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Small Scale Rice Farmers' Production Information Needs for Sustainable Development in Bakori Local Government Area, Katsina State

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Abstract

The recent Nigeria Federal Government interest in agriculture with particular reference to rice production necessitated evaluation of small scale information needs in Bakori Local Government, Katsina State being one of the major rice producing areas in the Northern part of the country. A total of 120 farmers were investigated using closed structural questionnaires in 15 villages of Tsiga, kwanki and Magawata districts. Data were subjected to descriptive statistics and mathematical techniques using confrontation indexes (CI). Results showed that 70.8 % of married men (65 %) dominated rice production with experience of ≥ 16 years (41.7 %). Of the 14 identified information need, 12 were highly needed with pest management (2.11) and marketing (2.0) ranking high while information on knowledge of planting technique (1.48) and soil fertility (1.46) ranked low. It was also observed that, Non-Governmental Organization (15.3 %), farmers based organization (14.9 %) and advice among farmers (14.6 %) dominated sources of technological information in Bakori. Although Bakori rice farmers were experienced, production is impeded by inadequate technological information dissemination (2.09), poor educational background in rice production (2.03) and lack of fund (2.02). Hence, there is a need to involve women for gender balance in rice production. Furthermore, farmers should be assisted in funding farming activities while functional extension services are needed in guiding and retraining of farmers through farm shows and demonstration using modern information systems that improves production, livelihood and standard of living of farmers in Bakori and Nigeria in general.

Keywords: *Information, Sources, Innovation, Technology needs, Farmers*

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Background to the Study

A total of 158 million hectares of land are cultivated in over 100 countries with a corresponding rice paddy production of 700 million tonnes and 470 million tons of milled rice. Out of which Asia produced 640 million tonnes representing 90 % of global production (ricepedia.org). In Nigeria, paddy rice production increased from353,000 tonnes in 1968 to 9.68 million tonnes in 2017 at average annual rate of 9.76 % (knoema.com), making rice farming a profitable agribusiness (fao.org), considering the local demand and its high export potentials. Currently, Nigeria rice production stands at 1.5 million metric tonnes against the 5 million metric tonnes required per year (Ochoga, 2015; Osayinlusi and Adenegan, 2016), hence the country depend largely on importation to supplement the domestic requirement (Hassan, 2016; Alfred, Kayoma, and Nwokoye, 2018), even after restriction policy.

Rice is highly priced and very important stable food, however the price has gone out of reach of middle income Nigerian (Omofonmwan and Kadiri, 2007), hence the need for means, attitudinal and technological change towards empowering poor resource farmers that constitutes above 70 % of the population in food production (Okoruwa and Ogundele, 2006; Nwanosike, 2009).Although Nigeria is presumed the largest producer and consumer of rice in West African sub region, the country consumes more than its production (Zarmai, Okwu, Dawang, and Nankat, 2014).Nevertheless, Nigeria ecology and soil supports cultivation of both upland and swamp rice in the different geo-political zones (Ambali, Adewuyi, Babayanju, and Ibrahim, 2015), as such adequate agricultural information will enhance rice productivity and facilitate poverty alleviation among farmers in the major producing areas (Tiamiyu, 2001; Adebayo, 2006).

Information and farm inputs are valuable tool in agricultural and rural development (Morrow, Nielse, and Wettasinha, 2002; Oguya, 2007), however available information targets policy makers, researchers and students (Omenesa, 2007) instead of the small scale poor resource farmers that are *sine quo non* in the transformation of traditional agriculture (Tologbonse, Fashola and Obadiah, 2008). Consequently, the inadequate access and dissemination of scientific farm information delivery has direct relationship with the low innovation, poor productivity and food insecurity (Tadesse, 2008; Nwanosike, 2009), hence farmers require well organized and properly package relevant information with good delivery system.

