

Willingness of Rural and Peri-Urban Women Smallholder Farmers to Participate in Home-Grown School Feeding Farming Contracts in Ghana

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The Ghanaian government has implemented a Home-Grown School Feeding Program, which mandates that school caterers source food from local producers. The volume of local purchases, however, remains low. This study explores constraints faced by local producers—particularly women—in selling their production to local schools. We present results of an agricultural household survey, which includes questions pertaining to a series of hypothetical school-grower contracts. We find that women state slightly lower willingness to participate in contracts compared to men, something that is partially explained by their differential ability to dictate the management of land and use of household income.

INTRODUCTION

Global hunger is on the rise again after significant declines since the early 2000's (FAO, IFAD, UNICEF, WFP and WHO 2017). Hunger and food insecurity affect 815 million people worldwide (11% of the global population), with 207 million children suffering from stunted growth and wasting. In sub-Saharan Africa alone, about 243 million people (22.7% of Africa's population) face hunger, food

insecurity and deteriorating nutrition (FAO, IFAD, UNICEF, WFP and WHO, 2017). Generally, women and children are the most vulnerable to hunger and malnutrition.

School meals for children are a common type of food aid extended to countries in sub-Saharan Africa. Conventional school feeding programs in developing economies have often been operated using international food aid to improve nutritional and educational outcomes of the most vulnerable school-age children. Home Grown School Feeding (HGSF) programs, on the other hand, refer to a framework in which the school feeding is administered using food that is locally grown by smallholder farmers; this mechanism is designed to link school feeding with local agricultural production. As emphasized by Espejo et al. (2009), HGSF programs have the two-fold objective of increasing children's wellbeing as well as promoting local agricultural production and development by generating demand for small-holder farmers' output.

Since 2005, Ghana has been operating a school feeding program under the HGSF framework, in line with the comprehensive Africa Agricultural Development Program (CAADP) goals on hunger, poverty and nutrition. Evaluations of the HGSF program in Ghana have revealed improvements in child nutrition (Danquah, Amoah, Steiner-Asiedu & Opere-Obisaw, 2012; Owusu, Colecraft, Aryeetey, Vaccaro & Huffman, 2017) as well as school attendance and performance (Abotsi, 2013). However, little success has been achieved in linking the Ghana school feeding program (GSFP) to local agricultural development (USDA 2009a; Sulemana, 2016).

Contract farming is an institutional arrangement that has been explored as a mechanism to reduce transaction costs in food supply chains and solve market imperfections in linking smallholders to markets (Oya, 2012) thereby improving farm productivity and incomes of smallholders (Maertens and Velde, 2017). The welfare impacts and benefits of participating in farming contracts on smallholders in developing economies have been explored (Barrett, Bachke, Bellemare, Michelson, Narayanan & Walker, 2012; Bellemare, 2012; Maertens and Velde, 2017). For example, Maertens and Velde (2017) analyze how contract farming participation in the Benin rice sector affects smallholder production. Their findings indicate that contract farming results in expansion of the area of rice farmed, rice commercialization and intensification of rice production, higher farm-gate prices and increased income. However, few studies have examined the willingness of smallholder farmers to participate in contracts (the exception is Abebe, Bijman, Kemp, Omta & Tsegaye, 2013) or the preferences of smallholders for particular attributes of contracts. While a number studies have focused on smallholder contracts with supermarkets (Michelson, 2013), export firms and national schemes, no known study has examined how contracts can be harnessed to link smallholder farmers to school lunch programs.

In this paper, we examine potential constraints faced by local smallholders in selling their agricultural products through the GSFP. While the GSFP aims to purchase foodstuffs from local smallholders, regardless of gender, this study places special emphasis on women smallholders. Specifically, we ask whether the barriers to participation in the GSFP are distinct between men and women. Women are the primary child caregivers and main actors in household food preparation in many communities; thus, policy interventions that reduce gender inequalities are thought to improve women and children's nutrition (Malapit and Quisumbing, 2015) and reduce poverty and food insecurity. Empowering women is prominently featured in the United Nations Millennium Development Goals.

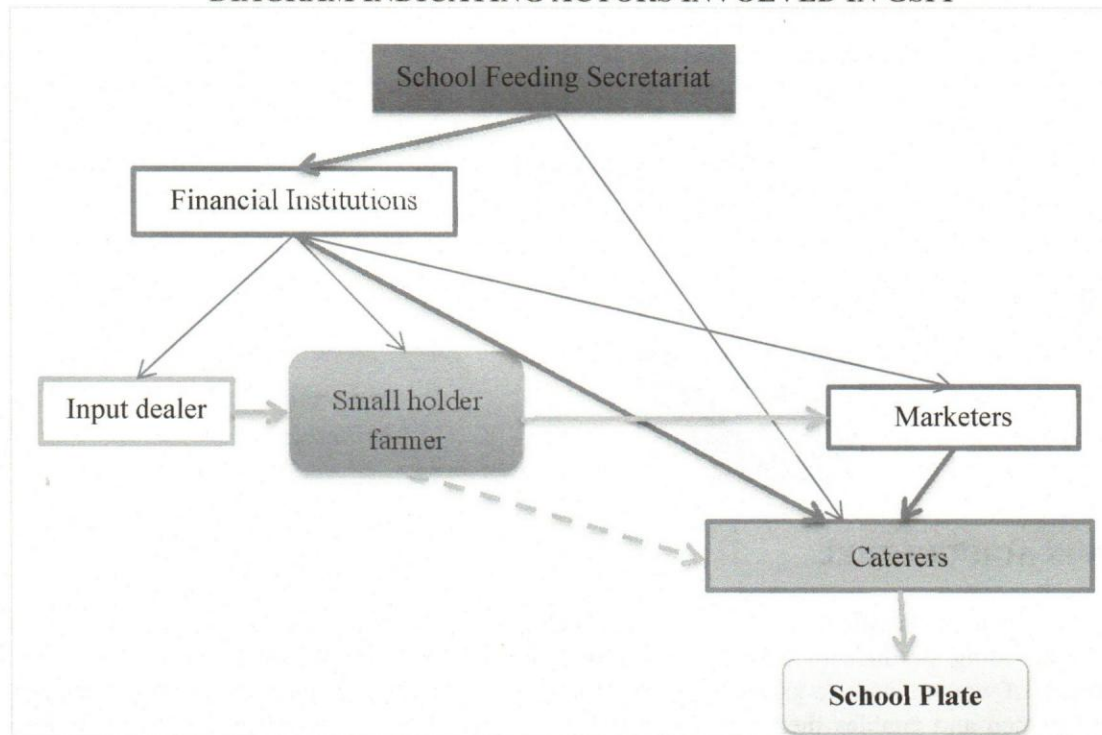
THE GHANA SCHOOL FEEDING PROGRAM

In 2005, the government of Ghana launched a HGSF as a strategy to reduce poverty and increase access to primary education. This initiative is in line with the comprehensive Africa Agricultural Development Program (CAADP) goals on hunger, poverty and nutrition. The GSFP was implemented to provide one hot, nutritious meal a day for students in pilot kindergarten and primary schools, covering 64,775 beneficiary pupils in all of the ten regions of Ghana.

