, there was a reduction in total food expenditure in the combined group, driven by reductions in the consumption of fish, oil and fats. The qualitative findings for HGSF sites indicate that HGSF co-op leaders were now able to buy meat, fish and eggs, indicating an increase in food expenditure. Similarly, a KII with a community health worker in the same site noted that farmers were now able to buy fish, cooking oil, sugar, rice and other items (clothes, soap shoes). In areas under the combined treatment, however, opinion leaders explained that farmers spent less for items they grow in their own farm and more for the rest, such as fish, milk, salt and sugar.

Again, the reason behind the seemingly ambiguous findings could be that the qualitative study captures a secular trend of general improvement over time across the country (as suggested by the fact that the same direction of change is found in both HGSF and combination sites), while the quantitative study measures effects as the difference, at a given point in time, between what is happening to a group under a given treatment and what would have happened to the same people without the treatment (proxied by the comparison group). This is, however, only a conjecture since only baseline data would have provided the necessary basis to confirm this interpretation.

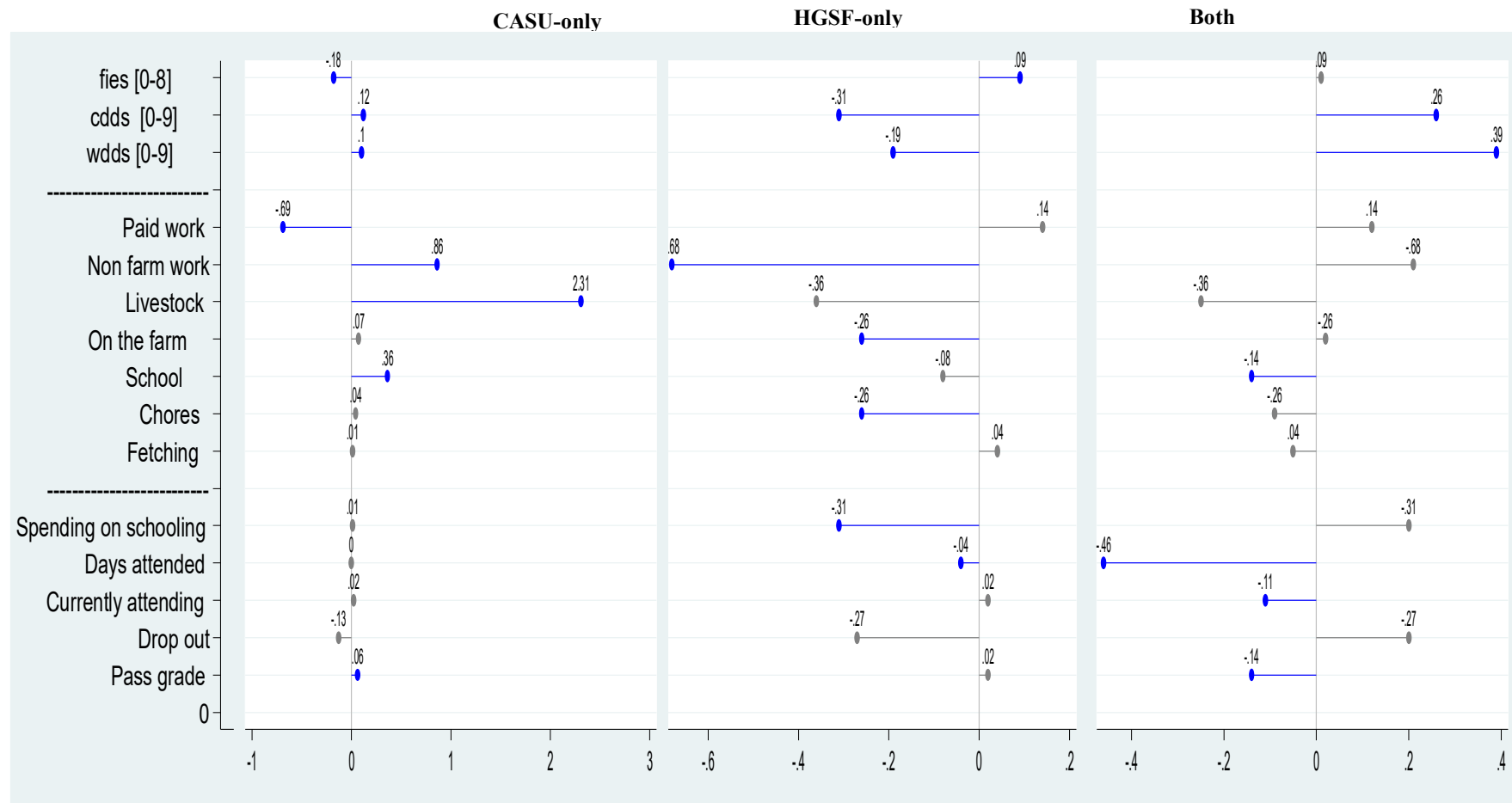
5.2.2. Schooling

Following the same approach as with the food security and nutritional outcomes, the report first presents the impact of the provision of meals and then of the three treatment arms on schooling outcomes. It is thus possible to observe that providing meals to primary school children increased the share of those attending and reduced further the already low drop-out rate. By stimulating attendance, meals are also associated with a higher share of literate children (Prifti and Grinspun, 2019).

