Baseline progress report on soybean in Tanzania

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Baseline progress report for Tropical Legumes-II

PROGRESS REPORT

2009

1. Background

Using a detailed and structured questionnaire, the Tanzania arm of the TL II Objective 7 (Soybean) baseline survey was carried out in April-May, 2008. Six trained enumerators (three females and three males) carried out the actual data collection. Mr. Appolinary Manyama, an Agricultural Economist from Sokoine University of Agriculture (SUA), *Mvomero* led the training of the enumerators, assisted by Dr. Jonas N. Chianu of the Tropical Soil Biology and Fertility institute of the Centro Internacional Agricultura Tropical (TSBF–CIAT). Prior to actual data collection, the trained enumerators pre-tested the questionnaire at *Msimba* village in *Kilosa* district. Thereafter, the outcome of the pre-testing exercise by each and every enumerator was discussed in group so that all enumerators would benefit from the discussions.

The topics covered in the questionnaire are summarized as follows: general information about the household (especially about the head of the household), household composition, household resources, institutional settings, and agricultural production (crop production, accessibility and productivity; soybean production including soybean seed systems and variety description; and livestock production and marketing). The other topics are agricultural commodity marketing decisions, commercial index, and crop gift; household income and expenditure profiles; household welfare and livelihoods; processing and other forms of value-addition; household food consumption and utilization; soybean utilization and perceptions on utilization of soybeans; household income from processed soybean products; household and community-level seed systems; sale of crop seeds; and capacity strengthening. Child welfare assessment topics (e.g., child feeding, weaning and complementary feeding, child health and nutrition status, and anthropometric assessment) targeted at survey households with children aged two years and below in Kenya was not included in the version of the questionnaire used in Tanzania.

In order to reach a sufficient number of soybean growing households, we sampled at district level (cutting across many villages). In total we visited three districts (two soybean growing districts and one non-soybean growing district). While the two soybean growing districts were *Kilosa and Njombe*, the non-soybean growing district *Mvomero*. We sampled a total of 240 farm households, distributed by districts as follows: 82 farm households (or 43.2%) from *Kilosa*, 78 farm households (or 32.5%) from *Njombe*, and 80 farm households (or 33.3%) from *Mvomero* district (see **Table 1.1**).

Table 1.1: Distribution of survey farm households in Tanzania

District	Frequency[$]
Kilosa	82 (34.2)
Njombe	78 (32.5)
Mvomero	80 (33.3)
Across district	**240 (100.0)**

[$]Values in parenthesis are percent figures

Source: Survey data, 2008

However, the distribution of the actual sampled farm households show that 88 farm households (or 39.3%) were soybean growing; the balance of 136 farm households (or 60.6%) was non-soybean growing (see **Table 1.1b**).

Table 1.1b: Soybean growing status of the farm households surveyed in Tanzania

Whether or not grow soybean	Frequency	Percent
Yes	88	39.3
No	136	60.7
Effective n	**224**	**100.0**

Source: Survey data, 2008

One village (if large enough) or a conglomerate of contiguous villages (where these were rather small) was selected for the survey in each of the three districts (*Kilosa, Njombe,* and *Mvomero*). Our initial intention was to have equal numbers of male-headed and female-headed farm households included in the survey. However, final sample selection was highly skewed towards male-headed households for the main reason that it was not possible to see a sufficient number of female-headed households.

However, post survey, we were able to use household headship and management to classify the survey farm households into three interesting classes for an improved understanding of the data. These classes are: **male-headed male-managed households** (where the head is a man and is actively living with the households), **male-headed female-managed** (where the man, though is taken as the head, but he is not always staying with the household), and **female-headed female-managed** (where the woman is fully incharge and control and a widow in all cases). Following this classification, our result shows that none of the households surveyed was male headed–female managed. In other words, the men in all the households were always staying at home, heading and managing their households. Most (~80% of them) of the households were male headed–

male managed. Only about 20% of the households were female headed–female managed (see **Table 1.1c**). We extended some aspects of the data analysis and the report following those classes.

Table 1.1c: Headship and management of the households surveyed in Tanzania

Household headship and management	Frequency	Percent
Male headed–male managed	191	79.6
Male headed–female-managed	-	-
Female headed–female managed	49	20.4
Across household headship and management	**240**	**100.0**

Source: Survey data, 2008

Following survey data collection, we embarked on data entry, cleaning, validation and preliminary data analysis. The results presented in this report are based on a preliminary analysis of a part of the baseline data collected. More detailed analyses, informed by the results from exploratory or preliminary data analysis will follow.

2. Results of preliminary data analyses

2.1. General information about the household

2.1.1 Gender distribution of the headship and management of the survey farm households

We verified the headship and the management of the survey farm households. Out of the 240 total farm households surveyed, 232 (~97% of the total farm households surveyed) responded to this question. According to the responses from this sub-sample, while ~79% (or 183 households) of the survey farm households were male headed-male-managed, ~21% (or 49 households were female headed-female managed).

2.1.2 Soybean growing status

Based on the filed data collection, while ~39% of the survey farm households were soybean growing, ~61% of them were non-soybean growing. When classified in terms of headship and management of the households, among the 183 male headed-male managed farm households, about 74 of them (or ~40%) were soybean growing. The corresponding proportion of soybean growing farm households among the 49 female headed-female managed farm households was 14 (or ~29%) (see **Table 2.1.2.1**). Of the 74 male headed-male managed households that were growing soybean, while 40 of them (or ~54%) were sampled from *Kilosa* district, the remaining 34 (or ~46%) were sampled from *Njombe* district. Similarly, of the 14 female headed-female-managed farm households that were growing soybean, while 10 of them (or ~71%) were sampled from *Kilosa* district, the remaining 4 (or ~29%) were sampled from *Njombe*. As expected, none of the soybean growing farm households (whether male headed-male-managed or female headed-female

managed) was sample from *Mvomero* district, a counterfactual district (**Table not shown**). On the average, the heads of the survey farm households that were soybean growing were older than the heads of the survey farm households that were non-soybean growing, 46.77±11.357 years compared with 42.49±11.982 years.

Table 2.1.2.1: Distribution of survey farm households by headship and management and soybean growing status in Tanzania

Headship and management of household	Soybean growing status[$]		Across soybean growing status
	Yes	No	
Male headed-male managed	74 (40.4)	109 (59.6)	183 (100.0)
Female headed-female managed	14 (28.6)	35 (71.4)	49 (100.0)
Across headship and management	88 (37.9)	144 (62.1)	232 (100.0)

[$]Values in parenthesis are percent figures

Source: Survey data, 2008

2.1.3. Age and marital status distribution of heads of survey households

The ages of the heads of the survey farm households ranged from 20 to 85 years with a mean and standard deviation[1] of 44.36±12.148 years. The mean ages and standard deviations of the heads of the survey farm households for the different districts were 45.83±12.381 years for *Kilosa*, 44.12±12.221 years for *Njombe*, and 43.08±11.821 years for *Mvomero*. Generally, the heads of the male headed-male managed farm households were older than those of the female headed female managed farm households, an average of 45.37±12.423 years compared with an average of 40.26±10.075 years.

We also assessed the marital status of the heads of the survey farm households and the available options included: single, married, divorced, separated, and widowed. Results indicate that most of the heads of the survey farm households were married. It was, however, surprising that about 5% of them noted that they were single (see **Table 2.1.3.1**).

[1] This is a measure of the spread, dispersion or variability of the distribution and is the square root of the variance, usually denoted by *s*. It is often abbreviated to **SD**. Because SD is a measure of variability about the mean, this is shown as the mean plus or minus one or two standard deviations. The SD is a statistic that tells you how tightly all the various examples are clustered around the mean in a set of data. When the examples are pretty tightly bunched together and the bell-shaped curve is steep, the SD is small. When the examples are spread apart and the bell curve is relatively flat, that tells you that you have a relatively large standard deviation. The SD tells you how diverse the values or scores are for each class being compared. A bigger SD for one class tells you that there are relatively more observations within that class scoring towards one extreme or the other.

Table 2.1.3.1: Distribution of the heads of the survey farm households by their marital status

Marital status	Frequency[$]
Married	199 (82.9)
Widowed	15 (6.3)
Single	12 (5.0)
Separated	9 (3.8)
Divorced	5 (2.1)
Total	**240 (100.0)**

[$]Values in parenthesis are percent figures

Source: Survey data, 2008

2.1.4. Decision making in the household

We evaluated the person in the households that is incharge of decision making on farming activities. Among others, the available options included: household head, the spouse, children, household head and spouse, household headed and children, spouse and children, and all members. The result shows that household heads dominated decision-making on farming activities in the study area. However, in about 26% of the cases, decision making on farming activities were mainly made jointly by the household head and the spouse (see **Table 2.1.4.1**).

Table 2.1.4.1: Distribution of responses on main decision maker on farming activities in the household in Tanzania

Main decision maker	Frequency[$]
Household head	143 (68.1)
Household head and spouse	55 (26.2)
Spouse	5 (02.4)
Others (children, spouse and children, all members, head and children)	7 (03.3)
Effective n	210 (100.0)

[$]Values in parenthesis are percent figures

Source: Survey data, 2008

2.1.5. Household size

Across gender and districts, the size of the survey farm households ranged from one person to 10 persons with a mean and standard deviation of 5.2±2.01 persons. Analysis by district shows that mean household sizes were similar among the three districts surveyed (see **Table 2.1.5.1**). **Figure 2.1.5.1** shows the chart on the frequency distribution of the sizes of the farm households surveyed in Tanzania. Also, the results of our analysis by soybean growing status show no difference in the size of households growing soybean and those that do not grow soybean (see **Table 2.1.5.2**). The same applies to the results based on analysis by headship and management of the households surveyed (see **Table 2.1.5.3**).

Table 2.1.5.1: Household size distribution among the households surveyed in Tanzania by districts

District	n	Mean	Std. Deviation
Kilosa	82	5.1	2.13
Njombe	78	5.4	1.96
Morogoro	80	5.1	1.95
Across districts	**240**	**5.2**	**2.01**
Sig		NS	

Source: Survey data, 2008

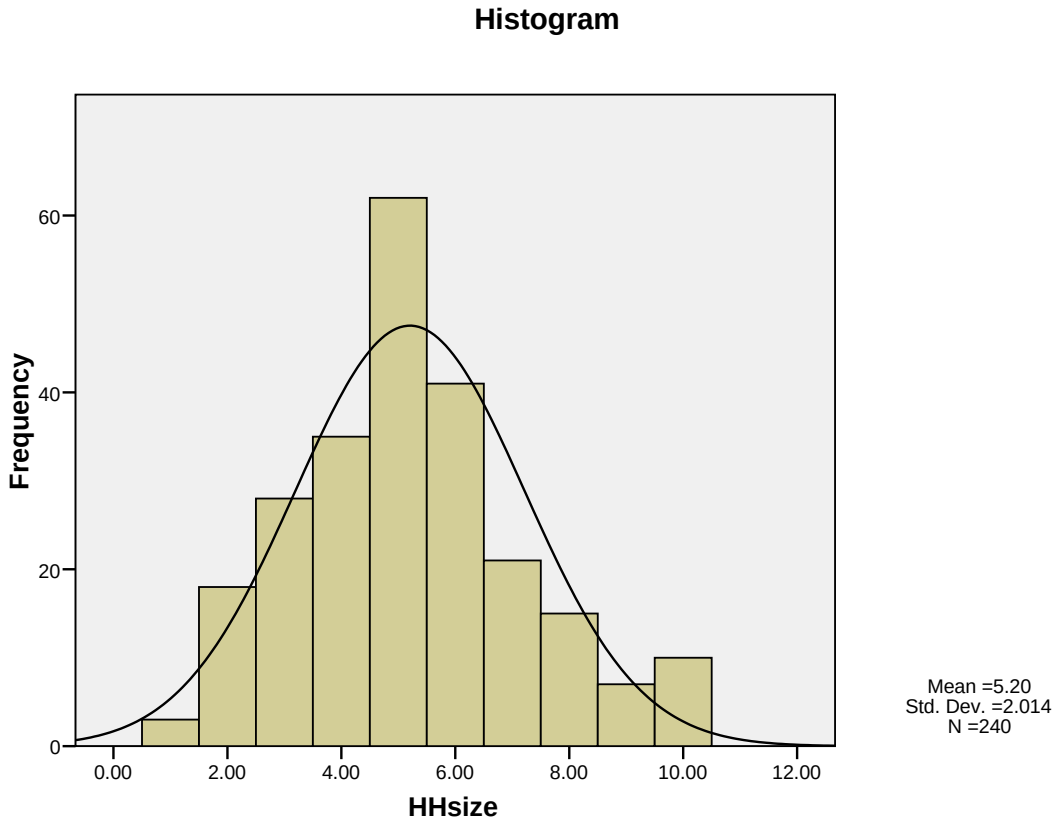

Figure 2.1.5.1: Frequency distribution of the sizes of the farm households surveyed in Tanzania

Table 2.1.5.2: Household size distribution among the households surveyed in Tanzania by soybean growing status

Soybean growing status	n	Mean	Std. Deviation
Yes	88	5.4	2.12
No	144	5.1	1.92
Across soybean growing status	**232**	**5.2**	**1.99**
Sig		NS	

Source: Survey data, 2008

Table 2.1.5.3: Household size distribution among the households surveyed in Tanzania by headship and management of households

Household headship and management	n	Mean	Std. Deviation
Male headed-male managed	191	5.3	1.96
Female headed-female managed	49	4.7	2.17
Across headship and management of households	**240**	**5.2**	**2.01**
Sig		NS	

Source: Survey data, 2008

2.1.6. Educational level and religion of household heads

We evaluated the survey household head's educational and religion. While the educational level was articulated under the options: illiterate, primary education, secondary education, post secondary education, and adult education, the religion was open-ended.

The result shows that most (~78.6%) of the heads of the survey farm households attained primary education. However, about 35 of the 238 heads of the survey households (~14.75%) that responded to the question were illiterates (see **Table 2.1.6.1**). Such heads of households could neither read nor write English. It is remarkable that only about 3.3% of the survey farm households attained secondary or post secondary education. This contributes to the clearly low agricultural productivity in the study area. It also helps to throw some light on the huge level of rural poverty often reported in agriculture-based third world countries of the world. Given the importance of education, in addition to evaluating the heads of the survey farm households, we also evaluated the educational attainment of all in the household. The result is presented in **Table 2.1.6.2**. It shows that the dominant educational level among farm household members in the study area was primary school. However, there is an increasing trend for more of the children (boys and girls) to acquire higher levels of education. The average literacy (in terms of number of years of schooling) of different people in the household ranges from 6.22±2.245 (for girl children), through 6.72±1.243 (for adult women), 6.82±1.530 (for adult men), to 6.93±2.275 years (for boy children) (**Table not shown**)

With respect to religion, while ~74% of the heads of the survey farm households were Christians, the balance (~26%) were Muslims (**Table not shown**).

Table 2.1.6.1: Distribution of heads of survey farm households in Tanzania by educational level

Educational level	Frequency[$]
Primary education	187 (78.6)
Illiterate	35 (14.7)
Adult education	8 (03.4)
Secondary education	7 (02.9)
Post secondary education	1 (00.4)
Effective n	238 (100.0)

[$]Values in parenthesis are percent figures

Source: Survey data, 2008

Table 2.1.6.2: Distribution of household members in Tanzania by educational level

Average educational level (based on last class completed)	Household member category[$]				Across category
	Adult men	Adult women	Children-Boys	Children-Girls	
Primary	178 (90.3)	183 (92.0)	87 (63.0)	92 (70.8)	540 (81.3)
Secondary	9 (04.6)	1 (00.5)	22 (15.9)	13 (10.0)	45 (06.8)
Tertiary	1 (00.5)	-	2 (01.5)	-	3 (00.5)
Illiterate	9 (04.6)	15 (07.5)	-	-	24 (03.6)
Minor	-	-	27 (19.6)	24 (18.5)	51 (07.7)
Completed pre-school	-	-	-	1 (00.7)	1 (00.2)
Effective n	**197 (100.0)**	**199 (100.0)**	**138 (100.0)**	**130**	**664**

[$]Values in parenthesis are percent figures

Source: Survey data, 2008

We also assess the average numeracy rates (based on the options: very high, high, middle, low, and very low) by gender of different people (referring to: Adult men, Adult women, Children-Boys, and Children-Girls) in the household. The result is presented in **Table 2.1.6.3**. For each gender or household member category, the highest proportion was assessed to be of 'middle' average numeracy rate. However, the proportion that came next was 'high' for all the household member categories except adult women where the next highest proportion was low. The fact that the rating between 'Children-Boys' and 'Children-Girls' is going in the same direction is an indication that the existing numeracy gap between adult men and adult women are in the process of being closed. This is a promising trend. Across household member categories, the proportion of the respondents

that fall into the different average numeracy rates was a more or less **normal distribution** (with 'very high' accounting for ~13% of the responses, 'high' accounting for ~25%, 'middle' accounting for ~43%, 'low' accounting for ~17%, and 'very low' accounting for ~2%). In other words, the Normal distribution curve will likely fit these data well. The importance of this is that 'many statistical methods are only valid if we can assume that our data follow a distribution of a particular type, the Normal distribution. A normal distribution of data means that most of the examples in a set of data are close to the "average", while relatively few examples tend to one extreme or the other.

