Promoting Bambara Groundnut *(Vigna subterranean)*: Perspectives of Farmers from Northern Ghana

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Abstract

Bambara groundnut (Vigna subterranean) is one of Africa's crops that is neglected and underutilized. However, the crop is important for small holder farmers because of its nutritional value. The present consumption of Bambara groundnut(BG) *is limited largely because it is mostly consumed by its growers coupled with little international trade in it. The main objective of the researchwas to elicit Bambara Groundnut farmers' views on how to promote and market Bambara groundnut.The study found that Bambara groundnut* farmers need support to increase production, a widened and guaranteed market and popularization on how it can be used. *The Savannah Agriculture Research Institute should support Bambara groundnut farmers with improved techniques of BG cultivation to increase production. Policy should facilitate Bambara groundnut consumption through the Ghana School Feeding Program and sensitization on Bambara groundnut nutritional benefits.*

Keywords: Bambara Groundnut, Consumption, Market, Nutritional value, Promote

1.Introduction

Bambara groundnut (*Vignasubterranean*) is regarded as one of Africa's crops that is neglected and underutilized (Bamshaiye, Adegbola & Bamishaiye, 2011). It is an important crop for small holder farmers due to its importance in food security and nutritional values (Hillocks, Bennett, & Mponda, 2012*). Bambara groundnut* consumption is mostly limited to its growers (Bamshaiye, et al 2011) and this is largely because there is little international trade in *Bambara groundnut* partly due to the difficulty of prospective buyers getting information on the product sometimes even in areas known for the cultivation of the crop (Hillocks,et al 2012).Bamshaiye et al (2011) contributed to *Bambara groundnut* literature by providing a comprehensive description of its characteristics, propagation, planting, growth development, harvesting and utilization. *Bambara groundnut* research scientists in Ghana have documented 5 types/varieties/landraces of *Bambara groundnut*: Nav 4, Nav Red, Black Eye, Burkina and Mottled Cream. In Nigeria, *Bambara groundnut* is classified into 4 Red, Black, Cream and Brown and it is used for different types of dishes (Bamshaiye et al, 2011).According to the African Crop Science Society (2012) there is supply side constraint to the consumption of *Bambara groundnut*, yet most of the food requirements of humans are limited to less than 20 crop species out of the over 100 species (Azam-Ali, Aguilar-Manjarrez & Bannayan-Avval, 2001). Also a number of reviews, including: Hillocks et al (2012), Okpuzor, Ogbunugafor, Okafor and Sofidiya (2010) and unpublished M.Sc. thesis by Akpaluin 2010 have underscored the advantages that *Bambara groundnut* has over other legumes.

Some of the attributes that make BG stand out among other legumes include: it yields relatively well on poor soil and low rainfall under which other legumes will not do well, it can be grown with minimal inputs (fertilizers and chemicals).It is suitable for inter cropping, it does not require large area of land for similar legumes (Bamshaiye et al 2011; Heller, Begemann & Mushonga, 1995).The crop also has agronomic benefits because it can fix nitrogen in the soil (Heller et al, 1995).The nutritional value, particularly make it one of the crops that have the potential of providing a balanced diet for both human and animals because ofits proteins, carbohydrates, vitamins and minerals sources (Bamshaiye et al, 2011;Okpuzor et al 2010). However, in Ghana 28 %, 9 % and 14% of children between the ages of 6 and 59 months are respectively stunted, wasted, and underweight (ICF Macro, 2010). Although *Bambara groundnut* is known to be a good source of food, after analyzing and unpacking the protein types that *Bambara groundnut* has, Okpuzoret al (2010) expressed worry about the few people who consume the product in Nigeria. This underutilization is not only in Nigeria. In Malawi, the underutilization of *Bambara groundnut* is largely due to the long cooking time (Pungulani, Kadyampakeni, Nsapato, & Kachapill, 2012).

Furthermore, Yao, et al (2015) revealed that*Bambara groundnut* seed Ci12 landrace (a variety/type of *Bambara groundnut*) which yields well even under poor soils, is good source of amino acid, n-6 fatty acid and minerals; particularly iron. Ten and twelve protein types respectively in malted and dry*Bambara groundnut* have been established by Okpuzor et al (2010), while according to Akpalu's unpublished thesis there are more protein and iron in Nav red and Black eyed than other varieties of *Bambara groundnut*.

