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Finding Default? Understanding the drivers of default on contracts with farmers' organizations under the World Food Programme Purchase for Progress Pilot

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**Abstract:** During the past two decades food assistance policy has shifted toward local or regional food purchases for in-kind delivery and away from purchases from donor countries. While recent research and policy interest has focused on whether and when local purchases can have positive impacts in developing countries and, in particular, on smallholder farmer suppliers, the primary mandate of food assistance remains the predictable, safe, and cost effective acquisition of food for needy populations. Yet, to date, little is known about what drives successful contracting with farmers' organizations (FOs). We utilize data from the World Food Programme Purchase for Progress pilot in three East African countries to examine what features of organizations, contracts, and contexts best predict successful purchases. Drawing on related literature, we examine four possible explanations: FO characteristics, repeated experience or relationships, contract modalities and how they relate to local market price dynamics, and country contexts. We find that, across countries, local price dynamics and contracting experience are consistently important; an increase in market price between contract approval and delivery is associated with a greater likelihood of default, and the more that FOs engage in contracts the less likely they are to default. The relative importance of these features varies across countries, however, and within certain contexts some FO characteristics also play a role. Our investigation hence yields both generalizable and context-specific insights, informing an ongoing debate in the food assistance community about whether – and when - procuring from smallholder farmers results in tradeoffs or synergies.

**Keywords:** food assistance, farmer organizations, supply-chain innovation, contracts, sub-Saharan Africa

**JEL Codes:** Q18; L14; O19

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## **I. Introduction and Motivation**

The past two decades have brought significant transformation in food aid and food assistance policy. One important change is sourcing food for in-kind delivery locally or regionally rather than sourcing from donor countries. In 1990 only 9% of all food aid delivered was bought outside of a donor country (3% in the recipient country); by 2000 that number had roughly doubled, and since 2010 that number has hovered around 50% (with over 20% purchased in recipient countries) (WFP 2015).<sup>1</sup> In fact, in 2013, 86% of the over 2 million metric tons of food delivered by the United Nations World Food Programme, the world's largest humanitarian agency, was sourced locally or regionally in low and middle-income countries (WFP 2013). While the primary impetus, and political will, for these changes is dominantly driven by cost considerations—a delayed recognition of the inefficiency of transoceanic shipments and cargo preferences, for example (Bageant et al. 2010), and improved ability to acquire less expensively in global breadbaskets from Afghanistan to Uganda (Lentz et al. 2013)—a secondary focus of discussion has been around whether and when purchases can have positive impacts in developing countries.

Research to date shows that the theoretical risk of inducing upward pressure on local market prices does not usually play out empirically (Garg et al. 2013), and that recipients prefer local foods (Harou et al. 2013, Violette et al. 2013). Many posit, in turn, that the demand stimulus of food assistance purchases can support local farmers and economies by encouraging local production. Some propose to explicitly combine food assistance and development objectives by supply chain innovations such as targeting smallholder farmers and farmers' organizations for purchases (Davies 2014). The primary mandate of food assistance, however, remains the predictable, safe, and cost effective acquisition of food for needy populations; in so far as purchases may lead to benefits for smallholders and/or local communities, we need first to assure that such purchases can be “successful,” which is to say contracts can be implemented with smallholder farmers organizations and defaults on those contracts minimized. Little to date is known about what drives the success or failure of contracts with smallholder farmers.

Following the food price crisis of 2007-2008, the United Nations World Food Programme (WFP) launched an ambitious, 20 country, five-year pilot project, Purchase for

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<sup>1</sup> These percentages are of total quantities of all types of foods measured in “grain equivalents.”

Progress (P4P).<sup>2</sup> Through P4P, WFP, the world's largest food assistance agency, aimed to better understand the possibilities and challenges of purchasing food from farmer organizations (FOs) for its school feeding programs, refugee and internally-displaced persons camps, and other in-kind food assistance programs. WFP provided a source of demand for smallholder production, through procurement of commodities<sup>3</sup> from farmer organizations, and at the same time WFP and its partners implemented supply side interventions, such as trainings and other production and marketing support. While maintaining fidelity to its primary mandate of successfully procuring and delivering food to needy communities, the focus of the P4P pilot is largely on learning objectives. The first objective is to understand whether food assistance purchased locally could strengthen farmer organizations, and/or improve the well-being of smallholder farmers. A related objective is to learn whether WFP could procure from farmer organizations, bypassing traditional marketing channels, without sacrificing its quality requirements or facing heavy default risks.

Much of the research and policy interest in P4P relates to whether purchasing from farmer organizations can benefit smallholder farmer members of farmer organizations selling to WFP. While the challenges are many, research is being undertaken to explore this question (Lentz and Upton 2016), and a number of other types of impacts on livelihoods and communities remain to be examined going forward. However, there has been little investigation of what features of organizations, contexts and purchases best minimize default on contracts, and lead to successful purchases. This gap in the research has grown increasingly important, as, even beyond WFP and P4P, more and more nongovernmental organizations and governments are looking to purchase food from FOs. Understanding what sorts of procurement modalities and what sorts of FO attributes increase the likelihood of default can chart a pathway for other organizations and governments seeking to engage with farmer organizations and their smallholder members, and help agencies understand better design procurement programs and identify which FOs need what sort of support moving forward.

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<sup>2</sup> The 20 countries included in P4P were: Burkina Faso, DRC, Ethiopia, Ghana, Kenya, Liberia, Malawi, Mali, Mozambique, Rwanda, Sierra Leone, South Sudan, Tanzania, Uganda, Zambia, Afghanistan, El Salvador, Guatemala, Honduras, and Nicaragua. The project ran roughly from 2009-2013, with some variation in timeline between countries.

<sup>3</sup> WFP procured commodities that are part of its food basket in the country. Under P4P, the two main commodities that were procured were maize and beans.

This paper examines the possible drivers of the success (or failure) of contracts, using sales and FO-level data from three East African countries that were part of the P4P programme. We focus on four possible explanations for why farmer organizations are (un)able to deliver contracts, that stem from our review of the related literature. These include FO characteristics, the influence of experience and relationships, contract modalities and how they interact with local market price dynamics, and country contexts. We find that that several of these factors are important. Context matters; default likelihood, and the drivers of default, vary across countries. Across all contexts, local price dynamics, and in particular an increase in spot market price relative to contract price, are (unsurprisingly) associated with a greater likelihood of default. Success rates are also linked to experience; FOs that engage in repeated contracts are less likely to default. The importance of these features, and other specific FO characteristics, vary across countries. In Kenya, the price difference is relatively less important, while larger organizations are slightly more likely to default. In Tanzania, FOs with higher tier affiliates, and those who had successfully taken out loans prior to the intervention, are less likely to default.