Table 2.1.6.3: Gender disaggregated average numeracy rates in farm households in Tanzania

Household member category	Average numeracy rate[$]					Effective n
	Very high	High	Middle	Low	Very low	
Adult men	47 (22.3)	51 (24.2)	**85 (40.3)**	28 (13.3)	-	211 (100.0)
Adult women	9 (03.9)	49 (21.2)	**110 (47.6)**	52 (22.5)	11 (4.8)	231 (100.0)
Children-Boys	21 (12.9)	45 (27.6)	**70 (42.9)**	25 (15.3)	2 (1.2)	163 (100.0)
Children-Girls	24 (14.7)	45 (27.6)	**64 (39.3)**	28 (17.2)	2 (1.2)	163 (100.0)
Across category	**101 (13.2)**	**190 (24.7)**	**329 (42.8)**	**133 (17.3)**	**15 (2.0)**	**768 (100.0)**

[$]Values in parenthesis are percent figures

Source: Survey data, 2008

2.1.7. Main occupation of the heads of survey households in Tanzania

Without necessarily assuming that the main occupation of the heads of all the survey farm households was farming, we evaluated what each one of them regarded as his/her main occupation, using an open-ended question format.

The result shows that we were right to have regarded the population from where the sample was drawn as a farming population. This is because 221 out of the 238 (or ~93%) heads of households that responded to the related question actually regarded '*farming* (including tree production)' as their main occupation. However, while about 3.8% of the heads of the survey farm households regard '*business*' as their main occupation, about 1.3% each noted that their main occupation were either artisanal work (e.g., masonry or carpentry) or formal employment (e.g., teaching). About 0.8% of the heads of the survey households noted other main occupations (including security guard, sub-village chairmanship) (see **Table 2.1.7.1**).

Table 2.1.7.1: Distribution of heads of survey households in Tanzania by main occupation

Main occupation	Frequency[$]
Farming (including tree production)	221 (92.9)
Business	9 (03.8)
Artisanal work (e.g., masonry, carpentry)	3 (01.3)
Formal employment (e.g., teaching)	3 (01.3)
Others (e.g., security guard, sub-village chairperson)	2 (00.8)
Effective n	**238 (100.0)**

[$]Values in parenthesis are percent figures

Source: Survey data, 2008

2.1.8. Other selected characteristics of survey farm households in Tanzania

We evaluated some other parameters (farm size, length of cropping before fallow, fallow period, and frequency of interaction with agricultural extension workers) that also underscore the characteristics of the survey households. What is particularly striking is that some farm households in the study area, unlike many other parts of sub-Saharan Africa, still leave some of their land on fallow after cultivating them for 1–10 cropping seasons (with a mean and standard deviation of 2.8±1.492 seasons) (see **Table 2.1.8.1**). This is probably due to the average household farm size (6.649±3.4092 acres) that is also relatively higher than what commonly obtains in many parts of sub-Saharan African countries. Farm land renting in was not common among the survey farm households as only about 14 of them (or ~6%) rented-in farmland in 2007/08 cropping season at mean rent ranging from Tshs. 500 (or ~US$0.37) to Tshs. 20000 (or ~US$14.8) with a mean and standard deviation of Tshs. 8928.57±5221.469 (or ~US$6.61±3.868) per plot. All the land rented-in in 2007/08 were devoted to arable crops.

It is important to note that ~72% of the survey farm households plant on their land for 1–3 cropping seasons before leaving them on fallow. Similarly, ~71% of the survey farm households allowed 1–2 years of fallow before reverting to the land for crop production (**Table not shown**). While the distribution of these other selected characteristics by district is presented in **Table 2.1.8.2**, the distribution by headship and management of households is presented in **Table 2.1.8.3**. With respect to most of the parameters considered, male headed-male managed farm households were relatively better positioned than their female headed-female managed counterparts. They have more landholding and interact more intensively with agricultural extension workers than the female headed-female managed counterparts. Besides, the number of seasons they usually crop their land before leaving them on fallow is relatively less than that for the female headed-female managed farm households, probably because they also have

relatively more land than them. However, these differences are not statistically significant.

A summary of another account of farm size (articulated in hectares) and the number of plots cultivated by survey farm households is presented in **Table 2.1.8.1b**. This again supports the relatively more access to farmland in Tanzania than in Kenya (see Chianu Justina et al., 2008). Result of analysis by district is presented in **Table 2.1.8.1c**. It shows that average farm sizes as well as number of plots cultivated by survey farm households were statistically significant at 1% probability. Mean farm sizes were highest in *Njombe* (4.5±4.13 ha), followed by *Kilosa* (3.0±1.73 ha), and then *Mvomero* (2.6±2.32 ha). The mean number of plots owned by the survey farm households followed the same order and was highest in *Njombe* (4.7±1.80 plots), followed by *Kilosa* (4.3±1.66 plots), and then *Mvomero* (3.4±1.56 plots). The difference between the mean number of plots owned by survey farm households in Njombe and *Kilosa* on one hand and *Mvomero* on the other hand was statistically significant at 1% probability level. However, the difference between the mean number of plots owned by farmers in *Kilosa* and farmers in *Njombe* were not statistically significant. The result of our analysis by soybean growing status of the survey farm households shows while the mean farm size (3.9±3.14 ha) of soybean growing farm households was significantly higher (at 10% probability level) than those (3.1±2.93 ha) of non-soybean growing farm households, the mean number of plots owned (4.8±1.71 plots) by soybean growing farm households was significantly higher (at 1% probability level) than the mean number of plots owned (3.8±1.69 plots) by non-soybean growing farm households. Similarly, the result of our analysis by the headship and management of survey farm households shows while the mean farm size (3.6±2.95 ha) of male headed-male managed farm households was significantly higher (at 5% probability level) than those (2.6±3.03 ha) of female headed-female managed farm households, the mean number of plots owned (4.3±1.74 plots) by male headed-male managed farm households was significantly higher (also at 1% probability level) than the mean number of plots owned (3.63±1.74 plots) by female headed-female managed farm households (**Tables not shown**).

Table 2.1.8.1: Other selected characteristics of survey farm households in Tanzania

Parameter	Effective n	Min.	Max.	Mean	Std Deviation
Land holding or farm size (acres)	177	1	15.5	6.649	3.4092
No. of seasons usually crop before fallowing land	95	1	10	2.8	1.492
No. of years of fallow usually observed	94	1	5	2.19	1.167
No. of times interacts with agric. extension workers in a year	120	1	10	2.88	2.357

Source: Survey data, 2008

Table 2.1.8.1b: Farm size (ha) and number of plots cultivated by survey farm households in Tanzania

Parameter	n	Min.	Max.	Mean	Std Deviation
Farm size (ha)	240	0.4	21.4	3.4	3.00
No. of plots owned	240	1	9	4.2	1.76

Source: Survey data, 2008

Table 2.1.8.1c: Farm size (ha) and number of plots cultivated by survey farm households in Tanzania

Parameter and statistics	District			Probability
	Kilosa	*Njombe*	*Mvomero*	
Farm size (ha):				
n	82	78	80	
Min.	0.6	1.0	0.4	
Max.	12.5	21.4	12.1	
Mean	3.0	4.5	2.6	0.000
Std Deviation	1.73	4.13	2.32	
No. of plots:				
n	82	78	80	
Min.	1	2	1	
Max.	9	9	7	
Mean	4.3	4.7	3.4	0.000
Std Deviation	1.66	1.80	1.56	

Source: Survey data, 2008

Table 2.1.8.2: Other selected characteristics of survey farm households in Tanzania by survey districts

Parameter	District[$]			Across district
	Kilosa	***Njombe***	***Mvomero***	
Land holding or farm size (acres)[*]	7.0±3.4 (63)	7.7±3.5 (51)	5.5±3.1 (63)	6.6±3.4 (177)
No. of seasons usually crop before fallowing land	2.6±1.3 (39)	2.9±1.7 (45)	3.0±1.5 (11)	2.8±1.5 (095)
No. of years of fallow usually observed	2.2±1.2 (38)	2.0±1.0 (45)	2.6±1.5 (11)	2.2±1.2 (094)
No. of times interacts with agric. extension workers in a year	2.9±2.3 (51)	2.9±2.4 (47)	2.8±2.6 (22)	2.9±2.4 (120)

[$]Values are means, followed by standard deviations and effective number of cases; [*]Significant at 0.005

Source: Survey data, 2008

Table 2.1.8.3: Other selected characteristics of survey farm households in Tanzania by headship and management of survey farm households

Parameter	Household headship & management		Across	Sig.
	Male headed-male managed	Female headed-female managed		
Land holding or farm size (acres)	6.7±3.5 (139)	6.3±3.0 (38)	6.6±3.4 (177)	ns
No. of seasons usually crop before fallowing land	2.8±1.5 (082)	3.1±1.7 (13)	2.8±1.5 (095)	ns
No. of years of fallow usually observed	2.2±1.2 (081)	2.2±0.9 (13)	2.2±1.2 (094)	ns
No. of times interacts with agric. extension workers in a year	3.0±2.5 (101)	2.1±1.0 (19)	2.9±2.4 (120)	ns

[$]Values are means, followed by standard deviations and effective number of cases; [*]Significant at 0.005

Source: Survey data, 2008

For the farm households that leave some of their farm land on fallow, we verified which crops they give attention when such fallow lands are reverted to agriculture. The result shows that two crops [maize (~42% of the responses) followed by common bean (~33%) are clearly given dominant attention (see **Table 2.1.8.4**).

Table 2.1.8.4: Distribution of crops grown following fallow period in Tanzania

Crop	Frequency[$]
Maize	63 (41.2)
Common bean	50 (32.7)
Sunflower	8 (05.2)
Cowpea	7 (04.6)
Sorghum	5 (03.3)
Soybean	4 (02.6)
Simsim	4 (02.6)
Millet	2 (01.3)
Groundnut	2 (01.3)
Tree crop	2 (01.3)
Other (Cassava, plantain, pumpkin, tea, cotton, green grams)	6 (06.7)
Effective n	**153 (100.0)**

[$]Values in parenthesis are percent figures

Source: Survey data, 2008

2.1.9. Food, nutrition and income security among survey farm households in Tanzania

Survey farm households were asked to describe their food, nutrition, and income security status of their households. Across the three security parameters, only ~26% of the survey farm households noted that they were secure. The rest (~74%) were insecure. The

proportion of the survey farm households that were secure ranges from 12.7% (for income security), through 17.2% for nutrition security to 47.9% for food security (see **Table 2.1.9.1**.

Table 2.1.9.1: Distribution of survey farm households in Tanzania by food, nutrition and income security status

Security type	Security status[$]		Effective n
	Secure	Insecure	
Food security	114 (47.9)	124 (52.1)	238 (100.0)
Nutrition security	41 (17.2)	197 (82.8)	238 (100.0)
Income security	30 (12.7)	207 (87.3)	237 (100.0)
Across security type	**185 (25.9)**	**528 (74.1)**	**713 (100.0)**

[$]Values in parenthesis are percent figures

Source: Survey data, 2008

The content of **Table 2.1.9.1** was further confirmed by another result which indicates that only about 50.2% (mostly accounted for by responses from *Njombe* district) of all the survey farm households noted that all their members had enough and adequate food in the preceding the survey year. The balance (49.8%) noted the contrary. While the result of our analysis by district is presented in **Table 2.1.9.2**, the result by headship and management of household is presented in **Table 2.1.9.3**. The proportion of survey of the survey farm households that indicated that their members had enough and adequate food in the year that preceded the survey year ranges from 21.8% (for *Mvomero* district), through 43.6% (for *Kilosa* district), to 88.% for *Njombe* district. A lower proportion of female headed-female managed farm households (~40%) than male headed-male managed farm households (~53%) indicated that their members had enough and adequate food in the year preceding the survey year (i.e., 2007 since the survey took place in 2008). A significantly higher proportion of soybean growing households (~63%) than non-soybean growing households (~43%) indicated that their members had enough and adequate food in 2007 (**Table not shown**). This again shows some disparity (due to either district or headship and management of the survey farm households) in the vulnerability of the different farm households. This needs to be taken into serious account by the development community as they design development interventions. Further analysis will be carried out to increase our understanding of the role being played by soybean in enhancing the ability of households to secure enough and adequate food for its members.

Table 2.1.9.2: District distribution of households in Tanzania by whether or not all their members had enough and adequate food in 2007

Whether or not all members had enough and adequate food in 2007?	District [$]			Across district
	Kilosa	*Njombe*	*Mvomero*	
Yes	34 (43.6)	65 (88.7)	17 (21.8)	114 (50.2)
No	44 (56.4)	8 (11.3)	61 (78.2)	113 (49.8)
Effective n	**78 (100.0)**	**71 (100.0)**	**78 (100.0)**	**227 (100.0)**

[$]Values in parenthesis are percent figures

Source: Survey data, 2008

Table 2.1.9.3: Distribution of households by whether or not all their members had enough and adequate food in 2007 by headship and management

Whether or not all members had enough and adequate food in 2007?	Headship and management of household		Across district
	Male headed-male managed	Female headed-female managed	
Yes	95 (52.8)	19 (40.4)	114 (50.2)
No	85 (47.2)	28 (59.6)	113 (49.8)
Effective n	**180 (100.0)**	**47 (100.0)**	**227 (100.0)**

[$]Values in parenthesis are percent figures

Source: Survey data, 2008

For the households that indicated that they did not have enough and adequate food for all their members in 2007, we verified the number of months in 2007 when this situation occurred. The result of the distribution shows that the number of month the concerned households did not have enough and adequate food for all their members ranged from 1 month to 12 months (see **Table 2.1.9.4**) with a mean and standard deviation of 3.81±1.830 months across districts, 2.62± 1.061 for *Njombe* district, 3.69± 1.906 for *Kilosa* district, and 4.05± 1.808 for *Mvomero* district (see **Table 2.1.9.5**). The average number of months in 2007 when households did not have enough and adequate food for members was slightly lower among soybean growing farm households than among non-soybean growing farm households (3.43±1.687 months vs. 3.83±1.773 months). Similarly, the average number of months in 2007 when households did not have enough and adequate food for members was slightly lower among male headed-male managed farm households than among female headed-female managed farm households (3.79±1.909 months vs. 3.88±1.563 months) (**Table not shown**). Again, further analysis will be carried out to understand the role being played by soybean and headship and

management of households in slightly reducing the average number of months households are unable to secure enough and adequate food for their members.

Table 2.1.9.4: Distribution of number of months in 2007 when survey households in Tanzania did not have enough and adequate food for all their members

No. of months household did not have enough & adequate food for members	Frequency
1 month	6 (05.5)
2 months	21 (19.1)
3 months	27 (24.5)
4 months	23 (20.9)
5 months	15 (13.6)
6 months	11 (10.0)
7 months	5 (04.5)
10 months	1 (00.9)
12 months	1 (00.0)
Effective n	**110 (100.0)**

[$]Values in parenthesis are percent figures

Source: Survey data, 2008

Table 2.1.9.5: Mean duration (months in 2007) survey households did not have enough and adequate food for all members by district

District	n	Mean and Std Deviation
Kilosa	42	3.69±1.906
Njombe	8	2.62±1.061
Mvomero	60	4.05±1.808
Across districts	**110**	**3.81±1.830**

Source: Survey data, 2008

The months there was not enough and adequate food for all household members were analyzed. Our result shows that most of this happened between January and March or during the first quarter of the year (see **Table 2.1.9.6**). This coincides with the period of the peak cropping season, especially in *Kilosa* and *Mvomero* districts of the survey area. It also coincides with the months the highest proportion of the survey farm households are mostly affected by critical shortage of funds for agricultural activities (see **section 2.4**).

Table 2.1.9.6: Distribution of months survey households in Tanzania were unable to secure enough and adequate food for their members in 2007

Months	Frequency	Percent
January – March	231	55.7
April – June	48	11.6
July – September	29	7.0
October – December	107	25.7
Effective n	**415**	**100.0**

Source: Survey data, 2008

2.1.10. Land tenure system in the study area of Tanzania

Based on plot-level analysis, we evaluated the different systems of land ownership and control in the study area. The result shows that in most cases (~90% of the cases), land is individually owned. The other minor systems of land ownership or control were family land, land renting, communal land, and land purchase in that order (see **Table 2.1.10.1**).

