USE OF RECOMMENDED EXTENSION PRACTICES AMONG HUNGRY RICE (ACHA) FARMERS IN BOGORO LOCAL GOVERNMENT AREA OF BAUCHI STATE, NIGERIA

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Abstract: The study was carried out in Bogoro local Government Area of Bauchi State to assess the use of recommended extension practices among hungry rice Acha (*Digitaria exillis*) producers. Three wards were selected from each of two districts; while two villages were selected from each of the six wards making a total of twelve villages to be sampled. A structured questionnaire was designed and distributed to 185 respondents proportionally. The data collected were analyzed using descriptive statistical tools such as frequency, percentage, mean, standard deviation and three rating scale type statistics. The result shows that majority of the respondents were married (82.49%), between 31-50 years (79.66%), female (82.49%), with family size of (5±1.49). majority of the Acha farmers had one form of education or the other (94.91%), had farming experience of (9±2.66) years, with farm size of (4±1.26)ha implied that the Acha farmers in the study area are still operating at a subsistent level. The results also indicated that majority of the Acha farmers were aware of the recommended extension practices on Acha (98.31%) for between 5 and 7 years (69.49%), mostly through extension agents (61.58%). From the nine recommended extension practices on Acha production tested, the result revealed that five were effective. The use of improved Acha seed, use of recommended seed rate, use of recommended planting time, use of recommended fertilizer and use of correct harvesting time. While four of the practices were not effective use of seed treatment chemical, use of recommended fertilizer rate, use of pesticide, use of herbicide. It is therefore, recommended that extension agents should focused on training Acha farmers on use of four recommended extension practices. use of seed treatment chemical, use of fertilizer rate, use of herbicide and use of pesticide in order to increase their Acha production in the study area.

Keywords: Acha, Bogoro, extension practice, farmers, descriptive statistical tool

Introduction

Acha (*Digitaria exillis*) is a cereal crop from a grass family. It is probably one of the oldest African cereal for the thousands of years, West African have cultivated it across the dry savannas, in fact, It was their major food even through few other people have ever heard of it. This crop still remains important in areas scattered from Cape Verde to Lake Chart, Mali Burkina Faso, Guinea and Nigeria (Philip, 2006). Despite its ancient heritage and widespread, importance, knowledge's of Acha's evolution, origin distribution and genetic diversity remains scanty even within West Africa itself. Part of the reason for they has been misunderstood by scientist. This neglect made it to be considered as a lost crop of Africa. However, Acha is being gradually rediscovered and considered for improvement as cultivated species (Ibrahim, 2001; Morales Payan *et al.*, 2002). More and more farmers are engaged in its production. In the year 2002, a total of 347, 330, hectares of land were devoted in its production in Africa with Nigeria, alone providing almost half of the area (FOASTAT, 2003). Acha is grown in various parts of Nigeria, Sierra-lion, Ghana Guinea, Bissau, Senegal, Togo, Mali, Benin Republic and Cote d'Ivoire, and Acha is known by various communities in Africa such as "*findin*" in Senegal, "*findo*" in Gambia, "*Falio*" in Sere-lion, in Mali "*Foni*" in Burkina "*Faso"*, "*Kpendo*" in Guinea, "*Podgi*" in Benin republic, *"pom/polin"* in Cote Devior and "*hungry rice*" in English (Gyang and Wuyep, 2005). In Nigeria, acha is grown in commercial quantities in some state such as Bauchi, Kaduna, Kebbi, Plateau, Nasarawa, Niger, Gombe and FCT Abuja with Plateau state being the highest producer with an estimated production of 20,000 ton per annum (Gyang and Wuyep, 2005). Acha is an annual cereal and erect herbaceous plant which reaches stature heights from 30 - 80 centimeters. The ears consist of two to five narrow pan ears, which are up to 15 centimeter long, Acha is usually cultivated only type of and areas traditional hand tools.

It is a small herbaceous annual plant that grows to heights of 30-80 cm. Research shows that farm areas of below 1 hectare are used its cultivation (Kwon-Ndung and Misari, 1999; Kuta *et al.*, 2003). According to their research study, it said that the production is generally considered laborious, so also is its harvesting and processing.

