

**P4P** Global Learning Series



# Impact Assessment Report: Ethiopia

March 2014



**P4P** Purchase for Progress

# The Impact of P4P on FOs and Smallholder Farmers in Ethiopia

March 2014

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## ACRONYMS

CU	Cooperative Union
DiD	Difference in Differences
FO	Farmers' Organization
ha	hectares
LRP	Local and Regional Procurement
mt	metric tonnes
NFRA	National Food Reserve Agency
P4P	Purchase for Progress
PC	Primary Cooperative
USD	United States Dollars
WFP	World Food Programme

# EXECUTIVE SUMMARY

The World Food Programme's (WFP) five-year Purchase for Progress (P4P) pilot initiative tests innovative approaches for linking some of the world's poorest farmers to formal commodity markets. If successful, P4P will transform smallholder low-income farmers from subsistence farming to business-oriented producers capable of delivering consistent surpluses to private sector buyers, government institutions, and international organizations. Remunerative participation in commodity markets should provide smallholder farmers the incentive and the means to invest in agricultural production thereby increasing their incomes and improving their wellbeing.

To accomplish this goal, WFP has committed about ten percent of its local and regional procurement (LRP) in 20 countries<sup>1</sup> to testing alternative approaches for procuring in a manner that more directly benefits smallholder low-income farmers. This commitment represents a substantial demand. In 2012, WFP purchased almost a half-million mt of food from the 20 pilot countries, transferring almost USD 204 million into the local economies.<sup>2</sup>

Each of the 20 P4P pilot countries developed its own strategy for engaging with smallholder farmers, taking into account the local environment, opportunities, and constraints. Building the capacities of smallholder farmers' organizations (FOs) to be active market participants lies at the center of all the strategies and WFP buys directly from FOs in almost all the countries. When the opportunities existed, some countries overlaid supporting structured market platforms (commodity exchanges and warehouse receipt systems), small and medium traders, and food processors onto the basic FO-centric model.

The P4P hypothesis describes a development progression that begins with building the capacities of FOs to aggregate commodities, add value (e.g., achieve WFP quality standards), and identify and sustainably access markets. To gain these capacities, FOs will necessarily need to engage their members; providing them with technical and financial services to support production and marketing, building trust and ownership, and promoting a business-oriented approach to farming. The progress individual countries are able to make along this progression will depend on the baseline capacities they find among FOs and smallholder farmers, the approach they take to capacity building, and characteristics of the enabling environment (e.g., partner support and policy).

## P4P in Ethiopia

Ethiopia buys from relatively high capacity Cooperative Unions (CUs), second tier FOs with Primary Cooperatives (PCs) as members. WFP directs its capacity building support to the CUs with the expectation that the stimulus provided at the CU level will indirectly build the capacities of member PCs and the smallholder farmer members of the PCs. WFP also buys from small-scale traders in Addis Ababa who provide a critical market outlet for smallholder farmers and strengthened the management and marketing capacities of traders' associations.

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<sup>1</sup> Afghanistan, Burkina Faso, Democratic Republic of Congo, El Salvador, Ethiopia, Ghana, Guatemala, Honduras, Kenya, Liberia, Malawi, Mali, Mozambique, Nicaragua, Rwanda, Sierra Leone, South Sudan, Tanzania, Uganda, and Zambia.

<sup>2</sup> WFP. (2012). Food Procurement Annual Report 2012. Rome. Accessed at <http://documents.wfp.org/stellent/groups/public/documents/communications/wfp255336.pdf>



## Assessing the Impact of P4P

The analysis in this report concludes that, by almost any objective measure, P4P-supported FOs and farmers are substantially better off at the end of the P4P pilot than at the beginning. For example, among the 13 P4P CUs, 70 P4P PCs, and a random sample of 321 of their member farmers from which the country office collected data. For example P4P-supported CUs and PCs are able to offer their members a wider range of value addition, marketing, quality, and production services; received more external assistance to build capacities in post-harvest management, production, and marketing; and substantially increase the quantities of maize they sold (CUs). P4P-supported households are using more productivity-enhancing inputs (certified seed); participating in more productivity training; and have increased their yields of maize and the quantities they produce and sell. Consequently, a range of household welfare indicators including income, assets, livestock value, and the food consumption score have improved substantially.

Trends in FO capacity and household production and welfare, however, do not constitute evidence that the observed changes are caused by participating in P4P. To credibly attribute changes to P4P it is necessary to compare these outcomes to those that *would have occurred had these same FOs and households not participated in P4P*. This report applies appropriate analytical techniques to the data to estimate the causal effects of P4P on key indicators of FO capacity and smallholder farmers' production and marketing of staple commodities and on their household income.

## Data and Methods

The impact assessment analysis for CUs draws largely on the survey data collected from a panel of 13 P4P-supported CUs and 4 non-P4P CUs. The Ethiopia country office collected data from these CUs in 2009, 2012, and 2013. The country office followed the same schedule for collecting data on PCs and followed a panel of 70 P4P and 68 non-P4P PCs. The household analysis draws on surveys of random samples of farmer members of both P4P and non-PCs conducted at the baseline, midpoint, and final periods of the pilot (2009, 2011, and 2013). Accounting for attrition, the panel dataset contains observations for 321 P4P and 278 non-P4P households.

The very small number of observations on CUs precludes involved statistical analysis. The analysis of the causal effect of P4P on CUs therefore uses a simple non-parametric difference-in-differences (DiD) approach that does not control for differences between P4P and non-P4P CUs. The larger number of observations on PCs facilitates a more complex DiD model estimated in a regression framework that does allow for controlling for differences between the two groups. The household impact assessment analysis also uses a DiD approach to estimate the causal effects of participating in P4P on household production, marketing, and welfare indicators. Both analyses rely on comparing outcomes for P4P groups with those of non-P4P groups which represent the counterfactual of not having participated in P4P. All three sets of analysis bolster the analytical results with visual inspection of the data to build a convincing case for causal effects.

## Findings and Conclusions

Ethiopia elected to buy primarily from Cooperative Unions (CUs), second tier FOs with Primary Cooperatives (PCs) as members. WFP and its partners directed all of the P4P-facilitated support to the CUs. Even though partners were assisting the PCs, WFP did not direct capacity building activities at the PC or household level. The results framework thus includes an additional layer to capture the indirect capacity building of PCs that are members of P4P-supported CUs. Results at the PC level may be very different than

at the CU level because the WFP stimulus is diluted (i.e., spread out in an unpredictable way among all the PCs that are members of a CU) and not linked to direct capacity building support from WFP and its partners.

At least on paper, Ethiopia's CUs and PCs appear to be relatively high capacity organizations. Fifty-four percent of P4P CUs and 50 percent of non-P4P CUs reported having sold maize in the two years prior to P4P. Similarly, 62 percent and 75 percent of P4P and non-P4P PCs, respectively, reported previous experience selling maize. P4P-supported CUs reported selling an average of 1,261 mt of maize in 2009, the baseline year for P4P and P4P-supported PCs reported selling an average of 187 mt. Sixty-nine percent of P4P CUs and 90 percent of P4P PCs reported having access to storage suitable for maintaining quality for the long-term.

All 13 of the P4P-supported CUs reported having access to storage at the time of the 2009 baseline and 8 owned their facilities. Average storage capacity accessible at baseline was 2,819 mt and average capacity of owned storage (for CUs that owned their warehouses) was 2,561 mt. The story is similar among PCs; 90 percent reported having access to warehouses in 2009 with an average capacity of 551 mt.

These basic conditions define the "baseline" for achieving the anticipated results laid out in the results framework of Figure 1 and Figure 2. The remainder of this section frames the conclusions in the context of the results framework. It presents results in the sequence in which they are likely to occur; CU capacity, PC capacity, household marketing, household production, and household welfare.

## **Impact of P4P on CU Capacity**

Figure 1 summarizes anticipated results and facilitators of FO (CU or PC) capacity and serves to frame the conclusions presented in this section.

The baseline capacities of CUs suggest that they were relatively capable marketing organizations. Eighty-five percent reported selling some crops in the two years prior to the baseline and average quantities sold ranged from 61 to over 1,000 mt, depending on the crop. As a group, the 13 P4P CUs surveyed reported providing an average of 49 percent of 8 quality-oriented services and 69 percent of 3 marketing services. Over 75 percent reported having access to credit and more than 50 percent reported being able to provide financing to their PC members.

Prior (to P4P) external assistance had focused largely on organizational management (e.g., record keeping, financial management, group management, and business planning). More than 80 percent of CUs reported having received such assistance. Few, (no more than 30 percent) reported receiving other types of assistance (e.g., post-harvest management, production, marketing, inputs, tools, or infrastructure). Some of these results are not surprising perhaps since CUs' members are PCs, not farmers.

These baseline conditions established many of the facilitating factors necessary to support organizational capacity building. The other crucial facilitator is WFP's procurement stimulus. By the end of the pilot, WFP had registered 31 CUs as WFP suppliers. Of the 21 CUs WFP registered as vendors at the start of the pilot, it purchased from 4 (19 percent) in only one year, 6 (28 percent) in two separate years, 8 (38 percent) in three years, and 1 (5 percent) in four years. The size of individual contracts ranged from 50 mt to 6,500 mt with an overall mean of 1,093 mt. The total quantity contracted per CU (throughout the five-year pilot) ranged from 200 to 14,920 mt with an average of 2,682 mt. WFP appears to have provided a sizeable but andr relatively consistent procurement stimulus in Ethiopia.

FIGURE 1: SUMMARY OF IMPACT OF P4P ON CU CAPACITY

Maize Marketing						
	Results attributable to P4P			Status		
	Indicators			Facilitators		
<b>Organizational capacity</b>	Planning	↑	Significant 23 percentage point impact on percentage of P4P CUs planning for production and marketing.	Infrastructure	+	69 percent of CUs reported having access to storage facilities
	Services	↑	Significant positive impact on P4P CU's provision of production (29 percentage points), and quality (23 percentage points) services.	Procurement	+	Sizeable and reasonably consistent procurement
	Inputs	→	No significant impact on P4P CUs facilitating members' access to inputs.	Supply-side support	+	Increased supply-side support for post-harvest handling, production, and tools relative to non-P4P FOs
	Training	↑	Significant 85 percentage point impact on percentage of CUs providing production training to members.			
<b>Marketing capacity outcomes</b>	Sales	↑	Significant 902 mt impact on total quantity of maize sold in 2013.	Procurement	+	Sizeable and reasonably consistent procurement
	Market diversity	↑	Significant 23 percentage point impact on the likelihood of selling to buyers other than WFP.	Access to credit	+	77 percent of P4P CUs received loans in 2009 with no change in 2013.
	Financing for members	↑	Significant 81 percentage point impact on likelihood of facilitating post-harvest financing for members.			
	Prices	→	No discernable difference in maize prices between P4P and non-P4P CUs or between sales to WFP and to others.			
<b>Impacts</b>	Sustainable access to value-added staples markets (increasing trajectory of quantities sold, especially to formal buyers; declining dependence on WFP market, established relationship with financial institutions, access to permanent storage facilities of at least 500 mt capacity)					

Legend

- ↑ Statistically significant positive impact attributable to participating in P4P.
- ↓ Statistically significant negative impact attributable to participating in P4P.
- No statistically significant impact associated with participating in P4P.
- +
- Favorable conditions/change.
- Unfavorable conditions/change.

The generally positive facilitating conditions for supporting organizational capacity building contributed to many significant positive changes in organizational capacity indicators that can be attributed to participating in P4P. These include:

- A 15 percentage point increase in the average percentage of 2 value addition services provided to members;
- A 23 percentage point increase in the average percentage of 8 quality services provided to members;
- A 29 percentage point increase in the average percentage of 5 production services provided to members;
- An 85 percentage point increase in the percentage of CUs providing production training to members; and
- A 23 percentage point increase in the percentage of CUs planning for production and marketing.

The facilitating environment for marketing outcomes was generally positive for P4P CUs. WFP's procurement stimulus was sizeable and relatively consistent but the percentage of P4P CUs selling to other buyers increased relative to non-P4P CUs, even though quantities sold were very small relative to quantities sold to WFP. And, although they experienced no significant increase in utilizing credit, most reported utilizing credit so there may have been little room for improvement.

Consequently, marketing capacity outcomes were positive. Those that could be attributed to participating in P4P included:

- An average 902 mt increase in the total quantity of maize sold between 2012 and 2013 relative to what would have happened without P4P;
- A 23 percentage point increase in the percentage of P4P CUs selling to buyers other than WFP relative to what would have happened without P4P; and
- A significant 81 percentage point increase in the percentage of CUs offering post-harvest financing to members relative to what would have happened without P4P.

The P4P CUs already seem to be sustainable marketing organizations and all reported selling to other buyers throughout the P4P pilot.

## **Impact of P4P on PC Capacity**

Impacts at the PC level are indirect. PCs benefit from the WFP procurement stimulus only to the extent that CUs aggregate from a PC to supply WFP. Furthermore, since the surveys represent only a sample of the PCs that are members of P4P CUs, the magnitude and consistency of the stimulus are both diluted.

Figure 2 illustrates that, like the CUs, PCs appear to be relatively capable FOs with many of the facilitating conditions in place to support organizational capacity building. In particular, most (90 percent) reported having access to storage. Eighty-five percent had received external assistance in organizational management and the percentage reporting assistance with post-harvest management, production, and marketing increased markedly during the pilot.

Positive change in facilitating conditions was associated with increased organizational capacity as measured by the selected indicators. Only one, however, was attributable to P4P. In particular:

FIGURE 2: SUMMARY OF IMPACT OF P4P ON PC CAPACITY

Maize Marketing						
		Indicators	Results attributable to P4P		Facilitators	Status
<b>Organizational capacity</b>	Planning	↑	Significant 10 percentage point impact on percentage of P4P PCs planning for production and marketing.		Infrastructure	+ 90 percent of P4P PCs reported access to storage at baseline but trend data are not consistent.
	Services	→	No significant impact on P4P PC's provision of services.		Procurement	+ - Sizeable but inconsistent procurement (from CUs)
	Inputs	→	No significant impact on P4P PCs facilitating members' access to inputs.		Supply-side support	+ Increased supply-side support for post-harvest handling, production, and marketing.
	Training	→	No significant impact on productivity training provided to members relative to non-P4P PCs			
<b>Marketing capacity outcomes</b>	Maize sales	→	No significant impact on quantity sold.		Procurement	+ - Sizeable but inconsistent procurement (from CUs)
	Financing for members	↑	Significant 22 percentage point impact on percentage of P4P PCs facilitating post-harvest financing for members.		Access to credit	+ 54 percent of PCs obtained loans in 2009 and 87 percent in 2013.
	Prices	→	No discernable difference in maize prices between P4P and non-P4P PCs.			
<b>Impacts</b>	Sustainable access to value-added staples markets (increasing trajectory of quantities sold, especially to formal buyers; declining dependence on WFP market, established relationship with financial institutions, access to permanent storage facilities of at least 500 mt capacity)					

Legend

- ↑ Statistically significant positive impact attributable to participating in P4P.
- ↓ Statistically significant negative impact attributable to participating in P4P.
- No statistically significant impact associated with participating in P4P.
- + Favorable conditions/change.
- Unfavorable conditions/change.

- The percentage of P4P PCs planning for production and marketing increased by 10 percentage points relative to what would have happened without P4P – the only change statistically attributable to P4P;
- The average percentage of services offered by PCs increased – value addition services by 7 percentage points, quality services by 11 percentage points, production services by 8 percentage points, and marketing services by 17 percentage points. However, non-P4P PCs registered similar changes so the results are not attributable to P4P.
- Most (78 percent) of P4P PCs reported facilitating members’ access to inputs at the time of the baseline and this percentage increased to 90 percent by 2013.
- P4P PCs registered a 59 percentage point increase in the percentage of PCs providing production training to members but non-P4P PCs experienced similar increases.

Similarly, the facilitating conditions for increased marketing capacity at the PC level were also mostly positive. More than half of P4P PCs (54 percent) reported utilizing credit prior to P4P but the percentage increased to by 23 percentage points to 87 percent by the end of the P4P pilot. This result is not statistically attributable to P4P but did improve the facilitating conditions for improved marketing capacity.

In spite of somewhat improved facilitating conditions, PCs reported few changes in marketing capacity indicators. Consistent with an increase in credit utilization, the percentage of P4P PCs that reported providing post-harvest financing to member farmers increased slightly but significantly during the pilot (from 10 percent to 13 percent). However, P4P PCs reported no significant increase in quantities sold or in prices received for maize.

### **Impact of P4P on Household Maize Marketing**

In the Ethiopia context, capacity building results at the PC level are the most likely to affect households’ marketing and production. Member households experienced little change in the factors facilitating marketing (Figure 3). A slightly larger percentage of P4P PCs (three percent) began offering post-harvest financing. P4P PCs also expanded the percentage of value addition, production, quality, and marketing services they offered (but not significantly relative to non-P4P PCs).

Predictably, these minor improvements in facilitating conditions did not stimulate significant changes in households’ marketing behavior. Specifically:

- The percentage of P4P households that reported selling through the PC at some point during the pilot increased from 18 percent in 2009 to 33 percent in 2013. This result suggests a growing engagement with the PC. However, non-P4P households reported similar growth rates so the result is not statistically attributable to P4P.
- The percentage of P4P households that reported holding some maize for sale more than four weeks after harvest increased from 29 percent to 40 percent. However, the result is not significantly different from changes in behavior among non-P4P households.

Since P4P PCs do not appear to have altered their marketing behavior much in response to P4P, it is no surprise to find no significant marketing outcomes among member households. Household members of P4P PCs reported receiving no higher prices for maize than P4P households, nor did they report selling larger quantities.

FIGURE 3: SUMMARY OF IMPACT OF P4P ON HOUSEHOLD MAIZE MARKETING

Maize Marketing								
	Indicators		Results attributable to P4P		Facilitators		Changes attributable to P4P	
	<b>Behavioral change</b>	Selling through the PC	→	No significant impact of P4P on percentage of households selling through the PC		Quantity sold by PC	→	No significant increase in quantities sold by PCs
Selling more than 4 weeks after harvest		→	No significant impact of P4P on percentage of households selling four weeks or more after harvest		Quality and marketing services available from PC	+	Small increase in access to services through the PC but not attributable to P4P.	
<b>Household marketing outcomes</b>	Prices	→	No significant difference between P4P and non-P4P households in terms of prices received for maize. In fact, non-P4P households reported receiving USD 32/mt more than P4P households in 2013.		Access to credit	→	P4P households were no more likely than non-P4P households to utilize credit for agricultural purposes.	
							Quantity sold by PC	→
					↑	Significant increase in percentage of PCs providing post-harvest financing to members.		

Legend

- ↑ Statistically significant positive impact attributable to participating in P4P.
- ↓ Statistically significant negative impact attributable to participating in P4P.
- No statistically significant impact associated with participating in P4P.
- + Favorable conditions/change.
- Unfavorable conditions/change.

## Impact of P4P on Household Maize Production

The P4P development hypothesis suggests that outcomes in household maize marketing lead to production outcomes. For example, higher prices obtained from selling maize through the PCs are expected to provide the incentive to invest in increasing maize production. In addition to the incentive provided by better access to markets, facilitating factors for maize production include access to inputs and credit to resolve financial constraints to investing in agriculture. Specific changes in production facilitating conditions (documented in Figure 4) include:

- The percentage of P4P households reporting that they had received training in agricultural production practices increased from 78 percent to 98 percent.
- P4P PCs were significantly more likely than non-P4P PCs to report providing post-harvest financing to members. Although the change was significant, however, the percentage of PCs offering financing to their members was very small, 13 percent in 2013.
- The percentage of P4P PCs that reported facilitating access to inputs was high throughout the five-year period of the pilot, never dropping below 70 percent.
- The percentage of P4P households reporting access to subsidized inputs increased from 29 percent to 38 percent.

Given the apparent focus on production technologies and practices, it is not surprising that the only notable change in household production practices was increased use of certified seed. The percentage of P4P households reporting using certified seed increased from 64 percent to 75 percent and the average percentage of all maize seed used that was certified increased from 63 percent to 90 percent. Non-P4P households reported similar changes, however, so these changes in production behavior are not attributable to P4P.

Consistent with the increased use of certified seed, P4P households reported a significant increase in average maize yields – from 1.88 mt/ha to 2.37 mt/ha. This increase was significantly greater than that reported by non-P4P households and is directly attributable to P4P. Given that P4P and non-P4P households' access to and use of productivity-enhancing inputs and training were similar, the difference in growth in yields may be due to the quality of training.



FIGURE 4: SUMMARY OF IMPACT OF P4P ON HOUSEHOLD MAIZE PRODUCTION

Maize Production					
	Anticipated Results		Results attributable to P4P	Facilitators	Changes attributable to P4P
<b>Behavioral change</b>	Planting maize	→	P4P households were no more likely than non-P4P households to change their maize planting behavior.	Access to inputs/credit	→ P4P households were no more likely than non-P4P households to report improved access to inputs or utilizing credit for agricultural purposes. However, P4P PCs were significantly more likely than non-P4P PCs to report providing post-harvest financing to members.
	Area allocated to maize	→	P4P households were no more likely than non-P4P households to change the area they allocated to maize production.	Production training	→ P4P households were no more likely than non-P4P households to report receiving production training.
	Use of inputs	→	P4P households were no more likely than non-P4P households to change their use of certified seed (either to begin using it or to change the percentage they used) or to change their use of fertilizer.		
<b>Intermediate outcomes</b>	Yields	↑	P4P households reported significantly greater growth in yields than non-P4P households between 2011 and 2013.	Access to inputs/credit	→ P4P households were no more likely than non-P4P households to report improved access to inputs or utilizing credit for agricultural purposes. However, P4P PCs were significantly more likely than non-P4P PCs to report providing post-harvest financing to members.
	Quantity produced	→	P4P households were no more likely than non-P4P households to increase the quantity of maize they produced.		
	Quantity sold	→	P4P households were no more likely than non-P4P households to sell larger quantities of maize.		

Legend

- ↑ Statistically significant positive impact attributable to participating in P4P.
- ↓ Statistically significant negative impact attributable to participating in P4P.
- No statistically significant impact associated with participating in P4P.
- + Favorable conditions/change.
- Unfavorable conditions/change.

## Impacts of P4P on Household Welfare

Ultimately, better access to markets and increased production should boost household welfare. However, the well-known difficulties in measuring income and the relatively small change anticipated make it likely that even if P4P “caused” a change in income, it would not be detected through the noise of reporting error (recall) and variability. The analysis therefore also considered alternative measures of changes in welfare where the prospects for detecting change were more promising. These included a summary measure of household assets (the household asset score), an indicator of food security (the food consumption score), the value of household livestock, and characteristics of the households housing (flooring, wall, and roofing materials). Which of these will respond first to changes in income will probably depend to some extent on characteristics of a particular household. For example, a food insecure household may spend additional income on food before investing in housing or livestock.

P4P households were better off in 2013 than in 2009 by almost any measure of welfare.

- Real incomes increased by 46 percent;
- The average household asset score increased by 5 percent;
- The real value of household livestock increased by 42 percent;
- The food consumption score increased by 9 percent; and

However, non-P4P households experienced similar improvements and none of the changes observed with P4P households were significantly different from those experienced by non-P4P households.

# INTRODUCTION

The World Food Programme's (WFP) five-year Purchase for Progress (P4P) pilot initiative tests innovative approaches for linking some of the world's poorest farmers to formal commodity markets. If successful, P4P will transform smallholder low-income farmers from subsistence farming to business-oriented producers capable of delivering consistent surpluses to private sector buyers, government institutions, and international organizations. Remunerative participation in commodity markets should provide smallholder farmers the incentive and the means to invest in agricultural production thereby increasing their incomes and improving their wellbeing.

To accomplish this goal, WFP has committed about ten percent of its local and regional procurement (LRP) in 20 countries<sup>3</sup> to testing alternative approaches for procuring in a manner that more directly benefits smallholder low-income farmers. This commitment represents a substantial demand. In 2012, WFP purchased almost a half-million mt of food from the 20 pilot countries, transferring almost USD 204 million into the local economies.<sup>4</sup>

Each of the 20 P4P pilot countries developed its own strategy for engaging with smallholder farmers, taking into account the local environment, opportunities, and constraints. Building the capacities of smallholder farmers' organizations (FOs) to be active market participants lies at the center of all the strategies and WFP buys directly from FOs in almost all the countries. When the opportunities existed, some countries overlaid supporting structured market platforms (commodity exchanges and warehouse receipt systems), small and medium traders, and food processors onto the basic FO-centric model.

The P4P hypothesis describes a development progression that begins with building the capacities of FOs to aggregate commodities, add value (e.g., achieve WFP quality standards), and identify and sustainably access markets. To gain these capacities, FOs will necessarily need to engage their members; providing them with technical and financial services to support production and marketing, building trust and ownership, and promoting a business-oriented approach to farming. The progress individual countries are able to make along this progression will depend on the baseline capacities they find among FOs and smallholder farmers, the approach they take to capacity building, and characteristics of the enabling environment (e.g., partner support and policy).

Ethiopia's FOs are organized around a three-tier cooperative system comprised of village-level Primary Cooperatives (PCs) as the lowest tier, district-level Cooperative Unions (CUs) that aggregate from PCs and top-tier regional Federations that support the cooperative system but do not typically aggregate or sell commodities. On the recommendation of the Government of Ethiopia, WFP elected to work with CUs with the belief that they had the capacity to aggregate and deliver commodities to WFP standards. WFP's assessment of PCs suggested that most lacked the human, financial, and transportation resources to be able to aggregate and deliver food to WFP.

