

1 **FARMERS' KNOWLEDGE AND CULTIVATION OF COWPEA (*Vigna***
2 ***unguiculata* (L.) Verdc.) IN THREE**
3 **COMMUNITIES OF BOLGATANGA MUNICIPALITY, UPPER EAST REGION,**
4 **GHANA**

7 **ABSTRACT**

8 A study was conducted in ~~three communities of~~ Kumbosco, Zuarungu and
9 Yarigabisi in the Bolgatanga Municipality of the Upper East Region of Ghana.
10 The research sought to examine the extent to which farmers' knowledge,
11 perception and management practices influenced the cultivation of cowpea. ~~A~~
12 ~~survey involving the use of~~ both open-ended and close-ended questionnaires
13 ~~and also~~ interviews were administered. A total sample size of 60 was used for
14 the study, 20 from each district. Data gathered was analyzed using the Statistical
15 package for Social Scientist (SPSS version 16.0). Frequencies, percentages, bar
16 charts and ~~par~~ charts were used to analyze the various variables. Data collected
17 included; Sex distribution, number of acreages cultivated, household sizes,
18 gender issues, utilization and constraints in production of the crop. The finding
19 from the study showed that farmers in these three communities cultivated
20 cowpea but intercropped with millet. The research revealed again that cowpea
21 was not cultivated by the people as a main crop (91.67%). From the study, males
22 formed the majority (56.67%) of people involved in cultivation of cowpea while
23 females formed the minority (43.33%). Active working age of people who

24 engaged in cowpea production was between 30-39 years. Majority (56.67%) in
 25 these communities were Christians, even though cowpea is a traditional crop.
 26 Most of the farmers in the three communities used the local white variety
 27 (76.67%) for cultivation as compared to the Boufor, Asontem and Red Nkwanta
 28 varieties. majority (68.33%) of the farmers in these communities who cultivated
 29 cowpea were married. The results revealed that smaller families (1-5, 38.33%)
 30 were more involved in cowpea production either for sale or for consumption. It
 31 was revealed that the number of acres most farmers cultivated was one acre
 32 ~~land~~ or less (63.6%) due to non availability of land in these communities, but
 33 6.06% cultivated 7 acres of land; 88.33% of the farmers inherited the land. For
 34 non-cowpea producing farmers, 29.63% of them attributed their failure to lack of
 35 farming land, 25.93% said they could not control the pests and livestock that
 36 destroyed cowpea when cultivated, due to high cost of synthetic pesticides, while
 37 3.70% attributed that to unavailability of ready market for cowpea. 11.11% of the
 38 respondents indicated lack of finance to cultivate cowpea as well as low yields of
 39 cowpea. Some of the challenges farmers faced included lack of labour to
 40 cultivate the crop in a proper manner, difficulties to store the produce (51.72%)
 41 due to pests and diseases and limited access to market. One of the basic aims of
 42 agricultural extension is about rural development through the introduction of
 43 appropriate interventions and strategies to farmers. Results from this research
 44 could be useful to the Ministry of Agriculture, the District Assemblies and Non-
 45 Governmental Organizations (NGOs) in their poverty reduction strategies. This
 46 study would therefore provide an important first step at improving the crop in

Ghana, particularly the North, and also provide a foundation to enhance their potential use in future, contributing to food security.

Keywords: Cowpea, chemical, cultivation, diseases, farmers, fertilizer, pests, Questionnaire, storage, survey

INTRODUCTION

Cowpea is a warm-season, annual, herbaceous legume, scientifically referred to as *Vigna unguiculata*. It is one of the most important food legume crops in the semi-arid tropics covering Asia, Africa and Southern Europe (Waters, 1987; Adu-Dapaah *et al.*, 2003; Rogers, 2003).

Cowpea (*Vigna unguiculata*), an annual legume, is also commonly referred to as black eye pea, Crowder pea or Southern pea. Cowpea originated in Africa and is widely grown in Africa, Latin America and Asia. It is used as a grain crop for animals, fodder, or as a vegetable (Adu-Dapaah *et al.*, 2003).

Total worldwide production of cowpea is estimated at 3.3 million tons of dry grain of which 60% is produced in Africa (CGIAR, 2001). About 12.5 million hectares are planted to cowpea in West Africa, making it the region with the largest production and consumption of cowpea in the world (CGIAR, 2001).

Cowpea is now a broadly adapted and highly variable crop, cultivated around the world primarily for its seed, but also as a vegetable, a cover crop and for fodder (Rogers, 2003).

69 In Ghana, cowpea is mostly grown in the savanna, coastal and transitional
70 zones. The vegetative parts and green pod are edible, but the dry grain is either
71 boiled and eaten or milled in several dish preparations, for example, porridge and
72 beans cake as well as processed into snacks (FAO, 1994).

73 Some of the popular varieties of cowpea grown in Ghana include Boufor, Local
74 white, Asontem, Red Nkwanta and New Era. The seed coat can be white, red,
75 cream, black or brown (Addo-Quaye, 1993).

76 Cowpea production is an important agriculture venture because, the crop is
77 consumed worldwide. Cowpea is mainly cultivated in the Northern, Upper East
78 and Upper West regions of Ghana, providing many uses (include domestic,
79 economic and environmental) to its inhabitants. In these regions, the rains fall
80 between May and October with an average annual rainfall between 900 and
81 1100mm (Singh, 1999; PEDUNE project, 2000). The cowpea season is from
82 April to July and from July to October. Cowpea is therefore the first crop to be
83 harvested in these parts of the country and as a result, bridges the 'hunger gap'
84 between two rainy seasons (PEDUNE project, 2000).