Final processing of Acha before usage is the hulling which is the separation of the hull (outer covering) from the grain of a crop either mechanically or manually by either impact of shearing. Acha (*Digitaria exillis*) is reported to have originated in West Africa where it is consumed as a cereal and remains an important crop in Eastern Senegal, Northern and southern Kaduna, Bauchi, Western Burkina Faso, Southern Mali and other African countries. In Nigeria, several names are used in calling Acha such as *Findi, Fonia, Tzwan, Chid, Funde, and Findo* (Jideani, 1999). According to (Gyang and Wuyep, 2005) Acha contains about 7% crude protein that is high leaucine (9.8%) methionine (5.6%) and saline (5.5%), (Temple and Bassa, 1991) in their research studies 1. It can make into numbers of dishes such as porridge and *cuscus.* It is mixed with other ingredients to make bread, kuskus, kamu, pastries, popped and beer brewing. It can also be used as ling food and it is recommended for diabetes patients by doctors, thus making the cereal very costly and unaffordable for many. The consumption of cereal such as biscuits and bread has become very popular in Nigeria especially among children and these foods contain poor sources of protein often of poor nutritional quality.

Therefore, consumption of Acha can serve as a substitute for search of nutritious meal (Alobo, 2001) the crude protein in Acha is 7%; it also has leaucine at 9.8%, menthionine properties at 5.6% and valine at 5.8% with high brewing and malting properties. According to Kowalski (2010), research and development on Acha cereal grains is experiencing renewed interest in Africa and the rest of the world, particularly for its flavour and nutritional qualities. (Jideani *et al.*, 2000; Shewry, 2002) in their research and development stated that Acha proteins have composition similar to that of rice (Temple and Bass, 1991; Jideani and Akingbala, 1993), but having relatively higher Sulphur amino acid (methionine

and cysteine) content. In studies by De Lumen *et al.* (1993); Jideani *et al.* (1994), they stated that sulphur amino acids are crucial for proper heart function and nerve: transmissions and that the cereals are essential sources of amino acids for people with low intake. According to Jideani and Akingbala (1993) stated that nutrients are now said to play a role in diabetes. It is believed that Acha have more nutrients needed by the body to prevent and manage type 2-diabetes. The resistant starch is part of some ingredients that assist in preventing and managing pre-diabetes and type 2-diabetes.

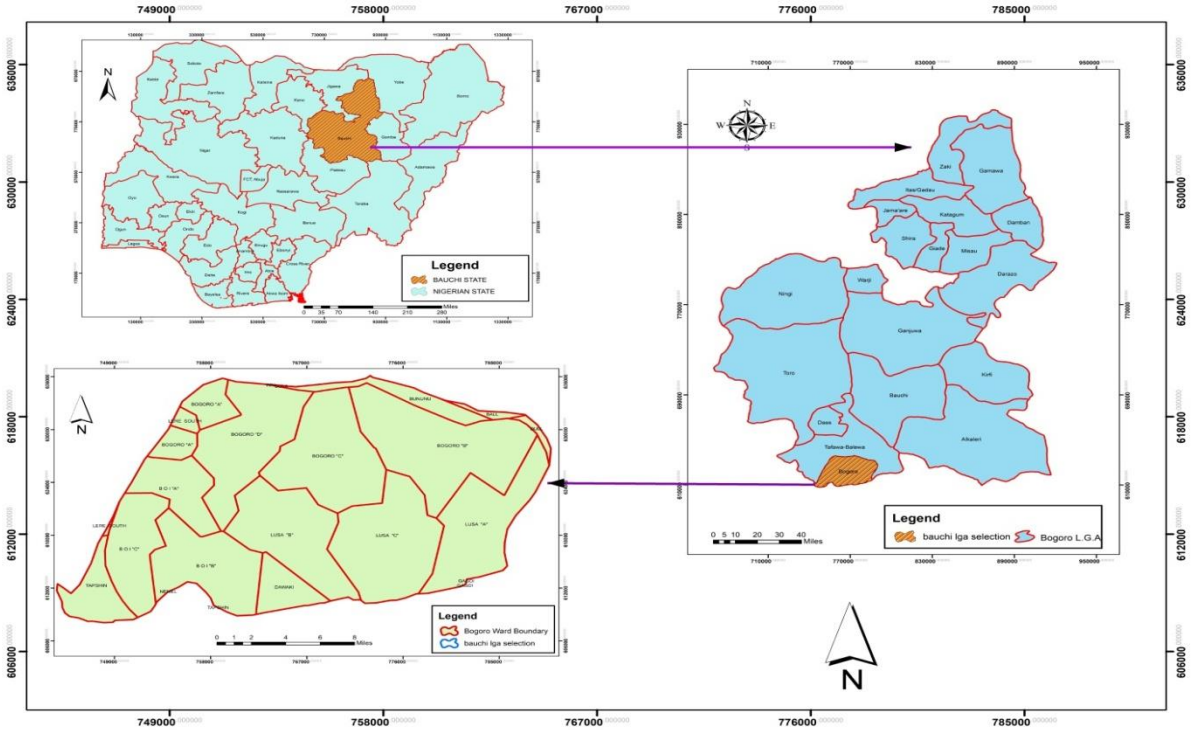
Materials and Methods

The major economic activity of the area is agriculture with a combination of trade, art and craft practiced by some people. The major crops in the areas are maize, groundnut, rice and Sorghum. In addition, Livestock types found in the area include cattle, sheep, goats, pigs and poultry (Bogoro LGA, 1999), as seen in Fig. 2.