Bambara groundnut is used in similar and yet different ways in Botswana, Burkina Faso, Ghana, Kenya, South Africa, Nigeria, Zambia, Zimbabwe and Mozambique (Bamshaiye et al, 2011). It is boiled when it is fresh or dry as a snack, processed into powder and used in different ways in different countries.Ani, Omeje, and Ugwuowo (2012) indicate that the residue of raw *Bambara groundnut* has been found to be useful for the growth of broiler chicken and reduction in their feed kilogram of weight. Bamshaiye et al (2011) review indicated medicinal values of the leaves and stems of *Bambara groundnut* for the treatment of various conditions in livestock, used as fodder for goats and as a pesticide for vegetable farms. Acceptable *okpa* (indigenous Nigerian dish) can be prepared from processed and ready to use BG germinated flour by soaking in cold water for some hours (Barimalaa, Agoha, Oboh & Kiin-Kabari, 2005).

Despite its usefulness, *Bambara groundnut* consumption is mostly limited to the farmers who produce it (Bamshaiye et al, 2011). Nonetheless, 1,741 primary and kindergarten schools with 697,416 pupils in Ghana are beneficiaries of the Ghana School Feeding Program (GSFP) which aims at boosting local food production through close linkage between local agriculture and the program according to 2011 annual operating plan of the GSFP. Again, as at 2008, only less than 20% of foodstuffs for the program were sourced from local farmers according to the Netherlands Development Organization (SNV) inventory of the GSFP.

The Ministry of Local Government and Rural Development, the Ministry of Food and Agriculture, and the Ministry of Education have responsibilities towards achieving the objectives of the GSFP which includes reducing hunger and malnutrition, increase school enrolment, attendance and retention according to the annual operating plan of the GSFP.

There is little international trade in *Bambara groundnut* partly due to difficulty of prospective buyers obtaining information on the product; sometimes even in areas known for the cultivation of the crop (Hillocks et al, 2012).
Though *Bambara groundnut* is a neglected crop in terms of research and utilization, growing interest among knowledge producers to whip interest in its production and utilization have resulted in studies aimed at identifying its growing potential beyond Africa, particularly, Sub-Sahara Africa. Using simulation model and weather data without recourse to differentials in soils, Azam-Ali et al (2001) found *Bambara groundnut* growing potential in almost all the continents in the world but more so in South America, Oceania and Australia apart from Africa where it is largely cultivated. Subsistence farmers like other professionals have other needs which must be met. Some of which include; health, clothes and education. To meet these other needs, subsistence farmers must necessarily sell some of their produce to raise cash. Hence, the widely held belief that subsistence farmers produce purposely for household consumption is problematic. Non-producers of *Bambara groundnut* who are interested in using it need information on its location, availability and quantity. Doku and Karikari (1971) and Akpalu's unpublished 2010 M.sc thesis indicate that *Bambara groundnut* is cultivated largely in northern Ghana. Nonetheless, the only known estimated quantity of BG *Bambara groundnut* in Ghana (20,000 metric tons), is indicated in a review by Hillocks et al (2012) which was cited from Doku and Karikari (1971).

Hence, the main aim of the research was to elicit the views of BG *Bambara groundnut* farmers on how to promote and market BG *Bambara groundnut*.

2 Methodology

The study adopted both quantitative and qualitative techniques for data analysis. The quantitative aspect is purely descriptive aimed at providing quantitative data in a descriptive manner while the qualitative aspect aimed at unearthing data from the perspectives of the farmers.

Multi-stage sampling technique was used to get to the study respondents. The study communities were selected using snowball and purposive sampling techniques. Market women who sell *Bambara groundnut* were first administered a questionnaire in the markets of the regional capitals of each of the regions of northern Ghana to determine from where they source their *Bambara groundnut*. The findings were then used to together with information from some crop scientists to select 4 districts in the Upper East, Upper West and Northern Regions. Mixed methods were used to collect primary data from randomly selected *Bambara groundnut* farmers (385) in 16 Communities. The Upper West region has 3 communities in excess of the Upper East and Northern Regions spread between the Nadowli-Kaleo and the Daffiama-Busie-Issah districts.