85 The crop found to be drought-tolerant crop, meaning it adapts to the drier regions
86 of the tropics, where other food legumes do not perform well. It is recommended
87 as a protein supplement for children, pregnant and lactating mothers as a way of
88 minimizing malnutrition in the rural and urban areas in Ghana (Adu-Dapaah *et*
89 *al.*, 2003). Cowpea is also utilized as cover crop for improving soil fertility.
90 Cowpea also provides fodder for livestock, and as a legume, it fixes nitrogen
91 efficiently up to 60-70 Kg N/ha for the succeeding crop since it provides a high

92 proportion of its own N requirement (Adu-Dapaah *et al.*, 2003). Cowpea
 93 additionally plays an important role by providing cash for farmers. It is shade
 94 tolerant and therefore, compatible as an intercrop with maize, and millet. This
 95 makes cowpea an important component of traditional intercropping system,
 96 especially in the complex and subsistence farming system of the dry Savanna in
 97 sub – Saharan Africa (Addo-Quaye, 1993).

98 But it is inconceivable that farmers within this study area remain poor when the
 99 potential to make a decent living could be found in the cultivation of cowpea; ~~The~~
 100 ~~Bolgatanga municipality, being one of the poorest districts in the country.~~

101 Despite the agronomic and economic importance of cowpea, ~~including its~~
 102 atmospheric nitrogen fixation ability, nutritional value and a good income
 103 placement capacity for farmers, farmers in the Bolgatanga municipality seem not
 104 to produce cowpea in larger quantities. ~~Ghana as a result~~ been experiencing
 105 seasonal shortages of the grain, especially in the North. Production and
 106 utilization have gone down. The crop has, to a large extent, been neglected by
 107 research. This study intended, therefore to present useful findings on how
 108 cowpea could be explored as an alternative protein source, income generating
 109 activity to the famers and also help the farmers within the municipality to
 110 inculcate the need to cultivate cowpea in large quantities.

111 The research, also sought to assess how the farmer's knowledge affected
 112 cowpea production in the three communities of the Bolgatanga municipality of the
 113 Upper East Region.

114 The aim, again were to obtain general information about farmers' management
115 practices of the cowpea crop; assess the constraints and other factors that
116 influence the production of the crop and to assess the extent to which the crop is
117 being utilized; to find out the extent to which farmers knowledge, perception and
118 management practices influenced the cultivation of cowpea. This study would
119 therefore provide an important first step at improving the crop in Ghana,
120 particularly the North, and also provide a foundation to enhance their potential
121 use in future, contributing to food security.▲

122

123 **MATERIALS AND METHODS**

124 The study was conducted in the three major Districts▲ of Kumbosco▲
125 Zuarungu and Yariigabisi, all in Bolgatanga Municipality of the Upper East Region
126 of Ghana.

127 The Snowball technique was used in selecting the respondents, considering a
128 sampling frame for the population because of the dispersed nature of sites.

129 A total sample size of 60 was used for the study.▲20 each from each district.

130

131 **Data Collection Methods**

132 The population from which data was collected included Ministry of Food and
133 Agriculture (MOFA), NGOs and farmers. These constituted the source of data for
134 the research. The following tools were used to gather data:▲ interviews, personal
135 observation (Nichols, 1991; Grady, 1998), focused group discussions (Twumasi,

2001), documentary review of manuals of the Ministry of Food and Agriculture, and the use of questionnaires.

Each method was used based on its relative merit over the others in relation to the situation at hand, type and nature of data to be collected.

Data gathered was analyzed using the Statistical package for Social Scientist (SPSS version 16.0). Frequencies, percentages, bar charts, par charts were used to analyzed the various variables.

RESULTS AND DISCUSSION

Sex distribution of farmers

Table 1: Sex distribution of Respondents

Gender	Number of responses	Percentage (%)
Male	34	56.67
Female	26	43.33
Total	60	100.00

Table 1 shows that out of the total number of farmers under the study, 56.67% of them were males whilst 43.33% were females. This is an indication of the fact that women were equally engaged in agriculture in these communities. Although they assisted on family farms, they were involved in the production of crops such as cowpea, groundnut, Bambara groundnut and soybeans. According to the

extension agents, women were increasingly involved in cowpea production due to the lower costs of pest-management. Women previously were often reluctant to cultivate cowpea due to the high cost of synthetic pesticides, (Patel, 1995; Nederlot *et al.*, 2004).