The question of what influences the default by farmer organizations is of acute policy interest. Agencies seeking to procure food from farmers' organizations have several decision parameters around the purchases themselves. Choices made for each of these areas may influence default rates: where to purchase, from whom, how to design contracts, how to set up contracts so as to be predictable over time, and how to otherwise support participating FOs so as to encourage their continued success. As we have a better understanding of if and how purchases can benefit local farmers and markets, making those purchases successful will remain the first step in moving food assistance forward and achieving those broader benefits.

## **II. Literature and Conceptual Framework**

The United Nations World Food Programme now procures more food locally than it receives from in-kind donations. In 2014, for example, 81 percent of food procured by WFP was procured from developing countries (WFP 2014a). As local procurement becomes more common place, what drives defaults and successful deliveries of food for food assistance is increasingly important question in the humanitarian sphere (Lentz et al. 2013). A very small literature has examined specific questions related to the local procurement of food aid from farmers, and its potential benefits. Lentz et al. (2013) find that, relative to transoceanic food aid,

local procurement of food assistance saves significant time and cost in the vast majority of cases. Harou et al. (2013) examine two case studies in Burkina Faso and Guatemala. In Burkina Faso case, they find that purchases from smallholder farmers are successful, and the suppliers benefit from purchases due primarily to decreased transaction costs. In the case of Guatemala, the emergency circumstances of the food aid program in question led to a failure to purchase from smallholders, as contracted organizations could not acquire the quantity needed from smallholders in time to meet program needs (Harou et al. 2013). Evidence has not yet solidified around best practices for contracting with farmer organizations for local procurement—and understanding what drives contract defaults is one major gap in this area of policy research.

To date, the literature that specifically examines questions of default rates from contracted purchases with farmer organizations is limited. Barrett et al., (2010), in comparative assessment of contract farming across five countries, argues that imperfect contract performance “remains a seriously understudied phenomenon” (p. 720). Barrett et al. (2010) have argued that the roles of FOs as firms can be mixed: on the one hand, FOs can support aggregation; on the other, they can increase bargaining power. Much of the contract farming research focuses on private, for-profit firms contracting directly with farmers. While contracts in agriculture have evolved in diverse ways, contracts do not always “work” for smallholder farmers (Glover 1984; Eswaran and Kotwal 1985; Glover 1987; Narayanan 2014). Several key themes about what can contribute to successful contracting inform our approach to estimating default of farmer organizations. Our review of findings from research on farmer-level defaults allow us to propose five plausible drivers of default: FO characteristics, (lack of) repeated experience, contract modalities and how they relate to local market price dynamics, and country contexts.

First, farmer differentiation and barriers to entry limit the successful involvement of farmers in contracting. Michelson (2013) shows that smallholders who were successfully involved in sales to supermarkets had higher resource endowments, such as access to water or roads. Osterloh (2016) finds that, in Malawi and Ghana, the age of the FO can contribute to its ability to participate successfully in P4P. Therefore, we include farmer organization characteristics, such as age of FO and access to services (prior to the program), in our model.

Second, Michelson et al. (2012) find that success with smallholders, and achieving benefits for them, are largely contingent on the consistency and predictability of purchases. From a contractual perspective, partners are more likely to cooperate in a so-called “repeated game”



(Warning and Key, 2002); and from smallholders' perspectives, better decision-making that might improve productivity and improve welfare is more likely if a component of demand is fixed (Michelson et al. 2012). Therefore, we include the number of contracts that each FO has engaged in over the course of the program.

Third, Barrett et al., among others, describe how contracts can provide risk reduction, by guaranteeing a price for a harvest before the harvest market price is known. Yet, when the market price rises above the contracted price and the risks of enforcement due to side-selling is low, farmers have an incentive to default. Relatedly, as Narayanan (2014) points out using data from southern India, firms' contracts with farmers tend to vary by type of product. Firms purchasing marigolds, for example, bundle subsidized inputs with its contracts, while firms purchasing broiler chickens, provide detailed protocols to the farmers they contract with. We therefore include both the contract type and the difference between the contracted price and the market price at the time of sale, which are closely related due to the structure of P4P contracts.

Lastly, Barrett et al. (2012) also describe how geographic placement can strongly influence smallholder participation. Thus, we include indicator variables for countries to capture variations due to geography, policy environment, and institutions, and examine the above factors at both cross-country and intra-country levels.

After a description of the P4P program, these pathways of default are operationalized in our methodological section.

### **III. Background**

#### **a. Purchase for Progress**

For each of the 20 P4P programs, WFP assessed the main drivers and constraints for smallholder producers. WFP examined each pilot area's food-system, including key players such as smallholders, farmer organizations, and marketing and agricultural institutions, and related policies. In each country, the P4P package included both supply and demand side interventions, although the specific interventions varied across the pilots to reflect local farmer organization and smallholder capacities and needs. Broadly, the supply side interventions were aimed at increasing productivity, capacity for aggregation, and quality assurance. The types of supply side intervention included (but were not limited to): facilitating access to credit and input packages; providing training on production, post-harvest handling, aggregation and management; and

supporting access to equipment and infrastructure either through loans, provision, or rehabilitation. WFP and its partners also sought to assist with market development and the enabling environment by forging links between farmer organizations and credit providers, and paving the way for access to other buyers in the future.

On the demand side, WFP utilized three main procurement approaches, including: direct delivery contracts; forward contracts or contracting for risk reduction; and “smallholder-friendly” competitive tenders. For each pilot, WFP chose procurement approaches based on FOs’ capacities and perceived quality, and availability of marketing options (such as national commodity exchanges). Direct delivery contracts are negotiated directly with FOs, for a given quantity and price, based on open market prices for similar commodities. Forward delivery contracts, in advance of planting or harvest, include “floor price” for future purchases, providing a sure market for suppliers. In smallholder-friendly or “soft” competitive tenders, FOs compete with each other as for typical competitive tenders. Some of the requirements were modified depending on the type(s) of supply-side support available. An initial goal for P4P was to “graduate” FOs from the former modalities into the latter modalities, in particular to start with direct purchases and/or forward contracts and build FO capacity toward competitive tenders, which would potentially open the doors for other buyers.

WFP and its partners targeted the P4P interventions through FOs. However, P4P’s primary objective was to improve income of FO *members* with less than two hectares of land. WFP posited that the causal pathway for smallholder income improvement would result from, first, supply side interventions combined with the demand stimulus would lead to increased surplus production. Second, as surpluses increased, more buyers would enter the market, potentially also lowering transaction costs, and lead to increased incomes. This pathway assumes that it is desirable for smallholders to increase surpluses and that, as smallholders spent more time and/or resources on farming, any foregone income from other activities would be less than gains in farming-based incomes. It further assumes that the contract design and delivery of contracted commodities would be successful. Lastly, smallholder income would increase through supply expansion or quality improvements, but not due to receiving above-market rates. WFP procured food at market prices and not at a premium, in order to most efficiently meet the needs of the food insecure populations it serves.

b. Focus countries

We limit the analysis to three P4P pilots in eastern sub-Saharan Africa, in order to provide some boundary on historical and geographic heterogeneity. We focus on Tanzania, Kenya, and Ethiopia, a block of three neighboring countries in the Horn of Africa. These pilot countries provide an opportunity to examine cross-country differences within those ecological and institutional bounds. The focus on this sub-set is also a result of various data limitations, described in brief in section V.