Heller et al (1995) pointed out that, in Ghana, the crop is mainly cultivated in northern Ghana while Akpalu's unpublished MSc. thesis indicated Bambara groundnut is cultivated in the Guinea Savanna and the Coastal Savanna ecological zones in Ghana but failed to indicate the producing communities. Hence, snowball sampling technique was used to identify the study communities. In specific locations of the Wa, Bolgatanga and Tamale markets where *Bambara groundnut* is sold daily in the market, traders were contacted on *Bambara groundnut* distribution chain right from the farmer to the final consumer. The information was used to sample 30 traders of *Bambara groundnut* (10 from each of the respective markets). Data were collected from them to determine where most of the farmers of *Bambara groundnut* could be located. It must be noted that the study targeted only farmers who cultivate *Bambara groundnut* and not farmers in general and so sampling communities proportionate to the total population of each of the regions was not necessary. In the Wa market, all 10 traders who were contacted, buy their *Bambara groundnut* from other market women who source the produce from markets located in farming communities.

All 10 said their "whole sellers" buy from Sankana and Busie markets, 8 mentioned Naro market. In addition to these two markets, 4 mentioned all these locations and Niger and Burkina Faso. The market womentakpo, indicated that these whole sellers usually move out of Ghana to buy at certain times of the yinear when they go to the markets they have indicated and do not get any. They also said that, the *Bambara groundnut* sold in these farmer community markets do not necessarily come from only these communities. Communities that are close by and which women easily walk to also do sell their wares in the markets they indicated. Sankana, Busie and Naro are geographically far apart and so in addition to people from these communities, people from other communities which are closer to each of these communities patronize these markets. Takpo, Nator and Chaango were added to Sankana because the market women said much of the *Bambara groundnut* sold in the Sankana market usually come from these communities. In addition to Busie whose market was indicated as a place where the traders buy *Bambara groundnut* from, Dakpaah was also selected because it is closer to Busie. Naro was selected because it is one of the markets the traders from the market of the regional capital buy from. A lot more communities could have been selected around Naro but this was not done because communities which are all close to the market centers are likely to share the same characteristics including *Bambara groundnut* cultivation and marketing. The final decision of inclusion or exclusion of these communities was determined by the availability of *Bambara groundnut* farmers.

In the Bolgatanga market all 10 market women mentioned Yelwongo market as the place they source the product. Only 2 traders mentioned two other markets in addition to Yelwongo which they mainly buy from. Since the scope of this study was limited to Ghana, Yelwongo was not sampled because it is a community in Burkina Faso. Feo, Namoo and Zorko were selected from a list of 5 communities obtained as BG producing communities due to their proximity to Yelwongo. Dua-Apuuwogo and Yidongo were selected because information from the Soe Market which the data collection team gathered during the two days visit to communities closer to Yelwongo indicated that farmers from these communities do sell BG in this market. Soe was however not selected because, it was observed to be more vibrant than Bongo (the district capital) in terms of non-farm activities. For similar reasons, only 4 communities were selected from the Yendi district in the Northern Region.

Few traders in the Tamale market mentioned markets other than the Yendi market as the location from which they buy their BG.Mixed methods were used to ensure that adequate data were collected. Only farmers who cultivated BG (cultivated for the 2013 and 2014 seasons) were selected. In a few cases during analysis, it was realized that some farmers cultivated for only one of the above farm seasons even though they initially said they did cultivate for both seasons. This was not deliberate in most of the cases because some farmers equated cultivating for one of these two farm seasons, but not making any harvest to not having cultivated at all, while others equated intension to cultivate, as having cultivated. Some factors that stalled their intensions included ill health, lack of seeds and no rains at the time they deemed appropriate for BG planting. The 2013 and 2014 farm seasons were considered for the data because these were the most recent farm seasons preceding this study which made for easy recollection for the farmers. Most of the questions were post-coded because the design of the questionnaire was largely opened ended questions. Quantitative data were organized and processed using SPSS version 21.