The assessment mission prior to the start of P4P in Ethiopia identified 14 candidate CUs for inclusion in P4P. WFP and partners visited each candidate CU to determine eligibility and elected to work with all of them. It also included two additional CUs bringing the number of CUs engaged with P4P at the beginning of

<sup>3</sup> Afghanistan, Burkina Faso, Democratic Republic of Congo, El Salvador, Ethiopia, Ghana, Guatemala, Honduras, Kenya, Liberia, Malawi, Mali, Mozambique, Nicaragua, Rwanda, Sierra Leone, South Sudan, Tanzania, Uganda, and Zambia.

<sup>4</sup> WFP. (2012). Food Procurement Annual Report 2012. Rome. Accessed at: <http://documents.wfp.org/stellent/groups/public/documents/communications/wfp255336.pdf>

the pilot to 16. Criteria for selecting CUs included having legal status (in order to enter into contracts), existing or potential access to surplus commodities, proximity to WFP programs, availability of supply-side partners, represent largely smallholder farmers, proximity to food processing facilities (as potential buyers), and participation of women. The selection criteria also considered CUs' access to storage facilities and the CU's commitment to engage with WFP. Selected CUs were in three regions (Amhara, Oromiya, and SNNPR). WFP added 13 additional CUs in 2013 when it signed forward delivery contracts for 38,000 mt of maize.

On paper, CUs appear to be relatively high-capacity FOs. All 13 CUs surveyed in 2009 had access to substantial warehouse capacity (600 mt to 12,000 mt with an average of 819 mt) and 7 owned their storage facilities.<sup>5</sup> Eighty-five percent reported selling commodities (mostly wheat) in the two years prior to the baseline survey and average annual quantities were substantial (1,762 mt). Seventy-seven percent reported having access to credit and they reported providing, on average, 49 percent of 8 quality-oriented services and 69 percent of 3 marketing services included in the baseline survey.

Ethiopia's P4P Story, however, documents several capacity limitations. In particular:

- “Many union managers lacked the ability to carefully observe market trends and make informed decisions about buying and selling maize at the start of the P4P initiative.”
- CUs had a limited ability to meet WFP's quality criteria. WFP's procurement records, however, document problems aggregating (caused by limited access to credit or side selling), rather than quality as the reasons for default in 2010. This points to limited organizational capacity.
- Moreover, insufficient equipment, especially cleaning machines and fumigation sheets in most of the FOs, contributed to the delayed delivery of food.

The analysis in this report concludes that, by almost any objective measure, P4P-supported FOs and farmers are substantially better off at the end of the P4P pilot than at the beginning. For example, among the 13 P4P CUs, 70 P4P PCs, and a random sample of 321 of their member farmers from which the country office collected data:<sup>6</sup>

- Between 2009 and 2013, P4P-supported CUs are able to provide their members a much greater range of value addition, production, marketing, and quality services. P4P-supported PCs also increased the range of the four services they were able to provide but the magnitude of change was not as great.
- The percentage of P4P-supported CUs able to facilitate access to inputs for their members increased from 69 percent in 2009 to 92 percent in 2013. The growth among P4P-supported PCs was from 78 percent to 90 percent.
- P4P CUs reported receiving substantially more external assistance in post-harvest management, production, and marketing. P4P PCs reported similar results.
- The total quantity of maize sold by the 13 P4P CUs increased from 1,261 mt in 2009 to 26,549 mt in 2012. The average quantity of maize sold by P4P PCs, however, delined from 187 mt in 2009 to 26 mt in 2012 before rebounding to 41 mt in 2013.
- The percentage of P4P households using post-harvest services increased from 31 percent in 2009 to 84 percent in 2013 and the percentage using marketing services increased from 23 percent to 54 percent. The percentage that participated in productivity training increased from 78 percent to 98 percent.

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<sup>5</sup> Ethiopia intervention mapping daa.

<sup>6</sup> The results reported below are all statistically significant with p-values ≤ 0.10.

- The likelihood of using certified maize seed increased from 64 percent to 75 percent and the average percentage of all seed used that was certified increased from 63 percent to 90 percent.
- Average maize yields increased from 1.88 mt/ha to 2.37 mt/ha.
- The average quantity of maize produced increased from 0.78 mt to 0.92 mt and the average quantity sold increased from 0.24 mt to 0.41 mt.
- Real household income increased by 46 percent, the average household asset score increased by 5 percent, the value of livestock increased by 42 percent, and the average food consumption score increased by 9 percent.

Trends in FO capacity and household production and welfare, however, do not constitute evidence that the observed changes are caused by participating in P4P. To credibly attribute changes to P4P it is necessary to compare these outcomes to those that *would have occurred had these same CUs, PCs, and households not participated in P4P*. This is the major challenge of assessing impact; that analysts cannot simultaneously observe outcomes under P4P and those under the counterfactual of not participating in P4P. This report applies appropriate analytical techniques to the data to estimate the causal effects of P4P on key indicators of FO capacity and smallholder farmers' production and marketing of staple commodities and on their household income.

To make a credible case for impact, it is first necessary to understand the details of what WFP did in Ethiopia so anticipated outcomes are not confused with the P4P "treatment." For example, increased access to storage is an important anticipated outcome of participating in P4P and an indicator of FO capacity in the P4P logframe. In Ethiopia, however, WFP invested directly in increasing CU's storage capacity. Increased access to storage in Ethiopia is therefore part of the P4P treatment and not an outcome of P4P. After a brief description of data and methods used in the impact assessment, this report describes in detail the elements of the P4P treatment in Ethiopia.

Separate sections of the report then examine the evidence of causal effects of P4P participation on selected indicators of FO capacity and household production, marketing, and welfare theoretically linked to participating in P4P. The final section of the report summarizes conclusions with respect to the impacts of P4P in Ethiopia.

## RESULTS FRAMEWORK

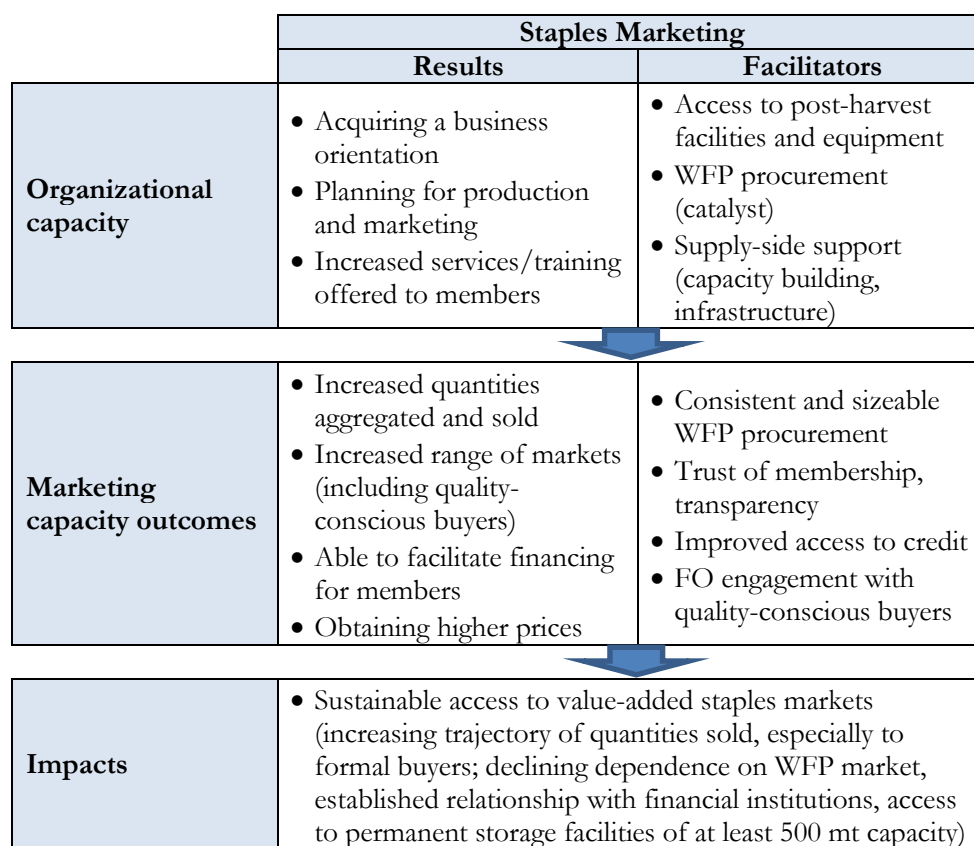
The results framework articulated in this section illustrates the interdependent, and often sequential, nature of anticipated P4P results and provides a context within which to interpret the findings and frame the conclusions. It is relevant at this juncture as a framework for understanding the relevance of the findings and analysis presented in the remainder of the report.

P4P is a capacity building program set within a market development framework. WFP's primary entry point in most countries, including Ethiopia, is farmers' organizations (FOs). The overarching rationale for WFP's involvement is the hypothesis that channeling a portion of the organization's local and regional procurement to a point in the supply chain that is closer to smallholder producers (usually FOs) can provide the market necessary to catalyze other development partner's efforts to build FOs' organizational and marketing capacities. FOs more capable of identifying markets, adding value, and reliably meeting market demands will improve households' marketing opportunities and outcomes. Improved access to markets for households will increase returns to agriculture, provide an incentive for investing in production, and ultimately, lead to improvements in household welfare.

This is an obviously simplistic summary of a much more complex and nuanced development hypothesis. For instance, it makes no mention of the myriad barriers FOs and smallholder farmers face pursuing these outcomes. It does, however, illustrate the sequential and interdependent aspects of the pathway through which P4P expects to produce results.

Figure 5 and Figure 6 illustrate the results framework for FOs and households, respectively. The vertical dimension of the figures illustrates the hypothesized progression of FO and household results, respectively. The second column of each figure (the second column of both the marketing and production components of Figure 6) lists the primary indicators at each level of result. For FOs, improved organizational capacity supports enhanced marketing capacity which ultimately leads to sustainable market access. For households, changing marketing behavior produces favorable market outcomes which then provide the incentive to change production behavior which increases production and, coupled with improved market access, improves the welfare of the household. On the horizontal dimension, moving right to left, the “facilitators” acknowledge some of the fundamental conditions necessary to support achievement of the results.

**FIGURE 5: P4P RESULTS FRAMEWORK: FO CAPACITY**



There are several other important things to note about the results frameworks outlined in Figure 5 and Figure 6.

1. Household marketing and production results are not necessarily independent. For example, the development hypothesis posits that higher prices associated with selling through the FO (a household marketing outcome) will provide an incentive to invest in productivity-enhancing technologies and practices (a behavioral change in the production column). The interdependence of results therefore works horizontally and vertically in the household figure.
2. Results often depend on “facilitators”, some of which fall within the remit of development partners’ or governments.
3. Many FO results appear as facilitators in the household results framework. This implies that household results depend, in many cases, on FO results. The FO and household frameworks are therefore interdependent and household results may lag FO results. It is also possible that FO results may lag household results. For example, an FO may find it difficult to aggregate large quantities before achieving a level of trust with its members that will encourage them to sell through the FO.

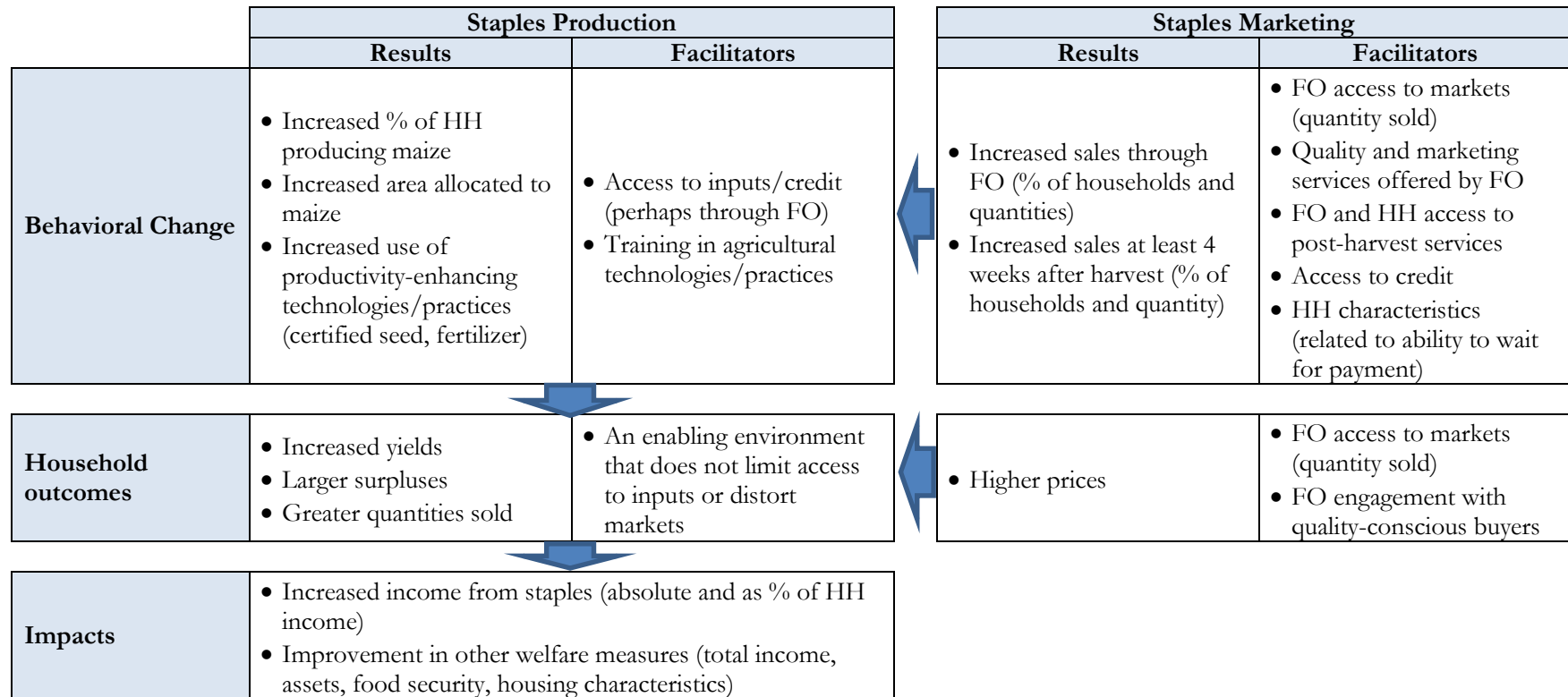
The remainder of this section more fully articulates this framework, describes its components, and illustrates the interdependencies between anticipated results. It is organized around the four basic elements of FO capacity, household marketing, household production, and household welfare. Following a detailed description of the quantitative results, the conclusions section returns to the results framework articulated in this section to draw the quantitative and qualitative evidence together into a coherent story of the impact of P4P in Ethiopia.

## FO Capacity

Organizational capacity refers to the capacity of the FO to operate effectively to support its farmer members’ agricultural endeavors, particularly in production and marketing. It encompasses the human and physical capacity required to aggregate, add value, and market staple commodities. Initial FO capacities, as documented in country assessments, varied substantially across the P4P pilot countries. Some countries (e.g., Tanzania, DRC) found few viable FOs with which to engage. Others (e.g., Ethiopia, Mali, Mozambique) found well established FOs, some of which had substantial marketing capacity. The rate at which countries are able to progress through the results framework will depend to some extent on the baseline situation with respect to FO and farmer capacity and facilitating factors at both the FO and household levels. When the capacity of P4P-supported FOs was particularly low, which it was in many countries, WFP and its partners often had to start organizational capacity building by establishing basic facilitating conditions. Important among these are:

- **Management capacity:** Building the organizations’ internal management capacity. Capable management promotes financial viability, efficiency, and sustainability. It also contributes to operational and financial transparency which may foster members’ trust in the FO, an important factor supporting participation and reliable aggregation. To support building management capacity WFP and its partners often train FO leaders and members in topics such as bookkeeping, financial management, group dynamics, and other topics.
- **External assistance:** Marshalling the technical, financial, and material assistance necessary to improve FOs’ commodity management and marketing skills and farmers’ knowledge of, and access to, productivity-enhancing technologies and practices. Training, in topics such as warehouse management, procurement procedures, negotiation, and production contribute to building these skills. In some countries, WFP and its partners help FOs build relationships with service providers such as financial institutions and input suppliers to help resolve barriers to aggregation and production.

**FIGURE 6: P4P RESULTS FRAMEWORK: HOUSEHOLD MARKETING, PRODUCTION, AND WELFARE**





- **Post-harvest infrastructure and equipment:** Establishing the storage infrastructure necessary to support aggregation and quality management. Equipment to clean, dry, grade, weigh, and bag commodities and storage facilities capable of maintaining quality are essential material capacities for marketing. Many countries found it necessary to enhance the quality and size of FOs' storage facilities and provide the equipment required to properly store and market commodities.
- **WFP's procurement:** Finally, access to a market will help provide the incentives for FOs and farmers to invest the time and resources to build these capacities. The basic tenet of P4P is that WFP's commitment to buy from FOs for a period of time will provide this market. Thus, the consistency and size of WFP's procurement is important; it must be large and regular enough to stimulate the necessary investments.

Establishing these facilitating conditions should contribute to improving organizational capacity. Relevant indicators of improved FO organizational capacity include:

- **Planning for production and marketing:** Planning is an important discipline that encompasses developing marketing strategies and predicting quantities that will be available from members. It may also provide farmers with some expectation that a market exists and thus ease aggregation.
- **Providing services to members:** FOs exist to provide services to their members and the greater the range and number of beneficial services they can offer, the more relevant they will be to the needs of their members. In the context of P4P, services associated with production and marketing are particularly germane. The ability to provide some services is contingent on facilitating conditions. For example, to provide storage and quality management services, an FO must have access to a warehouse and equipment and training in commodity management.
- **Facilitating members' access to inputs:** Smallholder farmers' access to productivity-enhancing inputs may be constrained by limited access to input markets or by financial considerations. FOs have facilitated members' access to inputs in a number of ways including providing inputs on credit, serving as a conduit for subsidized inputs provided by government programs, or by buying inputs in bulk at lower prices than farmers could obtain on their own.
- **Providing production training to members:** Access to inputs is not sufficient in itself to increase production. Farmers must also know how to use inputs correctly. Facilitating access to training on the appropriate use of a full range of other productivity-enhancing technologies and practices is another important role for FOs and one that reflects their overall capacity to serve members' needs.

As FOs become better managed and gain access to the infrastructure, equipment, and knowledge necessary to support production and marketing, they should become more capable marketing organizations. As with organizational capacity, a number of factors will facilitate improvements in marketing capacity. These include:

- **WFP's procurement:** WFP's procurement plays a central role in the P4P development hypothesis. By providing an assured and forgiving market for quality, WFP expects to create a window for capacity building – especially the capacity to reach quality-conscious buyers. Access to an assured market will also create the incentive for FOs to make the investments of time, energy, and money to build their capacities.
- **Access to marketing credit:** Limited access to credit is a major barrier to FOs' ability to aggregate and become reliable market participants. Many smallholder farmers do not have the financial capacity to wait for payment when they sell their crops. They need immediate cash to meet household expenses and to invest in inputs for the next season. In this environment, FOs without the ability to pay members prior to receiving payment from a buyer have trouble competing with traders who usually pay cash at the farm gate. This situation often leads to side-selling, when a farmer who has committed to sell through the FO sells instead to a different buyer. Volatile prices can exacerbate the problem of side selling. In 2010, volatile commodity prices in many east African countries contributed to side-selling when farmers (and FOs and even large traders) that had committed to

selling to WFP sold to other buyers as prices rose above the WFP contract price in the interval between signing a contract and delivering the commodity. Widespread side-selling can cause an FO to default on contracts. For FOs without sufficient internal capital, access to marketing credit can give them the ability to buy from farmers at the time they deposit commodities, eliminating the problem of side selling, and make them more reliable sellers. Many P4P countries have focused on building relationships between FOs and financial institutions to address this issue. And in many instances, financial institutions have agreed to accept a contract with WFP as collateral for a marketing loan.

Organizational capacity building coupled with establishing the facilitating conditions for more effective marketing should contribute to improved marketing capacity outcomes. Relevant indicators of marketing capacity in the P4P context include:

- **Quantity sold:** The total quantity an FO is able to aggregate and sell is an obvious indicator of marketing capacity. It reflects not only the FO's ability to find markets but also its ability to aggregate members' surpluses which, in turn, reflects the organizational capacity of the FO.
- **Quantity sold to buyers other than WFP:** WFP will not commit to buying from an FO indefinitely in a capacity building role. For results to be sustainable, FOs must develop the capacity to identify and sell to buyers other than WFP, and preferably to buyers who are willing to pay a premium for value addition (quantity, quality, or other commodity characteristics).
- **Facilitating post-harvest financing to members:** Access to credit, a facilitating factor, may give an FO the ability to provide post-harvest financing to members thus extending members' feasible marketing options and improving the reliability of aggregation. Using credit or other sources of capital to buy from members prior to a sale is only one technique for facilitating post-harvest financing. Some countries have supported warehouse receipt systems which can give farmers access to a loan secured by deposited commodities. In other countries, e.g., Burkina Faso, FOs may provide inputs on credit and then compel members to sell a sufficient quantity of commodities through the FO to cover the loan.
- **Prices:** An FO's ability to offer competitive prices will be an important consideration in farmers' decisions to sell through the FO. The prices an FO is able to obtain reflect its ability to identify markets where it has a competitive advantage, negotiate effectively, and deliver reliably. Prices are not the only consideration however. Others include the timeliness of payment and valuable services farmers receive from FO membership (e.g., credit, inputs, and training). Nevertheless, prices are a relevant indicator of FO marketing capacity.

The ultimate objective of FO capacity building under P4P is to leave in place an FO that can add value to members' commodities (through aggregation, quality, or transformation/processing) and sustainably access markets that appropriately compensate the FO for commodity characteristics. It is too early to assess the sustainability of P4P results but positive change in organizational and marketing capacity indicators may point to the sustainability of results.

## Household Marketing

To fully benefit from improved FO marketing capacity, farmers must elect to sell through the FO. A small handful of farmers (18 percent of P4P farmers in Ethiopia) reported selling through the FO at the time of the 2009 baseline. To extend results to a wider range of members, farmers must change their marketing behavior and begin selling their surpluses through the FO. Farmers collectively channeling larger quantities through the FO will further build the organization's capacity, further enhancing overall results.

As in the FO marketing capacity results framework, several factors are likely to facilitate behavioral change. Many of these are FO marketing capacity outcomes reflecting the P4P development hypothesis that stronger FOs will support better marketing and production outcomes for farmers. Facilitators of household marketing include:

- **Services provided by the FO:** Services provided to members through the FO serve several purposes. From the perspective of household marketing behavior, FO's that provide services relevant to improving their member's production and marketing outcomes are likely to earn members' trust and loyalty and capture a larger share of their marketed surplus. From the FO perspective, members' trust and loyalty can further strengthen the FO and its ability to aggregate effectively and reliably.
- **Household access to credit:** Few smallholder farmers have access to credit. Ethiopia appears to be an exception with just over half of surveyed farmers reporting that they had received credit at the time of the 2009 baseline. Access to credit enhances a household's flexibility in marketing choices. With access to credit, a household may be able to choose to sell to a buyer that does not pay cash on the spot or to hold commodities into the lean season when prices are typically higher. As mentioned among the FO marketing outcomes, FOs may play a role in facilitating households' access to credit. The efforts of WFP and its partners to build relationships with financial institutions and establish warehouse receipt systems may also contribute to improved access to credit.
- **Quantities sold by the FO:** For farmers to choose to sell through the FO, the FO must be able to offer a market. The quantity the FO is able to sell is thus a critical facilitating factor in households' decisions to sell through the FO.

Choosing to sell more through an FO that earns its members' support by providing valuable services and a reliable market should ultimately lead to improved marketing outcomes for farmers. In the P4P context these outcomes may include higher prices or lower marketing cost (and thus higher net returns to the farmer). The P4P monitoring and evaluation system did not collect detailed data on marketing costs. The relevant indicator of improved marketing outcomes at the household level is thus higher prices.

## Household Production

Better marketing outcomes should provide farmers the incentive and the means to invest in increasing productivity. The path to higher productivity begins with behavioral change (i.e., choosing to produce maize, allocating more area to maize production, investing in productivity-enhancing inputs and technologies) supported by favorable facilitating conditions, many of which are outcomes of FO capacity building. Relevant facilitators include:

- **Access to inputs:** Farmers' access to productivity-enhancing inputs may be constrained by access to input dealers, high prices, limited availability, or lack of knowledge of their use or benefits. FOs, governments, the private sector, and agricultural development organizations may all play a role in improving access to inputs and P4P countries have worked with each of these actors.
- **Access to credit:** In the context of production, access to credit is important as a facilitator of investment in productivity. Without access to credit, capital-poor households may not be able to purchase inputs, increase the area of land they cultivate, or invest in other practices that improve productivity (e.g., hired labor, mechanization). Credit need not be in the form of cash; it may also encompass in-kind schemes that advance inputs, machinery, or tools against future payment in crops.
- **Access to training in agricultural production practices:** As important as access to productivity-enhancing technologies and practices is the knowledge of how to use them appropriately. For example, farmers in El Salvador reported that the knowledge of when to plant and how and when to apply fertilizers and pesticides was perhaps more important to increasing productivity than access to

the inputs themselves. WFP and its P4P partners have often supported access to inputs and the training required to use them correctly.

