Utilization of Indigenous Knowledge Practices Among Crop Farmers in Ila Local Government Area, Osun State, Nigeria

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Abstract

The study examined the use of indigenous knowledge practices (IKPs) among crop farmers in Ila Local Government Area, Osun State, Nigeria. A multistage sampling procedure was used to select 120 respondents. Interview schedule was employed to elicit information on crop farmers' socioeconomic characteristics, IKPs mostly used, extent of IKP usage, benefits derived and the constraints faced in the use of IKPs. Data was subjected to percentage, weighted mean score, chi-square and Pearson product moment correlation at p=0.05. Findings revealed that most of the respondents were married (64.5%), female (54.8%), with a mean age of 40.5 years. The respondents' primary occupation was farming (48.4%) and most of them personally sourced credit (56.7%). Also, many belonged to farmers' clubs (48.4%) with farm sizes of ≤2 hectares (76.7%). The most used IKP was for household health care (92.5%) while the most used IKPs on domain basis were: food storage – sack (WMS 2.25); weeding – hoe (WMS 2.22); food processing – sun drying (WMS 2.15); land cultivation – land clearing (WMS 2.28); soil conservation – mulching (WMS 2.06); household health care – bitter leaf

and palm oil for measles' treatment (WMS 2.61); and pest control – indigenous trap (WMS 1.93). The percentage of those who used IKP was high (89.48%). The most benefit derived from IKP usage was the ease of use (95.0%), while the major constraint faced was labour intensiveness (91.7%). A significant relationship existed between farmers' age (r=0.392, p=0.006), marital status ($\chi 2$=247.25, p=0.000), farm size (r=0.266, p=0.003), primary occupation ($\chi 2$=13.69, p=0.002), main source of credit ($\chi 2$=43.32, p=0.000) and the extent of IKP usage. Prevailing farmers' characteristics that positively influence and support the use of IKPs should be documented. Hence, it is recommended that farmers should pool their resources to acquire farm machinery to ease the stress that comes with the use of IKPs and to ensure sustainability.

Keywords: Household's health care, indigenous trap, soil conservation, sources of credit and sustainability.

Introduction

Knowledge is life and power, particularly when it comes with the motive of disseminating naturally and locally originated, as well as needed and useful, information among groups of people. Knowledge, which is synonymous with information, has been known to be a vital tool for development, even in the improvement of indigenous practices. The aim and focus of these indigenous practices are to establish and enhance the sustainability of agriculture, especially among crop farmers, who culturally and ecologically provide services to people in their society (Albizua et al., 2021). Some of the practices in rural communities are referred to as indigenous because of the way such activities are carried out based on knowledge gained from the community's predecessors, nature, friends, the village wise men, among others, most of which may not have been scientifically proved. Hence, misconceptions about such indigenous knowledge have led to underrating of the principles and practices of such knowledge in the contemporary world, despite its cost effectiveness and environmental friendliness (Muthee, Gwademba and Masinde, 2019; Varella, 2020). Studies have shown that a greater percentage of rural dwellers are farmers who specialize in the cultivation of agricultural crops; an occupation that has been practiced from time

immemorial (Singh and Singh, 2017; Magocha et al., 2019). However, the crops grown have been noted to mainly provide the immediate food needs for man's survival, especially in the rural communities of developing nations. Such crops include maize, yam, melon, cassava, okra, pepper, and leafy vegetables (Adeniyi and Yekinni, 2015; Singh and Singh, 2017). The ability of these crops to provide the basic essentials for subsistence of most farmers and their families has made some practices in such climes to be handed down from one generation to the other. This is particularly so when such practices are found to be relevant, useful and result oriented in ways that aid the sustainability of global food security and ensure a friendly ecosystem right from the rural community as found in Malawi, South Africa, Mexico, India, Bangladesh, Kenya, Zimbabwe, Nigeria among other nations (Perroni, 2017; Sharma, Kanta, Dwivedi, and Rani, 2020).

Presently, in rural communities of developing nations, crop-related indigenous information that flows year in year out, could be said to be from experiences gained over time among crop farmers; this information has become part of their way of life and livelihood. The scope of agronomic information flow includes land clearing and cultivation (zero tillage); soil classification, maintenance and conservation (bush fallow, mulching and composting); pest and disease control (use of neem extract, garlic and ash); weed control; post-harvest preservation and storage of seed crops (ashes from burnt bean stalks for grain preservation); seed preservation (hung on kitchen ceilings for smoke and heat); knowledge and weather forecast (using rain, the moon, stars, spider web formation and the population of butterflies); indigenous cultural practices, harvesting of water, cropping systems, agroforestry, and harvesting of crops (Abu Bakr El Siddig, 2017; Perroni, 2017; Singh and Singh, 2017; and Magocha et al., 2019). All this indigenous knowledge had been used for agricultural sustainability at different levels for cropping practices, although with different reasons and benefits of usage, based on the prevalent constraints faced by different arable farmers in their local habitats (Maru et al., 2019). These constraints range from conservativeness of extension agents towards these practices, unfavourable attitudes of the youth farmers and the laboriousness of the IKP, among others (Magocha et al., 2019).

