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Assessment of Traditional Agricultural Practices in Nigeria for Possible Conversion to Organic Agriculture Production System

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Abstract
Low external input agriculture does not automatically confer on traditional farming the status of organic farming. This study assessed traditional agricultural practices for compliance with organic practices in Nigeria. Information was obtained from 177 crop farmers in six states (Oyo, Ekiti, Benue, Niger, Anambra, Ebonyi) of three agricultural zones (Southwest, Northcentral, Southeast) in Nigeria, while frequency counts, percentages, mean, and Pearsons product moment correlation were used to analyse the data. The result showed wood ash, multiple cropping, neem extract and trapping were ranked high as pest management practices, while cover crops, uncured poultry manure, crop rotation and mulching were ranked high as soil fertility management practices in use by the respondents. However, most of these practices were used as complement to synthetic inputs, thus compliance with organic practices is low. The correlation test showed a positive and significant relationship ($r=0.114$, $p=0.044$) between traditional practices in use and the level of possible compliance with organic practices. The study concluded that, possible compliance of traditional agricultural practices with organic standard is low. The study therefore recommended that, leveraging on some of the farmers' practices that align with organic principles, and engaging extension service for increased awareness of the standard and benefits of organic agriculture would enhance more rapid conversion to organic agriculture in Nigeria.

Keywords: Traditional agricultural practices, compliance with standard, organic agriculture.

Évaluation des Pratiques Agricoles Traditionnelles au Nigéria Pour une Possible Conversion en Système de Production D'agriculture Biologique

Résumé
L'agriculture à faibles intrants externes ne confère pas automatiquement à l'agriculture traditionnelle le statut d'agriculture biologique. Cette étude a évalué la conformité des pratiques agricoles traditionnelles avec les pratiques biologiques au Nigéria. Des informations ont été obtenues auprès de 177 agriculteurs de six États (Oyo, Ekiti, Benue, Niger, Anambra et Ebonyi) de trois zones agricoles (sud-ouest, centre-nord et sud-est) au Nigéria, tandis que les comptages de fréquence, pourcentages, moyenne et corrélation des moments de produit Pearsons ont été utilisés pour analyser les données. Les résultats ont montré que la cendre de bois, les cultures multiples, l'extrait de neem et le piégeage étaient considérés comme des pratiques de lutte antiparasitaire, tandis que les cultures de couverture, le fumier de volaille non séché, la rotation des cultures et le paillage étaient considérés comme des pratiques de gestion de la fertilité du sol utilisées par les répondants. Cependant, la plupart de ces pratiques étant utilisées en complément d'intrants synthétiques, le respect des pratiques biologiques est faible. Le test de corrélation a montré une relation positive et significative ($r = 0,114$, $p = 0,044$) entre les pratiques traditionnelles d'utilisation et le niveau possible de conformité aux

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pratiques biologiques. L'étude a conclu que la conformité possible des pratiques agricoles traditionnelles avec les normes biologiques est faible. Par conséquent, l'étude a recommandé de s'appuyer sur certaines des pratiques des agriculteurs qui s'alignent sur les principes de l'agriculture biologique et de faire participer les services de vulgarisation à une sensibilisation accrue aux normes et aux avantages de l'agriculture biologique au Nigéria.

Mots-clés: pratiques agricoles traditionnelles, respect des normes, agriculture biologique.

Introduction

Many farmers in Africa practice low external input farming. This claim has made many to think farmers in Africa, practice organic agriculture by default (Walaga, 2005; IFOAM- Organics International, 2013; and Olaito, 2014). The opinion holds because, about 70 percent of the farming population in Africa could not access some of the synthetic inputs such as chemical fertilisers and agrochemicals. Though, these low external inputs can be seen as potentials to leverage on, for promotion of organic agriculture in Africa, conscious recognition of and compliance with organic standards, would be required.