Table 2.1.10.1: Land tenure system in the study area of Tanzania

Land tenure system	Frequency[$]	Percent
Individual land	858	90.0
Land rented in	41	4.3
Family land	46	4.8
Purchased land	1	0.1
Communal land	7	0.7
Effective n	**953**	**100.0**

[$]Responses were articulated on plot by plot basis

Source: Survey data, 2008

2.2. Household composition

This aspect of the data collected that will expand on the aspect on household size are still being cleaned for processing. The outcome shall be included in the report once it is ready.

2.3. Household resources

2.3.1. Land holding

We evaluated land holding (articulated in acres) among the survey farm households. Overall, land holding per household in the study area ranges from 1 acre (or 0.4 ha) to 15.5 acres (or 6.2 ha) with a mean and standard deviation of 6.649±3.4092 acres (or 2.66±1.3637 ha). The result of our analysis of landholding by quartile shows that while the total land held by the least 25% landholders was 125 acres (or 10.6%), the total land held by the highest landholders was 512.5 acres (or 43.5%). The corresponding average household landholding figures were 2.84 acres for the least 25% landholding households and 11.65 acres for the highest 25% landholding households (see **Table 2.3.1.1**).

Table 2.3.1.1: Landholding by households in the study area of Tanzania

Household landholding quartile	Land holding (acres)		Proportion of total land owned (%)
	Average	Total	
First quartile	2.84	125.0	10.6
Second quartile	5.19	228.5	19.4
Third quartile	7.08	311.5	26.5
Fourth quartile	11.65	512.5	43.5
Across quartiles	**6.65**	**1177.5**	**100.0**

Source: Survey data, 2008

2.3.2. Type of dwelling

We ascertained the type of dwelling of the all the survey farm households. The enumerators were expected to complete the related question through observation and mostly based on the household's main house. Among others, seven options [mud hut with grass thatch roof, mud hut with asbestos/iron roof, brick house with grass thatch roof, brick house with asbestos/iron roof, block house with grass thatch roof, block house with asbestos/iron roof, and other (specify)] were available to choose from. The result contained in **Table 2.3.2.1** shows that none of the survey farm households dwelt in block houses (whether with grass thatch roof or with asbestos/iron roof). It is possible that blocks are not common building materials in the survey are and might have nothing to do with the wealth status of the survey farm households. Most of survey farm households (~51%) dwelt in brick house with asbestos/iron roof, followed by mud hut with grass thatch roof (~27%), mud hut with asbestos/iron roof (~12%), and brick house with thatch roof (~10.7%) in that order. Analysis by district shows that while brick house with asbestos/iron roof is dominantly most popular in *Njombe* (accounting for about 63% of the recorded types of dwelling) and *Mvomero* (accounting for ~51% of the recorded types

of dwelling) districts, mud hut with grass thatch roof (~45%) closely followed by brick house with asbestos/iron roof (~40%) was the most popular in *Kilosa* district.

Table 2.3.2.1: Distribution of survey farm households in Tanzania by type of dwelling

Type of dwelling	District [$]			Across district
	Kilosa	***Njombe***	***Mvomero***	
Brick house with asbestos/iron roof	33 (40.2)	46 (63.0)	40 (51.3)	119 (51.1)
Mud hut with grass thatch roof	37 (45.1)	4 (05.5)	21 (26.9)	62 (26.6)
Mud hut with asbestos/iron roof	11 (13.4)	7 (09.6)	9 (11.5)	27 (11.6)
Brick house with grass thatch roof	1 (01.2)	16 (21.9)	8 (10.3)	25 (10.7)
Block house with grass thatch roof	-	-	-	-
Block house with asbestos/iron roof	-	-	-	-
Effective n				**233 (100.0)**

[$]Values in parenthesis are percent figures

Source: Survey data, 2008

If the roofing material (asbestos/iron roof vs. thatch roof) alone is used to classify the survey farm households, the result shows that while about 63% of the survey farm households dwelt in houses roofed with asbestos/iron sheets, the remaining 37% lived in houses roofed with thatch materials. With this result, it is difficult to solely use 'type of dwelling' to classify the survey farm households into rich and poor. Some other indicators must be taken into consideration.

2.3.3. Ownership of different assets

We evaluated the survey farm households' ownership of several purchased items including motor vehicle, motor cycle, bicycle, tractor, tractor plough/harrow, draft animals (bullock/oxen/donkey), animal plough/harrow, animal cart, wheel barrow, television, and radio. Others were: private water well, private borehole, water pump, diesel pumps, water tanks, generator, mobile phones, and fixed phones. The results show that none of the survey farm households owned tractor, tractor plough, and diesel pumps. Only one household each owned animal cart, wheel barrow, private water well, private borehole, and fixed phone. Besides, only two to seven of the survey farm households owned motor vehicle (2 households), water pump (2 households), generator (3 households), water tanks (4 households), motor cycle (4 households), television (6 households), draft animals (bullock/oxen/donkey) (7 households), and animal plough/harrow (7 households). However, while about 53 of the 240 heads of the households surveyed (or ~22%) owned mobile phones, about 132 of them (or 55%)

owned radio. Similarly, about 133 of the heads of the survey farm households (or 55.4%) owned bicycle which ended up being the most commonly owned of all the items of assets evaluated. This result has again shown a dearth of assets among the survey farm families in the study area. It is important to acknowledge the increasing importance of cell phones among the assets that farm households tend to possess. It will be important to critical evaluate the role of cell phones in agricultural development in the survey area as well as other parts of sub-Saharan Africa. This is because of all the household heads that owned mobile phones, about 30 of them (or ~57%) bought theirs in the year 2007/08. This compares with 35 households (or ~27%) for radio and with 35 households (or ~26%) in the case of bicycle. Put together and across all the assets considered, only 5 out of the 240 households surveyed (or ~2.1%) sold any of its assets in the year 2007/08. Overall, while two bicycles were sold, one each of draft animal, animal plough, and mobile phone was sold to raise money to sole household immediate financial needs.

2.3.4. Time to reach household's farm

For the different main farmland use types (land use for tree crops, pasture land, arable crop land, fallow land, and land abandoned for various reasons), we estimated how long (in minutes, one way) it takes survey farm household members to get there on foot and from the homestead. While the results across farmland use types are presented in **Table 2.3.4.1**, the results by farmland use types are presented in **Table 2.3.4.2**. Except for tree crop farmlands, the largest proportions of the other land use types are located at distances of 1 and 30 minutes walk away from the homestead (see **Table 2.3.4.2**). However, with respect to tree crop lands, the largest proportion was located at distances more than 60 minutes walk (one way) from the homestead. This followed by the proportion located at distances of 1 to 30 minutes from the homestead. This result shows that most of the farm lands in the study area are accessible to the farm households. Therefore, commuting to the farm to carry out necessary farm operations will not likely constrain agricultural production in the study area and similar environments.

Table 2.3.4.1: Distribution of the time (in minutes, one way) to get to farm in Tanzania

Time scale	**Frequency[$]**
Less than 1 minute	64 (06.7)
Between 1 and 30 minutes	531 (55.8)
Between 31 and 60 minutes	171 (18.0)
More than 60 minutes	186 (19.5)
Across time scale	**952 (100.0)**

[$]Values in parenthesis are percent figures; Responses were not mutually exclusive since survey households had land located at different distances.

Source: Survey data, 2008

Table 2.3.4.2: Distribution of the time (in minutes, one way) to get to farm by land use type in Tanzania

Land use type	Time scale (in minutes, one way)[$]				Across
	<1	1–30	31–60	>60	time scale
Arable land	48 (06.6)	**423 (58.5)**	131 (18.1)	121 (16.7)	723 (100.0)
Plot under fallow	6 (07.5)	**40 (50.0)**	14 (17.5)	20 (25.0)	80 (100.0)
Tree crops land	5 (07.0)	24 (33.8)	15 (21.1)	**27 (38.0)**	71 (100.0)
Abandoned land	4 (05.8)	**39 (56.5)**	10 (14.5)	16 (23.2)	69 (100.0)
Pasture land	1 (11.1)	**5 (55.6)**	1 (11.1)	2 (22.2)	9 (100.0)
Across land use type	**64 (6.7)**	**531 (55.8)**	**171 (18.0)**	**186 (19.5)**	**952 (100.0)**

[$]Values in parenthesis are percent figures; Responses across time scale were not mutually exclusive

Source: Survey data, 2008

The values in **Table 2.3.4.2** refer to counts of farmers/responses. The time to farm ranges from near one minute to slightly above one hour.

2.3.5. Sources water for agricultural activities in the survey area of Tanzania

Our result shows that water for agricultural activities in the study area come from three main sources (rainfall, irrigation, and the swamp). Across agricultural land use types, while rainfall is the source of agricultural water in ~94% of the cases, irrigation accounts for the source of water in ~5% of the cases. The balance of ~1% is accounted for by swamp. The distribution of agricultural water sources by land use type is presented in **Table 2.3.5.1**. The over dependence of the agricultural production of the survey area, like in most other parts of sub-Saharan Africa, on rainfall exposes the resource-poor farmers to the risk of drought. Unfortunately, this risk and its adverse effect is increasing by the day due to climate change.

Table 2.3.5.1: Source of agricultural water in study area by land use type

Land use type	Source of water[$]			Total
	Rainfall	Irrigation	Swamp	
Arable land	632 (75.6)	37 (88.1)	7 (100.0)	676 (76.4)
Plot under fallow	75 (9.0)	-	-	75 (08.5)
Tree crops land	69 (8.3)	1 (02.4)	-	70 (07.9)
Abandoned land	51 (6.1)	3 (07.1)	-	54 (06.1)
Pasture land	9 (1.1)	1 (02.4)	-	10 (01.1)
Across land use type	836 (100.0)	42 (100.0)	7 (100.0)	885 (100.0)

[$]Values in parenthesis are percent figures

Source: Survey data, 2008

2.4. Institutional settings

2.4.1 Access to funds for agricultural activities

We evaluated the different facilities at the farm household's disposal within the village/community. The households were also asked if there were times they had critical shortage of available funds for agricultural activities. Result shows that about 82% of the survey farm households faced times of critical shortage of funds for agricultural activities. Only about 18% of the households (dominantly from *Njombe*, followed by *Mvomero* districts) noted that they do not usually face critical shortage of available funds for agricultural activities (see **Table 2.4.1.1**). A slightly higher proportion of the female headed-female managed farm households than the male headed-male managed farm households had critical shortage of available funds for agricultural activities (~86% vs. ~81%) (**Table not shown**). For the households that noted that they face critical shortage of funds for agricultural activities, we estimated the months of the year usually affected and articulated the non-mutually exclusive responses under Jan–Mar, Apr–Jun, Jul–Sep, and Oct–Dec. The result is presented in **Table 2.4.1.2**. It shows that for all the districts and across the districts, critical shortage of funds for agricultural activities is highest during the first quarter of the year (January to March), followed by during the second quarter of the year (April to June). Generally, households do not face critical shortage of funds for agricultural activities during the third and the fourth quarter of the year. This is because these two quarters are not critical farming operations periods but are periods when most crops have been harvested.

Table 2.4.1.1: Distribution of survey farm households in Tanzania by whether or not they face critical shortage of funds for agricultural activities

Whether or not face critical shortage of funds for agricultural activities	**District** [$]			**Across district**
	Kilosa	***Njombe***	***Mvomero***	
Yes	74 (90.2)	57 (73.1)	65 (81.3)	196 (81.7)
No	8 (09.8)	21 (26.9)	15 (18.8)	44 (18.3)
Effective n	**82 (100.0)**	**78 (100.0)**	**80 (100.0)**	**240 (100.0)**

[$]Values in parenthesis are percent figures

Source: Survey data, 2008

Table 2.4.1.2: Distribution of responses on months survey households in Tanzania were mostly affected by critical shortage of funds for agricultural activities

Months	District [$]			Across district
	Kilosa	***Njombe***	***Mvomero***	
Jan–Mar	86 (66.7)	69 (74.2)	81 (64.3)	236 (67.8)
Apr–Jun	42 (32.5)	24 (25.8)	45 (35.7)	111 (31.9)
Jul–Sep	1 (00.8)	-	-	1 (00.3)
Oct–Dec	-	-	-	-
Effective n	**129**	**93**	**126 (100.0)**	**348 (100.0)**

[$]Values in parenthesis are percent figures; Responses were not mutually exclusive

Source: Survey data, 2008

2.4.2 Receipt of cash and or input credit

We evaluated whether or not survey farm households received any cash and/or input (formal and informal) credit in the 2007/08 cropping season for crop or livestock production or household consumption. The result indicates a dearth of access to credit by the farm households in the survey area. Across gender and district, about 95% of the farm households did not receive any such credit (**Table not shown**). Compared with the male headed-male managed farm households, a relatively higher proportion of female headed-female managed farm households did not access any crop or livestock production or households consumption credit in 2007/08 (~98% vs. ~94%). Most of the farm households did not receive any cash and/or input credit in the 2007/08 because there was no source of credit in their vicinity (according to 46.8% of the responses). The other important reasons were: lack of collateral to guarantee credit (32.4%) and high interest rate (18.0%) (see **Table 2.4.2.1**)

Table 2.4.2.1: Why many farm households in Tanzania did not take credit in 2007/08

Reason	Frequency[$]
No source of credit in their vicinity	104 (46.8)
Lack of collateral to guarantee credit	72 (32.4)
High rate of interest	40 (18.0)
Lack of the ability to repay the loan	4 (01.8)
Does not know the procedure to secure credit	
Total	**222 (100.0)**

[$]Values in parenthesis are percent figures; Responses were not mutually exclusive

Source: Survey data, 2008

2.4.3 Membership of farmers' associations/cooperatives/groups

Given the limited overall coverage of agricultural extension work by the formal agricultural extension services of the Ministry of Agriculture, farmers' associations have been found to be an important channel through which agricultural extension services to smallholder farmers could be strengthened. In view of this, we evaluated the membership of farmers' associations/cooperatives/groups by the heads of the survey farm households. For the heads of survey farm households that belonged to farmers' associations or cooperatives or groups, we also estimated for how long (in years) they have been members. In addition, we evaluated the number of village/community-based associations or groups the survey household heads belonged to.

The result is presented in **Table 2.4.3.1**. Across the survey districts, about 35% of the heads of the survey farm households belonged to farmers' associations. This means that whatever are the benefits of belonging to such associations (including the agricultural extension benefits) can only be appropriated by this relatively small group. **Table 2.4.3.1**, however, shows a huge difference from district to district, with as high as 53.1% of the heads of the survey farm households from *Kilosa* district belonging to farmers' associations and as low as 5.1% of the heads of the survey farm households in *Mvomero* district belonging to farmers' association. *Njombe* district was in the middle with about 47.4% of the heads of the farm households surveyed here belonging to farmers' associations. Across the survey districts, a higher proportion of the heads of the survey farm households growing soybean (~64%) than non-soybean growing farm households (~36%) belonged to farmers' association. Similarly, a higher proportion of the heads of male headed-male managed farm households than female headed-female managed farm households belonged to farmers' associations (~86% vs. ~14%) (see **Table 2.4.3.2**).

Table 2.4.3.1: Membership of farmers' associations by the heads of the survey farm households in Tanzania

Whether or not belong to farmers' association?	District [$]			Across district
	Kilosa	*Njombe*	*Mvomero*	
Yes	43 (53.1)	37 (47.4)	4 (05.1)	84 (35.4)
No	38 (46.9)	41 (52.6)	74 (94.9)	153 (64.6)
Effective n	**81 (100.0)**	**78 (100.0)**	**78 (100.0)**	**237 (100.0)**

[$]Values in parenthesis are percent figures

Source: Survey data, 2008

Table 2.4.3.2: Distribution of membership of farmers' association by soybean growing status and headship and management of households in Tanzania

Household soybean growing status and headship and management	Whether head of household belongs to farmers' association or not[$]	
	Yes	No
Soybean growing household	52 (64.2)	35 (23.6)
Non-soybean growing household	29 (35.8)	113 (76.4)
Across soybean growing status	*81 (100.0)*	*148 (100.0)*
Male headed-male managed household	72 (85.7)	118 (77.1)
Female headed-female managed household	12 (14.3)	35 (22.9)
Across headship and management of households	*84 (100.0)*	*153 (100.0)*

[$]Values in parenthesis are percent figures

Source: Survey data, 2008

With respect to the number of years household heads have been members of farmers' associations or cooperatives or groups, and the number of village/community-based associations or groups they belonged to, the result is summarized in **Table 2.4.3.3**. Across the districts, the result shows that the number of years farm household heads have belonged to farmers' associations ranges from 3 months or quarter of a year to 8 years with a mean and standard deviation of 2.463±1.6372. With respect to the number of village/community-based associations/groups farm household heads belonged to, it ranged from one (51 of 69 responses or ~74%) to five (3 of 69 responses or ~4%). However, the mean and standard deviation was 1.49±1.024 (**Table 2.4.3.3**). The high standard deviation value (especially with respect to the number of years the heads of survey farm households have belonged to farmers' association), compared to the mean value, is an indication of a wide variation among the population. On the average, the

heads of soybean growing survey farm households have spent slightly longer years as members of farmers' associations than their non-soybean growing farm household counterparts (2.5±1.7 vs. 2.4±1.4) (**Table not shown**).. Similarly, for both the number of years that the heads of the survey farm households have been members of farmers' associations and the number of village/community-based associations/groups they belonged to, the heads of male headed-male-managed households seemed to slightly fair better than the heads of female headed-female managed households (see **Table 2.4.3.4**).