In the three countries, the primary products procured by WFP was maize, and to a lesser extent, beans. As shown in Table 1, procurement sizes across the countries were generally small relative to WFP's overall procurement levels beyond P4P. They were extremely small relative to estimates of national production levels (FAO 2015; WFP 2009-2013). The amount procured was, however, often quite sizeable from the perspective of the supplying FOs and their immediate communities. Furthermore, in most cases, procurement was irregular or sporadic. See Table 1. We return later to the inconsistency in demand, which appears to be an important factor in successful contracting and default.

—Table 1—

*Tanzania: Background & P4P Approach*

Agriculture dominates both Tanzania's domestic and export economies, accounting for roughly 50% of GDP, and 80% of the labor force. Tanzania is typically a net importer of cereals, although, recently, it has produced nearly enough rice and coarse grains for domestic consumption (FAO 2015). Maize is the primary cereal produced, followed with half the magnitude by rice, and then sorghum. The seasonality of production is bimodal in the northern parts of the country, with a long season ("Masika") from July to September and a short season ("Vuli") in January and February. The southern part of the country is dominated by a single season that roughly corresponds to the long season (GIEWS 2015a).

Prior to the entry of P4P, there were effectively no farmer organizations with a marketing and training function. Many farmers were members of localized Savings and Credit Cooperatives (SACCOs), but these organizations had been previously prohibited from engaging in collective marketing (WFP 2013). As this policy was just changing, WFP and its partners' supply side efforts in Tanzania focused on strengthening FO marketing infrastructure and skills. A key component of this support involved infrastructure; 23 community storage warehouses were

rehabilitated, approximately one per participating organization, and 10 of these were brought to the level of licensing as part of Tanzania's Warehouse Receipt System. Several such warehouses were loaned diverse equipment, such as for storage and cleaning, and trainings were provided on how to use it. Additional training was provided to FOs on a variety of topics, such as agribusiness management, post-harvest handling, gender sensitivity, and credit and finance. The SACCOs, initially a point of entry for WFP, have since emerged as FOs, due to end of the legal prohibition on any one organization providing both marketing services and credit.<sup>4</sup>

During the course of the intervention, which ran from 2009-2013, the policy environment was dynamic; the government of Tanzania launched its flagship program, Big Results Now, intended to boost maize productivity, and also instituted periodic export bans.

#### *Kenya: Background & P4P Approach*

Kenya's economy is likewise dominated by agriculture, but slightly less so, as agriculture accounts for closer to 25% of GDP while still 80% of the labor force (CIA 2015b). Kenya produced only roughly half of its rice and cereal needs annually (FAO 2015). While people practice agriculture nation-wide, grain production in Kenya is dominated by the Rift Valley breadbasket in the southeast, which was the primary region of focus of P4P's programs. Kenya is likewise split between unimodal and bimodal production areas. Maize dominates the cereal sector, with nearly an order of magnitude more maize produced than wheat, sorghum, or any other grain (GIEWS 2015b).

Prior to the start of P4P, there was already a stronger culture of farmers' organizations serving as marketing agents in Kenya, some who were and are regular suppliers to WFP. P4P worked with some established organizations, but also targeted less experienced ones; of those surveyed, the organizations had existed for on average only 3 years (see Table 2). P4P worked in particular to help connect FOs to agro-dealers, to facility access to inputs and other production assistance. On the demand side, P4P was able to make greater headway connecting FOs to other markets, such as government-run school feeding programs.

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<sup>4</sup> For Tanzania, we use SACCO and FO interchangeably.

### *Ethiopia: Background and P4P Approach*

Ethiopia, Kenya's northern neighbor, has a rather different agricultural environment, primarily in its diversity of staple grains; while maize production is significant, cereals like teff, wheat, and sorghum dominate production (FAO 2015). Agriculture is however of similar importance for the economy, accounting for 40% of GDP and 85% of the labor force (CIA2015c). Ethiopia has a long and established history of farmers' organizations, which are organized hierarchically, with many small "primary cooperatives" (PCs) being joined into umbrella organizations called "Cooperative Unions" (CUs), who frequently market commodities on behalf of PCs, and these are then organized under "Federations" at the regional level.

P4P purchased from the CUs, which had been operating for longer on average than those in the other countries, and also had far more members—and fewer female members (see Table 2). P4P supply-side interventions hence focused on some of these unique factor, particularly by training trainers in both CUs and the government on gender awareness, and fostering discussion around women's participation in FOs. The program also worked on enhancing marketing capacity inclusive of smallholders more broadly, including providing support for post-harvest handling and quality analysis equipment at the CU level (WFP 2014b).

The three countries, with district locations of the supplying FOs, are shown in Figure 1.

—Figure 1 (under development)—

## **IV. Methods**

We select our models with a predictive intent, i.e. not to seek causal impacts but to test the several posited hypotheses for defaulting on, or inversely, successfully fulfilling, a contract. We explore this default or success of sales at the sales level. Each observation is a sale associated with its quantity contracted and delivered, supplying FO, its location, the characteristics and experience of that FO, and the timing of sale, likewise associated with market commodity prices.

Combined, the measurement of the outcome, the relatively small sample size, and availability of FO data to match to the sales information inform our modeling choices. We choose to model the outcome, defaults versus (any) delivery, as binary, indicating a "1" for total default and "0" otherwise. First, WFP accepted partial deliveries for P4P contracts. Further, WFP quality standards and delivery logistics could also result in partial defaults (e.g., a portion of delivery did not meet WFP's quality standards). Hence we consider all partial delivery as a

delivery, not a default. Such partial deliveries accounted for 24% of all contracts in our sample, with 14% total defaults and 61% complete deliveries.

First, we pool data over both time (sales month/year) and supplying FO (many repeated). Pooling in this manner is similar to estimating plot-level characteristics in a case in which individual farmers may have several plots (as in Barrett et al. 2010). Controlling for sale-specific prices captures time dynamics with respect to changing market prices.

