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Participatory Rural Appraisal of Bambara Groundnut (*Vigna subterranea* (L.) Verdc.) Production in Southern Guinea Savanna of Nigeria

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***A*bstract:** Participatory Rapid Appraisal (PRA) study of bambara groundnut (*Vigna subterranea* (L.)Verdc.) production was conducted in six villages sampled from three Local Government Areas (LGA). The LGAs were Ogbadibo, Kwande (Benue State) and Olamaboro (Kogi State), all located in Southern Guinea Savanna of Nigeria. The study involved 6 group discussions and 240 individual key informants who were interviewed using a check list with a view to provide information on existing bambara groundnut-based cropping systems. Results indicated that most bambara groundnut farmers were literate (99.58%). 52.91% of the farmers were males and 47.08% were females. Bambara groundnut production was mainly in small holdings (≤1ha). About 30 % of bambara groundnut farmers plant the crop as sole while 65.83% intercropped it with other crops. Intercropping with cassava dominated the intercrop systems. Planting was mainly on ridges (83.33%). About 77% of the farmers do not apply fertilizer to bambara groundnut with the belief that it could grow well on poor soils. Weeding was done manually by 87.08% of the farmers, while 21.25% of them used herbicides for weed control mainly in Kwande LGA. Yields of bambara groundnut were generally low (100-600 kg/ha). Labour and lack of finance ranked the highest consideration by farmers as constraints to the production of bambara groundnut in Southern Guinea Savanna. Scientific investigation into the suitability of some of the popular landraces of bambara groundnut in the various cropping systems in Southern Guinea Savanna might be necessary to ensure food security in the region.

Keywords: PRA, bambara groundnut, cropping systems, southern guinea savanna

1. Introduction

Barbara groundnut (*Vigna subterranea* (L.)Verdc.) is an indigenous African leguminous crop which has been cultivated in the tropical regions of sub-Saharan Africa and Madagascar for many centuries (Zengeri & Mupamba, 1995).The crop is essentially grown for human consumption. Ouedraogo *et al.* (2008) described bambara groundnut seeds as a complete balanced diet, making it a good supplement to cereal- based diets. The seed contains 63% carbohydrate, 19% protein and 6.5% oil (Goli, 1995), and minerals like calcium, 95.5-99 mg/100 mg, iron 5.1-9 mg/100 mg, potassium 11447-14355 mg/100 mg and sodium2.9-10.6 mg/100 mg (Karikari *et al*., 1997). The fresh seeds may be boiled and eaten as snacks or the dry seeds may be ground into flour, spiced and made into paste, then boiled as "moi-moi or okpa". The paste may also be fried and eaten as "akara" (Tanimu & Aliyu, 1995; Swanevelder, 1998; and Jonah *et al.*, 2010).

In Nigeria, bambara groundnut production is low. Production output was estimated to be between 100,000-168,700 mt from an area of about 15350 hectares (Tanimu & Aliyu, 1995; NFRA, 2008). While the production of the crop was declining in the Sahel and Sudan Savanna Zones due mainly

to drought, its production was increasing in the Southern Guinea Savanna due to the fact that the crop fetches higher income now than it did previously (Tanimu & Aliyu, 1995). In Nigeria, like in many parts of Africa, bambara groundnut is grown by subsistence farmers mostly women, in small patches of land, and is frequently intercropped with cowpea, maize and sorghum, (Gibbon & Pain, 1985; Mkandawire and Sibuga, 2002; DFID, 2010). Farmers practice intercropping (Ibeawuchi, 2000) due to high variability in climatic conditions, diverse soil types, population density and socio-economic factors. Mulila – Mitti (1997) reported that food legumes including bambara groundnut enrich the soil by fixing atmospheric nitrogen, and thus resulted in reduced fertilizer requirement for subsequent crops. This has made the crop ideal for the resource poor farmers. Goli (1997) revealed that farmers through successive cultivations have selected bambara groundnut genotypes with desirable traits (high yielding and bunchy growth habit). Breeding of the crop was therefore focused on selection between and within population samples for yield performance, disease resistance and drought tolerance (Ouedraogo *et al*., 2008; Azam-Ali, 2000). Farmers' low adoption of technologies developed by research institutions show the need for client orientation in research and development. Their evaluations help scientists to design, test and recommend new technologies in the light of information about farmers' criteria for usefulness of the innovation (Odendo *et al.,* 2002). It is in this regard that participation becomes very crucial. Participatory research allows incorporation of farmers' indigenous technical knowledge, identification of farmers' criteria and priorities, setting research and development objectives, setting indicators, planning and implementation, and monitoring and evaluating results (Ellis-Jones *et al*., 2004).

