Determinants of Main actors’ Satisfaction with Issues Related to the Value chain of Organic Fruits, Vegetables and Spices in North Eastern Nigeria

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ABSTRACT

Reflection on the current system of issues related to organic fruits, vegetables and spices is essential to find out the potential opportunities, barriers, and benefits along the chain. The study was conducted on determinants of main actors’ satisfaction with issues related to organic fruits, vegetables, and spices in North-eastern Nigeria. Multi-stage sampling procedure was used to select 120 respondents. Data were collected on respondents’ socioeconomic characteristics; needs and priorities; level of knowledge, benefits derived and satisfaction with issues related to the value chain. Differences in respondents’ satisfaction across the states and determinants of their satisfaction with issues related to the value chain were tested. Data were analyzed using frequency counts, percentages, weighted score, analysis of variance and linear regression at α=0.05.

Results showed 58.2% of the respondents were between 21-35 years, female (59.2%) and had less than 5 hectares farm size (57.5%). They produced organic cucumber (0.76), okro (0.72), onions (0.74) and derived benefits from zero expense on inorganic pesticides (95.0%). They were satisfied with organic land tenure system (53.3%) and had high level of knowledge (53.3%). Their needs and priorities were more fertile land (294.4) and increased market (283.3). A significant difference (F=4.35; p=0.02) existed among respondents’ satisfaction across the states. Level of knowledge (β=0.19; p=0.04) and benefits derived (β=0.30; p=0.00) determined their satisfaction with issues related to organic fruits, vegetables, and spices. Hence, frequent organic workshop and training are recommended to keep respondents updated about issues related about issues related to the value chain.

Keywords: Actors, Needs and priorities, Organic fruits, Satisfaction, Spices.

I. INTRODUCTION

Agriculture in Northern Nigeria dates as far back as the pre–colonial era, [1] and the region has since then been leading in the production and sales of various agricultural produce ranging from grains, spices, vegetables, livestock and to fruits. Major fruits produced in Northern Nigeria include mango, pineapple, plantain/banana, citrus, guava, pawpaw, while vegetables include onion, tomato, okra, pepper, amaranthus, carrot, melon, Corchorus olitorus (ewedu), Hibiscus sabdariffa (sobo), Adansonia digitata (baobab leaves), all which could be produced either conventionally or organically.

Meanwhile, organic agriculture is the practice of cultivation of crops and rearing livestock without applying synthetic chemicals, pesticides and inorganic fertilisers which aims at human ecology and environment welfare. It combines the application of innovation, traditional knowledge and science to benefit the shared environment and promote fair relationships as well as improve good quality of life for all involved, [2]. Emerging and increasing trend of organic agriculture in the world might have various consequences on different stakeholders involved in the value chain and the producers (farmers) take the most important place along the chain, [3] value chain is a full range of activities which are required to bring a product or service from conception, through the different phases of production (involving a combination of physical transformation and the input of various producer services), to delivery for consumption and finally disposal after use.

Importance of organic fruits vegetables and spices along the value chain cannot be overemphasised; it can create more working opportunities, help more small farmers to improve their livelihood status as well as improve consumers’ health, [4]. These food crops have greatly contributed to the nutritional needs of the populace due to their affordability and availability to every stratum of the society. Previous researches have shown that organic agriculture can be an approach of poverty reduction for smallholder farmers [5]-[7].

Past studies have focused on organic agriculture, environment and food security, training needs and gender involvement in organic agriculture and farmers’ perception of organic farming, [8]-[12]. Despite, the various studies on organic agriculture coupled with benefits embedded in the production and consumption of organic vegetables, spices and fruits, there is limited information on actors’ satisfaction...
with issues related to the value chain of organic fruits, vegetables, and spices in Nigeria. Therefore, it is against this background that the study investigated factors that determine main actors’ satisfaction with issues related to the value chain of organic fruits, vegetables, and spices in North-eastern Nigeria. The following specific objectives guided the study:

1. to describe the socioeconomic characteristics of the respondents;
2. to determine producers’ (main actors) level of knowledge about principles and practices of organic agriculture;
3. to ascertain benefits derived by the respondents from participation in the value chain of organic fruits, vegetables, and spices;
4. to establish respondents’ satisfaction with issues related to (production, marketing, and processing) the value chain of organic fruits, vegetables, and spices;
5. to identify the needs and priorities of respondents in the value chain of organic fruits, vegetables, and spices.

Test of hypotheses

H01: Selected variables do not significantly determine respondents’ satisfaction with issues related to (production, marketing, and processing) the value chain of organic fruits, vegetables, and spices.