However, the dissemination of such useful indigenous agricultural practices has been through individual or communal forms of expression such as ancient stories, culture, rituals, songs in local dialects, folk tales, proverbs, dances, communal laws in order to prevent some species of crops from going into extinction and the peculiar practices that may come with each of such crops. Summarily, indigenous knowledge could be said to be culturally based on established ideas, perceptions, wisdom, and people's capabilities handed over from one generation to the other (Pace, 2015; Muthee et al., 2019).

There is the need to appropriately document, record, disseminate, preserve and conserve such indigenous knowledge of growing food crops in order to juxtapose the practices with scientific (modern) ways of growing such crops, which could be a good entry point for researchers, policy makers and extension agents in disseminating developmental information (technologies) discovered through investigations made on such crops (Maru et al., 2019). In this regard, the present study investigated the indigenous knowledge management practices involved in growing arable crops among crop farmers in Ila Local Government Area of Osun State. The study examined the socio-economic characteristics of the respondents, indigenous practices employed, level of usage of the indigenous knowledge, benefits derived and constraints faced in the use of indigenous knowledge. It was hypothesized that no significant relationship existed between the selected socioeconomic characteristics and the extent of usage of indigenous knowledge practices.

Methodology

The study was carried out in Ila Local Government Area (LGA) of Osun State, which has its headquarters in the town of Ila Orangun. It lies between 8.0121^0N, 4.8988^0E with an area of 303km^2 and a population of 62,049 based on the 2006 census. The economy of Ila LGA is predominantly agriculture-based, and the food crops mostly grown include maize, cassava and yam. The agricultural produce in the area has attracted traders from Osogbo and Ibadan, because of the preferred texture of the special species of yam grown in the area called 'Eleyintu' (UN-HABITAT, 2014).

Two sampling procedures were deployed in selecting respondents for the study. The first stage involved the purposive sampling of four of

the six villages in the LGA, based on the higher concentration of crop farmers. The selected villages were Ajaba, Alagbede, Ayetoro and Gaa Fulani. The second stage involved the simple random sampling of 30 crop farmers in each of the selected villages, providing a sample size of 120 respondents.

Data was collected with the use of a structured questionnaire, and results were subjected to percentages, weighted mean score, chi-square and the Pearson product moment correlation (PPMC) at α 0.05.

The socio-economic characteristics of the respondents such as age, sex, marital status, primary group affiliation, primary occupation and main source of income were measured accordingly.

The frequency of usage of indigenous knowledge among crop farmers was measured using seven indigenous practices on a four-rating point scale of never, rarely, occasionally, and always, with the score of 0, 1, 2 and 3 respectively. Thereafter, the indigenous knowledge practice (IKP) with the highest frequency was determined and used to rank the parameters of the seven IKPs measured. The IKP with the highest weighted mean score was ranked 1st, while the IKP with the lowest mean score was ranked the least used IKP by the respondents. IKP usage was categorized into high and low using the criteria of below or above the mean.

Indigenous knowledge used by the respondents was measured by providing respondents with seven IKPs that could be used by crop farmers in the study area, with the response options of 'used' and 'not used' and with the score of 1 and 0 respectively. Thereafter, the percentages of the frequency of the IKPs were determined and used to rank them in descending order.

Ten benefits that could possibly accrue to the respondents for using IKPs were provided the response options of "Benefit" and "Not a benefit", with scores of 1 and 0 in that order. The percentage for each IKP item was computed and used to rank the items in descending order.

Respondents' constraints to IKP usage were measured with nine possible constraint options. Some of the constraints were labour

intensiveness, time demanding, and insufficient documents. Two response options were provided: "Not a constraint' and 'A constraint', with scores of 0 and 1 assigned in that order. The percentage for each IKP constraint was used to rank the items in descending order.

The significant relationship between the selected socioeconomic characteristics of the respondents and the extent of use of IKP was tested using a chi-square analysis (sex, marital status, primary association [to which respondent] belongs, primary occupation, and main source of income) and the Pearson product moment correlation (PPMC) analysis (age and farm size).

