

The role of agricultural extension workers in promoting agricultural resources conservation through organic farming and capacity building in Cross River State

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Abstract

In recent years organic farming has become a topical and highly emotive issue in global agricultural development debate. The growing attention on organic agriculture is predicated on the widespread use and misuse of agricultural chemicals that have evidently, continued to generate severe health and environmental consequences. This study ascertains specifically, the perceived dangers of maintaining agrochemical-based farming practices; the benefits of organic farming to the farmers and to the environment; strategies for building farmers' capacities to better manage agricultural resources in the rural communities and the role of extension workers in building farmers' capacities to adopt organic farming conserve agricultural resources. The study covered some selected Agricultural Extension Blocks in Cross River State – Nigeria, namely, Obudu, Ogoja, Yala, Ikom, Abi, Yakurr, Akamkpa, Odunkpani and Akpabuyo. The population for the study comprised all the rural farmers in the selected, and 1,385 farmers were purposively selected as respondents for the study. Data were obtained through the use of questionnaire, interviews and focus group discussion. Data obtained were analyzed using frequency counts, percentages, mean ratings and ranking. The results of analysis revealed that agrochemicals have severe health and environmental implications, organic farming is profoundly beneficial, both to the farmers and the environment and extension workers play significant role in enhancing farmers' capacity to conserve agricultural resources, as well as adoption of organic farming. The study recommended among others the strengthening of rural extension services to train and promotes farmers adoption of organic agriculture.

Keywords: Agricultural Resources; Capacity Building, Organic Farming; Extension Workers

Introduction

From the prehistoric times to the medieval era, agriculture was fundamentally driven by the forces of nature, a complete reliance on wild plants and animals for survival. The ecosystems were still at their finest, having the ability to support the growth of all kinds of plants. The environment was unharmed and the biological

diversities were still sufficient to sustain all life forms, the wildlife species were not at risk of destruction, and human beings were equally not facing any recognizable artificial threat particularly those associated with chemical pollution of the environment (Aboh and Eremi, 2016).

Agriculture or what has come to be generally accepted as farming, emerged when man began to live a sedentary life, when human settlements were first initiated, and when humans began to make conscious attempts to multiply or preserve some selected wild edible plants and to tame some captured wild life species. Agriculture at this stage was largely without the use of artificial substances. Human population was also small and the food quantities produced at the time were sufficient to sustain the population.

However, with the global increase in population which brought some simultaneous increase in the demand for food, the calls for improved farming practices that will enhance crop yields and performance of livestock was inevitable. The natural course of action to improve crop yields was to design synthetic agricultural chemical substances for use by the farmers. For this reason, a wide range of chemical substances have been produced with widespread concerns about their environmental suitability (Food and Agriculture Organization, FAO, 2016).

Generally, agrochemicals or agrichemicals, is a common name given to chemicals which are used in agriculture, to aid plants and crops growth and safety. They are manufactured to protect agricultural crops from pests and for augmenting crop yields. Some of the frequently used agricultural chemicals that have severe

implications for environmental and human health include, among others, pesticides, insecticides, herbicides, fungicides, algacides, rodenticides, bactericides, molluscicides, nematocides, and fertilizers. The excessive utilization of these chemicals such as chlorofluro carbons, organophosphates (example, DDT) generates residues that cause nutrients disruption and reduction of the yielding capacity of crops. Some agrochemicals are known to be carcinogenic, with serious implications for human and livestock health.

The growing calls for adoption of organic farming techniques is a response to the prevalent environmental problems associated with agrochemicals including soil, air and water pollution, contamination of water bodies leading to the destruction of aquatic biodiversity, loss of wildlife species, dangers to human health, destruction of beneficial soil microorganisms, increase in soil pH and eutrophication among others.

According to Ambo, Oka and Bisong (2008) the use of inorganic compounds such as chlorinated hydrocarbons, argano-phosphorus, phenoxine and DDT etc. to control pests and the use of acidic fertilizers have continued to create severe environmental and health problems. The dangers posed by agrochemicals to biodiversity including crops, animals, soil, water, air, forest ecosystems and human health have become a

global health and environmental crisis. The consequences are so severe to the extent that in United State of America, Britain and Canada, the use of chlorinated compounds has been prohibited outrightly. The problems of soil degradation, environmental and health hazards due to persistent use of toxic agrochemical by farmers have continued unabated in spite the calls for the promotion of organic farming and the strengthening of farmers' capacities to manage all the resources in their domain.