With these facilitating factors in place, anticipated behavioral changes include:

- **Households choosing to produce maize:** Maize is a primary staple in many P4P countries and, consequently, most households produce maize. In Ethiopia, for example, 70 percent of surveyed P4P households reported producing maize in 2009. There may, therefore, be little scope for increasing the percentage of households that cultivate maize in some countries.
- **Area allocated to maize production:** Allocating more land to maize production, either by changing cropping patterns or increasing the overall area of land a household cultivates, may also affect the quantity of maize produced.
- **Use of productivity-enhancing technologies and practices:** Improved access to inputs, recognition of their value in increasing productivity, access to credit, and market-driven incentives should lead to increasing investment in productivity-enhancing inputs and practices.

All other things being equal, these behavioral changes should increase yields, quantities produced, and quantities sold, the key household production indicators.

## Household Welfare

Producing and selling larger quantities at higher prices will ultimately affect household welfare. Welfare is a broad concept with dimensions including income, wealth, nutrition, food security, and physical security to name a few. The P4P proposal identified income as the primary household welfare measure. Because of the anticipated difficulty measuring relatively small changes in income, however, the P4P logframe identified several alternate welfare indicators. These include the household asset score (a simple summary of household assets), the value of household livestock (an important store of wealth in many cultures), and the food consumption score (an indicator of food security).

## DATA AND METHODS

The impact assessment is based on a quasi-experimental design that compares outcomes for two groups of CUs, PCs, and households; one group that is participating in P4P and a similar group that is not. Survey data collected from these two groups at various points in time track changes in anticipated outcomes during the implementation of P4P. The Ethiopia country office commissioned surveys of samples of P4P CUs and PCs in every year of the five-year pilot and surveyed samples of non-P4P CUs and PCs in year 1, the baseline, year 4, and year 5. It also collected data from randomly selected members of the surveyed PCs in year 1, the baseline, year 3, and year 5. The surveys tracked a panel of FOs and households, i.e., the same set of FOs and households in each survey.<sup>7</sup> Table 1 summarizes the samples of CUs and PCs. Table 2 summarizes the household samples.

The surveys collected data on a variety of FO capacity and household production, marketing, and welfare indicators. For FOs these included data on services provided to members, storage capacity, marketing activity, and credit utilization, among others. The household surveys collected data on household characteristics; production; production practices; marketing activity; credit utilization; and income from crops, livestock, and off-farm sources, among others. The data collection instruments are available from WFP.

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<sup>7</sup> Due to attrition, the size of the household panel (households interviewed in all three surveys) is smaller than the overall sample.

TABLE 1: FARMERS' ORGANIZATION SAMPLE

	2009 (baseline)	2010	2011	2012	2013
<b>Cooperative Unions (full sample)</b>					
P4P	14	13	13	14	15
Non-P4P	5			5	4
<b>Cooperative Unions (panel)</b>					
P4P	13	13	13	13	13
Non-P4P	4			4	4
<b>Primary Cooperatives (full sample)</b>					
P4P	70	70	71	71	71
Non-P4P	68			65	65
<b>Primary Cooperatives (panel)</b>					
P4P	69	69	69	69	69
Non-P4P	65			65	65

TABLE 2: HOUSEHOLD SAMPLE

	2009 (baseline)	2011	2013
<b>Entire sample</b>			
P4P households	390	390	375
Non-P4P households	387	380	366
<b>Panel</b>			
P4P households	312	312	312
Non-P4P households	278	278	278

In the comparison group design, the outcomes for the non-P4P groups represent the counterfactual, i.e., outcomes for the P4P groups had they not participated in P4P. Obviously, many factors other than P4P may affect outcomes of the two groups over time. The more similar the two groups, the less potential exists for other factors to differentially influence outcomes. It was not feasible, however, to randomly assign FOs to P4P and non-P4P groups (the best way to obtain comparable groups) and the Ethiopia country office matched them loosely on similarity of size, marketing experience, location, and organizational capacity.

### Analysis of Impacts on FO Capacity Indicators

The very small sample of CUs makes it difficult to attribute differences between P4P and non-P4P CUs to participation in P4P. Even if differences do exist the analysis is unlikely to find them statistically significant unless they are relatively large. Given these constraints, the analysis relies on simple comparisons of average outcomes between P4P and non-P4P CUs – essentially a non-parametric difference-in-differences (DiD) approach, recognizing that many observed differences will not be statistically significant. The non-parametric approach implicitly assumes that P4P is the only difference between the two groups that affects outcomes. However, the small samples make regression approaches that attempt to control for other factors infeasible.

In contrast, the samples of PCs are relatively large. Consequently, the analysis uses a regression-based DiD approach to estimate the impacts of P4P on PC capacity indicators. The approach includes covariates to control for differences between P4P and non-P4P PCs. The selected covariates were factors on which P4P

and non-P4P PCs differed, were likely to affect outcomes, and were not correlated with participating in P4P. The following section describes the DiD approach.

## Analysis of Impacts on Households

Analysis of the PC and household data employs a DiD approach to estimate the causal effects of P4P on selected PC and household outcomes. The DiD estimator defines the impact of a program on an anticipated outcome as the relative change in the average outcome measure over time between a “treatment” group affected by the program and a “control” group that is not affected, or:

$$Impact = (\bar{Y}_{1t_1} - \bar{Y}_{1t_0}) - (\bar{Y}_{0t_1} - \bar{Y}_{0t_0}) \quad (1)$$

where  $\bar{Y}$  indicates the group mean of outcome measure  $Y$ ; the subscripts  $0$  and  $1$  refer to control and treatment groups, respectively, and the subscript  $t$  refers to time with the subscripts  $0$  and  $1$  on  $t$  referring to pre- and post- program time periods respectively.

The non-parametric DiD estimator in equation (1) is appropriate only if the treatment and control groups are statistically equivalent, that is, that differences are due only to chance. Statistical equivalence implies that the DiD impact estimate derived from equation (1) is due only to the treatment and not to other factors. Random assignment of experimental units (e.g., FOs or households) to treatment and control groups is the best way to ensure statistical equivalence. Except for Ghana, however, it was not possible to randomly assign FOs, or by implication, households, to P4P and non-P4P groups. Therefore, the simple estimator of equation (1) is not appropriate for Ethiopia.

A generalization of the DiD estimator in a regression framework is more appropriate for cases where treatment and control groups are not equivalent. When the two groups are not statistically equivalent, the analysis needs to control for the differences to obtain reliable estimates of causal effects. One useful feature of the DiD estimator is that it completely controls for time-invariant differences between the two groups leaving only time-variant differences as possible confounders. The regression equivalent of the DiD estimator is:

$$Y_{it} = \alpha + \beta D_{it_0} + \delta \tau + \gamma D_{it} + \theta X_{it} + \epsilon_{it} \quad (2)$$

where  $Y_{it}$  is the observed outcome for household  $i$  at time (survey)  $t$ ,  $D_{it_0}$  is a vector of indicators of whether household  $i$  is in the treatment group at time  $t=0$ ,  $\tau$  is a vector of indicators for each time period except  $t=0$ ,  $D_{it}$  is an indicator of household  $i$  being in the treatment group for all  $t \neq 0$ ,  $X_{it}$  is a set of control variables which may include interactions, and  $\epsilon_{it}$  is the error term. The elements of the coefficient vector  $\gamma$  are the average impacts of the treatment on  $Y$  at time  $t$ .

With panel data the regression equation becomes:

$$Y_{it} - Y_{it-1} = \alpha + \delta \tau + \gamma D_{it} + \theta X_{it} + \epsilon_{it} \quad (3)$$

where parameters are the same as those defined for equation (2).

Because WFP in Ethiopia purchased much more maize than beans, the technical review panel that WFP convenes annually to guide P4P recommended in 2013 that the quantitative analysis of impacts focus on maize. Consequently, the impact assessment analysis considers only maize.

## Data Limitations

The fact that the first and second follow-up surveys (2010 and 2011) did not cover non-P4P FOs severely restricts the scope of the analysis and probably biases some results. The missing observations for non-P4P FOs limits the comparison of temporal trends in outcome variables between the two groups. The limitation is particularly acute for variables formulated in cumulative terms, e.g., total quantity sold to date. In fact, in these instances, even a comparison of P4P and non-P4P FOs in the final year must ignore the 2010 and 2011 data for P4P FOs or values will not be comparable. Consequently, when necessary, the analyses of FO data compare data from the baseline and final years of the pilot without considering the intervening years.

The very small number of observations on non-P4P CUs also limits the power of tests for impacts on CU capacity. Low power means that the chance of identifying an effect that does in fact exist is relatively small.

## Comparability of P4P and Non-P4P Groups

The reliability of the DiD estimates of impact in the case of non-equivalent groups depends in part on the extent of their similarities and differences. Therefore, prior to assessing the impacts of P4P on FO capacity and farmers' productivity and welfare, the analysis examines the differences between the two groups and the significance of observed differences.

## Comparability of FOs

Side-by-side tests of differences in means and proportions of FO characteristics (27 characteristics for CUs and 29 for PCs) served to assess the baseline comparability of P4P and non-P4P FOs. Statistically significant differences (i.e., independent group tests with  $p < 0.10$ ) between the two groups were:

For CUs:

- P4P CUs reported significantly **fewer** full-time employees than non-P4P CUs: an average of 9.23 versus 12.25.

For PCs:

- In terms of PC characteristics:
  - P4P PCs reported significantly **fewer** farmer members than non-P4P PCs: an average of 1,034 compared to 1,368.
  - P4P PCs reported significantly **more** full-time employees than non-P4P PCs: an average of 13 versus 10 for non-P4P PCs.
  - P4P PCs reported being significantly **closer** to their primary markets than non-P4P PCs: an average of 72 kilometers (km) compared to 122 km for non-P4P PCs.
- On measures of PC capacity:
  - P4P PCs were significantly **less likely** than non-P4P PCs to report planning for production and marketing: 86 percent versus 99 percent.
  - P4P PCs were significantly **less likely** than non-P4P PCs to have sold through a contract: 17 percent versus 52 percent.
- In terms of receiving external assistance:



- P4P PCs were significantly **more likely** than non-P4P PCs to report having received assistance on agricultural production: 36 percent relative to 19 percent.
- P4P PCs were slightly, but significantly, **less likely** than non-P4P PCs to report having received assistance for inputs and tools: 0 percent versus 6 percent and 1 percent versus 12 percent, respectively.
- On the basis of services provided to their farmer members:
  - P4P PCs were significantly **more likely** than non-P4P PCs to report providing any services, quality services, and marketing services: 99 percent versus 89 percent, 29 percent compared to 16 percent, and 52 percent versus 30 percent, respectively.
- P4P PCs were also significantly **less likely** than non-P4P PCs to report having sold maize in the two years prior to the baseline survey: 39 percent versus 55 percent.

Table 16 and Table 17 in Annex A provide the full details of the tests for similarity between P4P and non-P4P CUs and PCs, respectively.

### Comparability of Households

Side-by-side tests of differences in means and proportions of 76 baseline household characteristics found a number of statistically significant differences. Differences between the two groups were:

- The only statistically significant difference on the basis of household characteristics was that P4P households had slightly, but significantly, fewer members than non-P4P households – average household size of 6.21 versus 6.64.
- In terms of agricultural production:
  - P4P households were significantly **more likely** than non-P4P households to cultivate maize – 72 percent versus 66 percent.
  - P4P households were significantly **more likely** than non-P4P households to use fertilizer – 100 percent versus 92 percent.
  - P4P households were significantly **more likely** than non-P4P households to use certified maize seed – 54 percent versus 41 percent.
  - P4P households were significantly **more likely** than non-P4P households to use certified seed for crops other than maize – 64 percent versus 50 percent.
  - P4P households harvested significantly **larger** quantities than non-P4P households of crops other than maize – 1.86 mt compared to 1.44 mt.
  - P4P households spent significantly **more** than non-P4P producing crops – 2,438 Birr versus 1,734 Birr per year.
  - P4P households reported a significantly larger value of crops than non-P4P households – 6,212 Birr versus 4,962 Birr.
- In terms of marketing activity:
  - P4P households reported selling significantly **larger** quantities of crops other than maize than non-P4P households – an average of 0.52 mt per year compared to 0.33 mt.
  - P4P households were significantly **more likely** than non-P4P households to report selling maize through the FO – 8 percent versus 4 percent.
  - P4P households reported selling significantly **larger** quantities of maize through the FO and at the farm gate than non-P4P households – an average of 0.03 mt through the FO and 0.01 mt at the farm gate compared to 0.01 mt and 0.00 mt, respectively.
- P4P households were significantly **more likely** than non-P4P households to report obtaining price information through the FO – 43 percent compared to 34 percent.
- P4P households also reported **larger** values of many household welfare indicators. In particular they reported:
  - Average annual household income from all sources of 7,979 Birr compared to 6,760 Birr;



- Average income from farming of 6,386 Birr compared to 5,228 Birr;
- Average annual value of crops consumed in the household of 5,045 Birr compared to 4,074 Birr;
- Average annual expenditure on household items of 1,495 Birr compared to 1,183 Birr; and
- Average food consumption score of 45 compared to 42.
- P4P household reported significantly **lower** income than non-P4P households from selling livestock – 63 Birr compared to 143 Birr.

The comparison of P4P and non-P4P households suggests that P4P households may have been somewhat more involved in agricultural production and marketing, particularly of crops other than maize. They also seemed somewhat better off although the difference did not show up in quality of housing, value of livestock, or assets.

Table 18 in Annex A shows the comparisons of all 76 baseline characteristics used to assess the comparability of P4P and non-P4P households.

## THE P4P “TREATMENT”

An impact assessment determines the causal effect of a *treatment* on anticipated outcomes. For P4P this is the impact on FO organizational and marketing capacity and household agricultural marketing, productivity, and welfare associated with participating in P4P. The P4P logframe defines a number of indicators of FO capacity and household productivity and welfare outcomes.<sup>8</sup>

The P4P development hypothesis expects that WFP’s commitment to buy from FOs during the pilot phase will catalyze the support of development partners to help build the capacities of participating FOs to capitalize on the opportunity to sell to WFP and provide individual farmers the financial incentive to invest in increasing agricultural productivity. In this context, the P4P *treatment* is merely WFP’s procurement and the capacity building activities of partners are outcomes of the treatment.

However, many P4P programs purposely selected FOs based in part on the presence of development partners working to build the capacities of the FOs. Furthermore, country programs often directly supported capacity building activities, e.g., conducted training, financed training conducted by partners, and provided infrastructure and equipment. In Ethiopia the country office participated in and financed training and invested in providing and equipping warehouses. In this context, participating in P4P implies a multi-faceted treatment that may vary across participating FOs.

Impact assessments often carefully design treatments/interventions to vary the treatment elements and/or their intensity across subjects (e.g., FOs). With P4P, however, country offices had a great deal of latitude to design and implement their own programs. The P4P Rome-based coordination unit, which designed and managed the monitoring and evaluation system and the impact assessment framework, had little direct control over specific implementation decisions at the country level. The impact assessment therefore has to take the types and intensities of treatments as given.

The remainder of this section documents characteristics of the P4P treatment for individual FOs in Ethiopia. These data will define the dimensions and intensity of the P4P *treatment* applied to individual FOs and help identify the characteristics of the treatment that influence particular outcomes. In the Ethiopia context, the

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<sup>8</sup> P4P Global Logframe, Internal WFP document.

broad dimensions of the treatment are WFP procurement, investments (largely in infrastructure and equipment), and training. Because, in most cases, WFP's development partners were already working with participating FOs, coordinated their activities closely with WFP, and were often funded by WFP, the impact assessment considers their activities to be part of the P4P treatment rather than an outcome of the treatment.

The remainder of this section describes, in detail, the various components of the P4P treatment in Ethiopia grouped broadly into categories of WFP procurement, investments in infrastructure and equipment, and training.

## **WFP Procurement**

Between P4P's inception in 2009 and May 2014, WFP took delivery of 44,511 mt of maize (42,470 mt) and beans (2,041 mt) from CUs in Ethiopia (see Table 21 in Annex B for a summary of WFP's procurement in Ethiopia). This figure does not include quantities purchased from other entities (i.e., 3,430 mt of maize purchased from traders and 5,050 mt of maize purchased across the commodity exchange) or forward delivery contracts with CUs for 30,628 mt of maize contracted in 2013 and not yet delivered. WFP purchased maize and beans in Ethiopia but maize accounted for the lion's share (96 percent) of quantities delivered to date. Ethiopia has registered 34 CUs as WFP suppliers under P4P, signed contracts with 33 of them, and taken delivery of commodities from 21. Twelve of those that have not yet delivered, signed their first (forward) contracts in 2013 and delivery is not yet due.

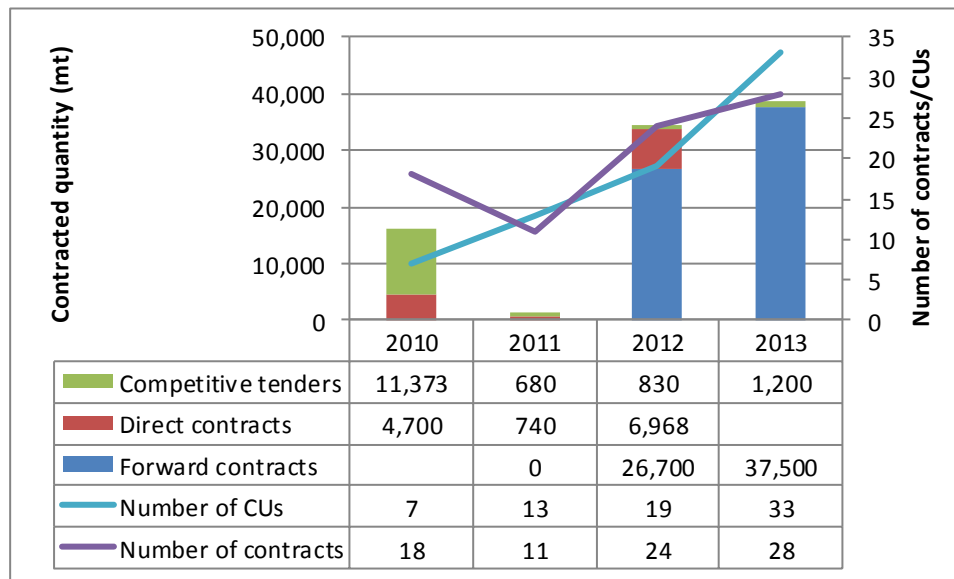
While the quantities WFP procured generally increased, they fluctuated somewhat due to programmatic requirements external to the P4P program (Figure 7). Aspects of the treatment as they relate to procurement that the country office could control were the procurement modality; the number of CUs from which it purchased; the number of contracts (excluding competitive tenders where WFP could not control the outcome) awarded to each CU; and by implication, the quantities contracted from each CU.<sup>9</sup> Figure 7 illustrates that Ethiopia has steadily expanded the number of CUs with which it has engaged. It has also shifted from direct contracts and competitive tenders to rely much more heavily on forward delivery contracts.

The P4P development hypothesis implies that the size and consistency of procurement matters. WFP's commitment to purchase from a CU is expected to provide the CU the space to build capacity with a patient buyer. The stimulus should also be large enough to provide member farmers with the incentive to invest in increasing production (although the stimulus at the farm level may be substantially diluted in the Ethiopia model which buys from CUs.) This implies a consistent level of procurement large enough to represent a meaningful sale volume for individual farmers.

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<sup>9</sup> With competitive tenders, the CO could control only the number of tenders it issued, and their size, but could not directly control the individual FOs that won tenders.

**FIGURE 7: WFP PROCUREMENT FROM P4P CUs BY YEAR AND MODALITY**



Source: WFP procurement records.

Over the course of the five-year pilot, Ethiopia contracted with 33 of the 34 CUs registered as P4P vendors. Of the 16 CUs WFP registered as vendors involved since the beginning of the pilot, it purchased from 3 (19 percent) in only one year, 6 (38 percent) in two separate years, 6 (38 percent) in three years, and 1 (6 percent) in four years. The remained 13 CUs were registered only in 2013 and received one contract each in that year (Table 3). The size of individual contracts ranged from 50 mt to 6,500 mt with an overall mean of 1,093 mt. The total quantity contracted per CU (throughout the five-year pilot) ranged from 200 to 14,920 mt with an average of 2,682 mt (Table 4). Total quantities delivered per contract (which excludes contracts not yet closed) ranged from 0 to 10,118 mt with an overall average of 1,349 mt. Actual deliveries were somewhat smaller as a result of defaults. These are relatively large quantities in the context of the 1,261 mt average quantity CUs reported selling in 2009, prior to selling starting to sell to WFP.

**TABLE 3: FREQUENCY OF WFP PROCUREMENT (FROM 21 CUs)**

Number of years with sales to WFP	Number of CUs	Percentage of CUs	Cumulative percentage
Four years	1	6%	6%
Three years	6	38%	44%
Two years	6	38%	82%
One year	3	19%	101%

Source: WFP procurement records.

Note: The table does not report results for the 18 CUs registered after 2009.

Note: Sum of 101% is a result of rounding.

**TABLE 4: DISTRIBUTION OF QUANTITIES CONTRACTED AND DELIVERED**

	<b>Number of observations</b>	<b>Mean</b>	<b>Median</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Standard deviation</b>
Quantity contracted (mt)	33	2,682	1,500	200	14,920	3,031
Quantity delivered (mt)	33	1,349	612	0	10,118	2,184

Source: WFP procurement records.

One concern in Ethiopia is that the procurement stimulus at the CU level will be too diluted at the PC and farmer levels to provide a meaningful stimulus. Using data provided by the country office on the number of PCs that are members of each surveyed CU and the number of farmer members of those PCs, the average annual stimulus to member PCs in years when WFP purchased from a CU ranged from 14 mt to 172 mt. Calculating the average stimulus to farmers was a little more complicated. When spread across the percentage of farmers who reported selling through the PC (26 percent on average), the average annual stimulus to farmers when the CU with which they were associated sold to WFP ranged from 0.095 to 0.209 mt. While these numbers seem small, they are meaningful in the context of the average quantities PCs and households reported selling. Surveyed PCs reported selling between 26 mt and 187 mt and households between 0.23 mt and 0.41 mt.

In conclusion, P4P appears to have provided a reasonably consistent procurement stimulus with contract sizes representing meaningful quantities at the CU, PC, and household levels.

## **Investments in Infrastructure and Equipment**

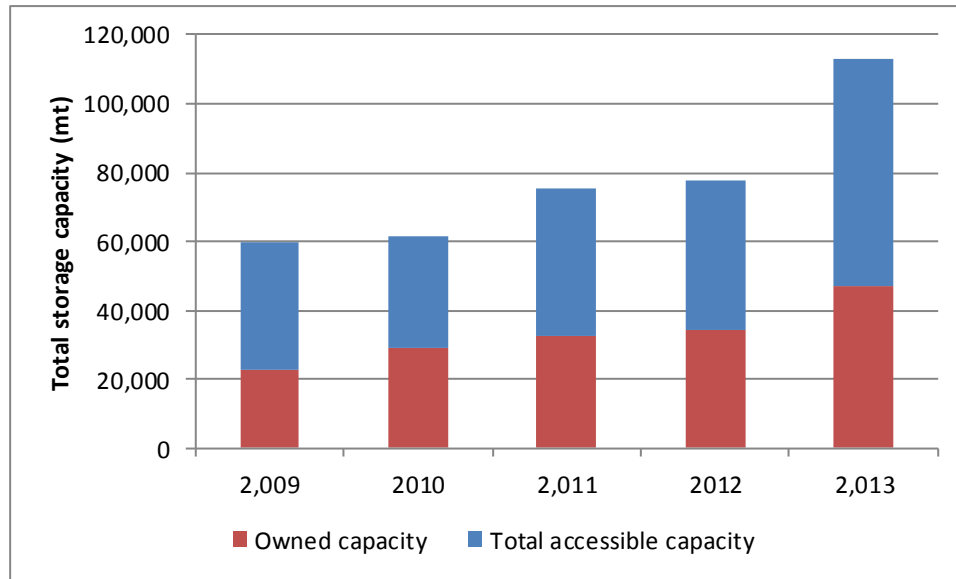
The Ethiopia P4P program directly invested in improving CUs' infrastructure by providing some or all of the financing to establish, expand, and equip warehouses. In particular, WFP supported warehouse expansion for 9 of the 13 surveyed CUs. During the 2009-2013 period, WFP provided temporary warehouses (rubhalls) to 7 P4P-supported CUs, 4 of which then received permanent warehouses (3 with WFP financial assistance). Table 20 in Annex B documents changes in P4P-supported CUs' warehousing capacity and the role of WFP and its partners in building the capacity. WFP and partners played a financial role in building the warehousing capacity of 10 of the 13 P4P-supported CUs included in the survey.

As a group, prior to any investment by WFP or P4P partners, the 13 P4P-supported CUs surveyed reported having access to 36,650 mt of storage space, 23,050 mt of it owned. By 2013, these CUs reported access to 65,000 mt of storage of which they owned 47,200 mt. Owned storage capacity increased by 105 percent, with 12,500 mt (52 percent) due to direct investments by WFP and its partners.

Figure 8 summarizes the evolution of storage capacity among surveyed P4P-supported CUs.

WFP and/or its P4P partners also fully or partially financed warehouse materials and equipment (e.g., weighing scales, moisture analyzers, sieves, and cleaning, drying, and grading machinery), office equipment, and shellers for all 13 of the P4P-supported CUs surveyed. Furthermore, WFP helped link all of the surveyed CUs to credit providers to facilitate access to fertilizer.

**FIGURE 8: STORAGE AVAILABLE TO P4P-SUPPORTED CUs**



Source: Ethiopia intervention mapping data.