An organized extension system that uses traditional and modern methods of communication like radio, television and mobile phones improved the knowledge of farmers in agricultural practice (Yahaya, 2002; Nwanosike, 2010; Zarmai, Okwu, Dawang, and Nankat, 2014). Information from other sources such as non-governmental organization (NGOs), farmer-based organization (FBO), private sector through contact to farmers and input dealers (agrochemical and fertilizer) has been reported to increase farmer's productivity (NSSO, 2005; Swanson and Rajalahti, 2010). Information and Communication Technology (ICT) devices such as use of computers, internet and digital appliances supported farming activities (Anastasios, Koutsouris, and Konstadinos,

2010), however are influenced by level of literacy and financial capability of the farmers in a given environment (Coudel and Tonneau, 2010). Although such facilities appeared to be expensive, with the enactment of favourable national policy, farmer's education, functional cooperative and formation of agricultural organization, farmers will not have problems in the application of ICT (Nwanosike and Yaroson, 2008; Nwanosike, 2010).

Information needs of rice farmers centered in production (Wesseler and Brinkman, 2002), soil and land management (Tologbonse *et al*., 2008), and rural access to credit (Alfred, Kayoma, and Nwokoye, 2018). Others areas of needs include improved variety of crop, new cropping systems, new irrigation methods, fertilizer and pesticide applications, efficient processing methods, improved marketing systems and adequate storage system. Such measures according to Okwu and Umoru (2009), needs to be addressed through efficient information system.

The need for self-reliance and sufficiency in rice production necessitated policy on the restriction of imported rice to encourage small scale farmers who in spite of their efforts, production still remains below requirement. Bakori is a major rice producing area in Katsina State and over the years, concerns has been on traditional production methods and inputs such as fertilizer and pesticides neglecting sources of information and technological needs. The current government interest in local rice production demands that the means, knowledge and attitude (Nwanosike, 2009) of the farmers should be geared towards improving traditional farming using proven technology and adequate information system at the right time in the prominent production areas. Therefore the study will establish areas of information needs of rice farmers in Bakori with the view to improving production for sustainable development.

Objectives of the study

The study seeks to;

1. Determine demographic information of the farmers
2. Identify farmers' source(s) of information in rice production
3. Assess farmers perception on information needs in rice production and
4. Determine the problems of rice production

Research questions

The study will provide answers to the following research questions;

1. Does the personal attributes of the farmers influence their participation in rice production?
2. What are the sources and does the available sources has a relationship to productivity
3. What are the rice production information needs of Bakori farmers?
4. What are problems militating against accessibility of rice production information by the small scale farmers in Bakori?

Agriculture contributed immensely to the Gross Domestic Product of the Nigeria economy before the discovery of oil in the 1970s, since the successive government has established several Agricultural Programmes to revamp the sector without success. Rural oriented agricultural policies particularly in the North West and North East with very high poverty index, adequately funded and well monitored low input agricultural activities, no doubt will reposition Nigeria agriculture (Nwanosike, 2017). The ban and restriction on importation of rice in Nigeria is therefore a right step in the right direction to improving self-sufficiency and equip small scale farmers with up-to date information on current technology, knowledge, competencies and attitudes to boost local rice production (Alfred *et al*., 2018) and reduce the present price of rice, diversify economy and solve the problem of food insecurity.

Materials and Method

The study was carried out in three prominent rice producing districtsviz; Tsiga, kwanki and Magawata using a total of 120 validated closed structured questionnaires which were randomly distributed at 40 questionnaires per districts. Five villages and eight farmers were selected in each district for the investigation. The instrument comprised of socio-economic characteristics of the farmers, sources of information, information needs and problems of rice production. The instrument was administered in the farm with coordinated local research assistants that speak Hausa language fluently in collaboration with head of rice farmers in the selected areas during the 2019 growing season. Validation of the instrument was done by experts in the Department of Agricultural Education, Federal College of Education, Zaria, while test and reliability of the instrument was determined using Pearson Product moment Correlation Statistics at 0.88 reliability coefficients.