International Federation on Organic Agriculture Movement (IFOAM, 2010) defines organic agriculture as an integrated farming system that strives for sustainability whilst, with rare exceptions, prohibiting synthetic pesticides, antibiotics, synthetic fertilizers, genetically modified organisms and growth hormones. Organic farming is an alternative agricultural system which originated early in the 20th century in reaction to rapidly changing farming practices. It is defined by the use of fertilizer of organic origin such as compost manure, green manure, and bone meal and places emphasis on techniques such as crop rotation and companion planting, biological pest control, mixed cropping and the fostering of insect predators are encouraged. In general, organic standards are designed to allow the use of naturally occurring substances while prohibiting or strictly limiting synthetic substances (FAO, 2006).

In spite of the hazards associated with agrochemicals, including the effects on environmental resources, and the widely acknowledged benefits of organic farming, the extent to which farmers in Cross River State have appropriated organic farming techniques to their farming activities is still far below globally accepted standards. The consensus is that some farmers do not even know what organic farming entails, and they equally lack the required skills and awareness to implement organic farming systems.

Agricultural extension workers have continued to be called to take-up greater responsibilities or roles in guiding the farming population out of ignorance and provide the necessary training for farmers to be able to maintain organically driven farming operations. It is hoped that, with greater extension workers' involvement in farmer education and training, farmers will develop the requisite capabilities to manage the agricultural resources in the communities. It is against this background that this study was carried out.

Study objectives

The general objective of this study was to examine the role of agricultural extension workers in promoting agricultural resources conservation through organic farming and capacity building. The specific objectives were to; ascertain the perceived dangers /

consequences of using agrochemicals in farming;

access the benefits of organic farming to the farmers and the environment; ascertain the role of extension workers in building capacities of farmers to conserve agricultural resources in the area.

Materials and methods

This study was carried out in Cross River State, in the South-South geopolitical zone of Nigeria. The study the three agricultural zones in the state Ogoja, Ikom and Calabar Zones (extension blocks) covered were Obudu, Ogoja, Yala (Ogoja Agricultural Zone), Ikom, Abi, Yakurr (Ikom Agricultural Zone), Akamkpa, Akpabuyo and Odukpani (Calabar Agricultural Zone) respectively. Cross River State is a state in South-South Nigeria, bordering Cameroon to the east, Benue State to the North, Ebong and Abia State to the West and Akwa Ibom and Atlantic Ocean to the South. The state is located on longitude 6.1670° N and latitude 8.6601° E. The vegetation is characterized with the derived savannah of the Ogoja zone. The average seasonal temperature is 31° C, the state is a multicultural and multilingual state. The population of the study consisted of all the farmers based in the selected extension blocks. All the extension blocks used were selected using a simple random sampling technique. A total of 1,385 respondents comprising 1365

farmers and 20 extension workers were randomly selected from the blocks. Data were collected using a set of validated structured questionnaire, interview schedule and focus group discussions. Data collected were analyzed using descriptive statistics namely percentages, mean and ranking.

Results and discussion

The result in Table 1 show the distribution of respondents based on the perceived dangers or consequences of agrochemicals, both to the farmers health and to the environment. The result revealed that all the effects identified recorded mean values above the cut-off mark of 2.50, which means all the effects were accepted by the respondents. Specifically, it was observed that the use of agrochemicals can lead to the death or destruction of beneficial soil micro-organisms ($\bar{x}=4$), increase the nitrate level of soil ($\bar{x}=3.89$), enhance toxicity and reduction of soil quality ($\bar{x}=3.75$), increase soil pH ($\bar{x}=3.83$) and cause water contamination. Other effects of agrochemicals, according to the respondents were cancer resulting from carcinogenic substances, disruption of plants ecosystem natural order, cause hormones disorder, skin irritation, blindness or even death when inhaled or in contact with eyes and increase in the cost of production among others. The implication of this result is that, despite frequent observations to the contrary, agrochemicals have substantial

health and environmental consequences. The effects do not only revolve around the health of the farmers and micro-organisms, valuable fauna and flora species are constantly threatened and some are teetering on the brink of extinction due to constant use and misuse of chemicals. Similarly, chemical farming has put at risk water resources as well as forest ecosystems with inhabiting wildlife. Thus, creating problems for humans who depend on them.

These findings support the views of Amalu (2014), Nemes (2009) and Robinson and Christian (2010), who emphasized the promotion of organic farming as a sine qua non to the health and environmental problems associated with chemical-based farming methods.