As the outcome is binary, we use a straightforward logistic model, where the outcome (full default or complete delivery) is predicted by a series of covariates:

$$\Pr(Y_j = 1 | X_{1j}, \dots, X_{kj}) = \frac{1}{1 + \exp(-\sum_{i=1}^k \beta_i^0 X_{ij})}$$

Where  $Y_j$  is the outcome, default or delivery for farmer organization  $j$ , and  $X_1$  through  $X_k$  are the covariates of interest. Using variations on this core model, we examine each of the plausible drivers of default, as described above. We address FO (and member) characteristics by including the number of members, percentage female, percentage female leaders, average land area of members (and standard deviation, to capture the diversity of capacity), the age of the FO (years operating), whether or not it owns a warehouses, whether it is affiliated with a higher tier organization, and loan approvals prior to baseline, so as to examine whether specific attributes of FOs can enable them to better meet delivery obligations. We include the number of contracts each FO engaged in, to reflect repeated experience. We then include contract type, contract size, and price change, or percentage difference between the market price at time of delivery and the contract price.<sup>5</sup> The contract prices available are those that were agreed upon at the time the contract was approved. However, in the case of forward contracts only, this price was not the ultimate sales price; it was a floor price, and if the market price rose between approval and delivery the sales price increased to reflect the new market price. We hence make this price difference zero for forward contracts, if it was otherwise positive (meaning that the market price was higher than the contract price); but we show cross-country results for both the original and adjusted differences. Finally, we address country context both by including country indicators in the pooled regression and by looking at countries independently.

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<sup>5</sup> We also examine simply the market price change from approval to delivery, or in the month of delivery. Results are consistent and available upon request.

The interpretation of the marginal effect of a covariate that is discrete is the difference in the probability of the outcome with that covariate equal to one or equal to zero, or:

$$\Pr(Y = 1|\mathbf{X}, X_k = 1) - \Pr(Y = 1|\mathbf{X}, X_k = 0)$$

For a continuous covariate, the marginal effect is the impact at the limit of a change in the covariate on the probability of the outcome as it goes to zero, or:

$$\lim_{\Delta \rightarrow 0} [\Pr(Y = 1|\mathbf{X}, X_k + \Delta) - \Pr(Y = 1|\mathbf{X}, X_k)]$$

The marginal effect can be thought of as the impact on the probability of the outcome of a small change in that covariate. To improve precision, we cluster the standard errors at the FO-level (Angrist and Pischke 2009).

While the above allows us to consider features of FOs individually, we can also isolate the influence of factors not related to FOs by using FO-level fixed effects. In this model, we use a linear probability model, likewise clustering standard errors at the FO level.

## V. Data

P4P collected data from two different sources. First, administrative data on each of WFP's procurement were collected by WFP and tracked by FOs. Second, WFP collected monitoring and evaluation data on FO characteristics at baseline, midline, and end line. Based on careful matching of these data for countries with adequate procurement, we have samples from the P4P pilots in Tanzania, Kenya, and Ethiopia.

The WFP country office procurement officer collected procurement and contracting details for each contract. These data include the contract date and type, commodity, price, value, quantity delivered (and/or defaulted), and delivery date. WFP's procurement data were sourced partly by data collected by the FOs themselves; FOs were expected to share with WFP records on sales to WFP, including prices, dates, and commodities. FOs were also expected to share membership records, with basic information (mainly sex and land cultivated) for each farmer member.<sup>6</sup> Some farmer organizations repeatedly bid for and won contracts, whereas other FOs

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<sup>6</sup> The amount of detail in the FO records varies by FOs. In some cases, FOs collected additional information, such as the number of farmer members contributing to each sale. In other cases, the FO records include purchases from other entities, such as traders or commodity exchanges. However, these data were not consistently collected across FOs, and, therefore, we cannot estimate FO sales in general nor can we estimate effects of sales directly on smallholders.

sold only once.<sup>7</sup> The monitoring and evaluation plan for P4P was designed in collaboration with Management Systems International, then led and coordinated by the African Economic Research Consortium (AERC) and its partners. The key component of the M&E plan was to collect survey data, up to three rounds depending on the country, on both FOs and farmer households. We utilize these FO-level surveys, which covered FO characteristics, infrastructure, experiences (such as trainings, use of credit, etc.), and interventions received.

Finally, we acquired market price data for the contracted commodities through the WFP Vulnerability Assessment and Mapping (VAM) database, matching FOs specifically to the closest regional market for the procured commodities.

To use these data for our analysis, for each pilot, we sought to match WFP's purchases and default data to information on FO characteristics. We utilized data on FOs from both membership records, which had land sizes and sex of all members, as well as the surveys, which had a number of FO-level characteristics and experiences not included in the membership records. Relatedly, we needed sufficient location information on FOs so as to match them to meaningful market prices for the appropriate time and commodity.<sup>8</sup>

After careful examination, we deemed analysis infeasible in a majority of the 15 P4P pilot countries in sub-Saharan Africa due to a limited number of procurements, a lack of FO survey data, or to the inability to match the procurement data with the data on FO characteristics. Of the 15 pilots, only seven pilots successfully collected the FO survey data. For the others, the procurement records were incomplete or unavailable. In a few cases, too few procurements (and also defaults) make meaningful analysis infeasible and/or very unlikely to yield meaningful results. In some pilots, sufficient data are available, but merging them was impossible due to missing information on FOs and/or missing location information.

The first three columns of Table 3 show the number of FOs and associated sales that match to each set of FO characteristics. From FO procurement data provided by the organizations, we can match membership information (and leadership numbers), along with the

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<sup>7</sup> Some data is available on FOs that did not contract at all—including FOs selected as part of the comparison group for the Tanzania and Ethiopia country studies. These are not, however, significant or representative enough to make meaningful comparisons between those who ever contracted and those who did not.

<sup>8</sup> The level of specificity of the matched market varies by country, depending on the availability of market data. For Kenya, only larger regional market prices are available, and hence the prices match to just four markets. In Tanzania and Ethiopia, the matches are somewhat more specific, with 10 and 8 markets usable in each, respectively.



percentage female, to almost all FOs (123 (119) of 124) and sales (442 (418) of 443). Land area by member was only provided for about half of the FOs overall, or 24, 42, and 3 (out of 26, 68, and 29) in Tanzania, Kenya, and Ethiopia, respectively. Not all FOs were surveyed about the characteristics of their members; survey data was available for 67 of the 124 FOs overall, but was incomplete, meaning some characteristics of interest are available for a still smaller set.

To maximize our use of the data, we run multiple models, so as to show some results for a maximum of sales (including the FO fixed-effect model, which can utilize all sales), as well as more nuanced results for a smaller sample. A comparison of commonly-available characteristics among FOs surveyed versus those not surveyed reveals a few significant differences, including differences in contract types (more competitive tendering among those in the survey, relative to direct purchases), female membership (a larger percentage of females in those not surveyed), and land area (a higher percentage of smallholder, between 2 and 5 hectares, in those surveyed).<sup>9</sup>

## **VI. Findings**

### **a. Descriptive characteristics of FOs**

We begin with some descriptive assessment of the FOs involved, and examination of characteristics and experiences, first, by country, and then by whether or not FOs have ever defaulted. Table 2 shows differences by country among those who ever participated in any contract.<sup>10</sup> FOs in Kenya are on average smaller and have higher percentages of women, as well as a higher percentage of women leaders. As would be expected from the history described above, FOs in Ethiopia have the most infrastructure (warehouse storage) and experience, in particular in providing assistance to members and marketing, followed by Kenya and then Tanzania.

