Farming Practices Employed by Vegetable Farmers in Calabar Agricultural Zone of Cross River State

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ABSTRACT

This study aimed at examining the farming practices employed by vegetable farmers in Calabar, Agricultural Zone of Cross River State. The study was carried out in three Local Government Areas – Calabar South, Calabar Municipality and Odukpani purposively selected and used for the study on the basis of intensity and scale of vegetable production out of the seven LGAs that make up the Calabar Agricultural zone. The population of the study comprised all the vegetable farmers in the study area. A sample size of two hundred and fifty (250) respondents was select using the purposive and random sampling techniques. Questionnaire and oral interview were used to elicit data for the analysis. The instrument was submitted for face and content validation by experts in the field. Test retest technique was used to test for reliability of the instruments. Data collected were analyzed using descriptive statistics. The findings from the study revealed that vegetable farmers in Calabar Agricultural Zone are utilizing various farming practices and technologies in vegetable production, including organic and conventional methods. It was recommended that the production of vegetable for commercial and dietary uses should not be at the detriment of our environment. Hence, farmers should be frequently reminded of the damages that conventional farming practices have caused the environment, and as well encouraged to adopt the organic farming practices.

Key Words: Organic, Conventional, Farming Practices, Vegetable Farmers

Introduction

Rural farmers and their farms collectively form an important foundation on which Nigeria's economy revolve (Olawepo, 2010). Jack, (2011) in the Agricultural Technological Adoption Initiative (ATAI, White Paper) stated that billions of dollars have been invested in the development of new agricultural technologies, included here is the green revolution technologies. Although some Green Revolution technologies such as use of synthetic agro-chemicals like fertilizers and pesticides, use of high yielding varieties and exploitation of irrigation potentials has increased crop production significantly in some areas, Setboonsarng (2006) observed that the gains of the Green Revolution have come at the cost of extensive environmental degradation and considerable health problems due to exposure to agro-chemicals. He maintained that low external input and sustainable agriculture approaches based on ecological principles of farming have been advocated as alternative for areas where the Green Revolution Technologies are not feasible in order to ensure food security in those areas.

Setboonsarng (2006) further reports that organic farming has particularly gained interest as a low external input sustainable agriculture. Organic farming generally requires less input, is easy to manage because the management of organic farms is in harmony with the local environment and depends on traditional knowledge systems. Hence Serrano & Damiani (2003)

assert that the poorest marginalized farmers who have not benefited from the Green Revolution and other related agricultural programmes stood to gain the most from organic agriculture.

The availability and easy access to ICT in Nigeria and other African countries has brought about increased awareness of the need for a highly diversified diet, rich in vegetables and fruits for good health (Maundu, Achigan-Dako & Morimoto, 2009). Vegetables are usually consumed fresh or after minimal processing to facilitate the consumption of its micro nutrients. The method of production adopted by vegetable farmers is of paramount importance because of health, economic and environmental implications. In particular, vegetable farmers' disposition towards organic farming especially those in Calabar Agricultural Zone of Cross River State have scarcely been mentioned in literature, even though vegetable farming forms the backbone of the area's agricultural activities. It is against this background that this study was undertaken to examine the farming practices used by vegetable farmers in the area.

Statement of the Problem

It has been noted that the demand for vegetables has increased significantly over the years, making vegetable farming a primary source of nutritive diets and a major income earner for small-scale farmers and vegetable sellers. However, production systems have remained a fundamental concern to all stakeholders, including advocates of environment conservation. One of the frequently proposed but less applied options is organic farming, which is more environmentally friendly, cheaper and sustainable. Further observations have revealed that the danger posed by the use of inorganic chemical compounds to produce vegetables to man, animals and crops has become a global health and environmental crisis such that in United States, Britain and Canada, the use of chlorinated compounds (e.g. DDT) has been prohibited outright. These effects are not limited to the Western countries, such problems as soil impoverishment, crop damage, environmental degradation and health hazards due to persistent use of toxic chemicals by farmers is common in our localities. These problems have continued to trigger the call for the adoption of organic farming system which is seen as a veritable choice for an environmentally friendly and sustainable agricultural system against the conventional approach. It is on this proviso that this study became necessary to examine the farming practices used by vegetable farmers in Calabar Agricultural zone of Cross River State.

Objectives of the study

The main aim of this study was to examine the various farming practices employed by vegetable farmers in Calabar Agricultural Zone of Cross River State. The study specifically seeks to:

i. Find out the organic farming practices available in the study area.

ii. Identify the various conventional farming practices in the study area.

Research questions

Based on the problem identified, the following research questions were raised for the study:

i. What are the organic farming practices in the study area?

ii. What are the conventional farming practices in the study area?