The CASU programme alone appears to have no significant impact on schooling outcomes, except that the share of those passing the grade increases by a small amount. By contrast, HGSF is associated with a sizable reduction in educational expenditure, while the reductions in the number of days attended in the last two weeks and in the share of literate children are statistically significant, but of very small magnitude. The combination of treatments has particularly significant and negative impacts on schooling indicators. The share of children passing to the next grade from the previous year reduces, and so does the share of those currently attending and the number of days attended in the last two weeks. The combined treatment does not cause any reductions in educational expenditure.

From a programme coherence perspective, the positive effects of providing meals are nullified when considered under the umbrella of the HGSF, meant as a combination of meals and access to the local purchasing component. This implies that there must be some sort of trade-off in the way these two components interacted with each other in their ability to affect schooling.

Figure 6: Summary of quantitative impact estimates on welfare outcomes



Note: Blue (grey) bars indicate statistically (in)significant impacts. The upper panel refers to food security indicators (C/WDDS=Children/Women Dietary Diversity Score, FIES=Food Insecurity Experience Scale). The middle panel refers to children's time use. The lower panel shows educational indicators

Similarly, the fact that the combination of CASU and HGFS appears to be detrimental to educational outcomes, while each programme separately has basically no impacts in this domain, highlights the possible existence of trade-offs. The qualitative study did not investigate educational outcomes. The report will later consider several hypotheses for the mechanisms that could be at play in connection with the seemingly conflicting interplay of the two programmes in relation to schooling outcomes.

The impacts on some school indicators, especially those related to the time spent by children at school, can be better understood if interpreted against the backdrop of each programme's impacts on children's time use. CASU is associated with increased time spent on school-related activities, but also with more time dedicated to livestock herding and to work in NFBs. This time, in turn, is compensated for by a reduction in the part of the day dedicated to paid work outside of the farm. The HGFS programme discourages the use of children's time in household chores, own farm work and NFBs, but has no effect on the time dedicated to school-related activities. Finally, the combined treatment seems to reduce by one half-hour the time dedicated to school activities.

5.3 Impacts at scale

The aim of the microsimulation is to explore the distributional impacts of the HGFS programme jointly with the CASU project (Kangasniemi, 2019). The programmes had different goals but, due to complementarities or conflicting interplay between certain elements of the programmes, there is a possibility of either reaping significant synergies or suffering the consequences of trade-offs.

The microsimulation was based on both the data collected for the impact evaluation and two nationally representative data sets.

The evaluation data allowed estimation of the average impact of the programme on the beneficiaries, but they are not nationally representative and do not provide a full picture of the incidence and distributional consequences of interventions. Neither do they, due to their highly limited coverage, allow for exploring the implications of a scale-up of the interventions. This analysis set out to explore such effects, by combining microsimulation with impact evaluation methods.

School feeding, institutional procurement and CA are likely to benefit different groups of the population. Therefore, their impacts on poverty and income inequality are not known *a priori*; they depend on both selection into the programmes and the impact they may have on their beneficiaries. The magnitude of impacts at the population level also depends on the scale of the programmes.

The aim of this study was to disentangle the aggregate distributional impacts of the programmes by using microsimulation, a methodology used for estimating the outcomes on selected variables of interest, resulting from a projected or hypothetical change in key parameters of a policy or programme intervention for each agent separately (individuals or households, for example). Microsimulation also allows for generating multiple *what-if* scenarios, where the aim is to compare the real outcomes to those that would have occurred under different conditions.

For CASU's productive support and the HGFS's local purchases programme, the method involves first estimating a model of selection into the programmes and their impact on household gross income from the evaluation data. The model of programme participation is then applied to the nationally representative Rural Agricultural Livelihoods Survey (RALS), capping the number of participants by districts to the number of beneficiaries set by the programmes. The estimated impacts are then added to the simulated beneficiary households' gross income, and the subsequent distributional impacts are explored.