In the late seventies, there was a growing awareness of the failure of conventional methods of research to generate social information for agricultural and rural development projects. This led to a search for alternative approaches and methods. One of those new approaches that emerged was Participatory Rural Appraisal (Chambers, 1994). Chambers (1994) described PRA as "a growing family of approaches, methods, attitudes and behaviors to enable and empower people to share, analyze and enhance their knowledge of life and conditions and plan, act, monitor, evaluate and reflect." PRA is therefore intended to enable local communities to conduct their own analysis and to plan and take action (Abedi & Vahidi, 2011). It involves the researcher learning together with the villagers as this will help scientists to design, test and recommend new technologies in the light of information about farmers' criteria for usefulness of the innovation (Odendo *et al*., 2002). With the farmers participation, it is hoped that research would develop technologies that farmers could play a key role in the diffusion of such research findings (Ellis-Jones *et al*., 2004) resulting in more productive, stable, equitable and sustainable agricultural systems (Odendo *et al*., 2002).

It is in the light of the above that it became necessary to provide information on existing bambara groundnut – based cropping systems in the Southern Guinea Savanna of Nigeria with a view to:

- Identify the suitability of other crops for intercropping with bambara groundnut;
- Identify the main constraints to bambara groundnut production in Southern Guinea Savanna of Nigeria.

2. Materials and Methods

2.1 Location Where PRA was Conducted and Sampling Procedures

Participatory Rapid Appraisal (PRA) study was conducted in six villages (Odoba-Otukpa, Obu-Otukpa, Mbakua-Nanev, Angir-Uyough, Atanigoma-Ade and Ugbamaka-Igah) sampled from three (3) Local Government Areas (LGAs) (Table 1). The LGAs were Ogbadibo and Kwande from Benue State (8^0 08'N and 10^0 0'E) and Olamaboro from Kogi state (8^0 06'N and 6^0 48'E) (see Figures 1&2). It involved six focal group discussions and 240 individual key informants who were interviewed using a check list. These LGAs were selected based on the information that they produce bambara groundnut in large quantities than other areas in Southern Guinea Savanna

(BNARDA, 2003). The LGAs consist of farm families with similar farming practices within the same agro-ecological zone.

Table 1. PRA sites and the number of farmers involved in the survey of bambara groundnut production in Benue and Kogi States of Nigeria

	State	LGA	Name of community	Location	No. of focal grp	No. of key informants
	Benue	Ogbadibo	Odoba-Otukpa	N 07^0 08.790' E 007^0 42.113' 412m above sea level	1	40
			Obu-Otukpa	N 07^0 08.569' E 007^0 40.665' 440m above sea level	1	40
		Kwande	Mbakua-Nanev	N 06^0 52.479' E 009^0 18.297' 169m above sea level	1	40
			Angir-Uyough	N 06^0 50.221' E 009^0 18.744' 235m above sea level	1	40
	Kogi	Olamaboro	Atanigoma-Ade	N 07^0 16.779' E 007^0 37.677' 359m above sea level	1	40
			Ugbamaka-Igah	N 07^0 14.326' E 007^0 28.562' 321m above sea level	1	40
Total	2	3	6		6	240

