Socio economic determinants of use of indigenous fallow system for enhancing soil fertility among farmers in Oyo State Nigeria

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Abstract: Many researches have been conducted to improve fallow system, and the results disseminated to farmers. Notwithstanding these, farmers still use their Indigenous Technical Knowledge (ITK) in fallow practices to achieve approximately the same result with scientific method. This is why this research examines the factors that are related to the use of indigenous knowledge on fallow practices by small-scale food crop farmers in Iseyin Local Government Area of Oyo State. The findings show that majority of the farmers were above 40 years with no formal education and still practice indigenous fallow system despite their contact with extension agents. It was also found that the use of Indigenous Knowledge on fallow practices have strong relationship with fanner's age, educational level, social participation, contact with extension and sources of information. These variables however could explain 58 per cent of the variation in indigenous knowledge use on fallow practices adopted respectively by farmers. Significant determinants were age (t = 1.61), gender (t = 2.65), household size (t = 2.06), marital status (t = 1.65), social participation (t = 2.82), farm size (t = 1.89), farming experience (t = 2.65) and income (t = 1.73).
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Introduction

It has been established that formal institutions of Agricultural Research and Extension are not the sole agents of innovation and dissemination (Roling, 1988; Chambers et al 1989). Most agricultural technologies in the world today were developed by fanners and not by (formally) educated scientists (Henkes, 1992). Farming systems based on these technologies provide the food for the majority of the world's population. However, the wrong notion that the local people in developing countries, especially the non- literate rural dwellers, have nothing to offer as solutions to their problems led to the neglect of indigenous knowledge systems of the local people. These people assumed to be ignorant and fatalistic have actually developed strategies to solve their own problems. Indigenous knowledge was described as local knowledge gained from fanners with respect to certain farm activities (Chambers et al 1989). It was also defined indigenous knowledge as local information made available through local people (Richard, 1995). Indigenous knowledge represents the accumulated experience, wisdom and know-how unique to cultures, societies, and for communities of people, living in an intimate relationship of balance and harmony with their local environments. These cultures have roots that extend into history beyond the advent of colonialism. They stand apart as distinctive bodies of knowledge, which have evolved over many generations within their particular ecosystem, and define the social and natural relationships with their environments. They are based within their own philosophy and cognitive system, and serve as the basis for community-level decision-making in areas pertaining to governance, food security, human and animal health, childhood development and education, natural resource management, and other vital socio-economic activities. It is embedded in community practices, rituals and relationships (Emery, 2000). A number of development programmes seek complementarities between IK and external knowledge such as ILEIA- the information centre knowledge communities, worldviews and sciences on Low External Inputs and Sustainable Agriculture, and ISWC, the programme on Indigenous Soil and Water Conservation) These programmes have shown to be effective to the extent that complementarities and synergy can indeed be realized (Reijntjes et al 1992). Indigenous knowledge was defined as local knowledge that is unique to a given culture or society (Warren, 1991). Many efforts in agricultural development today are aimed at improving the economic position of the farmers and not to discover why they behave as such. West African food crop producers are inventive but development agencies rarely accept this innovativeness because they misunderstand the nature of both the agriculture and the politics of communities where food production is a major interest (Richard, 1995). In the case of the farmer, the process of knowledge formation is the result of his observations of natural conditions over time and what he has been told by other farmers. Thus, Gupta (1993) acknowledged that no society could ever hope to achieve a long-term goal of sustainable development unless it builds upon its own knowledge tradition, ethical foundations, and technological endowments. Through a process of innovation and adaptation, local farmers have developed different fanning systems, each of which fit into their ecological, economic, socio-cultural and political environment and acknowledged even by researchers to be functional and worth preserving (Reijntjes et al 1992). The priority of the resource poor farmers is to ensure survival and security in an unstable and fluctuating environment, while the

researcher's goal is to get maximum yield per unit area of land. Hitherto, mono-cropping was adjudged by the researchers to be the ideal way of crop cultivation and was handed down to fanners without any consideration for the peculiar peasant farmer's production environment. However, the traditional practice of mixed cropping which was considered unscientific has been found to be convenient and suitable for the peasant farmer's production environment (Chambers et al 1989).