Results and Discussion

Socio-economic characteristics

The results in Table 1 show that the respondents were mostly married (64.2%), female (54.2%) with a mean age of 40.5 years. This implies that the respondents were young, active and can pool their resources for better productivity. Also, being married positions the females well as promoters of indigenous knowledge practices in household health.

The results further indicate that most of the respondents' primary occupation was farming (48.3%), with personally sourced credit (56.7%) for their enterprise; with farm sizes of ≤2 hectares (76.7%); and they belonged to farmers' clubs (48.3%). The main source of credit for the area of land cultivated implies that the respondents' enterprises were at the subsistence level as affirmed by Singh and Singh (2017), while the social groups to which the farmers belonged may enhance the flow of indigenous knowledge information among the respondents in the study area (Albizua et al., 2021).

Table 1: Distribution of Respondents by Socio-economic Characteristics

Variables	Frequency	Percentage	Mean
Age (Years)			
≤30	30	25.0	
31-40	44	36.7	
41-50	34	28.3	

Variables	Frequency	Percentage	Mean
≥50	12	10.0	
Total	120	100.0	40.50±9.38
Sex			
Male	55	45.8	
Female	65	54.2	
Marital Status			
Married	77	64.2	
Single	39	32.5	
Widowed	04	3.3	
Primary Association Membership			
Cooperatives	27	22.5	
Farmers club	58	48.3	
Religious	14	11.7	
Others	21	17.5	
Farm Size			
≤ 2	92	76.7	
3-4	13	10.8	
≥4	15	12.5	
Main Source of Credit			
Bank	16	13.3	
Cooperative society	25	20.8	
Friends and family	11	9.2	
Personal savings	68	56.7	
Primary Occupation			
Farming	58	48.3	
Trading	31	25.8	
Civil servant	08	6.7	
Artisan	23	19.2	

Source: Field survey, 2019.

Indigenous knowledge mostly practiced

The results in Table 2 indicate that the most frequently practiced indigenous knowledge practice was household healthcare (92.5%), followed by weeding (91.6%) while the least IKP was pest control (82.5%). This implies that respondents' health was paramount to them compared to controlling the pests plaguing their crops. This corroborates the assertion of Sharma et al. (2020) and Singh and Singh (2017) that traditional agriculture ensures and enhances the health safety of rural dwellers. Nevertheless, it is clearly evident that a greater number of the respondents considerably practice indigenous knowledge.

Table 2: Distribution of Respondents by Most Practiced Indigenous Knowledge

Indigenous Knowledge Practices	Frequency	Percentages	Rank
Household health care	111	92.5	1st
Weeding	110	91.6	2nd
Food processing	109	90.8	3rd
Land cultivation	107	89.1	4th
Soil conservation	104	86.6	5th
Food storage	102	85.0	6th
Pest control	99	82.5	7th

Source: Field survey, 2019.

Extent of utilization of indigenous knowledge practices

The indigenous knowledge practices (IKP) employed by the respondents in their crop enterprises can be classified into seven domains. These are: food storage, weeding, food processing, land cultivation, soil conservation, pest control, and household health.

The results in Table 3 show that the most utilized food storage IKP was the use of sacks (WMS=2.25), this was followed by the use of baskets (WMS=2.19), while hanging in fireplace was the least used. This implies that respondents mostly grow crops that can be stored in sacks because not all crops can withstand the heat by the fireplace during storage.

Table 3 further shows that the weeding IKP that ranked 1st was hoeing (WMS=2.22), this was followed by the use of cutlass (WMS=2.20), while hand picking (WMS=1.86) ranked 3rd. This implies that the use of the hoe is the best result-oriented means of removing unwanted plants by the arable farmers. In addition, the food processing IKP mostly used by the respondents was sun drying (WMS=2.15), followed by roasting/frying of food (WMS=2.14), while the least in this group was the use of fermentation (WMS=1.55). This implies that the respondents' way of adding value to their crops in the study area might be determined by sunlight. On land cultivation IKPs, as shown in Table 3, land clearing and zero tillage were ranked 1st with WMS of 2.2, while ploughing (WMS =1.73) was the 3rd and ridge making (WMS=1.68) was the least-ranked IKP land cultivation process. Land clearing and zero tillage that had the same rank suggests that most of the respondents do not grow crops that need ridges to thrive, or probably these practices are cheaper, as asserted by Magocha et al., 2019. Another explanation for this could be because most of the respondents were female (Table 1) who may lack the strength required to make ridges for their crops.