Results in Table 2 revealed the benefits of organic farming. The result indicates that all the benefits identified recorded mean scores above the decision rule of 2.50, which suggested that they were accepted by the respondents. In particular, the study noted that organic farming through green manure promotes microbial activities (rank = 1st), animal inputs can be used in crop production (rank = 2nd), organic farming does not cause pollution, organic farming promotes biodiversity conservation (rank = 5th) and organic farming protects beneficial microorganisms (rank = 6th). It was also found that organic inputs are cheap (that is, low cost)

(rank = 8th), organic farming is safe, harmless and has no residual side effects, organic inputs can be sourced locally and health complications and disruption of ecosystems. The implication of this result is that the health and environmental hazards associated with agrochemicals are overcome by the use of organic farming. In organic farming, agricultural resources, including land, water, air and wildlife are protected and conserved. This implies that food chains are not disrupted or broken when organic procedures are enshrined. The constant resource degradation and environmental hazards experienced in the 21st century has been partly blamed on the use of chemicals in farming. The death of both micro and macro organisms as well as plants continues to affect the stability of food chains and ecosystems. Again, while farmers have continued to spend heavily to produce small quantities of food, organic farming offers an appealing alternative to high cost of production. The benefits of organic farming therefore, include both biological benefits, social benefits, economic benefits, health benefits and environmental benefits. These benefits are essential to agricultural resources conservation and value chain management. The findings corroborate the submission of Adesope, Matthews-Njoku, Oguzor and Ugwuja (2012), Peters (2007) and Setbuonsarng (2006).

Table 3 shows the distribution of respondents according to the role of extension workers in building the capacities of farmers to implement organic farming to conserve agricultural resources in their area. The result revealed that all the roles identified recorded mean scores above the decision rule of 2.50 which suggests that the respondents agreed. Specifically, it was observed that, for farmers to be able to adopt organic farming as an alternative to chemical farming and a resources conservation strategy, extension workers will have to carryout continuous field trips with farmers to established farms for them to see practical evidence of organic procedures such as green manure, composting and farmyard manure etc. (rank=2nd) and enlighten farmers on the dangers or consequences of agrochemicals (rank=3rd). It was also noted that extension workers will need to train and retrain farmers on various organic farming practices, organize farmer into different farmer field school groups to carryout practical exercise and projects on organic farming, educate farmers on conservation and anti-conservation farming practices and mobilize them for resource conservation activities like tree planting. The implication of this result is that agricultural extension workers have a critical role to play in enhancing or promoting the adoption of organic farming among farmers, in doing this, farmers' present level of awareness must be increased through farmer

education, training and mobilization. Farmers will not automatically start applying organic farming, they need to be told its benefits, inputs and procedures. Farmers also require information on the health, environmental and economic advantages they will gain from organic farming. This is where extension workers' role is crucial in providing the required mobilization, information, encouragement and training of farmers to practice organic farming.

The continuing deterioration of environmental resources due to human-related causes is one of the most intractable challenges confronting the world today, and addressing these challenges requires a multisectoral approach. Organic farming has been frequently recommended as a more sustainable farming doctrine to compensate for the hazardous short-comings of agrochemicals and to protect agricultural resources. It has to be admitted that the extent of adoption of organic farming as an alternative resource conservation strategy in Cross River State is still far below global expectations. It is therefore, important for the state to activate a robust extension system that will mobilize, enlighten and train rural and urban farmers on the various dynamics of organic farming and encourage them to continue to produce organic food. Extension workers need sufficient support since they live, work and associate with the farmers, the logistic, fund, conditions of service

and staff welfare have to be prioritized by the government and donor community to enhance the job performance of extension workers working with farmers, to promote farmers' capacity to adopt organic farming and conserve resources.

Recommendations

The following recommendations are based on the findings of the study:

- i. Government should provide adequate support in terms of fund, logistics and welfare to extension workers to enable them train farmers effectively.
- ii. Farmer field school approach should be strengthened to create platforms for farmers to practice organic farming techniques.
- iii. Government should partner researchers to produce and supply organic inputs to farmers.
- iv. Farmers should be constantly trained on compost preparation, farmyard manure, green manure and cover cropping practices.
- v. The supply of agrochemicals should be prohibited or at least controlled by state legislation.