The study area is Bogoro Local Government Area of Bauchi State, Nigeria. Bogoro Local Government area is one of the 20 LGAs that made up Bauchi state which is approximately 83 km away from the state capital and is located in the southern part of state capital. Its headquarters is in the town of Bogoro. Za'ar or Sayawa people are the majority of its inhabitants. Bogoro Local Government Area (LGA) has a land area of 894 km² and with an estimated population of 84,215 people and about 80-95% of its population being farmers involved in both crops and animal production (Bogoro LGA, 1999; NPC, 2006).

Bogoro LGA is located between latitude 9.30^0 and 120^0 north of the equator and longitude 8.5^0 and the Greenwich meridian and has latitude of about 690.2 m above sea level. In terms of local government boundaries, it is bordered by Kanke Local Government Area of Plateau state to the south, Tafawa Balewa local government area of Bauchi state to the north, west and to the eastern parts, respectively. Bogoro local government area experience both rainy (cropping) and dry seasons which occur between late October and April, while the Rainy (cropping) season occur between early May and late October. The mean annual rainfall is 680 mm; the temperature ranges from as low as 11^0C to as high as 40^0C sometimes. The landscape of this area is slightly undulating towards the South and toward the East. The vegetation compositions comprise both scanty and thick vegetation (Bogoro LGA, 1999).

The major economic activity of the area is agriculture with a combination of trade, art and craft practiced by some people. The major crops in the area are Maize, Groundnut, Rice, Acha and Sorghum. In addition, Livestock types found in the area include Cattle, Sheep, Goats, Pigs and Poultry (Bogoro LGA, 1999), as seen in Fig. 1.



Source: Bauchi State Official Diary, 2019

Fig. 1: Locational Map of the study area Bogoro Local Government Area, Bauchi State Nigeria

Data were collected from both Primary and secondary source. Primary data were collected with the use of questionnaire. Secondary data were collected from published journal, conference proceeding. The questionnaires were pre-tested using smaller group to ensure its reliability, before the full-scale administration to the respondents. In this study, Multi stage, random sampling techniques were adopted in the selection of respondents.

In the **first stage:** Two districts in the local government area were selected purposively because of their prominence in Acha production in the area. This includes Bogoro (District 1) and Lusa (District 2).

Second stage: Three (3) wards were randomly selected from each district making a total of six (6) wards for the study. These wards include; Bogoro, Bar and Gobbiya from Bogoro District, while Lusa, Badagari and Tadnum- Banram from Lusa District were selected.

Third stage: Two villages were randomly selected from each ward to make a total of twelve (12) villages. List of the farmers were obtained from the villages by extension agent.

Forth stage: One hundred and eighty five (185) respondents were randomly selected in the villages showing in Table 1, using Taro Yamane (1967) formula of sample size determination as adopted by Joy *et al.* (2017). However, 177

questionnaires were correctly retrieved and used for the analysis.
The formula is stated as:

$$n = \frac{N}{1+N*(e)^2} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where: n= the sample size; N= the sampling frame; e= acceptable sampling error
95% confidence level and p= 0.05 are assumed

Data collected were analyzed using descriptive and three rating point scale type statistics. The descriptive statistics used were mainly frequencies count, means and percentages to analysing objectives 1, 3 while the 3-point rating scale type analysis was used to analyze objectives 4.