—Table 2—

Some notable baseline differences exist between those who were successful with contracts, versus ever defaulted, as shown in Table 3. Defaulting FOs were more likely to have ever engaged in a forward contract (56% versus 37%), which is logical given that forward contracting was designed to help lower capacity FOs. Average membership numbers were similar between these groups, while successful FOs had on average a slightly higher percentage

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<sup>9</sup> See full results in Appendix Tables 1-4.

<sup>10</sup> These comparisons should be taken with a grain of salt at this time, as we do not as yet have the baseline survey data for Kenya. Hence, for variables sourced from the FO survey, these are comparing baseline (2009) characteristics in Tanzania with later round information (2012) from Kenya.

of female members. Defaulters also had on average larger per-member land areas, 3.14 hectares versus 2.13 hectares. There are no significant differences at baseline in characteristics among those organizations surveyed, including in prior credit, banking, or marketing experience.<sup>11</sup>

—Table 3—

c. Evidence on default

We sequentially – and in combination, where possible - examine five plausible drivers of default: country contexts/institutions, contract modalities, local market price dynamics, FO characteristics, and repeated experience.

First, as discussed above, P4P had the intention of “graduating” FOs from forward contracts and direct contracts to competitive tenders. As shown in Figure 2, this intent did not particularly play out. While no competitive tenders were undertaken in the first year, thereafter, the percentage of competitive tenders relative to the other contract types was relative stable. These trends are fairly similar between countries, until 2013. In that year, in Tanzania, all contracts were competitive tenders. In contrast, in Kenya, only about 40% were, with a number of purchases happening with no contract at all.<sup>12</sup>

—Figure 2—

Table 4 presents the pooled Logit results on the dummy variables for “Total default” at the sales level. A clear and consistent finding is that the spot price change matters; to the degree that the market price is higher than the contracted price at time of delivery, default is *more* likely (models (1)-(4)). The magnitude and significance of this relationship—indicating a doubling to quadrupling of the likelihood of default for every percentage increase in price—remain similar with inclusion of FO characteristics. In turn, repeated experience is still important; each contract makes an FO about 11-18% less likely to default, and this is statistically significant across most specifications across and within countries (models 1-3). We also see that context is very important—the dummy variable on Kenya is negative and significant on total default, indicating better success with contracts in Kenya relative to Tanzania (model 3). This is in keeping with descriptive statistics which indicated that FOs in Tanzania had less prior experience than those in Kenya. In fact, when we include key experience indicators, years in existence and loans, the

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<sup>11</sup> Keeping in mind that these data are only available for a subset of FOs, as indicated.

<sup>12</sup> Due to these trends, we estimated models that interacted the contract type with year dummies, to see if default is largely a function of a combination between time and contract choice. We do not find a substantial effect. Results are available upon request.

significance on the Kenya indicator disappears (model 4). The importance of the price change seems, however, to dominate. We also see that the size of a contract is important, in that FOs are less likely to default completely on larger contracts.

—Table 4—

While the inclusion of FO characteristics does not fundamentally change the above results, the signs on most are telling. In particular, affiliation with higher tier organizations, and having had loans approved in the past, are associated with a lower likelihood of default.

We explore each model with the countries divided, to see if other details emerge within each context that are obscured by the pooled regression (Table 5). The importance of the price difference is more or less consistent across countries, though it loses significance for Kenya in isolation. In terms of other features of contracts, larger contracts are also associated with default across countries, although this difference is less significant when we include other FO characteristics. We find that impacts differ somewhat, primarily in that FO characteristics become important. For example, the default impact of spot market prices is less significant in Kenya (models 6-7), where default is more likely for larger organizations, but less likely when their landholders are on average larger. The percentage difference between contracted price and market price remains a highly statistically significant driver of default in both Tanzania (models 1-3) and Ethiopia (model 8-10). It is only in Tanzania that we see that prior loan experience, and affiliation with higher tier organizations, are associated with a decreased likelihood of default. This last is not true in Kenya, where average farmer land area is associated with lower default and years in existence appear to be associated with greater default.<sup>13</sup>

—Table 5—

To develop further precision around the importance of contracts and market prices, we then look at the pooled sample using fixed effects at the FO-level, which controls for all aspects that may relate to FO characteristics and/or experiences. These results are shown in Table 6. The first column uses the original price change that is not adjusted to account for the forward contract price scheme. As we might expect—given that forward contracts were targeted toward less experienced FOs—there are in this case greater defaults on forward contracts. However, once the

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<sup>13</sup> In the Kenya sample, note that these two sets of features cannot be controlled for simultaneously due to issues with insufficient sample size. Hence these last are more likely to be biased estimates.

price change is adjusted to reflect the structure of the contracts (i.e., that the contract price is never inferior to market price at time of delivery), this difference disappears.

—Table 6—

Otherwise, these results confirm that the price difference is a highly significant factor in default, all other FO-specific characteristics aside. To further isolate the importance of the relative price difference, we predict default using just the contract modalities and FO characteristics, then graph the difference between the predicted and observed values against the percentage differences between the contract and market prices in log-odds scale, as shown in Figure 3. The average cross-country relationship is about 75%, meaning that, all else equal, each percentage difference in market price relates to about  $\frac{3}{4}$ % greater likelihood of default.

—Figure 3—

## **VII. Conclusion**

In this paper, we examine the possible drivers of the successful contracts, defined as the likelihood of not completely defaulting on a quantity of food contracted between the WFP and farmers' organizations. We focus on four likely explanations for why farmer organizations are (un)able to deliver contracts: FO characteristics, repeated experience, contract modalities and local market price dynamics, and country contexts.

Our results from three country studies both confirm features of default that were already observable by policy makers and reveal new insights. The percentage difference between contract price and market price is a significant, and relatively large, predictor of default. As the percentage difference increases, the probability of default also rises. The size of the contract and prior experience also matter. As the contracted volume increases, the likelihood of default decreases, even when holding the membership size of the FO constant. This, perhaps, suggests that FOs take larger contracts more seriously than smaller contracts. Prior experience also decreases the likelihood of default, even when accounting for FO characteristics or country.

Across the pooled countries, no single FO characteristic stands out as a strong important predictor of default, suggesting that targeting across countries using these FO characteristics may not decrease default rates. However, turning to our within country estimations, FO characteristics become important. For example, the default impact of spot market prices is less significant in Kenya, where default is more likely on larger contracts. Hence, we can say that country context

is important, for the relative importance of these factors as well as in general—in this case, we see that contracts in Kenya are generally less likely to default than those in Tanzania.

The question of what influences the default by farmer organizations is of acute policy interest. Agencies seeking to procure food from farmers' organizations have several decision parameters around the purchases themselves: where to purchase, from whom, how to design contracts, how to support FOs, and the timing of contracting and delivery. These findings specifically may provide policy direction for future smallholder procurement.