The results show that before the intervention, programme participants are generally less poor than those not participating in programmes, but the levels of poverty and extreme poverty are still significant. CASU decreases poverty and extreme poverty and slightly reduces income inequality, despite the fact that it did not target farmers with the lowest income and landholdings. As shown by the impact evaluation study (Prifti & Grinspun, 2019), the market access scheme of the HGFS has a slightly negative impact on gross household income, but its impact on overall poverty is small due to its small scale. The joint impact of both programmes is poverty-reducing.

In terms of overall income distribution, CASU and HGFS have a slightly equalizing effect. The benefits (and also losses, due to the market access programme) are spread across the entire income distribution. This supports the observation that the programmes target neither the poor nor large-scale farmers, but smallholders generally. In fact, the poorest are to some extent excluded, likely due to their land constraints or inability to, for example, join a cooperative because of lack of resources.

Microsimulation of the school meals component of HGFS is based on the 2010 and 2015 Living Conditions Monitoring Surveys. The analysis consists of first estimating a model of school attendance as a function of household demographic and economic characteristics, and then generating scenarios with different coverage of school feeding. The analysis is limited to the rural strata; school attendance in urban areas is already high and the impacts found were relatively mild. The simulation results show that if school feeding were scaled up to reach universal coverage, it would increase school attendance rates by 4.7 percentage points, on average, as compared with a scenario with no school feeding.

Compared with the current situation, universal school feeding would increase attendance by 1.8 percentage points. The difference between the no-feeding and universal feeding scenarios is larger for females, though not significantly, and larger for the medium, large and non-agricultural households than for small farm households. The value of the food transfer and subsequently the direct effects on poverty are relatively small. However, for the children in the bottom consumption percentiles, the transfer represents a relatively large share of their estimated food consumption, especially if the food is completely allocated to the child. The potential relative gain in food consumption from universal attendance, compared with the attendance levels in the scenario of universal feeding, is much larger for the poorest children.

6. Conclusion and recommendations

This study sheds light on the benefits of synergies that may accrue from increasing coherence between social protection and agricultural programmes aimed at the same population. Overall, the study found that each programme or programme component fulfilled its own stated objectives, but also highlights the need for action to improve coherence within and between programmes.

CASU meets its own objectives of stimulating adoption of conservation technologies, and thereby boosting farm income and improving the food security situation in the household, without altering schooling outcomes. Harvests increased for virtually all crops (except beans) and there is also robust evidence of increased livestock accumulation and production of livestock by-products. CASU also raised revenues from crop sales and market participation of beneficiaries. In terms of food security and nutrition, the CASU programme is associated with improved children's and women's dietary diversity, as well as consumption – both from purchases and from own production – of maize and other crops. There were no impacts on school attendance and drop out.

The provision of school meals by the HGSF programme met the objective of improving the dietary diversity of school-going children and further contributed to attracting and keeping them in school. The improvements in food security and educational outcomes induced by the school meals, besides being sizable for the average beneficiary, concern the vast majority of children in a district and have the potential to trigger long-term development processes through human capital development, specifically in health and education.

HGSF also met its strictly defined objectives of creating a market for legumes and increasing revenues from these crops, given an increase in their production and sales. However, if the analysis broadens to gauge the HGSF's impacts on the farm-household economy as a whole, the evidence suggests that the stimulus for increased beans production came with a number of unintended consequences. HGSF increased the share of beans growers and sellers as well as revenues from sales of beans. This positive outcome, however, was accompanied by a smaller number of farmers growing maize and a drop in the average amount of harvested maize. The harvest of other crops also declined. The HGSF programme reduced herd size and the share of farmers owning livestock. Gross income dropped too, mainly as a result of a reduction in livestock and wage income.

Hence, restricting attention to the domain of farm production, this pattern of results suggests that the HGSF programme must have induced a reallocation of resources within the farm economy. The extra demand for pulses may have provided an incentive to farmers to reallocate land, labor and other resources from livestock to crops, and from the production of maize to the production of beans. The revenue forgone by moving away from other crops and livestock was not compensated for by the increase in beans revenues, as shown by the reduction in total gross income. This forces the question of why HGSF farmers were persistently privileging beans in their crop and livelihood choices. One possible

reason could be that farmers were prioritizing safer but lower income from P4P beans purchases, although maize also had a safe market through the Food Reserve Agency.

HGSF decreased dietary diversity (for both women and children) and increased household food insecurity.¹¹ It had no effects on drop-out rates or school attendance among primary-school children. These findings lend additional support to the idea that the local purchase of legumes through P4P may have had unintended detrimental impacts, which neutralized the positive effects of the meals on food security, diets and education. One explanation may relate to the reduction in total gross income experienced by HGSF households and to the related reductions in food expenditure and educational expenditure.

