

Rural Communities and Indigenous Knowledge Systems in a Changing World: Soil Fertility Conservation Practices Amongst Farmers

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INTRODUCTION

Ruralites to whom development efforts are directed have their own body of knowledge that enables them arrive at decisions, which could help better their lots (Kolawole, 2002). "To ignore people's knowledge is almost to ensure failure in development" (Brokensha et al., 1980). This is because local people's knowledge, also referred to as indigenous knowledge "... respects the expertise of indigenous people" and has been regarded as a major contribution to development thinking (Osunade, 1996).

Today, indigenous knowledge is seen as pivotal above all in discussions on sustainable resource use and balanced development (Brokensha et al., 1980; Warren, 1990). The development and use of local knowledge covers all areas of human endeavours. It is an all inclusive concept, which embraces all aspects of community knowledge and responses to other elements of creation which impinge upon their livelihood (Osunade, 1996).

Warren (1996) wrote that the interest in indigenous knowledge research is in the seeking of universal characteristics of knowledge systems, of providing a mechanism that will respect the contributions of every community to global knowledge, and will change attitudes in such a way that nation states will begin to recognize the most important resource they have. Ekong (2003) defined a community as a locality group or an aggregation of families habitually living together within a definite geographical location.

The people are guided by certain norms, belief and value systems. However, most communities are now becoming more open to Western education. The diffusion of the Western Knowledge Systems (WKS) into the traditional society through institutional influences has greatly impinged on the inner drive of older people to "transfer their knowledge and farming skills to the next generation...".

The agrarian economy mainly depends on land to survive. Schiller (1980) reported that "the earth has only 7.86 billion acres of land potentially suitable for agriculture, and we are already farming half that total. We can boost agricultural production only by bringing the rest of the land into cultivation or by increasing the output per acre." The WKS main approach to improving on the soil is through the application of chemical fertilizer. Although seen to be efficacious as a result of its quick action, the inorganic fertilizer is a luxury to the resource-poor farmer in terms of procurement, and his ability to pay even when the input is available. Aside the pricing and procurement problems, chemical fertilizers, if not properly used, could engender environmental hazard when the soil becomes acidic (Akinyosoye, 1976; Muller-Samann and Kotschi, 1997). Yet, the traditional people have over the years devised local approach to improving on the soil. Some approaches to soil fertility conservation are, however, fetish amongst the folks. The people of *Umuofia* in *Things Fall Apart* were of the opinion that "We... honour our great goddess of the earth without whose blessing our crops will not grow" (Achebe, 1958). At present, these can still not be explained as they are not always made open for outsiders' consumption. For instance, in some local communities, farmers grow a particular hedge plant known as *enukopire* to "influence" bumper harvest. Those local technologies that can be explained are, however, encouraged for utilisation. Dialla (1994) advised that "If resources are to be used sustainably, indigenous soil conservation systems must be recognized by extension services and used as springboard for promoting soil conservation practice among local farmers". He also added that "Indigenous soil conservation systems should be improved and not carelessly supplanted by international scientific knowledge systems." It is of great significance to note that Ogburn's (1950) *concept of culture lag* which states that "the rate of change in non-

material aspect of culture lags behind material aspect” may still strongly hold true in some cases and environments. What then are the community factors that influence the use of indigenous practices in soil fertility conservation in Ekiti State, Nigeria? These and other questions are addressed in this article.

Objectives

The general objective of this article was to analyse community-related factors associated with the use of local practices in soil fertility conservation in Ekiti State. The specific objectives were to:

- (i) identify various IKS utilized in conserving soil fertility in Ekiti State;
- (ii) identify the reasons for using IKS in soil fertility conservation in Ekiti State;
- (iii) identify the problems associated with IKS utilization in soil conservation; and
- (iv) analyse community-related factors associated with the use of IKS in conserving soil fertility in Ekiti State.

METHODOLOGY

Area of Study: Ekiti State in Western Nigeria was studied. The State comprises five major administrative divisions (Ekiti North; Ekiti West; Ekiti East; Ekiti South; and Ekiti Central) with 16 Local Government Areas (LGAs). These are *Ikole, Oye, Ilejemeje, Moba, Ekiti East, Ijero, Ido/Osi, Irepodun/Ifelodun, Ado, Gbonyin, Emure, Ise/Orun, Ikere, Ekiti South West, Efon Alaaye and Ekiti West* LGAs.

The area lies between latitudes $6^{\circ}20'$ and $8^{\circ}10'$ North of the equator and between longitudes $4^{\circ}20'$ and $5^{\circ}40'$ East of the Greenwich Meridian (London). Ekiti State is landlocked and is, therefore, bounded in the North by Kwara and Kogi States; in the West by Osun State; also in the East by Kogi State and in the South by Ondo State. It has a land area of approximately 10,898.68 square kilometers. Ekiti State economy is purely agrarian.

