

# FARMERS' PERCEPTIONS OF ORGANIC FARMING IN SELECTED LOCAL GOVERNMENT AREAS OF EKITI STATE, NIGERIA

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## Abstract

The study investigated farmers' perception of organic farming in selected Local Government Areas of Ekiti State, Nigeria, with the specific objectives of assessing the demographic characteristics of farmers, identifying the major crops grown by the farmers, assessing farmers' sources of information on organic farming, examining farmers' knowledge of organic farming, as well as assessing farmers' perception about organic farming. A multi-stage sampling technique was used to select 160 farmers in the study area. The data collected were analyzed using frequency counts, percentages and Chi-square. Results obtained show that farmers in the study area are mostly male with a mean age of 53.8 years, married, and have formal education. Crops grown by the farmers include: maize, yam, cassava, plantain, vegetables, and tomato. Farmers' sources of information on organic farming are radio, extension agents, television, newspapers, farmers association, fellow farmers, and relatives. Their most preferred sources of information are Mobile phones and radio. Farmers in the study area have a high knowledge of organic farming and favourable perception towards organic farming. Results further show that significant relationships exist between sources of information on organic farming and farmers' perception of organic farming, as well as knowledge of organic farming and farmers' perception of organic farming. These imply that those who have more access to information on organic farming tend to have a favourable perception towards organic farming than those who have less access to information on organic farming. In the same vein, the farmers with high knowledge of organic farming tend to have a favourable perception towards organic farming than those who have little knowledge of organic farming. Policy recommendations emanating from the study are: active involvement of youths and women in organic crop production, improvement of information sources on organic farming, and enlightenments on various organic methods of weed, pest and disease control through the regular sources of information on organic farming. Farmers should be motivated through credit facilities and discouragement of inorganic farming in order to ensure sustainable production of food, since the farmers have a favourable perception towards organic farming.

Key words: Knowledge, Perception, Organic farming, Sources of Information

## Introduction

The mainstay of the Nigerian economy since independence is agriculture, as it accounts for over 38 percent of the non-oil foreign exchange earnings and employs about 70% of the active labour force of the population (BPE, 2004). Despite this level of involvement in agricultural production in Nigeria, the food produced can no longer meet the demand of the the fast growing population of the country. Attempts to increase food production in the country have brought about the expansion of farming area, as well as an increase in the use of agro-chemicals, the long-term effect of which does not support sustainable agriculture. In an attempt to promote organic agriculture and ensure the production of agricultural goods at a sustainable level, the second national conference on organic agriculture was held in Nigeria, under the auspices of the International Federation of Organic Agricultural Movement (IFOAM), where the participants were charged with the responsibilities of developing organic agriculture in Nigeria (IFOAM, 2007).

The National Organic Standard Board (NOSB) has defined organic agriculture as 'an ecological production management system that promotes and enhances biodiversity. It is based on minimal use of off-farm inputs and on-farm management practices that restore, maintain and enhance ecological harmony' (ATTRA, 2007). According to Robertson and Morgan (1996), organic farming avoids the use of synthetic fertilisers and pesticides and relies on developing biological diversity in the field to disrupt habitats for pest organisms and the purposeful maintenance and replenishment of soil fertility. Organic farming emphasises the use of renewable natural resources and their recycling (Emsley, 2001). It eliminates the use of synthetic pesticides, growth hormones, antibiotics and gene manipulation in the crop production system, and this poses a challenge to crop and pest management specialists to device new tactics for crop and animal protection (Ivbijaro, 1990; Tapondjon *et al.*, 2002). Attention is instead focussed on disease resistance and restoring or enhancing ecological processes (Smil, 2001; Adeoye, 2005). Organic systems rely on crop rotation, crop

residues, animal manures, legumes, green manures, off-farm organic wastes and aspects of biological pest control to maintain soil productivity and tilt, to supply plant nutrient and to control insects, weed and other pests (Lampkin, 1990; Miguel, 1998).

Most of the synthetic fertilisers and other agrochemicals that are used in non-organic farming are manufactured using resources such as fossil fuels which are not renewable. Using such resources may cause pollution and contribute to environmental degradation, thus making such agricultural practices unsustainable. Some inorganic fertilisers used to increase crop yield are leached or washed away by erosion to nearby rivers, causing water pollution, which is dangerous to aquatic life and human health (Smil 2001).