Figure 1 shows the current actors in the provision of GSFP lunches. The Ghana School Feeding Secretariat has national, regional district and community level offices. The GSFP national secretariat collaborates with the Ministry of Gender, Children and Social Protection to implement the feeding

program. The district secretariat recruits school caterers, monitors their catering activities and requests payments to be released from the Ministry to the caterers. The monies are either paid through banks to the caterers account or via mobile electronic financial systems, after they have prepared and served food to the school children.

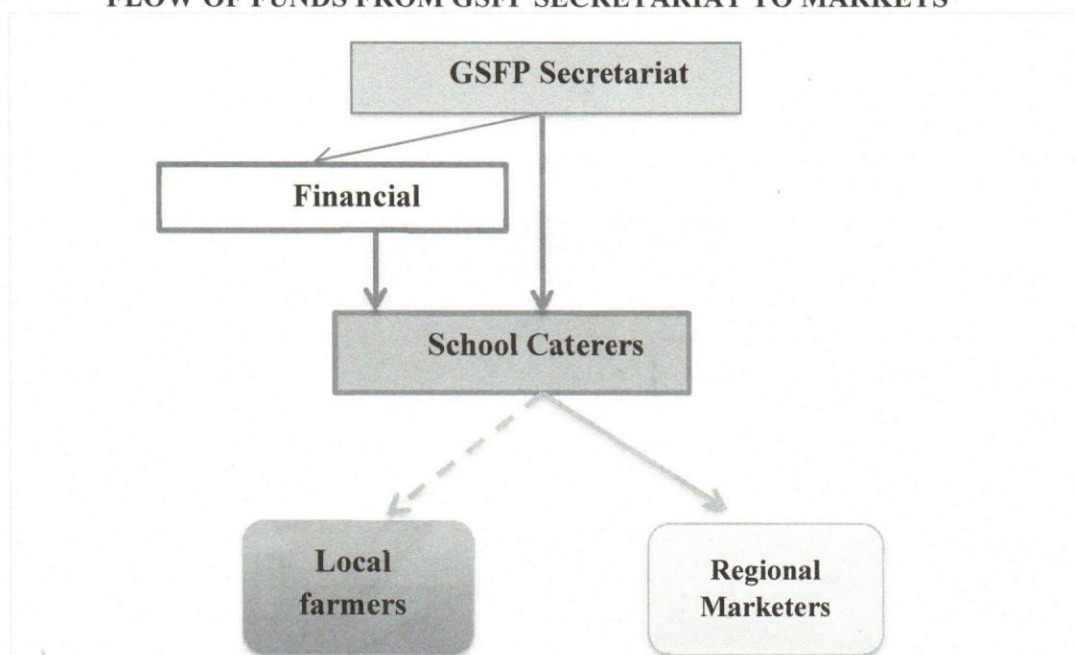
FIGURE 1
DIAGRAM INDICATING ACTORS INVOLVED IN GSFP



The three stated goals of the GSFP are to (1) reduce hunger and malnutrition, (2) increase school enrollment, attendance, performance and retention, and (3) boost local food production. This study focuses on the third goal. The GSFP mandates that 80% of school food purchases (typically made by the school caterers) be direct purchases from local farmers. Prior to the GSFP, school lunches, when provided, were based heavily on food aid and/or imported products. The rationale of including the 'local-purchase quota' was to induce the smallholder farmers to expand their farms and produce more to meet the increased demand of food by caterers to feed school children, thereby increasing the incomes of smallholder farmers and improving the nutritional status of both the school children and those of the smallholder farmers. According to Sulemana (2016), the success in linking the GSFP to local agricultural development requires active participation of school level governance structures school food caterers, small-holder farmers and local food traders, as key players involved in procurement of food under the GSFP.

Presently, however, the local-purchase quota is rarely met; in practice, caterers purchase nearly all of their food items from the regional market. Caterers typically purchase imported and/or processed items (e.g., imported rice and canned tomatoes) from the regional markets, thus defeating the local agricultural development objective. According to an inventory of the GSFP by the Dutch NGO SNV (Netherlands Development Organization) in 2008, only one out of the ten regions had caterers purchasing more than 20% of food from local farmers. In figure 2, the present flow of funds is shown in solid lines; the dashed line is the link between local smallholder farmers and school caterers that could potentially be facilitated by the farm-to-school-lunch contracts described herein.

FIGURE 2
FLOW OF FUNDS FROM GSFP SECRETARIAT TO MARKETS



WOMEN IN AGRICULTURE

This study focuses specifically on the appeal of such potential farm-to-school contracts, as a proxy for interest in providing produce to schools, to *women* farmers. Recent literature shows that economic empowerment of women leads to greater welfare outcomes for children. Engaging in productive activities empowers women and enables them to contribute to development within their economies (Woldie and Adersua, 2004). As emphasized by FAO (2012), bridging the gender gap is essential to increasing agricultural productivity and reducing poverty, malnutrition and food insecurity.

Female labor participation rates in sub-Saharan Africa rank among the highest in the world (FAO, 2011). However, despite women comprising nearly 80% of the labor force in sub-Saharan African, they often work in the informal sector (Aderemi et al, 2008), are under- or unpaid (Doss, 2011) and often do not have the same opportunities as men (Woldie and Adersua, 2004). Without more economic agency, the potential for job creation and wealth generation driven by female employment is limited. In Ghana's agricultural sector women are vital participants; they make up more than 50% of the agricultural labor force (SEND-Ghana, 2014). However, here, too, there is some evidence of women having systematically lower access to productive resources (SEND-Ghana, 2014).

A number of studies have shown that if women were fully empowered, they could contribute as much as men to the growth and development in any sector of any economy. For example, Kilic et al. (2015) find that 80% of gender differences in agricultural productivity among farm plot managers in Malawi was due to average differences in access to inputs such as lower inorganic fertilizer use, lower production of high-value export crops, lower use of adult male labor and restricted access to agricultural tools. Similarly, Aguilar et al. (2015) find that 23% of gender differences in agricultural productivity was attributable to differences in land access and child dependency in Ethiopia. This suggests that making productive assets more accessible to women would help attenuate the gender gap in agricultural productivity.