First, price differentials are the main driver of defaults. When market prices rise relative to the contract, smallholders have a greater incentive to default. Contracting to accommodate price changes, such as through forward contracts, can be an effective way of managing this issue. Second, repeated experience is important, and leads to lower default. This is consistent with the economic literature on contracting—that relationships and trust improve the performance of contracts (Masuka 2009). It seems plausible that longer-term experience with contracting, combined with consistent and predictable demand stimulus, is more likely to lead to benefits to smallholder farmers (per Michelson et al. 2012).

Third, findings related to FO characteristics and default rates may be less about advising against purchasing from those organizations (e.g., those with more female members) than about being able to better target additional supply-side support.

As we develop a better understanding of if and how purchases can benefit local farmers and markets, making those purchases successful will remain the first step in moving food assistance forward and achieving those broader benefits. Thus, our research informs an ongoing debate in the food assistance community about whether – and when - procuring from smallholder farmers results in tradeoffs or synergies (Harou et al. 2013).

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# IX. Tables and Figures

**Table 1: P4P Procurement in Overview, by Country**

		2009	2010	2011	2012	2013	2014
Tanzania	Production (Maize & Beans)	4,099,920	5,600,600	5,016,771	6,303,515	6,469,891	7,763,127
	WFP Procurement	17,783	33,923	64,992	77,119	51,286	71,733
	<i>P4P Procurement:</i>						
	Quantity contracted	2,050	2,337	6,010	3,246	1,564	210
	% of WFP Procurement	12%	7%	9%	4%	3%	0.3%
	% of P4P Procurement defaulted	23%	33%	28%	46%	27%	0%
Kenya	Production (Maize & Beans)	2,904,363	3,855,139	3,954,536	4,213,902	3,920,206	4,129,163
	WFP Procurement	27,126	75,864	57,961	37,415	27,368	44,763
	<i>P4P Procurement:</i>						
	Quantity contract	250	9,251	4,148	1,355	1,318	1,701
	% of WFP Procurement	1%	12%	7%	4%	5%	4%
	% of P4P Procurement defaulted	40%	67%	41%	6%	1%	0%
Ethiopia	Production (Maize & Beans)	4,260,053	5,326,405	6,457,215	6,621,327	6,823,422	7,748,680
	WFP Procurement	73,591	252,076	85,293	112,454	154,431	131,392
	<i>P4P Procurement:</i>						
	Quantity contracted	-	5,903	3,440	34,070	38,000	37,000
	% of WFP Procurement	N/A	2%	4%	30%	25%	28%
	% of P4P Procurement defaulted	N/A	10%	53%	23%	11%	1%

All quantities in Metric Tons.

Production data from FAO Statistics, <http://faostat3.fao.org/home/E>

WFP total procurement data from WFP Annual Procurement Reports, 2009 - 2013

P4P Procurement quantities drawn from procurement records shared by WFP

**Table 2: FO Characteristics at Baseline, all FOs**

	All Countries (Pooled)			Tanzania		Kenya		Ethiopia	
	Mean	SD	FOs	Mean	SD	Mean	SD	Mean	SD
<i>Membership Data</i>									
Number of FO members	8423	22523	123	665	681	187	552	34692	35692
Percentage female members	0.41	0.25	123	0.41	0.12	0.54	0.23	0.11	0.07
Number of elected leaders	7.61	3.03	119	8.75	1.89	6.61	2.96	8.97	3.17
Percentage female leaders	0.37	0.28	119	0.38	0.17	0.5	0.26	0.07	0.1
Owns warehouse	0.41	0.49	118	0.09	0.29	0.35	0.48	0.79	0.41
Land area cultivated, members' average (ha)	2.54	2.35	69	4.61	2.97	1.43	0.62	1.47	0.38
Land area cultivated, SD	2.09	2.72	69	4.41	3.6	0.88	0.48	0.63	0.41
Land area cultivated, median	2.01	1.8	69	3.51	2.31	1.2	0.59	1.38	0.54
<i>Survey Data</i>									
Years in existence	5.28	4.28	46	6.22	3.3	3	3.6	6.92	5.35
Affiliated with higher-tier org	0.62	0.49	50	0.43	0.51	0.76	0.44	0.75	0.45
Has lower-tier org affiliates	0.81	0.4	67	0.81	0.4	0.47	0.51	1	0
Has a bank account in FO's name	0.98	0.14	50	1	0	0.94	0.24	1	0
Ever applied for cash loans	0.62	0.49	50	0.9	0.3	0.12	0.33	0.83	0.39
Ever had loans approved	0.52	0.5	50	0.76	0.44	0.06	0.24	0.75	0.45
Members received any training	0.5	0.51	50	0.62	0.5	0	0	1	0
Any other assistance received	0.64	0.48	50	0.62	0.5	0.65	0.49	0.67	0.49
FO offers any training	0.08	0.27	50	0.14	0.36	0	0	0.08	0.29
FO offers use of storage facilities	0.3	0.46	50	0.29	0.46	0	0	0.75	0.45
FO offers marketing support	0.34	0.48	50	0.29	0.46	0	0	0.92	0.29
Markets members' commodities directly	0.5	0.51	50	0.24	0.44	0.47	0.51	1	0
Connects members to buyers	0.2	0.4	50	0.48	0.51	0	0	0	0
Does not market commodities	0.26	0.44	50	0.24	0.44	0.47	0.51	0	0
Observations	123			26		68		29	

Table 3: FO Characteristics, all FOs; and Ttests by whether or not ever defaulted completely on a contract

	Full Sample			Never Defaulted		Ever Defaulted		Difference (Default-Not)	P-value
	Mean	FOs	Contracts	Mean	FOs	Mean	FOs		
Direct Purchase	0.43	123	416	0.47	75	0.38	48	-0.09	0.321
Forward Contract	0.45	123	416	0.37	75	0.56	48	0.19	0.04
Competitive Tender	0.64	123	416	0.59	75	0.73	48	0.14	0.11
Number of contracts	3.57	124	443	3.21	76	4.15	48	0.94	0.051
<b>Membership Data</b>									
Number of FO members	8423	123	442	8450.39	75	8380.54	48	-69.85	0.987
Percentage female members	0.41	123	442	0.45	75	0.35	48	-0.1	0.033
Number of elected leaders	7.61	119	418	7.34	74	8.07	45	0.73	0.204
Percentage female leaders	0.37	119	418	0.41	74	0.32	45	-0.09	0.099
Owns warehouse	0.41	118	416	0.42	74	0.39	44	-0.03	0.73
Land area cultivated, members' average (ha)	2.54	69	292	2.13	41	3.14	28	1.01	0.079
Land area cultivated, SD	2.09	69	292	1.79	41	2.53	28	0.74	0.272
Land area cultivated, median	2.01	69	292	1.69	41	2.49	28	0.8	0.068
<b>Survey Data</b>									
Years in existence	5.28	46	188	5.79	24	4.73	22	-1.06	0.406
Affiliated with higher-tier org	0.62	50	204	0.69	26	0.54	24	-0.15	0.282
Has lower-tier org affiliates	0.81	67	261	0.78	36	0.84	31	0.06	0.537
Has a bank account in FO's name	0.98	50	204	1	26	0.96	24	-0.04	0.303
Ever applied for cash loans	0.62	50	204	0.62	26	0.62	24	0	0.946
Ever had loans approved	0.52	50	204	0.5	26	0.54	24	0.04	0.774
Members received any training	0.5	50	204	0.46	26	0.54	24	0.08	0.58
Any other assistance received	0.64	50	204	0.65	26	0.62	24	-0.03	0.836
FO offers any training	0.08	50	204	0.12	26	0.04	24	-0.08	0.347
FO offers use of storage facilities	0.3	50	204	0.35	26	0.25	24	-0.1	0.469
FO offers marketing support	0.34	50	204	0.35	26	0.33	24	-0.02	0.926
Markets members' commodities directly	0.5	50	204	0.54	26	0.46	24	-0.08	0.58
Connects members to buyers	0.2	50	204	0.19	26	0.21	24	0.02	0.89
Does not market commodities	0.26	50	204	0.23	26	0.29	24	0.06	0.632
Total Observations	124		443	76		48			