Scholars have reported ITK association with the environment (Ellen 1996), agricultural practices (Brush 1992), in situ conservation and management of genetic resources (Hammer et al 1991), communal resource management institutions[13], and tenure arrangements and resource allocation9 Berkes 2002). Agro-ecologists visualize traditional systems as unique opportunities to study the perspectives of stability and sustainability and to get ideas for agro-ecosystem management (Altieri and Merrick 1987). In Nigeria indigenous soil taxonomy provides the base for agricultural decision-making (warren and Rajasekaran, 1993) and folk biological taxonomy in plant genetic resource conservation, and in Guatemala and Peru forest conservation activities incorporate traditional sustainable harvesting methods (Salick, 1992). Similarly, in Namibia the WWF has demonstrated the use of traditional knowledge in community based resource management, creating a win-win situation between economy and environment (AFROL, 2003). In many parts of the world, women farmers are most knowledgeable about natural resources because of their constant close interaction with them (Samal and Dhyani, 2006). Women farmers in resource-poor marginal farming systems have deep knowledge that includes ecological, agronomic and consumption characteristics about local landraces, crop improvement, agricultural practices, and the entire value chain and environment. It is argued that in traditional agricultural communities, this experiential knowledge gave women an important role in decision-making both at the family and community levels, consequently contributing to equitable power relations between genders (Rengalakshmi, 2006). The changing socio-economic and political systems in the agricultural domain influence the relevance of traditional knowledge, widen the gap between culture and traditional knowledge, and make the knowledge less relevant to the context. In particular, indigenous knowledge provides local farmers with the basis for agricultural decision making (White et al, 2006). Indigenous knowledge systems offers great prospects for effective integration of strategies that will be attractive enough to the vast majority of small-scale local farmers (Oladele and Braimoh, 2010): use of zero tilling practices in cultivation, and mulching, as well as other soil management techniques (Osunade, 1994). Local farmers are known to have practiced a fallow system of cultivation, which encouraged the development of forests. Farmers, through their familiarity with and use of local knowledge, can determine when the soil is exhausted by examining the water retention level, which reduces substantially (becomes too porous), the plants/crops or weeds are stunted and yellowish, and the crop yields decline at an increasing rate. Decline in soil fertility is also determined by evident loss of crumb structure. It also becomes very light, dusty or sandy in texture. The soil colour changes from dark or brown to reddish with increased number of stones. When soils are exhausted, this allows the growth of certain weeds.

It has been established that the indigenous knowledge of the people is not static but dynamic and is disseminated through informal communication sources such as word of mouth, village meetings, initiation rites, etc. and become internalized as part of the indigenous knowledge system. *As* new experiences are gained others lose their relevance because of changing circumstances and needs. The capacity of farmers to manage change is also part of their indigenous system thus; indigenous knowledge can be seen as a dynamic and ever-changing accumulation of the collective experience of generations. To further understand the concept of indigenous knowledge system, this research was designed to examine socio-economic factors that are related to the use of indigenous knowledge on fallow practices by small-scale food crop farmers in Iseyin Local Government Area of Oyo State, Nigeria

Materials and Methods

The study area is located in the derived savannah area of Oyo State. Five villages were selected because of the high concentration of food crop farmers. These are Paago, Otiri, Ajepero, Okeamu and Ipapo. On the whole 100 households were randomly selected from the household heads listings that were aged 30 years and above were interviewed because of their level of indigenous knowledge, based on their long years of experience in farming and agricultural productions. Data were collected using a structured questionnaire which contained open and close-ended questions that elicited information on socio-economic characteristics, use of indigenous technical knowledge and fallow practice. The researcher also used participant observation to obtain qualitative data.

Results

The results of the study are presented in Tables 1 and 2. Table 1 shows the percentage distribution of farmers according to personal characteristics and use of indigenous fallow system and Table 2 presents the socio-economic determinants of use of indigenous fallow system among farmers.

Discussion

This section is made up of three parts, these arc demographic, indigenous knowledge and fallow practices. Table 1 shows the demographic characteristics of respondents. Majority of the respondents (65%) were 40 years and above, while 44 per cent were below the age of 40 years. This is expected to enhance the study findings, as farmers of this age bracket will be good sources of indigenous knowledge system and its use. Eighty-four per cent were male farmers; this indicates the dominance of

fanning by male, since most Yoruba women are more likely to engage in off-farm income generating activities. Ownership of farmlands by some cultures in the opinion of (Olawoye, 1993) is strictly that of the males alone, although women are allowed to perform numerous farm operations. Many of the respondents (83%) were married; this stresses the need for labour that is often raised through families in the rural Yoruba setting. Of the 83 percent that were married, 57 per cent of the males had between one and two wives, while 24 per cent had more than four wives showing that polygamy still prevails. The number of wives and children are often used as indicators of the socio-economic status of the husband and consequently predict the farm size. This explains why 62 per cent of the respondents had more than five children (Table 1).