A significant body of research has documented gender-specific constraints faced by women smallholder farmers (Doss, 2001). Some research has focused on innovations that address the productive needs of women small-scale farmers (Quisumbing and Pandolfelli, 2010). There is, however, a paucity of research on the willingness of women smallholders to participate in contracts, and how the linkages

between a school-lunch program and smallholders can induce local agricultural development, reduce poverty, malnutrition and food insecurity.

Measures of Women Empowerment in Agriculture

A woman's access to farming resources, as well as her agency in managing farm and household affairs, are functions of her empowerment in her household and the community at large. Empowerment is a multidimensional concept that requires appropriate measures for diagnosis. (Akire et al., 2013; Malapit et al., 2015). The indicators of the Millennium Development Goals, which measure gender parity and women empowerment, are education, women's share in paid employment, and women's equal representation in national parliaments. Other approaches used to measure women empowerment and gender parity include using nationally representative data on women's status (Smith et al., 2003); agency - ability to exercise choices where none existed a priori, resources, and achievements (Kabeer, 2005); proxy measures of bargaining power such as income and assets (Thomas, 1994); and direct measures of empowerment such as mobility and decision-making (Bhagowalia et al., 2012). More recently, studies have used a survey-based index designed to measure women's empowerment across five domains in agriculture, namely agricultural production, access to and control over productive resources, control over the use of income, leadership in the community and time allocation (Akire et al., 2013, Malapit et al. 2015). Data from these types of surveys are used to construct the Women's Empowerment in Agriculture index (WEAI), a widely-recognized metric of gender parity (or lack thereof) within households and communities (Akire et al., 2013). Here, too, we use select questions from the WEAI survey.

Different domains and indicators of women's empowerment are important in different social, cultural and economic settings (Akire et al., 2013; Malapit et al., 2015). Calculation of the WEAI in northern Ghana indicates that the resources and production domains contribute the most to women's disempowerment in northern Ghana. (Malapit et al., 2015; Alkire et al., 2013). In other words, parity was lowest in terms of access to resources and agency in production. Access to and decisions about credit is the key indicator that contributes most to the resource domain while input into productive decisions contributes the most to disempowerment in the production domain (Malapit et al., 2015). Malapit et al. (2015) find that women's empowerment is weakly associated with children's nutrition outcomes and significantly correlated with women's dietary diversity in northern Ghana. The results of the authors suggest that expanding women's access to credit and participation in credit decisions is associated with improved outcomes for both women and girls in northern Ghana.

This study uses a modified, simpler, version of the Women's Empowerment in Agriculture Index (WEAI) to measure the empowerment (or disempowerment) of women in the areas of agricultural production, resources and income. Specifically, we ask the respondent the extent to which she can make personal decisions regarding cash crop farming; how much input she has in decisions on use of income generated from cash crop farming; and whether she owns agricultural land. We then link these subjective measures to her willingness to participate in farm-to-school lunch contracts, as well as other (more objective) measures of empowerment and resource access.

SURVEY DATA

Sampling Strategy

The objective of the study is to examine the potential and motivation of smallholder farmers to participate in farm-to-school-lunch contracts in the Northern Region of Ghana. Additionally, the study explores how local women farmers could be better connected with school feeding programs. Thus, the study adopts two sampling frameworks so as to oversample women. The first sampling framework generates a representative sample of smallholder farmers who live in rural and peri-urban areas in the Northern Region of Ghana while the second sampling strategy generates a representative sample of women smallholder farmers in those same communities. In this study, these two samples are pooled. Thus, we use a sample in which households where women are known to farm are oversampled, but is otherwise representative of the population.

In each of the samples, responses were collected from both the primary and secondary respondents, who were always adults above the age of 18 years. The primary respondent was typically the male head-of-household and the secondary respondent was typically the first wife. In households where the man or woman was widowed, any other adult significantly involved in farming activities with the smallholder farmer was interviewed. A total of 298 individuals were interviewed, of which nearly half (148) were women.

The survey instrument was implemented in six communities; three rural and three peri-urban communities within two districts in the Northern region of Ghana. A total of 150 households were randomly selected. Out of the 25 households selected in each community, 15 were selected using the representative household sampling strategy and ten households were selected using the women farmer sampling strategy. In related studies, sampling frames are typically drawn from selected Farmer Based Organizations (FBO). In contrast, the sampling frame for this research focuses on the community as a whole and thus captures key characteristics at the community level. Moreover, smallholder women farmers make up only about 5% of farmer based organizations in Ghana; using FBO's as a sampling frame would have largely excluded a population of interest.

Survey Modules

The survey instrument comprised six modules, A to F (Table 1). This study primarily uses data on demographics (Module A), the modified WEAI (B) and the hypothetical contracts (F). Module A asked the primary and secondary respondent about demographics such as age, sex, marital status, years of marriage, education, and religion. It also asked household-level questions such as the total number of persons in the household, the number of working adults, the number of adults who manage farm plots, the number of dependents, the number of young children, as well as whether any school children in the household benefited from the Ghana school feeding program. Module B asked about the respondent's role in household decision making around production and income generation. Module B was a modified version of the Women's Empowerment in Agriculture Index developed in 2012 by the International Food Policy Research Institute, the Oxford Poverty and Human Development Initiative, and the U.S. Agency for International Development. Module F incorporates a contingent valuation experiment eliciting respondent's willingness to enter into hypothetical farming contracts with school feeding programs. In these (hypothetical) contracts, the respondent is responsible for supplying the school caterer a 100-kg bag of maize (or beans). The respondent is presented with contracts that vary in terms of payment amount, payment times and delivery times.

TABLE 1
SURVEY MODULES

Modules	Description
A	Demographics
B	Modified WEAI
C	Respondent farming activities
D	Maize farming activities (2016/2017 agricultural season)
E	Legume farming activities (2016/2017 agricultural season)
F	Hypothetical maize and beans contract

Adapted Women's Empowerment in Agriculture Index

As described in Alkire et al. (2013) the WEAI is a survey-based index which directly measures women's empowerment across five agricultural domains of production, resources, income, leadership and time. The WEAI uses responses from primary male and female adult decision-makers, aged 18 and over, in the same household. This study collects data on the three domains that were identified by the WEAI as contributing most to women's disempowerment in northern Ghana: production, resources and income.

While we do not calculate the WEAI index itself, we use data from the WEAI module to generate simpler indices of empowerment described below.