Age distribution of farmers

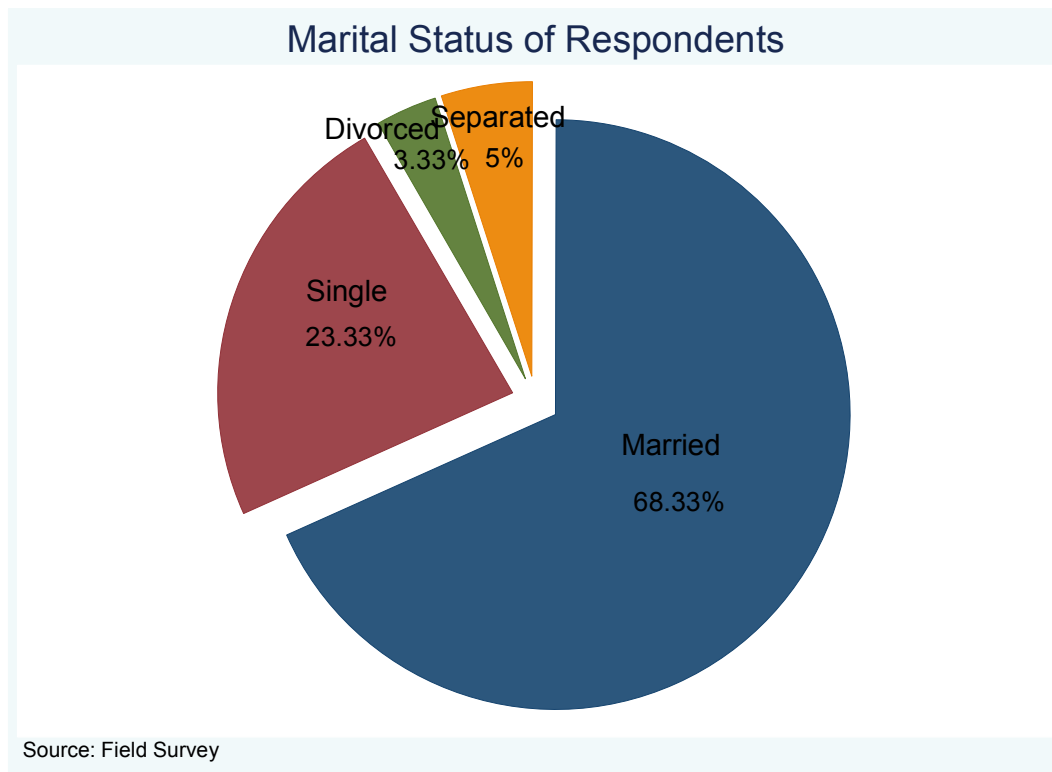
Table 2: Age groups of Respondents

Age Group	Number of Responses	Percentage
20 – 29	14	23.33
30 – 39	21	35.00
40 – 49	8	13.33
50 and Above	17	28.33
Total	60	100.00

From the Table 2, 35.00% of the respondents were between the age groups of thirty and thirty-nine years of age who could be categorized as the active working age. On the other hand, 28.33% of the respondents were above the age of fifty years. About 23.33% of the farmers were between the ages of 20-29 years and 13.33% between 40-49 years. This result shows that the active working age of people who engaged in cowpea production were between 30-39 years. This indicates that both young and old are interested in the cultivation of cowpea in these communities.

170 Marital status of farmers

171



172

173 Figure 1: Marital Status of Respondents

174 From Figure 1, 68.33% of the farmers are married, 23.33% are single, 5% are
 175 separated and 3.33% are divorced. This shows that majority of the farmers in
 176 these communities who cultivated cowpea was married. It indicates that married
 177 people were interested in cowpea production due to its numerous importances to
 178 the family. Many dishes are prepared from cowpea which can sustain the family.
 179 Due to the time, labour and energy involved in cowpea production, unmarried
 180 people did not have interest in cultivation of cowpea.

181 Household size of farmers

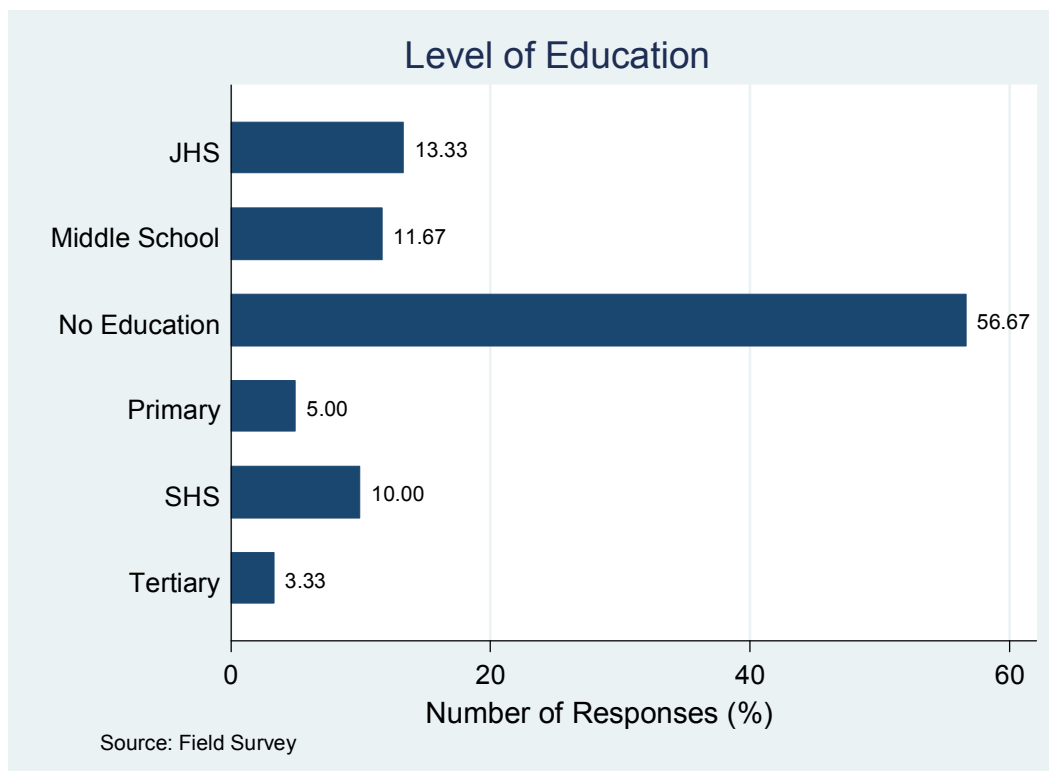
182 Table 3: Household Size

Household size	Number of Responses	Percentage (%)
1 – 5	23	38.33
6 – 9	15	25.00
10 – 14	9	15.00
15 and Above	13	21.67
Total	60	100.00

183

184 From the Table, 38.33% of the respondents indicated that they had a household
185 size between 1-5, 25.0% of farmers were responsible for feeding between 6-9
186 house size, 21.67 had a household size between 15 and above and 15.00%
187 between 10-14. The results revealed that smaller families were more involved in
188 cowpea production either for sale or for consumption. The larger families may
189 engage in commercial crop production because of its economic importance.
190 Food which is produced seasonally like cowpea must be taken care of properly
191 because they are “savior” in most families, especially in the West Africa sub-
192 region (Bressani, *et al.*, 1985; Akin, 1990).