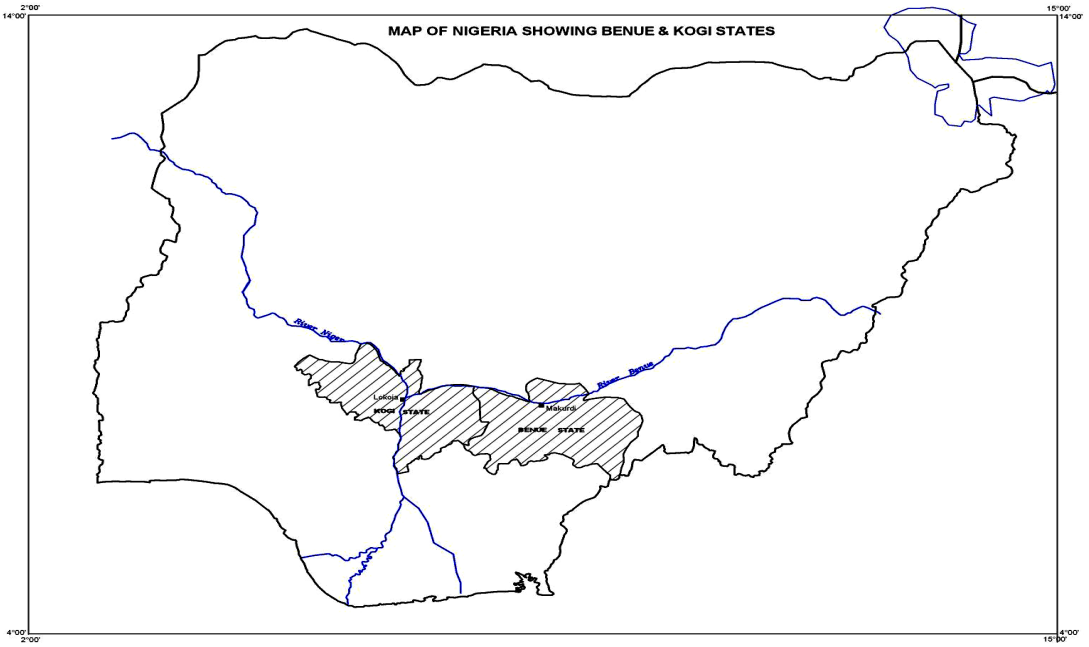

Figure 1. Map of Nigeria indicating position of Benue and Kogi States

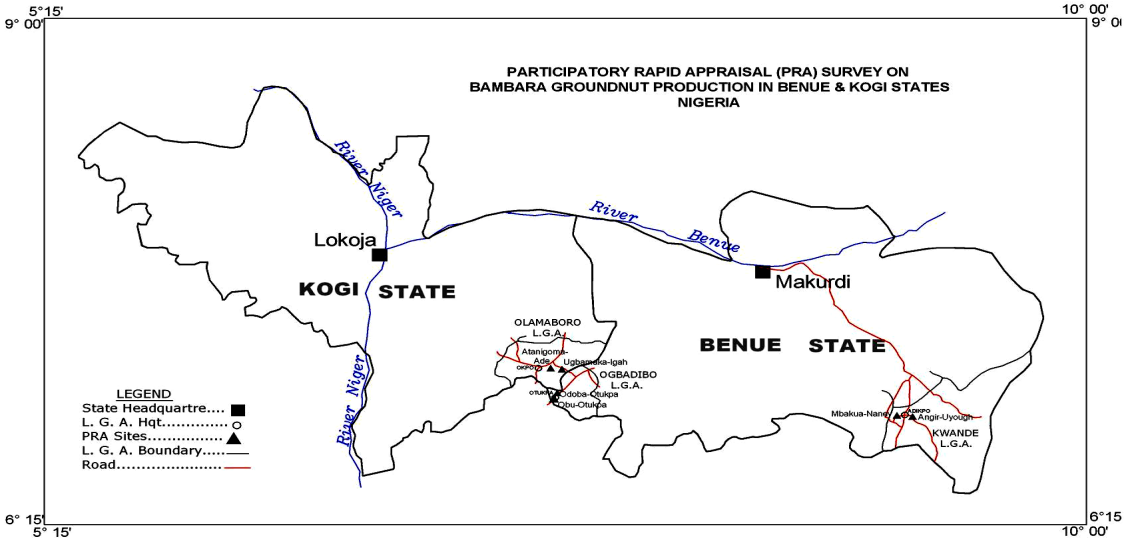

Figure 2. Benue and Kogi States of Nigeria indicating
the local government areas where PRA study was conducted