The production dimension concerns sole or joint decision-making about agricultural production activities. The subjective participation indicator is constructed from respondents' participation in cash crop farming. Respondents were asked to what extent they felt they could make their own decision regarding cash crop farming. The answer scale was 1 = *not at all*, 2 = *small extent*, 3 = *medium extent*, and 4 = *to a high extent*. For each type of decision, a sub-indicator was created that considers the respondent as having some agency if he or she makes the decisions, or if the respondent feels that he or she could participate in the decision-making to at least a medium extent (i.e., answers of 3 or 4).

The resources dimension concerns ownership of or access to productive capital. The subjective indicator is constructed from the question that asks respondents whether they solely or jointly own agricultural land. A person is considered to have some adequacy if he or she reports having sole or joint ownership of agricultural land.

The income dimension concerns sole or joint control over the use of income. The subjective indicator measures the degree of input into decisions about the use of income generated from cash crops. The answer scale for the question regarding input in decisions is 1 = *no input*, 2 = *input into some decisions*, and 3 = *input into most or all decisions*. A sub-indicator was created that considers the individual as having some agency if he or she participates in that activity and has input into at least some decisions related to that activity (i.e., answers of 2 or 3).

Willingness-to-Accept Experiment

The main innovation of this paper is use data from the experimental module, which we describe here. The dataset captures the minimum prices that a respondent will accept—or minimum willingness to accept (WTA)—for his/her delivery of maize (and beans), under differing contract parameters. Table 2 below presents the attributes and levels of the hypothetical contracts used in the experiment.

TABLE 2
ATTRIBUTES AND LEVELS OF HYPOTHETICAL CONTRACT

Attributes	Description	Levels
Advance payment	Whether the contract includes an advance payment or not	0% 50%
Delivery times	Delivery time for product and receiving payment	At harvest Before next planting season

The respondents are presented with 4 hypothetical contracts for maize and beans, respectively. Table 3 is a sample maize contract orally administered to the respondents by enumerators. In the first contract, the respondent would receive no advance payment but receives full payment when the bag of crop is delivered, with the delivery time being right at harvest. In the second contract as well, there would be no advance payment to the small-holder respondent. They would store the crop, deliver it to the caterer right before the next planting season and receive full payment at delivery of the bag of maize or beans. The third and fourth contracts offer half payment for the crop at the start of the contract and the remaining half payment at the time of delivery of the crop. The third contract requires delivery at harvest time while the forth segment requires storage of the crop for delivery right before the next planting season.

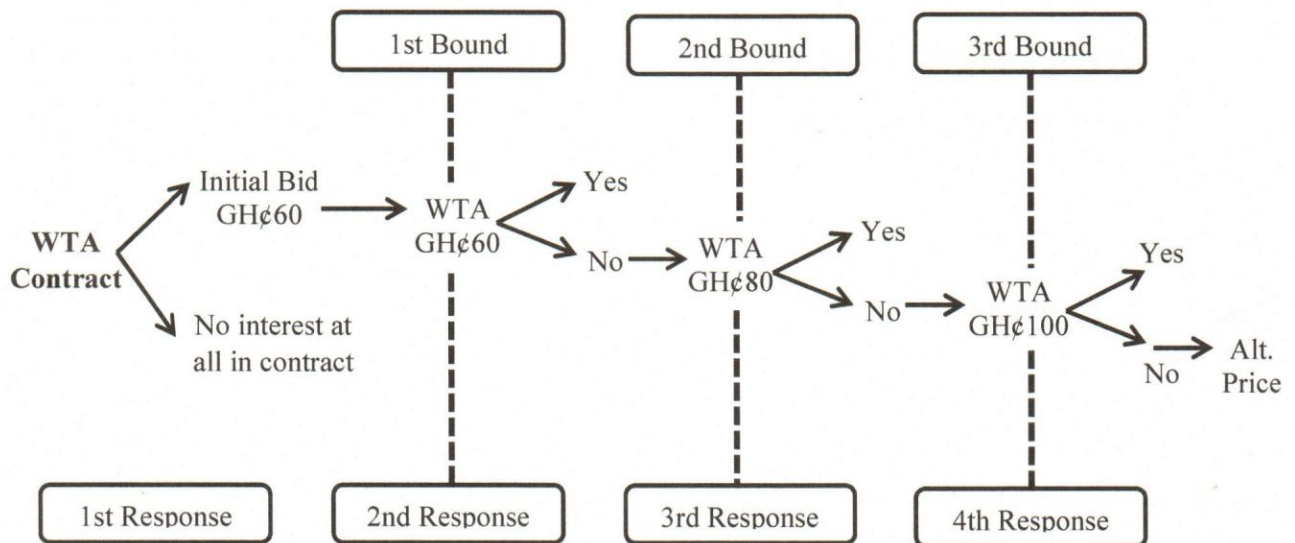
TABLE 3
SAMPLE SURVEY MAIZE CONTRACT

Contract Type	Advance Payment	Delivery Times	Price (GH¢) (ask sequentially)	If no what price will you accept?	No to ALL contracts
Contract 1.A	0%	At harvest	60 80 100		
Contract 2.A	0%	Before next planting	80 100 120		
Contract 3.A	50%	At harvest	60 80 100		
Contract 4.A	50%	Before next planting	80 100 120		

The times of delivery and payment were varied to reflect the times that smallholders sell their crops. Based on the findings of the pre-test instrument, some smallholder farmers sell their crops immediately at harvest if they are cash-constrained, while others store the crop and sell when they have large expenditures such as school fees or investments for the next planting season.

The prices were sequentially asked for each contract. Depending on the response to the first amount, two subsequent prices were offered to the respondent. A higher amount was offered to respondents who refused the first amount. An alternate price was asked of the respondent who refused all three prices given and a 'no' was recorded for farmers who were unwilling to participate in the contract. For example, with Contract 1.A, the respondent would first be asked whether he/she would enter the contract if he/she were paid a price of 60 GH. If so, a 'yes' was recorded for 60GH, and—implicitly—80GH and 100GH as well. If the respondent refused at 60GH, he/she would be asked the same question, but at 80GH, and so on. Thus, a minimum willingness to accept was observed on the four contracts for each respondent. Thus, each contract is designed as a triple-bounded dichotomous choice. The advantages of such a design have been shown in recent studies (Kanninen, 1993; Langford, Bateman & Langford, 1996; Bateman, Langford, Jones & Kerr, 2001).

FIGURE 3
THE STRUCTURE OF THE CONTRACT GAME USED IN THE SURVEY



PRELIMINARY DESCRIPTIVE RESULTS

We begin by presenting descriptive statistics at the household level. Table 4 below presents the demographics of the households given by the head of each of the 150 households surveyed represented in our sample. The average household size was 11 members, with an average of 5.7 males and 5.4 females. On average, households had 0.7 elderly dependents and 4.1 young dependents. Each household also had an average of 2.1 children under the age of 5 years. The households had an average of 3.2 school children benefitting from an existing free school lunch program in their communities.