Overall, the low mean values, especially for the number of years farm household heads have been members of farmers' association is an indication of the newness of this concept and institution in the study area. The implication is the need to strengthen the existing associations and make them attractive to farmers through effective delivery of the services critically desired by the farmers.

Table 2.4.3.3: Mean number of years of membership of farmers' associations and the number of farmers' associations farm household heads belong to

Parameter	District[$]			Across district	Sig.
	Kilosa	*Njombe*	*Mvomero*		
No. of years farm household head has been a member of farmers' association	3.1±1.7 (41)	1.8±1.1 (34)	1.3±0.6 (3)	2.5±1.6 (78)	0.000
No. of village/community-based associations/groups farm household head belonged to	1.5±0.9 (38)	1.5±1.2 (29)	1.0±0.0 (2)	1.5±1.0 (69)	ns

[$]Values are means, followed by the standard deviation and the effective sample size in bracket

Source: Survey data, 2008

Table 2.4.3.4: Mean number of years of membership of farmers' associations and the number of farmers' associations farm household heads belong to by headship and management of households

Parameter	Headship and management of household[$]		Across	Sig.
	Male headed-male managed	Female headed-female managed		
No. of years farm household head has been a member of farmers' association	2.5±1.6 (67)	2.3±1.7 (11)	2.5±1.6 (78)	ns
No. of village/community-based associations/groups farm household head belonged to	1.5±1.1 (59)	1.2±0.6 (10)	1.5±1.0 (69)	ns

[$]Values are means, followed by the standard deviation and the effective sample size in bracket

Source: Survey data, 2008

2.4.4 Agricultural extension services

We evaluated the survey farm households' frequent sources of agricultural extension messages based on available non-mutually exclusive options which include: agricultural extension staff, agricultural extension bulletins, newspapers, radio, television, marketing institutions, and research institutions. The result, presented in **Table 2.4.4.1**, indicates that agricultural extension staffs were overwhelmingly the most frequent sources of agricultural extension messages in the study area. It accounts for ~59% of the responses from *Mvomero* district, ~77% of the responses from *Njombe* district, ~86% of the responses from *Kilosa* district and ~76% of the responses across the three districts. In almost all the cases, the other sources (including radio, friends and relations, and other farmers) did not seem to be that frequent sources of agricultural extension messages to the farmers in the study area.

Table 2.4.4.1: Frequent sources of agricultural extension message among smallholder farmers in Tanzania

Frequent source of agricultural extension messages	**District**			**Across district**
	Kilosa	***Njombe***	***Mvomero***	
Agricultural extension staff	71 (85.5)	65 (77.4)	34 (58.6)	170 (75.6)
Radio	2 (02.4)	9 (10.7)	9 (15.5)	20 (08.9)
Friends & relations	2 (02.4)	4 (04.8)	6 (10.3)	12 (05.3)
Other farmers	3 (03.6)	1 (01.2)	5 (08.6)	9 (04.0)
Village meetings	-	2 (02.4)	3 (05.2)	5 (02.2)
Agricultural extension bulletins	2 (02.4)	1 (01.2)	-	3 (01.3)
Newspapers	1 (01.2)	1 (01.2)	-	2 (00.9)
Television	1 (01.2)	-	1 (01.7)	2 (00.9)
Research institutions	1 (01.2)	-	-	1 (00.4)
Other	-	1 (01.2)	-	1 (00.4)
Marketing institutions	-	-	-	-
Total	**83 (100.0)**	**84 (37.3)**	**58 (100.0)**	**225 (100.0)**

Source: Survey data, 2008

We estimated the number of times survey farm households interacted with agricultural extension workers on crop and livestock production in 2007/08 cropping season. Result based on the analysis of data from 120 farm households that responded indicates that this ranges from once to 10 times with a mean and standard deviation of 2.88±2.357 times (**Table not shown**). The high standard deviation is a clear indication of huge differences among the survey farm households on the intensity of their interaction with agricultural extension workers. The distribution of the responses, presented in **Table 2.4.4.2**, shows that ~77% of the farm households interacted with agricultural extension workers between one and three times.

Table 2.4.4.2: Distribution of frequency of survey farm households' interaction with agricultural extension workers in 2007/08: Tanzania

No. of times	Frequency	Percent	Cumulative percent
Once	32	26.7	26.7
Two times	46	38.3	65.0
Three times	14	11.7	76.7
Four times	9	7.5	84.2
Five times	5	4.2	88.3
Six times	4	3.3	91.7
Seven times	2	1.7	93.3
Eight times	-	-	-
Nine times	-	-	-
Ten times	8	6.7	100.0
Effective n	**120**	**100.0**	

Source: Survey data, 2008

The result of another account with respect to survey farm households' sources of information about improved variety (related to soybean section in the questionnaire) confirms the critical role being played by formal agricultural extension in Tanzania. *Sokoine* University of Agriculture (SUA) and Research Institutes as well as farmer-to-farmer agricultural technology information dissemination also came out strongly (see **Table 2.4.4.3**). The challenge is to further strengthen these already promising methods of making agricultural technology information available to the farmers.

Table 2.4.4.3: Distribution of sources of information about improved soybean varieties in the survey area of Tanzania

Source of information	Frequency$
Agricultural extension services of the Ministry of Agriculture	38 (34.5)
SUA and Research Institutes	38 (34.5)
Fellow farmers	24 (21.8)
Local retail shop/community-based seed provider	5 (04.5)
Other (radio, NGO, Mission *Mtembwa*, CEFA (*Matembo*)	5 (04.5)
Effective n	**110 (100.0)**

Source: Survey data, 2008

2.4.5 Sources of seeds in the survey area of Tanzania

We evaluated the survey farm households' major sources of see. The responses were articulated based on non-mutually exclusive responses with the options that included: saved from last season's harvest, free seed from a neighbor, free seed from government program, free seed from an NGO program, purchased from a seed company and purchased from NGO. Others were purchased from Ministry of Agriculture, purchased from another farmer, purchased from market, purchased at a seed fair, and purchased from an agro-input dealer. The result, presented in **Table 2.4.5.1**, shows that apart from widespread use of seeds saved from previous harvest, common access to free seeds (from governments, neighbors, *Sokoine* University of Agriculture and NGOs) are dealing a blow to the development of crop seed systems in the study areas of Tanzania. This is clear from the Table showing the non-popularity of all options that involve seed purchase. Of particular concern here is the complete non-importance of seed companies and agro-input dealers. Meanwhile many people hold the view that future access to agricultural seeds in sub-Saharan African will have to heavily rely on these two channels for sustainability. This finding is a great challenge to all those who support initiatives to empower seed companies and agro-input dealers to be on the driver's seat on the provision of agricultural crop seeds in sub-Saharan Africa. It is import to re-evaluate the role of *Sokoine* University of Agriculture in farmers' access to agricultural seeds.

Table 2.4.5.1: Distribution of major sources of seeds among survey farmers in Tanzania

Source of seeds	**District[$]**		**Across district**
	Kilosa	***Njombe***	
Saved from last season's harvest	28	23	51
Free seed from government program	14	13	27
Free seed from a neighbor	14	10	24
Sokoine University of Agriculture (SUA)	23	-	23
Purchased from another farmer	6	7	13
Free seed from an NGO	3	5	8
Purchased from a seed company	2	3	5
Purchased from Min. of Agriculture	2	1	3
Purchased from market	-	1	1
Purchased from an agro-input dealer	2	1	3
Effective n			

[$]The numbers are just the frequencies, not percentages.

Source: Survey data, 2008

2.5. Agricultural production (crop production, accessibility and productivity

2.5.1. Farm labor sources

In the baseline survey, efforts were made to collect data on the crop and livestock production practices and systems of the survey farm households. Among others, the survey farm households' main sources of labor (family, hired, communal, and or shared labor) for various field operations (with particular reference to soybean fields) were evaluated. The farm operations covered included: manual land preparation, land preparation using draught animal, land preparation using tractor, planting, weeding, fertilization, harvesting, and threshing. A summary result is presented in **Table 2.5.1.1**. Apart from presenting the farm operations in a decreasing order of popularity among the survey farm households, it shows that the most important source of farm labor is still the family. Depending on farm operation, family labor accounts for ~53% to about 86% of labor used by the survey farm households. Hired labor came next, accounting for ~9% to ~22% of the sources of labor used for the most popular farm operations (excluding land preparation using tractor, followed by land preparation using draught animal that do not seem to be common practices) in the study area. Hired labor was mostly engaged weeding, manual land preparation, planting and harvesting in that order (see **Table 2.5.1.1**). Based on these results, one can conclude that provision of farm labor in the study area is more or less a family affair.

Table 2.5.1.1: Sources of labor for various field operations in Tanzania

Field operation	Sources of labor[$]				Across sources
	Family	Hired	Communal	Shared	of labor
Weeding	131 (69.3)	42 (22.2)	6 (3.2)	10 (5.3)	189 (100.0)
Manual land preparation	128 (68.1)	38 (20.2)	9 (4.8)	13 (06.9)	188 (100.0)
Planting	131 (78.4)	25 (15.0)	5 (3.0)	6 (03.6)	167 (100.0)
Harvesting	131 (82.4)	20 (12.6)	4 (2.5)	4 (2.5)	159 (100.0)
Threshing	129 (86.0)	15 (10.0)	2 (1.3)	4 (2.7)	150 (100.0)
Fertilization	55 (80.9)	6 (08.8)	1 (1.5)	6 (8.8)	68 (100.0)
Land preparation using draught animal	10 (52.6)	7 (36.8)	-	2 (10.5)	19 (100.0)
Land preparation using tractor	-	1 (50.0)	-	1 (50.0)	2 (100.0)

[$]Values in parenthesis are percent figures

Source: Survey data, 2008

2.5.2. Determinants of seasonal size of cultivated land in Tanzania

The survey farm households were asked to score the factors that determine how large their cultivated farm should be in any given season. The available options included:

expected family labor availability, cash availability to hire labor, cash availability to purchase other inputs, current grain prices, expected grain prices after harvest, food needs, and availability of seed. Scores ranging from 1 (for *least important*) to 10 (for *most important*) were expected. This implies that the higher the average score the more important a factor is in determining the seasonal size of a household's farm in the study area. The result is presented in **Table 2.5.2.1**. It shows that of the available options, household food needs followed by expected family labor availability were the most important factors that farm households consider in deciding the quantity of land to cultivate. On the other hand, current grain prices, followed by availability of seeds were the least factors that survey farm households consider in deciding seasonal size of land to cultivate. The result of our analysis by headship and management of survey farm households shows that both male headed-male managed farm households and female headed-female managed farm households followed more or less the same trend (**Table not shown**). The role of household food needs in determining the area of land cultivated is a reflection of the farming objectives of the farmers in the study area. This is further confirmed by the low importance of current grain prices. This shows that the survey farm households were not commercial-oriented. The low average score of availability of seeds underscores how farmers take the issue of seeds for granted. This is especially so given that farm households in the study area often plant the seeds saved from previous harvests. The result of an analysis by district is presented in **Table 2.5.2.2**. It shows that household food needs is the most important in all the districts. The expected family labor availability was the second most important factor in *Kilosa* and *Mvomero*, but not in *Njombe* where the second most important factor was cash availability to purchase other inputs. While expected grain prices after harvest and availability of seeds were the least important factors in *Kilosa* and Njombe districts, the least important factors in *Mvomero* district were current grain prices followed by cash availability to hire labor (see **Table 2.5.2.2**).

Table 2.5.2.1: Factors that determine the seasonal size of household's farm in Tanzania

Factor	Effective n	Score[$]			Std.
		Min.	Max.	Mean	Deviation
Food needs	233	1	10	8.38	3.467
Expected family labor availability	235	1	10	7.29	4.237
Cash availability to purchase other inputs	233	1	10	6.64	4.360
Cash availability to hire labor	235	1	10	6.08	4.458
Expected grain prices after harvest	230	1	10	5.47	4.506
Availability of seeds	229	1	10	5.35	4.501
Current grain prices	230	1	10	4.80	4.449

[$]Score 1 = Least important, 10 = Most important

Source: Survey data, 2008

Table 2.5.2.2: Factors that determine the seasonal size of household's farm in Tanzania by district

Factor	District[$]			Across district	Sig.
	Kilosa	*Njombe*	*Mvomero*		
Food needs	**8.6±3.3**	**7.5±4.0**	**8.9±2.9**	**8.4±3.5**	0.030
Expected family labor availability	**7.9±3.8**	6.4±4.4	**7.4±4.1**	**7.2±4.2**	0.065
Cash availability to purchase other inputs	6.2±4.5	**7.1±4.2**	6.6±4.4	6.6±4.4	0.499
Cash availability to hire labor	6.6±4.4	5.5±4.5	6.1±4.5	6.1±4.5	0.342
Expected grain prices after harvest	5.0±4.5	4.8±4.5	6.6±4.4	5.5±4.5	0.031
Availability of seeds	5.2±4.5	4.6±4.4	6.2±4.5	5.4±4.5	0.092
Current grain prices	5.8±4.5	5.0±4.5	3.7±4.1	4.8±4.4	0.010

[$]Score 1 = Least important, 10 = Most important

Source: Survey data, 2008

2.5.3. Land uses by farm households

Our results implicate the existence of five main land use types in the study area. These include: land use for tree cops, pasture land, arable crop land, fallow land and land abandoned for various reasons. Of all these different types of land uses, arable crop land use was overwhelmingly the most popular, accounting for ~75% of the responses. The other land use types were far behind with land under fallow coming next (accounting for ~9% of the responses), followed by land under tree crops (~8%), land abandoned for various reasons (~7%), and pasture land (~1%).

2.5.4. Crops grown by the farmers

On the whole, we encountered about 29 different types of crops in the farming systems of the study area. These could be classified as food crops (maize, rice, sorghum, millet, cassava, common bean, cowpea, chickpea, pigeon pea, Irish potatoes, sweet potatoes, bananas, and green grams), vegetable and horticultural crops (tomatoes, water melon, and other vegetable and horticultural crops), traditional cash crops (tea, coffee, sugarcane, and cotton), oil crops (soybean, groundnut, sunflower, and simsim), tree crops (pines, and other tree crops), and others (*guatemala*, wattles, and *kitindi*). Across the different classes, maize (grown by ~100% of the survey farm households) was clearly most important and popular crop in the farming system. In terms of popularity and importance, maize was followed by common bean (grown by ~59% of the survey farm households). The other important and popular crops, grown by between 20% and 40% of the survey farm households were soybean (39.2%), cowpea (29.6%), and sorghum (24.6%). Pigeon pea and groundnut were grown by ~10% of the survey farm households. The other crops are generally not important or popular in the farming systems of the study area, especially

wattles, sweet potato, banana, rice, chickpea, and onion (with each of them grown by about 0.4% of the survey farm households) (see **Table 2.5.4.1**). The last column of Table 2.5.4.1 shows that survey farm households have had long experiences growing some of the crops we encountered especially sorghum, cowpea, maize, millet, common bean, and groundnut in that order.

Table 2.5.4.1: Farm households growing different crops in the survey area of Tanzania

Crop	Number of farm households growing it	Proportion (%) of total sample (240 households)	Mean number of years households have been growing crop
Maize	239	99.6	18.0±13.29 (n = 80)
Common bean	142	59.2	12.8±10.66 (n = 61)
Soybean	94	39.2	4.3±03.81 (n = 92)
Cowpea	71	29.6	20.1±18.12 (n = 20)
Sorghum	59	24.6	23.4±16.16 (n = 18)
Pigeon pea	25	10.4	8.8±03.77 (n = 04)
Groundnut	24	10.0	10.9±14.09 (n = 14)
Millet	15	6.3	13.1±07.83 (n = 8)
Tomato	12	5.0	-
Trees	9	3.8	4.0±03.16 (n = 5)
Cassava	7	2.9	1.0±. (n = 1)
Simsim	5	2.1	-
Sunflower	4	1.7	8.3±14.43 (n = 3)
Tea	2	0.8	6.0±. (n = 1)
Wattles	1	0.4	4.0±. (n = 1)
Sweet potato	1	0.4	-
Banana	1	0.4	-
Rice	1	0.4	-
Chickpea	1	0.4	-
Onion	1	0.4	-

Source: Survey data, 2008

2.5.5. Share of land cultivated accounted for by different crops in Tanzania

We evaluated the proportion of the total land cultivated by survey farm households that are accounted for by selected grain legumes, cereals, and other crops. The result, presented in **Table 2.5.5.1**, shows that farm households clearly pay a lot of attention to maize in their land allocation (allocating a mean of ~63% of their land to it). Among the crops where at least 50 of the farm households responded, the other crops that receive good land allocation attention among the farm households that grow them were sorghum (~29%, with 56 farm households responding), common beans (~23%, with 134 farm households responding), cowpea (~18%, with 66 farm households responding), and soybean (~14%, with 78 farm households responding) (**Table 2.5.5.1**).