A 4 point scale of strongly agreed (SA), agreed (A), disagreed (D) and strongly disagreed (SD) were assigned to the identified 7 problems and 14 information needs of the rice farmers with a corresponding weighted values of 3, 2, 1 and 0 (Alfred *et al*., 2018) while multiple choice were allowed in the sources of information.

Data on socio economic characteristics and sources of information were subjected to descriptive statistics while farmers' information needs and problems were analyzed by mathematical techniques using confrontation index (Aurup, Islam and Uddin, 2017) with modification as follows;

$$ICI = [I_{SA}x3] + [I_{A}x2] + [I_{D}x1] + [I_{SD}x0]$$

Where

ICI = Information needs confrontation index
SA = Number of farmers that ticked strongly agreed in each item
A = Number of farmers that ticked agreed in each item
D = Number of farmers that ticked disagreed in each item
SD = Number of farmers that ticked strongly disagreed in each item

$$PCI = [P_{SA}x3] + [P_{SA}x2] + [P_{SA}x1] + [P_{SA}x0]$$

Where

PCI = Problem confrontation index
SA = Number of farmers that ticked strongly agreed in each item
A = Number of farmers that ticked agreed in each item
D = Number of farmers that ticked disagreed in each item
SD = Number of farmers that ticked strongly disagreed in each item

The expected range of information needs (ICI) and problems of production (PCI) were 0-480. The mean was calculated by dividing each confrontation index with total number of farmers used in the investigation. A mean decision bench mark of 0-1.49 were regarded as not needed or not accepted, 1.5-1.9 was fairly needed or not a serious problem, 2.0-4.0 were needed and accepted problems in rice production.

Results and Discussion

Results in Table 1 showed that 70.8 % of the farmers were male within the productive age range of 31 to 40 years (38.3 %). Tiamiyu, Ukwungu, and Ochigbo, (2010) reported that age and income influences positively in the adoption of agricultural technology when education is high and negative when education and experience is low. Results also revealed that 41.8 % of the farmers attended tertiary institutions and dominated by married men (65 5 %) with ≥16 years of rice production experience (41.7 %), indicating that most farmers were married males with high level of education, however majority were not in the area of agriculture. Ambali*at al*. (2015) reported rice production as a stressful, intense and time consuming activity and maybe responsible for the gender lopsidedness in Bakori, although field experience showed that the females participate mostly in processing (threshing and winnowing) and marketing of the rice (Idris, Gwary, and Shehu, 2008).

Alfred *et al*. (2018) earlier reported non formal educated males' farmers within average age of 43.9 years dominated rice farmers in Edo State. The differences in the educational background may be associated with the expensiveness of attending tertiary institution in the Eastern and Mid-West Nigeria which the farmers cannot afford, lack of government subsidy and or free education and availability of tertiary institutions. The proximity of institution and programmes such part-time in the Universities, Polytechnics and Colleges (weekend programmes) base on field observation encouraged farmers' education in the North particularly in North West where such incentives are relatively available. In spite of institutions in Katsina State, Bakori is close to Zaria, a cosmopolitan city with over 16 Federal Government tertiary intuitions where most of the farmers studied.

The educational experience of the farmers is therefore an advantage to training of the farmers because Omofonmwan and Kadiri (2007), reported that literacy level of farmers determines rate of diffusion and responsiveness to agricultural innovation. Farming experience of more than 16 years implied that most farmers had good knowledge of rice

cultivation, because there is positive relationship between experience and rice production (Obasi, Henri-Ukoha, Ukewuihe, Chidiebere-Mark, (2013), Alfred *et al*., 2018).