Under the soil conservation domain, Table 3 shows that mulching (WMS=2.06) ranked 1st, followed by the use of green manure (WMS =1.88), while bush fallowing system (WMS=1.86) was ranked 3rd. This implies that mulching is the most utilized IKP for soil nutrient conservation, while the use of animal dung that was ranked the least indicates that it was not popular in the study area as it was in some developing regions of the world (Singh and Singh, 2017). However, IKPs have been known to conserve soil nutrients and enhance the agro ecological system in rural communities (Maru, Gebrekirstos and Haile, 2019). The results in Table 3 further show that the use of bitter leaf and palm oil to treat measles (WMS=2.61) was ranked 1st among the IKP for household health and this was followed by the use of coconut oil in treating rough skin (WMS=1.88), while the least ranked in the domain was the use of shea butter (*ori*) for the treatment of rashes (WMS=1.67). This implies that the use of bitter leaf and palm oil for combating measles has contributed to an increase in the health status of the rural households. On pest control strategies, as indicated in Table 3, the use of indigenous traps (WMS=1.93) was ranked 1st, this was followed by the use of scarecrows to control birds (WMS=1.69), while the spraying of animal

urine for pest control (WMS=1.55) was ranked 3rd. The use of indigenous traps and scarecrows to control pests in the study area suggests that rodents and birds were the most prevailing pests.

Table 3: Distribution of Respondents by Extent of Usage of Indigenous knowledge Practices

Indigenous knowledge practices	Always	Occasionally	Rarely	Never	WMS	Rank
Food storage						
Use of sack	40.8	44.2	14.2	0.8	2.25	1st
Use of basket	45.8	28.3	25.0	0.8	2.19	2nd
Use of mud pot	20.0	44.2	20.8	15.0	1.69	3rd
Mixing with red chilli pepper	27.5	33.3	16.7	22.5	1.66	4th
Hanging in fireplace	18.3	30.8	20.8	30.8	1.37	5th
Weeding						
Hoe	40.8	41.7	15.8	1.7	2.22	1st
Cutlass	45.0	34.2	16.7	4.2	2.20	2nd
Hand picking	32.5	39.2	10.0	18.3	1.86	3rd
Food processing						
Sun drying	41.7	35.0	20.0	3.3	2.15	1st
Roasting/frying	45.8	26.7	23.3	4.2	2.14	2nd
Grinding with stone	29.2	30.8	20.5	15.0	1.74	3rd
Fermentation	18.3	39.2	21.7	20.8	1.55	4th
Land cultivation						
Land clearing	49.2	32.5	15.0	3.3	2.28	1st
Zero tillage	30.0	39.2	15.0	15.8	2.28	1st
Ploughing	25.0	35.8	26.7	12.5	1.73	3rd
Use of mounds/ridges	25.0	38.3	15.8	20.2	1.68	4th

Indigenous knowledge practices	Always	Occasionally	Rarely	Never	WMS	Rank
Soil conservation						
Mulching	37.5	36.7	20.0	5.8	2.06	1st
Green manure	20.0	55.0	18.3	6.7	1.88	2nd
Bush fallow	27.5	43.3	18.3	10.8	1.86	3rd
Shifting cultivation	25.8	36.7	29.2	8.3	1.80	4th
Cover cropping	25.8	40.0	18.3	15.8	1.76	5th
Use of animal dung	19.2	32.5	30.0	16.7	1.53	6th
Pest control						
Setting of indigenous traps	36.6	31.7	19.2	12.5	1.93	1st
Scarecrow	30.8	30.0	16.7	22.5	1.69	2nd
Spraying with animal urine	27.5	24.2	24.2	24.2	1.35	3rd
Use of ashes	31.7	29.2	27.5	11.7	1.31	4th
Household health						
Use of mixture of bitter leaf and palm oil for the treatment of measles	30.8	45.8	19.2	4.20	2.61	1st
Use of coconut oil for rough skin	24.2	43.3	28.3	4.2	1.85	2nd
Deworming with bitter leaf solution	26.7	38.3	25.8	9.2	1.83	3rd
Use of shea butter for injuries and rashes	19.2	40.0	29.2	11.7	1.67	4th

*Source***:** Field survey, 2019.

However, it is worthy of note (Table 4) that the respondents had a high index of utilization of IKPs as indicated by a high percentage of 89.48% of the respondents. This suggests that the indigenous knowledge practices used by the respondents have been yielding positive results and

are worthy of being documented to ensure their sustainability by future generations.

Table 4: Level of respondents' use of Indigenous knowledge Practices n=120

Level of IKP utilization	Frequencies	Percentages
Low	12	10.52
High	108	89.48
Total	120	100.0

Source: Field survey, 2019.