193



194

195 Figure 2: Level of Education

196 Farmers' level of education

197 Figure 2 shows that majority of the farmers had no formal education as
 198 evidenced by 56.67% of the respondents. Whereas 13.33% and 10.0% of the
 199 respondents had respectively attained junior and senior high school education,
 200 11.67% and 3.33% were middle school and tertiary education graduates. Only
 201 5.0% of the farmers represented in the study disclosed that they had attained
 202 primary education as at the time of the study.

203 This indicates that, cowpea plays a major traditional role in the communities.
 204 Even though majority of the farmers had no formal education, they were engaged
 205 in cowpea cultivation. FIDA, 2000 stated that local farmer's believed that cowpea

206 Cultivars have beneficial effect on soil fertility, weed reduction, soil cover and
207 impact on organic matter (ODA, 1998: Rogers, 2003).

208 Religion of farmers

209 Table 4: Religious Affiliation

Religion	Number of Responses	Percentage (%)
Christianity	34	56.67
Islam	3	5.00
Traditional worship	23	38.33
Total	60	100.00

210

211 From Table 4, 56.67% of them indicated they were Christians, 38.33% were
212 traditional worshippers while 5.0% of the respondents were affiliated to the
213 Islamic religion. The results indicated that a large number of farmers in these
214 communities were Christians, even though cowpea is a traditional crop. This
215 shows that most traditional farmers were now moving from traditional worship to
216 Christianity. Religion does not have any effect on cowpea production in these
217 communities.

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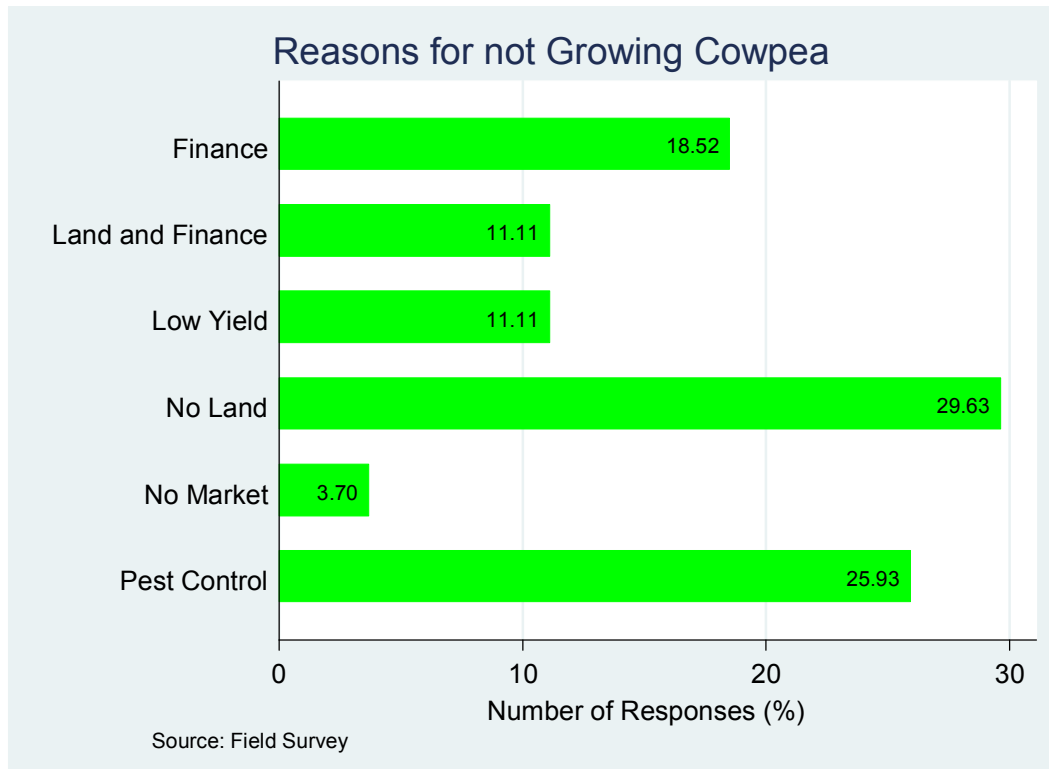
223 Table 5: Gender and cowpea cultivation

Cultivation of cowpea			
Gender	NO	YES	Total
	17	17	34
Male	50.00	50.00	100.00
	62.96	51.52	56.67
	10	16	26
Female	38.46	61.54	100.00
	37.04	48.48	43.33
	27	33	60
Total	45.00	55.00	100.00
	100.00	100.00	100.00

224

225 The first number in each cell represents the frequency of number of responses;
 226 the second number is the row percentage while the third number represents the
 227 column percentage.

228 An equal number of males (50.0%) indicated they cultivated cowpea while
 229 61.54% of the female farmers under the study also stated that they cultivated
 230 cowpea. Women are more involved in cowpea cultivation because of its economic
 231 benefits to the family. Moreover, women do not intercrop cowpea with other
 232 crops, unlike the men who intercrop cowpea with millet and other crops.