H02: There is no significant difference in respondents’ satisfaction with issues related to (production, marketing, and processing) the value chain of organic fruits, vegetables, and spices across the states.

II. METHODOLOGY

The study was carried out in North-Eastern region of Nigeria. Literature have shown that the region is located between latitude 90° 5’ N to 130° 44’ N and longitude 90° 50' E to 140° 38’ E [13, 14], with land resources of 176 000 km² (68 000 mi²). Northeast, Nigeria comprises six states (Adamawa, Borno, Bauchi, Yobe, Gombe and Taraba). The population of this study, main actors in the organic fruits, vegetables and spices value chain were selected using simple random sampling technique and this resulted in selection of three (Gombe, Adamawa and Taraba states) out of six states in the zone. In the second stage, 10.0% of 16 Local Government Areas (LGAs) in Taraba, 21 LGAs in Adamawa and 7.0% of 11 LGAs in Gombe states were selected using a simple random sampling technique. This amount to six local government areas in all. In the third stage, 20.0% of wards from 2 selected LGAs in Taraba and Adamawa states as well as and 15.0% of wards from 2 selected LGAs in Gombe state were also selected using a simple random technique. In all 12 wards were selected. The fourth stage involved selection of at least one village from the 12 selected wards which amount to 12 villages, the selection was done using simple random technique. Then in the villages 40 farming households were sampled using simple random technique. Therefore, one hundred and twenty main actors were sampled for this study. Data were collected using structured interview schedule. Data were analysed using percentage, mean and weighted score, analysis of variance and linear regression at α 0.05.

Respondents’ socioeconomic characteristics like age, sex, household size, farm size, years of farming experience, role played in the value chain, the kind of organic fruit, vegetable and spices they deal with among others were measured in nominal and interval level of measurement as the case dictated.

Level of respondent’s satisfaction with issues related to (production, processing and marketing) the value chain of organic fruits, vegetables and spices was measured by providing respondents with 16 items. They were provided with five response options of “Very Satisfactory (VS)”, “Satisfactory (S)”, “Neutral (N)”, “Unsatisfactory (U)” and “Very Unsatisfactory (VU)”. Scores of 5, 4, 3, 2, and 1 were assigned to the response options respectively, the minimum obtainable score was 16 while the maximum obtainable score was 80. Then, weighted mean score was computed for each score in order to rank the satisfaction item before satisfaction index was then computed. The Mean of satisfaction index scores was used to categorise the respondents into low and high level of satisfaction.

Respondents’ level of knowledge of the respondents on organic agriculture practices and principles was measured based on the principles and practices of organic agriculture in Nigeria. Twenty knowledge items in form of objectives questions were provided for the respondents with at least two response options (maximum of three) including one correct answer. Eventually all correct answers were scored 1 and wrong answers scored 0. The maximum obtainable score was 20 with minimum 0. Knowledge index was then computed to determine the level of respondent knowledge about principles of organic agriculture. Using mean as the benchmark, knowledge index was categorised into high and low level of knowledge. Respondents with mean score and above were categorised as high while those with scores below mean were categorised as having low level of knowledge about organic agriculture practices and principles.

III. RESULTS AND DISCUSSION

A. Socioeconomic Characteristics of the Respondents

Table I shows that more than majority (58.2%) of main actors were between age range 21-35 years. This implies that they are youth according to [15] agile and health to put up with the rigours of farming. More than half (59.2%) were female, married (64.2%), had secondary education (31.7%) and majority (63.3%) had at least 1–5 persons in their households. Table I also presents that half (57.5%) of them had less than 5 hectares farm size, 95.8% had 1–10 years farming experience and 57.5% were not organically certified. This could probably mean that either they practiced organic agriculture by default, or they are in the process of getting their activities certified.

Meanwhile, when asked why they were not registered or certified, majority (80.4%) of them implicate lack of fund, while 74.5% of those that were certified indicate that they were certified under Participatory Guarantee System. This is understandable as organic certification is quite expensive for smallholder farmers to obtain. Table I also shows that roles
played by the respondents were interwoven while majority (84.2%) were producers, a higher percentage (97.3%) were involved in marketing, only a few (12.5%) involved in processing of their produces and many (74.7%) of them consumed what they produced.