3. Findings and discussion

3.1 Social and demographic data of respondents

The study respondents included male and female BG farmers from the Upper East, Upper West and Northern Regions of Ghana. In the demographic analysis of Ghana people between 15 and 64 years are referred to as the working population. The youngest BG farmer recorded from the opened ended question on age was 18 years while the oldest farmer was 82 years. In all the regions, more than 80% of the sampled BG farmers were between 18 and 62 years. This means that though the crop is neglected, the majority of its growers fall within the working population of Ghana which is 15-64 years (Ghana statistical, 2013). Hence the need to sensitize the people within production age of (18-62) years about the value of production of BG to reduce the current neglected position on the crop. The Northern Region had a relatively high percentage of respondents missing on the variable 'age' (table 2) because these respondents claimed they did not know their ages.

Table 2: Age and gender distribution of respondents

Upper East			**Upper West**		**Northern**	
Age	Frequency	Percent	Frequency	Percent	Frequency	Percent
18-22	1	**0**.69	5	2.8	3	4.8
23-27	8	5.52	16	9.0	5	8
28-32	12	8.28	25	14	14	22
33-37	15	10.35	26	14.6	9	14
38-42	28	19.32	16	9.0	6	9.6
43-47	23	15.87	16	9.0	4	6
48-52	16	11.04	22	12.3	2	3
53-57	16	11.04	20	11.2	3	4.8
58-62	10	6.9	10	5.6	5	8
63-67	3	2.07	7	4.0	2	3
68-72	8	5.52	6	3.4	0	0
73-77	2	1.38	3	1.7	1	1.6
78-82	4	2.76	2	1.1	1	1.6
Missing	-	-	4	2.2	9	14
Total	**146**	**100.71**	**178**	**100**	**61**	**100**
Gender						
Female	105	71.9	103	57.9	40	65.6
Male	41	28.1	75	42.1	21	34.4
Total	**146**	**100**	**178**	**100**	**61**	**100**

For all the regions women constitute the dominant gender of BG farmers with the Upper East having an overwhelming majority of 71.9%. This supports Heller, et al(1995) assertion that BG is mostly grown by women. Observation and interaction with community opinion leaders during data collection supports the statistics of the farmers regarding gender. During community entry processes, the community opinion leaders made reference to the effect that data collectors should go to women on issues relating to BG farmers because they are the ones who largely cultivate it. This means that if BG cultivation, marketing and consumption are supported and promoted, women economic conditions could be enhanced.

3.2 Purpose for BG cultivation

BG consumption is mostly limited to its growers (Bamshaiye et al., 2011) and few people consume it in Nigeria (Okpuzor et al, 2010). Contrary to Bamshaiye et al., (2011), famers in this study do not cultivate or produce BG for household consumption only. The percentages of respondents who produce purposely for household consumption are 85.6, 42.1 and 4.9 respectively for the Upper East, Upper West and Northern Regions. Even though in the Upper East Region an overwhelming majority (85%) cultivate only for household consumption, 15% produce for both household consumption and for sale. In contrast, 95.1% and 57.3% respectively for the Northern and Upper West regions produce BG for both household consumption and for sale. This means that for those who do not cultivate BG but want to gain the numerous nutritional benefits associated with BG, they can obtain the legume from the market through traders or arrange with farmers and buy directly from them. Also, the farmers can earn some income from such sales to meet their non-food needs or buy other food stuff which they do not cultivate.

In the 2013 harvest season, 26 or 17.2% of respondents in the Upper East Region sold BG. Quantities sold ranged from 1 to 140 *koko*bowls (4 to 560 kg). In the 2014 season for the same location, 25 or 17.1% of respondents sold some of the BG. Quantities sold ranged from 1 to 60 *koko* bowls (4 to 240 kg). In the Upper West Region, for both the 2013 and 2014 seasons, 155 or 87.1% of the respondents sold some of their produce and quantities sold ranged from 1 to 160 *koko*bowls (4 to 640 kg). However in the Northern Region, 59 or 96.7% of the respondents sold BG for both the 2013 and the 2014 harvest seasons with quantities ranging from 1 to 126 *koko* bowls (4 to 504 kg). Longer hours of cooking dry BG seeds have been highlighted by Pungulani et al (2012) to be hindering BG consumption in Malawi. However, this study reveals that this is not a major challenge in Northern Ghana because the problem is ameliorated through the use of BG flour for the preparation of various dishes compared to cooking dry BG seeds.