233

234 Figure 3: Reasons for not Growing Cowpea

235 For the respondents who indicated that they were not cultivating cowpea, 29.63%
 236 of them attributed their failure to lack of farming land; 25.93% said they could not
 237 control the pests and livestock that destroy cowpea when cultivated while 3.70%
 238 attributed that to no unavailability of ready market for cowpea.

239 Whilst 11.11% of the respondents indicated that land and lack of finance to
 240 cultivate cowpea as well as low yield of cowpea, 18.52% of the farmers
 241 emphasized that lack of funds was the main factor that hindered the cultivation of
 242 cowpea. Other factors are that farmers were often reluctant to cultivate cowpea
 243 due to the high costs of synthetic pesticides. The study revealed that land is the
 244 major reason for not cultivating cowpea in large quantity.

245 Table 6: Farm Size (Acres)

Number of Acres	Number of Responses	Percentage (%)
One Acre	21	63.64
2 – 3	10	30.30
7 and Above	2	6.06
Total	33	100.00

246

247 It was discovered that 63.64% of the farmers cultivated cowpea on a one acre
 248 land or less whilst 30.30% used up to three (3) acres only for cowpea production.
 249 Meanwhile, only 6.06% of the farmers under the study used more than seven (7)
 250 acres for cowpea cultivation. The result revealed that majority of farmers
 251 cultivated cowpea on one acre land due to non availability of land in these
 252 communities.

253

254 Table 7: Challenges in growing cowpea

Challenges in growing cowpea	Number of Responses	Percentage (%)
NO	2	3.33
YES	55	91.67
Missing	3	5.00
Total	60	100

255

As in every aspect of life, farmers in cowpea production also face challenges before and during the cultivation and after harvesting processes. Apart from the 5.0% non-response rate for this item on the questionnaire, 91.67% of the respondents affirmed that they did face challenges in the process of cowpea production while 3.33% indicated otherwise. Some of the challenges farmers faced included lack of labour to cultivate it in a proper manner, difficulties to store the produce due to pest, pest and diseases during cultivation and limited access to market.

Table 8: Challenges of cowpea production

	RANKING (%)			
	1	2	3	4
Storage	-	55.00	8.33	-
Pest	90.00	1.67	-	-
Disease	1.67	3.33	55.00	3.33
Marketing	-	3.33	-	60.00

In an attempt to find out the challenges faced by farmers in this sector, the items in the above table were ranked by respondents.

It was discovered that the destruction of cowpea crops by pests was the main concern by farmers as indicated by 90.0% of the respondents. The second most challenging problem as evidenced from the study was storage which represented

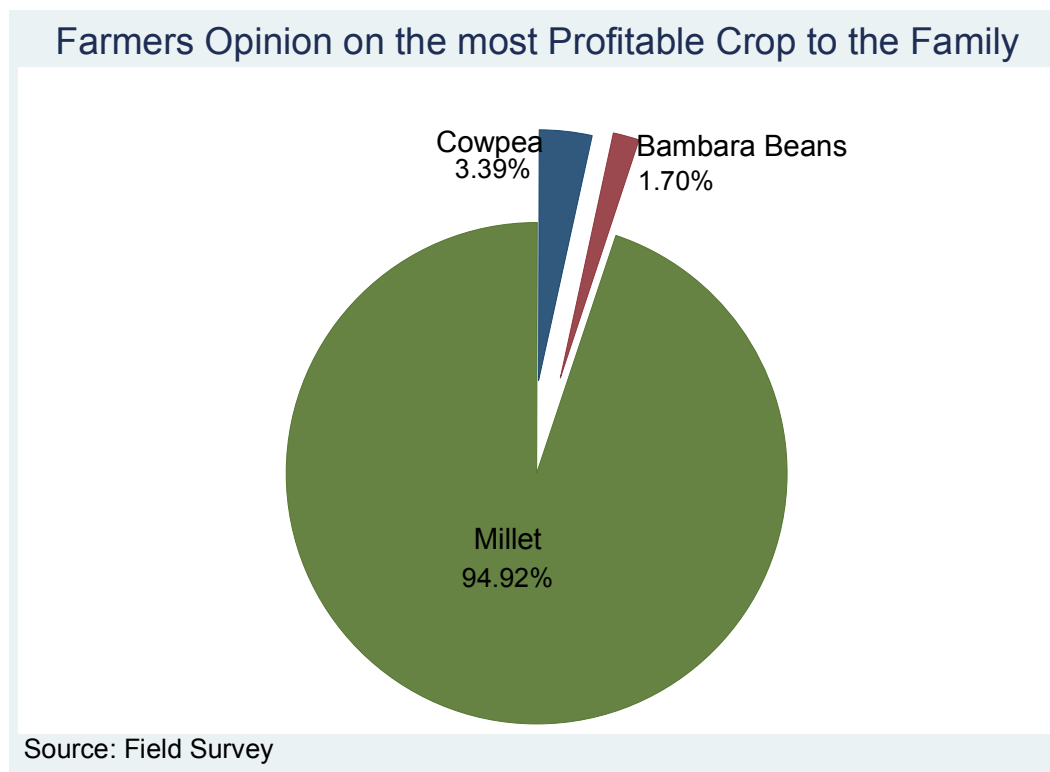
55.00% whilst disease was ranked third as a challenge to cowpea production indicated by 55.00%. The last and least ranked item was the problem of marketing the product. The focus of cowpea research in West Africa over the preceding fifteen to twenty years was mainly to develop cowpea cultivars that are resistant to pest and diseases within a sustainable farming system, (Hammond, 2002).