2.2 Field Visits and Group Discussions

The researchers and the staff of the Benue State Agricultural and Rural Development Authority (BNARDA) and those of Kogi Agricultural Development Project (KGADP) visited the chosen communities. The visits were aimed at familiarizing the researcher with the key sites, establish a good rapport with the local people and have a feeling of the study areas. After some discussion, the community heads and the extension workers were asked to mobilize farmers, both male and female for focus group discussion on agreed dates, time and venues. Checklists were developed and used to guide discussions with farmers' groups and individual key informants. The objectives of the study and contributions of various actors were explained and communication procedures established to ensure that farmers, extension staff and the researcher would discuss the same issues. Farmers were encouraged to use a language they were most familiar with and where there was language barrier, an interpreter was engaged. For ease of focusing the discussions and reaching a consensus, the farmers were asked to form discussion groups depending on the farmers present at the centre. Sex and age were the important criteria the farmers used in categorizing themselves into discussion groups. Farmers were asked to list in order of importance the main constraints to bambara groundnut production using a scale of 1-5 as indicated below:

1 = not important

2 = fairly important

3 = important

4 = very important

5 = most important

2.3 Data Analysis

Analysis was done using percentages and means while scoring and ranking techniques were used to assess farmers' constraints (Odendo*, et al.,* 2002). Standard errors were used to separate means where necessary.

3. Results

3.1 Age of Farmers

Table 2 presents the ages of farmers involved in bambara groundnut production in the study area. Most of the farmers were aged between 41 – 50 years (26.66%), 20-40 years (12.91%), 51 – 60 years (4.16%) and >61 years (5.13%). There were more youths (52.50%) in bambara groundnut production in Kwande than in Ogbadibo and Olamaboro Local Government Areas. There were more elderly people in bambara groundnut production in Olamaboro (23.75%) than in Ogbadibo (12.25%) and Kwande (7.50%).

Table 2. Age of bambara groundnut farmers in Benue and Kogi States of Nigeria

State	LGA	Age		Age		Age		Age	
		20-40		41-50		51-60		61 and above	
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Benue	Ogbadibo	16	20	28	35	26	32.50	10	12.25
	Kwande	42	52.50	28	35	2	2.50	8	7.50
Kogi	Olamaboro	35	43.75	24	30	2	2.50	19	23.75
Mean		31	12.91	26.66	11.10	10	4.16	12.33	5.13

3.2 Educational Qualification of Bambara Groundnut Farmers

Table 3 presents the educational qualification of bambara groundnut farmers in Benue and Kogi States of Nigeria. 13.75% had First School Leaving Certificate (FSLC), while 14.16% had "O" level (school certificate). Only 0.27% of the farmers had Degree certificates. Most of the respondents were literate.

Table 3. Educational qualification of bambara groundnut farmers in Benue and Kogi States of Nigeria.

State	LGA	Qualification							
		FSLC		"O" level		NCE		Degree	
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Benue	Ogbadibo	27	33.70	49	61.23	3	3.75	1	1.20
	Kwande	39	48.75	26	32.50	13	16.25	1	1.25
Kogi	Olamaboro	33	41.25	27	33.80	20	25.00	0	0
Mean		33	13.75	34	14.16	12	5.00	0.66	0.27

3.3 Sex of Farmers

There were more males (52.91%) in bambara groundnut production than females (47.08%) in the study area. However, in Kwande LGA, there were more females (55.00%) in bambara groundnut production than males (45.00%). Most of bambara groundnut farmers were married (94.58%), while only 5.41% were singles (table 4).

