

Scientific Technology Development a Necessary Tool for Promotion of Organic Agriculture in Africa: A case study of Scientists in organic Agriculture in the South western Nigeria

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Abstract

Appropriate technology development (TD) and transfer are fundamental to the promotion of organic agriculture (OA) as mitigation to climate change and food insecurity. This study assessed the technology developed by scientists, motivational factors and the challenges of TD for the promotion of OA in Nigeria. The study area was South Western zone of Nigeria. 30 % of the members of OA movements were randomly selected (62) and surveyed with the use of questionnaire. The result of the study revealed that interest in OA, health and environmental concern ranked high as motivational factors for TD. Funding and inadequate exposure to Oa techniques we-re challenges to TD. There was significant correlation between motivational factors and TD ($r = 0.277$, $p \leq 0.05$). In conclusion, a few technologies have been developed, but funding and inadequate exposure to OA techniques are challenges to scientific technology development for promotion of OA in Nigeria.

Introduction

Organic Agriculture (OA) has the potential to both influence and address the factors that contribute to climate change and food insecurity. The constraints in adoption of OA include; the limited amount of truly scientific research on organic technologies, and difficult access to needed plant material, animal breeds and plant-protection inputs (Rezvanfar *et al.*, 2011). Adopting OA does not mean a return to low form of technology or backward agriculture but involves blend of innovations originating from participatory intervention of scientists and farmers.

The current participation of farmers, professionals and consumers in OA in Nigeria, indicate the need for scientific technologies to enhance promotion of organic production. Recent study shows the researchers potential to develop technologies that could be transfer to farmers. Hence, the need to assess the motivational factors, the technology developed, and constraints of technology development to scientists in OA in Nigeria.

Material and methods

This study was carried out in selected States in the South Western zone of Nigeria being the agro-ecological zone that has the highest concentration of research institutes and tertiary institutions that offer are active in organic agriculture. From the available data, 30 % of the scientists that are involved in OA were randomly selected; this gave rise to a sample size of 65 respondents. Data were collected from the respondents with the use of structured questionnaire. Out of the 65 questionnaire administered, 62 were returned giving about 95 % return rate. The dependent variable of the study was assessment of technology developed for promotion of organic agriculture, measured at the level of availability and it's transferred to farmers, from a list of identified areas of technology needs. Meanwhile, motivational factors, challenge to organic agriculture technology development, were measured as the independent variables. The data collected were analysed with the aid of the descriptive and inferential statistical tools such as frequency count and percentage, mean and Person Product Moment Correlation.

Results

The respondents were drawn from research institutes and tertiary institutions across the zone. Majority have higher education as PhD (46.3%), M.sc (50%) and B.sc (3.2%). Table 1 shows the ranking of the respon-

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dents' motivational factors using the mean score to rank. Interest in organic agriculture was rank 1st as the major motivational factor for involvement in organic agriculture research and technology development, while health and environmental concerns was rank 2nd on the list of motivational factors. This is in line with the reports of IFOAM, (2004) and Adrian Muller, (2009), identifying health and environment as fundamental principles of organic agriculture. Meanwhile, exposure to organic farming techniques and research grants were ranked as the 8th and 9th motivational factors for technology development by the respondents.

Analysis of technologies developed by scientists with focused on the availability and transfer of these technologies to the end users (farmers) are presented in Table 2. Composting techniques (22.6 %), planned crop rotation technique (12.9 %) and soil fertility improvement techniques (11.3 %) were the technologies developed that few of the scientists have transferred to farmers. While majority claimed to have developed same technologies but have not transferred to farmers. Aside from the low transfer of the developed technologies, most of the farmers' production challenges in organic agriculture, such as disease management technique (4.8 %), Pest management (8.1%), and Weed management (8.1 %) have low level of technology development and transfer.