Table 1: Demographic information of the rice farmers' in Bakori Local Government Area, 2018

N = 120

S/no	Characteristics		Frequency	Percent (%)
1	Sex	Male	85	70.8
		Female	35	29.2
2	Age	≤ 20-30	44	36.7
		31-40	46	38.3
		≥ 41	30	25.0
3	Marital status	Single	27	22.5
		Married	38	31.7
		Divorced	55	41.8
4	Education	Primary	33	27.5
		Secondary	78	65.0
		Tertiary	9	7.5
5	Experienced	≤ 1-5	7	5.8
		6-10	30	25.0
		11-15	33	27.5
		≥ 16	50	41.7

N = number of farmers used for investigation, Age and experience is in years, education is last qualification acquired, ≥ is greater or equal to, ≤ is less or equal to

Results (table 2) showed that 29.1 % information was acquired from parents, friends and other experience farmers' indicating that rice production is basically traditional subsistence. Earlier, Omodara, *et al*. (2020) reported that friends and family dominated crop production in Kauru. Other sources of information were through non-governmental organization, farmers based organization, On-farm demonstration by seed, herbicides and pesticide companies. Information acquisition through mass and printed media (12. %), extension agents (11.5 %) and farm shows (2.7 %) were relatively low and in some places not available, contrarily to reports (Tologbonse, (2002), Bhagat, Nain, and Narda, (2004), Alfred *et al*., (2018) where extension agents dominated source of rice production information. The inadequate and or inefficient extension services to farmers in Bakori may be responsible for the subsistence rice production technologies.

Similarly, radio and television dominated sources of farming information Yahaya, (2002), Sunuga, Baines, Conway and Naylor, 2020), however, mass and printed media ranked low in study possibly because Bakori is rural environment without electricity to power the media and where available, epileptic power supply discouraged small scale farmers towards the use radio and television (Zarmai*et al*., 2014), coupled with relatively very low agricultural programmes in such media particularly in rice production.

Table 2: Sources of information acquisition used by rice farmers in Bakori Local Government Area, 2018

N = 765

S/no	Sources	Frequency	Percent (%)
1	Parents, friends and experienced farmers advise	223	29.1
2	Non-governmental organization	117	15.3
3	Farmers based organization	114	14.9
4	On-farm demonstration	108	14.1
5	Mass and printed media	95	12.4
6	Extension agents	87	11.5
7	Field days and agric. Shows	21	2.7

N = number of farmers, multiple choice allowed

Fourteen information needs in rice production (Table 3) showed average confrontation indexes of 175 to 254 in CI range of 0 to 480 with a corresponding mean rank of 1.46 to 2.11, indicating that farmers have the knowledge of such information but needs to be trained in the use of the technologies. However, pests and weed management (2.11) followed by marketing information (2.00) were the most needed information for improving rice production, contrary to improved production and post-harvest technologies that are major needs of farmers in Edo State (Alfred *et al*., 2018). This may be probably due to the low education and climatic factors in Edo State. The State relatively humidity is high compared to Bakori and such factors are likely to impede production of farmers. Adequate training on marketing, storage facilities and pesticide application were reported as major needs of rice production in Benue State (Okwu and Umoru (2009), while Tologbonse *et al*. (2008), reported that rural rice farmers in Niger State may be empowered with adequate information on credit facilities, indicating that farmers needs vary with location. Bakori is prominent in rice production but dominated by poor smallholder farmers, continuous cropping over time would have built pests population, hence has become an impediment to production. Poor financial background and storage facilities forces farmers to dispose produce on harvest to middle men. Farmers acknowledged the importance of use of machinery, formation co-operative society and extension services to rice production, however such services are scanty.

Other areas where farmers are aware but needs more information include sources of improved seed varieties, seed management and rice management techniques, sources of credit, irrigation and water management, and post-harvest techniques. Field experience showed that farmers' that were frequently advised by extension agents are more familiar and more knowledgeable with improved agricultural innovations. Tiamiyu *et al*. (2010) earlier reported positive relationship between extension and adoption of innovation and further explained that membership of an association is expected to assist farmers to get easy access to credit and other production inputs. Poor access to low interest credit and allocation, such that was observed in Bakori affected the opportunity to intensify and commercialize agricultural activity (Buah, Nutsugah, Kanton, Atokple, Dogbe, Karikai, Warede, Amankwah…Ndiaye, (2011), Mukhwami, Gathungu, and Kalio, (2020). Results also showed that that farmers were experienced on planting operation (1.48) and soil

management techniques (1.46) but requires fertilizer subsidy and availability to increase production.