Table 4. Sex and marital status of bambara groundnut farmers in Benue and Kogi States of Nigeria

State	LGA	Sex				Marital status			
		Male		Female		Married		Single	
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Benue	Ogbadibo	46	43.80	34	42.50	75	93.75	5	6.25
	Kwande	36	45.00	44	55.00	79	98.80	1	1.20
Kogi	Olamaboro	45	56.25	35	43.80	73	91.25	7	8.75
Mean		127	52.91	113	47.08	227	94.58	13	5.41

3.4 Area Cropped to Bambara Groundnut, Cropping Systems Practiced and Time of Planting

Bambara groundnut production in the study area was in small holdings (≤1ha) as only 10.83% of the farmers had farms larger than 1ha. Table 5 presents area planted with bambara groundnut by farmers in Benue and Kogi States of Nigeria. About 40% of the farmers had bambara groundnut farms of 1hectare, while 26.66% were in 0.5hectare group and 22.50% planted less than 0.5hectare of bambara groundnut farms.

Table 5. Area planted with bambara groundnut in Benue and Kogi States of Nigeria

Area cropped	Benue State		Kogi State			
	Ogbadibo LGA	Kwande LGA	Olamaboro LGA	Total	%	Mean
Less than 0.5ha	26	8	20	54	22.50	18.00
0.5ha	19	35	10	64	26.66	21.33
1ha	27	27	42	96	40.00	32.00
More than 1ha	8	10	8	26	10.83	8.66
SE (±)	4.37	6.57	7.78	14.44	6.01	4.81

3.5 Time of Planting Bambara Groundnut in Benue and Kogi States of Nigeria

Most farmers in the study area plant bambara groundnut in August (57.50%), while 42.50% plant in July (Table 6). More farmers in Olamaboro (73.75%) plant in July but in Ogbadibo LGA 76.25%% of the farmers plant bambara groundnut in August and 70.00% in Kwande also plant bambara groundnut in August.

Table 6. Time of planting bambara groundnut by farmers in Benue and Kogi States of Nigeria

Time of planting	Benue State		Kogi State			
	Ogbadibo LGA	Kwande LGA	Olamaboro LGA	Total	%	Mean
July	19	24	59	102	42.50	34
August	61	56	21	138	57.50	46
SE (±)	21.00	16.00	19.00	18.00	7.50	6.00

3.6 Bambara Groundnut-based Cropping Systems Practiced by Farmers in Benue and Kogi States of Nigeria

About 30% of bambara groundnut farmers planted the crop as sole while 65.83% intercropped it with other crops (Table 7). Intercropping systems with cassava dominated the intercrop systems, accounting for 41.25%, followed by bambara groundnut/cassava and bambara groundnut/cowpea (30.41%). Only 1.25% of the farmers intercropped bambara groundnut with maize (Table 8).

Table 7. Cropping systems practiced by bambara groundnut farmers in Benue and Kogi States of Nigeria

	Benue State		Kogi State			
Cropping systems	Ogbadibo LGA	Kwande LGA	Olamaboro LGA	Total	%	Mean
Sole	17	8	48	73	30.41	24.33
Intercropped	54	72	32	158	65.83	52.66
SE (±)	18.50	32.00	8.00	42.50	17.71	14.16

Table 8. Companion crops of bambara groundnut in Benue and Kogi States of Nigeria

Companion crops	Benue State		Kogi State			
	Ogbadibo LGA	Kwande LGA	Olamaboro LGA	Total	%	Mean
Cassava	17	34	48	99	41.25	33.00
Cassava/ cowpea	17	46	10	73	30.41	24.33
Maize	3	0	0	3	1.25	1.00
Maize /cassava	33	0	3	36	15.00	12.00
Maize/cassava/ cowpea	9	0	3	12	5.00	4.00
Maize/cassava/ pigeonpea	1	0	0	1	0.40	0.33
Cowpea	0	0	4	4	1.66	1.33
Maize/ cowpea	0	0	12	12	5.00	4.00
SE (±)	4.13	6.64	5.64	13.05	5.43	4.35

3.7 Land Preparation for Bambara Groundnut Production in Benue and Kogi States of Nigeria

Most farmers in the study area planted bambara groundnut on ridges (83.33%) while 16.66% planted on heaps. No farmer planted bambara groundnut on flat in the study area (Table 9).