In sub-Saharan Africa, poor soil fertility is one of the major causes of low agricultural productivity (Bationo and Mokwunye 1991; Williams, 1999). Research indicates that organic manure increases yields of food crops and forages. It augments soil organic matter content, raises soil pH, and improves nutrient exchange and water holding capacity of soil (Williams, 1999). However, despite these beneficial effects and the vital role in supporting crop production and soil fertility improvement, organic manure is not regularly applied by most farmers, even in areas where aggregate livestock population may permit its use (Adejobi and Kormawa, 2002) in Sub-Saharan Africa.

Nigeria appears to be at the early stage of the development of organic agriculture, with very few farms or projects claiming to be organic and even fewer operating a recognised form of certified organic agriculture (Harris, 2006). An internet search for organic agriculture developments in Nigeria reveals a few entries. The organisation, World-Wide Opportunities on Organic Farms (WWOOF), which offers volunteers the chance to gain short term experience on organic farms, lists four opportunities in Nigeria: an organic farm which sells most of its farm produce, while some goes into humanitarian and personal consumption; a 30 hectare farm growing fruits, food crops and livestock production organically; the All Nigeria Organic Farmers Association, a co-operative formed to assist local farmers in learning organic systems; and the Food Basket of Nigeria, producing various crops- arable and cash crops in small holdings using mainly organic means.

The major goal of organic farming activities is a sustainable production of quality food with little or no effect on the environment. This goal has not been fully achieved by the current agricultural practices, i.e. conventional farming in the study area, hence, the need to encourage organic farming which is capable of providing solutions to the current agricultural problems and help to achieve optimal production of quality food sustainably (IFOAM, 2005). Despite the global awareness of environmental degradation and climatic change that could result from continuous practice of inorganic farming, and the threats it poses on sustainable agricultural production, the farmers in Ekiti State are still very much in a system of producing inorganically. This study was an attempt to understand the feelings of farmers about sustainable farming in the study area.

Therefore, this study was designed to examine farmers' perception of organic farming by providing answers to the following research questions:

- What are the demographic characteristics of the farmers in Ekiti State, Nigeria?
- What are the major crops grown by the farmers?
- What are the farmers' present sources of information on organic farming?
- Do the farmers have the knowledge required for practising organic farming?
- What are farmers' perceptions about organic farming in Ekiti State, Nigeria?

## **Methodology**

### **Study Area**

The study was conducted in Ekiti State, Nigeria in 2009. The choice of Ekiti State for this research was due to its well known agricultural activities in the country. The state is located at latitude 7° 40'N and longitude 5° 15'E and is mainly an upland zone (above 250 metres above sea level). The area is underlain by metamorphic rocks and has a generally undulating land surface. The state enjoys a tropical climate with two distinct seasons: rainy season (April to October) and dry season (November to March). The temperature ranges from 21°C to 28°C, with high humidity. South-westerly and north-easterly winds blow in the rainy and dry seasons, respectively. Tropical forest exists in the southern part of the state, while guinea savannah occupies the northern peripheries. The population of the inhabitants of the state, according to a 2006 population census, was 2,384,212 (NPC, 2006).

Agriculture is the predominant occupation of the people in Ekiti state. Their major produce includes cocoa, kola nut, orange (and other citrus), oil palm, maize, rice, cassava, yam and sweet potato. People also engage in trading and manufacturing of goods such as textiles, pottery, bricks, mats and footwear.

## Sampling procedure

The population involved in this study consisted of farmers in Ekiti South-West Local Government and Ikere Local Government areas of Ekiti State. A multi-stage sampling technique was used for this study because of the several stages that were involved in selecting respondents. Ekiti State was purposively selected for this study because of its well known agricultural practices. The state is divided into two zones according to the Agricultural Development Project's (ADP) zoning, with each zone consisting of eight local government areas. The first stage involved the selection of one local government from each zone. The selected local government areas were: Ekiti South-West Local Government area from zone one and Ikere Local Government area from zone two. The second stage involved random selection of four political wards (out of an average of 11 political wards) from each local government area. The selected wards were: Ward 2, Ward 5, Ward 9, and Ward 10 from Ekiti South-West Local Government area, and Agbado-Oyo, Afao-Kajola, Atiba-Aafin, and Ogbonjana wards from Ikere Local Government area. In the third stage, the lists of registered farmers in the selected wards were obtained from the block extension agents in Ekiti State ADP and snow ball technique was also used to locate some unregistered farmers. Twenty farmers were selected from each ward to make a total of 160 respondents which constituted the sample size for the study. The selection of 20 farmers was chosen to maximise the number of farmers included within the budget constraints of the project. Locating unregistered farmers through snow ball was challenging as some farmers were not easy to locate for investigation.