TABLE 4
HOUSEHOLD LEVEL DEMOGRAPHIC STATISTICS

Variable	Mean	Std. Dev.	Min	Max
Household size	11.04	5.48	2	30
Males in household	5.65	3.09	1	19
Females in household	5.36	3.30	1	22
Elderly (>65 years)	0.72	0.87	0	3
Male elderly	0.30	0.47	0	2
Female elderly	0.42	0.58	0	2
Children < 18	4.11	2.67	0	15
Males < 18	2.17	1.74	0	11
Females <18	1.95	1.72	0	11
Children <5	2.41	1.86	0	10
Males <5	1.12	1.10	0	5
Females <5	1.30	1.39	0	7
Kids benefitting from school lunch	3.20	2.68	0	16
Boys benefitting from school lunch	1.58	1.55	0	8
Girls benefitting from school lunch	1.61	1.63	0	10

FIGURE 4
EDUCATIONAL LEVEL OF RESPONDENTS

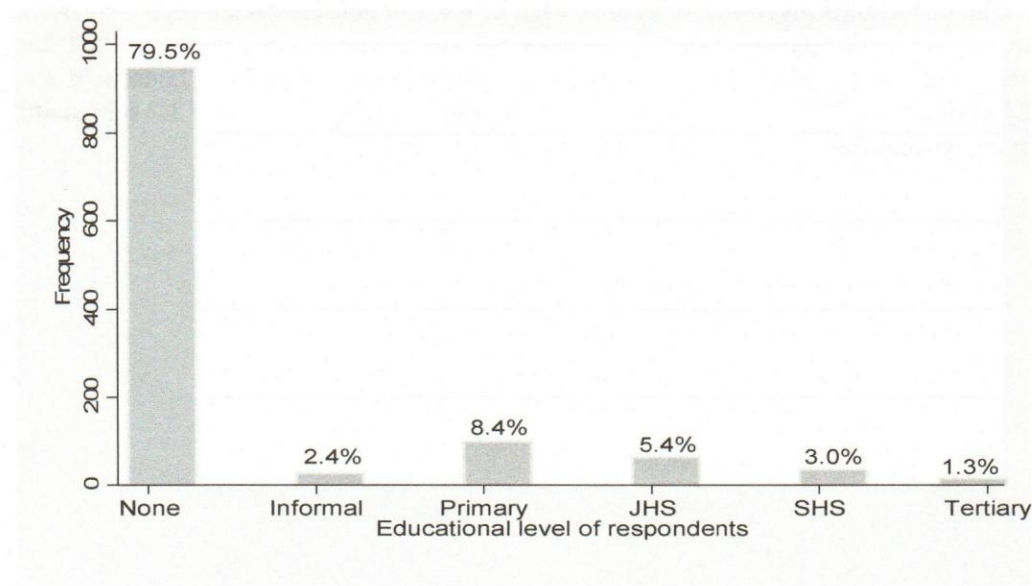


Figure 4 above shows the educational level of the respondents, specifically, the highest level achieved by the primary (the head, most commonly a man) and secondary (typically the first wife) respondents of each household. 79.5% of respondents have no education, 2.4% have some formal education, 8.4% have primary school education and 5.4 % and 4.4% have high school and some tertiary education, respectively. Examining educational level of respondents by gender showed that more women have no education

compared to men; 124 women had no education while 100 men respondents had no education; no woman had some informal education while 7 men had some informal education. Additionally, 19 men had more than a primary school education while only 8 women had any education higher than primary. The descriptive statistics show that no woman had tertiary level education while 4 men had received tertiary education.

TABLE 5
INDIVIDUAL LEVEL DESCRIPTIVE STATISTICS BY GENDER

Variable	Female		Male	
	Mean	Std. Dev.	Mean	Std. Dev.
Age (years)	41.8	13.0	49.6	14.2
Married (yes=1, no=0)	.9	0.2	.9	0.2
Marriage (years)	21.0	12.5	20.6	12.2
Any schooling_ (yes=1, no=0)	0.2	0.4	0.3	0.4
Farm land size (acres)	2.1	1.3	5.6	3.9
Grow maize (yes=1, no=0)	0.6	0.5	1.0	0.1
Maize farm size (acres)	1.4	0.8	3.3	2.3
Maize farm to market (miles)	4.2	4.5	6.6	3.8
Grow legumes (yes=1, no=0)	0.5	0.5	0.5	0.5
Legume farm size (acres)	1.2	0.4	1.4	0.9
Legume farm to market (miles)	6.0	2.8	5.8	2.7