Sampling and Sample Size: Ekiti State was purposively selected for the study. A multi-stage sampling technique was used to sample male and female farmers' opinion in the State. Stratified sampling technique was used to select 10 Local Government Areas (LGAs) from the five (5) major divisions. Two (2) communities were

randomly chosen from each of the selected LGAs. Also, respondents were randomly sampled from each of the selected communities in proportion to the latter's population. In all, two hundred and fifty (250) respondents were selected for the research. A set of validated and pre-tested, structured and unstructured interview schedules were developed and used between August and October 2000.

Measurement of Variables: The dependent variable (IKS utilization score) was measured by the number of practices employed by the farmer to conserve soil fertility.

A field pre-survey exercise carried out before the commencement of the actual field survey found six commonest practices (mulching, organic manure application, shifting cultivation, crop rotation, trash burning and bush fallow) amidst farmers. Each practice was score one (1) point. In all, the maximum score possible was six (6) while the minimum was zero (0).

The independent variables were measured under the community factor in the study. To measure cultural pattern, farmers were asked to respond 'yes' (with 2 points) or 'no' (assigned 1 point) to a set of statements such as: "Cereals are grown in my community"; "Tubers are grown in my community"; "permanent crops are grown in my community"; "poultry is raised in my community"; etc. The maximum possible score was 14 points. Also, a set of statements were responded to by the interviewees in an attempt to measure: presence of agriculture-oriented people; lack of faction and dispute; communication patterns, decision making pattern, and people's attitudes. Scores were assigned based on 'yes' or 'no' responses of the farmers.

Data Analysis Procedure: Measures of central dispersion (such as mean and standard deviation), frequency counts, and percentages were used to describe the data collected.

Inferential statistics such as Pearson's correlation and multiple regression analysis were used to test the hypotheses of the study.

Pearson's correlation (r) analysis was used to determine the relationship between the dependent variable, Y (IKS utilization score) and independent variables, $X_{1...i}$.

The coefficient of determination (r^2) gives the percentage variation in the dependent variable as explained by an independent variable (Koutsoyiannis, 1997; and Karmel and Polasek, 1980).

Multiple regression analysis was also employed to determine the magnitude of change in the farmers' IKS utilization score as explained by the community, factors influencing the practices in soil fertility conservation amidst farmers in Ekiti State.

RESULT AND DISCUSSION

The major findings of the study are presented under the community factors thus:

Community - Related Factors

Cultural Pattern: This refers to the interdependent cultural relationship existing between units of artificial objects (e.g. cutlasses and hoes) in various occupations, institutions (e.g. farm families) and modes of life or thought which characterize a group of people in a community. Detailed analysis in Table 1 shows that all (100.0%) the farmers said that cereals, tubers, and permanent crops were grown in their communities. Also, about 93.6% and 83.2% of the farmers claimed that ruminants and poultry were raised in their communities, respectively. About 89.6% of the farmers also indicated that leguminous crops were grown in their communities.

Presence of Agriculture-Oriented People: Analysis in Table 1 reveals that all (100.0%) the farmers claimed farming was the major occupation in their communities and that people were more active in farming than any other job. It was, therefore, a good indication that IKS practices may have found common use amongst the people.

Lack of Faction and Dispute: Table 1 shows that about 53.6% of the farmers opined that there were no interpersonal conflicts. Also, 70.0% said that there were no group conflicts. About 96.4%; and 97.2% said there were no external threats or war; and tribal/ethnic conflicts within their communities, respectively. It, therefore, showed that most communities were likely to have appropriated their cultural wealth in pursuing communal goals.

Communication Pattern: The study revealed in Table 1 that most farmers received and passed information through family members (92.4%), friends (90.0%), and neighbours (90.0%).

Further analysis indicated that most information were also obtained through radio

(98.4%), and television (74.0%).

Decision-making Pattern: The study showed that decision-making processes could be individualistic (98.0%), familistic (91.2%) or communal (66.0%) (Table 1).

The inference was that most decisions made were either individualistic or universal.

People's Attitudes (Objectivity and Open-mindedness): Table 1 shows that about 84.8% of the farmers indicated that ideas that were in line with community values were always upheld. Also 64.8% affirmed that "proven indigenous knowledge cannot and will never be compromised for any form of foreign knowledge/ideas"; and "people are never apprehensive of new ideas perceived as beneficial".

Utilization of Indigenous Knowledge System (IKS)

IKS Score: The study indicated that about 64.0% line farmers utilized between 1 and 2 IKS just as 36.0% utilized between 3 and 4 of the practices identified.

