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The Characteristics of Indigenous Knowledge Systems (IKS) Influencing Their Use in Rice Production by Farmers in Ekiti State, Nigeria

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Abstract: The study examined the characteristics of Indigenous Knowledge Systems (IKS) influencing their utilization by rice farmers in Ekiti state of Nigeria. Two hundred and sixty-six rice farmers were selected through a multi-stage random sampling technique and data procured through the administration of a validated and structured interview schedule. Results obtained through correlation analysis revealed a positive association between IKS utilization and Affordability ($r = 0.17$, $p \leq 0.05$), Effectiveness ($r = 0.08$, $p \leq 0.05$), Communicability ($r = 0.677$, $p \leq 0.01$), Relative advantage ($r = 0.368$, $p \leq 0.01$) and Availability ($r = 0.054$, $p \leq 0.01$). However, a negative association was found between IKS utilization and Environmental-friendliness ($r = -0.351$, $p \leq 0.01$).

Key words: Indigenous Knowledge Systems, rice, farmers, Ekiti state, Nigeria

INTRODUCTION

The high-yielding white grain, *Oryza sativa* was introduced into Nigeria about 1890 and by 1960 has accounted for >60% of the rice grown in that country. Today, rice is cultivated in virtually all the agro-ecological zones of Nigeria. Adewale (2002) observes that the emphasis on rice consumption has shifted from its ceremonial status to a staple food in the country.

In spite of the widespread cultivation and consumption of rice in Nigeria, the local production has been found to be always short of the demand for the commodity (Wudiri and Fatoba, 1992).

In order to improve the output of domestic rice production, programmes embodying imported technologies have been introduced and executed. Such programmes include Special Rice Scheme, National Accelerated Food Production Programme (NAFPP) and River Bain Development Programme. In spite of these programmes, rice production level remains unsatisfactory.

Adewale (2002) suggests this might be due to the neglect of the development of appropriate technology for local rice farmers based on their indigenous knowledge and practices. Adekunle and Okunlola (1997) observe that despite the fact that Nigerian rural communities (which produce the greatest amount of food for the country and excess for export) have produced their own food, made their own farm implements and conducted their own farming activities, the role of Indigenous Knowledge (IK) used has not been appreciated.

Kolawole claims that rural people to which all research development efforts are directed have their own body of knowledge that enables them arrive at decisions which would better their lots. Bro-Kensha *et al.* (1980) had warned to ignore rural people's knowledge, otherwise known as indigenous knowledge, which respects the expertise of indigenous people has come to be regarded as a major contribution to development thinking (Osunade, 1996).

Researchers have observed that indigenous agricultural practices are cost-effective and pose less production risks and environmental degradation (Hansen and Erbaugh, 1987; Vanek, 1989; Alcon, 1999).

Considering the ever growing importance of rice in the diet of Nigerians and the desire for sustainable local production, this study focused on the use of indigenous rice production knowledge system among rice farmers in Ekiti state of Nigeria. Specifically in this study, the characteristics of IKS that have endeared the local people to their uses over the years are investigated. These characteristics are Affordability, Environmental-friendliness, Effectiveness, Communicability, Availability and Relative advantage (Expensiveness).

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MATERIALS AND METHODS

The study was carried out in Ekiti state, one of the South-Western states of Nigeria. The state is located between 4°2 and 5°4'E and Latitude 6°2 and 8°1'N. Approximate population according to 2006 census was 2,384,212 with approximate land mass of 10,898.68 km^2. Majority of the people are Christians, while the major occupation is farming, both cash crops (Cocoa and Kolanut) and food crops (yam, cassava, cocoyam, plantain) are grown in the state. The rainy season is between March and October, while at peak, 1800 mm may be recorded in the Southern part of the state.

Multi-stage random sampling technique was used to select the respondents for the study. Five of the sixteen Local Government Areas (LGAs) of the state were purposively selected based on the level of rice production. The selected LGAs are Efon-Alaye, Ekiti West, Ijero, Oye and Irepo/Ifelodun. Two communities were then randomly selected from each of the LGA, making a total of 10 communities. Respondents were then selected, pro-rata, based on the number of registered rice farmers in the communities. In all, two hundred and sixty-six farmers were selected for the study.

Data were collected through the administration of pre-tested and validated structured interview schedule. Trained enumerators administered the instrument under the supervision of the researchers.