## Training

Training is also an important element of capacity building for FOs. In Ethiopia, WFP directly supported training for CUs. While some of its partners worked with PCs and farmers, WFP did not deliberately direct the types of training provided at these levels or support the training financially.

At the CU level, WFP and its partners provided training in agribusiness management, credit, institutional capacity building, gender, monitoring and evaluation, post-harvest handling, production, and WFP procurement. WFP participated substantially in training on post-harvest handling, M&E, and WFP procurement. Partners provided most of the training in the other topics with WFP providing it for some CUs in some years. WFP financially supported all types of training, either fully or partially, and provided financing to a large majority of the individual training events conducted by partners (Table 5).

## IMPACT OF P4P ON FO CAPACITY

This section estimates changes in FO capacity that can be attributed to participating in P4P. The presentation is organized around the results framework of Figure 5, looking first at organizational capacity and then at intermediate outcomes. Each section presents evidence of changes in facilitating factors and links them to changes in anticipated results. Two sub-sections present results for CUs and then for PCs.

Each section first compares trends in indicators between P4P and non-P4P FOs in a visual format that intuitively illustrates differential trends in outcomes and then presents non-parametric DiD estimates of impact.

TABLE 5: SUMMARY OF TRAINING ACTIVITIES

Training topic	Number of FOs trained	Trainer (number of events)	Funding (number of events)
Agribusiness management	13	Partners (48) WFP & partner (4)	WFP & partner (51)
Credit and finance	13	Partners (28) WFP & partner (1)	Partners (29) WFP & partner (22)
Institutional capacity building	13	Partners (34) WFP & partner (1)	Partners (3) WFP (11) WFP & partner (30)
Gender	13	Partners (30) WFP & partner (1)	Partners (5) WFP (26) WFP & partner (4)
Monitoring and evaluation	12	WFP (15) WFP & partner (7)	Partners (9) WFP (24)
Post harvest handling, storage, quality control	13	Partners (23) WFP & partner (29)	WFP (1) WFP & partner (51)
Production and productivity	13	Partners (48) WFP & partner (4)	Partners (29) WFP & partner (23)
WFP procurement and payment procedures	13	Partners (1) WFP & partner (51)	WFP (52)

Source: Ethiopia intervention mapping data.

## Impact of P4P on Organizational Capacity

Organizational capacity refers to the human and physical capacity of an organization to effectively manage commodity aggregation, value addition, and marketing. WFP's procurement, its direct investments in providing and equipping warehouses, and the external assistance it brought to bear on the FOs significantly improved the facilitating conditions necessary to support improvements in organizational capacity. Indicators of organizational capacity relevant in the Ethiopia context include services FOs are able to provide to members, including production training and access to inputs, and planning for production and marketing.

### Visual Inspection - CUs

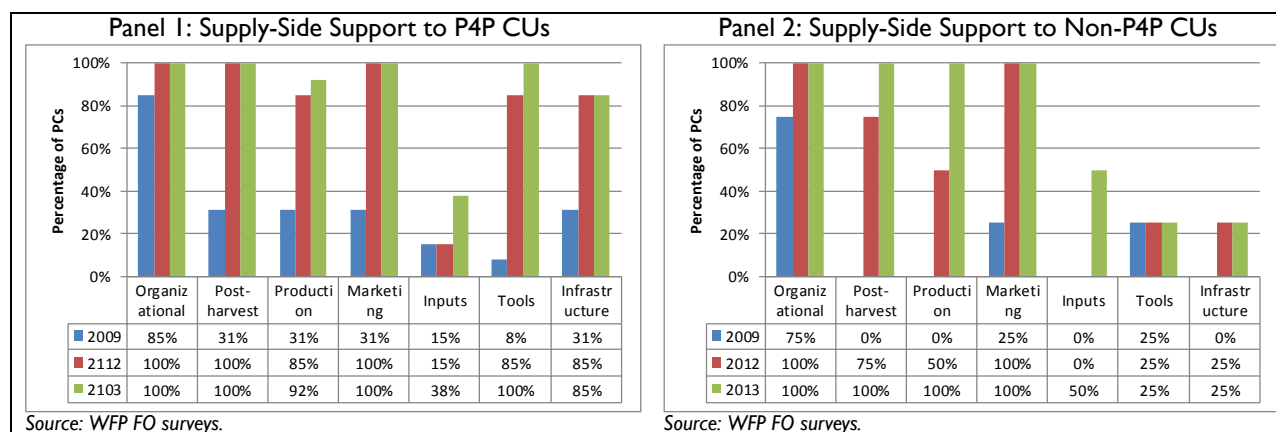
The results framework of Figure 5 postulates that access to post-harvest infrastructure, WFP's procurement, and other supply-side support are important factors facilitating improvements in organizational capacity. At the time of the baseline, all of the 13 P4P-supported CUs had access to substantial storage capacity. WFP and its partners invested directly in enhancing warehouse capacity in 11 of the 13 surveyed P4P-supported CUs. Furthermore, they provided warehouse equipment and machinery to all 13 CUs and bolstered the investments with training (to all CUs) in post-harvest handling and storage and quality control. Supply-side support proved by WFP and partners also included training in agribusiness management; credit and finance; institutional capacity building; gender; production and productivity; and WFP procurement and payment procedures (Table 5).

WFP's commitment to provide a market for high quality commodities should have catalyzed this supply-side support. For these particular areas of support, however, WFP played a key role in directing and financing the activities. The growth in the percentage of CUs that reported receiving supply-side support illustrated in Panel 1 of Figure 9 is, therefore, an element of the P4P treatment and not necessarily catalyzed by WFP's

procurement. Interestingly, the percentage of non-P4P CUs that reported receiving supply-side support also increased during the time of the P4P pilot. Differences between the percentage of P4P and non-P4P CUs receiving supply side support were statistically significant only for post-harvest assistance in 2012 and tools and infrastructure in 2012 and 2013. The latter two almost certainly reflect the investments WFP and partners made in providing and equipping warehouses.

Finally, the consistency and size of WFP’s procurement is also an important facilitating factor contributing to building organizational capacity. The “WFP Procurement” section on page 16 summarizes WFP’s procurement from P4P CUs and concludes that WFP provided a reasonably consistent and sizable procurement stimulus.

**FIGURE 9: ORGANIZATIONAL CAPACITY FACILITATORS - CUS**



The improved facilitating environment should have contributed to improved organizational capacity as measured by a greater range of services offered to members, the ability to facilitate members’ access to production inputs and provide production training to members, and greater use of planning for production and marketing.

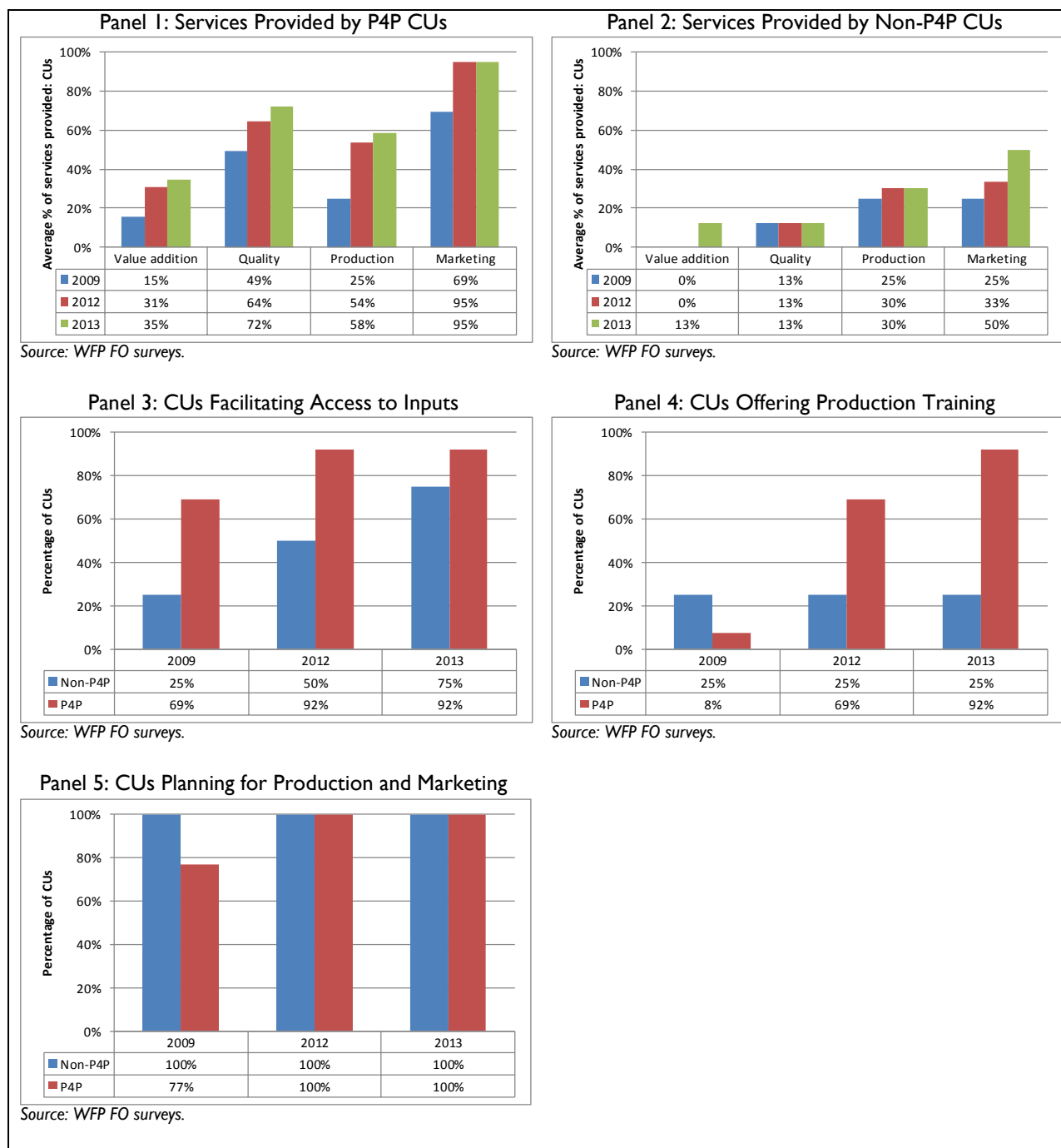
The FO survey asked whether FOs provided a range of 18 different services; too many to examine individually. The services fall into four categories; value addition, quality, production, and marketing.<sup>10</sup> The analysis aggregates the services into these four categories and defines four service capacity indicators as the percentage of the services within a category the FO provides. Panels 1 and 2 of Figure 10 illustrate trends in the average percentage of services offered by P4P and non-P4P CUs, respectively.

At the time of the 2009 baseline, P4P CUs offered a significantly larger percentage of quality and marketing services than did non-P4P CUs. Figure 10 shows steady growth in the average percentage of all four services offered by P4P CUs while non-P4P CUs exhibited much lower growth rates (Panel 2 of Figure 10). In fact, the growth in the percentage of services offered by P4P CUs exceeded that for non-P4P CUs for every service.

<sup>10</sup> The value addition category includes two services; small-scale food processing and milling. The quality category includes eight services; drying commodities, cleaning commodities, removing small/broken grains, removing discolored grains, use of storage facilities, use of cleaning facilities, use of drying equipment, and fumigation. Production includes five services; technical assistance in agricultural technologies and practices, supplying agricultural inputs, facilitating access to inputs, maize threshing/shelling, and draft power. Marketing includes the three services of transporting good to buyers/markets, weighing and bagging, and aggregating commodities for sale.

Panel 3 of Figure 10 shows a greater growth in the percentage of P4P CUs than non-P4P CUs facilitating access to inputs for members. Recall that WFP and its partners established links between P4P CUs and credit providers specifically to facilitate access to fertilizer. Panel 4 of Figure 10 shows much greater growth in the percentage of P4P CUs than non-P4P CUs offering production training to their members, a result that tracks the fact that WFP and partners specifically trained all 13 P4P-supported CUs in production. Finally, almost all P4P and non-P4P CUs reported planning for production and marketing (Panel 5 of Figure 10) and there was little room for improvement. The few P4P CUs that were not planning in 2009, however, were by 2012.

**FIGURE 10: ORGANIZATIONAL CAPACITY INDICATORS - CUs**





## DiD Estimates of the Impact of P4P on Organizational Capacity - CUs

Table 6 reports DiD estimates of the impact of participating in P4P on key organizational capacity indicators for CUs. The underlying data are from the panel of 13 P4P and 4 non-P4P CUs collected in 2009, 2012, and 2013. Estimated coefficients reflect the marginal impact of participating in P4P on the outcome of interest. For example, the 0.2308 coefficient for the change in the percentage of quality services provided between 2009 and 2013 means that the average percentage of quality services provided by P4P CUs increased by 23 percent relative to the change among non-P4P CUs. If non-P4P CUs represent a suitable counterfactual, then the change can be interpreted as the change relative to the outcome that would have occurred had the CU not participated in P4P. The “\*” associated with some coefficients in Table 1 indicate the level of statistical significance. Coefficients without “\*” are not statistically different from zero, i.e., no impact.

A negative value does not necessarily mean that the value of the outcome declined, *it means it declined for P4P CUs relative to non-P4P CUs*.

**TABLE 6: DID ESTIMATES OF THE IMPACT OF P4P ON CUS’ ORGANIZATIONAL CAPACITY**

Model	Impact (coefficient/p-value)			N	R <sup>2</sup>
	2009-2012	2012-2013	2009-2013		
Percentage of value addition services provided (cumulative %)	.01538* (0.0690)	-0.0865 (0.4830)	0.0673 (0.6550)	34	.0719
Percentage of quality services provided (cumulative %)	0.1538** (0.0250)	0.0769 (0.1280)	0.2308*** (0.0060)	34	0.1080
Percentage of production services provided (cumulative %)	0.2423*** (0.0060)	0.0462 (0.1850)	0.2885*** (0.0020)	34	0.3711
Percentage of marketing services provided (cumulative %)	0.1731* (0.1030)	-0.1667* (0.0700)	0.0064 (0.9510)	34	0.3302
Likelihood of facilitating access to inputs (cumulative %)	-0.0192 (0.9420)	-0.2500 (0.2870)	-0.2692 (0.3740)	34	0.1072
Likelihood of providing production training (cumulative %)	0.6154*** (0.0000)	0.2308* (0.0730)	0.8462*** (0.0000)	34	0.2764
Likelihood of planning for production and marketing (%)	0.2308* (0.0730)	-0.0000 (0.2660)	0.2308* (0.0830)	34	0.1563

Numbers in parentheses are p-values.

\* significant at  $p < 0.10$

\*\* significant at  $p < 0.05$

\*\*\* significant at  $p < 0.01$

The results reported in Table 6 support the following conclusions regarding the impact of P4P on CU organizational capacity.

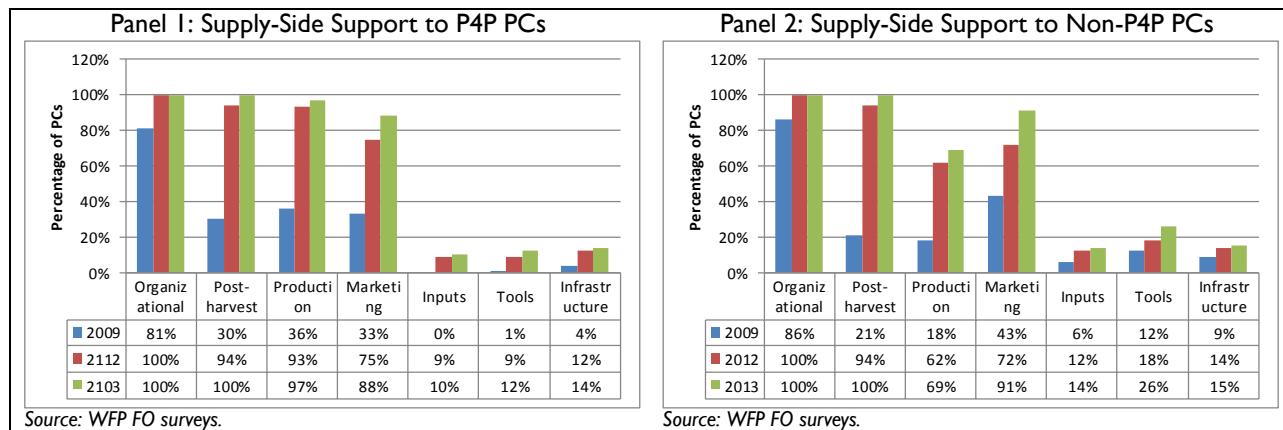
- Participating in P4P significantly increased (by 23 percentage points) the percentage of quality and production services P4P CUs offered relative to what would have occurred had the CU not participated in P4P.
- Participating in P4P significantly increased (by 29 percentage points) the percentage of P4P CUs that offered production training to members. This result corresponds to WFP’s focus on production training in Ethiopia.
- Participating in P4P led to a significant 85 percentage point increase in the percentage of P4P CUs planning for production and marketing relative to what they would have done without P4P.

## Visual Inspection - PCs

Except for WFP's procurement stimulus, which will have a less direct effect, the factors facilitating organizational capacity building among PCs are the same as those associated with CUs; supply-side support and post-harvest infrastructure. P4P and non-P4P PCs reported receiving similar levels of supply-side support in 2009, prior to the start of P4P. In fact, the only statistically significant baseline differences between P4P and non-P4P PCs were that P4P PCs were significantly more likely than non-P4P CUs to have received assistance with production, input, and tools. By 2013, the only significant differences were in production and tools and in both cases P4P PCs gained relative to non-P4P PCs (Panels 1 and 2 of Figure 11).

Survey data on PCs' access to storage and storage capacity are not consistent<sup>11</sup> so it was not possible to examine this facilitating factor.

**FIGURE 11: ORGANIZATIONAL CAPACITY FACILITATORS - PCS**



Organizational capacity indicators for PCs are also the same as for CUs; services provided, facilitating access to inputs, offering production training, and planning for production and marketing. Figure 12 presents trends in each of these indicators.

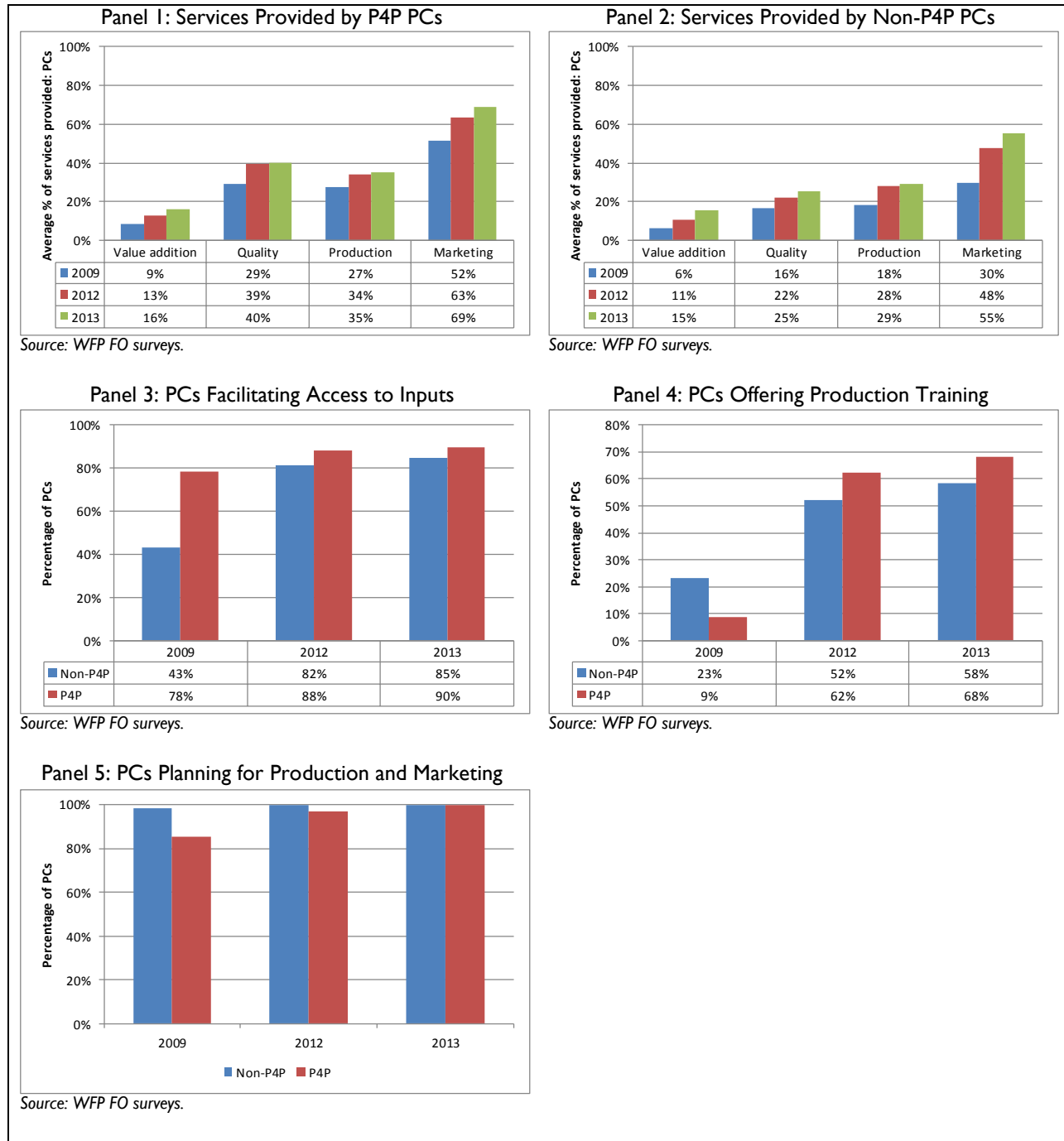
On average, P4P PCs offered a significantly greater percentage of quality, production, and marketing services to their members in 2009 than did non-P4P PCs. Trends in the services indicators between 2009 and 2013 appear similar (Panels 1 and 2 of Figure 12). Both groups of PCs seemed more focused on marketing than on the other services.

Non-P4P PCs appear to have experienced more improvement than P4P PCs in terms of facilitating members' access to inputs (Panel 3 of Figure 12). This is a somewhat surprising result in light of the fact that WFP helped link 100 percent of P4P-supported CUs to credit providers specifically to improve access to fertilizer.

P4P PCs' abilities to provide production training to members increased relative to non-P4P PCs (Panel 4 of Figure 12). As with CUs, a large percentage of PCs, both P4P and non-P4P reported planning for production and marketing so there was little room for improvement in either group (Panel 5 of Figure 12).

<sup>11</sup> Many PCs reported having access to storage in 2009 but not in subsequent years. This result might be understandable in a few cases but not in many cases which included storage the PCs claimed to own.

**FIGURE 12: ORGANIZATIONAL CAPACITY INDICATORS - PCs**



**DiD Estimates of the Impact of P4P on Organizational Capacity - PCs**

The much larger sample of PCs facilitates a more rigorous approach to causal analysis. The DiD estimates in this section are derived from a regression model that controls for factors other than P4P that could affect observed results. The covariates selected are those on which P4P and non-P4P PCs differed significantly at the time of the baseline, might be expected to affect outcomes, and are uncorrelated with the treatment. To

ensure exogeneity all covariates are measured at their baseline values. Covariates are omitted from the analysis when they are also the outcome of interest. For example, the estimates of the impact of P4P on the percentage of quality services provided does not include the percentage of quality services provided as an explanatory variable.

Table 7 summarizes the covariates used in the PC analysis.

**TABLE 7: COVARIATES IN PC ANALYSIS**

Variable description	Baseline values				
	P4P status	N	Mean	Median	Standard deviation
Years since CU was established	Non-P4P	68	23.87	31.00	10.78
	P4P	70	15.73	10.00	11.17
Indicator marketing activity prior to baseline	Non-P4P	68	0.51	1.00	0.50
	P4P	70	0.44	0.00	0.50
Number of members	Non-P4P	68	1,324	1,069	923
	P4P	70	1,022	839	862
Number of full-time employees	Non-P4P	68	10.13	11.00	4.04
	P4P	70	13.03	13.00	8.12
Distance to usual market	Non-P4P	68	33.26	5.00	74.17
	P4P	70	28.87	13.00	51.34
Indicator of planning for production and marketing	Non-P4P	68	0.98	1.00	0.12
	P4P	70	0.86	1.00	0.35
Indicator of experience with contract sales	Non-P4P	68	0.50	0.50	0.50
	P4P	70	0.17	0.00	.038
Indicator of receiving production assistance	Non-P4P	68	0.22	0.00	0.42
	P4P	70	0.36	0.00	0.48
Indicator of receiving assistance with tools	Non-P4P	68	0.12	0.00	0.32
	P4P	70	0.01	0.00	0.12
Indicator of receiving assistance with Inputs	Non-P4P	68	0.06	0.00	0.24
	P4P	70	0.00	0.00	0.00
Percentage of quality services provided	Non-P4P	68	0.16	0.12	0.19
	P4P	70	0.29	0.25	0.23
Percentage of marketing services provided	Non-P4P	68	0.32	0.33	0.34
	P4P	70	0.52	0.67	0.24
Percentage of production services provided	Non-P4P	68	0.18	0.20	0.17
	P4P	70	0.27	0.30	0.15

The visual inspection suggested that participating in P4P may be associated with a reduced (relative to non-P4P PCs) likelihood of facilitating members' access to inputs and increased abilities to provide production training to members. The results presented in Table 8, however, find few changes that can be attributed to PCs participating in P4P. In fact, the only statistically significant positive effect is a 10 percentage point increase in the percentage of P4P PCs planning for production and marketing relative to what would have occurred without P4P. The small negative results between 2012 and 2013 in the percentage of quality and production services offered by P4P PCs relative to non-P4P PCs and the percentage providing production training to members are not particularly worrisome because the indicator value increased and there is no reason to expect that participating in P4P would have depressed these indicators for P4P PCs relative to non-P4P PCs.