Table 9: Most profitable crop as ranked by respondents

RANKING (%)					
	1	2	3	4	5
Rice	1.67	18.33	13.33	23.33	10.00
Bambara Beans	-	5.00	5.00	13.33	41.67
Groundnut	-	11.67	28.33	20.00	5.00
Millet	95.00	1.67	1.67	-	-
Maize	3.33	30.00	16.67	6.67	8.33

Results from Table 9 shows that 95.0% of them ranked millet as the most profitable crop to them. Maize was not left out as 30.0% of the respondents strongly supported the crop as the second most profitable crop to them. 28.33% also ranked groundnut as their number third most profitable crop whilst 23.33% of the respondent ranked rice as fourth and Bambara groundnut as fifth crop.

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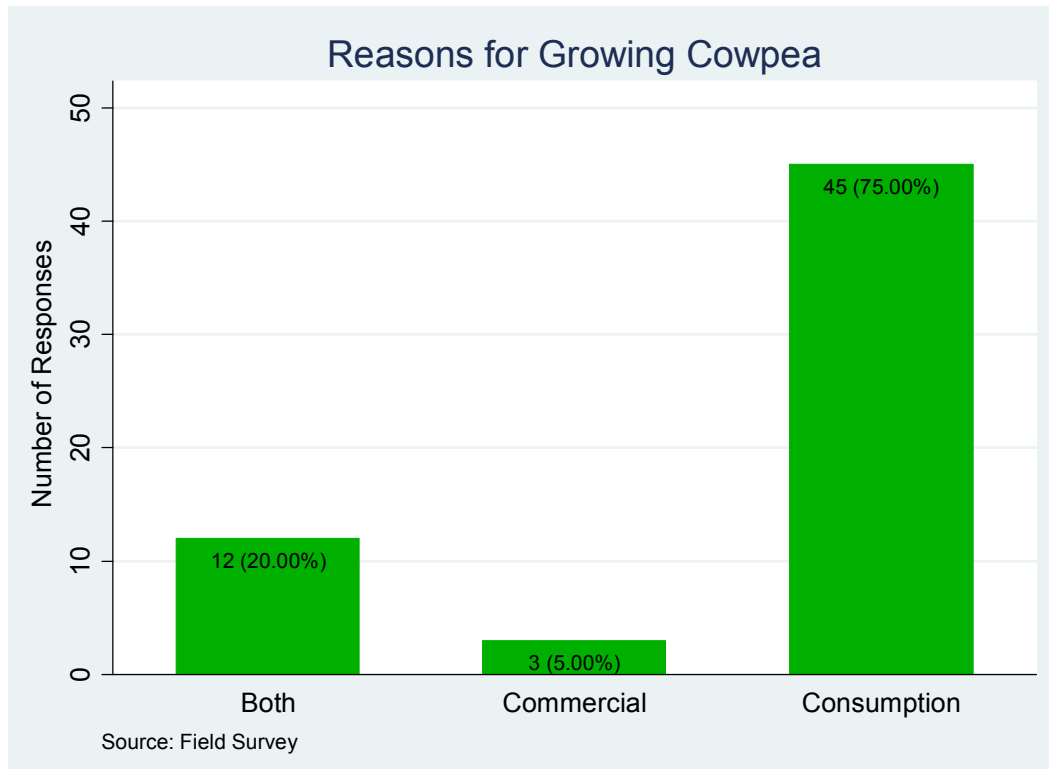
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289 **Figure 4: Farmer's opinion on the most important crop to the family**

290 Based on the farmers' opinion on the importance of the crops they grow, 94.92%
 291 of them concomitantly ranked millet as the first most important crop to the family.
 292 This could be due to wide variety of reasons to include the main crop that gives
 293 the family a year long food among others. Millet is the principal crop in the Upper
 294 East Region. It is the food staple crop and a traditional crop as well. Millet ranked
 295 as the most profitable because farmers can depend on millet for the whole dry
 296 season either by feeding or selling some to solve their problems.

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299

300 Figure 5: Reasons for growing Cowpea

301 Every farmer produces certain crops for reasons known to them. The cultivation
 302 of cowpea is not an exception as 75.0% of the farmers under the study disclosed
 303 that the production of cowpea was mainly for household consumption while 5.0%
 304 cultivated cowpea for commercial purposes. However, 20.0% of the farmers
 305 included in the study sample produced cowpea for both household consumption
 306 and for commercial purposes. The study revealed that, ~~because of lack of land,~~
 307 ~~farmers did not produce~~ cowpea in large quantities for commercial purposes,
 308 ~~they~~ they only produced the crop on subsistence basis to feed their families.

309

310

311 Table 10: Varieties of Cowpea Grown

Variety	Number of Responses	Percentage (%)
Boufor	3	5.00
Local White	46	76.67
Asontem	1	1.67
Red Nkwanta	4	6.67
Missing	6	10.00
Total	60	100.00

312

313 Among the many varieties of cowpea in the market, the Local White won the
 314 hearts and interest of the farmers in the community as evidenced by 76.67% of
 315 the respondents. The Red Nkwanta was also well patronized as indicated by
 316 6.67% of the respondents. Meanwhile, 10.0% of the respondents failed to
 317 provide an answer to this item. This shows that, farmers in these communities
 318 were not adopting the new varieties of cowpea. It appeared that most improved
 319 cowpea varieties were yet to be adopted by farmers, (IITA, 1997; Kamara, *et al.*,
 320 2006).