Review of Related Literature

Theoretical framework

For the purpose of this study, theories of Innovation shall be employed

Innovation Decision Process Theory

The Innovation Decision Process Theory (Rogers, 1995), states that diffusion is a process that occurs over time and can be seen as having five distinct stages. The stages in the process are Knowledge, Persuasion, Decision, Implementation, and Confirmation. According to this theory, potential adopters of an innovation must learn about the innovation, be persuaded as to the merits of the innovation, decide to adopt, implement the innovation, and confirm (reaffirm or reject) the decision to adopt the innovation). The relevance of this theory to this study is that certain processes must be accomplished before effective adoption of organic farming by vegetable farmers can be achieved. In this instance, the knowledge of organic farming techniques should be provided to farmers, they must be persuaded possibly through extension agents on public campaigns, farmers should be given time to make their decision on whether to adopt organic farming or not and if adoption occurs, the rate of implementation (adoption) should be assessed or confirmed.

Accordingly, Rogers (1995) identified five categories of adopters. The first category of adopters is the innovators (2.5%). These are the risk-takers and pioneers who lead the way. They are youngest in age, have great financial liquidity, are very social and have closest contact to scientific sources and interaction with other innovators. The second group is known as the early adopters (13.5%). These individuals have the highest degree of opinion leadership among the other adopter categories and are more discrete in adoption choices than innovators. They climb on board the train early and help spread the word about the innovation to others. The third and fourth groups are the majority and late majority. Each constitutes 34% of the potential adopting population. The innovators and early adopters convince the early majority. The late majority waits to make sure that adoption is in their best interests. The final group is the laggards (16%). These are the individuals who are highly skeptical and resist adopting until absolutely necessary. In many cases, they never adopt the innovation (Rogers, 1995). The implication of this theory is that adoption of organic farming practices by vegetable farmers is not expected to be simultaneous across a population.

Organic Vegetables Farming Practices

Vegetables are plants with edible parts, especially leafy or fleshy parts that are used mainly for soups and salads, or to accompany main dishes. Vegetables are also plants that are usually consumed fresh or after minimal processing to facilitate consumption of the main dish, as well as its micro nutrients. Maundu, Achigan-Dako and Morimoto (2009) explain that vegetables are consumed for their freshness and for being good sources of micro nutrients (especially A and C), some minerals and roughages. African Indigenous Vegetables are mainly grown for economic reasons Pasquini et al (2010).

There is a wide range of domesticated and wild vegetables in Cross River State. However, this study is focused on fluted pumpkin *(Telfairia occidentalis),* waterleaf *(Talinum fruticosum)* and okra *(Abelmoschus esculentus),* the most common varieties in the study area.

Vegetable farming has reduced chronic malnutrition levels and improved income for most households (Maity and Tripathy, 2009). It is therefore essential to enhance the adoption of

practices that not only increase production but also ensure that the vegetables produced are safe for consumption. According to Shackleton, Pasquini, and Drescher (2009), African Indigenous Vegetables (AIVs) and urban agriculture are an integral component of livelihood throughout the continent, there is extensive trade in cultivated AIVs worth billions of US dollars per year, benefitting millions of producers and vendors, and women are currently playing strong roles in the production and/or marketing of AIVs in urban areas. Consequently, women's contribution to family nutrition is significant since they are responsible for vegetable, fruits, spice growing and livestock rearing in homestead agriculture. Although much research has been carried out on small-scale farmers and their contribution to agriculture generally, not much has been done in the area of vegetable farming.

Organic farming is a form of agriculture that uses methods and techniques that align with the natural system. The International Federation of Organic Movement (IFOAM) conceptualizes organic farming as a subset of sustainable agriculture (Farnworth and Hutchings, 2009). In the broadest sense, it is a holistic production management system that avoids the use of synthetic fertilizers, pesticides and genetically modified organisms, minimizes pollution of air, soil and water and optimizes the health and community of interdependent communities of plants, animals and people (Scialabba, 2007). Farnworth et.al (2009), remarks that organic agriculture is not simply agriculture without chemicals but an ecologically sound, socially just, economically viable and sustainable form of agriculture.

In the simplest terms, organic growing or farming is based on maintaining a living soil with a diverse population of micro and macro soil organisms. Organic matter is maintained in the soil through the addition of compost, animal manure, green manure, and the avoidance of excess tillage and nitrogen applications (FAO, 2007). Another common aspect of organic agriculture is growing plants without synthetic fertilizers and pest control chemicals.

On a broader scale, it seems there are some that perceive that organic farming requires some spiritual or religious commitment. While this is scientifically unsubstantiated, Williams (2008) argues that it is true that many people committed to organic growing are committed to some important social principles as well. These usually include the desire for organic agriculture to be economically, environmentally and socially sustainable and based on integrated production systems. There is an emphasis on using locally available and renewable resources, marketing locally and the quality of food is also seen as a key part of personal health and wholeness (Reed, 2006).