| TABLE I: MAIN ACTORS’ SOCIOECONOMIC CHARACTERISTICS |
|-----------------------------------------------|
| Characteristics | Frequency | Percentage |
| Age categories |
| 21-35 years | 71 | 59.2 |
| 36-51 years | 41 | 34.2 |
| 51 years and above | 8 | 6.7 |
| Total | 120 | 100 |
| Sex |
| Female | 71 | 59.2 |
| Male | 49 | 40.8 |
| Total | 120 | 100 |
| Marital status |
| Single | 34 | 28.3 |
| Married | 77 | 64.2 |
| Widowed | 13 | 7.5 |
| Total | 120 | 100 |
| Household size |
| 1-5 persons | 76 | 63.3 |
| 6-10 persons | 41 | 34.2 |
| 11 persons and above | 3 | 2.5 |
| Total | 120 | 100 |
| Educational background |
| No formal education | 15 | 12.5 |
| Primary education | 36 | 30.0 |
| Secondary education | 38 | 31.7 |
| Tertiary education | 31 | 25.8 |
| Total | 120 | 100 |
| Are your organic activities certified? |
| No | 69 | 57.5 |
| Yes | 51 | 42.5 |
| Total | 120 | 100 |
| Kind of certificate acquired (n=51) |
| Third party | 38 | 75.5 |
| Participatory guarantee system | 13 | 25.5 |
| Total | 51 | 100 |
| Main actors’ reasons for non-registered organic stakeholders (n=51) |
| New in the business | 41 | 80.4 |
| Lack of fund | 10 | 19.6 |
| Total | 51 | 100 |
| Farm size |
| Less than 5 hectares | 69 | 57.5 |
| 5-14 hectares | 49 | 40.8 |
| 15 hectares and above | 2 | 1.7 |
| Total | 120 | 100 |
| Years of experience |
| 1-10 years | 115 | 95.8 |
| 11-20 years | 5 | 4.2 |
| Total | 120 | 100 |
| Roles played in the value chain |
| Producers/producers | 89 | 84.2** |
| Marketers/marketing | 11 | 97.3** |
| Processors/processing | 15 | 12.5** |
| Consumers/consuming | 5 | 74.7** |

Source: Field survey 2020.

### B. Organic Fruit, Vegetables and Spices that Respondents deal with in the Value Chain

Data in Table II presents that among organic fruits that main actors dealt with were cucumber (0.76), banana (0.53), watermelon (0.53) and plantain (0.50) but among organic vegetables they dealt with okro (0.72), lettuce (0.62), garden egg (0.58), cabbage (0.57) and ugu (0.55). Meanwhile, among spices, they dealt with organic onion (0.74), pepper (0.71), and ginger (0.66). This implies that main actors dealt with (either produced, marketed, processed, or consumed) organic cucumber, onion, okro, pepper, ginger, lettuce, garden egg, cabbage and ugu (pumpkin) as they were generally ranked 1st, to 10th respectively among other fruits, vegetables and spices.

| TABLE II: ORGANIC FRUIT, VEGETABLES AND SPICES THAT RESPONDENTS DEAL WITHIN THE VALUE CHAIN |
|-----------------------------------------------|
| Organic fruits, vegetables, and spices | Mean score | Rank within group | Overall rank |
| Fruits |
| Cucumber | 0.76 | 1st | 1st |
| Banana | 0.53 | 2nd | 10th |
| Watermelon | 0.53 | 3rd | 10th |
| Plantain | 0.50 | 4th | 12th |
| Citrus | 0.37 | 5th | 16th |
| Vegetables |
| Okro | 0.72 | 1st | 3rd |
| Lettuce | 0.62 | 2nd | 6th |
| Garden egg | 0.58 | 3rd | 7th |
| Cabbage | 0.57 | 4th | 8th |
| Ugu | 0.55 | 5th | 9th |
| Amaranthus | 0.41 | 6th | 15th |
| Celosia | 0.28 | 7th | 17th |
| Corchorus | 0.14 | 8th | 18th |
| Spices |
| Onions | 0.74 | 1st | 2nd |
| Pepper | 0.71 | 2nd | 4th |
| Ginger | 0.66 | 3rd | 5th |
| Turmeric | 0.49 | 4th | 13th |
| Garlic | 0.43 | 5th | 14th |

Source: Field survey 2020.

### C. Satisfaction with Issues related to the Value Chain of Organic Fruits, Vegetables and Spices

Table III shows that 55.8% of the farmers are very satisfied with business risks, organic land tenure system (53.3%), technical skills and energy expended in management of the crops (52.5%), finance availability (50.8%) and off taking system (49.2%). Main actors had high level (58.3%) of satisfaction with issues related to the value chain of organic fruits, vegetables, and spices. This high level of satisfaction in the organic agriculture value chain related issues, implies that actors have tendency to participate more in the value chain of organic fruits, vegetables, and spices.