321 Farmers reported that prices for local varieties were much higher than the
 322 improved varieties.

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327 Table 11: The use of fertilizer by farmers

Use of Fertilizer	Number of Responses	Percentage (%)
NO	29	48.33
YES	29	48.33
Missing	2	3.33
Total	60	100.00

328

329 According to the study, an equal number (48.33%) of respondents indicated
 330 ~~whether or not they used fertilizer in~~ cowpea production whereas 3.33% of the
 331 individuals failed to respond to whether or not they use fertilizer in the cultivation
 332 of cowpea. 48.33% respondents indicated that they use fertilizer while 48.33% of
 333 them ~~do~~ not use fertilizer in the cultivation of cowpea. Fertilizer is not commonly
 334 used on cowpea. Farmers generally did not think it was needed, because of
 335 cowpea's ability to fix atmospheric nitrogen (Rogers, 2003). Some farmers said
 336 they did not use fertilize because they were financially handicap and could not
 337 afford fertilize due to the high cost.

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344 Table 12: Type of Fertilizer Use

Type of fertilizer	Number of responses	Percentage (%)
Phosphate	4	13.79
Potassium	1	3.45
Organic Manure	11	37.93
NPK	13	44.83
Total	29	100.00

345 Out of the twenty-nine (29) respondents who indicated that they used fertilizer in
 346 the cultivation of cowpea, 44.83% of them preferred the NPK fertilizer; 37.93%
 347 used ~~the~~ organic manure while 13.79% used the phosphate fertilizer. A few
 348 respondents (3.45%) used potassium instead. This shows that farmers in these
 349 communities were well adapted to NKP fertilizer, even though some used organic
 350 manure. NPK is the most common fertilizer used by farmers as it ensured
 351 maximum yield.

352 Table 13: Cultivation of cowpea as a main crop

Cultivating cowpea as a main crop	Number of Responses	Percentage (%)
NO	55	91.67
YES	5	8.33
Total	60	100.00

It was discovered that all except 8.33% of the farmers cultivated cowpea as a main crop, while 91.67% of the respondents did not cultivate cowpea as their main crop because it was not their stable crop and could not sustain the family for a longer period. Farmers indicated that they only cultivated the crop as a supplement.

Table 14: Relationship between the purpose and mode of cultivation of cowpea

Reasons for growing cowpea	Cultivating cowpea as a main crop		
	NO <i>n</i> (%)	YES <i>n</i> (%)	Total <i>n</i> (%)
Commercial Use	0 (0.00)	3 (5.00)	3 (5.00)
Household Use	45 (75.00)	0 (0.00)	45 (75.00)
Both Purposes	10 (16.67)	2 (3.33)	12 (20.00)
Total	55 (91.67)	5 (8.33)	60 (100.00)

Pearson Chi2 (2) = 38.18 p-value = 0.000

The above table looks at the relationship between the purpose of cultivation of cowpea and the mode of producing the crop. The number in parenthesis represents the cell percentage. For example, out of the twelve (12) respondents who indicated that they produced cowpea for both commercial and household use, 3.33% stated that they cultivated cowpea as a main crop whereas 16.67% stated otherwise.

Below the table is the Pearson chi-square statistic which attempts to test the hypothesis of independence of the two items. At the 5% significance level, there

is enough evidence to indicate that the farmer's reason for growing cowpea influenced them to either cultivate cowpea as a main crop or not.

Table 15: Cross tabulation of relative yield of cowpea and mode of cultivation

Yield of cowpea relative to other legumes	Cultivating cowpea as a main crop		Total <i>n</i> (%)
	NO <i>n</i> (%)	YES <i>n</i> (%)	
NO	22 (38.60)	0 (0.00)	22 (38.60)
YES	30 (52.63)	5 (8.77)	35 (61.40)
Total	52 (91.23)	5 (8.77)	57 (100.00)

Pearson chi2 (1) = 3.45 p-value = 0.063

In an attempt to establish whether or not the yield of cowpea, relative to other legumes could influence the farmer to produce cowpea in large quantities leading to possibly growing cowpea as a main crop, the above table proved that the two items were independent at the 5% significance level. This suggests that the yield of cowpea relative to other legumes did not have any relationship to the mode of cowpea production.

382 Table 16: Access to land for farming

Access to land for farming	Number of Responses	Percentage (%)
Inheritance	53	88.33
Land Lease	4	6.67
Purchase	1	1.67
Missing	2	3.33
Total	60	100.00