The mean is expressed as:

$$X = \frac{\Sigma fx}{n} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Where: X = Mean; Σfx = sum of individual observation; n = sample size

Results and Discussion

Table 1 shows that majority of the respondents 41.24% are within the age range of 31-40 years. This implies that the youth had enough energy, were healthier and stronger to be engaged in a tedious work of the production of Acha cereal which is labour intensive. This result suggests agrees with the finding of Philip (2006). (82.49%) were Females while 17.51% were Males. This shows that majority of the respondent were Females. This implies that there were more female Acha producers than males. This could be attributed to the fact that Acha cereal is considered as female related cereals produced by women, while males are more involved in producing other cereals/grain crops such as corn, millet and guinea corn. This finding agrees with Philip (2006) result.
The result also indicates that majority (70.62%) of respondents are married with highest respondents (47.46%) having family size (5±1.49%). By implication, that there is need of farming in order to increase production of agricultural produce to ease the feeding challenges of their homes: That means farmers with large families size have more access to family labour, skills and strong social capital to adopt to changing situation. While those with small, family have to adopt on hired labour Philip (2006) many of the respondents have Farm size of (4±1.26) ha of farm. Table 1 the result also indicates that majority of the respondents have (67.80%) farming as major occupation. It shows that most (94.91%) of the respondents had one form of formal education or the other and are literate. Since most of them are literate it could have a positive influence on the use of recommended extension practices on Acha production in the study area. The result agrees with the finding of Nwaru and Onuoha (2010) that a greater percentage of small holder crop farmer (both credit using and non-credit farmers) in Imo State, Nigeria only attended secondary school or its equivalents.The results also reveal that the majority of the respondents have farming experience of (9±2.66) years in Acha production; this implies that the respondents are not just farming Acha but have had many years of farming Acha cereal. This experience combined with adequate farm resources will translate into profitable agricultural production. This implies that farmers in the study area known about the plant called Acha.

Table 1: Socio-economic characteristics of respondents in the study area

Characteristics	Frequency	Percentages	Mean
Sex			
Male	31	17.51	
Female	146	82.49	
Total	177	100	
Age (Years)			
21-30	23	12.99	40
31-40	73	41.24	
41-50	68	38.42	
51 and above	13	7.34	
Total	177	100	
Marital status			
Single	23	12.99	
Married	125	70.62	
Divorced	3	1.69	
Widowed	26	14.69	
Total	177	100	
Family Size			
1-3	32	18.08	5
4-6	84	47.46	
7-9	48	27.12	
10-12	11	6.21	
13 and above	2	1.13	
Total	177	100	
Farm Size (Ha)			
1-2	35	19.77	4
3-4	116	65.54	
5-6	21	11.86	
7-8	4	2.26	
9 and above	1	0.56	
Total	177	100	
Occupation			
Farming	120	67.80	
Civil servant	49	27.68	
Business	8	4.52	
Total	177	100	
Education Level			
Non formal education	9	5.08	
Primary education	1	0.56	
Secondary education	103	58.19	
Tertiary education	64	36.16	
Total	177	100	
Farming Experience (Years)			
1-5	21	11.86	9
6-10	46	25.99	
11-15	69	38.98	
16-20	36	20.34	
21 and Above	5	2.82	
Total	**177**	**100**	

Source: Field Survey, 2019

Table 2: Distribution of the respondents based on the used of recommended extension practices on Acha production

Recommend Extension practices	Used	%
Use of improved Acha seed	176	99.44
Use of seed treatment chemical	26	14.69
Use of recommended seed rate	15	8.47
Use of recommended planting time	153	86.44
Use of recommended fertilizer	173	97.74
Use of recommended fertilizer rate	172	97.18
Use of herbicide	166	93.79
Use of pesticide	157	88.70
Use of correct harvesting time	175	98.87
Total	**1,213***	

Source: Field Survey, 2019; *Multiple responses

The extent on the use of recommended extension practices on Acha production by the respondents

The various use of recommended extension practices used by the respondents from Table 2 as a result of use of the recommended extension practice on Acha production indicated that 99.44% make used of improved seed, 98.87% used of recommended planting time, 97.74% used of recommended fertilizer, 97.18% used of fertilizer rate, 93.79% used of herbicide, 88.70% used of pesticide, and use of recommended planting time 86.44% were identified as used among the recommended extension practices on Acha production by the farmers in the study area. This could be attributed to the fact that all the recommended extension practice on Acha production identified used by the farmers was those that increase production unlike the others who do not used seed treatment chemical and seed rate in Acha production in the study area. While this shows that the respondent made use of the recommended practices on Acha production in the study area to help to increases their production. This was similar to Ogunwale *et al.* (2006) that all the farmers sampled indicated that the used of farm technologies increased yield and productivity