One key question that clearly emerges is whether the farm households targeted by the HGSF programme were in a position to adequately respond to the demand stimulus from HGSF's public food procurement, without sacrificing other sectors of farm production (e.g. other crops, livestock activities) or compromising their own welfare (e.g. food security, schooling). They could be facing several supply-side constraints including limited access to land, variable inputs, technology and knowledge; limited market information; and limited liquidity. Our evidence shows that HGSF farmers did not increase the use of land. Instead, land was merely reallocated from maize and other crops to beans production.

If the land constraint cannot be relieved and farmers have no choice but to reallocate resources, there are two ways to ensure that the increased revenues from beans sales more than compensate for the forgone earnings from maize. This may occur by increasing either or both elements that determine beans revenues: quantities produced and sold or prices. Given the land constraint, an increase in beans production that compensates the farmer for a reduction in maize production necessarily implies an increase in beans yield through increased use of fertilizers or more capital-intensive and labor-saving technologies.¹²

The second way to increase beans revenues to compensate for the reduction in earnings from the sale of maize would require the HGSF programme to offer higher prices to farmers for beans. In Zambia, maize yields in terms of output per hectare are four times as large as bean yields; however, the price for beans offered to farmers by P4P was not four times as large as the price for maize. The price of maize in

¹¹ In some instances, the qualitative assessment did not confirm or corroborate the findings of the quantitative study. However, farmers often attributed their luck not directly to HGSF, but rather the support they got from other development agents and programmes.

¹² Here we focus discussion on maize, which is by and large the most important crop for Zambian farmers, but the argument applies to all crops that suffered a reduction in their relative importance in the crop portfolio due to the incentives to produce more beans.

the control areas was statistically higher than in HGSF areas, by a factor of 2. The Central Statistical Office data confirm higher inflation (6.7 percent) in control areas relative to HGSF areas (3.3 percent).

Both of these fixes assume that farmers are able to sell the desired amount of produce to WFP at the convened price. However, the qualitative study found that some farmers were not able to sell the desired amount to WFP because the produce did not meet the quality standards to start with or deteriorated in the warehouse, due to inadequate storage conditions or prolonged storage times related to alleged WFP's delays. As a result, part of the produce was sold through alternative channels at lower prices than those offered by HGSF, because of the lower quality or the prevailing price at that point in time.

In terms of the intrinsic coherence of the HGSF programme, it is important to highlight that smallholders are farm households, whose production, consumption and welfare decisions are interdependent. Choices made in one domain affect the others. This is why it is possible to see negative impacts on HGSF households' welfare and consumption, due to changes in their production decisions induced by the programme's local procurement of legumes.

The combination of the HGSF and CASU programmes had positive impacts on a wide number of farming and food security outcomes.¹³ In particular, combining the CA training and productive support with the HGSF programme led to increased crop production and sales. For some crops, the improvements were larger than from CASU alone, hinting at possible synergic effects of the combined programmes. The beneficiaries of the combined treatment accumulated more livestock and produced more livestock by-products – sometimes more than those in the CASU-only arm. Farm households in the combined HGSF and CASU arm had higher revenues from crop sales than households in either standalone programme treatment. As a result, total gross income also increased considerably more in the combined group relative to the CASU group.

The study also found evidence of increased adoption of CA techniques in the combined group, to a larger extent than among CASU-only farmers. The evidence that the effects from the combined treatment were better than in either standalone programme is proof of synergies taking place for specific outcomes. CASU farmers had higher incentives to adopt the CA techniques and produce more thanks to their access to the HGSF's public purchasing and, conversely, meeting the HGSF's demand was easier with the productive support coming from CASU. In the food security domain, while the HGSF alone had mixed effects, effects often turned positive when combined with CASU.

With regard to education, the combination of the HGSF and CASU programmes produced negative impacts for primary school-aged children. The study found no evidence of increased children's work

¹³ Here, too, when we refer to impacts in the production domain of HGSF, we are referring to its food procurement component, as this is the one that has a direct effect on production, while the school meals do not.

involvement or reduced spending on schooling. The negative impacts on schooling should not be attributed to the programme's effects on the productive domain, where income increased and cross-programme synergies occurred. Other mechanisms might be at work related to how programme-induced incentives to pursue production and welfare objectives affect each other within the household. Intra-household bargaining power, for instance, could play a role in the way income is spent. When women have more control over income, they are more likely to spend it on improving their children's schooling and feeding (Idrissu *et al.*, 2017). The study, in fact, shows some evidence that women's decision-making power was significantly lower in the combined group relative to the rest of the population.