Organic farming system in Nigeria is not new as most of the traditional farming methods are organic by default (IFAD, 2008). However, Farnworth et al (2009) noted that organic agriculture is not just agriculture without chemicals; instead it is ecologically sound, socially just and economically viable and therefore sustainable form of agriculture. The United States Department of Agriculture (USDA 2010) study on Organic farming conceives organic farming as a system which avoids or largely excludes the use of synthetic inputs (such as fertilizers, pesticides, hormones, feed additives etc) and to the maximum extent feasible rely upon crop rotation, crop residues, animal manures, off-farm organic wastes, mineral grade rock additives, and biological system of nutrient mobilization and plant protection.

FAO (2009) suggests that organic agriculture is a unique production management system which promotes and enhances agro-ecosystem health, including biodiversity, biological cycles and soil biological activity, and this is accomplished by using on-farm agronomic, biological and mechanical methods in exclusion of all synthetic off-farm inputs. Maundu et al (2009)

concludes that the principle goal of organic production is to develop enterprises that are sustainable and harmonious with the environment.

According to USDA (2010), the main features of organic farming include; protecting the long term fertility of the soils, by maintaining organic matter levels, encouraging soil biological activity, and careful mechanical intervention, providing crop nutrients indirectly using relatively insoluble nutrient sources which are made available to the plant by the action of soil micro organisms; nitrogen self-sufficiency through the use of legumes and biological nitrogen fixation, as well as effective recycling of organic materials including crop residues and livestock manures; weed, disease and pest control relying primarily on crop rotations, natural predicators, diversity, organic manuring, resistant varieties and minimal thermal, biological and chemical intervention, extensive management of livestock, paying full regard to their evolutionary adaptations, behavioural patterns and animal welfare issues with respect to nutrition, housing, health, breeding and rearing; careful attention to the impact of the farming system on the wider environment and the conservation of habitats. Conventional farming practices on the other hand describe those farming practices that are dominantly present in the area today. These include both low-input farming systems and high-input industrial agriculture. The practice of bush burning and use of synthetic fertilizers have proven to prepare the soil for cultivation faster than mulching which is an organic farming practice. The production and use of animal droppings is significantly very low compared to the use of fertilizer which has a high level of production, sales and supplies.

Materials and Methods

Study area

The study was carried out in the Calabar Agricultural Zone of Cross River State. The main crops produced in Calabar zone include; plantain, banana, maize, rubber, palm produce and vegetables. The main economic activity of most farmers in the study area is the cultivation and sale of vegetables.

Population of the study

The population of this study comprised all the vegetable farmers in Calabar Agricultural zone. Data available at the Agriculture Development Programme ADP, Calabar zone, indicates that there were four hundred and fifty-three (453) registered vegetable farmers in the area.

Sample and sampling technique

Multi-stage sampling procedure was used to select zone, blocks, cells and individual farmers for the study. The blocks are the Local Government Areas under the zone while the cells refer to the communities in the different local government areas where vegetable is produced. Ninety-four vegetable farmers were randomly selected in Calabar South and one hundred and four in Odukpani while fifty-two were selected in Calabar Municipality based on the proportion of farmers in each site making a total of 250 respondents.

Instrumentation

The instrument used for data collection was a structured questionnaire and oral interview.

Validation of instrument

The validity of the instrument was determined by professionals in the field.

Reliability of the instrument

The reliability of the instrument was determined using a test retest technique. A pilot test was conducted with 10 percent (25) of the respondents. The result of the correlation recorded a coefficient of 0.88, which implied that the instrument was 88% reliable.

Procedure for data analysis

Descriptive statistics was used to analyze data generated from the study.

Results and Discussion

Research Question 1

The research question sought to find out the organic farming practices used by vegetable farmers in the study area. Descriptive analysis was applied on the data and the result is as shown in Table 1.

TABLE 1: Distribution of respondents according to organic farming practices utilized

Variable	L.G.A. (Block)						Total	
	Cal. South		Cal Municipal		Odukpani		Frequency	Percentage
	F	%	F	%	F	%	F	%
Use of Local seeds	80	88.89	32	61.54	79	80.61	191	79.58
Crop rotation	10	11.11	17	32.69	26	26.53	53	22.08
Mixed cropping	29	32.22	19	36.54	31	31.63	79	32.92
Hand/manual weeding	87	96.67	48	92.31	83	84.69	218	90.83
Use of green manure	-	-	2	3.85	6	6.12	8	3.33
Use of compost manure	1	1.11	-	-	-	-	1	0.42
Use of animal dropping	37	41.11	26	50.00	50	51.02	113	47.08
Use of plant leaves for Mulching	14	15.55	18	34.62	9	9.18	41	17.08
Intercropping	2	2.22	7	13.46	19	19.39	28	11.67
Handpicking of insects	6	6.67	3	5.77	1	1.02	10	4.17
Use of other plants to Control pests (e.g. venus Fly tap)	-	-	-	-	-	-	-	0.00
Use of animals to Control weeds	-	-	-	-	2	2.04	2	0.83
Manual harvesting of vegetables	89	78.89	50	96.15	97	98.98	236	98.33
Manual tilling/ Preparation of land	82	91.11	47	90.38	79	80.61	208	86.67
Manual planting of Seeds	90	100	51	98.08	97	98.98	238	99.17