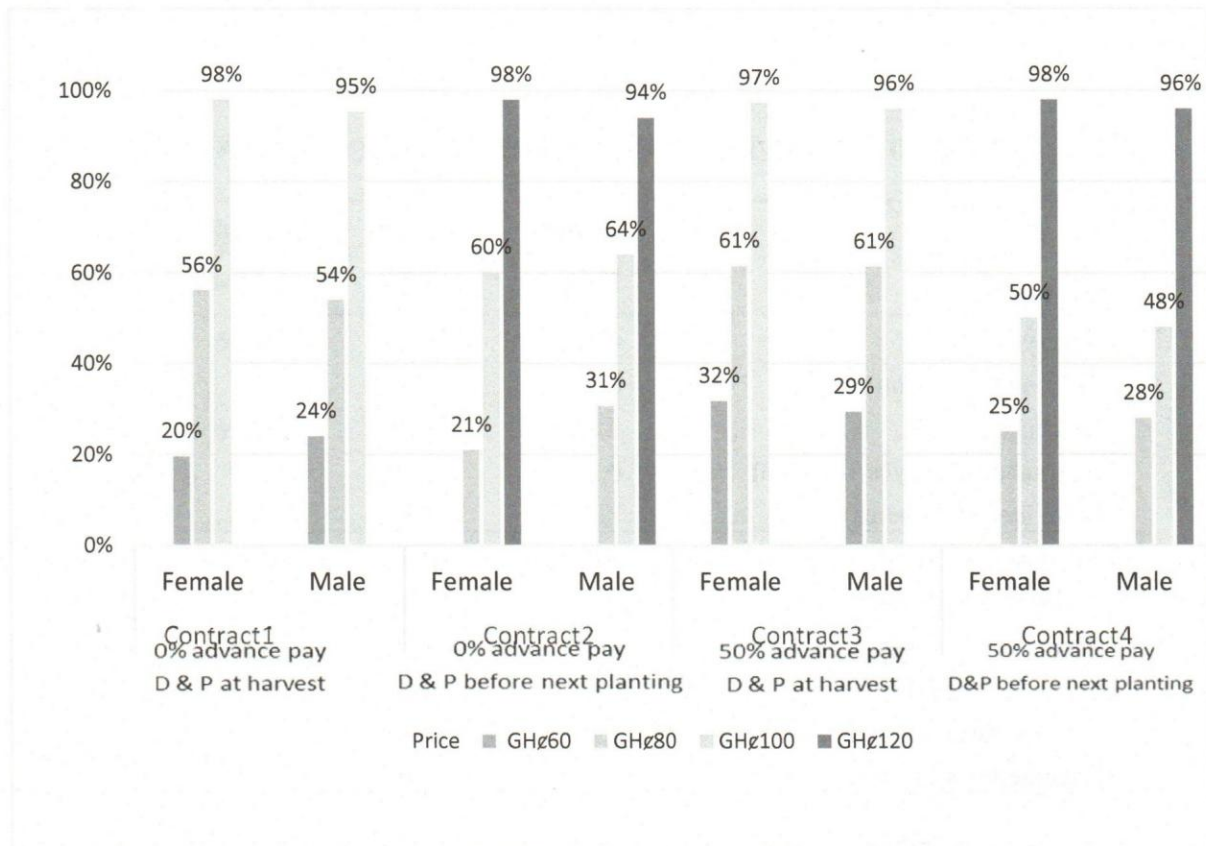
Table 5 presents individual level summary statistics of respondents by sex. The average acreage (Farm land size) managed by male respondents is more than twice that managed by women respondents: women (first wives, plus some female household heads) cultivate an average of 2.1 acres while men farm an average of 5.6 acres. This farm size includes all crops grown, including maize and/or beans. All men manage at least one maize plot, whereas just over half (60%) of women do so. This can be explained by the fact that maize is a staple crop that is consumed almost daily; moreover, the male is expected to supply maize for the entire household all year round. The average maize farm size of men is also more than twice that of women (conditional on managing a maize plot). Males cultivate an average maize farm size of 3.3 acres while women cultivate an average maize farm size of 1.4 acres. The average distance from respondents' maize farms to the nearest market is about 4.2 miles for women and 6.6 miles for men. This might be because women often cultivate their crops in the backyard of the house while men tend to cultivate their farms farther away from home where they may own or rent larger pieces of land.

About half of both male and female respondents, on average, cultivate legumes. The average legume area cultivated by females is 1.2 acres while that of males is 1.4 acres (conditional on having any legumes). The average distance from legume plots to the nearest market is 6 miles for females and 5.8 miles for males.

Willingness to Accept Contracts

Figure 5 below illustrates the willingness to accept a farm-to-school lunch maize contracts, by gender. Respondents (again, 150 men and 148 women) were asked whether they were willing to accept the contracts based on attributes of advance payment, delivery times and prices.

FIGURE 5
WILLINGNESS TO ACCEPT CONTRACT BY GENDER



Consistent with the law of supply, we observe that at higher prices, more smallholders are willing to participate in all the farm-to-school lunch contracts. In contract 1, for example, at a price of GH¢60 per 100kg bag of maize, only 20% of women are willing to accept the contract while 24% of men are willing to accept the contract. At a higher price of GH¢80 per bag of maize, about 56% of women smallholders are willing to accept the contract while 54% of men are willing to accept the contract. At the highest price offered for contract 1, GH¢100 per maize bag, 98% of women are willing to accept the contract while 95% of the men are willing to accept contract 1.

As indicated in Table 1, the farm to school lunch contracts were designed with varying advance payment, delivery and payment times as well as price attributes. One objective was to ascertain the extent to which the initial (advance)-payment feature would increase participants' willingness to participate in the school lunch contract, and how this increase in willingness differs between men and women. The difference between contract 1 and 3 is that contract 1 has no advance payment while contract 3 has 50% advance payment. At a price of GH¢60 per 100kg bag of maize, 20% of women are willing to accept the contract with no advance payment while 32% of the women are willing to accept the contract that has advance payment. Similarly, at GH¢60 per bag of maize, 24% of males are willing to accept contract 1 with no advance payment while 29% are willing to accept contract 3 with advance payment. At a higher price of GH¢80 per bag of maize, 56% of the women are willing to accept the contract with no advance payment while 61% of the women are willing to accept the contract with some advance payment. Similarly, at GH¢80 per bag of maize, 54% of males are willing to accept contract 1 with no advance payment while 61% are willing to accept contract 3 with some advance payment. These data suggest that women may feel cash constraints more acutely than men. The questionnaire also elicited qualitative responses to questions asked about the reason for the choice of the respondents preferred contract: The

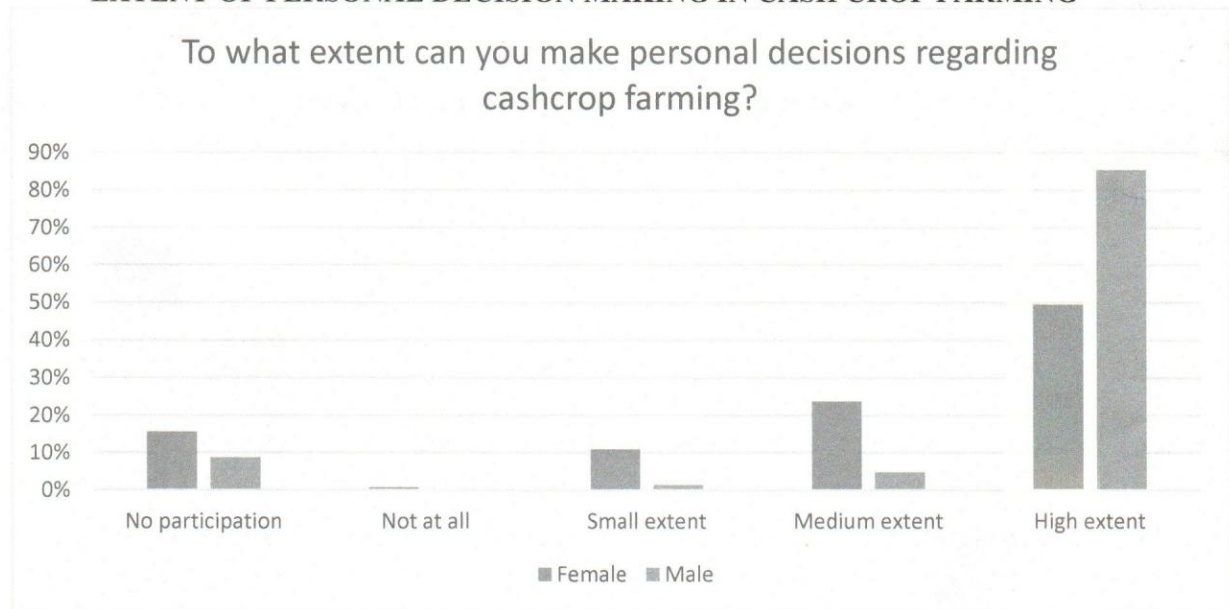
ubiquity among women of responses such as ‘I will farm more land’, ‘It will help me purchase inputs like improved seeds and fertilizer for my farm’ and ‘It will help me to farm well’ further suggest that some women smallholders may not have sufficient money up front to cultivate the crop and supply to the school caterers.