Frequency, percentage and mean were used in presenting the data, while correlation analysis was used in analyzing the relationship between Indigenous Knowledge utilization and IKS characteristics.

RESULTS AND DISCUSSION

Use of indigenous knowledge system: Table 1 shows the distribution of the rice farmers by the types of IKS utilized. Seven categories of IKS were identified, each following the various stages of rice cultivation, processing and storage. The categories are land preparation, soil fertility management, weeding, pests (termite, grass cutter and birds) control, harvesting, processing and storage.

The most patronized IKS under land preparation and management were bush slashing without burning (98.1%), slashing with burning of debris (95.9%), bush fallow (97.4%), shifting cultivation (87.6%), use of hoe (91%) and cutlass (87.6%) for weeding.

For pest control, termites, grass-cutters and birds were the most notorious and destructive pests of padi rice. The most utilized termite control methods were the burying of carbide on the farm (54.1%) and the use of effluent of locust bean solution (53.4%). For grass cutter control, setting of traps (95.9%) and the use of a mixture of lime and gunpowder (46%) were the most employed methods. For the control of birds, all the four indigenous practices were highly utilized. These are the use of human bird scarers (83.4%), use of catapult by human bird scarers (80%), scare crows (62.4%) and use of traditional medicine (51.9%). The use of traditional medicine, even though acclaimed to be the most effective by the farmers, was used least because of the fetishness attached to it which was claimed to be at variance with modern religious practices. For harvesting, the knife was mostly (95.1%) was used, while the stick was mostly used (92.5%) for threshing. Storage in jute bags was the most commonly adopted method by 68.4% of the respondents.

Table 1: Distribution of respondents by IKS utilization (N = 266)

Type of IKS	Frequency	Percentage
Land clearing		
Slashing without burning	261	98.1
Slashing with burning of debris	255	95.9
Soil fertility management		
Bush fallow	259	97.4
Shifting cultivation	233	87.6
Cover cropping	148	55.6
Organic fertilization	102	38.3
Termite control		
Burying of carbide on the farm	144	54.1
Use of effluent from locust bean	142	53.4
Gegemu fruit solution	118	44.4
Burying of dead dog on the farm	78	29.3
Grass cutter control		
Setting of traps	255	95.9
Lime + gunpowder	122	45.9
Digging of trenches round farm	95	35.7
Root of jatropha + saltpeter + common salt	89	33.4
Bird control		
Human bird scarer	222	83.4
Use of catapult + human bird scarers	213	80.0
Scarecrows	166	62.4
Traditional medicine	138	51.9

Field survey, 2008

IKS characteristics

Affordability: For the land clearing methods, >2/3 of the respondents claimed they were highly affordable. In the case of soil fertility management indigenous practices, cover cropping and organic fertilization were claimed to be highly affordable by only about one-third of the respondents (Table 2). This may be due to the cost of acquiring seeds for the cover crop and preparation of organic fertilizer. For termite control, almost all the IKS were claimed to be highly affordable by only one-third of the respondents. This is likely to be due to the fact that the complete control over these methods may be enmeshed in traditional religious practices, which many consider to be at variance with the principles of modern religions which they have embraced. For grass cutter

Table 2: Distribution of respondents by Affordability of IKS (N = 266)

	Not affordable		Less affordable		Highly affordable	
IKS	N	Percentage	N	Percentage	N	Percentage
Land clearing						
Slashing without burning	29	10.9	78	29.3	160	60.1
Slashing and trash burning	71	26.7	20	7.5	175	65.8
Soil fertility management						
Bush fallow	71	26.7	15	5.6	180	67.7
Shifting cultivation	71	26.7	42	15.8	153	57.5
Cover cropping	75	28.2	89	33.4	102	38.3
Organic fertilization	53	19.9	122	45.9	91	34.2
Termite control						
Gegemu fruit lotion	67	25.2	106	39.8	93	35.0
Burying of dead dog	82	30.8	91	34.2	93	35.0
Soaked locust bean effluent	58	21.8	113	42.5	95	35.7
Burying carbide on farm	58	21.8	104	39.1	47	39.2
Grass cutter control						
Setting traps	53	19.9	58	21.8	155	58.3
Lime + gunpowder	44	16.5	142	53.4	80	30.1
Root of jatropha + common salt	38	14.2	148	55.6	80	30.1
Digging trench round farm	89	33.4	80	30.1	98	36.8
Bird control						
Scarecrow	82	30.8	67	25.2	118	44.4
Human bird scarer	58	21.8	73	27.4	125	50.8
Human bird scarer + Catapult	50	18.8	78	29.3	140	52.6
Traditional medicine	58	21.8	115	43.2	93	35.0