## Data collection and analysis

Data were collected from the primary sources (respondents) with the aid of a structured interview schedule consisting of both open and close ended questions. The data collected were analysed with the aid of the descriptive statistical tools of frequency count and percentage. An inferential statistical tool, Chi-square ( $\chi^2$ ), was used to analyse the study hypotheses. The hypotheses were stated in the null form ( $H_0$ ):

$H_{01}$ : There is no significant relationship between the farmers' sources of information and perception of organic farming, and

$H_{02}$ : There is no significant relationship between the farmers' knowledge on organic farming and perception of organic farming.

The hypothesis was rejected if the  $P$ -value was  $\leq \alpha = 0.05$ .

## Results and Discussion

### Demographic characteristics of the respondents

The demographic characteristics of the respondents analysed in this study, which are relevant to individuals' perceptions of organic farming, include age, sex, marital status, and educational attainment. Analysis of results obtained from this study (Table 1) reveals that a majority (90%) of the respondents are between the ages of 40 and 70 years, with the mean age of 53.8 years; youth comprised only 10%. This agrees with the findings of Solomon (2008) that the mean age of farmers was 51 years, meaning that older people were involved in organic farming activities more than the younger ones. The implication of this is that youths are not involved in the practices of organic farming to any appreciable extent. As a result, the older farmers may not have enough energy to effectively carry out some labour-intensive activities in organic farming. Also, the adoption of any innovation on organic farming may not be as high as expected, as adoption can vary inversely with age (Ogunyemi, 2005).

The majority of the respondents were male, suggesting that farming in this area may mostly be practiced by males, as was also found by Dipeolu *et al.* (2006) and Solomon (2008). In this part of the country, females are usually engaged in post harvesting operations such as transportation, processing and marketing of agricultural produce.

The results depicted in Table 1 show that the majority of the farmers are married, while very few were single or widowed. This means that married people are more involved in farming and may receive assistance from their spouses in carrying out some activities on the farm.

In terms of education, the majority (80.6%) of the respondents had some formal education: primary, secondary or post secondary education. Almost 20% had no formal education. This implies that learned people are involved in farming, which is in support of Solomon (2008) who stated that the majority of present day farmers had some formal education. High literacy among the respondents may enhance adoption of innovations that are related to organic farming.

**Table 1. Demographic characteristics of respondents (n = 160).**

Variables	Frequency	Percentage	Mean
<b>Age (years)</b>			
20 – 29	3	1.9	53.8
30 – 39	13	8.1	
40 – 49	31	19.4	
50 – 59	56	35.0	
60 – 69	43	26.9	
Above 70	14	8.7	
<b>Gender</b>			
Male	138	86.3	
Female	22	13.7	
<b>Marital status</b>			
Single	2	1.3	
Married	153	95.6	
Widowed	5	3.1	
Divorced	-	-	
<b>Educational background</b>			
No formal education	31	19.4	
Primary education	37	23.1	
Secondary education	40	25.0	
Tertiary education	52	32.5	

### Major crops grown by the farmers

Major crops are referred to as crops commonly grown in a large quantity for commercial purpose by the farmers in the study area. The comprehensive list of crops was developed from the result of pre-survey carried out prior to the study. The crops were identified by asking the farmers to indicate which of the crops they grow from the list of various crops presented to them. Table 2 shows that majority of the respondents grow the following staple food crops: maize (86%), yam (78.5%), cassava (77%) and plantain/banana (50%). Less than 50% of respondents grow the following cash and food crops: tree crops such as cocoa, kola nut and citrus, tomato/pepper, vegetables, okra, cowpea and sweet potato. The major staple crops were planted on large areas of individual land, family land and borrowed land and are the major sources of income for the respondents. Other crops were seen as complimenting the major crops. Some of these crops are planted in between the major crops for intercropping and green manuring (e.g. nitrogen fixation by leguminous crops) which are important activities in organic farming. The green manure crops will improve the soil condition (Taiwo *et al.* 2006).