Table 2.5.5.1: Proportion of total farmland devoted to different crops by survey farm households in Tanzania

Crop	n	Min.	Max.	Mean and Std Deviation
Maize	238	4.7	100.0	62.6±23.02
Common bean	134	2.9	55.6	22.9±12.13
Soybean	78	1.2	42.1	13.8±07.67
Cowpea	66	3.6	46.2	17.6±09.99
Sorghum	56	4.5	85.0	29.4±14.63
Pigeon pea	23	2.9	44.4	14.0±08.69
Groundnut	22	4.0	12.5	8.1±02.79
Millet	15	5.6	22.2	15.6±04.29
Tomato	12	13.0	44.4	28.8±10.53
Cassava	7	9.1	18.2	12.0±03.36
Trees	7	35.6	60.0	44.7±09.38
Simsim	5	9.5	25.0	15.4±05.95
Sunflower	3	15.4	20.5	18.6±02.81
Tea	2	16.7	35.6	26.2±13.36
Wattles	1	12.8	12.8	12.8±.
Rice	1	10.5	10.5	10.5±.
Banana	1	9.1	9.1	9.1±.
Onion	1	9.1	9.1	9.1±.
Chickpea	1	7.1	7.1	7.1±.
Sweet potato	1	4.8	4.8	4.8±.

Source: Survey data, 2008

2.5.6. Land area (acres) devoted to different crops in Tanzania in 2007

Among the crops (including maize, common bean, soybean, cowpea, and sorghum) on which at least 20% of the survey farm households responded, mean land allocation in 2007 was highest for maize (about 2.4 acres), followed by common bean and sorghum (1.7 acres each), cowpea (0.8 acres), and soybean (0.6 acres) in that order (see **Table 2.5.6.1**).

Table 2.5.6.1: Farmland area (acres) devoted to different crops in 2007 by survey farm households in Tanzania

Crop	n	Min.	Max.	Mean and Std Deviation
Maize	237	0.5	12	2.37±1.25
Common bean	133	0.3	5	1.008±0.77
Soybean	78	0.1	2.0	0.6±0.38
Cowpea	67	0.3	3.0	0.8±0.60
Sorghum	55	0.3	4	1.38±0.728
Pigeon pea	23	0.3	2.0	0.7±0.43
Groundnut	22	0.3	0.4	0.4±0.18
Millet	15	0.3	3.0	0.9±0.66
Tomato	12	0.8	3.0	1.4±0.80
Cassava	7	0.3	1.0	0.6±0.31
Trees	7	2.0	5.0	3.3±0.95
Simsim	5	0.5	1.0	0.9±0.22
Sunflower	3	1.0	3.1	2.0±1.06
Tea	2	1.0	4.0	2.5±2.12
Wattles	1	1.3	1.3	1.3±.
Sweet potato	1	0.5	0.5	0.5±.
Banana	1	0.5	0.5	0.5±.
Rice	1	0.5	0.5	0.5±.
Chickpea	1	0.5	0.5	0.5±.
Onion	1	0.5	0.5	0.5±.

Source: Survey data, 2008

2.5.7. Quantity (kg) of different crops produced by farm households in Tanzania in 2007

Among the crops (again including maize, common bean, soybean, cowpea, and sorghum) on which at least 20% of the survey farm households responded, mean farm household production in 2007 was highest for maize (~687 kg), followed by sorghum (~330 kg), common bean (~213 kg), soybean (~96 kg), and cowpea (~77 kg) in that order (see **Table 2.5.7.1**).

Table 2.5.7.1: Quantity (kg) produced of different crops by households in 2007

Crop	n	Min.	Max.	Mean and Std Deviation
Maize	236	6.0	5400.0	687.3±0686.48
Common bean	135	8.0	1800.0	212.5±0280.15
Soybean	67	2.0	473.0	96.4±0106.16
Cowpea	66	2.0	420.0	77.1±0083.38
Sorghum	52	20.0	1800.0	330.3±0340.90
Pigeon pea	24	3.0	300.0	61.8±0060.11
Groundnut	22	4.0	200.0	61.5±0057.14
Millet	14	2.5	2400.0	387.3±0626.15
Tomato	10	200.0	48000.0	5418.0±14966.97
Simsim	5	40.0	200.0	132.0±84.38
Cassava	3	300.0	1250.0	616.7±0548.48
Sunflower	2	90.0	2500.0	1295.0±1704.13
Sweet potato	1	500.0	500.0	500.0±.
Banana	1	2000.0	2000.0	2000.0±.
Rice	1	140.0	140.0	140.0±.
Chickpea	1	60.0	60.0	60.0±.
Onion	1	150.0	150.0	150.0±.

Source: Survey data, 2008

2.5.8. Incentives to increase crop production in Tanzania

For selected grain legumes (including soybean, common bean, cowpea, groundnut, and chickpea) and cereals (maize, sorghum, and millet), we assessed whether or not survey farm households have ever received some incentives to increase their production. The result is presented in **Table 2.5.8.1**. It shows that among the eight crops evaluated, some farm households have received some incentives in half of them (soybean, common bean, chickpea, and maize). There was no record of any farm household receiving increase to increase the production of the remaining four crops (cowpea, groundnut, sorghum, and millet). Among the farm households that indicated that they have ever received incentives to increase crop production, the crop was soybean in ~55% of the cases. This was followed by chickpea (~28% of the cases), common bean (~13%), and maize (~4%) (**see Table 2.5.8.1.** The most important type of incentive received by the survey farm households in order to increase production was seed (accounting for ~69% of the responses), mineral fertilizers (~13%), and training and capacity building (~11%) (see **Table 2.5.8.2**). The incentives were received from various sources including Sokoine University of Agriculture SUA and Ministry of Agriculture (accounting for ~33% of the responses each), village executive officers (~11%), HIMA (~8%), village government and *Uyole* (~4% each), *Matembwe* village (~3%), *Nzuruma* (~2%), and others (friends, farmers' associations, Mission **Matembo**, and NMC (~4%) (**Table not shown**). Generally, the recipients of the incentives had mixed feelings about them. While some made nice and favorable comments (e.g., good, motivating, valuable, helpful, and increased household income), others made unfavorable comments (e.g., too little, very

high interest rates, no benefit, poor mode of payment, brought late, expired urea, and not of great help). Some recipients were more or less neutral, making comments such as 'fair'. A slightly higher proportion of the respondents from *Kilosa* district than Njombe district received the incentives (48.1% compared with 43.3%). There was a dearth of access to incentives to survey farm households from *Mvomero* district since only ~9% of those that received some kind of incentive were from this district. Analysis based on headship and management of the survey farm households shows that of all the households that indicated that they received some kinds of incentives, while ~83% of them were male headed-male managed, only ~17% were female headed-female managed (**Table not shown**).

Table 2.5.8.1: Whether or not survey farm households in Tanzania have ever received incentives to increase the production of different crops

Crop	**Frequency[$]**
Grain legumes	
Soybean	58 (54.7)
Common bean	14 (13.2)
Cowpea	-
Groundnut	-
Chickpea	30 (28.3)
Cereals	
Maize	4 (03.8)
Sorghum	-
Millet	-
Across crops	**106 (100.0)**

[$]Values in parenthesis are percent figures

Source: Survey data, 2008

Table 2.5.8.2: Types of incentives received by farmers to increase production in Tanzania

Crop production incentive	**Frequency[$]**
Seed	68 (68.7)
Mineral fertilizers	13 (13.1)
Training and capacity building	11 (11.1)
Marketing	4 (04.0)
Money	2 (02.0)
Irrigation	1 (01.0)
Across incentives	**99 (100.0)**

[$]Values in parenthesis are percent figures

Source: Survey data, 2008

2.6. Soybean production (+soybean seed systems and variety description)

2.6.1. Knowledge of improved soybean varieties

Past experience in many parts of sub-Saharan Africa has shown that typical farmers are hardly able to distinguish between local and improved varieties of soybean, especially in practical terms. In order to confirm or dispute this position, we verified whether or not survey farm households knew the different types of soybean referred to as improved varieties. The result shows that only ~36% of the survey households across the survey districts indicated that they knew the different types of soybean referred to as improved varieties. At district level, the proportion was ~33% for *Kilosa* district and ~40% for *Njombe* district. As expected, none of the farm households from *Mvomero* district could differentiate between local and improved varieties of soybean (see **Table 2.6.1.1**). A slightly higher proportion of the female headed-female managed farm households than male-headed male managed farm households could differentiate between local and improved varieties of soybean (41.2% against 34.9%) (**Table not shown**).

Table 2.6.1.1: Distribution of survey farm households by their ability to differentiate between local and improved varieties of soybean

Whether can differentiate between local and improved soybean varieties?	District[$]			Across district
	Kilosa	***Njombe***	***Mvomero***	
Yes	22 (33.3)	23 (40.4)	0 (0.0)	45 (35.7)
No	44 (66.7)	34 (59.6)	3 (100.0)	81 (64.3)
Effective n	66 (100.0)	57 (100.0)	3 (100.0)	126 (100.0)

[$]Values in parenthesis are percent figures; *Mvomero* district was sample as a check, largely non-soybean growing

Source: Survey data, 2008

2.6.2. Planting of improved varieties of soybean by survey farm households

Although many of the farm households noted that they could not distinguish between local and improved soybean varieties, a large proportion of them noted that they have planted improved variety of soybean during the last five years (see **Table 2.6.2.1**). A significantly higher proportion (12 out of 16 or 75%) of the female headed-female managed farm households than male-headed-male managed farm households (59 out of 97 or 60.8%) have planted improved varieties of soybean during the last five years (**Table not shown**).

Table 2.6.2.1: Distribution of survey farm households according to whether of not they have planted improved varieties of soybean during the last five years

Whether have planted improved soybean during the last 5 years?	District[$]			Across district
	Kilosa	***Njombe***	***Mvomero***	
Yes	39 (60.9)	32 (68.1)	0 (00.0)	71 (62.8)
No	25 (39.1)	15 (31.9)	2 (100.0)	42 (37.2)
Effective n	64 (100.0)	47 (100.0)	2 (100.0)	113 (100.0)

[$]Values in parenthesis are percent figures; *Mvomero* district was sample as a check, largely non-soybean growing

Source: Survey data, 2008

For the farm households that have not grown improved soybean varieties over the past 5 years and who have never planted any improved soybean varieties, their two most important reasons for this behavior were 'seed not available' (accounting for ~45% of the responses) and 'not heard about any of the improved varieties of soybeans' (~26%). These two reasons are concerned with availability of the seeds of improved varieties of soybean and also availability of information about those improved varieties. Both dimensions of improved seeds of all crops, not only soybean, are extremely important and poses a great challenge to formal seed companies, agro-input dealers, and the overall agricultural development community. Farmers cannot rightly be blamed for low productivity or continued use of crop seeds saved from previous harvests when alternative and improved crop seeds have not been availed to them. The other less popular reasons why survey farm households have not grown improved soybean varieties over the past 5 years or have never planted any improved soybean varieties are also contained in **Table 2.6.2.2.**

Table 2.6.2.2: Distribution of the reasons why some farm households have not grown soybean either in the past 5 years or ever before

Reason for not growing improved varieties of soybean	**Frequency[$]**
Seed not available	19 (45.2)
Not heard of any improved soybean varieties	11 (26.2)
Not seed any demonstration to show superiority of improved variety	7 (16.7)
Simply not interested in experimenting with new varieties	2 (04.8)
Other (no land, reduces soil fertility, no market)	3 (07.1)
Effective n	**42 (100.0)**

[$]Values in parenthesis are percent figures

Source: Survey data, 2008

2.6.3. Soybean varieties grown by farmers in Tanzania

Like their counterparts in Kenya, apart from about two varieties (TGx 1805-8E and *Songea*) farmers in Tanzania hardly knew precisely the names of the soybean varieties that they claim to grow. Most of them were describing the other varieties either simply by their color (e.g., white, yellow, brown) or by the size of their seed (e.g., small seed sized, large seed sized or medium seed sized). That many farmers were not very clear about the different varieties of the crops they grow seems to go beyond soybean. Our result shows that this also applies to other grain legumes including common bean, cowpea, pigeon pea, and chickpea. We also noticed a similar problem with cereals, especially sorghum and millet. There is a clear gap in knowledge here that needs to be filled by all those involved in soybean and other crops development and promotion in East Africa. What currently happens is for farmers to know about the very outstanding and old varieties unlike the new entrants. In order to clearly understand how modern crop breeding is contributing to agricultural development in various parts of sub-Saharan Africa, it is important to understand the switches in crop varieties. One critical way of ensuring the availability of such information is when farmers can easily distinguish among the varieties of the different crops they grow.

The reason for farmers' limited knowledge about the varieties of the soybean they grow could be because, most (~78%) of the soybean varieties were first grown by the farmers between 2004 and 2008, the same period about 90% of the survey farm households indicated was their peak of soybean adoption in the survey area (**Table not shown**). The remaining varieties were first grown by ~22% of the farmers between 1987 and 2003. Another account shows that while ~73% of the survey farm households planted improved variety of soybean for the first time only 1–3 years ago, about 23% of them planted improved variety of soybean for the first time 4 – 10 years ago. Only about 4.1% of the respondents indicated that they planted improved variety of soybean 11–15 years ago (see **Table 2.6.3.1**). **Table 2.6.3.2** shows that the duration since survey farm households planted improved soybean varieties for the first time ranges from 1 year ago to 15 years ago with a mean and standard deviation of 3.11±2.817 years across districts, from 1 to 10 years ago with a mean and standard deviation of 3.04±1.918 years for *Kilosa* district, and from 1 to 15 years ago with a mean and standard deviation of 3.26±4.234 years for *Njombe* district. These results seem to suggest a rather short history of soybean cultivation by farmers in the study (does not seem to go beyond 1987). TGx 1805-8E and *Songea* seem to be the most popular soybean varieties in the farming systems of the study area of Tanzania. It was also the most commonly purchased soybean variety by farm households in the major cropping season of 2007/08 (according to 5 out of 11 farm households or ~46% of the farm households that responded to related question). However, the soybean varieties referred to by farmers as 2E followed by Soya lishe seemed to be the oldest soybean varieties in the farming systems. Soya lishe (~18%) and Bossier (~9%) were also among the few soybean varieties that some farm households in the study area purchased in the major cropping season of 2007/08.

Table 2.6.3.1: Distribution of number of years since survey farm households first planted improved soybean variety in Tanzania

Year range	Frequency	Percent
1 – 3 years	54	72.9
4 – 10 years	17	23.0
11 – 15 years	3	04.1
Effective n	**74**	**100.0**

Source: Survey data, 2008

Table 2.6.3.2: Duration since survey farm households in Tanzania first planted improved soybean varieties for the first time

District	n	Duration since household first planted improved soybean variety			Std. Deviation
		Min.	Max.	Mean	
Kilosa	51	1	10	3.04	1.918
Njombe	23	1	15	3.26	4.234
Across district	**74**	**1**	**15**	**3.11**	**2.817**
Sig.	ns				

Source: Survey data, 2008

2.6.4. Sources of soybean seed planted by farmers

The result of the sources of the soybean seeds grown by farmers in Tanzania is a clear indication that soybean development and promotion is not receiving a due attention in Tanzania. A distribution of the sources of soybean seeds grown by the farmers indicates that *Sokoine* University of Agriculture (SUA) was outstandingly the most important source, accounting for 51 of the 73 total responses (or ~70%). Agricultural extension accounted for only 14 of the 73 total responses (or ~19%). All the other sources (e.g., neighbors, local NGOs, friends and relations) accounted for only 11% of the responses. Although it is surprising that SUA was outstandingly the most important source of soybean seed to the farmers in the study area, it can be explained by the fact that some researchers from the Food Science and Technology Department of SUA have been working with farmers from *Msimba* Village, the main village sampled from *Kilosa* district, on soybean development, especially from the processing point of view. They must have, therefore, been supplying farmers with some soybean seed to encourage them to plant soybean grains that they needed to process.

Soybean seed purchase does not seem to be a common practice among the survey farm households, even the so-called soybean growing households. For instance a frequency distribution of the quantities of soybean seed purchased by the few purchasing farm households in long rainy season of 2007/08 is presented in **Table 2.6.4.1**. This table underscores the generally lack of soybean seed market in the study area of Tanzania. The quantity of soybean seed purchased ranges from 0.25 kg to 7 kg (with a mean of 2.7±2.35 kg). When asked to indicate the sellers from where they purchased the soybean seeds, the responses indicated local seller (50% of the responses), extension officer (20%), and CEFA, market, and village officer (10% each). This again strengthens our conclusion of the lack of development of soybean seed market in the study area of Tanzania. This is another key challenge for Tropical Legumes II project and all other projects on soybean development and promotion in Tanzania.