Table 3: Rice production information needs of the farmers in Bakori Local Government Area, 2018

N = 120

S/no	Information needs	ICI	Rank	Decision
1	Pests, weeds and disease management	254	2.11	Needed
2	Marketing information	241	2.00	Needed
3	Access to farm machinery	228	1.90	Fairly needed
4	Storage and facilities	227	1.89	Fairly needed
5	Co-operative agents and societies	220	1.83	Fairly needed
6	Extension services	214	1.78	Fairly needed
7	Improved rice seed varieties	207	1.73	Fairly needed
8	Sources of credit	203	1.69	Fairly needed
9	Seed management	210	1.67	Fairly needed
10	Irrigation and water management	199	1.66	Fairly needed
11	Improved rice management techniques	195	1.62	Fairly needed
12	Post-harvest management techniques	190	1.58	Fairly needed
13	Planting operations	178	1.48	Not needed
14	Soil fertility management	175	1.46	Not needed

ICI = Information needs confrontation indexes

Results (Table 4) showed six farmers perceived significant rice production impediments out of seven identified in the study with average problem confrontation index of 91 to 251 (0 to 480) and a corresponding mean rank of 0.76 (language barrier) to 2.09 (inadequate information dissemination). Four major problems were inadequate information dissemination, poor educational background in rice production (2.03), inadequate funds (2.02) and poor format of information presentation (2.01). Although out-dated information and cultural influence constitutes problem in rice production, farmers acknowledged that such factors were not as serious as the four earlier mentioned. Bakori Local Government Area is predominantly a Hausa and Fulani settlement with Hausa language as the medium of communication possibly why language (0.76) is not a limiting factor in rice production.

Reports has shown that language barrier is a major problem in rice production (Tologbonse *et al*., 2008; Alfred *et al*., 2018),possibly due settlement of people from diverse culture and language, however, Tologbonse *et al*. (2008) reported that lack of funds, out-dated information and poor format of information presentation were major impediment in rice production. Although most farmers in the study were educated, field experience showed that majority of the farmers did not read agriculture as a subject and as such affected their farming activity particularly in the interpretation to farming technologies.

Table 4: Problems associated with rice production information acquisition in Bakori Local Government Area, 2018

N = 120

S/no	Problems	PCI	Rank	Decision
1	Inadequate information dissemination	251	2.09	Accepted
2	Poor educational status	244	2.03	Accepted
3	Inadequate of fund for digital information	242	2.02	Accepted
4	Poor presentation of information	241	2.01	Accepted
5	Out-dated information	231	1.93	Accepted
6	Cultural influence	207	1.73	Accepted
7	Language influence	91	0.73	NA

Problem confrontation index, N = number of farmers used, NA = not accepted as a problem

Conclusion

Small scale farmer's information needs are imperative considering that such farmers dominated rice production in Bakori, although at subsistence level. The sources and needs for information to improve production and livelihood of the farmers for now is based on traditional technological transfer and therefore poses a threat to rice production in Bakori, hence will retard self-sufficiency plan of the Federal Government in local rice production. Therefore, farmers needed to be encouraged towards digital forms of acquiring information while improving on extension services and field shows. It is also necessary to assist farmers in pests and weed management, and marketing of rice while ensuring that farmers are given adequate information at the right time for sustainable production.

Recommendations

Base on the finding of the study, the following are necessary for sustainable production of rice in Bakori;

1. The study showed wide gap in female participation and there is a need for gender equality the community heads in rice production
2. There is a need for efficient extension services to assist farmers in up-to date information on marketing and pests management for improved rice production
3. Farmers needs digitalized sources of information for proper dissemination of production technologies
4. There is a need for retraining farmers through demonstrations, field shows and exhibitions for proper skill acquisition in rice production.
5. Farmers should be assisted with credit facilities by State and Local Government, NGOs and other stakeholders to easy their farming activities

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