Table 1: Percentage distribution of farmers according to personal characteristics and use of indigenous fallow system (n = 100)

Variables	Percentages
Age	
40 years and below	44
41-50	45
51-60	8
Above 60	3
Gender	
Male	84
Female	16
Marital status	
Single	15
Married	83
Separated	2
Number of wives	
1-2	57
3-4	19
Above 4	24
Number of children	
1-3	38
4-6	42
Above 6	20
Religion	
Christianity	46
Islam	42
Traditional	12
Primary Occupation	
Farming	76
Trading	17
Hunting	7
Educational level	
No formal education	64
Adult education	9
Primary education	7
Secondary education	7
Above secondary education	13
Use of indigenous fallow	
Yes	80
No	20

Table 2: Socio-economic determinants of use of indigenous fallow system among farmers

Variables	Reg. Coefficient(SE)	t
(Constant)	82.1(16.5)	4.98**
Age	0.45(0.28)	1.61*
Gender	5.12(1.93)	2.65**
Household size	2.53(1.23)	2.06**
Educational level	-0.05(0.10)	0.50
Religious beliefs	2.63(4.66)	0.56
Marital status	4.80(2.91)	1.65*
Social participation	0.79(0.28)	2.82**
Information sources	0.17(0.12)	1.42
Farm size	0.34(0.18)	1.89*
Extension contact	0.23(0.53)	0.43
Farming experience	1.14(0.43)	2.65**
Income	1.90(1.10)	1.73*
R	0.76	
R^2	0.58	
F	2.49	
p	0.05	

*Significant @0.05, **Significant @0.01

Such large family size is seen as an economic boom as they arc major source of rural labour (Adegeye and Dittoh, 1985). The religion of the farmers studied is an indication of what indigenous system would be. Twelve per cent of the respondents were traditional worshippers, while 42 per cent and 46 per cent were Moslems and Christians respectively. About 76 per cent were into farming as primary occupation, while the remaining 24 per cent who were engaged in other occupations such as trading, hunting and weaving, practiced farming as secondary occupation. However, 64 per cent were without formal education, while the remaining 36 per cent had a bit of formal education. Increased level of education is expected to expose the farmer to more sources of information other than localizing on the oral tradition of ITK that is common in the area.

Regression analysis was used to ascertain the amount of variation explained in the use of indigenous knowledge and fallow practices. Indigenous knowledge and fallow practices being dependent variables were regressed on socioeconomic characteristics as independent variables. The independent variables include: Age of respondents, gender, household size, educational level, religious beliefs, marital status, social participation, sources of information, farm size and contact with extension agents.

The results of multiple regression analysis of relationships between farmers' socio-economic characteristics and use of indigenous fallow system are presented in Table 2. The independent variables were significantly related to use of indigenous fallow system, with an F value of 2.49, $p < 0.05$. Also, R-value of 0.70 showed that there was a strong correlation between independent variables: and use of indigenous fallow system. The results accounted for 58% of the variation

for use of indigenous fallow system by farmers. Significant determinants were age (t = 1.61), gender (t = 2.65), household size (t = 2.06), marital status (t = 1.65), social participation (t = 2.82), farm size (t = 1.89), farming experience (t = 2.65) and income (t = 1.73). It implies that as farmers aged, and farming experiences and household size increased, more use of indigenous fallow system by farmers. It was reported that as farmers aged; with long years of farming experience with household sizes increasing the more use of indigenous knowledge (Kuponiyi and Bamigbose, 2009). Also, the gender of farmers is significantly related to the use of indigenous knowledge as the Yoruba traditional culture discriminated between male and female in terms of information and farming practices. Marital status and social participation are significant due to the fact that these could be sources of information on indigenous practices. In many parts of the world, women farmers are most knowledgeable about natural resources because of their close constant close interaction with them (Samal and Dhyani, 2006). Similarly, Rengalakshmi (2006) noted that women farmers in resource- poor marginal farming system have deep knowledge that includes ecological, agronomic and consumption characteristics about local land races, crop improvement and the entire value chain and environment. The significance of farm size and income may be due to the fact that the use of indigenous fallow system is sustainable and practicable on the average farm size usually found among small scale farmers and would lead to cost reduction on crop production. The use of indigenous knowledge led to low cost investment in farming and higher productivity among farmers in Cameroon (Toyang, 2003). Similarly, Ayoola et al (2007) reported high benefit over cost among farmers using indigenous methods of treating animal diseases in Nigeria. The study concludes with the assertion that indigenous technical knowledge is a widely used practice. It is therefore apparent from the study that for technologies generated to be adopted by farmers, the local farming practices have to form the basis of technology development and transfer.

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