Table 2.6.4.1: Distribution of the quantity of seeds survey farm households purchased during the major season (long rainy season) in Tanzania

Quantity of seed (kg)	**Frequency[$]**
0.25	1 (08.3)
0.50	1 (08.3)
1.00	3 (25.0)
2.00	2 (16.7)
3.00	1 (08.3)
4.00	2 (16.7)
7.00	2 (16.7)
Effective n	**12**

[$]Values in parenthesis are percent figures

Source: Survey data, 2008

2.6.5. Knowledge of different varieties of soybean

Farmers are expected to know the varieties of the soybeans (and also of the other crops) they grow. However, we tried to verify the extent of the knowledge of the farm households in the study area with respect to their knowledge of the different types of soybean, especially those referred to as ‘improved varieties. There seems to be some problems here just like was the case with the baseline data from Kenya (see **more details in sections 2.6.1, 2.6.2, and 2.6.3**).

2.6.6. Decision about choice of soybean variety

Irrespective of the generally poor knowledge of the farmers in the study area about the soybean varieties they claim to be growing, we investigated who decides about the choice

of the soybean varieties planted by the survey farm households. The results, articulated based on mutually exclusive responses that include household head, the spouse, and household head/the spouse, show that while household head decides in about 49% of the cases, the spouse decides in about 31% of the cases. Decision was jointly taken by household head and the spouse in about 20% of the cases (**Table not shown**).

2.6.7. Land area devoted to soybean cultivation in Tanzania

We assessed and articulated the land area devoted to soybean in the study area by variety. Generally, the average land area devoted to different varieties of soybean was small and ranges from a low value of 0.3 acres (or 0.12 ha) for *Karea* to another low value of 0.8 acres (or 0.32 ha) for *Songea* and *Ndogo*. The result, however, shows that the two most popular soybean varieties in the study area, TGx 1805-8E and *Songea*, are increasingly being allocated more land in the study area.

An assessment of 'how the last soybean season area compared with the previous ones' revealed that while ~27% of those who responded noted an increase, ~42% noted a decrease. The balance of ~31% indicated no change. This result is presented in **Table 2.6.7.1**. In other words, about 73% of the so called soybean growing farm households were either keeping stagnant or reducing the land area they devote to soybean production in the study area of Tanzania. The result of our analysis by district shows that a larger proportion of households (14 out of 17 or ~82%) from *Kilosa* district than households from *Njombe* district (18 out 27 or ~67%) were either keeping stagnant or reducing the land area they devote to soybean production (**Table not shown**). Similarly, a larger proportion of female headed-female managed farm households (8 out of 9 or ~89%) than male headed-male managed farm households (24 out 35 or ~69%) were either keeping stagnant or reducing the land area they devote to soybean production (**Table not shown**). This is definitely a challenge for the Tropical Legumes II project in Tanzania to reverse and also ensure a steady increase in soybean production.

For the farm households that have reduced their land area under soybean, their reasons for doing so were: poor rainfall that is also poorly distributed (sometimes heavy leading to poor germination) (according to ~37% of the responses), reduced farm labor force (~32%), reduced land availability (~15.8%), and inadequate seed, low price, and has been experimenting (~5% each). For the farm households that have been devoting the same level of land area to soybean, the reasons they gave were lack of market and low price (according to ~36% of the responses), unchanged rainfall pattern (~29%), low yield (~14%), and other reasons such as weeds, unchanged land size, and illness (~21%). Lastly, for the farmers who devoted larger land to soybean compared with the previous seasons, their main reasons for this were higher demand and increase in household income (~33% of the responses), access to sufficient seed and access to sufficient land (~25% each), better rainfall (~17%), and access to sufficient farm labor (~8%). These different reasons for the different behaviors with respect to land area devoted to soybean were articulated on a non-mutually exclusive basis of available options and more.

Table 2.6.7.1: How the last soybean season area compares with the previous planted area in Tanzania

Comparison	Frequency[$]
Smaller	19 (42.2)
The same	14 (31.1)
Larger	12 (26.7)
Effective n	**45 (100.0)**

[$]Values in parenthesis are percent figures

Source: Survey data, 2008

2.6.8. Important characteristics farmers desire in soybean in Tanzania

Survey farm households were requested to list three most important characteristic they desire in their ideal soybean varieties. The result shows that yield potential and stability is clearly the most important attribute that survey farm households look for in their ideal soybean variety. This attribute accounts for 39.4% of the responses. It was followed by drought tolerance (19.0%), early maturity (17.6%), and pest and disease resistance (9.2%). All together, these four features accounted for ~85% of the responses on the characteristics survey farm households desire in their ideal soybean variety. All the remaining other features (plant height, low soil fertility tolerance, high oil and milk content, seed eye color, superior storage pest resistance, and high germination rate) put together accounted for ~15% of the responses. This pattern is more or less the same for both male headed-male managed farm households and the female headed-female managed farm households (**Table not shown**).

2.7. Livestock production and marketing

The most commonly owned and produced livestock in the study was poultry (chicken category). This livestock was produced by about 82% of the farm households surveyed. It was distantly followed by pigs (~38% of the households surveyed), small ruminants (sheep and goats) (~13%), non-chicken poultry (~8%), cattle (~5%), and rabbit (see **Table 2.7.1**). Among the farm households that owned different types of livestock, the number owned ranged from 1 to 50 (with a mean of 10.4) for chicken category poultry, from 1 to 20 (with a mean of 3.2) for pigs, from 1 to 18 (with a mean of 4.3) for small ruminants, from 1 to 20 (with a mean of 6.9) for non-chicken poultry, from 1 to 8 (with a mean of 3.9) for cattle, and from 3 to 15 (with a mean of 7.7) for rabbit. The results of our analysis by district, headship and management of household, and soybean growing status are contained in **Tables 2.7.1b**, **2.7.1c**, and **2.7.1d**, respectively. These results show a dearth of livestock, especially large ruminants, in the farming areas of the study area. This scene will become clearer if these average numbers of the different types of

livestock are converted into Tropical Livestock Unit (TLU[2]). Depending on the livestock in question, only 1.3 to 81.7% (with a mean of 24.5%) of the farm households surveyed owned livestock.

Table 2.7.1: Number of different types of livestock owned by farm households in Tanzania

Livestock	n[$]	Min.	Max.	Mean	Std. Deviation
Poultry (chicken category)	196 (81.7)	1	50	10.4	9.08
Pigs	91 (37.9)	1	20	3.2	3.30
Small ruminant (sheep, goat)	31 (12.9)	1	18	4.3	4.20
Poultry (non - chicken category)	18 (07.5)	1	20	6.9	6.01
Cattle	13 (05.4)	1	8	3.9	2.36
Rabbit	3 (01.3)	3	15	7.7	6.43

[$]**Values in parenthesis are percent figures**

Source: Survey data, 2008

Table 2.7.1b: Number of different types of livestock owned by farm households in Tanzania by district

	District[$]			
Livestock	***Kilosa***	***Njombe***	***Morogoro***	**Total**
Poultry (chicken category)	13.0±9.8 (68)	07.8±5.7 (64)	10.3 ±10.3 (64)	10.4±9.1 (196)
Pigs	03.9±4.0 (49)	02.3±2.0 (41)	2 (1)	03.2±3.3 (091)
Small ruminant (sheep, goat)	04.7±4.6 (18)	03.9±3.8 (12)	2 (1)	04.3±4.2 (031)
Poultry (non - chicken category)	03.3±2.5 (04)	10.7±9.0 (03)	7.3 ±5.8 (11)	06.9±6.0 (018)
Cattle	-	05.4 ±6.1 (14)	-	05.4±6.1 (014)
Rabbit	-	07.7±6.4 (03)	-	07.7±6.4 (003)

[$]Values in parenthesis are the respective effective sub-sample sizes

Source: Survey data, 2008

2.7.1c: Number of different types of livestock owned by farm households in Tanzania by household headship

	Household headship and management[$]		
Livestock	**Male headed-male managed**	**Female headed-female managed**	**Total**
Poultry (chicken category)	11.0±9.5 (161)	7.7±6.0 (35)	10.4±9.1 (196)
Pigs	03.4±3.5 (079)	1.9±1.5 (12)	03.2±3.3 (091)
Small ruminant (sheep, goat)	04.1±4.3 (025)	5.2±4.1 (06)	04.3±4.2 (031)
Poultry (non - chicken category)	07.3±6.3 (016)	4.0±2.8 (02)	06.9±6.0 (018)
Cattle	06.1±6.3 (012)	1.5±0.7 (02)	05.4±6.1 (014)
Rabbit	07.7±6.4 (003)	-	07.7±6.4 (003)

[$]Values in parenthesis are the respective effective sub-sample sizes

Source: Survey data, 2008

[2]Computation of Tropical Livestock Units (TLU): The following conversion factors have been used following Runge-Metzeger and Diehls (1993). 0.7 for cattle, 0.20 for pigs, 0.10 for sheep and goats, 0.005 for rabbits and 0.01 for fowls and ducks)

Table 2.7.1d: Number of different types of livestock owned by farm households in Tanzania by soybean growing status

	Soybean growing status[$]		
Livestock	**Yes**	**No**	**Total**
Poultry (chicken category)	11.0±08.6 (74)	9.9±9.5 (115)	10.4±9.1 (189)
Pigs	03.8±03.9 (47)	2.5±2.4 (41)	3.2±3.3 (88)
Small ruminant (sheep, goat)	04.8±04.6 (24)	2.8±1.5 (6)	4.4±4.2 (30)
Poultry (non - chicken category)	11.0±12.7 (2)	6.4±5.3 (16)	6.9±6 (18)
Cattle	04.4±02.3 (11)	1.5±0.7 (2)	3.9±2.4 (13)
Rabbit	04.0±01.4 (2)	15 (1)	7.7±6.4 (3)

[$]Values in parenthesis are the respective effective sub-sample sizes

Source: Survey data, 2008

The mean monetary value of the different livestock owned by the households surveyed ranged from a low value Tshs 4833.3 (or ~US$4) for rabbit, through Tshs 39666.7 (or ~US$30) for non-chicken poultry, Tshs 46249.7 (or ~US$35) for the chicken poultry, Tshs 139972.2 (or ~US$107) for pigs, Tshs 166774.2 (or ~US$128) for small ruminants (sheep and goats), to a high value of Tshs 1147857.1 (or US$880) for cattle (see **Table 2.7.2**). The results of our analysis by district, headship and management of household, and soybean growing status are contained in **Tables 2.7.2b**, **2.7.2c**, and **2.7.2d**, respectively.

Table 2.7.2: Total value of livestock the owned by farm households surveyed in Tanzania (Tshs)

Livestock	**n**	**Min.**	**Max.**	**Mean[$]**	**Std. Deviation**
Poultry (chicken category)	196	40	495000	46249.7 (35.4)	59913.88
Pigs	90	3500	1050000	139972.2 (107.3)	184912.13
Small ruminant (sheep, goat)	31	10000	1000000	166774.2 (127.8)	228628.33
Poultry (non - chicken category)	18	3000	120000	39666.7 (30.4)	37509.22
Cattle	14	80000	6250000	1147857.1 (879.6)	1559621.15
Rabbit	3	1000	7500	4833.3 (03.7)	3403.43

[$]Values in bracket are the US Dollar ($) equivalent of the Tanzania Shillings (Tshs. 1305 = US$1)

Source: Survey data, 2008

Table 2.7.2b: Total value of livestock the owned by farm households surveyed in Tanzania by districts (Tshs)

	District[$]			
Livestock	**Kilosa**	**Njombe**	**Morogoro**	**Total**
Poultry (chicken)	57824.1±65792 (68)	41500±66198.4(64)	38701.6±43587.3(64)	46249.7±59913.9(196)
Pigs	150812.5±210312 48)	125817.1±153851.4(41)	200000±0(1)	139972.2±184912.1(90)
Small ruminant (sheep, goat)	226666.7±279058.3 (18)	90000±87594.1(12)	10000±0(1)	166774.2±228628.3(31)
Poultry (non - chicken)	10250±3304 (4)	73333.3±50332.2(3)	41181.8±34542.2(11)	39666.7±37509.2(18)
Cattle	-	1147857.1 ±1559621.2(14)	-	1147857.1±1559621.2(14)
Rabbit	-	4833.3 ±3403.4(3)	-	4833.3±3403.4(3)

[$]Values in parenthesis are the respective effective sub-sample sizes

Table 2.7.2c: Total value of livestock the owned by farm households surveyed in Tanzania by headship and management of household (Tshs)

	Household headship and management[$]		
Livestock	**Male headed-male managed**	**Female headed-female managed**	**Total**
Poultry (chicken)	48850.6±62821.3 (161)	34285.7±42855.8 (35)	46249.7±59913.9(196)
Pigs	148237.2±197073.2 (78)	86250±33920 (12)	139972.2±184912.1(90)
Small ruminant (sheep, goat)	121600±181359 25)	355000±320982.9 (6)	166774.2±228628.3(31)
Poultry (non-chicken)	40875±39587.7 (16)	30000±14142.1 (2)	39666.7±37509.2(18)
Cattle	1307500 ±1636415.8 (12)	190000 ±155563.5 (2)	1147857.1±1559621.2(14)
Rabbit	4833.3 ±3403.4 (3)	-	4833.3±3403.4(3)

[$]Values in parenthesis are the respective effective sub-sample sizes

Source: Survey data, 2008

Table 2.7.2d: Total value of livestock the owned by farm households surveyed in Tanzania by soybean growing status (Tshs)

	Soybean growing status[$]		
Livestock	**Yes**	**No**	**Total**
Poultry (chicken category)	50750.5±62629.8(74)	42299.1±57846.2(115)	45608.1±59743.4(189)
Pigs	100489.1±87432(46)	179878±251561.3(41)	137902.3±187143.4(87)
Small ruminant (sheep, goat)	197291.7±250881(24)	67500±63698.5(6)	171333.3±231099.1(30)
Poultry (non - chicken category)	45000±49497.5(2)	39000±37774.8(16)	39666.7±37509.2(18)
Cattle	858181.8±529845.6(11)	190000±155563.5(2)	755384.6±546742.1(13)
Rabbit	3500±3535.5(2)	7500 (1)	4833.3±3403.4(3)

[$]Values in parenthesis are the respective effective sub-sample sizes

Source: Survey data, 2008

2.8. Agricultural commodity marketing decisions

A section of the questionnaire was devoted to investigating how the survey farm households dispose off the crops harvested. This data was focused on about eight crops (soybean, common bean, cowpea, groundnut, pigeon pea, maize, sorghum, and millet)

and addressed at the produce for 2007/08 cropping season. Data solicited for each crop were in terms of quantity harvested, quantity consumed, quantity sold, quantity given out as gift, quantity reserved as seed for next season, quantity lost due to handling, and seed credit repayment. We also investigated when ('soon after harvest', 'six months after harvest', or 'just before planting') the farmers normally sell their soybean grains. For the different grains that survey farmers sold in 2007/08 cropping season, we assessed who fixed the prices. The result of our analysis of the data on the fixing of the prices of grains shows that across the districts, these prices were fixed by the buyer in about 69% of the cases and by the farmer in only about 29% of the cases (see **Table 2.8.1**). Where farmers were the ones that fixed the grain prices, they mostly (i.e., in 78% of the cases) determined these prices guided by prices in neighboring markets. About 16% of them based the prices fixed on production cost. The balance (6%) based the price they fixed on other things (prices announced on radio 2%, quality of grain 2%, other 2%). This result needs to be kept in mind as we move with the development of market information systems that would enable farmers to get value for their produce.

Table 2.8.1: Distribution of those who fixed the prices of grains in 2007/08 in Tanzania

Who fixed grain prices?	**District[$]**			**Across district**
	Kilosa	***Njombe***	***Mvomero***	
The farmer	12 (19.0)	24 (38.7)	10 (31.2)	46 (29.3)
The purchaser	50 (79.4)	37 (59.7)	22 (68.8)	109 (69.4)
Other	1 (01.6)	1 (01.6)	-	2 (01.3)
Effective n	63 (100.0)	62 (100.0)	32 (100.0)	157 (100.0)

[$]Values in parenthesis are percent figures

Source: Survey data, 2008

2.9. Commercial index

The commercial index (or proportion of total output that is sold) of soybean is quite high. Most farmers sold their soybean produce between the time of harvest and six months after harvest (see **Table 2.9.1**). The proportion of the total output sold at different periods is presented in **Table 2.9.2**.