Table 9. Land preparation methods for bambara groundnut production in Benue and Kogi States of Nigeria

Methods of land preparation	Benue State		Kogi State			
	Ogbadibo LGA	Kwande LGA	Olamaboro LGA	Total	%	Mean
Ridge	79	41	80	200	83.33	66.66
Heap	1	39	0	40	16.66	13.33
Flat	0	0	0	0	0	0
SE (±)	26.16	13.34	26.66	61.10	25.45	20.36

3.8 Inter- and Intra- Row Spacing of Bambara Groundnut in Benue and Kogi States

Inter-row spacing of bambara groundnut varied from less than 1 m apart (18.75%) to 1 m (67.91%) and to > 1 m apart (13.33%) (Table 10). Intra-row spacing of bambara groundnut ranged from 5 cm between stands (52.50%) to 25 cm (3.33%) (Table 10). Planting at 10 cm between stands was also common (28.75%).

Table 10. Inter- and intra- row spacing of bambara groundnut in Benue and Kogi States of Nigeria

Inter row spacing	Benue State		Kogi State			
	Ogbadibo LGA	Kwande LGA	Olamaboro LGA	Total	%	Mean
1M	63	29	71	163	67.91	54.33
Greater than 1M	13	11	8	32	13.33	10.66
Less than 1M	4	40	1	45	18.75	15.00
SE (±)	18.35	8.45	22.25	41.66	17.36	13.88
Intra row spacing						
Greater than 25cm	37	0	0	37	15.41	12.33
25cm	6	2	0	8	3.33	2.66
10cm	36	32	1	69	28.75	23.00
5cm	1	46	79	126	52.50	42.00
SE (±)	9.58	11.34	19.66	25.28	10.53	8.42

3.9 Time of Introduction of Companion Crop to Bambara Groundnut in Benue and Kogi States of Nigeria

Farmers (3.33%) planted bambara groundnut at the same time with companion crops (Table 11). Most farmers (42.50%) introduced companion crops into bambara groundnut one week after planting (WAP) the bambara groundnut .Other farmers in both Benue and Kogi states introduced the companion crops 2WAP the bambara groundnut component. Only in Kogi state do farmers (22.50%) plant the companion crop 4WAP bambara groundnut (Table 11).

Table 11. Time of introduction of companion crops into bambara groundnut in Benue and Kogi States of Nigeria

Time of introduction	Benue		Kogi			
	Ogbadibo	Kwande	Olamaboro	Total	%	Mean
At the same time	7	1	0	8	3.33	2.66
1WAP	69	33	0	102	42.50	34.00
2WAP	4	46	26	76	31.66	25.33
1 month after planting	0	0	54	54	22.50	18.00
SE (±)	16.39	11.56	12.88	19.91	8.29	6.64

3.10 Fertilizer Application to Bambara Groundnut in Benue and Kogi States of Nigeria

77.08% of the farmers in the study area did not apply fertilizer to bambara groundnut, while 22.91% did (Table 11). Fifty (50) out of the eighty farmers involved in the study in Kwande LGA (representing 62.50%) applied fertilizer to bambara groundnut. In Olamaboro LGA, only five (5) out of the 80 farmers applied some fertilizers. The farmers in Ogbadibo LGA did not apply fertilizer to bambara groundnut at all (Table12).

Table 12. Fertilizer application to bambara groundnut in Benue and Kogi States of Nigeria

	Benue State		Kogi State			
Fertilizer application	Ogbadibo LGA	Kwande LGA	Olamaboro LGA	Total	%	Mean
Yes	0	50	5	55	22.91	18.33
No	80	30	75	185	77.08	61.66
SE (±)	40.00	10.00	35.00	65.00	27.08	21.66

3.11 Reasons Given by Farmers for not Applying Fertilizer to Bambara Groundnut in Benue and Kogi States of Nigeria

About 70.41% of bambara groundnut farmers in the study area did not apply fertilizer to the crop because they believed that the crop could grow on poor soils, while 29.58% could not apply fertilizer to bambara groundnut due to the high costs of the fertilizers (Table13).