3.3 Quantity of BG produced by farmers (2013 and 2014 seasons)

Of the 385 sampled BG farmers, 6 did not cultivate in 2013 but did for the 2014 season. In the 2014 season 4 respondents did not cultivate but did produce in 2013. Both the 6 and 4 respondents were treated as missing in the data analysis. For all the three regions combined 30 famers who cultivated for the 2013 season recorded zero (0) harvest. The farmers attributed their situation to late planting and explained that though they were aware of planting late they took the risk because the rains are unpredictable and they hoped the rains would have fallen in a manner that would have been to their advantage. Similarly in the 2014 season, 22 of the farmers who cultivated did not harvest anything. The quantity of BG produced for the 2013 and 2014 harvest seasons in the sampled communities for the three regions are presented in table 3.It can be seen in table 4 that the quantity of BG among farmers in 2013 was more than the quantity in 2014 even though 6 out of the total sample of 385 did not produce in 2013 compared to the 4 farmers who did not produce in 2014. Again, more farmers (30) recorded zero yield in 2013 compared to the 22 famers for the 2014 harvest season. This can be attributed to poor yield especially from the Northern Region with a total of 5356 kg of BG in 2014 compared to 9,424 kg in 2013 because farm sizes did not vary much between 2013 and 2014. Compared to Doku (1971) estimate of 20,000 metrictons of BG in Ghana 4 decades ago, BG production in Ghana has reduced drastically as the total production by all the sampled farmers for the two seasons combined is less than 40tons when kilograms are converted to tons. This is not surprising because Doku reported that, BG was canned in the 1960s and this might have motivated many farmers to add this to the list of crops they cultivated or BG farmers increased their farm sizes.

Table 3: Quantity of BG produced by farmers in three regions of Ghana

	2013 Quantity of BG		2014 Quantity of BG	
Location	**koko* bowls	Kilogram	*koko* bowls	Kilograms
Upper East	612.5	2,450	696.5	2,786
Upper West	1,893.5	7,574	1,909.5	7,638
Northern	2,356	9,424	1,339	5,356
Total	4,862	19,448 =19.448tonnes	3,945	15,780=15.78tons

*****koko bowls is the unit of measurement among producers and traders in grains, nuts and legumes in northern Ghana. 1 *koko* bowl is converted to 4 kilograms

The quantities of BG of most farmers were close to the average of 15.4 and 12.6 *koko* bowls respectively for the 2013 and 2014 seasons. However, the Upper West and Northern regions had high standard deviations; indicating spread of the number of bowls that each farmer produced for the 2013 and 2014 crop seasons. Similar to the mean quantity of BG in the Upper West Region for the two harvest seasons under consideration, in the Upper East Region, the mean number of *koko* bowls 15.4 and 12.6 respectively for the 2013 and 2014 harvest season are fairly close. However, vast variation exists in the mean quantity of BG in the Northern Region for the 2013 and 2014 harvest seasons. This could be explained by a respondent who reported 800 *koko* bowls for the 2013 harvest season which is far higher than the quantity reported by most of the famers in that region. Also, this outlier also affects the standard deviation.

Again, for all the regions in both years, the minimum quantities recorded were zero (0). This ultimately affected the means and the standard deviations. These notwithstanding, the basic statistics presented, provide a general idea about the quantum of BG in Ghana and could help in further estimations of the quantity of BG available in Ghana. The basic statistics of BG produced for the year 2013 and 2014 for the Upper East, Upper West and Northern regions are summarized in table 4.