Field survey, 2008

Table 3: Distribution of respondents by environmental-friendliness (N = 266)

	Not harmful		Harmful	
IKS	N	Percentage	N	Percentage
Land clearing				
Slashing without burning	264	99.2	21	7.70
Slashing and trash burning	222	83.4	44	16.50
Soil fertility management				
Bush fallow	264	99.2	2	0.75
Shifting cultivation	253	95.1	13	4.90
Cover cropping	257	96.6	9	3.40
Organic fertilization	251	94.4	15	5.60
Termite control				
Gegemu fruit lotion	219	82.3	47	17.70
Burying of dead dog on far	204	76.7	62	23.30
Soaked locust bean effluent	253	95.1	13	4.90
Burying carbide on farm	248	93.2	18	6.80
Grass cutter control				
Setting traps	164	61.7	102	38.30
Lime + gunpowder	248	93.2	18	6.80
Root of jatropha + common salt	248	93.2	18	6.80
Digging trench round farm	209	78.6	58	21.80
Bird control				
Scarecrow	257	96.6	9	3.40
Human bird scarer	259	97.4	7	2.60
Human bird scarer + Catapult	211	79.3	55	20.70
Traditional medicine	164	61.7	102	38.30

Field survey, 2008

control, only 33.4% could not afford to dig trench round the farm, while >60% considered all the methods affordable; about 80% in the case of setting traps. Regarding all the indigenous methods of bird control, the least proportion (35%) of those who considered all the methods highly affordable was found in the case of using traditional medicine, this may not be unconnected with the fact that use of traditional medicine to scare birds away from the rice farm would involve some fetishism.

Environmental friendliness:. Most of the IKS techniques were considered environmentally friendly otherwise they would have been abandoned. Table 3 shows that it is only the use of traps in controlling grass cutters and use of traditional medicine in bird control that were considered not harmful by 61.7% of the respondents, all others were considered not harmful to the environment by >70% of the respondents. In the case of setting of traps, the argument was that people who did not know about the

Table 4: Distribution of respondents by effectiveness of IKS (N = 266)

	Highly effectiv		Moderately effective		Not effective	
IKS	N	Percentage	N	Percentage	N	Percentage
Land clearing						
Slashing without burning	157.0	59.0	102.0	38.8	7.0	2.6
Slashing and trash burning	202.0	75.9	53.0	19.9	11.0	4.1
Soil fertility management						
Bush fallow	202.0	75.9	53.0	19.9	11.0	4.1
Shifting cultivation	197.0	74.1	58.0	21.8	11.0	4.1
Cover cropping	115.0	43.2	124.0	46.6	25.0	9.4
Organic fertilization	124.0	46.6	124.0	46.6	18.0	6.8
Termite control						
Gegemu fruit lotion	111.0	41.7	120.0	45.1	35.0	13.2
Burying of dead dog on farm	86.0	32.3	122.0	45.9	58.0	21.8
Soaked locust bean effluent	95.0	35.7	144.0	54.1	27.0	10.2
Burying carbide on farm	89.0	33.5	146.0	54.9	31.0	11.7
Grass cutter control						
Setting traps	131.0	49.2	122.0	45.9	13.0	4.9
Lime + gunpowder	126.0	47.4	109.0	41.0	31.0	11.7
Root of jatropha + common salt	120.0	45.1	113.0	42.5	33.0	12.4
Digging trench round farm	95.0	35.7	138.0	51.9	33.0	12.4
Bird control						
Scarecrow	67.0	25.2	171.0	64.3	29.0	10.9
Human bird scarer	115.0	43.2	142.0	53.3	9.0	3.4
Human bird scarer + Catapult	113.0	42.5	142.0	53.3	11.0	4.1
Traditional medicine	115.0	43.2	95.0	35.4	53.0	19.9