6.1. Recommendations

The findings suggest that in deciding the beneficiaries of the HGSF's purchases, planners should target smallholders who are already producing a surplus in the required crops or who have the productive potential to increase production necessary to meet the extra demand. If farmers with limited capacity are chosen as the target population, supply side constraints should be taken into account at the planning stage of the programme. If not properly addressed, these constraints may lead to inefficient resource reallocation within the farm economy and, consequently, to detrimental welfare impacts, for instance in terms of food security and schooling (Galli *et al.*, 2015).

Complementary interventions aimed at either easing or circumventing supply constraints could yield benefits from selling produce to HGSF that outweigh the actual or opportunity costs for the farmers participating in the programme. These support interventions can be built into the HGSF programme or result from combining HGSF with other livelihood support interventions, such as the CASU project or other agricultural programmes currently operating in Zambia. Such measures could include:

- Easing access to land, to allow farmers to allocate more of it and other resources to meet the extra demand from HGSF, without having to reduce the land dedicated to the production of maize and other crops;
- Linking the HGSF programme to complementary productive interventions, e.g. the provision of inputs such as seeds and tools, training on farming, food conservation and marketing techniques, subsidized fertilizers or use of mechanized tools, provision of insurance or access to cash grants;
- Offering a higher purchasing price, which speaks to the need to improve implementation aspects and fine tune the timing when P4P collects the produce; and
- Strengthening the inner coherence of the HGSF programme.

A crucial implication of this case study is that productive support from the P4P intervention and the school meals offered by HGSF should not operate in isolation. Rather, both programme components need to be thoroughly coordinated, so that they do not neutralize each other's effects on certain critical outcomes.

In terms of its operations, HGSF implementers should make sure that the farmers have what they need (pesticides and purchasing capacity) to safely store the produce for the necessary storage time. Further,

the alleged delays in collecting the produce have to be addressed by stating in advance the time of collection, which would give both sides the opportunity to plan ahead. Mechanisms could also be put in place to compensate parties for losses incurred due to their counterpart's inability to comply with one or more elements agreed in the contract.

Considering that farmers often struggle to meet the quality and quantity requirements of public food procurement, they are bound to need specific additional support. One example relates to the physical infrastructure constraints experienced by co-operatives and farmers, including supplying the bags that farmers use for their initial harvest to transport to aggregation centers. Another example involves the transportation costs borne by farmers to collection points, some of which were too distant, and the provision of assistance for storage costs to prevent excessive moisture, infestation and rot as a result of delays by WFP. Other measures could include:

- Addressing payment delays so that the timing of collection consistently aligns with and takes into consideration the harvest season, to ensure that farmers do not sell their produce to traders at lower prices. This may be done through agreements between co-operatives and programme implementers "with conditions" for defaults or delays; and
- Addressing the timing of payments through part payment to farmers upon signature, which should facilitate aggregation and address the uncertainty and risk of price volatility while farmers await full payment, as well as the quality standards that farmers must meet, which imply additional costs and effort.

Several measures can be taken to balance out the incentives, improve cross-programme coherence and reduce the unintended detrimental effects on schooling when combining programmes like HGSP and CASU:

- Women's empowerment and contributions to decision-making in the household can go some way towards curbing some of the unintended negative impacts of the combination of both programmes on education. Increasing women's role in both CASU and HGSP might lead to stronger female control over income and resources, which increases the chances that the extra money will be spent on food and education.
- Introducing soft conditionalities, for instance in the form of messaging aimed at promoting school attendance.

In general, increased coherence between programmes targeted at the same households is required to make sure they reinforce each other's effects or mitigate unintended negative impacts on key outcomes. Programme coherence requires *intention*. This is greatly facilitated when there is multi-stakeholder engagement, and concrete measures are put in place to strengthen coordination and articulation from planning to implementation. This implies that:

- Multisectoral arrangements and planning are necessary to enhance coherence and articulation in programme design and implementation, and hence the impact of synergies between social protection and agricultural interventions. This includes making sure that market access programmes,

such as P4P, provide better communication and support to farmers and co-operatives, to enable them to meet the output targets set in the contracts.

- Use of a common registry of beneficiaries, or increased inter-operability between registries in case every programme sets up its own, is recommended for targeting purposes.
- Agreements to have two complementary programmes have to be followed up by constant efforts to maintain a permanent communication flow and active collaboration between the staff of the programmes, within technical committees or other similar arrangements throughout their duration.

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FAO, together with its partners, is generating evidence on the impacts of coordinated agricultural and social protection interventions and is using this to provide related policy, programming and capacity development support to governments and other actors.

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