Rating of recommended extension Acha production practices by the farmers

The result about the rating of various recommended extension practices on Acha production by farmers from Table 3 was determined using a three rating scale of Very effective (3), effective (2), and Not effective (1) where items that scored a mean scale of 2.50 and above was deemed effective otherwise any mean scale less than 2.50 was deemed not effective in recommended extension practices on Acha production practices by respondents in the study area. The Use of improve Acha seed (mean=3.20), use of recommended seed rate (mean=2.80), use of recommended planting time (mean=2.90), use of recommended fertilizer (mean=2.86), and use of correct harvesting time (mean=2.79) were identified as the most effective among there commended extension practice on Acha production while the use of seed treatment chemical (mean=1.98), use of recommended fertilizer rate (mean=2.12),use of herbicide (mean=2.47) and use of pesticide (mean=1.68) were identified as not effective among the recommended extension practices on Acha production by the respondents in the study area. Table 3 This could be attributed to effective use of recommended extension practice on Acha production were identified effective by the farmers were said that offer the opportunity for the farmers to increase production unlike the others who do not consider the use of seed treatment chemical, use of recommended fertilizer, use of herbicide and use of pesticide as non-effective in Acha production in the study area. Most farmers (67.9%) attributed lack of use of the recommended extension practices to inadequate capital while 29.3% said they lacked adequate knowledge about the use of recommended practices. This agrees with the finding of Garba (2008) who stated that lack of necessary extension teaching was the most serious problems why some farmers in Nigeria did not adopt the improved farm practice introduced to them.

Table 3: Information on rating of recommended extension practices on Acha production by farmers in the study area

Statement	VE (3)	E(2)	NE(1)	TS	Mean of each REPAP	Remark
Use of Acha seed	134(75.71)	22(12.43)	121(68.36)	567	3.20	Effective
Use of seed treatment chemical	54(30.51)	22(12.43)	101(57.42)	351	1.98	Not effective
Use of recommended seed rate	154(87.01)	10(5.65)	13(7.34)	495	2.80	Effective
Use of recommended planting time	166(93.76)	5(2.82)	6(3.39)	514	2.90	Effective
Use of recommended fertilizer	155(87.57)	18(10.17)	4(2.26)	505	2.86	Effective
Use of recommended fertilizer rate	36(20.34)	126(71.19)	15(8.47)	375	2.12	Not Effective
Use of herbicide	90(50.85)	81(45.76	6(3.39)	438	2.47	Not Effective
Use of pesticide	35(19.77)	51(58.81)	91(51.41)	298	1.68	Not Effective
Use of correct harvesting time	145(81.92)	27(15.25)	5(2.82)	494	2.79	Effective
Total					**22.80**	

Source: Field survey, 2019; Figures in parentheses are percentage

$Mean\ of\ REPAP\ \bar{X} = \frac{TS}{TNR}$

$Total\ mean\ of\ REPAP\ \bar{X} = \frac{\sum REPAP\ \bar{X}}{NS} = \frac{22.80}{9} Total = 2.54$

Note: VE= very effective, E= effective, NF= not effective, $\bar{X}$ = Mean

REPAP = Recommended Extension Practices on Acha Production

TS= Total Responses Score; TNR= Total Number of Respondents; NS= number of statement

- Any mean score below 2.5 is termed Not effective, while the mean score equal or above 2.5 is effective

Technology adoption among farmers is higher when extension services are made available. Through extension services, farmers get to know the benefits of new technology through extension agents. Extension agent acts as a link between the innovators (Researchers) of the technology and users of that technology. This helps to reduce transaction cost incurred when passing the information on the new technology to a large heterogeneous population of farmers (Genius *et al.*, 2013). Extension agents usually target specific farmers (farmers with whom a particular farmer interacts) exerting a direct or indirect influence overall population of farmers in their respective areas (Genius *et al.*, 2013). Many authors have reported a positive relationship between extension services and technology adoption. This is because exposing farmers to information based upon innovation-diffusion theory is expected to stimulate adoption (Uaiene *et al.*, 2009).

Conclusion

Base on the results obtained, the study therefore concluded that a reasonable number of individuals were aware and used the recommended extension practices of Acha production in the study area. However, rating of various recommended extension practices on Acha production by farmers in the study area. The results indicated that use of improve Acha seed, use of recommended seed rate, use of recommended planting time, use of recommended spacing, use of recommended fertilizer, use of recommended fertilizer rate, use of herbicide and use of correct harvesting time were

identified as the most effective among the recommended extension practice on Acha production by the farmers in the study area, while the use of seed chemical and use of pesticide were not effective on Acha production.

Recommendation

i. Extension agents should focused on training Acha farmers on using the recommended extension practices. use of seed treatment chemical, use of fertilizer rate, use of herbicide and use of pesticide in order to increase their Acha production.

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