As expected, at higher prices more women are willing to participate in the farm-to-school lunch contracts regardless of the presence of the advance payment option. For example, at a price of GH¢100 per 100kg bag of maize 98% of women farmers are willing to accept contract 1, 60% of them are willing to accept contract 2, 97% of the women smallholders are willing to accept contract 3 while 50% are willing to accept contract 4. To illustrate, more than 50% of the women farmers are willing to accept all the contracts offered at a price of GH¢100. At relatively high prices, women smallholders might deem the net profit sufficient to participate. These women may likely borrow from formal and informal sources knowing that the net profit would be sufficient to pay off the debt and interest they might incur. Thus, to a woman smallholder, sufficiently high prices compensate for the absence advance payments.

Measures of Empowerment

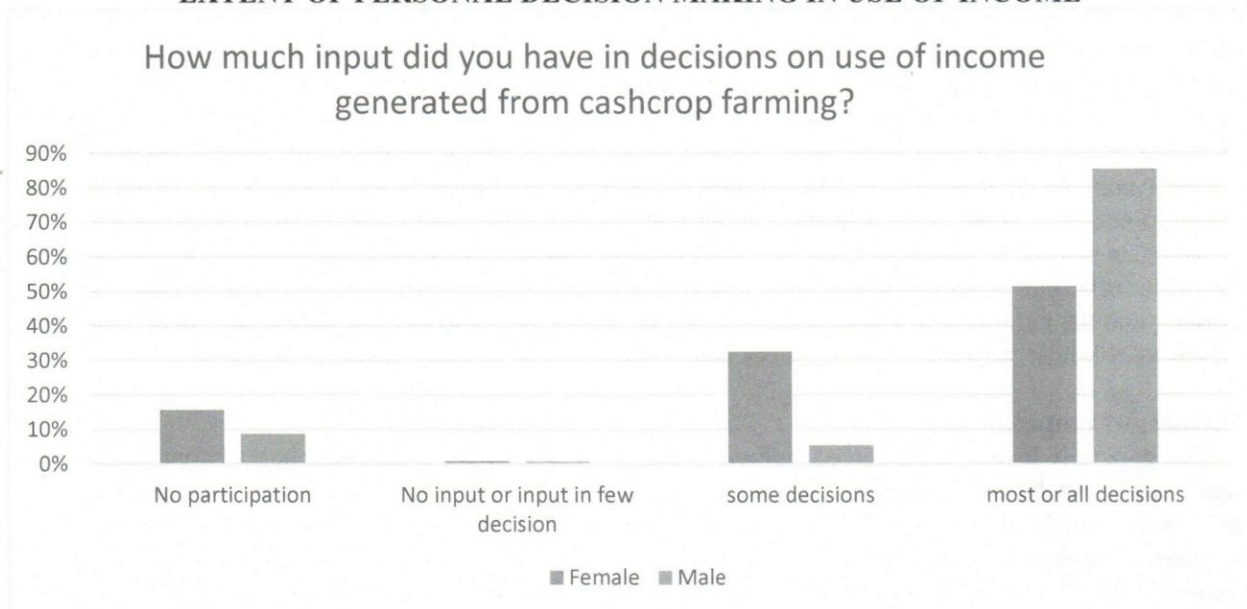
The generally lower likelihood of women choosing to participate in the hypothetical contract at lower prices might not be necessarily be an indication of *unwillingness* but might be an indication of their *inability* to which may be reflected in lower empowerment levels compared to men. We use three measures of empowerment, one each from the domains of production, income and resources. The first question asks ‘To what extent can you make personal decisions regarding cash crop farming?’ We observe in Figure 5 that more than 80% of men answered *high extent* while less than 50% of women felt the same way.

FIGURE 6
EXTENT OF PERSONAL DECISION MAKING IN CASH CROP FARMING



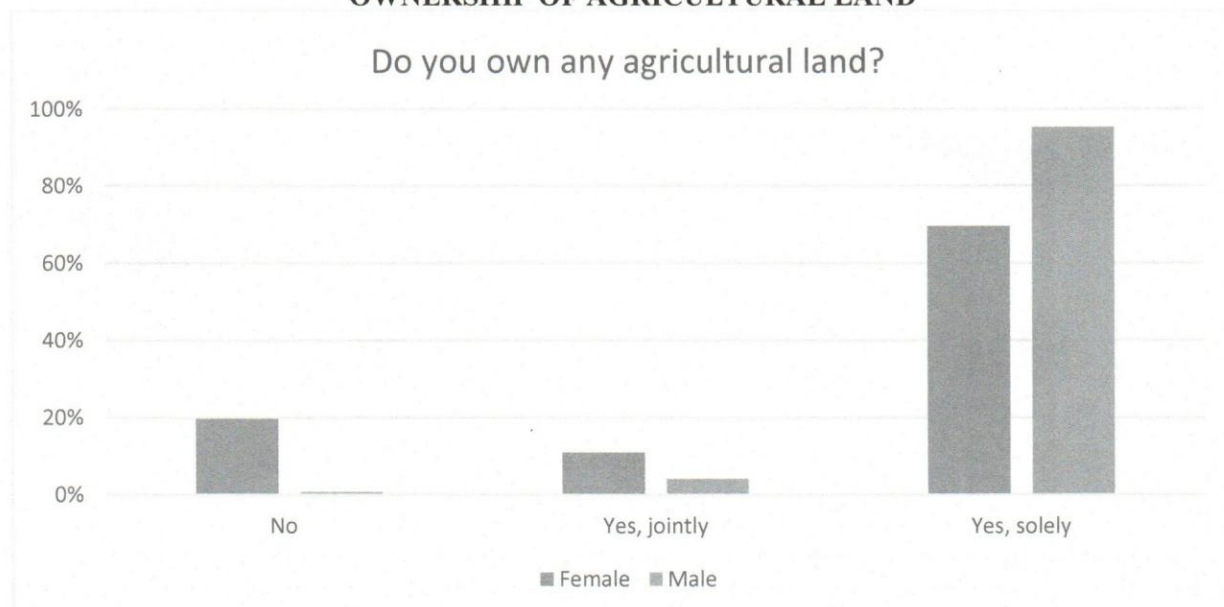
The second measure—which pertained to *income*—asked “How much input did you have in decisions on the use of income generated from cash-crop farming?” As figure 6 shows, only 51% of women reported having input into most or all decisions regarding income generated from cash crop farming whereas nearly 85% of men had input into most or all income decisions.