Table 2.9.1: Proportion of soybean producers in Tanzania that sold their soybean produce at different time periods

When sold	n	Min.	Max.	Mean	Std. Deviation
Soon after harvest	20	40	100	86.50	19.619
Six months after harvest	37	13	100	81.95	23.392
Just before planting	6	40	100	65.00	22.583
Across period	63	13	100	81.78	22.611

Source: Survey data, 2008

Table 2.9.2: Average proportion of soybean sold and average price per unit of soybean at different times of sale among farmers in Tanzania

When sold	Proportion sold (%)	Average price per unit
Soon after harvest	37	506.5
Six months after harvest	35	580.0
Just before planting	28	828.8
Total	**234**	**638.4**

Source: Survey data, 2008

2.10. Crop gift

File has been attached (TLII_Q71-80)

2.11. Household income and expenditure profiles

2.11.1. Households' annual income

Household's income level is an important determinant of household's welfare and livelihoods. This notwithstanding, it is often difficult to accurately estimate income, especially farm income. Apart from using triangulations to try to overcome this problem, we requested the respondents to fit themselves into income ranges [<Tshs. 688, 000;

Tshs. 688,000 – Tshs. 1,376,000; Tshs. 1,376,001 – Tshs 2,064,000; >Tshs. 2,064,000; US$1 = Tshs. 1300; Kshs. 1 = Tshs. 17.2] that were provided in the questionnaire. The result shows that most the survey farm households were extremely poor, with as high as ~80% of them having an annual income of less than Tshs. 688,000 or US$530 (see **Table 2.11.1.1**). The result of our analysis by district is presented in **Table 2.11.1.2**. Among others, it shows that while about 80% of the farm households in *Mvomero* district have an annual income of less than Tshs. 688,000 or US$530, not a single one of the households possess an annual income of >Tshs. 2,064,000 or US$1588. *Kilosa* had the highest proportion of its survey farm households with an annual income of less than Tshs. 688,000 or US$530 (~83% compared with ~76% for *Njombe*). A larger proportion of the non-soybean growing farm households than soybean growing farm households were in the annual income bracket of less than Tshs. 688,000 or US$530 (~81% compared with ~77% for the soybean growing farm households) (see **Table 2.11.1.3**). Similarly, a slightly higher proportion of the female headed-female managed survey farm households than the male headed-male managed ones were in the annual income bracket of less than Tshs. 688,000 or US$530 (81.1% compared with ~79.3% for the male headed-male managed survey farm households) (see **Table 2.11.1.4**).

Among others, it shows that while about 81% of the female headed-female managed farm households have an annual income of less than Tshs. 688,000 or US$530, like was the case with *Mvomero* district, none of them possess an annual income of >Tshs. 2,064,000 or US$1588. About five (5) male headed-male managed farm households (or 3% of them) possess an annual income of >Tshs. 2,064,000 or US$1588 (**Table 2.11.1.4**).

Table 2.11.1.1: Distribution of survey farm households in Tanzania by annual income range

Annual income (Tshs)	**Annual income (US$ equivalent**	**Frequency[#]**
<688,000	<530	164 (79.6)
688,000–1,376,000	530–1,059	28 (13.6)
1,376,001–2,064,000	1,060–1,588	9 (04.4)
>2,064,000	>1,588	5 (02.4)
Effective sample size		**206 (100.0)**

[#]Values in parenthesis are percent figures

Source: Survey data, 2008

Table 2.11.1.2: Distribution of the annual income range of survey farm households in Tanzania by district

Annual income (Tshs)	Annual income (US$ equivalent	District[#]			Across district
		Kilosa	*Njombe*	*Mvomero*	
<688,000	<530	63 (82.9)	53 (75.7)	48 (80.0)	164 (79.6)
688,000–1,376,000	530–1,059	8 (10.5)	10 (14.3)	10 (16.7)	28 (13.6)
1,376,001–2,064,000	1,060–1,588	3 (03.9)	4 (05.7)	2 (03.3)	9 (04.4)
>2,064,000	>1,588	2 (02.6)	3 (04.3)	-	5 (02.4)
Effective sample size		**76 (100.0)**	**70 (100.0)**	**60 (100.0)**	**206 (100.0)**

[#]Values in parenthesis are percent figures

Source: Survey data, 2008

Table 2.11.1.3: Distribution of the annual income range of survey farm households in Tanzania by soybean growing status

Annual income (Tshs)	Annual income (US$ equivalent	Soybean growing status[#]		Across soybean growing status
		Soybean growing household	*Non-soybean growing household*	
<688,000	<530	61 (77.2)	98 (81.0)	159 (79.5)
688,000–1,376,000	530–1,059	11 (13.9)	16 (13.2)	27 (13.5)
1,376,001–2,064,000	1,060–1,588	4 (05.1)	5 (04.1)	9 (04.5)
>2,064,000	>1,588	3 (03.8)	2 (01.7)	5 (02.5)
Effective sample size		**79 (100.0)**	**122 (100.0)**	**200 (100.0)**

[#]Values in parenthesis are percent figures

Source: Survey data, 2008

Table 2.11.1.4: Distribution of the annual income range of survey farm households in Tanzania by household headship and management

Annual income (Tshs)	Annual income (US$ equivalent	Headship and management of household[#]		Across headship & management of household
		Male headed-male managed	*Female headed-female managed*	
<688,000	<530	134 (79.3)	30 (81.1)	164 (79.6)
688,000–1,376,000	530–1,059	22 (13.0)	6 (16.2)	28 (13.6)
1,376,001–2,064,000	1,060–1,588	8 (04.7)	1 (02.7)	9 (04.4)
>2,064,000	>1,588	5 (03.0)	-	5 (02.4)
Effective sample size		**169 (100.0)**	**37 (100.0)**	**206 (100.0)**

[#]Values in parenthesis are percent figures

Source: Survey data, 2008

We followed the estimation of the survey farm households' annual income range with an assessment of their sources of income in 2007/08. The optional but non-mutually exclusive income source categories provided included: soybean, other legumes, cereals, fruits and vegetables, livestock, petty trading, and other off farm employment. The respondents were also requested to indicate (in local currency) an estimate of the level of income from each source and also the share of households' total income accounted for by each income source. Arranged in order of popularity, especially with respect to the number of farm households that derive income from the different sources, **Table 2.11.1.5** shows the income sources indicated by the survey farm households. It shows that livestock, fruits and vegetables, cereals, and grain legumes (other than soybean) are clearly the main sources of income to the survey farm households in 2007/08. Petty trading and other off farm employment follow next. Soybean came seventh and was clearly not among the key sources of income to the survey farm households. However, it was much more popular than remittance and income from trees in 2007/08. In all cases with an effective sample size of more than 1, there was a huge difference in the income figure as also reflected in the values of the standard deviations. This again points to the huge differences among rural communities as earlier pointed out for Kenya (Chianu Justina et al., 2008) and for Ghana, Zimbabwe, Kenya, Uganda, and Malawi (Chianu et al, 2009 – IDRC Book). In addition to assessing the income sources, we also requested the respondents to indicate the share (in percent terms) of income represented by the incomes from the different sources that they have indicated. For the income sources with reasonable sub-sample sizes, the result is presented in **Table 2.11.1.6**. It shows that the highest mean income shares were from off-farm employment (with a mean income share of ~51%), petty trading (~40%), fruits and vegetables and cereals (~38% each), livestock (27%), other legumes (apart from soybean) (~23%), and soybean (~19%) in that order. This result seems to be reliable, especially given that it more or less follows the order of the magnitude of the mean amount of income from the sources with reasonable sub-sample sizes included in the analysis (see **Table 2.11.1.5**). These mean amounts of income from the different included sources are off-farm employment (Tshs. 292,870.59

or US$ 225.29) > petty trading (Tshs. 247,955.76 or US$ 190.74) > fruits and vegetables (Tshs. 223,400.86 or US$ 171.85) > cereals (Tshs.160,259.13 or US$ 123.28) > livestock (Tshs. 107,414.00 or US$ 82.63) > other legumes apart from soybean (Tshs. 95,536.54 or US$ 73.49) > soybean (Tshs. 40,209.68 or US$ 30.93). Analysis by gender indicates that while cereals was the most popular source of income (in terms of the number of households getting income from particular source) among female headed-female managed farm households (ranking third among the male headed-male managed farm households), the most important source of income among the male headed-male managed farm households was livestock which ranked second among the female headed-female managed farm households. Fruits and vegetables ranked second among the male headed-male managed farm households and third among the female headed-female managed farm households (**Table not shown**).

Table 2.11.1.5: Sources of income for 2007/08 by survey farm households in Tanzania

Income source	Effective n	Amount of income (Tshs)			Std Deviation
		Min.	Max.	Mean	
Livestock	125	750	1,500,000	107,414.00	163428.727
Fruits and vegetables	116	1,000	2,000,000	223,400.86	326,027.174
Cereals	115	4,000	1,800,000	160,259.13	217,770.296
Other legumes (apart from soybean)	104	2,500	1,200,000	95,536.54	179,271.790
Petty trading	85	240	2,364,000	247,955.76	361,831.730
Other off-farm employment	85	10,000	2,000,000	292,870.59	396,058.611
Soybean	31	1,200	200,00	40,209.68	44,541.272

Source: Survey data, 2008

Table 2.11.1.6: Share (%) of household income constituted by income from different sources in Tanzania in 2007/08

Income source[$]	n	Share (%) on household income			Std. Deviation
		Min.	Max.	Mean	
Off-farm employment	85	1.61	100	50.53	26.615
Petty trading	85	0.27	100	40.11	25.919
Fruits and vegetables	116	0.11	100	38.06	30.814
Cereals	115	1.42	100	37.75	29.679
Livestock	125	0.33	100	27.00	23.872
Other legumes (excluding soybean)	104	0.16	100	22.70	22.870
Soybean	31	0.25	100	19.35	25.025

[$]Trees, remittance, and casual as sources of income were not included due to limited sub-sample sizes

Source: Survey data, 2008

2.12. Household welfare and livelihoods

2.12.1. Mechanisms for coping against food shortage

In many parts of sub-Saharan Africa, it is not unusual for even farm households to have shortage of food. For this reason, we evaluated the most important mechanisms through which the survey farm households coped with shortage of food. Among others, we articulated these in part based on some options provided. These included: reduced frequency of food intake, withdrawing children from schools, reducing other expenditure, selling small animals, selling cattle, selling farm equipment, and selling other assets. Others were working more off-farm, working at Food-for-Work, and receiving food aid. The result shows five clearing outstanding coping mechanisms which include reduce frequency of food intake, work more off-farm, reduce other expenditure to give priority to food purchases, sell small animals, and work at Food-for-Work in that order. These five mechanisms also appeared to be the dominant ones irrespective of the headship and the management of the households. However, there were some internal reshufflings (see **Table 2.12.1.1**. It is clear that credit and remittance were not important methods through which farm households in the survey area cope with food shortages.

Table 2.12.1.1: Distribution of the methods through which farmers cope with food shortages in Tanzania

Coping mechanism	Headship and management of household[$]		Across
	Male headed-male managed	Female headed-female managed	
Reduce frequency of food intake	34 (18.4)	12 (23.5)	46 (19.5)
Reduce other expenditure (prioritize food)	36 (19.5)	8 (15.7)	44 (18.6)
Work more off-farm	32 (17.3)	11 (21.6)	43 (18.2)
Sell small animals	32 (17.3)	6 (17.8)	38 (16.1)
Work at Food-for-Work	24 (13.0)	6 (17.8)	30 (12.7)
Receive food aid	10 (05.4)	5 (09.8)	15 (06.4)
Sell farm equipment and other assets	4 (02.2)	2 (03.9)	6 (02.5)
Leasing assets (land, cash crops, etc.)	4 (02.2)	-	4 (01.7)
Diversify diet (supplement, substitute)	3 (01.6)	-	3 (01.3)
Sell cattle	2 (01.1)	-	2 (00.8)
Improve farming methods	2 (01.1)	-	2 (00.8)
Remittance from children	1 (00.5)	1 (02.0)	2 (00.8)
Borrow or take loan	1 (00.5)	-	1 (00.4)
Total	**185 (100.0)**	**51 (100.0)**	**236 (100.0)**

[$]Values in parenthesis are percent figures

Source: Survey data, 2008

2.12.2. Livelihood outcomes among survey farm households in Tanzania

The livelihood outcomes of the survey farm households were examined. Households were to indicate the four most important outcomes for improving their livelihoods. Among the options provided were: increase agricultural production, reduce agricultural production risk, reduce marketing risk, increase food security, improve health status of members, increase volume of household assets, increase education level of household members, increase land ownership, improve household's social status, increase household's income/reduce income risk, increase job opportunities/earn wages, and get out of agriculture (or embrace more off-farm activities). The result shows that the four most important livelihood outcomes to the survey farm households were: increase agricultural production (with a mean score of 1.44±0.808), reduce agricultural production risk (2.44±1.017), reduce marketing risk (2.45±0.872), and increase food security (2.74±0.991) (see **Table 2.12.2.1**). The result of this ranking clearly shows the importance of food, food security and risk (related to production and market) to survey farm households. This implies that for an intervention to be highly attractive to the farm households, such intervention must be addressing these livelihood outcomes that these farmers consider their priorities. It also indicates some issues that farm households are usually less concerned about. The most important of these were social status, volume of assets, increase in job opportunities/earn wages, and get out of agriculture. Interventions that focus on these livelihood outcomes may not attract and hold the attention of the farmers. This result is clearly important to agricultural and rural development agencies.

Table 2.12.2.1: Mean ranking of livelihood outcomes among survey farm households in Tanzania

Livelihood outcome	n	Rank		
		Min.	Max.	Mean & Std Deviation
Increase agricultural production	213	1	4	1.44±0.808
Reduce agricultural production risk	108	1	4	2.44±1.017
Reduce marketing risk	142	1	4	2.45±0.872
Increase food security	105	1	4	2.74±0.991
Increase job opportunities/earn wages	7	2	3	2.71±0.488
Get out of agriculture (more off-farm activities)	22	1	4	2.82±1.296
Increase land ownership	36	1	4	3.00±1.121
Increase household's income/reduce income risk	54	1	4	3.02±0.981
Improve health status of members	100	1	4	3.05±0.903
Increase education level of household members	81	1	4	3.09±0.977
Increase volume of household assets	20	2	4	3.25±0.786
Improve household's social status	4	2	4	3.25±0.957

Source: Survey data, 2008

2.12.3. Threats to the livelihoods of survey farm households in Tanzania

Each of the survey farm households were asked to indicate the threats to their livelihoods. The result implicates several issues that threaten the livelihoods of the survey farm households. However, the increasing cases of theft are the clearly outstanding threat and accounts for ~42% of all the responses (see **Table 2.12.3.1**). It is very distantly followed by diseases and pests (~10%), poor health (~9%), and incessant fire breakouts (~8%) among others. The increasing spate of theft is an indication of pressure and hard conditions that the communities are passing through due to widespread poverty.

Table 2.12.3.1: Distribution of the most serious threats to livelihoods of survey farm households in Tanzania

Livelihood threat	**District[$]**			**Across districts**
	Kilosa	***Njombe***	***Mvomero***	
Increasing cases of theft	76	64	58	198 (41.7)
Diseases and pests	10	14	24	48 (10.1)
Poor health	20	9	14	43 (09.1)
Incessant fire outbreaks	16	5	15	36 (07.6)
Lack of good housing	9	12	13	34 (07.2)
Lack of funds	7	7	14	28 (05.9)
Limited markets	8	19	-	27 (05.7)
Witchcraft	5	19	-	24 (05.1)
Lack of employment	3	6	5	14 (02.9)
Poor soil quality	-	-	9	9 (01.9)
Food insecurity	1	1	2	4 (00.8)
Insufficient farm labor	-	2	1	3 (00.6)
Climate variability	-	-	2	2 (00.4)
Other (Limited education and training, insufficient land, old age, poor land policy `	-	4	-	4 (00.8)
Effective n	**155**	**162**	**157**	**475 (100.0)**

[$]Values outside parenthesis are frequency figures; Values in parenthesis are percent figures

Source: Survey data, 2008

2.12.4. Constraints to improving the livelihoods of households in the survey area of Tanzania

We examined the most serious constraints to improving the livelihoods of survey household members. Results, contained in **Table 2.12.4.1**, clearly shows that poor markets (accounting for ~43% of the responses) constitutes the most serious constraint to improving the livelihoods of survey farm households in the study area of Tanzania. It is distantly followed by lack of funds, credit, and farm inputs (~13%), and low soil and low crop yields (also ~13%), among others.

Table 2.12.4.1: Distribution of the most serious constraints to improving the livelihoods of household members in Tanzania

Constraint	District[$]			Across districts
	Kilosa	*Njombe*	*Mvomero*	
Poor input and output markets	76	64	58	198 (43.1%)
Lack of credit facilities, farm inputs and funds	24	16	21	61 (13.3)
Poor soil fertility and low crop yields	14	25	21	60 (13.1)
Diseases and pests	16	5	15	36 (07.8)
High transport cost (due to poor road conditions)	9	13	13	35 (07.6)
Poor health and lack of medical facilities	5	19	9	33 (07.2)
Lack of labor and time	4	3	6	13 (02.8)
Seed related problems (poor quality & limited availability)	3	3	3	9 (02.0)
Food shortage	-	-	5	5 (01.1)
Lack of knowledge	-	2	1	3 (00.7)
Cattle feeding on crops	-	-	2	2 (00.4)
Other (Dependency on family members; drunkenness; lack of land; and poor weather, rainfall, hailstones)	-	3	1	4 (00.9)
Effective n	**151**	**153**	**155**	**459 (100.0)**

[$]Values outside parenthesis are frequency figures; Values in parenthesis are percent figures.