**Table 2. Distribution of the respondents based on types of crop grown (n = 160).**

Crop	Frequency	Percentage
Maize	138	86.2
Yam	124	77.5
Cassava	123	76.9
Plantain, Banana	80	50
Cocoa, Kola nut, Citrus	70	43.8
Tomato, Pepper	42	26.3
Vegetable	39	24.4
Okra	25	15.6
Cowpea	15	9.4
Rice	7	4.4
Sweet potatoes	7	4.4

### Sources of information on farming

Sources of information on farming are channels through which farmers gain access to information on farming activities and other aspects of livelihood such as marketing. Information sources were evaluated by presenting respondents with a list of sources developed from the literature and asking them to indicate which ones they use for accessing information on farming activities, frequency of access, and the most preferred source. The data in Table 3 show that the respondents have access to information on farming through a variety of sources. The finding that 95% of respondents can access information through Mobile phones corroborates reports by Morrow (2002) and Oyesola *et al.* (2008) on the use of communication technologies among farmers. Farmers now use Mobile phones to get information on various farming needs by phoning

their relatives and friends who are in urban centres. About 93% of respondents used radios as an information source. This partly supports the findings of FAO (1989) who observed that radio was among the electronic media used successfully in rural areas.

It was noted that most of the information sources provided farmers with useful information on organic farming but not on a regular basis, with the exception of Mobile phones and extension agents. However, farmers in the study area have low access to sources of information on organic farming. The lack of preference for internet-based information sources was as a result of inadequate accessibility to internet facilities in the study area.

**Table 3. Percentage distribution of respondents based on their sources of information on organic farming (n = 160).**

Information sources	Response (%)	Frequency of access (%)		Preference (%)
	Yes	Regular	Occasional	Most preferred
Radio	92.5	47.5	45.0	61.9
Extension agents	74.4	51.3	23.1	34.2
Friends	52.5	14.4	38.1	8.1
Farmers association	54.4	18.1	36.3	4.4
Relatives	30.6	7.5	9.4	16.3
Television	56.9	25.0	31.9	23.8
Pamphlets/Newspapers	5.0	28.8	9.4	16.3
Mobile Phones	95.0	81.3	13.7	63.2
Internet	1.9	1.3	0.6	-

### Knowledge of organic farming

Knowledge of organic farming was defined in this research as a proper understanding of organic farming activities. Knowledge of organic farming among the respondents was measured by asking them in their local language to indicate true or false to the ten knowledge questions presented to them. The knowledge questions were prepared from the literature and pre-test stage of the study. The highest, lowest, and mean scores were obtained. The mean score was used in determining the level of knowledge of organic farming among the respondents. The highest score for knowledge of organic farming was 10 and the lowest score was 0, while the mean score was 5. Therefore, all the respondents having scores below 5 were categorised as having low level of knowledge on organic farming, while respondents having scores of 5 and above were categorised as having high level of knowledge on organic farming.

The majority (65%) of the respondents were highly knowledgeable about organic farming (score of 5-10), with the remainder (35%) having a low level knowledge of organic farming (score of 0-4). The implication is that the farmers have good knowledge of organic farming and the knowledge could influence them towards a favourable perception of organic farming. It could also help the farmers convert to organic food production, if they are encouraged and motivated, since they have started practicing organic farming.

### Perception of organic farming

This is the view of farmers about organic farming, and it was assessed by asking the respondents in their local language to indicate their opinion on 25 positive and negative statements. Their responses were recorded on a five-point Likert scale of SA (Strongly Agreed), A (Agreed), U (Undecided), D (Disagreed), SD (Strongly Disagreed), which were 5, 4, 3, 2, and 1, respectively, for positive statements, and 1, 2, 3, 4, and 5, respectively, for negative statements. Individual scores were obtained and categorised. The highest score was 125, lowest was 25, and mean score was 75. Respondents with a mean score less than 75 were categorised as having unfavourable perception about organic farming, while those who scored 75 and above were categorised as farmers who have a favourable perception of organic farming.