**TABLE 8: DiD ESTIMATES OF THE IMPACT OF P4P ON PCs' ORGANIZATIONAL CAPACITY**

Model	Impact (coefficient/p-value)			N	R <sup>2</sup>
	2009-2012	2012-2013	2009-2013		
Percentage of value addition services provided (cumulative %)	0.0327 (0.2100)	-0.0181 (0.4130)	0.0146 (0.6690)	268	0.0980
Percentage of quality services provided (cumulative %)	-0.0026 (0.9370)	-0.0414** (0.0180)	-0.0439 (0.1990)	268	0.3418
Percentage of production services provided (cumulative %)	0.0159 (0.4660)	-0.0067 (0.6080)	0.0092 (0.7020)	268	0.5748
Percentage of marketing services provided (cumulative %)	0.0219 (0.4300)	-0.0603** (0.0520)	-0.0384 (0.2160)	268	0.4738
Likelihood of facilitating access to inputs (cumulative %)	0.0715 (0.2800)	-0.0150 (0.6930)	0.0565 (0.4600)	268	.6050
Likelihood of providing production training (cumulative %)	0.0881 (0.3630)	-0.1317** (0.0270)	-0.0435 (0.6500)	268	0.3610
Likelihood of planning for production and marketing (%)	0.0963*** (0.0130)	0.0042 (0.7820)	0.1005** (0.0170)	268	0.1922

Numbers in parentheses are p-values.

\* significant at  $p < 0.10$

\*\* significant at  $p < 0.05$

\*\*\* significant at  $p < 0.01$

In summary, with the exception of a small increase in the percentage of P4P PCs planning for production and marketing, participating (indirectly) in P4P appears to have had little effect on PCs' organizational capacity as measured by the selected indicators.

### Impact of P4P on FOs' Marketing Capacity

The results framework of Figure 5 identifies four factors that should facilitate improvements in CUs' marketing capacity. These include consistent and sizeable WFP procurement, trust of membership/transparency, improved access to credit, and the extent of CUs' engagement with quality-conscious buyers. Anticipated marketing capacity outcomes include increased quantities aggregated and sold, accessing a larger range of markets (including quality-conscious buyers), the ability to facilitate financing for members, and obtaining higher prices. This section investigates, visually and then analytically, changes in these facilitating factors and outcomes for CUs and then for PCs.

### Visual Inspection - CUs

Previous sections have already documented trends in WFP's procurement from P4P CUs and concluded that it provided a meaningful and relatively consistent procurement stimulus. Panel 1 of Figure 13 compares trends in utilizing credit between P4P and non-P4P CUs. P4P CUs experienced a slight bump in utilizing credit in 2012 relative to non-P4P CUs but otherwise the two groups appear very similar. The data provide no direct indicators of trust or transparency. However, the fact that all P4P CUs were trained in agribusiness management, credit and finance, and institutional capacity building should have increased leaders' capacity for transparent operation.

In terms of marketing outcome indicators, Panel 2 of Figure 13 shows little difference between P4P and non-P4P CUs in terms of their ability to provide financing to members. In 2013 however, none of the non-P4P CUs reported providing financing while the percentage of P4P CUs providing financing jumped to 85

percent. The increase in the percentage of P4P CUs offering financing to members coincides with the Commercial Bank of Ethiopia endorsing WFP's forward delivery contracts as a criterion for qualifying for loans. This represents a change from the bank's pre-P4P policy. However, delays submitting documents and lengthy internal procedures at the bank prevented many CUs with forward delivery contracts from accessing the loans.<sup>12</sup>

Panels 3 and 4 of Figure 13 review data on overall sales and sales to buyers other than WFP. Panel 3 shows that P4P CUs were quite involved with other buyers before P4P (2009). In 2009, 62 percent of P4P CUs reported selling maize to buyers other than WFP and the cumulative percentage increased to 85 percent by 2013. The percentage selling to WFP followed a similar trajectory for 2012 and 2013. In terms of quantities sold, however, CUs sold much more maize to WFP than to other buyers. Collectively, the 13 surveyed P4P CUs reported selling 99 percent of their maize to WFP in 2012 and 95 percent in 2013.

Although quantities sold fluctuate widely from year to year, the dramatic increase in 2012 and 2013 relative to 2009 suggests that P4P stimulated a substantial increase in quantities of maize sold. Survey data on CU's marketing activity in the two years prior to the 2009 baseline supports this conclusion. P4P CUs were very engaged in marketing with 85 percent reporting selling crops. They reported selling a wide variety of crops however, with relatively large percentages reporting sales of wheat and teff. In terms of quantity, P4P CUs reported selling much more wheat on average (1,142 mt) than maize (467 mt). The quantities sold to WFP in 2012 and 2013 therefore represent significant increases in the quantities of maize P4P CUs were able to aggregate and sell.

Non-P4P CUs were also active in marketing with 100 percent reporting selling crops in 2009 (Panel 4 of Figure 13). Non-P4P CUs, however, sold primarily soy beans (1,300 mt on average) and wheat (667 mt on average) and reported selling very little maize (91 mt on average). Unlike P4P CUs, non-P4P CUs reported no increase in maize marketing. Seventy-five percent (3 CUs) reported selling maize in 2009 and none of the CUs reported selling maize in 2012 or 2013. Furthermore, the average quantity sold in 2009 (75 mt) was very small relative to P4P CUs. At least on the basis of visual inspection, P4P seems to have stimulated a substantial increase in maize marketing activity as measured by quantities sold overall but it has had little effect on market diversity since WFP appears to be mopping up most of what the CUs sell.

The data on prices CUs received for maize were too thin to reach any conclusions about whether P4P-supported CUs received higher prices than non-P4P CUs or whether WFP paid more than other buyers.

## **DiD Estimates of the Impact of P4P on Marketing Capacity - CUs**

Table 9 presents DiD estimates of the impact of P4P on CUs' marketing capacity. Because the number of observations on CUs was so small, the estimates are from a non-parametric DiD model that does not control for differences between P4P and non-P4P CUs that may have differentially affected outcomes. Their validity as accurate estimates of causal effects depends, therefore, on their being statistically equivalent, an assumption that is almost certainly not strictly supported. However, the few baseline differences between P4P and non-P4P CUs suggests that they may not be too dissimilar.

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<sup>12</sup> Ethiopia P4P Story.

FIGURE 13: EVOLUTION OF CU MARKETING CAPACITY

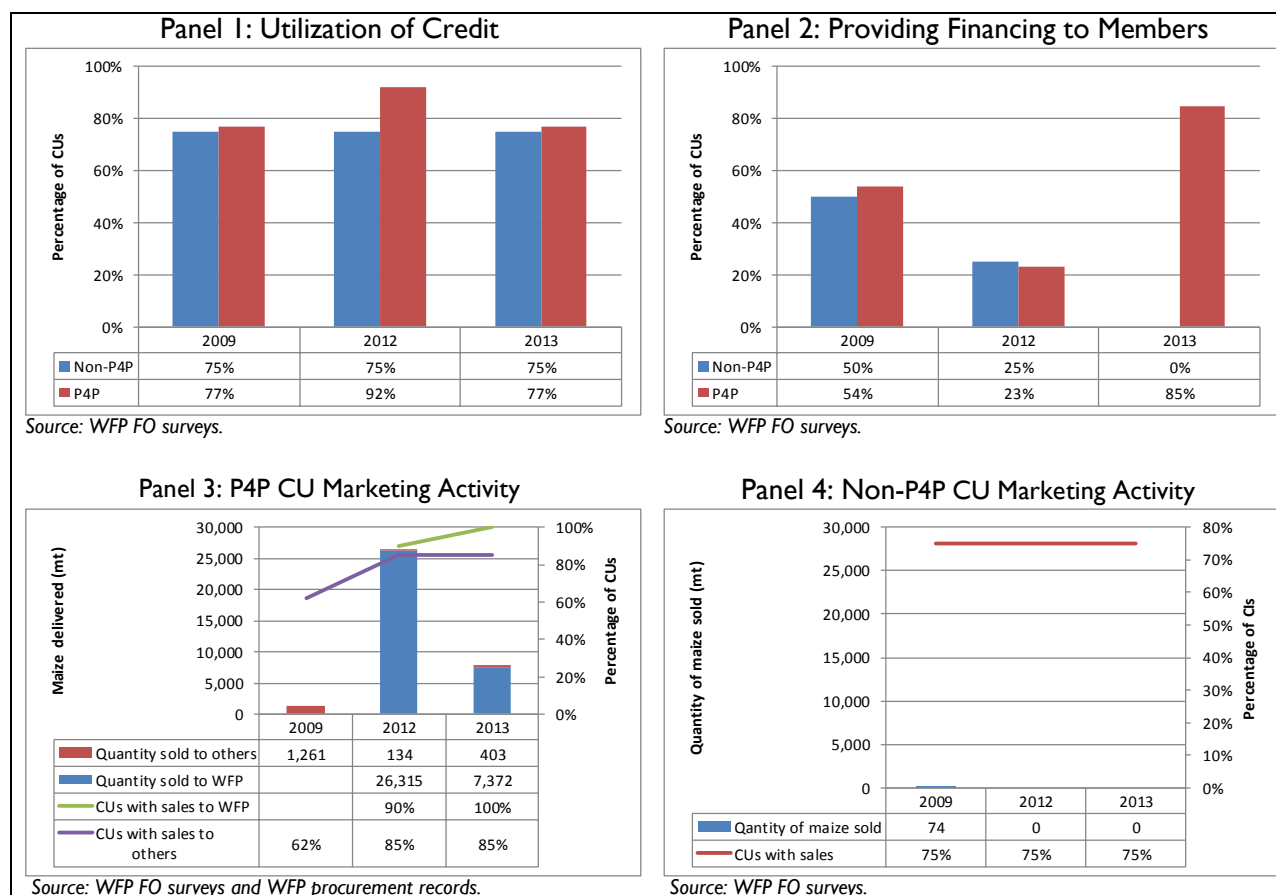


TABLE 9: DID ESTIMATES OF THE IMPACT OF P4P ON CUS' MARKETING CAPACITY

Model	Impact (coefficient/p-value)			N	R <sup>2</sup>
	2009-2012	2012-2013	2009-2013		
Likelihood of utilizing credit (%)	0.1538 (0.7090)	-0.1538 (0.1590)	0.0000 (1.0000)	34	0.0769
Total quantity of maize sold to any buyer	-543 (0.2670)	902*** (0.0030)	359 (0.4510)	34	0.2453
Likelihood of selling maize to buyers other than WFP (%)	0.2308* (0.0730)	-0.0000 (0.3360)	0.2308* (0.0830)	34	0.1563
Average quantity of maize sold to buyers other than WFP (%)	-627 (0.1920)	31 (0.7000)	.596 (0.2040)	34	0.1030
Likelihood of providing financing to members (%)	-0.0577 (0.8450)	0.8654*** (0.0030)	0.8077** (0.0320)	34	.04115

Numbers in parentheses are p-values.

\* significant at  $p < 0.10$

\*\* significant at  $p < 0.05$

\*\*\* significant at  $p < 0.01$

The statistically significant effects on CUs' marketing capacity associated with participating in P4P include:

- Between 2012 and 2013, P4P CUs significantly increased the average quantity of maize they sold relative to non-P4P CUs. Participating in P4P was responsible for increasing the average quantity sold by 902 mt relative to non-P4P CUs.
- Participating in P4P significantly increased P4P CUs' likelihood of selling maize (by 23 percentage points) relative to non-P4P CUs.
- Participating in P4P was associated with a significant increase in the likelihood of providing financing to members. The magnitude of the impact was 86 percentage points between 2012 and 2013 and 81 percentage points between 2009 and 2013.

## Visual Inspection - PCs

The facilitators and indicators of marketing capacity relevant to PCs are the same as those for CUs. The major difference is that the stimulus provided by WFP's procurement is indirect in the sense that it is transmitted to PCs through the CUs from which WFP buys. The section on WFP's procurement (page 16) concluded that even the diluted stimulus experienced by PCs was relatively meaningful in the context of PCs' typical sales volumes. Because CUs did not record which PCs contributed commodities to a WFP contract, it is not possible to determine the consistency of the procurement stimulus at the PC level.

Panel 1 of Figure 14 shows that a slight majority of P4P and non-P4P PCs reported receiving loans prior to P4P but the difference between the two groups was not statistically significant. Between 2009 and 2012, the percentage of P4P PCs that received loans increased by much more than among non-P4P PCs (34 percentage points for P4P CUs compared to 11 percentage points for non-P4P CUs)..

Prior to P4P, a large majority (80 percent) of P4P PCs reported having received external assistance with organizational capacity building. The percentage increased to 100 percent by 2012 and this may have increased the transparency of operations and the trust of members.

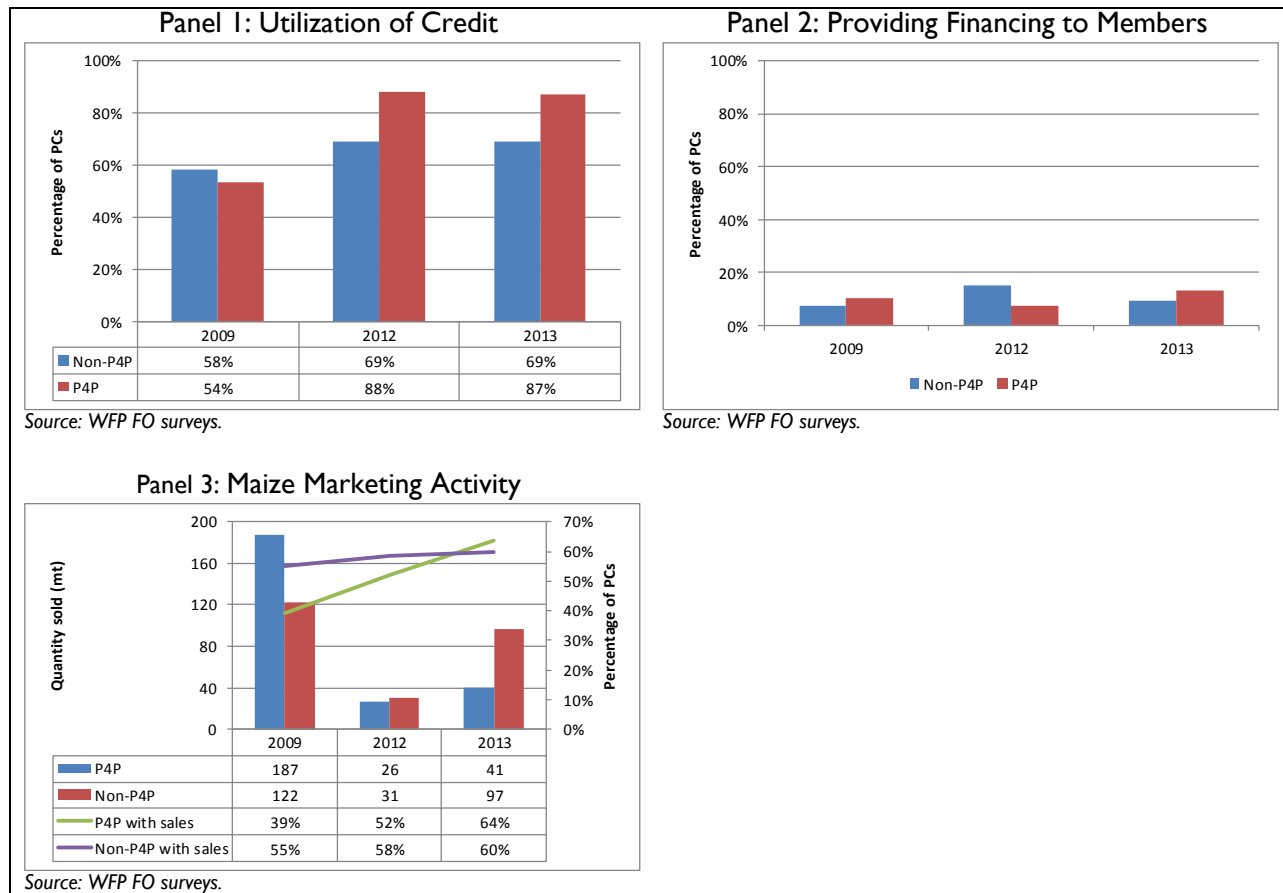
A meaningful procurement stimulus, increased use of credit, and training aimed at building organizational capacity established some of the facilitating conditions that support increased marketing capacity. However, neither P4P nor non-P4P PCs showed much progress in their ability to provide financing to members between harvest and sale, an important indicator of marketing capacity (Panel 2 of Figure 14). With respect to marketing, Panel 3 of Figure 14 shows an increase in the cumulative percentage of PCs that reported selling maize for both P4P and non-P4P PCs. And while P4P PCs sold more maize on average than non-P4P PCs in 2009, the roles were reversed by 2013.

The PC data provides somewhat more information on prices than the CU data, between 17 and 36 observations per P4P status/survey stratum. These data (Panel 1 of Figure 15) show prices generally tracking, albeit at a lower level, annual average wholesale prices in Addis Ababa. The differential may reflect transportation costs, quality enhancement, or season of sale. None of the differences between prices received by P4P and non-P4P PCs are statistically significant.

Panel 2 of Figure 15 examines maize prices reported by households. The prices households reported receiving did not track wholesale prices as well as the PC-reported data. But, as with the PC-reported data, there was no statistically significant difference between prices reported by P4P and non-P4P households. Panel 3 of Figure 15 shows average prices households reported disaggregated by whether the household



**FIGURE 14: EVOLUTION OF PC MARKETING CAPACITY**



reported selling through the PC. There was no statistically significant difference in prices between households that reported selling maize through the PC and those that did not.

Visual inspection of the PC data reveals few obvious differences between P4P and non-P4P PCs, with the possible exception of the percentage utilizing credit and the quantity of maize sold.

### DiD Estimates of the Impact of P4P on Marketing Capacity - PCs

Table 10 reports DiD estimates of the impacts of P4P on PCs' maize marketing capacity indicators. These estimates largely confirm the visual inspection. The only statistically significant positive impact was a 22 percentage point increase in the percentage of P4P PCs providing financing to members relative to non-P4P PCs. As with CUs, this may be a result of CUs being able to access credit with the collateral of a forward delivery contract with WFP.

The large (relative to average sales volumes) and significant decline in the average quantity of maize P4P PCs reported selling relative to non-P4P PCs is difficult to interpret in the context of the large quantities WFP procured through the CUs. In 2012 (the calendar year associated with data collected in 2013), however, WFP used forward delivery contracts for almost 75 percent of its P4P purchases. It is possible that, at the time of the survey, the PCs had not yet delivered against these contracts and thus did not report sales associated with the WFP contracts.

FIGURE 15: AVERAGE MAIZE PRICES - PCs

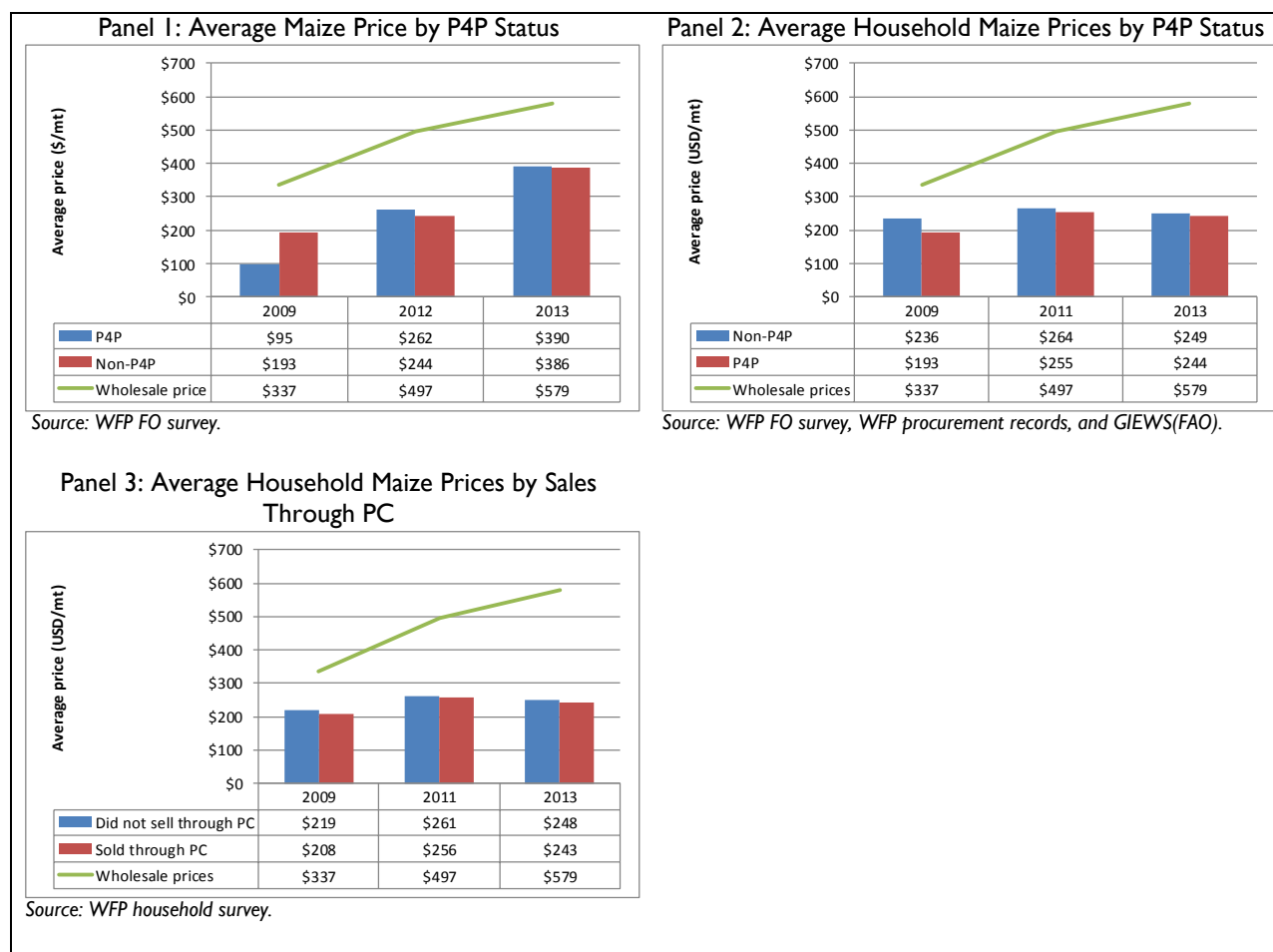


TABLE 10: DID ESTIMATES OF THE IMPACT OF P4P ON PCs' MARKETING CAPACITY

Model	Impact (coefficient/p-value)			N	R <sup>2</sup>
	2009-2012	2012-2013	2009-2013		
Likelihood of utilizing credit (%)	0.0698 (0.5140)	0.0426 (0.5080)	0.1124 (0.3520)	268	0.2482
Likelihood of selling maize (%)	0.1830* (0.0780)	-0.0550 (0.6680)	0.1280 (0.2700)	268	0.2873
Average quantity of maize sold (mt)	-111** (0.0300)	-21 (0.2240)	-132** (0.0180)	268	0.3632
Likelihood of providing financing to members (%)	-0.1262 (0.1770)	0.2235* (0.0550)	0.0973 (0.3220)	268	0.1295

Numbers in parentheses are p-values.

\* significant at  $p < 0.10$

\*\* significant at  $p < 0.05$

\*\*\* significant at  $p < 0.01$

# IMPACT OF P4P ON HOUSEHOLD MARKETING, PRODUCTION, AND WELFARE

The household analysis examines three broad categories of impacts aligned with the results framework of Figure 6; maize production, maize marketing, and household welfare. The sections on maize production and marketing present evidence of the impact of P4P on maize production and marketing “facilitators”, behavioral change, and intermediate production and marketing outcomes. The household welfare section examines the combined effect of production and marketing on income and other measures of household wellbeing.

Each of the three main sections first presents the data in a graphical format that visually illustrates trends in the indicators over time for both P4P and non-P4P households and differences between the two groups. The analysis then presents DiD estimates derived from a regression model that incorporates covariates to control for factors other than participation in P4P that may influence the outcome measures differently for P4P and non-P4P households. Relevant covariates include factors that might be expected to differentially influence outcomes and which are exogenous to the treatment. Many of the candidate variables are not exogenous. For example, higher maize yields might indicate that a particular farmer is more likely to be using productivity-enhancing technologies or practices which are also anticipated outcomes of the treatment. For this reason, the regressions use baseline values for the selected covariates which are exogenous because they are measured prior to the treatment. Table 11 describes and summarizes baseline values for the covariates included in the analysis.

Location-specific characteristics such as weather, agricultural productivity, input availability, population, distance to urban centers, and transportation infrastructure might also influence agricultural production and marketing activity. To control for these factors, the covariate model included dummy variables for each of the three regions in which the households reside.<sup>13</sup>

The P4P development hypothesis suggests that many of the anticipated household-level outcomes of P4P are contingent on selling through the PC. However, few surveyed households reported selling through the PCs. In fact, only 27 percent of non-P4P households and 33 percent of P4P households reported having sold through the PCs at any time between 2009 and 2013. In an attempt to isolate impacts for this group of households, a separate set of analyses estimated impacts for all household indicators using selling through the PCs as the treatment. Those analyses identified no significant impacts, perhaps because the numbers are very small, and the results are not reported here.