In order to meet the ever increasing demand for food, many farmers in Africa have developed sustainable technologies and practices to produce food for the increasing population in Africa and Nigeria, in particular. Although, some of the technologies and practices are clearly not sustainable and do require improvement. Farmers adopt a wide range of indigenous agricultural practices based on experiences, informal experiments and good understanding of their environment. The application of indigenous farming practices for example has reflected in the following: soil preparation and planting materials, controlling pests and diseases, maintaining soil fertility, controlling weeds, harvesting and storage (Abioye *et al.,* 2011). Many of these indigenous knowledge and approaches to environmental conservation include technologies and practices such as; shifting cultivation, mixed cropping or intercropping, minimum tillage and agro-forestry as well as ethnoveterinary. Some of the advantages of these technologies and practices are reduction in susceptibility of the crops to pests and diseases, and better utilisation of the environmental (Yekinni, 2002). Walaga (2005) opined that, the subsidies withdrawal on agrochemicals by most African governments and the misuse of the Green Revolution in Africa have increased the promotion of viable alternatives for improving food security and sovereignty, and organic agriculture has been adjudged as sustainable farming system (Singh and Grover, 2011).

Organic agriculture (OA) is based upon traditional agricultural practices, farmers' innovations and the results of scientific research (AdeOluwa, 2010; Singh and Grover, 2011; IFOAM, 2011). Organic farming practices are embedded in local cultures, ethical values and beliefs. It gives them renewed possibilities for maintaining and developing their local sustainable farming systems. Organic agriculture as a production system, distinguished its practices by being deliberate in planning, organising, and compliance with standards from seed selection to processing of products. Currently, Nigeria has an organic agriculture standard published in 2012 to enhance; compliance to principles of organic agriculture, adoption of organic practices, access to local and international market, and stimulate engagement of policy makers in Nigeria.

Since about 70-80% of the smallholder farmers practice low external input farming in Nigeria, this study assessed the possible compliance of traditional practices with organic standard; for them to benefit from the inherent health, economic, and environmental potentials of OA. Therefore the objectives of this study were to; (i) identify the traditional practices in use for crop production in Nigeria, and (ii) determine the extent of compliance of the agricultural practices with organic principles and standard in Nigeria. The study hypothesized that there is no significant relationship between traditional practices and compliance with organic principles and standard in Nigeria.

Materials and Methods

This study was conducted in three agricultural zones (Southwest, North central, and Southeast)

in Nigeria. The study population comprised crop farmers in three agricultural zones in Nigeria. A multistage sampling procedure was used to select respondents for the study. The primary data were collected using quantitative method; validated structured questionnaires. From three agricultural zones, six states (Ebonyi, Anambra, Benue, Niger, Ekiti and Oyo) were randomly selected for this study. From the six states, ten percent of the Local Government Areas (LGAs) were randomly selected to give 15 LGAs, and two rural communities were randomly selected from each of the 15 LGAs, to give thirty communities. Twenty percent of the farmers were randomly selected to give 177 respondents for the study. Variables measured in the study were socio-economic characteristics, traditional practices in use, and extent of compliance with organic practices. The respondents were asked to identify traditional practices in use on a four point scale of; above 3 years, 2 years, 1 year ago and not at all; the mean score was used to rank the mostly used practices. Also, index of frequency of compliance was determined and the mean (39.60±7.58) was used to categorised respondents into high or low compliance with organic standard.

Results and discussion

Socio-economic characteristics

The study (Table 1) reveals that the farmers had a mean age of 47.7 years. This shows that most of the farmers were still in the active and productive years. These findings are consistent with that of Meludu (2014), who reported a mean age of 49 years for farmers in Oyo State. Distribution of farmers by sex shows that majority (69.0%) of them were male, while the females (31.0%). The average number of years spent for formal education was 10.5 years. This finding is in line with Adeniyi, and Yekinni (2015), who reported that the average formal education of farmers was 9.6 years. This result implies that there is considerable level of literacy among the farmers, which is an important factor that likely influence application of new ideas and agricultural practice. The average year of farming experience was 26.5 years, implying that these farmers are well knowledgeable on farming activities; the predominant mode of land acquisition in the study area was through inheritance (61.0%), half (50.5%) of the population had farm size between 1 and 3 ha that indicate predominance of smallholder farmers and above half (52.0%) of the respondents had access to extension service fortnightly, which could have influence on their practices from indigenous to modern agriculture, that encourages use of agrochemicals,. This is in line with the Adesope *et al.* (2012), that extension contact with farmers influenced their agricultural practices. The average monthly income of US $84 also emphasized that largely the farmers in the study areas are low income earners, which could influence their quest for more income, hence, the use of indigenous practices was guided. This is in agreement with the findings of Ezeh (2013), that most farmers were low income earners and use available agrochemicals to meet their production needs in Nigeria.