Source: Field Survey, 2014

The result of the analysis in Table 1 shows that a wide range of organic farming practices are available in the study area. The respondents identified a number of organic farming practices utilized in vegetable production. The most frequently mentioned practices were manual seeding, hand/manual weeding, manual harvesting of vegetable, use of local seeds, manual tillage and use of animal (manure) dropping among others.

The least cited practices were the use of compost manure, (0.42%), use of animal to control weeds (0.83%) and use of green manure (3.33%). Interestingly, in all the three blocks studied, the respondents admitted that the use of other plants to control pests was not obtainable. This corroborates the findings of Peters (2007) and Wilson (2009).

Research Question 2

The research question sought to find out the conventional farming practices adopted by vegetable farmers in the study area. Descriptive analysis was applied on the data and the result is as shown in Table 2.

TABLE 2: Summary of conventional farming practices adopted by vegetable farmers

Variable	LGA (Block)						Total	
	Cal. South		Cal. Municipal		Odukpani		F	%
	F	%	F	%	F	%		
Use of Herbicide to clear the bush before cultivation.	60	66.67	37	71.15	91	92.86	188	78.33
Use of plough	0	0.00	0	0.00	0	0.00	0	0.00
Tillage using hoe/shovel/spade.	87	96.67	42	80.77	94	95.92	223	92.92
Tillage using tractor.	0	0.00	0	0.00	0	0.00	0	0.00
Planting using seeders	0	0.00	0	0.00	0	0.00	0	0.00
Use of pre-emergence herbicide	43	47.78	39	75.00	89	90.82	171	71.25
Application of chemical fertilizers	58	64.44	50	96.15	95	96.94	203	84.58
Application of insecticides to control pests.	86	95.56	51	98.08	90	91.84	227	94.58
Use of nematicides to control soil-borne diseases/nematodes.	0	0.00	0	0.00	0	0.00	0	0.00
Harvesting using harvesters	0	0.00	0	0.00	0	0.00	0	0.00
Manual harvesting using knife	90	100.00	52	100.00	98	100.00	240	100.00
Use of hoe/cutlass to clear bush before planting	85	94.44	47	90.38	97	98.98	229	95.42
Manual weeding using hoe	88	97.78	49	94.23	95	96.94	232	96.67
Use of fire (bush burning) to clear land.	31	34.44	29	55.77	68	69.39	128	53.33

Source: Field Survey, 2014

The result of the analysis in Table 2 shows the distribution of conventional farming practices adopted by vegetable farmers. It reveals that the respondents adopted a variety of conventional farming technique, including manual harvesting of vegetables (100%), manual weeding (96.67%), use of hoe/cutlass to clear bush before cultivation (95.42%), tillage using

hoe/shovel/spade (92.92%) as well as the use of herbicides after planting (84.58%). Other conventional practices used by the respondents were application of chemical fertilizers (94.58%) and use of insecticide to control pests (81.25%). However, the result indicates that the use of plough to prepare land, planting using seeders, use of nematicide to control soil-borne diseases and harvesting of vegetables using harvesters were not adopted by the respondents in the study area. The implication of this result is that conventional farming practices are very popular and highly practiced by vegetable farmers in the study area. The frequencies with which these practices are adopted by the farmers vary from one community and farmer to another.

Conclusion

The study also found that vegetable farmers in Calabar Agricultural Zone are utilizing various farming practices and technologies in vegetable production, including organic and conventional methods. In particular, the study indicated that a good proportion of them adopted manual tillage in land proportion (86.00%), manual seeding (99.17%), hand pulling of weed (90.33%), manual harvesting (98.33%), use of local planting materials (29.58%) and use of animal manure (47.08%) among others.

Recommendations

The following recommendations were made guided by the result of the study:

i Considering the importance of vegetable and the medical recommendation for daily intake, it is expedient to encourage vegetable farmers to imbibe the practice of organic farming practices.

ii It should as well be emphasized that the production of vegetable for commercial and dietary uses should not be at the detriment of our environment. Hence, farmers should be frequently reminded of the damages that conventional farming practices have caused the environment, and as well encouraged to adopt the organic farming practices.

iii Government, and policy makers should set up policies that guard against the use of harmful conventional farming practices and regulate the measures set up where offenders are allowed to face the full fledge of the law.

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