The majority (60.6%) of the respondents have a favourable perception towards organic farming (score of 75-125), while only (39.4%) of the respondents have an unfavourable perception (score of 25-74). This supports the findings of Dipeolu *et al.* (2006) that farmers, in general, had a positive perception of organic produce. Also, Tratnik *et al.* (2009) observed that the attitude of vegetable growers towards organic agriculture was positive. The implication of this finding is that organic farming adoption has potential in the study area if farmers are encouraged and motivated through adequate training.

## Testing of hypotheses

Hypothesis one ( $H_{01}$ ): There is no significant relationship between the farmers' sources of information on organic farming and perception of organic farming.

Sources of information were measured here by presenting to respondents a list of sources of information from literature and they were asked to indicate which ones they use for accessing information on farming activities, frequency of access, and the most preferred source. 'Yes' response was scored as 1, while 'No' was scored as 0; 'regularly used' was scored as 2, and 'occasionally' was scored as 1. The highest, lowest, and mean scores were obtained. The mean score obtained was used to determine the level of sources of information of the respondents on organic farming. The highest score was 27, the lowest was 0 and the mean score was 13.5. Therefore, respondents who scored less than 13.5 were categorised as having a low level of sources of information on organic farming, while those who scored 13.5 and above were categorised as farmers who have a high level of sources of information on organic farming.

A Chi-squared test indicated that there was a significant ( $5.557 = \chi^2$ ;  $P = 0.018$ ) relationship between farmers' information sources on organic farming and their perception of organic farming (Table 4). This result suggests that access to information has an influence on the perception of farmers about organic farming; those who had more access to information on organic farming were equally favourable or unfavourable about organic farming, while those who did not have much access to information were more inclined to perceive organic farming favourably.

**Table 4: Relationship between farmers' sources of information and perception of organic farming.**

Information Sources	Perception (% of respondents)		Total
	Favourable	Unfavourable	
Higher level of information sources	23.1	22.5	45.6
Lower level of information sources	37.5	16.9	54.4
Total	60.6	39.3	100

Hypothesis 2 ( $H_{02}$ ): There is no significant relationship between the farmers' knowledge and perception of organic farming.

There is significant ( $4.07 = \chi^2$ ;  $P = 0.044$ ) relationship between farmers' knowledge and perception about organic farming (Table 5). This implies that the farmers' knowledge of organic farming has an influence on their perception of organic farming in the study area. Farmers with a higher level of knowledge of organic farming were twice as likely to perceive organic farming favourably, while those with a low level of knowledge of organic farming reported similar levels of favourability towards organic farming.

**Table 5. Relationship between farmers' knowledge of organic farming and perception about organic farming.**

Knowledge	Perception (% of respondents)		Total
	Favourable	Unfavourable	
High level of knowledge of organic farming	43.1	21.9	65.0
Low level of knowledge of organic farming	17.5	17.5	35.0
Total	60.6	39.3	100

## Conclusion and recommendations

Based on the findings of this study, it can be concluded that the farmers were mostly men, married and well educated. The major crops grown by the farmers in the study area are maize, yam and cassava, key staple crops in the region. The farmers had access to information on farming through various sources of which only GSM, radio and extension agents provided them with information on regular basis. The most preferred source of information on farming are GSM and radio. A majority of farmers had good knowledge of organic farming and favourable perception towards organic farming in the study area.

Based on the conclusion of this study, the following recommendations are made:

1. Women and youths should be encouraged to be actively involved when providing training on organic farming in the study area.
2. Sensitisation programmes on organic farming should use preferred sources of information like GSM, radio and extension agents in local languages.
3. Farmers should be enlightened on various organic methods of controlling weeds, pest and diseases, through the farmers' regular sources of information.

4. Farmers should be motivated through credit facilities and series of training on technical-know-how of organic farming in order to ensure sustainable production of food, since the farmers have favourable perception towards organic farming.