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<sup>13</sup> Amhara, Oromiya, and SNNPR.

TABLE 11: COVARIATES IN HOUSEHOLD ANALYSIS

Variable description	Baseline values				
	P4P status	N	Mean	Median	Standard deviation
Indicator of HH head completing at least a secondary education	Non-P4P	278	0.11	0.00	0.32
	P4P	312	0.14	0.00	0.35
Indicator of female HH head	Non-P4P	278	0.09	0.00	0.28
	P4P	312	0.10	0.00	0.36
Age of HH head	Non-P4P	278	47.49	45.00	12.27
	P4P	312	45.44	44.50	12.10
Indicator of HH head being engaged in agriculture	Non-P4P	274	0.97	1.00	0.16
	P4P	309	0.97	1.00	0.17
Food consumption score	Non-P4P	278	42.29	40.5	10.67
	P4P	312	45.12	40.75	12.47
Value of crops produced	Non-P4P	278	4,962	3,960	4,268
	P4P	312	6,212	4,567	5,941
Value of crops consumed	Non-P4P	278	4,073	3,250	3,396
	P4P	312	5,045	3,761	4,820
Expenditure on HH items	Non-P4P	278	1,183	973	801
	P4P	312	1,495	1,095	1,723
Income from farming	Non-P4P	278	5,228	4,250	4,373
	P4P	312	6,386	4,719	6,024
Total HH income from all sources	Non-P4P	278	6,760	5,795	4,836
	P4P	312	7,979	6,353	6,581
Indicator of getting price information from FO	Non-P4P	278	0.34	0.00	0.47
	P4P	312	0.43	0.00	0.50
Family size	Non-P4P	278	6.64	7.00	2.23
	P4P	312	6.21	6.00	2.44
Indicator of selling through the FO	Non-P4P	278	0.04	0.00	.020
	P4P	312	0.08	0.00	0.27
Indicator of cultivating maize	Non-P4P	278	0.66	1.00	0.48
	P4P	312	0.72	1.00	0.45
Quantity sold through the FO	Non-P4P	278	0.01	0.00	0.10
	P4P	312	0.03	0.00	0.15

## Impact of P4P on Household Maize Marketing

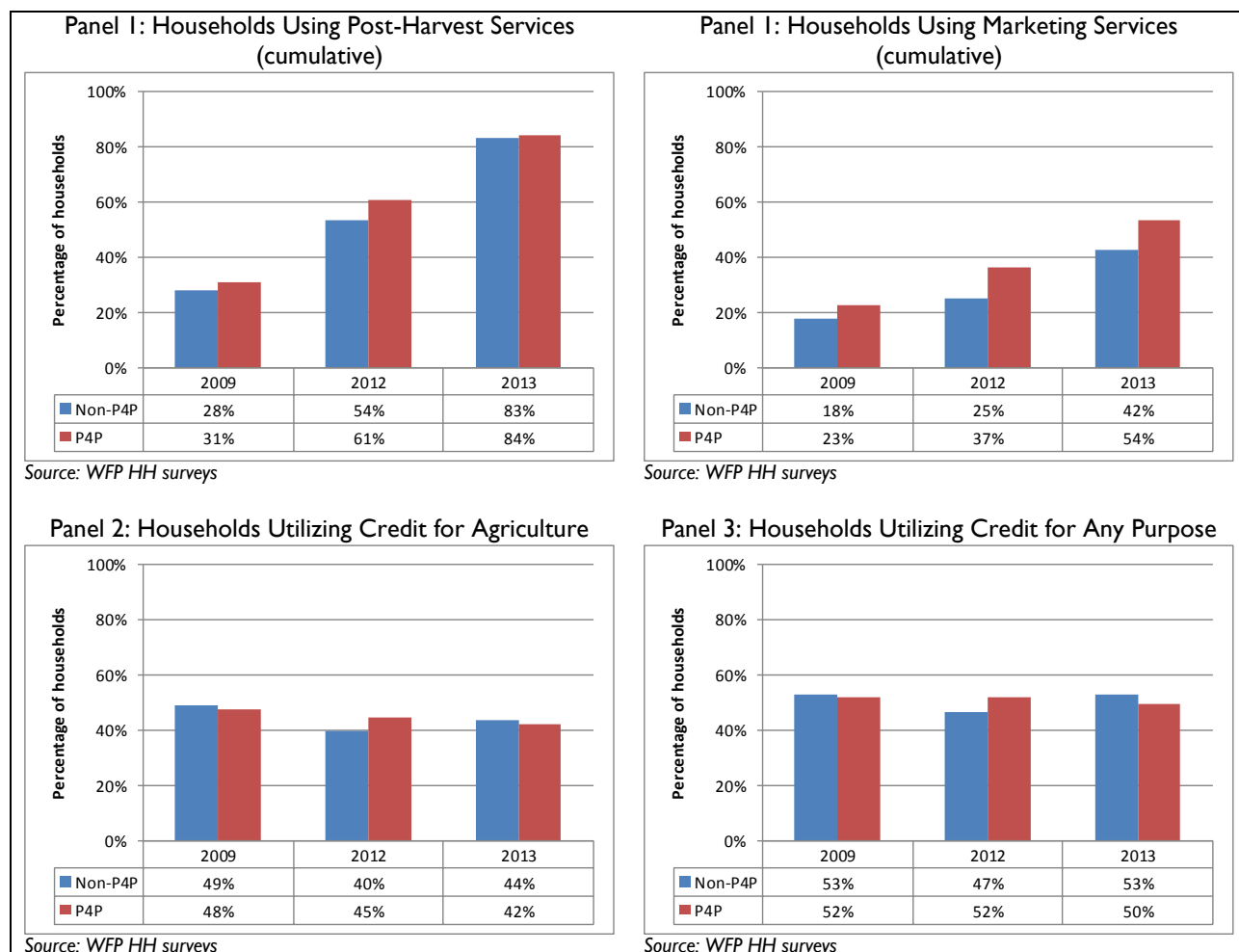
Following the outline of the results framework illustrated in Figure 6, this section first examines changes in the factors facilitating changes in household marketing behavior and then links them to observed changes in marketing decisions, i.e., the location and timing of sales. It then presents evidence of changes in facilitating factors for intermediate marketing outcomes and links them to observed changes in prices received for maize, the primary intermediate household marketing outcome.

### Visual Inspection

With respect to household marketing facilitators, the PC analysis found a sharp and significant decline in the quantity of maize P4P PCs sold relative to non-P4P PCs. It illustrated 11 percentage point and 17 percentage point increases, respectively, in the average percentage of quality and marketing services that PCs offered to members but these increases were not statistically different from those reported by non-P4P PCs. From the household perspective, the percentage of households that reported using post-harvest and marketing services

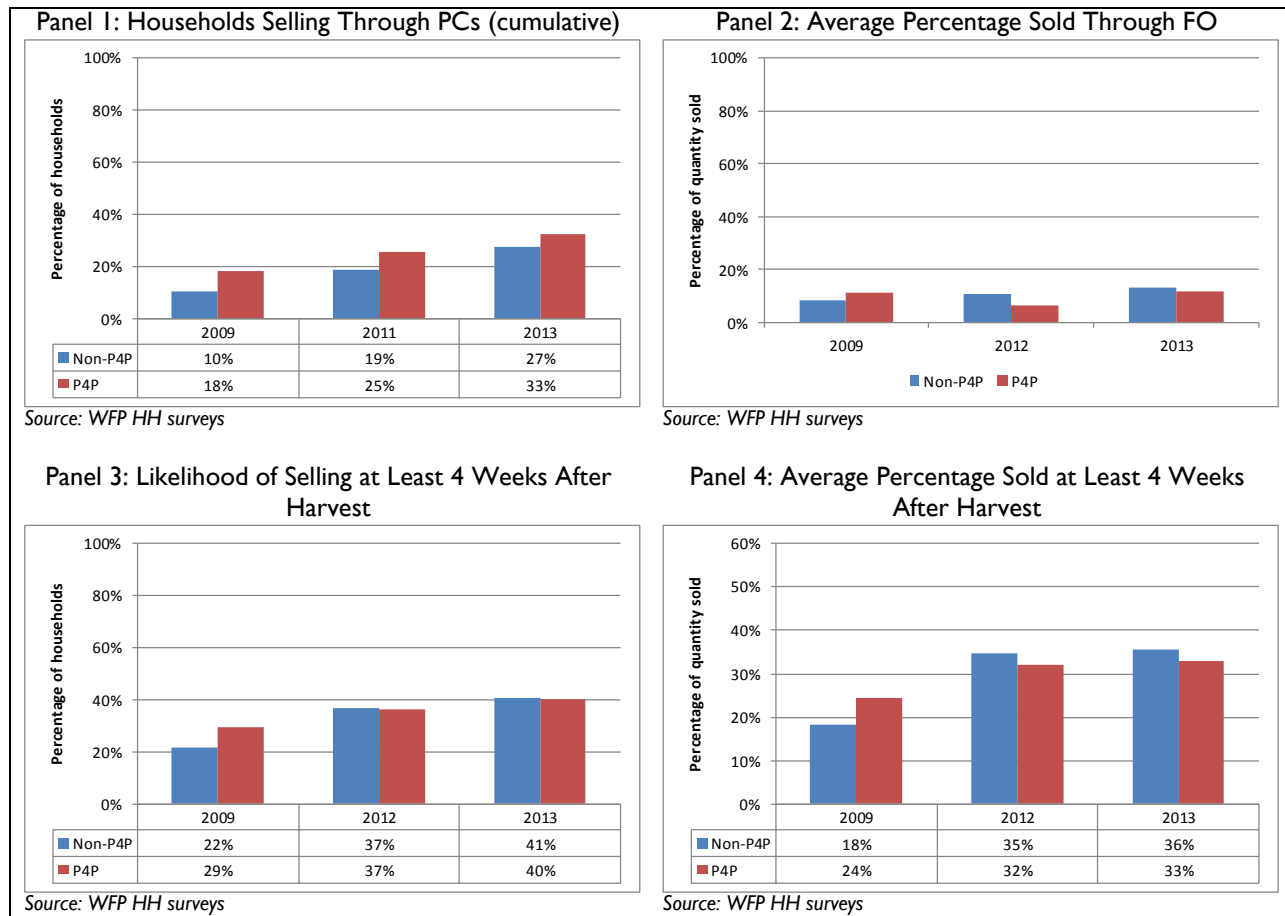
increased (Panels 1 and 2 of Figure 16). The percentage of households using credit for agricultural or other purposes remained relatively flat for both P4P and non-P4P households (Panels 1 and 2 of Figure 16). The only statistically significant differences between P4P and non-P4P households were the likelihood of using marketing services in 2011 and 2013 and the likelihood of using post-harvest services in 2011.

**FIGURE 16: HOUSEHOLD MAIZE MARKETING FACILITATORS**



Visual inspection of household marketing facilitators shows few improvements for P4P households relative to non-P4P households. It is, therefore, not surprising that P4P and non-P4P households reported similar changes in maize marketing behavior, i.e., selling through the PC and the selling four weeks or more after harvest (Figure 17). In fact, the only statistically significant difference between P4P and non-P4P households was the percentage that reported selling through the PC in 2009.

**FIGURE 17: LOCATION AND TIMING OF MAIZE SALES**



Households with a marketable surplus will generally find a way to sell the surplus. The percentage of households selling maize and the quantities sold are therefore more related to production than to marketing. Nevertheless, Figure 18 presents the household data on maize surpluses and sales as context for other marketing outcomes. P4P and non-P4P households reported similar trends in these four marketing parameters. In fact, there were no statistically significant differences between the two groups of households on any of the four indicators in any time period.

**FIGURE 18: MAIZE MARKETING PARAMETERS**



### DiD Estimates of the Impact of P4P on Household Maize Marketing

Table 12 reports DiD estimates of changes in household maize marketing facilitators and indicators of household marketing behavior. The results largely confirm expectations from visual inspection, i.e., that being a member of a P4P PC had little significant impact on changes in maize marketing facilitating conditions or in household marketing behavior, i.e., the timing and location of maize sales. The only significant impact was a 6 percentage point increase in the likelihood that P4P households used marketing services relative to non-P4P households between 2009 and 2012. P4P households did, however, see a significant USD 32 per mt increase in maize prices between 2009 and 2013 relative to non-P4P households.

TABLE 12: DiD ESTIMATES OF THE IMPACT OF P4P ON HOUSEHOLD MAIZE MARKETING

Model	Impact (coefficient/p-value)			N	R <sup>2</sup>
	2009-2011	2011-2013	2009-2013		
<b>Household marketing facilitators</b>					
Likelihood of using post-harvest services (%)	0.0439 (0.2550)	-0.0465 (0.2280)	-0.0037 (0.9290)	1,110	0.0531
Likelihood of using marketing services (%)	0.0564* (0.0600)	-0.0110 (0.7130)	0.0459 (0.2390)	1,110	0.0863
Likelihood of using agricultural credit (%)	0.0747 (0.1620)	-0.0510 (0.3390)	0.0234 (0.6690)	1,110	0.0334
Likelihood of using credit for any purpose (%)	0.0642 (0.2220)	-0.0767 (0.1450)	-0.0130 (0.8140)	1,110	0.0341
<b>Household marketing outcomes</b>					
Likelihood of selling maize through the PC (cumulative % of households)	-0.0071 (0.8630)	-0.0105 (0.7950)	-0.0180 (0.7420)	426	-0.0105
Average percentage of marketed maize sold through the PC (%)	-0.0732 (0.1540)	0.0222 (0.6660)	-0.0501 (0.3880)	426	0.0676
Likelihood of selling maize four weeks or more after harvest (% of households)	-0.0830 (0.4070)	0.0077 (0.9390)	-0.0735 (0.4680)	426	0.0606
Average percentage of marketed maize sold four weeks or more after harvest (%)	-0.1075 (0.2520)	0.0219 (0.8160)	-0.0842 (0.3590)	426	0.0539
Average maize prices to farmers (USD/mt)	-31 (0.4090)	-11 (0.7490)	32* (0.1000)	110	0.2856

Numbers in parentheses are p-values.

\* significant at  $p < 0.10$

\*\* significant at  $p < 0.05$

\*\*\* significant at  $p < 0.01$

## Impact of P4P on Household Maize Production

Maize is a major staple crop in Ethiopia with 71 percent of households reporting producing it in the 2009 baseline. Teff and wheat are also major staples with 74 percent of households reporting that they produced teff and 56 percent producing wheat. The behaviors that affect the average quantity of maize households produce include the decision to cultivate maize, the land area allocated to maize production, and adopting productivity-enhancing agricultural technologies and practices such as certified seed or fertilizer. Positive changes in these behaviors should increase yields and total quantities produced.

Weather is also likely to strongly influence maize production. In the absence of accessible subnational rainfall data, the regional dummy variables control, to some extent, for weather-related factors that influence production.

Average cereal yields capture country-wide factors that affect yields and quantities produced. The World Bank reported average cereal yields for Ethiopia of 1,653 kg/ha in 2009 and 1,833 kg/ha in 2011.<sup>14</sup> Data from 2013 are not yet available but, while FAO reports good prospects for growth in yields, it also reported that hail and flooding may reduce yields in two of the primary P4P regions, Oromiya and Amhara.<sup>15</sup>

<sup>14</sup> Accessed at <http://data.worldbank.org/indicator/AG.YLD.CREL.KG>

<sup>15</sup> Accessed at <http://www.thecropsite.com/news/15107/ethiopia-to-enjoy-above-average-yields>



## Visual Inspection

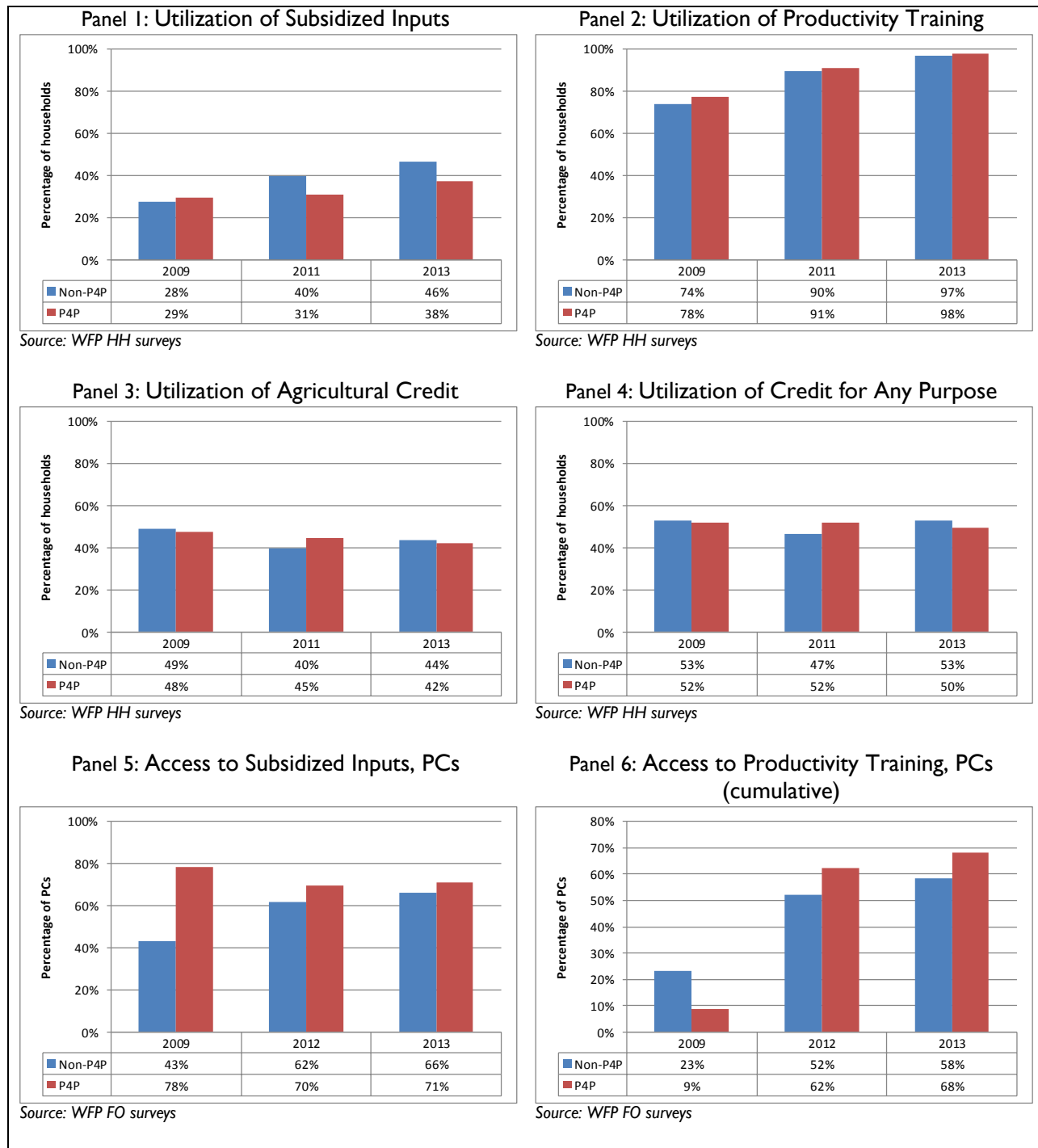
The results framework presented in Figure 6 defines a number of “facilitators” that might be expected to influence household production results. These include access to productivity-enhancing inputs and training and access to credit. Figure 19 illustrates changes in these facilitators over time for P4P and non-P4P households. Panels 1 through 4 present the household perspective while Panels 5 and 6 reflect results from the surveys of PCs.

P4P households reported increasing trends in two of the six facilitators: obtaining subsidized inputs and participating in productivity training (Panels 1 and 2 of Figure 19). The latter corresponds to an increase in the percentage of PCs that reported providing production training (Panel 6 of Figure 19). However, the increase in the percentage of households reporting that they obtained subsidized inputs corresponds to a decline in the percentage of PCs reporting facilitating members’ access to inputs. The percentage of households reporting that they had utilized credit for agricultural or other purposes (Panels 3 and 4 of Figure 19) remained relatively flat throughout the P4P pilot.

With the exception of the percentage of PCs facilitating access to inputs (an indirect measure of a facilitator), P4P and non-P4P households reported similar trends in production facilitators. The only statistically significant differences between P4P and non-P4P households were: a larger percentage of non-P4P than P4P PCs reported providing production training in 2009, a greater percentage of P4P than non-P4P PCs reported facilitating members’ access to subsidized inputs in 2009, and a greater percentage of non-P4P than P4P households reported obtaining subsidized inputs in 2011 and 2013.

In summary, it appears that P4P and non-P4P households experienced similar trends in most production-facilitating factors with the possible exception of their use of subsidized inputs and productivity training.

**FIGURE 19: MAIZE PRODUCTION FACILITATORS**



Improvement in the conditions facilitating changes in household maize production behavior should influence behavior and, ultimately, quantities produced. Figure 20 summarizes changes in maize production behavior and production for P4P and non-P4P households.

**FIGURE 20: MAIZE PRODUCTION PARAMETERS**

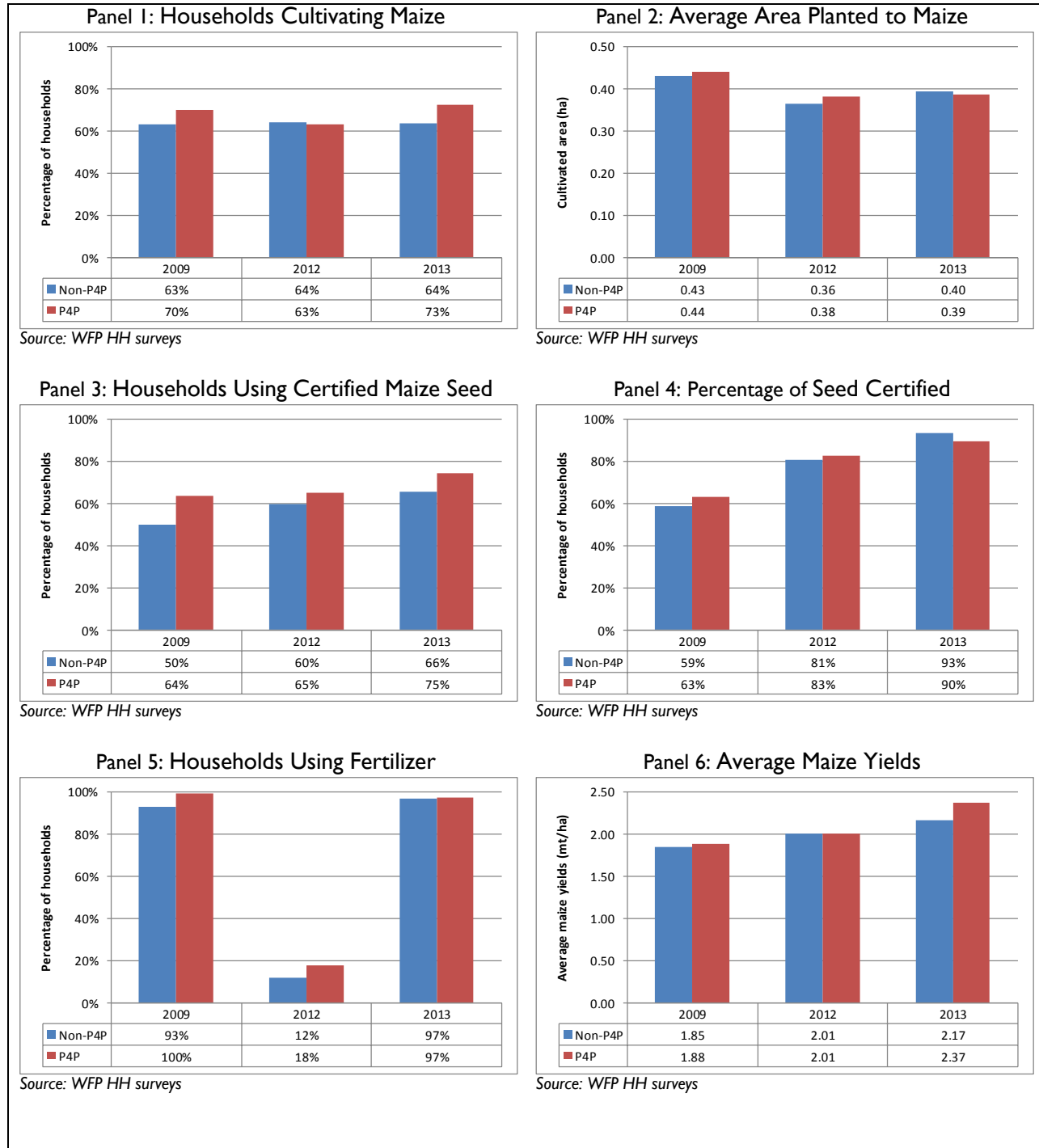


FIGURE 20: MAIZE PRODUCTION PARAMETERS (CONTINUED)

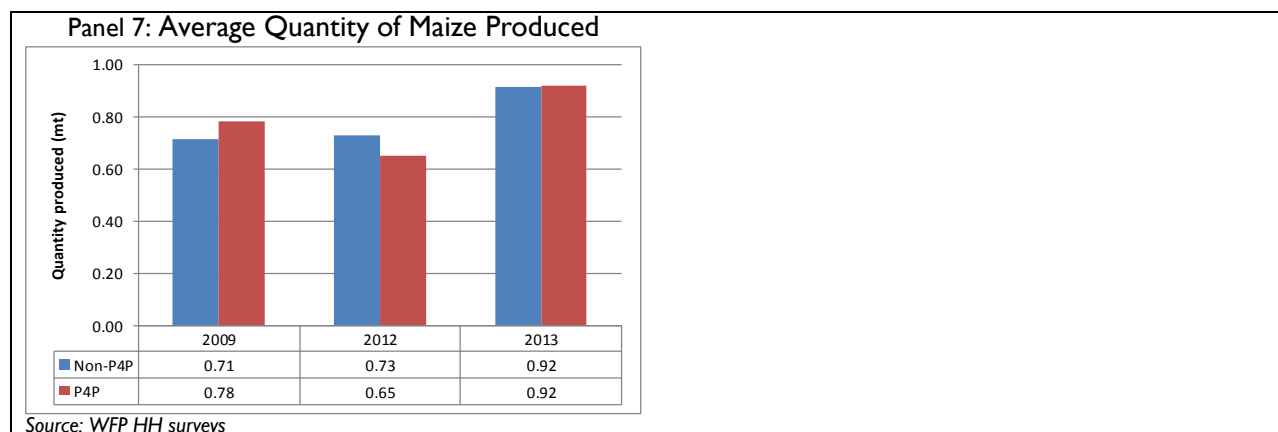


Figure 20 reveals no large differences in maize production parameters between P4P and non-P4P households or substantially different trends in the parameters over time. The two differences that were statistically significant include:

- P4P households were more likely than non-P4P households to plant maize in 2009 and 2013.
- P4P households were more likely than non-P4P households to use certified maize seed and fertilizer in 2009 and 2011.