**Table 4:** Logit on Total Default, All Countries (Draft)

	(1)	(2)	(3)	(4)
Forward Contract	0.28 (0.646)	0.773 (0.809)	0.131 (0.683)	0.899 (0.815)
Competitive Tender	0.517 (0.442)	0.584 (0.698)	0.162 (0.464)	0.883 (0.857)
Quantity of Contract (100 MTs)	-0.209*** (0.081)	-0.204* (0.119)	-0.198*** (0.071)	-0.232* (0.132)
Percentage difference between contract price and market price	1.939** (0.960)	4.818** (2.080)	2.580** (1.043)	5.251** (2.228)
Number of contracts over period	-0.162*** (0.058)	-0.188** (0.090)	-0.158** (0.064)	-0.103 (0.116)
Number of FO members	0 (0.000)	0 (0.000)	0 (0.000)	0 (0.000)
Percentage female members	-0.643 (1.630)	1.173 (2.079)	-0.168 (1.714)	2.29 (2.250)
Percentage female leaders	-1.211 (1.398)	-2.48 (2.028)	-1.522 (1.555)	-2.368 (2.201)
Warehouse, owns	0.175 (0.452)	-0.162 (0.472)	0.566 (0.532)	0.008 (0.686)
Years in existence		-0.086 (0.064)		-0.106 (0.065)
Affiliated with higher-tier org		-0.372 (0.547)		-0.22 (0.511)
Ever had loans approved		0.543 (0.522)		-0.025 (0.467)
Kenya			-1.172** (0.519)	-1.584 (1.149)
Ethiopia			-1.314 (0.826)	0.255 (1.118)
No. of FOs	358	172	358	172
Pseudo R2	0.11	0.17	0.14	0.18

\*, \*\*, and \*\*\* represent significance at the 10%, 5%, and 1% levels, respectively  
Robust standard errors, clustered at the FO level

Table 5: Logit on Total Default, by country										
	Tanzania			Kenya				Ethiopia		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Forward Contract	0.47 (0.563)	0.28 (0.646)	9.057** (4.015)	0.47 (0.563)	0.28 (0.646)	1.412 (1.925)	37.400*** (12.248)	0.47 (0.563)	0.28 (0.646)	9.889 (7.418)
Competitive Tender	0.363 (0.441)	0.517 (0.442)	9.697*** (2.933)	0.363 (0.441)	0.517 (0.442)	-0.252 (0.854)	34.778*** (12.163)	0.363 (0.441)	0.517 (0.442)	0.443 (3.620)
Quantity Contracted	-0.001** (0.000)	-0.002*** (0.001)	0.012 (0.011)	-0.001** (0.000)	-0.002*** (0.001)	0.006 (0.004)	0.008 (0.009)	-0.001** (0.000)	-0.002*** (0.001)	-0.009 (0.011)
Percentage difference between contract price and market price	1.555** (0.714)	1.939** (0.960)	12.566** (5.217)	1.555** (0.714)	1.939** (0.960)	4.696 (2.992)	1.518 (2.291)	1.555** (0.714)	1.939** (0.960)	37.213* (19.715)
Number of contracts over period		-0.162*** (0.058)	-1.578 (0.251)		-0.162*** (0.058)	-0.712** (0.323)	-1.498** (0.703)		-0.162*** (0.058)	1.599 (2.456)
Number of FO members		0 (0.000)	0.001 (0.001)		0 (0.000)	0.006** (0.003)	0.082** (0.034)		0 (0.000)	0 (0.000)
Percentage female members		-0.643 (1.630)	6.983 (9.486)		-0.643 (1.630)	-2.294 (2.404)	5.98 (7.145)		-0.643 (1.630)	51.189 (37.386)
Percentage female leaders		-1.211 (1.398)	13.747** (6.263)		-1.211 (1.398)	0.558 (2.099)	-2.916 (5.980)		-1.211 (1.398)	0 (.)
Warehouse, owns		0.175 (0.452)	0 (.)		0.175 (0.452)	1.915 (1.549)	-4.956 (3.411)		0.175 (0.452)	0 (.)
Land area cultivated, members' average			0.064 (0.204)			-1.934** (0.890)				
Land area cultivated, SD			0.017 (0.200)			1.409 (1.129)				
Years in existence			-0.068 (0.158)				0.719** (0.351)			2.521 (3.720)
Affiliated with higher-tier org			-5.568* (3.382)				6.993** (3.406)			0 (.)
Ever had loans approved			-3.663** (1.513)				0 (.)			7.022 (11.792)
No. of FOs	372	358	50	372	358	147	71	372	358	38
Pseudo_R2	0.05	0.11	0.52	0.05	0.11	0.37	0.4	0.05	0.11	0.63

\*, \*\*, and \*\*\* represent significance at the 10%, 5%, and 1% levels, respectively