Table 1: Distribution of crop farmers by socio-economic characteristics n=177

Variables	Percentage	
Age		
21 – 33	8.70	Mean = 47.78±11.32
34 – 46	39.0	
47 -59	33.9	
60 -72	17.7	
73 – 85	0.7	
Sex		
Male	69.0	
Female	31.0	Mode = Male
Years of formal Education		
Primary education	30.96	Mean = 10.57±6.12
Secondary education	40.32	
Tertiary education	21.30	
No formal education	7.42	
Years of farming experience		
1 – 10	17.7	
11 – 20	27.4	Mean = 26.46±4.33
21 – 30	21.6	
31 – 40	18.1	
41 – 50	11.0	
51 – 60	4.2	
Land Acquisition		
Inheritance	61	
Lease	12	
Rent	22	
Purchase	5	
Farm size (acre)		Mean=5.8±2.18
< 1	3.6	
1-3	50.5	
4-6	37.5	
8-10	2.7	
>10	5.6	
Access to extensive service		
None	32.7	
Once in a year	4.0	
Twice in a year	4.0	
Quarterly	7.3	
Fortnightly	52.0	
Monthly income		
1,000 - 20,000	50.24	
20,001 - 40,000	27.12	30,485.76 ± 21,834.27
40,001 - 60,000	11.86	
60,001 - 80,000	4.00	
80,001 - 100,000	2.26	
>100,000	4.52	

Source: Field Survey, 2017

Traditional practices in use by Nigeria farmers

The study in Table 2 shows the mean distribution of traditional agriculture practices used for pest and soil fertility management. The table shows that wood ash (1.0±0.5) was mostly used. This is closely followed by multiple cropping (0.99±0.2), neem extract (0.86±0.4), trapping (0.58±0.1) and marigold flower (0.14±0.2) as least on the list. This implies that majority of the farmers still used some traditional practices to manage both insect and rodent pests. This finding is corroborated by the report of Eze and Echezona (2012) and Meludu and Adesina (2014), that majority of the farmers in African and Asia use some indigenous practices like neem extracts, wild tobacco, wood ash, and chilli to control and repel pest. Moyin-Jesu (2010) also affirmed that wood ash is used as insecticide. Also the study shows that cover crop (1.27±0.5) ranked first among the traditional practices used for soil fertility management. This is closely followed by wet poultry manure (1.10±0.8), crop rotation (1.03±0.3) and cow manure (0.41±0.2) as the least used. This implies that largely, the farmers used some of the traditional practices to supplement the agrochemicals for so many reasons, which may include; low income and inability to access enough fertiliser. This was corroborated by Omari, Bellingrath-Kimura, Addo, Oikawa and Fujii (2018), that this is the situation of some farmers in Africa, who due to low access to agrochemicals, use indigenous inputs as supplement.

Table 2: Distribution of crop farmers' use of traditional practices n = 177

Items	Mean	SD	Rank
Pest management			
Wood ash	1.00	0.5	1st
Multiple cropping	0.99	0.2	2nd
Neem extract	0.86	0.4	3rd
Trap setting	0.58	0.7	4th
Neem + kerosene	0.39	0.1	5th
Lemon grass extract	0.32	0.1	6th
Tobacco	0.24	0.4	7th
Pawpaw	0.24	0.3	7th
Alligator pepper and lemon grass extract	0.21	0.1	9th
Local black soap	0.21	0.1	9th
Dried pawpaw leaf	0.21	0.5	9th
Marigold flower	0.14	0.2	12th
Soil fertility			
Cover crop	1.27	0.8	1st
Uncured poultry manure	1.10	0.3	2nd
Crop rotation	1.03	0.6	3rd
Use of wet mulching materials	0.79	0.2	4th
Compost	0.78	0.3	5th
Poultry manure (cured)	0.77	0.1	6th
Pig manure	0.72	0.3	7th
Sheep and goat	0.58	0.3	8th
Abattoir manure	0.45	0.5	9th
Cow manure	0.41	0.2	10th

Source: Field Survey, 2017

Extent of closeness of traditional practice to organic standard

The distribution of the results as represented in Table 3 shows compliance of respondents practices under three headings; general organic practices, soil fertility management and pest management. it was revealed that 12.4% of the respondents complied with no use of mineral fertilizer, but 88.8% did not comply with avoidance of herbicides, while 37.3% complied with use of cured manure before application. Use of battery powder as seed dresser is not allowed in organic practices, however, 41.1% of the respondents used it as seed dresser, while 78.5% still engaged in the use of bush burning for land clearing.