FIGURE 7
EXTENT OF PERSONAL DECISION MAKING IN USE OF INCOME



The third question, pertaining to *resources*, asked “Do you own any agricultural land?” Answers are depicted in Figure 8. Ninety-five percent of male respondents said they solely owned agricultural land while 70% of women responded as solely owning (and therefore having management authority on some amount of) agricultural land.

FIGURE 8
OWNERSHIP OF AGRICULTURAL LAND



Correlations between WTA, Empowerment, and Demographic Variables

We have summarized findings from three types of questions, each with their attendant advantages and disadvantages. Given the dearth of contract-related experience among these respondents, the stated WTA values are the only way to gauge the willingness of farmers, short of entering real contracts with all (or a randomly-chosen subset) of the respondents. However, these data must be interpreted with caution, as these are stated responses to *hypothetical* situations that may seem unrealistic or abstract. For example, it is unclear respondents have experience with any sort of contracts, including those with features such as advance payment. Similarly, the responses to the empowerment questions are ostensibly subjective. Nonetheless, it is reasonable to expect that perceptions of agency or control would match real-life outcomes. Finally, our data on demographic and farm characteristics are the most grounded in reality, yet by themselves, have limited explanatory power.

Therefore, we consider the ensemble of responses by looking for correlations between the willingness to accept contracts (1 and 3) at the lowest price (GH¢60 in both cases), answers to the three empowerment questions ('production', 'income', and 'own land'), and basic demographic variables (respondent age, educational attainment, and marital status). This is done separately for male and female respondents (tables 5 and 6, respectively). Surprisingly, this reveals no strong associations with only weak associations between the willingness to accept a contract at GH¢60 and the subjective empowerment questions in the domains of production, income and resources. This might suggest that being empowered in agricultural production, income decision-making or land ownership is not related to the willingness to accept the hypothetical contract at the lowest price. Also, we observe no relationship between the willingness to accept the contract at GH¢60 and demographic variables such as age, education and marital status, for both men and women.

TABLE 6
CORRELATIONS OF MALE WTA WITH WEAI AND DEMOGRAPHICS

	WTA Contract1 at 60	WTA Contract3 at 60	Production	Income	Own land	Age	Education	Married
WTA C1 at 60	1							
WTA C3 at 60	0.614	1						
Production	-0.033	-0.046	1					
Income	0.0026	0.0019	0.826	1				
Own land	-0.129	0.058	-0.028	-0.033	1			
Age	-0.029	0.0036	-0.025	0.060	-0.029	1		
Education	0.0925	0.0618	-0.0037	0.022	0.049	-0.444	1	
Married	-0.0775	-0.0578	0.082	0.052	-0.014	0.109	-0.09	1

TABLE 7
CORRELATIONS OF FEMALE WTA WITH WEAI AND DEMOGRAPHICS

	WTA Contract1 at 60	WTA Contract3 at 60	Production	Income	Own land	Age	Education	Married
WTA C1 at 60	1							
WTA C3 at 60	0.650	1						
Production	-0.060	-0.016	1					
Income	0.043	0.076	0.617	1				
Own land	-0.122	-0.115	-0.262	-0.317	1			
Age	0.025	0.009	-0.098	-0.019	0.088	1		
Education	-0.1212	-0.098	-0.045	-0.044	-0.081	-0.328	1	
Married	0.096	0.134	-0.030	-0.035	0.0019	-0.144	-0.027	1

CONCLUSION AND IMPLICATIONS

This paper assesses the willingness of rural and peri-urban smallholder farmers to engage in school-lunch contract farming and to identify the constraints that these farmers, particularly women farmers, may face. Contract farming could be the institutional arrangement that enables HGSF programs to achieve its win-win goal of strengthening local agrarian economies while providing nutritious meals to school children. These preliminary results might be useful to policymakers as well as international food aid organizations when devising development project for rural and peri-urban smallholder farmers.

The study reveals a number of interesting findings about constraints that smallholders face and how that might translate into their willingness or ability to participate in farm-to-school lunch contracts. Firstly, both men and women smallholders are faced with constraints. However, women smallholders may be more constrained, as indicated by lower educational levels and lower access to productive resources such as total land holdings and maize and legume farm sizes. Despite women managing far less land than men, the willingness of women to participate in the hypothetical contracts at the different prices is not different from that of men.

Secondly, women in northern Ghana are not as empowered as men in the WEAI domains of production, income use and resources. Women are particularly constrained in terms of decision making about cash crop farming, input into the use of income generated from cash crop farming and ownership of land. However, correlations show that these measures of empowerment (in domains of production, control over the use of income, access to and control over resources) have little explanatory power in terms of participating in the farm-to-school lunch contract at lower prices.

Thirdly, women appear to appreciate advance payment slightly more than men, but on the whole, preferences are similar between men and women. Women smallholders seem to have a lower willingness to accept for the farm-to-school lunch contracts that provide no initial payments. They might have to borrow resources to pre-finance the cultivation of high quality maize crop required for the school lunch program, and thus require a premium to payback interest rates. At higher prices, say GH¢100 per 100kg bag of maize women farmers are willing to accept the farm-to-school lunch contract with or no advance pay as the price may be sufficient to pay off any accrued interest they may have incurred from borrowing. Thus, higher prices may serve a similar purpose as an advance payment.

Fourthly, based on hypothetical contract responses, nearly all respondents would be willing to supply the GSFP if the prices were as high as 100 cedis (maize with advance payment) and 120 cedis (maize with no advance payment). This is unsurprising, as 100 cedis is considered by nearly all to be a 'very good' price. What is more useful to know is that fully one-fifth of respondents—both male and female—stated that they would be willing to provide maize at 60 cedis. This suggests that not all women are

similarly constrained; while not all women smallholders would participate in the HGSF program, a portion might do so, if purchasing contracts were offered.

Further research and analysis is needed to substantiate these preliminary findings. Whereas this study examined difference between men and women generally, future analysis will seek to understand differences in WTA responses *among* women (and men) to identify the characteristics of those most likely to consider supplying food to local school caterer. This can be achieved through an empirical model that estimates the willingness to participate based on contract attributes, access to productive capital, demographic characteristics and interactions of gender with contract attributes.

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