Fieldsurvey, 2008

Table 5: Distribution of respondents by communicability N = 266

	Easily communicable		Difficult to communicate	
IKS	N	Percentage	N	Percentage
Land clearing				
Slashing without burning	253.0	95.1	13.0	4.9
Slashing and trash burning	257.0	96.6	9.0	3.4
Soil fertility management				
Bush fallow	259.0	97.4	7.0	2.6
Shifting cultivation	251.0	94.2	15.0	5.6
Cover cropping	208.0	78.2	58.0	21.8
Organic fertilization	193.0	72.6	73.0	27.4
Termite control				
Gegemu fruit lotion	231.0	86.8	35.0	13.2
Burying of dead dog on farm	186.0	69.9	80.0	30.0
Soaked locust bean effluent	242.0	91.0	25.0	9.4
Burying carbide on farm	228.0	85.7	38.0	14.3
Grass cutter control				
Setting traps	259.0	97.4	7.0	2.6
Lime + gunpowder	266.0	85.0	40.0	15.0
Root of jatropha + common salt	211.0	79.3	47.0	17.7
Digging trench round farm	188.0	70.7	78.0	29.3
Bird control				
Scarecrow	191.0	71.8	75.0	28.2
Human bird scarer	248.0	93.2	18.0	6.8
Human bird scare + Catapult	253.0	95.1	13.0	4.9
Traditionalmedicine	122.0	45.9	144.0	54.1

Field survey, 2008

traps may fall victim but in the case of traditional medicine there was no plausible reason to declare it environmentally harmful by the 38.3% who said so.

Effectiveness: Table 4 showas that more people (75.9%) considered slashing without burning of farmland as highly effective than slashing with burning of debris (59%). For soil fertility management, >74% each considered bush fallow and shifting cultivation as highly effective, while 46.6% each considered cover cropping and organic fertilization as moderately effective in restoring soil fertility. For termite control, >80% of the respondents considered all the indigenous methods in use as effective. For grass cutter control, about 95% considered setting of traps as effective, while other methods too were considered effective by >80% of the

Table 6: Distribution of respondents by availability of IKS (N = 266)

	Readily available		Moderately available		Not vailable	
IKS	N	Percentage	N	Percentage	N	Percentage
Soil fertility management						
Organic fertilization	157.0	59.0	73.0	27.4	35.0	13.2
Termite control						
Gegemu fruit lotion	153.0	57.5	62.0	23.3	51.0	19.2
Burying of dead dog on farm	128.0	48.1	53.0	19.9	84.0	31.6
Soaked locust bean effluent	153.0	57.5	71.0	26.7	42.0	15.8
Burying carbide on farm	153.0	57.5	64.0	24.1	49.0	18.4
Grass cutter control						
Setting traps	242.0	93.2	20.0	7.5	5.0	1.9
Lime + gunpowder	138.0	51.9	67.0	25.2	62.0	23.3
Root of jatropha + common salt	131.0	49.2	69.0	25.9	67.0	25.2
Digging trench round farm	118.0	44.4	49.0	18.4	100.0	37.6
Bird control						
Scarecrow	157.0	59.0	29.0	10.9	80.0	30.0
Human bird scarer	213.0	80.0	29.0	10.9	25.0	9.4
Human bird scarer + Catapult	111.0	41.7	73.0	27.4	82.0	30.8
Traditional medicine	186.0	69.9	51.0	19.2	29.0	10.9

Field survey, 2008

Table 7: Distribution of respondents by Relative advantage (N = 266)

	Not expensive		Less expensive		Expensive	
IKS	N	Percentage	N	Percentage	N	Percentage
Land clearing						
Slashing without burning	146	54.9	98.0	36.8	22.0	8.3
Slashing and trash burning	237	89.1	18.0	6.8	11.0	4.1
Soil fertility management						
Bush fallow	239	89.8	18.0	6.8	9.0	3.4
Shifting cultivation	237	89.1	22.0	8.3	7.0	2.6
Cover cropping	200	75.2	58.0	21.8	9.0	3.4
Organic fertilization	168	63.2	84.0	31.6	13.0	4.9
Termitecontrol						
Gegemu fruit lotion	177	66.5	67.0	25.2	22.0	8.3
Burying of dead dog on farm	102	38.3	84.0	31.6	80.0	30.1
Soaked locust bean effluent	146	54.9	98.0	36.8	20.0	7.6
Burying carbide on farm	210	78.9	42.0	15.8	10.0	3.8
Grass cutter control						
Setting traps	195	73.3	55.0	20.7	15.0	5.6
Lime + gunpowder	124	46.6	111.0	41.7	31.0	11.7
Root of jatropha + common salt	151	56.8	84.0	31.6	31.0	11.7
Digging trench round farm	62	23.3	67.0	25.2	138.0	51.9
Bird control						
Scarecrow	160	60.0	60.0	22.6	47.0	17.7
Human bird scarer	191	71.8	44.0	16.5	31.0	11.7
Human bird scarer + Catapult	200	75.2	40.0	15.0	27.0	10.2
Traditional medicine	82	30.8	115.0	43.2	69.0	25.9

Field survey, 2008

respondents. For the control of birds, slightly >40% considered the indigenous methods as highly effective (except in the case of use of scarecrow), while >50% considered them moderately effective (except in the case of traditional medicine -35.4%).