Table 13. Reasons given by farmers for not applying fertilizer to bambara groundnut in Benue and Kogi States of Nigeria

Reasons for not applying fertilizer	Benue State		Kogi State			
	Ogbadibo LGA	Kwande LGA	Olamaboro LGA	Total	%	Mean
Can grow on poor soils	57	51	61	169	70.41	56.33
Fertilizer Is scarce and costly	23	29	19	71	29.58	23.66
SE (±)	17.00	11.00	21.00	49.00	20.41	16.33

3.12 Methods of weeding in bambara groundnut farms in Benue and Kogi States of Nigeria

Weeding was done manually by 87.08% of the farmers while 21.25% of them used herbicides for weed control mainly in Kwande LGA. No farmer in Ogbadibo and Olamaboro LGAs used herbicide for weed control in bambara groundnut farms (Table 14).

Table 14. Methods of weed control by bambara groundnut farmers in Benue and Kogi States of Nigeria

Methods of weed control	Benue State		Kogi State			
	Ogbadibo LGA	Kwande LGA	Olamaboro LGA	Total	%	Mean
Manual	80	49	80	209	87.08	69.66
Herbicides	0	51	0	51	21.25	17.00
SE (±)	40.00	1.00	40.00	79.00	32.91	26.33

3.14 Yields of Bambara Groundnut in Benue and Kogi States of Nigeria

Yields of bambara groundnut were generally low as 52.07% of the farmers in the study area had yields ranging from 100kg/ha to 600kg/ha (Table 15). Yields as high as 1t/ha and above were obtained by farmers (8.33%) from Kwande LGA of Benue State.

Table 15. Yields of bambara groundnut in Benue and Kogi States of Nigeria

Yields (100kg bag)	Benue State		Kogi State			
	Ogbadibo LGA	Kwande LGA	Olamaboro LGA	Total	%	Mean
1-2 bags	0	2	9	11	4.58	3.66
3-4 bags	25	14	1	40	16.66	13.33
5-6 bags	38	14	22	74	30.83	24.66
7-8 bags	16	16	47	79	32.91	26.33
9-10 bags	1	17	0	18	7.50	6.00
More than 10 bags	0	2	0	2	0.83	0.66
SE (±)	6.47	2.83	7.60	13.42	5.59	4.47

3.15 Constraints to the Production of Bambara Groundnut in Benue and Kogi States

Labour and lack of finance ranked the highest consideration by farmers with a mean score of 5 for each of these constraints (Table 16). Pests/diseases were considered next with a score of 2.16. Poor germination of seeds and unreliable rainfall were considered unimportant among the list of constraints in the production of bambara groundnut.

Table 16. Constraints to the production of bambara groundnut in Benue and Kogi States of Nigeria

Constraints	Benue State				Kogi State		Mean score
	Ogbadibo LGA		Kwande LGA		Olamaboro LGA		
	Odoba-Otukpa	Obu-Otukpa	Mbakua-Nanev	Anger-Uyough	Atanigoma-Ade	Ugbamaka-Igah	
Poor soil fertility	3	1	1	1	1	5	2.00
Extension service	1	1	1	1	1	1	1.00
Labour intensive	5	5	5	5	5	5	5.00
Unreliable rainfall	1	1	1	1	2	1	1.16
Pests/ diseases	2	4	1	4	1	1	2.16
Poor market price	1	1	3	3	2	1	1.83
Lack of finance	5	5	5	5	5	5	5.00
Poor germination of seeds	1	1	1	1	1	1	1.00

3.16 Some Popular Bambara Groundnut Landraces Grown in Benue and Kogi States of Nigeria

Karo and Okirikiri landraces were popular among bamabara groundnut growers in Ogbadibo and Olamaboro LGAs, while Adikpo, Sisi and Pavanger landraces were popular in Kwande LGA. Ogbadibo LGA has other landraces like Ekpei-eke, Ekpei-emichi,Ekpei-egede and Okpa-eke that are popular in the communities. Apart from Karo, Okpa-eke and Okpa-eikpa are also popular in Olamaboro LGA (Table 17).