Table 4: Basic statistics of BG produced in 2013 and 2014

2013			
Quantity (in *kookoo* bowls) Statistics	Upper East N=146	Upper West N=178	Northern Region N=61
Mean	15.3715	32.5086	50.3279
Mode	30.00	**.00a**	40.00
Std. Deviation	22.01015	41.28179	107.54669
Minimum	.00	.00	.00
Maximum	200.00	280	800.00
2014			
Mean	12.6069	31.1914	30.1639
Mode	10.00	15.00	.00
Std. Deviation	15.15535.	51.18699	49.16780
Minimum	.00	.00	.00
Maximum	80.00	600	280.00

Multiple modes exist in the Upper West Region for 2013. The smallest value is highlighted. *1 *koko* bowl is convertible to 4 kilograms

3.4 BG sourcing points in northern Ghana

For all the three regions the study covered, respondents who grow BG for both sale and consumption, usually sell on cash basis in the nearest market on market days. Figures 2 and 3 suggest that producers of BG in the Upper East Region do not sell their produce outside the producing districts because the places where they sell are not very different from the study communities. The bulk (42%) of BG producers in the Upper East Region who sell, do so in Soe market. Soe is one of the communities in the study district which has a market that comes on every 3 days typical of other community market days in the Upper East Region. Again, 27% sell in Yelwungo market. Yelwungo is a community in Burkina Faso but closer to Namoo, Zorko and other communities in the Bongo district.The respondents reported that, in the Yelwungo market, they sell to other farmers who did not cultivate, but want to consume BG or traders from Bolgatanga (the regional capital of the Upper East region).

The greatest proportion of the respondents in the Upper West Region who do sellBG usually sell in the Sankana market (figure 3).

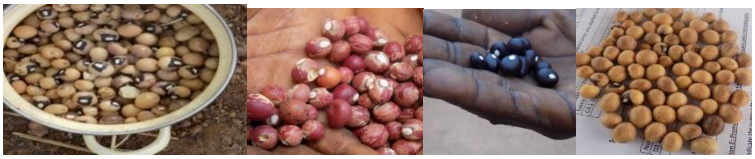

Figure 1, some varieties of BG respondents produce

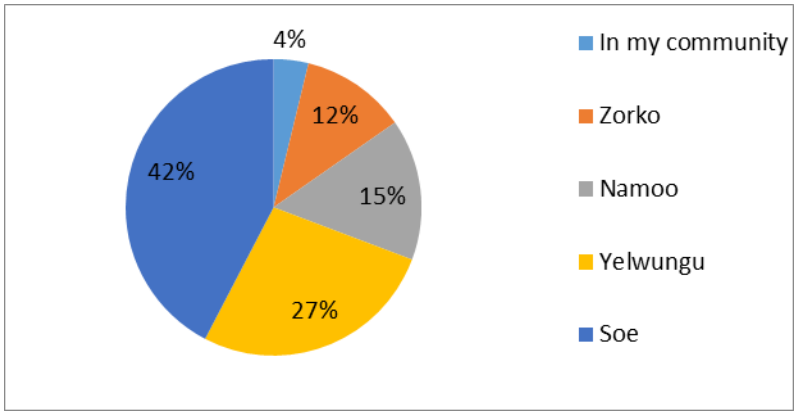

Figure 2, places where farmers sell BG (Upper East region)

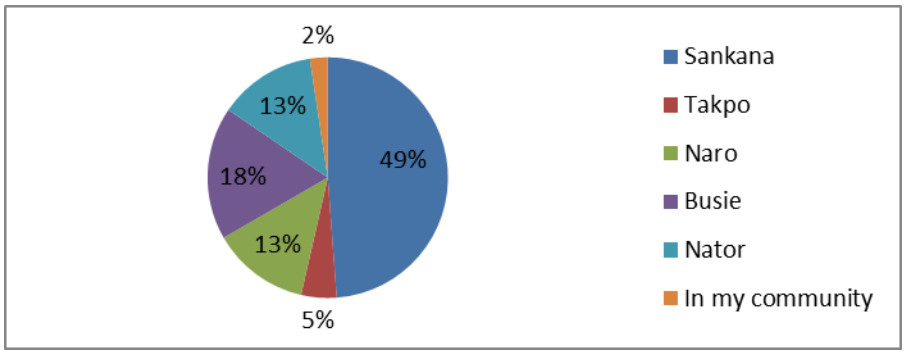

Figure 3 Places where farmers sell BG (Upper West region)