Communicability: Data in Table 5 shows that all the indigenous methods studied were considered to be easily communicable by more by 70% of the respondents except in the case of traditional medicine (45.9%) used for driving birds away from the rice farms. The traditional medicine involved some esoteric incantations which the custodians were not willing to divulge to the users.

Relative advantage: Table 6 shows how expensive the indigenous methods were considered to be by the respondents. Burying of dead dog in the middle of the rice farm to control termites, digging of trenches round the farm for grass cutter control and use of traditional medicine to scare away birds were considered very expensive by 30.1, 51.9 and 25.9%, respectively (Table 7). In most other cases, the methods were considered inexpensive to use. This means that most of them would be within the reach of the largely small-scale farms.

Test of hypothesis: Correlation analysis revealed a positive associations between IKS utilization and

Affordability (r = 0.17, p≤0.05), Effectiveness (r = 0.08, p≤0.05), Communicability (r = 0.677, p≤0.01), Relative advantage (r = 0.368, p≤0.01) and Availability (r = 0.054, p≤0.01). However, a negative association was found between IKS utilization and Environmental-friendliness (r = -0.351, p≤0.01).

CONCLUSION

The use of IKS in rice production was intensive and extensive in the study area. Despite the fetishness attached to some of the techniques, they were still widely used because of their efficacy. Most of the practices have been regarded as affordable, environmentally-friendly, communicable and inexpensive. More so, the ingredients of the indigenous practices were readily affordable.

RECOMMENDATIONS

Agricultural extension agents must be knowledgeable in the techniques of preparation and use of IK practices to promote same among the rice farmers for enhanced productivity and profitability.

Some of the herbs used in the preparation of the IK practices should be domesticated in order to forestall their extinction due to the current pervasive deforestation.

REFERENCES

Adekunle, O.A. and J.O. Okunlola, 1997. An analysis of indigenous knowledge practices by crop farmers in a derived savannah area of Nigeria. Applied Trop. Agric. Int. J., 2: 114-151.

Adewale, J.G., 2002. Nigerian rice farmers use of indigenous agricultural practices. J. Rural Dev., 35: 91-100.

Alcon, J.B., 1999. Sociology: Obafemi Awolowo University, Ile-Ife Indigenous Agro-Forestry Stretegies in Meeting Farmers Needs. In: Alternatives to Deforestation, Anderson, A.B. (Ed.). Columbia University Press, New York, pp: 76-83.

Bro-Kensha, D., D.M. Warren and O. Werner, 1980. Indigenous Knowledge Systems and Development. University Press of America, Lanham, pp: 1-10.

Hansen, D.O. and J.M. Erbaugh, 1987. The Social Dimension of Natural Resources Management. In: Sustainable Resources Development in then Third World, In Southgate, D.D. and J.F. Disinger (Eds.). Westview Press, Boulder, pp: 81-94.

Osunade, M.A., 1996. Research inn indigenous knowledge systems for sustainable agricultural development. Proceedings of the Delivered at a Workshop for Indigenous Knowledge and Biotechnology, Polyconsult Seminar Room, (DWIKBPSR'96), The Polytechnic, Ibadan, pp: 1-8.

Vanek, E., 1989. Enhancing Natural Resources Management in Developing Nations Through Improved Attitudes Towards Indigenous Knowledge Systems: The Case of the World Bank. In: Indigenous Knowledge Systems: Imlications for ASgricukltural and International Development, Studies in Technology and Social Change, No. 11, Warren, D.M., L.J. Slikkerveer and S.O. Titiilola (Eds.). Iowa State University, Iowa, pp: 162-170.

Wudiri, B.B. and I.O. Fatoba, 1992. Cereals in the food economy of Nigeria. Proceedings of the Workshop on Recent Dev in Cereal Production in Nigeria Kaduna, Sept. 2-4, IITA, Ibadan, Nigeria, pp: 13-32.