Table 17. Bambara groundnut landraces grown in Benue and Kogi States of Nigeria

Landraces	Benue State				Kogi State	
	Ogbadibo LGA Villages		Kwande LGA Villages		Olamaboro LGA Villages	
	Odoba-Otukpa	Obu-Otukpa	Mbakua-Nanev	Anger-Uyough	Atanigoma-Ade	Ugbamaka-Igah
Karo	✓	✓	×	×	✓	✓
Okirikiri	✓	✓	×	×	✓	✓
Adikpo	×	×	✓	✓	×	×
Sisi	×	×	✓	✓	×	×
Pavanger	×	×	✓	✓	×	×
Ekpei-eke	✓	✓	×	×	×	×
Ekpei-emichi	✓	✓	×	×	×	×
Ekpei- egede	✓	✓	×	×	×	×
Okpa-eke	✓	✓	×	×	✓	✓
Okpa-eikpa	×	×	×	×	✓	✓

Note: √= landrace popular at the site**;** × = landrace not popular at the site

4. Discussion

The study showed that more youths in Kwande (52.50%) and Olamaboro LGAs (43.75%) engaged in the production of bambara groundnut than the elderly. This might not be unconnected with the campaign by various governments in Nigeria encouraging youths to embrace farming in addition to the improved rural infrastructure which is attracting youths to the local communities. Educational qualification of the respondents was high as most of them were literate. This high rate of literacy might be due to the existence of free basic education in the country which has improved school enrolment. The study also indicated that more males (52.91%) than females (47.08%) were engaged in the production of bambara groundnut. This contrasted the works of Gibbon and Pain (1985), Mkandawire and Sibuga(2002) and DFID (2010).These reports indicated that bambara groundnut production was done mainly by female subsistence farmers. Many men might have gone into the production of bambara groundnut because the crop fetches higher income now than it did previously (Tanimu and Aliyu,1995. Most farmers (83.33%) in the study area planted bambara groundnut on ridges and it was intercropped (65.83%) mainly with cowpea and cassava. The continued reliance on intercropping by farmers is might be due to the reasons advanced by Norman (1967). The reports of Norman (1967) indicated that it was relatively more profitable to grow crops in mixtures in Northern Nigeria than in sole, and there was no significant difference between the marginal value product of resource used and the opportunity cost of the resource. The growing of crops in mixtures is consistent with the goal of food security. Also, Ibeawuchi (2007), Rashid *et al.* (2007) reported that farmers intercrop due to a number of factors ranging from population pressure, climatic conditions, and efficient use of land resources, risk management and high economic

returns. This study revealed that 77.08% of the farmers did not apply fertilizer to bambara groundnut. This might be due to the traditional belief in the study area that bambara groundnut could give some reasonable yield without the application of synthetic fertilizer. It is common knowledge that bambara groundnut like most legume crops has the ability to fix atmospheric nitrogen and thus could grow on poor soils (Mulila-Mitti, 1997). This might also be due to the farmers' inability to procure fertilizers as a result unavailability and limited financial resources (Rogers, 1983). On the contrary, however, substantial number of farmers (62.50%) in Kwande LGA applied fertilizer to bambara groundnut which resulted in high yields (≥1ton/ha). This agreed with the findings of Toungos *et al*. (2009) who reported higher yields in plots where fertilizer was applied than in plots without fertilizer in Yola, Nigeria. Farmers in the study area considered cowpea and cassava as good companion crops with bambara groundnut while maize, sorghum and millet were considered as not –so- good companion crops. These cereals (maize, sorghum and millet) are taller and often shade the bambara groundnut, especially at high densities. Ikorgu (1998) had reported that for better performance of the bambara groundnut intercrop, the density of the component crop may have to be reduced for better companionship. The high score indicated for labour and lack of finance as constraints in the production of bambara groundnut in Southern Guinea Savanna Region of Nigeria might not be unconnected with drudgery associated with manual crop production and the general poverty in the rural areas where more than 90% of bambara groundnut is produced. In a study by Achieng *et a*l. (1999) in western Kenya, farmers ranked poor cash flows as a key constraint because they believed that alleviation of the finance constraint would lead to alleviation of many other constraints. Scientific investigation into the suitability of some of the popular landraces of bambara groundnut in the various cropping systems in Southern Guinea Svanna might be necessary to ensure food security in the region.

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