Sankana and Busie markets are among the vibrant markets respectively in the Nadowli-Kaleo and Daffiama-Busie-Issah districts of the Upper West Region. In the Northern Region, however, the greatest proportion of the respondents who sell BG, always sell in Yendi which is the district capital of the Yendi municipality. Nearly 40% sell within their own communities and the rest sell in other nearby communities. There is little international trade in*Bambara groundnut* partly because of the lack of data on the product for prospective buyers and sometimes even in areas known for the cultivation of the crop (Hillocks et al, 2012). This study indicates that for prospective traders who are interested in distributing *Bambara groundnut* beyond its currents selling points, they can source it directly from the producers in the 16 study communities (table 1). Alternatively they can compete with "market queens" (those who buy directly from the farmers) in the community markets where farmers sell, particularly the Yendi, Sankana, Busie, Soe and Yelwongo markets or buy from the market queens in Bolgatanga, Wa and Tamale markets.

Table 1: The study regions, districts and communities

Region/District	Community	Number of BG farmers
Upper East/Bongo	Dua-Apuuwogo	18
	Feo	37
	Namoo	38
	Yindongo	24
	Zorko	39
	Sub-total	**146**
Upper West /Nadowli/Kaleo	Sankana	27
	Takpo	37
	Nator	30
	Chaango	19
	Sub-total	**114**
Upper West /Daffiama/Busie/Issah	Busie	16
	Naro	20
	Dakpaah	28
	Sub-total	**64**
Northern/Yendi	Karachdo	17
	Kulkpeni	22
	Montondo	10
	Naaluugo	12
	Sub-total	**61**
All districts	Total	385

3.5 Farmers views on how to promote and market *Bambara Groundnut*

It is a generally known fact that globalization and international trade have made the marketing of agricultural, industrial and technological produce/products beyond their production areas possible.*Bambara groundnut* has numerous nutritional and agronomic benefits than other legumes (Hillocks et al, 2012 &Okpuzor et al, 2010).Nonetheless, the food requirements of humans are limited to less than 20 crop species out of the over 100 species (Azam-Ali et al, 2001) and BG consumption is largely restricted to its growers (Bamshaiyeet al, 2011). For these reasons, farmers were asked how *Bambara groundnut* can be promoted locally, nationally and internationally. Their views were summarized and presented below.

Locally:

- Government should support farmers with inputs and marketing of BG
- Buyers should support farmers with inputs to increase production
- BG farmers should form associations
- BG consumption should be encouraged
- Sensitize people on the variety of dishes that can be prepared from BG
- Government should identify industrial uses of BG
- Through research the findings in books can attract companies to partner farmers
- Farmers should produce more to entice companies to buy
- Farmers should not sell at harvesting season
- Farmers should be given 'good' price for BG

Nationally:

- Famers need support to increase production and consumption
- Researchers can help to promote its marketing and cultivation
- Government should support BG farming through price legislation
- Provide value chain service/companies should buy from farmers
- Government should buy from famers and sell
- Traders should market it nationwide
- There should be 'good' price for BG farmers

Internationally:

- Companies should promote BG cultivation and marketing to the outside world
- Government should market BG to international community

Most of the farmers were able to provide their opinions on how BG can be promoted locally and nationally. But, only a few were able to indicate how BG can be promoted internationally. The views above suggest that BG farmers have some expectations from both the state and non-state institutions for the elevation of BG.Most farmers stressed guaranteed market and price as one of the motivating factors to increase BG production. A 48 year old male BG farmer at Kranchodo in the Yendi Municipality said: A ready market should be created for BG, so that the produce does not remain with the farmers and also to prevent buyers from cheating the farmers. In a focus group discussion at the Chaango community in the Nadowli-Kaleo district of the Upper West Region of Ghana, the following were captured from the mixed group discussion: There should be guaranteed price for BG from government. BG can be promoted on the national television by showing the various uses of it as a food crop. Its industrial uses should be promoted.