Type of IKS: The study revealed that about 72.0% of the farmers utilized trash burning; 58.0%, shifting cultivation; 45.2%, mulching and 28.0%, crop rotation. Only about 20.4% and 8.0% utilized bush fallow and organic manure application, respectively. The inference was that most farmers utilized trash burning in conserving soil fertility in Ekiti State, Nigeria.

Reasons for Utilizing IKS: Majority (80.0%) of the farmers utilized IKS in conserving the fertility of the soil because they were easy to practise. Also, about 72.0% of the population used IKS because inorganic fertilizers were not easily come by. About 60.0% of the farmers also reported that they utilized IKS because facilities for such practices were always available to them. *Benefits of IKS Utilization:* Most (80.0%) farmers were of the opinion that IKS practices were cheaper than modern methods. It was also believed that IKS practices were economically advantageous (80.0%) and ecologically sound (30.0%).

Problems of IKS Utilization: Land tenure (48.4%); the destructive nature of trash burning (49.2%); and (the) drudgery associated with mulching (5.6%) were the major problems recorded against the identified IKS practices in Ekiti State.

Table 1: Percentage distribution of respondents by community - related factors such as cultural pattern, lack of faction/ dispute, communication pattern, decision-making pattern and people's attitude (N=250)

Variable	Yes		No	
	N	%	N	%
<i>Cultural Pattern*</i>				
i. Cereals are grown in my community	250	100.0	-	-
ii. Tubers are grown in my community	250	100.0	-	-
iii. Permanent crops are grown in my community	250	100.0	-	-
iv. Legumes are grown in my community	224	89.6	26	10.4
v. Poultry is raised in my community	208	83.2	42	16.8
vi. Ruminants are raised in my community	234	93.6	16	6.4
<i>Presence of Agric. Oriented People*</i>				
i. Farming is the major occupation in my community	250	100.0	-	-
ii. People are more active in farming than in any other jobs	250	100.0	-	-
iii. Although interested in new agric. ideas, people still use IKS in the cultural practices of farming	249	99.6	1	0.4
<i>Lack of Faction and Dispute*</i>				
i. There are interpersonal conflict in the community	116	46.4	134	53.6
ii. There are group/political conflicts in the community	75	30.0	175	70.0
iii. There are tribal or ethnic conflict in the community	7	2.8	243	97.2
iv. There are external threats or war facing the community	9	3.6	241	96.4
<i>Communication Pattern*</i>				
i. I receive or pass information through family members	231	92.4	19	7.6
ii. I receive or pass information through friends	225	90.0	25	10.0
iii. I receive or pass information through neighbours	225	90.0	25	10.0
iv. I receive or pass information through local formal organisation	123	49.2	127	50.8
v. I receive or pass information through town crier	109	43.6	141	56.4
vi. I receive or pass information through radio	246	98.4	4	1.6
vii. I receive or pass information through television	185	74.0	65	26.0
viii. I receive or pass information through agric. Newsletters	36	14.4	214	85.6
ix. I receive or pass information through banners or leaflets	26	10.4	224	89.6
<i>Decision-making Pattern*</i>				
i. Decision-making is individualistic	245	98.0	5	2.0
ii. Decision-making is familistic	228	91.2	22	8.8
iii. Decision-making is communal	165	66.0	85	34.0
<i>People's Attitude (Objectivity and Open-mindedness)*</i>				
i. Ideas that are in line with community values are upheld	212	84.8	38	15.2
ii. Proven indigenous knowledge cannot and will never be compromised for any form of foreign knowledge/ideas	88	35.2	162	64.8
iii. People are never apprehensive of new ideas perceived as beneficial	88	35.2	162	64.8

* Multiple responses

Source: Field survey, 2000

Relationship Between Community-related Factors and the Utilization of IKS

Table 2 shows that at both $P < 0.01$ and 0.05 levels of significance, cultural pattern ($r=0.128$), presence of agric-oriented people ($r=0.183$) and lack of faction and dispute ($r=0.213$) had positive and significant relationship with the utilization of IKS. Conversely, decision-making pattern ($r = - 0.131$) and people's attitudes ($r = - 0.336$) had negative but significant relationship with the utilization of IKS.

The coefficient of determination (r^2) in Table

2 explains 1.6%, 3.3%, 4.5%, 0.4%, 1.7% and 11.3% variations in IKS score (Y) as attributable to cultural pattern, presence of agric-oriented people, lack of faction and dispute, communication pattern, decision-making and people's attitudes, respectively.