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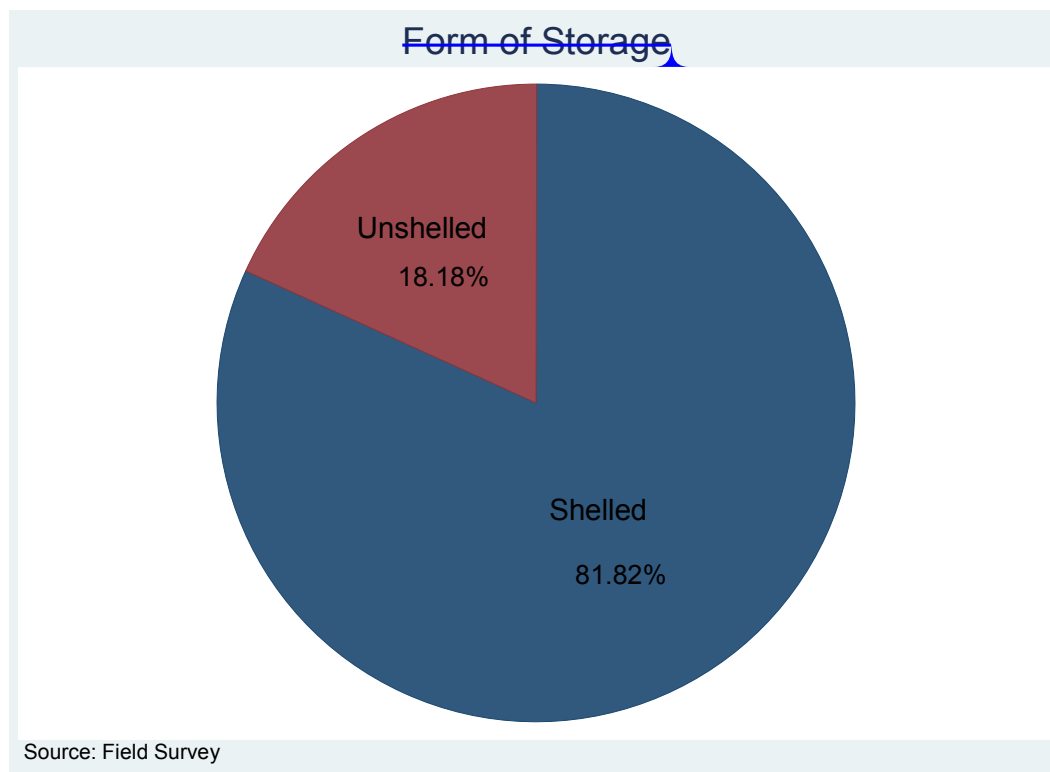
384 The study revealed that 88.33% of the farmers inherited the land they were
 385 currently using for cowpea production whereas 6.67% of the respondents
 386 acquiring the land by lease. However, 1.67% of the respondents purchased their
 387 own land for crop production. The results also show that most farmers in these
 388 communities inherited land for farming which continued from generation to
 389 generation. The indigenous people in these communities did not purchase land
 390 for farming.

391 Table 17: Yield of cowpea per acre (in bags)

	Mean	N	Sd	Min	Max
Yield per Acre	2.73	37	4.77	1	20

392 Out of the sample size of sixty (60), thirty-seven (37) of them responded to the
 393 questionnaire. The mean yield per acre according to the thirty-seven respondents
 394 was approximately three (3) bags with a minimum of one bag to a maximum of
 395 twenty bags.

396



397

398 **Figure 6: Forms of Storage**

399 Cowpea is either stored with or without the shell. From the study, 81.82% of the
 400 respondents confirmed that they store cowpea by removing the shells whilst
 401 18.18% preferred storing cowpea unshelled. Farmers store cowpea by removing
 402 the shells to ensure low moisture content and to make storage very easy.

403

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407 Table 18: Problems with forms of storage

Problems with Forms of Storing	Number of Responses	Percentage (%)
Cowpea		
NO	28	48.28
YES	30	51.72
Total	58	100.00

408

409 Cowpea, either stored shelled or unshelled, still gave farmers reasons to worry
 410 as 51.72% of the farmers confirmed they had problems with the mode of storing
 411 cowpea after production. The main problem in storing legumes such as cowpea
 412 was susceptibility to insects attack. There are over ten (10) pest species of
 413 grain legumes in Africa which destroy grain from the field and in storage and
 414 among these are weevils, (Fellow, 1980; Onyebe, 2006).

415

416 Table 19: Use of chemicals in storage

Use of chemicals in storage	Number of Responses	Percentage (%)
NO	23	40.35
YES	34	59.65
Total	57	100.00

417

Table 19 shows that, 59.65% of the respondents disclosed that they used chemicals in storing cowpea to preserve it for future use while 48.28% of them indicated otherwise. Farmers used oil, ashes and neem leaves to preserve cowpea with weevil infestation. According to Masur, (1994), palm oil and cotton seed oil can stop insect's infestation when in every kilogram of beans.

Table 20: Length of Storage

Length of Storage	Number of Responses	Percentage (%)
Less than 6 months	5	8.33
Six months and more	55	91.67
Total	60	100.00

With farmers who store their crops, 91.67% of them revealed that they could keep cowpea in the store for more than six months while 8.33% could only preserve the crop up to a maximum of six months. Most farmers attributed to the fact that they stored cowpea for more than six month because they applied chemicals such as oil, ashes and neem leaves to the grain before storage.

Table 21: Uses of Cowpea

Use of the Crop	Number of Responses	Percentage (%)
Funeral	49	83.05
Food	10	16.95
Total	59	100.00

432

433 ~~Whereas~~ 83.05% of the respondents indicated that they used cowpea for funeral
 434 purposes, 16.95% added that cowpea was used for food as well. This revealed
 435 that cowpea was a traditional crop in these three communities.

436 Table 22: Cowpea as a traditional crop

Cowpea as a traditional crop	Number of Responses	Percentage (%)
NO	10	16.95
YES	49	83.00
Total	59	100.00

437

438 The notion that cowpea is a traditional crop was supported strongly by 83.0% of
 439 the respondents while 16.95% indicated otherwise.

440 However, all the respondents under the study attested to the fact that traditional
 441 belief did not hinder cowpea production in these three communities.

442

443 Conclusively, the findings from the study showed that farmers in these three
 444 communities cultivated cowpea but intercropped with millet. The research
 445 revealed that cowpea was not cultivated by the people as a main crop and that
 446 both males and females were involved in its cultivation with males being the
 447 majority. Most of the farmers in the three communities used the local white
 448 variety for cultivation as compared to the Boufor, Asontem and Red Nkwanta.

Non-availability of land resulted in farmers not cultivating cowpea on large scale as well as difficulty in pest control. Observation also showed that farmers in the three communities used cowpea for traditional purposes such as funeral rites.

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