### DiD Estimates of the Impact of P4P on Maize Production

**VISUAL INSPECTION OF THE DATA SUGGESTS THAT P4P HAD LITTLE IMPACT ON THE QUANTITY OF MAIZE HOUSEHOLDS PRODUCED OR ON THE FACTORS THAT MAY HAVE AFFECTED MAIZE PRODUCTION. WITH LITTLE SIGNIFICANT DIFFERENCE BETWEEN P4P AND NON-P4P HOUSEHOLDS IN MOVEMENT ON MAIZE PRODUCTION FACILITATORS, WE MIGHT ALSO EXPECT LITTLE DIFFERENCE IN MAIZE PRODUCTION INDICATORS. THE ESTIMATES PRESENTED IN**

Table 14, however, show several positive impacts associated with participating in P4P. These include:

- Participating in P4P increased the percentage of P4P households choosing to cultivate maize by 9 percentage points between 2012 and 2013 and 8 percentage points between 2009 and 2013 relative to what would have happened without P4P.
- Being a member of a P4P PC is associated with a 0.47 mt/ha increase in maize yields in 2011 relative to the yields households would have achieved without P4P. This result is somewhat difficult to square with the fact that non-P4P households increased the percentage of certified seed they used by less than non-P4P households and suffered a larger decline in the use of fertilizer. However, anecdotal data from country visits and a recent study by the Mali country office suggests that access to inputs is an important facilitator of increased yields but affordability, inconsistent use, and limited knowledge of correct application procedures are at least as important.

Table 13 presents DiD estimates of the impact of participating in P4P on the maize production facilitators measured at the household level, i.e. using inputs, participating in productivity training, and using credit. Participating in P4P had no statistically significant positive impact on any of the maize production facilitators. For the facilitators, however, movement in a direction that supports increases in production is more important than a causal connection to participating in P4P. This was the case for all facilitators except using credit and the likelihood of PCs facilitating access to subsidized inputs.

**WITH LITTLE SIGNIFICANT DIFFERENCE BETWEEN P4P AND NON-P4P HOUSEHOLDS IN MOVEMENT ON MAIZE PRODUCTION FACILITATORS, WE MIGHT ALSO EXPECT LITTLE DIFFERENCE IN MAIZE PRODUCTION INDICATORS. THE ESTIMATES PRESENTED IN**

Table 14, however, show several positive impacts associated with participating in P4P. These include:

- Participating in P4P increased the percentage of P4P households choosing to cultivate maize by 9 percentage points between 2012 and 2013 and 8 percentage points between 2009 and 2013 relative to what would have happened without P4P.
- Being a member of a P4P PC is associated with a 0.47 mt/ha increase in maize yields in 2011 relative to the yields households would have achieved without P4P. This result is somewhat difficult to square with the fact that non-P4P households increased the percentage of certified seed they used by less than non-P4P households and suffered a larger decline in the use of fertilizer. However, anecdotal data from country visits and a recent study by the Mali country office suggests that access to inputs is an important facilitator of increased yields but affordability, inconsistent use, and limited knowledge of correct application procedures are at least as important.

**TABLE 13: DiD ESTIMATES OF THE IMPACT OF P4P ON MAIZE PRODUCTION FACILITATORS**

Model	Impact (coefficient/p-value)			N	R <sup>2</sup>
	2009-2012	2012-2013	2009-2013		
Utilization of subsidized inputs (%) – all households	-0.0085 (0.9020)	0.0633 (0.3620)	0.0541 (0.4980)	1,110	0.1014
Utilization of productivity training (%) – all households	-0.0216 (0.4130)	-0.0149 (0.5720)	-0.0361 (0.2970)	1,110	0.0720
Utilization of agricultural credit (%) – all households	0.0747 (0.1620)	-0.0510 (0.3390)	0.0233 (0.6690)	1,110	0.0334
Utilization of credit for any purpose (%) – all households	0.0642 (0.2220)	-0.0767 (0.1450)	-0.0131 (0.8140)	1,110	0.0341
Likelihood of PCs facilitating access to subsidized inputs (%)	.0715 (0.2800)	-0.0150 (0.6390)	0.0565 (0.4600)	268	0.6050
Likelihood of PC providing productivity training (%)	0.0881 (0.3630)	-0.1317** (0.0270)	-0.0435 (0.6500)	268	0.3610

Numbers in parentheses are p-values.

\* significant at  $p < 0.10$

\*\* significant at  $p < 0.05$

\*\*\* significant at  $p < 0.01$

**TABLE 14: DiD ESTIMATES OF THE IMPACT OF P4P ON HOUSEHOLD MAIZE PRODUCTION**

Model	Impact (coefficient/p-value)			N	R <sup>2</sup>
	2009-2012	2012-2013	2009-2013		
Likelihood of cultivating maize (%) – all households	-0.0107 (0.7830)	0.0868*** (0.0260)	0.0758** (0.0440)	1,110	0.1616
Average area planted to maize (ha) – cultivating households	0.0587 (0.2480)	-0.0452 (0.3740)	0.0131 (0.7710)	910	0.0875
Likelihood of using certified maize seed (%) – cultivating households	-0.0249 (0.6230)	0.0147 (0.7720)	-0.0111 (0.8330)	910	0.0596
Average percentage of maize seed that was certified (%) – certified seed using households	-0.0626 (0.3300)	-0.0297 (0.6290)	-0.1122* (0.0820)	583	0.0515
Likelihood of using fertilizer (%) – cultivating households	-0.0273 (0.4480)	-0.0310 (0.3890)	-0.0579*** (0.0130)	910	0.8389
Average maize yield (mt/ha) – producing	-0.0937	0.4766***	0.2107	610	0.0223

households	(0.5690)	(0.0030)	(0.2320)		
Average quantity of maize produced (mt) – producing households	-0.0143 (0.8650)	0.0868 (0.3040)	0.0714 (0.4580)	910	0.1172

Numbers in parentheses are p-values.

\* significant at  $p < 0.10$

\*\* significant at  $p < 0.05$

\*\*\* significant at  $p < 0.01$

## Impact of P4P on Household Welfare

Welfare is a broad concept with dimensions including income, wealth, nutrition, food security, and physical security to name a few. The P4P proposal identified income as the primary household welfare measure. Because of the anticipated difficulty measuring small changes in income, however, the P4P logframe identified several alternate welfare indicators. These include the household asset score (a simple summary of household assets), the value of household livestock (an important store of wealth in many cultures), and the food consumption score (an indicator of food security). The analysis of the impacts of P4P on household welfare examines each of these indicators to provide a well-rounded picture of welfare change.

### Visual Inspection

As with previous sections, the inquiry begins with illustrations of changes in income and welfare measures (Figure 21). P4P and non-P4P households reported similar trends on all four indicators. P4P households reported consistently lower real incomes than non-P4P households but the trends moved in tandem (Panel 1). Income from crops appears to have accounted for most of the difference between the two groups with non-P4P households consistently earning a larger share of their total income from crops (Panel 2). Panels 3 and 4 illustrate similar patterns of change in asset scores, real livestock value, and the food consumption score (Panels 3-5).

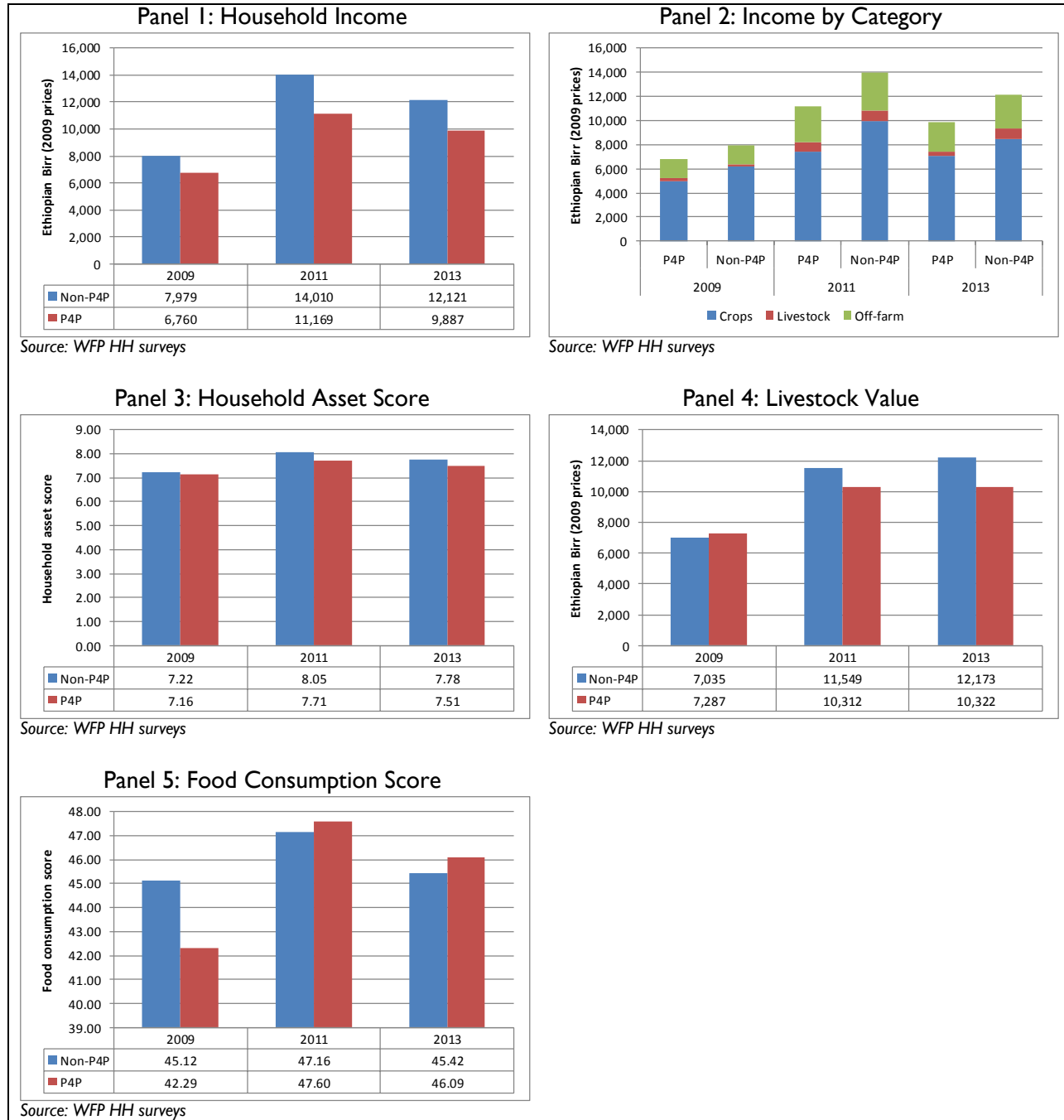
The statistically significant differences between the two groups include:

- Non-P4P household reported significantly higher incomes in all periods.
- Non-P4P households had a higher household asset score than P4P households in 2011.
- Non-P4P households had higher livestock values than P4P households in 2011 and 2013.
- Non-P4P households had higher food consumption scores than P4P households in 2009.

### DiD Estimates of the Impact of P4P on Household Welfare

Table 15 reports DiD estimates of the impact of P4P on four household welfare indicators. Even though P4P households improved their wellbeing in 2013 relative to 2009 on all four indicators, non-P4P households experienced significantly greater improvements in total income and value of livestock. Being a member P4P had no identifiable impact on household welfare.

**FIGURE 21: HOUSEHOLD WELFARE INDICATORS**



**TABLE 15: DiD ESTIMATES OF THE IMPACT OF P4P ON HOUSEHOLD WELFARE INDICATORS**

Model	Impact (coefficient/p-value)			N	R <sup>2</sup>
	2009-2011	2011-2013	2009-2013		
Household income (2009 Ethiopian Birr)	-3,088*** (0.0010)	1,250 (0.1690)	-1,854*** (0.0110)	1,110	0.1578
Household asset score	-0.4250** (0.0240)	.02082 (0.2680)	-0.2162 (0.3240)	1,110	0.0687
Value of livestock (2009 Ethiopian Birr)	-1,513*** (0.0130)	-735 (0.2260)	-2,256*** (0.0020)	1,108	0.1016
Food consumption score	1.2977 (0.4670)	-0.1778 (0.9210)	0.9977 (0.4840)	1,108	0.1744

Numbers in parentheses are p-values.

\* significant at p< 0.10

\*\* significant at p< 0.05

\*\*\* significant at p< 0.01

## CONCLUSIONS

Ethiopia elected to buy primarily from Cooperative Unions (CUs), second tier FOs with Primary Cooperatives (PCs) as members. WFP and its partners directed all of the P4P-facilitated support to the CUs. Even though partners were assisting the PCs, WFP did not direct capacity building activities at the PC or household level. The results framework thus includes an additional layer to capture the indirect capacity building of PCs that are members of P4P-supported CUs. Results at the PC level may be very different than at the CU level because the WFP stimulus is diluted (i.e., spread out in an unpredictable way among all the PCs that are members of a CU) and not linked to direct capacity building support from WFP and its partners.

At least on paper, Ethiopia’s CUs and PCs appear to be relatively high capacity organizations. Fifty-four percent of P4P CUs and 50 percent of non-P4P CUs reported having sold maize in the two years prior to P4P. Similarly, 62 percent and 75 percent of P4P and non-P4P PCs, respectively, reported previous experience selling maize. P4P-supported CUs reported selling an average of 1,261 mt of maize in 2009, the baseline year for P4P and P4P-supported PCs reported selling an average of 187 mt. Sixty-nine percent of P4P CUs and 90 percent of P4P PCs reported having access to storage suitable for maintaining quality for the long-term.

All 13 of the P4P-supported CUs reported having access to storage at the time of the 2009 baseline and 8 owned their facilities. Average storage capacity accessible at baseline was 2,819 mt and average capacity of owned storage (for CUs that owned their warehouses) was 2,561 mt. The story is similar among PCs; 90 percent reported having access to warehouses in 2009 with an average capacity of 551 mt.

These basic conditions define the “baseline” for achieving the anticipated results laid out in the results framework of Figure 5 and Figure 6 (in main body of report). The remainder of this section frames the conclusions in the context of the results framework. It presents results in the sequence in which they are likely to occur; CU capacity, PC capacity, household marketing, household production, and household welfare.



## Impact of P4P on CU Capacity

Figure 22 summarizes anticipated results and facilitators of FO (CU or PC) capacity and serves to frame the conclusions presented in this section.

The baseline capacities of CUs suggest that they were relatively capable marketing organizations. Eighty-five percent reported selling some crops in the two years prior to the baseline and average quantities sold ranged from 61 to over 1,000 mt, depending on the crop. As a group, the 13 P4P CUs surveyed reported providing an average of 49 percent of 8 quality-oriented services and 69 percent of 3 marketing services. Over 75 percent reported having access to credit and more than 50 percent reported being able to provide financing to their PC members.

Prior (to P4P) external assistance had focused largely on organizational management (e.g., record keeping, financial management, group management, and business planning). More than 80 percent of CUs reported having received such assistance. Few, (no more than 30 percent) reported receiving other types of assistance (e.g., post-harvest management, production, marketing, inputs, tools, or infrastructure). Some of these results are not surprising perhaps since CUs' members are PCs, not farmers.

These baseline conditions established many of the facilitating factors necessary to support organizational capacity building. The other crucial facilitator is WFP's procurement stimulus. By the end of the pilot, WFP had registered 31 CUs as WFP suppliers. Of the 21 CUs WFP registered as vendors at the start of the pilot, it purchased from 4 (19 percent) in only one year, 6 (28 percent) in two separate years, 8 (38 percent) in three years, and 1 (5 percent) in four years. The size of individual contracts ranged from 50 mt to 6,500 mt with an overall mean of 1,093 mt. The total quantity contracted per CU (throughout the five-year pilot) ranged from 200 to 14,920 mt with an average of 2,682 mt. WFP appears to have provided a sizeable but andr relatively consistent procurement stimulus in Ethiopia.

The generally positive facilitating conditions for supporting organizational capacity building contributed to many significant positive changes in organizational capacity indicators that can be attributed to participating in P4P. These include:

- A 15 percentage point increase in the average percentage of 2 value addition services provided to members;
- A 23 percentage point increase in the average percentage of 8 quality services provided to members;
- A 29 percentage point increase in the average percentage of 5 production services provided to members;
- An 85 percentage point increase in the percentage of CUs providing production training to members; and
- A 23 percentage point increase in the percentage of CUs planning for production and marketing.

The facilitating environment for marketing outcomes was generally positive for P4P CUs. WFP's procurement stimulus was sizeable and relatively consistent but the percentage of P4P CUs selling to other buyers increased relative to non-P4P CUs, even though quantities sold were very small relative to quantities sold to WFP. And, although they experienced no significant increase in utilizing credit, most reported utilizing credit so there may have been little room for improvement.

FIGURE 22: SUMMARY OF IMPACT OF P4P ON CU CAPACITY

Maize Marketing					
	Results attributable to P4P			Status	
	Indicators			Facilitators	
<b>Organizational capacity</b>	Planning	↑	Significant 23 percentage point impact on percentage of P4P CUs planning for production and marketing.	Infrastructure	+ 69 percent of CUs reported having access to storage facilities
	Services	↑	Significant positive impact on P4P CU's provision of production (29 percentage points), and quality (23 percentage points) services.	Procurement	+ Sizeable and reasonably consistent procurement
	Inputs	→	No significant impact on P4P CUs facilitating members' access to inputs.	Supply-side support	+ Increased supply-side support for post-harvest handling, production, and tools relative to non-P4P SACCOs
	Training	↑	Significant 85 percentage point impact on percentage of CUs providing production training to members.		
<b>Marketing capacity outcomes</b>	Sales	↑	Significant 902 mt impact on total quantity of maize sold in 2013.	Procurement	+ Sizeable and reasonably consistent procurement
	Market diversity	↑	Significant 23 percentage point impact on the likelihood of selling to buyers other than WFP.		
	Financing for members	↑	Significant 81 percentage point impact on likelihood of facilitating post-harvest financing for members.	Access to credit	+ 77 percent of P4P CUs received loans in 2009 with no change in 2013.
	Prices	→	No discernable difference in maize prices between P4P and non-P4P CUs or between sales to WFP and to others.		
<b>Impacts</b>	Sustainable access to value-added staples markets (increasing trajectory of quantities sold, especially to formal buyers; declining dependence on WFP market, established relationship with financial institutions, access to permanent storage facilities of at least 500 mt capacity)				

Legend

- ↑ Statistically significant positive impact attributable to participating in P4P.
- ↓ Statistically significant negative impact attributable to participating in P4P.
- No statistically significant impact associated with participating in P4P.
- + Favorable conditions/change.
- Unfavorable conditions/change.

Consequently, marketing capacity outcomes were positive. Those that could be attributed to participating in P4P included:

- An average 902 mt increase in the total quantity of maize sold between 2012 and 2013 relative to what would have happened without P4P;
- A 23 percentage point increase in the percentage of P4P CUs selling to buyers other than WFP relative to what would have happened without P4P; and
- A significant 81 percentage point increase in the percentage of CUs offering post-harvest financing to members relative to what would have happened without P4P.

The P4P CUs already seem to be sustainable marketing organizations and all reported selling to other buyers throughout the P4P pilot.

### **Impact of P4P on PC Capacity**

Impacts at the PC level are indirect. PCs benefit from the WFP procurement stimulus only to the extent that CUs aggregate from a PC to supply WFP. Furthermore, since the surveys represent only a sample of the PCs that are members of P4P CUs, the magnitude and consistency of the stimulus are both diluted.

Figure 23 illustrates that, like the CUs, PCs appear to be relatively capable FOs with many of the facilitating conditions in place to support organizational capacity building. In particular, most (90 percent) reported having access to storage. Eighty-five percent had received external assistance in organizational management and the percentage reporting assistance with post-harvest management, production, and marketing increased markedly during the pilot.

Positive change in facilitating conditions was associated with increased organizational capacity as measured by the selected indicators. Only one, however, was attributable to P4P. In particular:

- The percentage of P4P PCs planning for production and marketing increased by 10 percentage points relative to what would have happened without P4P – the only change statistically attributable to P4P;
- The average percentage of services offered by PCs increased – value addition services by 7 percentage points, quality services by 11 percentage points, production services by 8 percentage points, and marketing services by 17 percentage points. However, non-P4P PCs registered similar changes so the results are not attributable to P4P.
- Most (78 percent) of P4P PCs reported facilitating members' access to inputs at the time of the baseline and this percentage increased to 90 percent by 2013.
- P4P PCs registered a 59 percentage point increase in the percentage of PCs providing production training to members but non-P4P PCs experienced similar increases.

Similarly, the facilitating conditions for increased marketing capacity at the PC level were also mostly positive. More than half of P4P PCs (54 percent) reported utilizing credit prior to P4P but the percentage increased to by 23 percentage points to 87 percent by the end of the P4P pilot. This result is not statistically attributable to P4P but did improve the facilitating conditions for improved marketing capacity.

In spite of somewhat improved facilitating conditions, PCs reported few changes in marketing capacity indicators. Consistent with an increase in credit utilization, the percentage of P4P PCs that reported providing post-harvest financing to member farmers increased slightly but significantly during the pilot (from 10

FIGURE 23: SUMMARY OF IMPACT OF P4P ON PC CAPACITY

Maize Marketing							
		Indicators	Results attributable to P4P		Facilitators	Status	
<b>Organizational capacity</b>	Planning	↑	Significant 10 percentage point impact on percentage of P4P PCs planning for production and marketing.		Infrastructure	+	90 percent of P4P PCs reported access to storage at baseline but trend data are not consistent.
	Services	→	No significant impact on P4P PC's provision of services.		Procurement	+ -	Sizeable but inconsistent procurement (from CUs)
	Inputs	→	No significant impact on P4P PCs facilitating members' access to inputs.		Supply-side support	+	Increased supply-side support for post-harvest handling, production, and marketing.
	Training	→	No significant impact on productivity training provided to members relative to non-P4P PCs				
<b>Marketing capacity outcomes</b>	Maize sales	→	No significant impact on quantity sold.		Procurement	+ -	Sizeable but inconsistent procurement (from CUs)
	Financing for members	↑	Significant 22 percentage point impact on percentage of P4P PCs facilitating post-harvest financing for members.		Access to credit	+	54 percent of PCs obtained loans in 2009 and 87 percent in 2013.
	Prices	→	No discernable difference in maize prices between P4P and non-P4P PCs.				
<b>Impacts</b>	Sustainable access to value-added staples markets (increasing trajectory of quantities sold, especially to formal buyers; declining dependence on WFP market, established relationship with financial institutions, access to permanent storage facilities of at least 500 mt capacity)						

Legend

- ↑ Statistically significant positive impact attributable to participating in P4P.
- ↓ Statistically significant negative impact attributable to participating in P4P.
- No statistically significant impact associated with participating in P4P.
- + Favorable conditions/change.
- Unfavorable conditions/change.

percent to 13 percent). However, P4P PCs reported no significant increase in quantities sold or in prices received for maize.

## **Impact of P4P on Household Maize Marketing**

In the Ethiopia context, capacity building results at the PC level are the most likely to affect households' marketing and production. Member households experienced little change in the factors facilitating marketing (Figure 24). A slightly larger percentage of P4P PCs (three percent) began offering post-harvest financing. P4P PCs also expanded the percentage of value addition, production, quality, and marketing services they offered (but not significantly relative to non-P4P PCs).

Predictably, these minor improvements in facilitating conditions did not stimulate significant changes in households' marketing behavior. Specifically:

- The percentage of P4P households that reported selling through the PC at some point during the pilot increased from 18 percent in 2009 to 33 percent in 2013. This result suggests a growing engagement with the PC. However, non-P4P households reported similar growth rates so the result is not statistically attributable to P4P.
- The percentage of P4P households that reported holding some maize for sale more than four weeks after harvest increased from 29 percent to 40 percent. However, the result is not significantly different from changes in behavior among non-P4P households.

Since P4P PCs do not appear to have altered their marketing behavior much in response to P4P, it is no surprise to find no significant marketing outcomes among member households. Household members of P4P PCs reported receiving no higher prices for maize than P4P households, nor did they report selling larger quantities.