Source: Survey data, 2008

2.13. Processing and other forms of value-addition

2.13.1: Soybean processed products that survey household could make

Survey farm households were requested to furnish the names of processed products they could make from soybean. Overall, about 14 different processed products (porridge, chapatti, beverage, milk, roasted grains, *mandazi*, flour, cake, buns, *ugali*, spices, *bhajia*, meat, and bread) were mentioned by the farm households. However, given that the frequency ranges from a very low value of 1 (or 0.9%) for bread, meat, and *bhajia* to yet another low value of 15 (or 13.9%) for porridge (**Table not shown**), one can conclude that soybean processing is still not widespread in the study area. Group processing (through collective action) of soybean was also not common in the area. Of all the 240 survey farm households, only 16 of them (or ~6.7%) noted that they knew some soybean processing groups. Besides, only about 13.2% of the soybean producing farm households (~92% from who were from *Kilosa* district) noted that someone from their household was involved in group or cottage-level processing of soybean into various products. All these are clear indications that soybean processing is not yet a common phenomenon in the study area. There were clearly no sign of group or cottage-level soybean processing in Njombe district.

Given the above scenario, the respondents were asked if they observe any problems preparing or cooking soybean. It is surprising to not that only 16 out of the 74 households (or ~22%) that responded to this question indicated that they observe some problems preparing or cooking soybean. The balance (or ~78%) does not observe any problem. All the 16 farm households that noted that they observe problems preparing or cooking soybean were male headed-male managed. While 15 (or ~94%) of them were from *Kilosa* district, only 1 or ~6% was from *Njombe* district. Surprisingly, while 66.7% of them were from soybean growing households, about 33.3% were from non-soybean growing farm households. One thing to learn from here is that some of the sampled households that were non-soybean growing were nonetheless involved in soybean preparation or cooking, probably for household consumption. Most of the farmers (11 out of 15 or ~73%) that indicated that they had problems preparing or cooking soybean blamed it on lack of knowledge on soybean processing. The rest blamed it on lack of frequent processing of soybean, lack of tool, and the lack of desire to go beyond roasting soybean into soybean nuts.

2.13.2: Cash income from sale of soybean processed products

We investigated if the survey farm households earn cash income from the sale of soybean processed products. Of the 69 survey households that responded to this question, only 15 of them (or ~22%) indicated that they earn some cash income from the sale of soybean processed products. The balance (~78%) does not earn any cash income from the sale of soybean processed products. At district level, the corresponding percent value of households that do not earn cash income from the sale of soybean processed products was ~72% for *Kilosa* district and ~91% for *Njombe* district. A slightly higher proportion (not in absolute terms) of female headed-female managed farm households than male headed-male managed farm households (3 out of 12 that responded to the question or 25% vs. 12 out of 57 that responded to the question or ~21%) earn cash income from the sale of soybean processed products. The households that indicated that they earn cash income from the sale of soybean processed products were additionally asked to mention such processed products. The result of their responses is presented in **Table 2.13.2.1**. It shows that six soybean processed products (soy flour, soy *mandazi*, soy beverage, soy chapatti, soy buns, and soy *uji* or porridge) are being made for cash income by few farm households in Tanzania. The challenge for the Tropical Legumes II project and the other projects promoting soybean in Tanzania to increase not only the number of such products but also the number of households that derive some cash income from their sales. It is important to note that all the survey farm households that supplied the information about the soybean processed products in **Table 2.13.2.1** were from *Kilosa* district (and none from *Njombe* district). This must have been due to the influence of the interventions on soybean processing by Sokoine University of Agriculture and being executed over the years at *Msimba* village in *Kilosa* district. Prof. Henry Laswai of the Department of Food Science and Technology of SUA has been leading this initiative.

Table 2.13.2.1: Distribution of soybean processed products from which some survey farm households earn cash income in Tanzania

Soybean processed product	Frequency[$]
Soybean flour	6 (33.3)
Soy *mandazi*	4 (22.2)
Soy beverage	2 (11.1)
Soy chapatti	2 (11.1)
Soy buns	2 (11.1)
Soy *uji* or porridge	2 (11.1)
Effective n	**18 (100.0)**

[$]Values in parenthesis are percent figures

Source: Survey data, 2008

2.13.3: Capacity building on soybean enterprises

Soybean is relatively new in the farming systems of the study area. Besides, it is different from many of the other crops that farmers in the study area were used to. For one thing, soybean requires processing before consumption. Its incorporation into local dishes to improve their food values also requires some skill and knowledge.

In view of the above, we tried to verify if someone from each of the survey farm households has received training on soybean enterprises. For households with someone trained, we verified the organization that offered the training, the year the training was received as well as the household member's assessment of the training (scored on a scale of very relevant to not relevant). The training areas audited included: (i) Seed production technology, methods, or practices; (ii) Basic business management and income generation; (iii) Ways and methods to increase commercial index; (iv) Agricultural marketing; (v) Nutrition and health; and (vi) Soybean value-addition and processing methods. Others were: (vii) Production and productivity increase; (viii) Soybean value chains and the benefits thereof; and (ix) Soybean farmer participatory varietal selection (FPVS).

The result shows that only approximately 13–49% of the farm households that responded to the question had one of its members trained (see **Table 2.13.3.1**). Taken across all the survey farm households, the result shows that only ~5–21% of the survey farm households had a member that was trained on the soybean enterprises. This again underscores the limited access to training to farmers in the study area. All of these explain the low productivity and limited income that characterize soybean enterprises in the study area and other similar environments in sub-Saharan Africa. About eight different organizations featured in the list of the organizations providing the training. In a decreasing order of importance, these organizations were Sokoine University of Agriculture (SUA) (accounting for ~85% of the responses), agricultural extension

officers (~11%), and others (HIMA, village nutrition nurse, TOSCA, local NGO, MTC, and Heifer International) (4%).

Table 2.13.3.1: Distribution of survey farm households where someone has received different soybean enterprise trainings in Tanzania

Soybean enterprise training area	Proportion (%) of households with someone that received the training	
	Of households that responded[$]	Of all the 240 farm households surveyed
Nutrition and health	48.6 (or 51 of 105)	21.25
Production and productivity increase	47.5 (or 48 of 101)	20.00
Soybean value-addition/processing methods	43.1 (or 44 of 102)	18.33
Seed production technology, methods, or practices	41.9 (or 39 of 093)	16.25
Basic business management and income generation	25.6 (or 22 of 086)	9.17
Agricultural marketing	25.0 (or 22 of 088)	9.17
Soybean value chains and the benefits thereof	22.4 (or 19 of 085)	7.92
Soybean FPVS	15.6 (or 12 of 077)	5.00
Ways and methods to increase commercial index	13.3 (or 11of 083)	4.58

[$]Values in parenthesis are figures used to derive the percent figures.

2.14. Household food consumption and utilization

2.14.1: Frequency of household members' consumption of selected food items

This was assessed on per weekly basis. The results were articulated under six available options (daily, more than three times a week, two times a week, once a week, rarely, and never). Among the grain legumes, the selected food items included soybean, common bean, cowpea, groundnut, and pigeon pea. Among the cereals the food items considered included maize, sorghum and millet. Vegetables were taken as a block. The result is presented in **Table 2.14.1.1**. It shows that maize is outstandingly the most commonly consumed food item in the study area and consumed daily by ~93% of the survey farm households. This results also shows that a great majority of the survey households do not consume crops such as millet (according to ~78% of the responses), soybean (~46%), and pigeon pea (~44%). Groundnut is consumed once a week by majority (~47%) of the survey farm households. Most of the households (~54%) consume vegetables on daily basis, followed by ~30% that consume it more than three times a week, and ~14% that consume vegetables two times a week. Although most of the households (~30%) that noted that they consume sorghum indicated that they consume it on daily basis, it is important to note that an equally high proportion of the respondents (~26%) indicated that they never consumed sorghum. Generally, the frequency of household consumption of the grain legumes unlike the cereals is low and must be stepped up given the level of malnutrition, especially among children, in the study area. This requires increased

awareness creation about them and also a conscious promotion of the processing and consumption of grain legumes, especially soybean given its versatile nature and the fact that it could be processed into several products, even using the existing household utensils.

Table 2.14.1.1: Frequency of survey farm households' consumption of selected food items in Tanzania

Food item	Frequency of consumption per week[$]						Total
	Daily	>3 times	2 times	Once	Rarely	Never	effective n
Soybean	25 (22.3)	12 (10.7)	15 (13.4)	8 (07.1)	-	**52 (46.4)**	112 (100.0)
Common bean	12 (06.0)	81 (40.3)	**84 (41.8)**	23 (11.4)	-	1 (00.5)	201 (100.0)
Cowpea	6 (04.4)	31 (23.0)	**45 (33.3)**	40 (29.6)	2 (1.5)	11 (08.1)	135 (100.0)
Groundnut	11 (12.5)	11 (12.5)	17 (19.3)	**41 (46.6)**	-	8 (09.1)	88 (100.0)
Pigeon pea	6 (07.4)	10 (12.3)	17 (21.0)	12 (14.8)	-	**36 (44.4)**	81 (100.0)
Maize	**222 (93.3)**	13 (05.5)	2 (00.8)	1 (00.4)	-	-	238 (100.0)
Sorghum	**31 (30.1)**	9 (08.7)	18 (17.5)	16 (15.5)	2 (1.9)	**27 (26.2)**	103 (100.0)
Millet	5 (06.5)	4 (05.2)	3 (03.9)	5 (06.5)	-	**60 (77.9)**	77 (100.0)
Vegetables	**82 (54.3)**	45 (29.8)	21 (13.9)	3 (02.0)	-	-	151 (100.0)

[$]Values in parenthesis are percent figures.

Source: Survey data, 2008

2.14.2: Sources of selected food items consumed by the households

We also evaluated how the selected food items in **Table 2.14.1.1** above are sourced. The available options included: own produce; assistance; purchase; own farm and purchase; own farm and assistance; assistance and purchase; and own farm, assistance, and purchase. The result is presented in **Table 2.14.2.1**. It shows that in most cases, own production was the most important sources of the different food items consumed by the household. However, purchases were also critically important for food items such groundnut, cowpea and common bean in that order. It is clear from the results that assistance with food item was not an important source of the food consumed by the survey farm households.

Table 2.14.2.1: Sources of selected food items consumed by survey farm households in Tanzania

Food item	Source of food item[$]							Total effective n
	Own produce	Assistance	Purchase	Own farm + purchase	Own farm + assistance	Assistance + purchase	Own farm + assistance + purchase	
Soybean	**56 (91.8)**	-	4 (06.6)	1 (01.6)	-	-	-	61 (100.0)
Common bean	**115 (57.8)**	1 (0.5)	**58 (29.1)**	19 (09.5)	1 (0.5)	-	5 (02.5)	199 (100.0)
Cowpea	**59 (47.6)**	2 (1.6)	**39 (31.5)**	16 (12.9)	-	3 (2.4)	5 (4.0)	124 (100.0)
Groundnut	15 (19.0)	3 (3.8)	**55 (69.6)**	4 (5.1)	-	2 (2.5)	-	79 (100.0)
Pigeon pea	**28 (63.6)**	2 (4.5)	7 (15.9)	6 (13.6)	-	-	1 (2.3)	44 (100.0)
Maize	**210 (90.5)**	-	-	19 (8.2)	-	-	3 (1.3)	232 (100.0)
Sorghum	**52 (68.4)**	2 (2.6)	13 (17.1)	8 (10.5)	-	-	1 (1.3)	76 (100.0)
Millet	**15 (88.2)**	-	2 (11.8)	-	-	-	-	17 (100.0)
Vegetables	**98 (65.8)**	-	17 (11.4)	15 (10.1)	-	-	19 (12.8)	149 (100.0)

[$]Values in parenthesis are percent figures.

Source: Survey data, 2008

2.14.3: Adequacy of selected food items consumed by the households

We also evaluated whether or not the survey farm households considered the quantity of the different food items they consumed as adequate. The result is presented in Table **2.14.3.1**. It shows that there was no food item (including the staple crops such as maize) that all the survey farm households felt they consumed adequate quantity of. The proportion of the survey farm households that indicated that they consumed adequate quantities of different types of food items ranged from ~44% (for groundnut), through ~54% (cowpea), ~57% (common bean), ~61% (soybean), ~62% (sorghum), ~74% (vegetables), 75% (pigeon pea), ~79% (maize), to ~82 for millet. This is another clear indicator that many farm households are still food insecure, especially given that all available sources for these different food items were taken into consideration in the food adequate or inadequacy assessment.

Table 1.14.3.1: Distribution of survey farm households in terms of whether or not consider the quantity of different food items they consumed as adequate

Food item	Household evaluation of the quantity of different food items they consume[$]		Effective n
	Adequate	Inadequate	
Maize	183 (78.5)	50 (21.5)	233
Common bean	113 (57.4)	84 (42.6)	197
Vegetables	109 (74.1)	38 (25.9)	147
Cowpea	66 (54.1)	56 (45.9)	122
Groundnut	34 (43.6)	44 (56.4)	78
Sorghum	46 (62.2)	28 (37.8)	74
Soybean	37 (60.7)	24 (39.3)	61
Pigeon pea	33 (75.0)	11 (25.0)	44
Millet	14 (82.4)	3 (17.6)	17

[$]Values in parenthesis are percent figures

Source: Survey data, 2008

2.15. Soybean utilization and perceptions on utilization of soybeans

In this section, we sought to know a little bit more about the survey households' soybean utilization and perceptions related to the utilization of soybeans. The results of the responses obtained from an investigation of whether or not survey households use soybean as food indicate that of the 88 households that responded, about 59 (or 67%) noted that they use soybean as food. A higher proportion of the households that use soybean were from *Kilosa* than from Njombe (~80% compared with ~44% for *Njombe*). However, the result of an analysis based on the headship and management of survey farm households indicate that approximately equal proportion (~67% in each case) of male headed-male managed households and female headed-female managed household use soybean as food. The characteristics of the survey farm households as related to soybean utilization are presented in **Table 2.15.1**. Among others, it shows that survey households, especially those from Njombe district infrequently purchase soybean for family use. The decision about purchase of soybean for family use was made by the head of the household in about 50% of the cases, by the spouse in about 37.5% of the cases, and jointly by all family members in 12.5% of the cases. However, it is important to note that only about 8 survey households (hence negligible sub-sample size) responded to related question.

Table 2.15.1: Characteristics of survey farm households as related to soybean utilization

Parameter	District[$]			Across districts
	Kilosa	*Njombe*	*Mvomero*	
Price at which buy soybeans for use by the family (Tshs./kg)[#]	1033.3±416.3 (3)	450±70.7 (2)	-	800±435.9 (5)
No of times in 3 months household buy soybean for use	10.3±13.3 (4)	01.0±00.0 (3)	-	6.3±10.6 (7)
Distance (km) to nearest market	36.8±62.9 (22)	10.4±16.9 (8)	-	29.8±55.5 (30)
Distance (km) to main market	69.4±69.3 (17)	19±20.0 (3)	-	55±56.0 (20)

[$]Values in parenthesis are the number of cases or respondents; [#]US$1 = Tshs. 1300

Note that sometimes the main market can be further than the nearest market from the household.

Source: Survey data, 2008

2.16. Household income from processed soybean products

Most of the survey farm households were not yet earning money from processed soybean products. Only about 22% of them were (see **Table 2.16.1**). The number of processed products is also very limited (see **Table 2.16.2a** and **Table 2.16.2b**)

Table 2.16.1: Household that earn cash income from the sale of soybean processed products

Whether or not earn income from processed soybean products?	Frequency	%
Yes	15	21.7
No	54	78.3
Effective n	**69**	**100.0**

Table 2.16.2a: Number of processed products sold by farmers per household in Tanzania

	n	Min.	Max.	Mean	Std. Deviation
Number of processed products	206	1.00	4.00	1.2961	.66603

Table 2.16.2b: Processed products sold by farmers in Tanzania

Processed products sold	Frequency	%
Flour	6	24.0
Grains	6	24.0
Mandazi	4	16.0
Beverage	2	8.0
Chapati	2	8.0
Buns	2	8.0
Porridge	1	4.0
Uji	1	4.0
Primary products	1	4.0
Total	**25**	**100.0**

2.17. Household and community-level seed systems

Table 96i, Data may not have been keyed in

2.18. Sale of crop seeds

Analysis not completed.

2.19. Capacity strengthening

File related to capacity strengthening is (TLIITZ-Q97_Capacity strengthening

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