Robust standard errors, clustered at the FO level

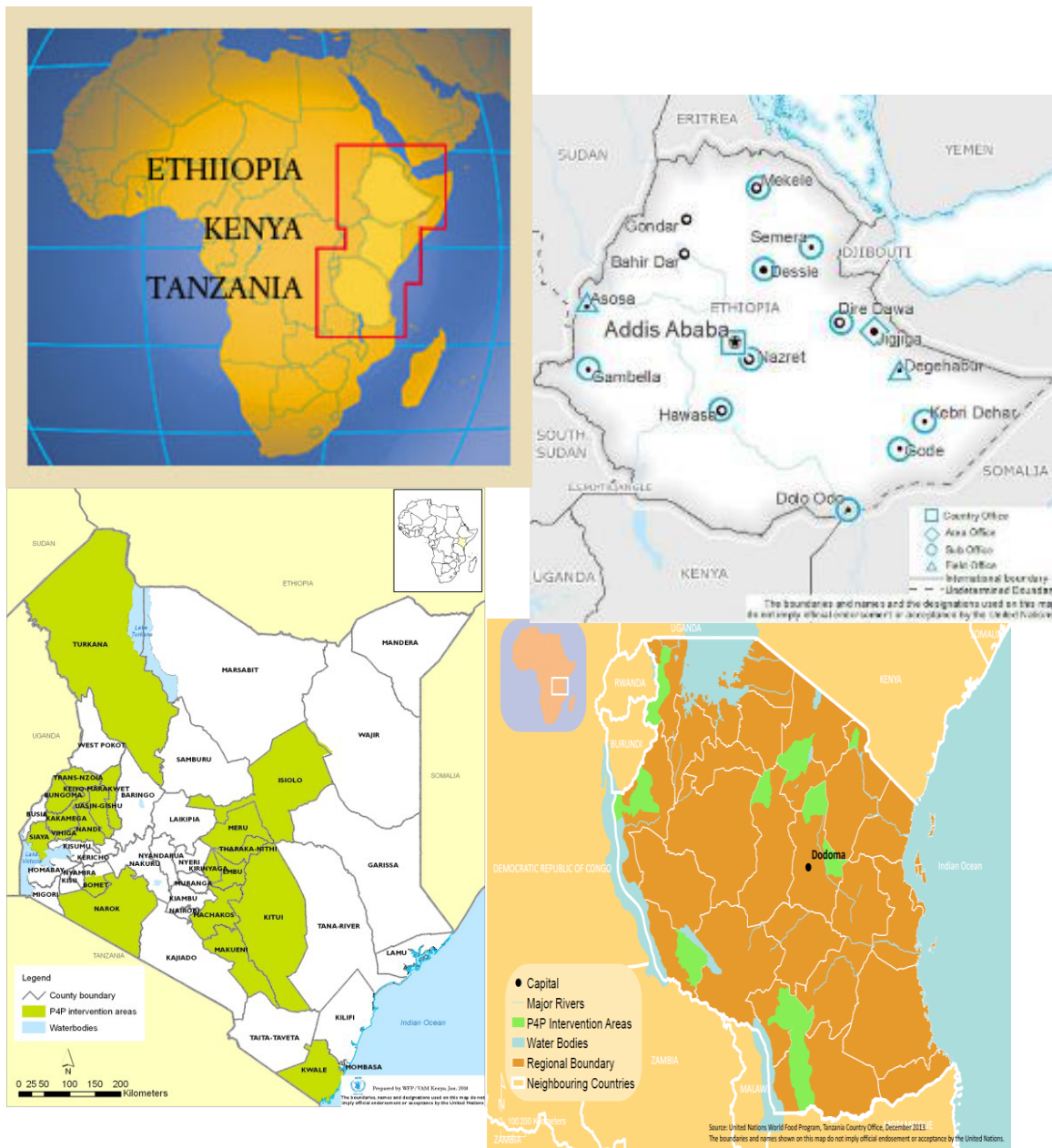
**Table 6: LPM on Total Default, FO Fixed-Effects**

	All		Tanzania	Kenya	Ethiopia
	(1)	(2)	(3)	(4)	(5)
Forward Contract	-0.165** (0.080)	0 (0.074)	-0.249 (0.175)	0.117 (0.121)	-0.056 (0.092)
Competitive Tender	0.036 (0.049)	0.011 (0.051)	-0.002 (0.082)	0.01 (0.066)	0.019 (0.104)
Quantity Contracted (100 MTs)	0 (0.003)	-0.004** (0.002)	0.004 (0.024)	0.025 (0.032)	-0.002 (0.002)
Percentage difference between contract price and market price, <i>not adjusted for forward contracts</i>	0.376*** (0.102)				
Percentage difference between contract price and market price, <i>adjusted for forward contracts (replace to =0 if &gt;0)</i>		0.397** (0.159)	1.004*** (0.262)	0.124 (0.165)	0.853** (0.313)
No. of FOs	353	372	78	197	97
R2 - overall	0.05	0.03	0.12	0.05	0.23

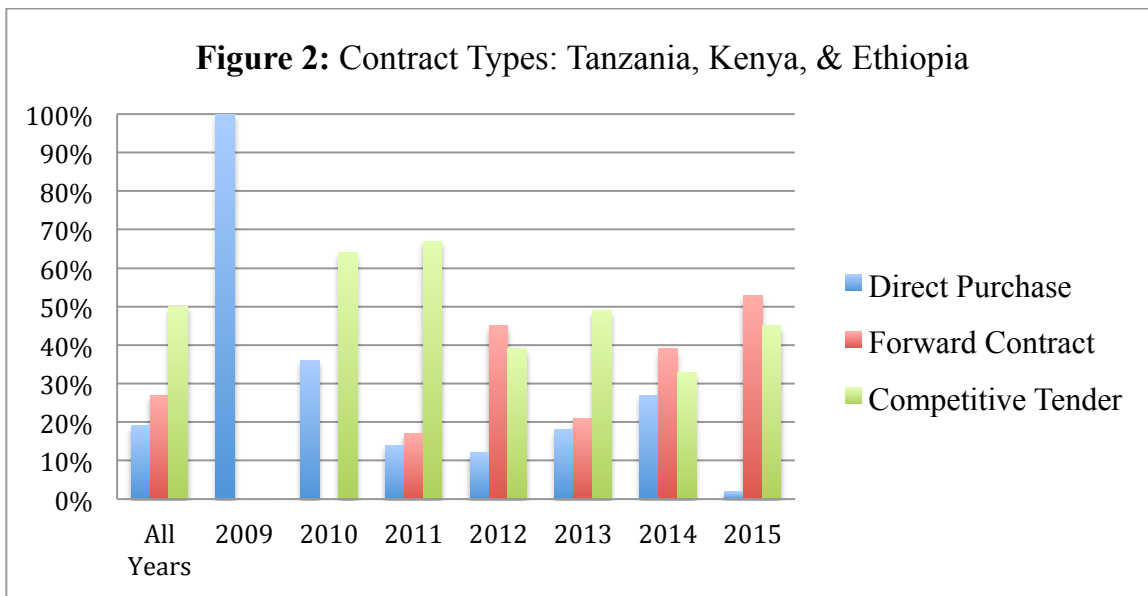
\*, \*\*, and \*\*\* represent significance at the 10%, 5%, and 1% levels, respectively.

Robust standard errors, clustered at the FO Level

**Figure 1: Country Maps with Procurement Regions**  
[Under development]



Sources: WFP; overview map at [humanjourney.us](http://humanjourney.us)



Source: WFP Procurement Data, Tanzania, Kenya, and Ethiopia



**Figure 3:** Relationship between likelihood of default and market price differential (controlling for contract type and FO characteristics)