## References

- Adejobi, A. O., Kormawa, P. M. 2002. *Determinants of manure use in crop production in northern Guinea Savanna of Nigeria*. Proceedings of Deutscher tropentag in 2002. International Research on Food Security. Natural Resources Management and Rural Development. October 9 – 11, 2002. University of Kassel – Witzenhausen, Germany.
- Adeoye, G.O. 2005. *Organic Agriculture: a review and possible adoption for food security in Nigeria*, Proceedings of the 1st National Conference on Organic Agriculture in Nigeria.
- Appropriate Technology Transfer for Rural Areas (ATTRA), 2007. *An overview of organic crop production, fundamentals of sustainable agriculture*, ATTRA, Fayetteville.
- Bationo, A. and A. U. Mokwunye. 1991. Role of manures and crop residue in alleviating soil fertility constraints to crop production: with special reference to the Sahelian and Sudanian zones of West Africa. *Fertilizer Research* 29: (117 - 125).
- BPE (Bureau of Public Enterprises: Nigeria) 2004. BPE data, Accessed February, 2004. <http://www.bpeng.org/101031773/656532b.asp?>
- Dipeolu, A. O.; K. A. Bello and S. O. Akinbode 2006. *Comparative economic analysis of organic and inorganic vegetable production in Ogun State, Nigeria*. Proceedings of the 2nd National Conference on Organic Agriculture, University of Ibadan, Ibadan, Nigeria 27 – 29 November, 2006. pp. 24.
- Emsley, J. 2001. Going one better than nature. *Nature*. 410: 633-634.
- Food and Agriculture Organization (FAO) 1989. Guide-lines on communication for rural development: A brief for development planners and project for-mulators. In: FAO. 1999. *Communication for Development Publications*. [CD Rom]. Rome: FAP
- Harris, P. J. C 2006. *Sustaining Organic Agricultural Projects in Nigeria*, Proceedings of the 2nd National Conference on Organic Agriculture, University of Ibadan, Ibadan, Nigeria 27-29 November, 2006. pp. 16
- International Federation of Organic Agriculture Movement 2005. *The IFOAM Norm for organic production and processing*, London Press, London Pp 254.
- International Federation of Organic Agriculture Movement (IFOAM) 2007. *Africa Organic*, IFOAM news letter, Volume 1 No. 7. <http://www.ifoam.org/newsletter/newsletter-africa/Africa-organic-news-vol.1-No.7.html>
- Ivbejaro, M. F. 1990. The efficacy of seed oil of *Azadirachata indica* A. Juss and *piper guineense* schum and thonn on the control of *Callosobruchus Maculatus*. *Insect science and its application*, 11: 149 – 152.
- Lampkin, N. *Organic Farming*. Farming Press Miller Freeman Plc, United Kingdom, pp. 715.
- Miguel, A. A. 1998. *Agro ecology; the science of sustainable agriculture*, 2nd edition. IT publication, pp 179 – 193.
- Morrow, K. 2002. The ICT Agenda: Global action plans and local solutions. *LEISA*. 18(2): 9 – 10.
- Ogunyemi, O. M. 2005. Principles and Practice of Agricultural Extension. Deen-Lat Lithoprint and Publishers, Ado, Nigeria. Pp.56.
- Oyesola, O. B. and J. O. Oladeji, 2008. Use of Information Technologies among rural dwellers in Oyo State. Paper presented at the 9<sup>th</sup> Agricultural Extension Society of Nigeria National Conference, Federal University of Technology, Mina, May 2008.
- Smil, V. 2001. *Enriching the Earth: Fritz Haber, Carboch, and the Transformation of World Food*, MIT Press, Boston.
- Solomon, O. 2008. Small scale oil palm farmers perception of organic agriculture in Imo State, Nigeria, *Journal of Environmental Extension*. 7: 67-71.
- Taiwo, L.B.; Akande M.O. and J.A. Adediran 2006. *Recycling of farm wastes for sustainable organic farming in Nigeria Agriculture*, Proceedings of the 2nd National Conference on Organic Agriculture, University of Ibadan, Ibadan, Nigeria 27-29 November, 2006. pp. 35.
- Tapondjou, A. L.; Alder, C.; Bouda, H and C. Rechmuth, 2002. Ability of products derived from the leaves of *Clausena Anisata* to protect stored legumes from attack by *Callosobruchus Maclatus* and *C. Chinensis* (Coleoptera Bruchidae). Proceedings of 10BC-WPRS working group 'Integrated protection in stored products', Lisbon Portugal, 3-5 September, 2001, Bulletin DILB, 25: 3 Pp153 – 164.
- Tratnik, M. and D. Zutinic 2009. *Organic Vegetable Growing – Attitude of The Croatian Farmers*. International society for horticultural science. <http://www.actahort.org>.
- Williams, T. O. 1999. Factors Influencing manure application by farmers in semi-arid West Africa. *Nutrient Cycling in Agroecosystems*. 55: 15-22.