Distribution of respondents by benefits derived from indigenous knowledge practices

The results in Table 5 show the benefits enjoyed by the respondents in using IKPs. Top on the list is ease of use (95.0%). This is followed by the ability of the IKP to increase crop yield (90.8%), while 86.7% made use of the IKP because it was domestically available. This result implies that IKPs are beneficial to the end user, hence, their sustainability may be guaranteed (Muthee et al., 2019).

Table 5: Distribution of Respondents by Benefits of Indigenous Knowledge to Sustainable Agriculture

Benefit derived	Frequency	Percentage	Rank
Easy to use	114	95.0	1st
Increase yield	109	90.8	2nd
IK is not hazardous	105	87.5	3rd
Longer food shelf life	104	86.7	4th
Domestically available	104	86.7	4th
Cost effective	101	84.2	6th
Familiar with IK	100	83.3	7th
Supported by extension services	96	80.0	8th
Improved soil fertility	95	79.2	9th
Improved storage quality	95	79.2	10th

Source: Field Survey, 2019. *Multiple Responses

Distribution of respondents' constraints to the use of indigenous knowledge practices

The results in Table 6 show that most (91.7%) of the respondents perceive IKPs as labour-intensive as it ranked 1st among the constraints faced. Next was that they are time demanding (87.5%), ranked 2nd while the non-availability of IKP documentation (86.7%) was ranked 3rd. The constraints identified by the respondents were in tune with the findings of Magocha et al. (2019) that most IKPs were yet to be automated and lacked adequate records. This implies that despite the challenges that come with IKPs, the respondents were able to cope as reflected in the high percentage of respondents (89.48%) that use them (see Table 4).

Table 6: Distribution of Respondents' Constraints to the Use of Indigenous Knowledge Practices

Constraints items	Frequency	Percentage	Rank
Labour intensive	110	91.7	1st
Time demanding	105	87.5	2nd
Insufficient documentation	104	86.7	3rd
Obsolete and outdated	98	81.7	4th
Climatic constraint	98	81.7	4th
Poor access to credit	95	79.2	6th
Unproductive land	93	77.9	7th
Lack of resources	85	70.8	8th
Poor recognition	79	65.8	9th

Source: Field survey, 2019. * Multiple Reponses

Test of relationship between the selected socioeconomic characteristics of the respondents and the extent of use of indigenous knowledge practices

The results in Table 7 reveal that a significant relationship existed between respondents' age ($r = 0.342$; $p=0.006$), marital status ($\chi2=247.25$, $p=0.000$), farm size ($r =0.266$; $p=0.003$), primary occupation ($\chi2=13.69$, $p=0.002$), main source of credit ($\chi2=43.32$, $p=0.000$) and the use of indigenous knowledge practices. This implies that the higher the aforementioned socioeconomic variables, the higher the use of IKPs and

vice versa. It further implies that these significant socioeconomic characteristics have decisive influence on the extent of use of IKPs among crop farmers in the study area.

This result is expected as the age of a farmer goes in line with the experience that may enhance the way IKPs are practiced, the farm size and sources of credit for the enterprise, which will as well depict the scope of practice of the IKPs. Hence, it can be established that there is a direct relationship between respondents' age, marital status, farm size, primary occupation, main source of credit and the use of IKPs for crop production in the study area (Magocha et al., 2019; Singh and Singh, 2017).

Sex ($\chi 2=87.46$, $p=0.21$) and the primary association to which the respondents belonged ($\chi 2=2.07$, $p=0.31$) were not significant, which implies that sex and the primary association group did not have any substantial effect on the use of IKPs because the practices are not gender or association biased (Magocha et al., 2019).

Table 7: Test of Relationship between Enterprise Characteristics and Poverty Status (n=230)

Characteristics	χ^2	Df	p-value	Decision
Sex	87.46	5	0.21	Not significant
Marital status	247.25	6	0.00	Significant
Primary association belonged	2.07	1	0.31	Not significant
Primary occupation	13.69	5	0.02	Significant
Main source of credit	43.32	37	0.00	Significant
Variable	r-value	NA	p-value	Decision
Age	0.392	-	0.006	Significant
Farm size	0.266	-	0.003	Significant

Source: Field survey (2019).

Conclusions and Recommendations

This study concludes that respondents' age, marital status, farm size, and main sources of credit for their enterprise are all directly proportional to the high level of indigenous knowledge practices adopted. The benefits derived from the use of IKPs make their use valuable despite their being labour intensive. The study recommends that

the prevailing farmers' characteristics that positively influence and support the use of IKPs should be documented and encouraged, while farmers should pool their resources to acquire farm machinery to ease the stress that comes with the use of IKPs to ensure their sustainability.

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