Table 3 shows the mean scores and the ranking of the respondents' serious challenges to organic agriculture technology development. Majority of the respondents identified inadequate funding for research (28%) as most serious constraints to technology development. This is line with the findings Sami,(2002) and Olanrewaju,(2011). Inadequate exposure to organic farming techniques (18.8%) was ranked as the 2nd serious constraints, while low demand for organic research by farmers (11.5%) and low market for organic products (10.4%) were ranked 3rd and 4th as serious constraints to technology development respectively. Analysis presented in Table 4 revealed that there was significant correlation between the motivational factors of the respondents and technology development on organic agriculture.

Table 1: Ranking of respondent's motivational factors for organic technology development

Motivational Factor	Mean \bar{x}	Rank
Demand driven/Market	2.29	3 rd
Interest in organic agriculture	2.56	1 st
Friends' involvement	1.84	5 th
Promotion	2.11	4 th
Institutional mandate	1.81	6 th
Health and Environmental issues	2.32	2 nd
Research grant	1.61	9 th
Private investment	1.74	7 th
Exposure on organic farming	1.65	8 th

Source: Field Survey, 2013

*Multiple response

Table 2: Distribution of the respondents' technologies developed on organic agriculture

Technology Developed	Mean score	Not available		Available not transferred		Available transferred	
		Freq	%	Freq	%	Freq	%
Composting techniques	0.94	18	29.0	30	48.4	14	22.6
Planned crop rotation techniques	0.82	19	30.6	35	56.5	8	12.9
Disease management	0.61	27	43.5	32	51.6	3	4.8
Pest management	0.70	26	41.9	31	50.0	5	8.1
Weed management	0.65	27	43.5	30	48.4	5	8.1
Bio pesticide	0.39	39	62.9	22	35.5	1	1.6
Soil fertility improvement technique	0.81	19	30.6	36	58.1	7	11.3
Bio fertilizer	0.60	30	48.4	27	43.5	5	8.1
Storage techniques	0.23	50	80.6	10	16.1	2	3.2
Value addition	0.30	47	75.8	12	19.4	3	4.8

Source: Field Survey, 2013 *Multiple response

Table 3: Distribution of serious constraints faced by respondents on organic agriculture technology development

Challenges to organic agriculture technology developed	Mean \bar{x}	Percent	Rank
Organic production is time consuming	0.89	7.3	7 th
Inadequate funding for research	1.89	28.0	1 st
Labour intensive	1.10	8.9	5 th
Inadequate exposure to organic farming techniques	1.50	18.8	2 nd
Availability of Raw material	1.00	7.8	6 th
Low demand for organic research by farmers	1.42	11.5	3 rd
Criticisms of organic agriculture	0.89	7.3	7 th
Low market for organic products	1.30	10.4	4 th

Source: Field Survey, 2013 *Multiple response

Table 4: Pearson Product Moment Correlation (PPMC) of the relationship between motivational factors and technology developed for promotion of OA

Variable	r value	p value	Decision
Motivational factors	0.277	0.029	Significant

Source: Field Survey, 2013

Discussion

This investigation revealed high interest of the scientists in having a healthy production of crops with environmental friendly technologies. However, inadequate exposure to the best organic practices and lack of research grant were constraints to the development of organic agriculture technologies and its promotion among farmers. In-depth interviews were conducted with some of the scientists, majority emphasised that, the few technologies that have been developed and transferred were achieved by funding from international donors. Aside from the low transfer of the developed technologies, most of the farmers' production challenges in organic agriculture, such as disease, pest and weed managements have low level of technology development and transfer. The significant correlation between motivational factor and technology development emphasized the need to effectively motivate the scientists in a multidimensional ways for farmers oriented technology development.

Comment, Suggestions and Recommendations

Scientific technology development is tool for promotion of OA in Africa. This study suggest; multidimensional approaches should be employed by scientists for funding of technology development and transfer across the organic production chain. Survey of farmers' challenges in organic production, and the appropriateness and adaptability of scientific TD should be conducted in Africa, to prioritize research focus for the continent

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