For soil fertility management, 52.5% complied with the use of crop rotation, but 60.5% indicated that they do not have planned crop rotation scheme. About 51.4% of the respondents experienced bad odour from compost materials. Adding some synthetic fertilizers to compost is fraud in organic farming, half (50.3%) of the respondents added synthetic fertilizers to compost.

About 18.6% practiced the use of neem for pest management. The use of same knapsack sprayer for both neem extracts and synthetic pesticide is not allowed in organic farming. About 83.6% used same knapsack sprayer, while not adding chemical and kerosene to neem extracts were not complied to by 55.9% and 67.82% respectively. These findings show that majority of the respondents' practices are not in compliance with organic practices and standards, therefore, extent of compliance with organic practices is low. This implies that, educating farmers on the organic standards and practices are highly needed across the zones for conversion to organic agriculture.

It was revealed in Table 4 that crop farmers (51.4%) had low level of compliance with organic practices. This implies that higher proportion of the agricultural practices of the respondents are not in compliance with organic practices. This is in line with the findings of Babalola (2012), Issa, (2015), and Oyekale (2017), that Nigeria farmers still have low compliance to agricultural standards, especially safety practices.

Table 3: Distribution of crop farmers by extent of compliance to organic principles

Variables	Complied %	Not Complied %
General practices		
No use of mineral fertilizer	12.4	87.6
No use of herbicides to control weed	11.2	88.8
Use cure manure before application	37.3	62.7
No use battery powder as seed dresser	58.8	41.3
No use of fire for land clearing	21.5	78.5
Soil fertility management		
Use of crop rotation	52.5	47.5
Use planned crop rotation	39.5	60.5
No bad odour of compost before application	48.6	51.4
No addition of some synthetic fertilizer to compost	49.7	50.3
Pest management		
Use of neem extracts	18.6	81.4
No use of same knapsack sprayer for neem extract and synthetic pesticide	16.4	83.6
No addition of some chemical pesticides to neem extracts	44.1	55.9
No addition of kerosene to neem extracts	32.2	67.8

Source: Field Survey, 2017

Table 4: Distribution of respondents by level of compliance with organic standards n=177

Level	Percentage	
Crop farmers		
Low	51.4	Min =18.00, Max =61.00, Mean = 39.60
High	48.6	

Source: Field Survey, 2017

Table 5: Test of relationship between use of traditional practices and compliance with organic standard

Variable	r value	p value	Decision
Traditional practices	0.114	0.044	Significant

Source: Field Survey, 2017

Relationship between respondents' use of traditional agricultural practices and the level of compliance with organic standard

As indicated in Table 5 there is significant relationship (r=0.114) between the respondents traditional agricultural practices and level of compliance with organic practices. This could attributed to the fact that some of the respondents are smallholder farmers and have limited access to synthetic inputs and with relatively low income to purchase synthetic inputs. These challenges could have informed the use of available traditional practices, to make up for their agricultural production. Considering some of these traditional practices in use, which are not too far from some organic practices, such as; crop rotation, use of manure, use of plant extract and multiple cropping, traditional practices should be leveraged on to promote conversion to organic agricultural practices.

Conclusion

Many Nigerian farmers use traditional agricultural practices with synthetic inputs for their production. Most commonly used traditional practices are; crop rotation, use of manure, use of plant extract and multiple cropping, without compliance with organic standard. The level of compliance with organic practices is low.

Therefore, for rapid adoption of organic practices, the need to leverage on the few traditional practices that are close to organic principle is imperative as well as engaging agricultural extension service for awareness, advocacy and to promote organic agriculture as adaptable practices for health, economic and environmental benefits.

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