For example it can be canned like canned fish and let be made to reach everywhere in the world. One of the participants highlighted "We don't know where *talia* (spaghetti) come from, which crop it is made of, yet we all buy and consume it because it is brought from somewhere. BG should be treated the same way".

The Farmers lamented how BG is neglected in comparison to other crops and suggested how it should be promoted. Just like soya beans, BG should be supported by governments and non-governmental organizations. Farmers should be supported with credit to cultivate and after harvesting the organizations should come and buy from farmers at the market price and then deduct the credit facilities they gave to the farmers (Male, 32 years, BG farmer, Naalugu).A 58 year old female BG farmer, Kranchodo also stressed:BG should be 'woken up'. Its cultivation should be encouraged. If one is sleeping and he/she is woken up and told to work, the person will do that. At first, people did not take the farming of groundnuts and soya beans seriously. But because they are "woken up" (promoted), that is why people are cultivating a lot of groundnuts and soya beans. Both the 32 year old man and the 58 year old woman's sentiments are indicative of the fact that not many farmers cultivate BG and/or no support for its production. There is perceived lack of market for BG because it is believed that BG consumers are few leading to reduced production. But there is supply side constraint to the consumption of BG (African Crop Science Society, 2012). This means that there is no linkage between *Bambara groundnut* producers and marketers/consumers. A 48 years old female *Bambara groundnut* farmer in Nadowli-Kaleo district has a suggestion:

If people in authority could promote the use of BG among other Ghanaians, its production could be enhanced.

'People in authority' can be interpreted as officials of governmental and business organizations. The Ghana Education Service is a governmental institution that has been operating a school feeding program for selected basic schools since 2004. All boarding senior secondary schools, teacher training colleges and other special schools feed their students/pupils. The managers of all these institutions are people in authority who can promote this nutritious but neglected food crop by incorporating it into the menu of their students/pupils.

The farmers believed that when demand for *Bambara groundnut* increases, they will increase production. But to do this very well, they will need agricultural extension services. For the business person 'in authority' *Bambara groundnut* could be canned, branded and advertised in a manner that will be appealing to consumers.

In a free market economy it is almost impossible for anybody to think of price legislation. But since it appeared in the views of the farmers, it signals that they do not find the price at which they currently sell their *Bambara groundnut* competitive enough. Most of the farmers emphasized the need for government to support farmers with inputs such as tractor services and provide guaranteed market and price for *Bambara groundnut*. Most of them lamented over how attention is given to soya beans cultivation though few farmers know how to prepare something out of it. The farmers explained that in years past, *Bambara groundnut* cultivation used to begin in July, by which time planting for major household food crops: millet, beans, maize, groundnuts were over. However, because of the shifts in the farming season resulting from changes in rainfall pattern and unpredictable rainfall over the past years, it is impossible for any farrmers to do any serious farming of *Bambara groundnut* with just the hoe and cutlass since its cultivation time mostly competes with these major crops. Hence, the input support most of them emphasized was tractor service which they consider very expensive for farmers especially at the beginning of the farming season when most farmers do not have farm produce to sell in order to raise cash.

Apart from addressing the production constraints discussed above, the remaining themes on promoting and marketing of *Bambara groundnut* hinges on a relationship between demand and production. Most farmers explained that if they are assured of high demand and a competitive price for *Bambara groundnut*; they will circumvent all production challenges that are not natural by nature and produce a lot of *Bambara groundnut*. But in the absence of high demand and a good price, it is better for them to channel their energies into other crops which may not necessarily be as nutritive as *Bambara groundnut*.

4. Conclusion and policy implications

We presented the views of farmers on how *Bambara groundnut* can be promoted having highlighted the varied benefits of *Bambara groundnut* and the scarcity of information which limit its trade across countries. To promote *Bambara groundnut*, farmers need support to increase production and a widened market. Its uses should be popularized and consumption encouraged. State institutions have a critical role policy wise to increasing both production and consumption of *Bambara groundnut*. In particular the Ministry of Food and Agriculture (MoFA) and the Savannah Agriculture Research Institute (SARI) have critical roles to increase BG production.
The Ministry of Education can increase *Bambara groundnut* consumption through policy that makes BG a part of the meals of the Ghana School Feeding Program.

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