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Table 1: Mean distribution of respondents according to perceived dangers/consequences of agrochemicals

S/No	Variables/item	$\sum fx$	$\bar{x}$	Remark
*	Death of beneficial soil microorganism	5540	4.00	Accepted
*	Increase in nitrate level in soil	5390	3.89	Accepted
*	Residual effect	4261	3.08	Accepted
*	Toxicity and reduction in soil quality	5200	3.75	Accepted
*	Alteration of soil pH	5311	3.83	Accepted
*	Causes water contamination	5182	3.74	Accepted
*	Leads to eutrophication	5000	3.61	Accepted
*	Death of fish and other aquatic entities	4700	3.39	Accepted
*	Promote growth of algae	4614	3.33	Accepted
*	Makes water unsafe for consumption	5431	3.92	Accepted
*	Destruction of vegetation	4800	3.47	Accepted
*	Extinction of valuable wildlife species	4378	3.16	Accepted
*	Death of useful plants	4964	3.58	Accepted
*	Carcinogenic chemicals causes cancer	5111	3.69	Accepted
*	Affect human nervous system	4600	3.32	Accepted
*	Reduce human immune system	5331	3.85	Accepted
*	causes skin irritation	5427	3.92	Accepted
*	Causes hormones disorder	5009	3.62	Accepted
*	Affect human lungs, liver and eyes	4521	3.26	Accepted
*	Human death through poisoning	4191	3.03	Accepted
*	Soil degradation and low crop yields	4487	3.24	Accepted
*	Food poisoning through chemical residues	5039	3.64	Accepted

Source: Field Survey, 2019.

Table 2: Distribution of respondents based on benefits of organic farming

S/N	Variables/Items	$\bar{x}$	Rank	Remark
*	Organic inputs are cheap (low cost)	3.87	8 th	Accepted
*	Organic inputs can be secured locally	3.64	12 th	Accepted
*	Organic inputs have no side effects	3.11	19 th	Accepted
*	They are harmless to the farmers	3.68	11 th	Accepted
*	Organic farming reduce the cost of production	3.49	15 th	Accepted
*	Organic farming is safe	3.60	13 th	Accepted
*	Organic farming improve the soil structure (manure)	3.90	7 th	Accepted
*	Green manure promote microbial activities	4.00	1 st	Accepted
*	Organic farming protect beneficial microorganisms	3.93	6 th	Accepted
*	Organic manure enhances soil organic matter	3.95	5 th	Accepted
*	Organic farming does not course pollution	3.97	3 rd	Accepted
*	Organic inputs do not cause cancer like chemicals	3.40	16 th	Accepted
*	Organic farming does not affect wildlife	3.58	14 th	Accepted
*	Organic farming dose not affect forest ecosystem	3.30	17 th	Accepted
*	Organic farming enhance crop yield	3.77	10 th	Accepted
*	Animal inputs can be used in crop production	3.99	2 nd	Accepted
*	Organic farming leaves no residual effect	3.24	18 th	Accepted
*	Organic farming promote biodiversity conservation	3.96	4 th	Accepted
*	Organic enable farmers to make more profit	3.80	9 th	Accepted
*	Organic farming is not affected by ethical problems	2.93	20 th	Accepted
*	Organic farming does not require high literacy level	2.90	21 st	Accepted

Source: Field Survey, 2019

Table 3: Distribution of roles of extension workers in building farmers capacities to conserve agro-resources

S/ N	Variables/Items	$\bar{x}$	Rank	Remark
*	Sensitization of farmers on the benefits of organic farming	3.62	10 th	Agreed
*	Enlightenment campaign on the health effects of agrochemicals	3.70	8 th	Agreed
*	Enlightenment of farmers on the environmental effect of agrochemicals	3.91	3 rd	Agreed
*	Training of farmers on various conservation farming systems e.g. teanacing, contouring, crop rotation etc.	3.89	5 th	Agreed
*	Helping farmers to identify organic farming techniques	3.72	7 th	Agreed
*	Carrying out demonstrations on the use of green manure, compositing, farm yard manure application etc.	3.94	2 nd	Agreed
*	Grouping of farmers into small farmer field school groups to execute organic farming projects.	3.67	9 th	Agreed
*	Organizing organic farming workshop and seminars for farmers	3.52	12 th	Agreed
*	Take farmers on field trip to established farms to learn about organic farming and see practical examples	4.00	1 st	Agreed
*	Periodically inviting subject matter specialists to the community to train farmers on various organic farming procedures.	3.31	13 th	Agreed
*	Using small plot adoption techniques to allow farmers see for themselves the values of organic farming	3.75	6 th	Agreed
*	Mobilize farmers for tree planting, cover cropping and erosion control	3.60	11 th	Agreed
*	Continuous farmer education on the dangers of deforestation , bush burning, continuous cropping, agrochemicals etc.	3.90	4 th	Agreed

Source: Field Survey, 2019