## **Impact of P4P on Household Maize Production**

The P4P development hypothesis suggests that outcomes in household maize marketing lead to production outcomes. For example, higher prices obtained from selling maize through the PCs are expected to provide the incentive to invest in increasing maize production. In addition to the incentive provided by better access to markets, facilitating factors for maize production include access to inputs and credit to resolve financial constraints to investing in agriculture. Specific changes in production facilitating conditions (documented in Figure 25) include:

- The percentage of P4P households reporting that they had received training in agricultural production practices increased from 78 percent to 98 percent.
- P4P PCs were significantly more likely than non-P4P PCs to report providing post-harvest financing to members. Although the change was significant, however, the percentage of PCs offering financing to their members was very small, 13 percent in 2013.
- The percentage of P4P PCs that reported facilitating access to inputs was high throughout the five-year period of the pilot, never dropping below 70 percent.
- The percentage of P4P households reporting access to subsidized inputs increased from 29 percent to 38 percent.

Given the apparent focus on production technologies and practices, it is not surprising that the only notable change in household production practices was increased use of certified seed. The percentage of P4P households reporting using certified seed increased from 64 percent to 75 percent and the average percentage

FIGURE 24: SUMMARY OF IMPACT OF P4P ON HOUSEHOLD MAIZE MARKETING

Maize Marketing					
	Indicators		Results attributable to P4P	Facilitators	Changes attributable to P4P
<b>Behavioral change</b>	Selling through the PC	→	No significant impact of P4P on percentage of households selling through the PC	Quantity sold by PC	→ No significant increase in quantities sold by PCs
	Selling more than 4 weeks after harvest	→	No significant impact of P4P on percentage of households selling four weeks or more after harvest	Quality and marketing services available from PC	+ Small increase in access to services through the PC but not attributable to P4P.
<b>Household marketing outcomes</b>	Prices	→	No significant difference between P4P and non-P4P households in terms of prices received for maize. In fact, non-P4P households reported receiving USD 32/mt more than P4P households in 2013.	Access to credit	→ P4P households were no more likely than non-P4P households to utilize credit for agricultural purposes. ↑ Significant increase in percentage of PCs providing post-harvest financing to members.
				Quantity sold by PC	→ No significant increase in quantities sold by PCs

Legend

- ↑ Statistically significant positive impact attributable to participating in P4P.
- ↓ Statistically significant negative impact attributable to participating in P4P.
- No statistically significant impact associated with participating in P4P.
- + Favorable conditions/change.
- Unfavorable conditions/change.

of all maize seed used that was certified increased from 63 percent to 90 percent. Non-P4P households reported similar changes, however, so these changes in production behavior are not attributable to P4P.

Consistent with the increased use of certified seed, P4P households reported a significant increase in average maize yields – from 1.88 mt/ha to 2.37 mt/ha. This increase was significantly greater than that reported by non-P4P households and is directly attributable to P4P. Given that P4P and non-P4P households' access to and use of productivity-enhancing inputs and training were similar, the difference in growth in yields may be due to the quality of training.

## **Impacts of P4P on Household Welfare**

Ultimately, better access to markets and increased production should boost household welfare. However, the well-known difficulties in measuring income and the relatively small change anticipated make it likely that even if P4P “caused” a change in income, it would not be detected through the noise of reporting error (recall) and variability. The analysis therefore also considered alternative measures of changes in welfare where the prospects for detecting change were more promising. These included a summary measure of household assets (the household asset score), an indicator of food security (the food consumption score), the value of household livestock, and characteristics of the households housing (flooring, wall, and roofing materials). Which of these will respond first to changes in income will probably depend to some extent on characteristics of a particular household. For example, a food insecure household may spend additional income on food before investing in housing or livestock.

P4P households were better off in 2013 than in 2009 by almost any measure of welfare.

- Real incomes increased by 46 percent;
- The average household asset score increased by 5 percent;
- The real value of household livestock increased by 42 percent;
- The food consumption score increased by 9 percent; and

However, non-P4P households experienced similar improvements and none of the changes observed with P4P households were significantly different from those experienced by non-P4P households.

FIGURE 25: SUMMARY OF IMPACT OF P4P ON HOUSEHOLD MAIZE PRODUCTION

Maize Production					
	Anticipated Results		Results attributable to P4P	Facilitators	Changes attributable to P4P
<b>Behavioral change</b>	Planting maize	→	P4P households were no more likely than non-P4P households to change their maize planting behavior.	Access to inputs/credit	→ P4P households were no more likely than non-P4P households to report improved access to inputs or utilizing credit for agricultural purposes. However, P4P PCs were significantly more likely than non-P4P PCs to report providing post-harvest financing to members.
	Area allocated to maize	→	P4P households were no more likely than non-P4P households to change the area they allocated to maize production.	Production training	→ P4P households were no more likely than non-P4P households to report receiving production training.
	Use of inputs	→	P4P households were no more likely than non-P4P households to change their use of certified seed (either to begin using it or to change the percentage they used) or to change their use of fertilizer.		
<b>Intermediate outcomes</b>	Yields	↑	P4P households reported significantly greater growth in yields than non-P4P households between 2011 and 2013.	Access to inputs/credit	→ P4P households were no more likely than non-P4P households to report improved access to inputs or utilizing credit for agricultural purposes. However, P4P PCs were significantly more likely than non-P4P PCs to report providing post-harvest financing to members.
	Quantity produced	→	P4P households were no more likely than non-P4P households to increase the quantity of maize they produced.		
	Quantity sold	→	P4P households were no more likely than non-P4P households to sell larger quantities of maize.		

Legend

- ↑ Statistically significant positive impact attributable to participating in P4P.
- ↓ Statistically significant negative impact attributable to participating in P4P.
- No statistically significant impact associated with participating in P4P.
- + Favorable conditions/change.
- Unfavorable conditions/change.



# ANNEXES

## Annex A: Comparison of P4P and non-P4P FOs and Households

TABLE 16: BASELINE DIFFERENCES BETWEEN P4P AND NON-P4P CUs

CU characteristic	P4P	Non-P4P	p-value of difference
<b>FO characteristics</b>			
Number of full-time employees	9.23	12.25	0.0246
Distance from market (km)	270	295	0.8125
<b>FO capacity indicators</b>			
Indicator of planning for production and marketing	0.77	1.00	0.2897
Indicator of receiving credit in past two years	0.77	0.75	0.9368
Indicator of providing financing to members	0.54	0.50	0.8928
Indicator of access to storage	0.69	0.75	0.8247
Storage capacity (mt)	3,178	2,700	0.8275
Indicator of using price information	1.00	1.00	
Indicator of contract experience	0.69	0.50	0.4816
Indicator of defaulting on contracts	0.00	0.00	
<b>External assistance received</b>			
Indicator of receiving organizational assistance	0.85	0.75	0.6591
Indicator of receiving post harvest assistance	0.31	0.00	0.2046
Indicator of receiving production assistance	0.31	0.00	0.2046
Indicator of receiving marketing assistance	0.31	0.25	0.8247
Indicator of receiving assistance for inputs	0.15	0.00	0.4036
Indicator of receiving assistance for tools	0.08	0.25	0.3475
Indicator of receiving assistance for infrastructure	0.31	0.00	0.2046
Indicator of receiving any assistance	0.85	0.75	0.6591
<b>Services provided</b>			
Indicator of providing any services	0.92	0.75	0.3475
Indicator of providing value addition services	0.15	0.00	0.4036
Indicator of providing quality services	0.49	0.13	0.1929
Indicator of providing production services	0.25	0.25	0.9876
Indicator of providing marketing services	0.69	0.25	0.1160
<b>Marketing activity</b>			
Indicator of selling anything during past two years	1.00	1.00	
Maximum quantity of anything sold in past two years	1,931	1,274	0.7382
Indicator of selling maize in past two years	0.69	0.75	0.8247
Maximum quantity of maize sold in past two years (mt)	776	56	0.4056

TABLE 17: BASELINE DIFFERENCES BETWEEN P4P AND NON-P4P PCs

PC characteristic	P4P	Non-P4P	p-value of difference
<b>FO characteristics</b>			
Number of members	1,034	1,368	0.0320
Percentage of female members	0.87	0.87	0.9892
Number of full-time employees	13	10	0.0081
Distance from market (km)	72	122	0.0324
<b>FO capacity indicators</b>			
Indicator of planning for production and marketing	0.86	0.99	0.0063
Indicator of receiving credit in past two years	0.54	0.58	0.5728
Indicator of providing financing to members	0.10	0.08	0.6192
Indicator of access to storage	0.90	0.86	0.4983
Storage capacity (mt)	551	470	0.5523
Indicator of using price information	0.91	0.92	0.8325
Indicator of contract experience	0.17	0.52	0.0000
Indicator of defaulting on contracts	0.08	0.09	0.9371
<b>External assistance received</b>			
Indicator of receiving organizational assistance	0.81	0.85	0.5959
Indicator of receiving post harvest assistance	0.30	0.22	0.2431
Indicator of receiving production assistance	0.36	0.19	0.0215
Indicator of receiving marketing assistance	0.33	0.43	0.2456
Indicator of receiving assistance for inputs	0.00	0.06	0.0364
Indicator of receiving assistance for tools	0.01	0.12	0.0121
Indicator of receiving assistance for infrastructure	0.04	0.09	0.2591
Indicator of receiving any assistance	0.08	0.09	0.5467
<b>Services provided</b>			
Indicator of providing any services	0.99	0.89	0.0229
Indicator of providing value addition services	0.09	0.06	0.5758
Indicator of providing quality services	0.29	0.16	0.0741
Indicator of providing production services	0.27	0.19	0.2271
Indicator of providing marketing services	0.52	0.30	0.0098
<b>Marketing activity</b>			
Indicator of selling any crop	0.99	0.99	0.9661
Average quantity of all crops sold (mt)	430	440	0.9685
Indicator of selling maize	0.39	0.55	0.0596
Average quantity of maize sold (mt)	73	76	0.9537

**TABLE 18: BASELINE DIFFERENCES BETWEEN P4P AND NON-P4P HOUSEHOLDS**

<b>Household characteristic</b>	<b>P4P</b>	<b>Non-P4P</b>	<b>p-value of difference</b>
Number of individuals in household	6.21	6.64	0.0328
Indicator of using certified maize seed	0.54	0.41	0.0013
Indicator of using certified seed on crops other than maize	0.23	0.16	0.0362
Indicator of using certified seed on any crop	0.64	0.50	0.0010
Area of land owned (ha)	1.20	1.25	0.2949
Area allocated to maize (ha)	0.37	0.35	0.5129
Area allocated to crops other than maize (ha)	1.16	1.11	0.5038
Total cultivated area (ha)	1.53	1.46	0.3530
Average maize yield (mt/ha)	1.83	1.88	0.6401
Average quantity of maize harvested (mt)	0.66	0.57	0.1985
Average quantity of crops other than maize harvested (mt)	1.86	1.44	0.0028
Average quantity of all crops harvested (mt)	2.52	2.02	0.0009
Quantity of maize sold (mt)	0.10	0.09	0.7564
Quantity of crops other than maize sold (mt)	0.52	0.33	0.0117
Quantity of all crops sold (mt)	0.62	0.42	0.0129
Size of maize surplus (mt)	0.47	0.39	0.2583
Average percentage of maize sold within 4 weeks of harvest (%)	0.09	0.08	0.3640
Average percentage of maize sold 4 weeks after harvest (%)	0.11	0.09	0.4193
Average quantity of maize sold within 4 weeks of harvest (mt)	0.03	0.03	0.6901
Average quantity of maize sold 4 weeks after harvest (mt)	0.04	0.02	0.2524
Average percentage of maize sold through FO (%)	0.05	0.03	0.3622
Average percentage of maize sold elsewhere (%)	0.01	0.00	0.1989
Average percentage of maize sold at the farm gate (%)	0.15	0.13	0.5576
Average quantity of maize sold through FO (mt)	0.03	0.01	0.1029
Average quantity of maize sold elsewhere (mt)	0.01	0.00	0.0860
Average quantity of maize sold at the farm gate (mt)	0.03	0.04	0.6174
Value of loans received for agricultural purposes (2009 Ethiopian Birr)	756	858	0.3259
Value of loans received for non-agricultural business (2009 Ethiopian Birr)	54	79	0.6401
Value of loans received for any purpose (2009 Ethiopian Birr)	896	989	0.4473
Average food consumption score	45	42	0.0034
Average food consumption rank	2.83	2.82	0.6988
Average household asset score	7.22	7.16	0.7545
Value of livestock assets (2009 Ethiopian Birr)	1,013	7,287	0.5612
Average annual household income (2009 Ethiopian Birr)	7,979	6,760	0.0114
Average annual income from farming (2009 Ethiopian Birr)	6,386	5,228	0.0085

Household characteristic	P4P	Non-P4P	p-value of difference
Average annual off-farm income (2009 Ethiopian Birr)	1,593	1,531	0.7484
Net value of crops produced (2009 Ethiopian Birr)	6,212	4,962	0.0038
Net value of crops consumed (2009 Ethiopian Birr)	5,045	4,074	0.0053
Net value of crops sold (2009 Ethiopian Birr)	1,201	938	0.1088
Net value of staples sold (2009 Ethiopian Birr)	138	121	0.5546
Net income from livestock (2009 Ethiopian Birr)	174	267	0.1123
Income from livestock sales (2009 Ethiopian Birr)	63	143	0.0602
Value of livestock consumed (2009 Ethiopian Birr)	3	6	0.3516
Income from livestock products and services (2009 Ethiopian Birr)	108	118	0.7939
Annual cost of keeping livestock (2009 Ethiopian Birr)	813	630	0.1564
Percentage of household income from off-farm sources	0.21	0.23	0.4829
Annual expenditure (2009 Ethiopian Birr)	6,933	6,340	0.3496
Annual expenditure on household items (2009 Ethiopian Birr)	1,495	1,183	0.0059
Annual expenditure on food (2009 Ethiopian Birr)	2,740	2,654	0.8702
Annual expenditure on other items (2009 Ethiopian Birr)	2,670	2,493	0.4923
Annual expenditure on rent (2009 Ethiopian Birr)	28	9	0.4748
Annual crop production expenses (2009 Ethiopian Birr)	2,438	1,734	0.0000
Indicator of female household head	0.03	0.03	0.9823
Indicator of metal roof on house	0.31	0.34	0.5372
Indicator of concrete floor in house	0.91	0.90	0.5487
Indicator of concrete or fired brick walls on house	0.99	0.98	0.3302
Indicator of improved toilet facilities in house	0.99	0.98	0.6162
Indicator of household access to improved water source	0.62	0.64	0.7690
Indicator of using fertilizer	1.00	0.92	0.0000
Indicator of access to inputs on credit or subsidized	0.36	0.34	0.6692
Indicator of irrigating maize	0.00	0.00	
Indicator of planting maize	0.72	0.66	0.0988
Indicator of planting crops other than maize	0.94	0.92	0.3032
Indicator of producing a surplus of maize	0.70	0.63	0.1070
Indicator of selling maize within 4 weeks of harvest	0.12	0.09	0.2704
Indicator of selling maize 4 weeks after harvest	0.13	0.11	0.3226
Indicator of selling maize through the FO	0.08	0.04	0.0873
Indicator of selling maize at the farm gate	0.02	0.00	0.1331
Indicator of selling maize elsewhere	0.16	0.14	0.4345
Indicator of receiving loans for agriculture	0.48	0.49	0.7115
Indicator of receiving loans for non-agricultural business	0.02	0.02	0.6184
Indicator of receiving loans for any purpose	0.52	0.53	0.8167

<b>Household characteristic</b>	<b>P4P</b>	<b>Non-P4P</b>	<b>p-value of difference</b>
Indicator of obtaining crop price information through FO	0.43	0.34	0.0181
Indicator of using crop price information	0.99	0.99	0.8870
Indicator of finding price information from FO useful	0.37	.029	0.0457

## Annex B: P4P Treatment Details

TABLE 19: QUANTITIES PROCURED BY WFP BY CU AND YEAR

Surveyed CU?	FO name	Quantity delivered (mt)					Number of contracts	Years w/ contracts	Average contract size (mt) <sup>a</sup>
		2009	2010	2011	2012	2013			
Yes	DAMOT MULTIPURPOSE FARMERS COOPERATIVE		2,512		2,000		9	4	824
Yes	GOZAMIN FARMERS COOPERATIVE UNION LTD.				1,700		2	2	1,125
Yes	GIBE DEDESA FARMERS COOPERATION UNION				1,143		2	2	1,500
Yes	MIRA SERVICE DEVELOPMENT PLC		800		500		4	3	1,025
Yes	Lume-Adama Farmers Cooperative Unio		250		389		2	3	375
Yes	Mencheno Alaba Farmers cooperative Union				600		2	2	1,375
Yes	Walta Farmers Cooperative Union				700	240	3	2	567
Yes	Sidama Elto Farmers Cooperative Union			800	2,500		4	3	1,875
Yes	Melik Siltie's Farmers Cooperative Union			740	2,154	2,161	4	3	1,685
Yes	Damota wolayta Farmers Cooperative union				612		3	3	1,267
Yes	LICHA HADIYA FARMERS COOPERATIVE UNION		1,541		500		4	4	510
Yes	Ambericho farmer's Cooperative Union Ltd				550	140	4	3	275
No	Admas Farmers Cooperative Union				2,150	3,300	4	2	1,663
No	Somali Regional State West Gode Integrat		1,000				1	2	4,000
No	SOUTHERN REGION FARMERS COOPERATIVE		2,900				4	3	725
No	BORA DENBEL FARMERS MULTIPURPOSE		200		329	336	4	4	625
No	Merkeb Farmers Cooperative Union LTD			80	10,038		6	3	2,487
No	Angacha Farmers Cooperative Union				250		4	3	163
No	Barsan Primary Cooperative				200		1	2	200
No	Uta Wayu Multipurpose Farmers Cooperativ					995	1	1	1,500
No	Buno Bedele Farmers Cooperative Union						1	1	750
No	Admas Multipurpose Farmers Cooperative						1	1	1,500
No	Anger Abaya Farmers Cooperative Union						1	1	1,000
No	Esipe Dicha Farmers Cooperative Union Li						1	1	500
No	Oysa Dawro Farmers Multipurpose Cooperat						1	1	500
No	South Omo Crop Producer Farmers Cooper						0	0	

Surveyed CU?	FO name	Quantity delivered (mt)					Number of contracts	Years w/ contracts	Average contract size (mt) <sup>a</sup>
		2009	2010	2011	2012	2013			
No	Limu Inara Farmers Multipurpose Cooperat						1	1	1,500
No	Liben Farmers Cooperative Union					200	0	1	1,000
No	Haragu Farmers Cooperative Union						0	1	1,500
No	Ambo Farmers Cooperative Union						0	1	1,000
No	Jergo Birbir Farmers Multipurpose Union						0	1	550
No	Mete Yoma Badewacho Farmers Union Coope						0	1	500
No	Bore Bakko Farmers Cooperative Union						0	1	1,000
No	Jimma Farmers Cooperative Union Limited						0	1	750
Totals			<b>9,203</b>	<b>1,620</b>	<b>26,315</b>	<b>7,372</b>			1,093

Source: WFP procurement records

a. Average contract size may be different than average quantity delivered per year because many FOs had multiple contracts in a given year. Defaults may also cause differences between quantities delivered and quantities contracted.



**TABLE 20: INVESTMENTS IN WAREHOUSE REHABILITATION AND CONSTRUCTION (2009-2010)**

FO Name	Ownership status	Capacity by year (mt)					WFP and partner roles
		2009	2010	2011	2012	2013	
Ambericho	All storage	2,000	900	1,200	1,200	3,200	2011: WFP set up a mobile warehouse (rubhall) 2013: WFP partially funded a prefabricated warehouse
	Owned storage	0	0	500	500	2,500	
Angacha	All storage	4,800	150	500	1,000	1,000	2011: JICA built 500 mt warehouse w/ WFP financial help 2012: WFP set up a mobile warehouse (rubhall)
	Owned storage	0	0	500	1,000	1,000	
Damot	All storage	1,500	1,500	2,000	2,000	3,000	WFP committed to provide permanent warehouse
	Owned storage	1,500	1,500	2,000	2,000	2,000	
Damotta Wolayita	All storage	1,000	1,000	1,400	1,900	3,900	WFP set up a mobile warehouse (rubhall)
	Owned storage	1,000	1,000	1,400	1,900	3,900	
Gibe Dedessa	All storage	2,500	1,000	1,000	1,900	2,750	ACDI/VOCA committed to build 5,000 mt warehouse, no WFP financial assistance
	Owned storage	0	0	0	0	2,750	
Gozamin	All storage	3,000	6,000	13,580	11,000	21,000	None recorded
	Owned storage	3,000	6,000	6,000	6,000	6,000	
Licha Hadiya	All storage	5,000	8,000	8,500	8,500	8,500	WFP partially financed unspecified warehouse work
	Owned storage	5,000	8,000	8,500	8,500	8,500	
Lume Adama	All storage	12,000	10,000	10,000	10,000	10,000	None recorded
	Owned storage	10,000	10,000	10,000	10,000	10,000	
Malik Siltie	All storage	950	950	1,450	1,450	3,450	2011: WFP set up a mobile warehouse (rubhall) WFP committed to provide permanent warehouse
	Owned storage	950	950	1,450	1,450	3,450	
Menchemo Alaba	All storage	1,000	600	200	1,050	3,500	2012: WFP set up a mobile warehouse (rubhall) 2013: WFP partially funded a permanent warehouse
	Owned storage	0	0	0	500	2,500	
Mira	All storage	600	300	1,200	1,200	1,600	2012: WFP set up a mobile warehouse (rubhall)
	Owned storage	0	0	0	500	500	
Sidama Elto	All storage	1,700	1,700	1,500	1,500	1,500	2011: WFP set up a mobile warehouse (rubhall) ACDI/VOCA committed to build 5,000 mt warehouse, no WFP financial assistance
	Owned storage	1,000	1,000	1,500	1,500	1,500	
Walta	All storage	600	600	600	600	2,600	2013: WFP fully funded a prefabricated warehouse
	Owned storage	600	600	600	600	2,600	

TABLE 21: WFP PROCUREMENT BY MODALITY

Contract year	Procurement modality									Total (all modalities)		
	Competitive tenders			Direct contracts			Forward contracts					
	Beans	Maize	Total				Beans	Maize	Total	Beans	Maize	Total
2010	1,041	3,462	4,503	1,000	3,700	4,700				2,041	7,162	9,203
2011		80	80		740	740		800	800		1,620	1,620
2012		520	520		6,968	6,968		18,827	18,827		26,315	26,315
2013								0	0		0	0
<b>Total</b>	1,041	4,062	5,103	1,000	11,408	12,408		19,627	19,627	2,041	35,098	37,139

Source: WFP procurement records.

TABLE 22: WFP PROCUREMENT DETAIL

CU name	Surveyed	2010	2011	2012	2013 <sup>a</sup>
Lume-Adama Farmers Cooperative Union	Yes	250		389	
MIRA SERVICE DEVELOPMENT PLC	Yes	800		500	0
GIBE DEDESA FARMERS COOPERATION UNION	Yes			1,143	0
SOUTHERN REGION FARMERS COOPERATIVE		2,900			
BORA DENBEL FARMERS MULTIPURPOSE		200		329	0
LICHA HADIYA FARMERS COOPERATIVE UNION	Yes	1,541		500	
DAMOT MULTIPURPOSE FARMERS COOPERATIVE	Yes	2,512	0	2,000	0
GOZAMIN FARMERS COOPERATIVE UNION LTD.	Yes			1,700	0
Somali Regional State West Gode Integrat		1,000			
Admas Farmers Cooperative Union	Yes			2,150	0
Merkeb Farmers Cooperative Union LTD			80	10,038	0
Walta Farmers Cooperative Union	Yes			700	0
Melik Siltie's Farmers Cooperative Union	Yes		740	2,154	0
Angacha Farmers Cooperative Union			0	250	0
Damota wolayta Farmers Cooperative union	Yes		0	612	0
Ambericho farmer's Cooperative Union Ltd	Yes		0	550	0
Mencheno Alaba Farmers cooperative Union	Yes			600	0
Sidama Elto Farmers Cooperative Union	Yes		800	2,500	0
Barsan Primary Cooperative				200	
Uta Wayu Multipurpose Farmers Cooperative					0
Buno Bedele Farmers Cooperative Union					0
Admas Multipurpose Farmers Cooperative					0
Anger Abaya Farmers Cooperative Union					0
Esipe Dicha Farmers Cooperative Union Limited					0
Oysa Dawro Farmers Multipurpose Cooperative					0
South Omo Crop Producer Farmers Cooperative					0
Limu Inara Farmers Multipurpose Cooperative					0
Liben Farmers Cooperative Union					0
Haragu Farmers Cooperative Union					0
Ambo Farmers Cooperative Union					0
Jergo Birbir Farmers Multipurpose Union					0
Mete Yoma Badewacho Farmers Union Cooperative					0
Bore Bakko Farmers Cooperative Union					0
Jimma Farmers Cooperative Union Limited					0

a. 2013 figures reflect signed forward contracts that have not yet been delivered.

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**P4P on Twitter:** @WFP\_P4P

**20 P4P pilot countries**

**Asia:** Afghanistan

**Africa:** Burkina Faso, Democratic Republic of the Congo, Ethiopia, Ghana, Kenya, Liberia, Malawi, Mali, Mozambique, Rwanda, Sierra Leone, South Sudan, Tanzania, Uganda, Zambia

**Latin America:** El Salvador, Guatemala, Honduras, Nicaragua