Multiple correlation coefficient (R) showed 40.3% relationship between IKS score (Y) and all independent variables (X). R^2 gave the total percentage variations in IKS score (Y) as explained by the joint contribution of the independent variable (X), which had significant relationship with Y. Data in Table 2, therefore,

Table 2: Correlation and multiple regression analyses showing linear relationship between IKS utilization score and community - related factors

<i>Community-related factors (x-variables)</i>	<i>Correlation coefficient</i>	<i>Coefficient of determination (r)</i>	<i>Regression coefficient (r²)</i>	<i>t-value for Ho (b)</i>
i. Cultural pattern	0.128*	0.016	0.083	1.305
ii. Presence of agric.oriented people	0.183**	0.033	0.119	1.975*
iii. Lack of faction and dispute	0.213**	0.045	0.138	2.182*
iv. Communication Pattern	-0.064	0.004	-0.061	-0.982
vi. Decision-making Pattern	-0.131*	0.017	-0.024	-0.376
vii. People's attitude (objectivity and open mindedness)	-0.336**	0.113	-0.280	-4.585*

Number of independent variables = 6

Number of respondents = 250

Source: Field survey, 2000

Critical values of r at $p \leq 0.01$ and 0.05 are 0.171 and 0.124, respectively.

t- values at $P \leq 0.01$ and 0.05 are 2.326, and 1.645, respectively

**r and *r significant at $P \leq 0.01$ and 0.05 levels, respectively.

R= 0.403

R-square (R^2) = 0.163

Adjusted or corrected R^2 = 0.142

shows that the presence of agric-oriented people ($t=1.975$), lack of faction and dispute ($t=2.182$) and people's attitudes ($t = - 4.585$) explained 16.3% of the variations in the farmer's IKS score.

CONCLUSION AND RECOMMENDATIONS

The types of IKS utilized in the conservation of soil fertility in the study area were: mulching, organic manure application, crop rotation, shifting cultivation, trash burning and bush fallow. Some of the problems militating against the use of IKS were: that the traditional land holding system has always been a constraint to the practice of bush fallow and shifting cultivation; that trash burning could sometimes prove destructive if not properly applied; and the drudgery associated with some of the practices were inimical to the utilization of IKS. Community-related factors found to associate closely with the utilization of IKS practices were the cultural pattern, presence of agriculture-oriented people, lack of faction and dispute, communication pattern, decision-making pattern and people's attitudes. In most of the communities, crops were grown. Also, ruminants and poultry were raised. In essence, farming was the major occupation with majority being actively involved in the same.

The almost total absence of intra-communal and inter-communal conflicts and wrangling was an incentive to establishing stable social structures and functions that encouraged IKS practices. It may have been, however, that

external influences have generally reduced the urge to stick to the traditional soil management practices. Communication was through family members, friends and neighbours. Other media through which information was mainly received were the radio and television. The process of decision-making was both individualistic and communalistic. In addition, people were always open to foreign ideas that were not inimical to their social and religious co-existence.

Since rural community people are seemingly willing to accept new ideas about agricultural development, Research and extension, as a matter of urgency, need to work closely with the grassroots farmers in order to improve on the identified IKS practices which were found to be economically and environmentally beneficial. This is to make such practices more attractive.

Government should weaken the perpetuation of the land holding system, (wherever such prevails), which, prevents the landless, women and other willing farmers from having access to a substantial amount of land to enable them practise appropriate soil fertility conservation techniques.

KEYWORDS Community. Indigenous Knowledge Systems/ Practices. Culture Lag. Soil Fertility Conservation. Farmers.

ABSTRACT The paper identified the community factors associated with indigenous knowledge practices in soil fertility conservation amongst farmers in Ekiti State, Nigeria. It specifically identified various indigenous knowledge systems (IKS) utilized in conserving soil fertility; identified the reasons for utilizing the IKS practices in soil fertility conservation;

identified the problems associated with IKS utilization in soil fertility conservation; and analysed community-related factors associated with the use of IKS in conserving soil fertility. The study was conducted using a multi-stage sampling procedure to sample opinions of 250 farmers in 20 communities that were randomly selected from the five administrative divisions of the State, namely: Ekiti North; Ekiti West; Ekiti East; Ekiti South; and Ekiti Central of Ekiti State. Pre-tested structured and unstructured interview schedules were used to elicit information from the interviewees. Frequency distribution, percentages, mean and standard deviation were used to describe the data. Inferential statistics such as correlation and regression analyses were also used to test the hypotheses. The result showed that at $P \leq 0.01$ and 0.05 levels of significance, there was a significant relationship between IKS practices and community-related factors such as: cultural pattern ($r=0.128$); presence of agric-oriented people ($r=0.183$); lack of faction and dispute ($r=0.213$); decision-making pattern ($r=-0.131$); and people's attitude ($t=-4.585$). Six commonest practices such as mulching, organic manure application, shifting cultivation, crop rotation, trash burning and bush fallow were found to be in use amongst farmers in Ekiti State. Most (80%) farmers were of the opinion that IKS practices were cheaper, economically advantageous (80%) and ecologically favourable (30%).

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