### D. Benefits Derived by the Respondents from Participation in the Value Chain of Organic Fruits, Vegetables, and Spices

Table IV indicates that majority (68.3%) of main actors had high level of benefits derived from participating in the value chain of organic fruits, vegetables, and spices. Among economic benefits, a higher percentage (95.0%) benefited from zero expense on chemicals and inorganic pesticides and 94.2% benefited from greater net return and certainty of availability market. Similarly, among environmental benefits main actors derived benefits from recycling of animal waste (92.5%) and reduced exposure to drought and harmful chemical (91.7%) meanwhile, from social benefits, they derived benefits from enhanced community development (88.3%), enhanced social exposure and interaction (85.0%) as well as social recognition (82.5%). The fact that respondents derived such high benefits economically, environmentally, and socially could inform a high level of satisfaction.
Table III: Respondent’s Satisfaction with Respect to the Issues that Concern the Value Chain of Organic Fruits, Vegetables and Spices

| Organic agriculture value chain issues                                      | Very satisfactory | Satisfactory | Neutral | Unsatisfactory | Very unsatisfactory |
|---------------------------------------------------------------------------|-------------------|--------------|---------|----------------|---------------------|
| Organic inputs cost                                                      | 41.7              | 30.0         | 8.3     | 5.8            | 14.2                |
| Quality control and certification system                                  | 41.7              | 26.7         | 15.8    | 1.7            | 14.2                |
| Pricing of organic fruits, vegetables, and spices                         | 43.3              | 35.8         | 18.3    | 2.5            | 0.0                 |
| Profits from sales of organic fruits, vegetables, and spices              | 38.3              | 43.3         | 15.0    | 3.3            | 0.0                 |
| Time consumption in farm production                                       | 46.7              | 28.3         | 22.5    | 2.5            | 0.0                 |
| Technical skills and energy expended in management of the crops           | 52.5              | 23.3         | 18.3    | 5.8            | 0.0                 |
| Organic land tenure system                                                | 53.3              | 27.5         | 15.0    | 4.2            | 0.0                 |
| Finance availability                                                       | 50.8              | 26.7         | 15.8    | 5.8            | 0.8                 |
| Harvesting and postharvest handling such as packaging and shelf-life storage | 36.7              | 44.2         | 15.8    | 3.3            | 0.0                 |
| Logistics such as transportation, marketing, and so on.                   | 19.2              | 45.8         | 30.0    | 5.6            | 0.0                 |
| Tedious nature of cultivating with hoe and cutlass                         | 32.5              | 44.2         | 18.3    | 3.3            | 1.7                 |
| Growth rate and future business plan                                      | 46.7              | 35.8         | 11.7    | 5.0            | 0.8                 |
| Business risks such as lower yield, pest infestation and contamination, etc.| 55.8              | 25.8         | 11.7    | 5.0            | 1.7                 |

Level of satisfaction

| Level of satisfaction | Frequency | Percentage |
|-----------------------|-----------|------------|
| High satisfaction     | 70        | 58.3       |
| Low satisfaction      | 50        | 41.7       |
| Total                 | 120       | 100.0      |

Source: Field survey 2020.

Table V shows that majority of the farmers have high knowledge (55.5%) about issues related to organic agriculture practices and principles.

Table VI shows that more fertile land among critical and immediate needs and priority of the respondents was ranked first with weighted score of 294.4. This is followed by increased market (283.3), broader value chain for organic fruits, vegetables, and spices (280.8), irrigation facilities (277.5) and research into affordable organic inputs (270). This implies that more fertile land, increased market, broader value chain for organic fruits, vegetables and spices, irrigation facilities as well as affordable organic inputs were main actors’ critical and immediate needs and priorities as they participate in the value chain of organic fruits, vegetables, and spices.

E. Main actors’ Needs and Priorities based on Their Participation in the Value Chain of Organic Fruits, Vegetables and Spices

Table VII: Regression Analysis of Determinants of Main Actors’ Satisfaction with Respect to the Issues Related to the Value Chain of Organic Fruits, Vegetables and Spices

| Variable                        | β-value | t-value | p-value |
|---------------------------------|---------|---------|---------|
| Main actors’ age                | -0.23   | -0.32   | 0.75    |
| Household size                  | -0.75   | -0.62   | 0.41    |
| Farm size                       | 0.21    | 1.29    | 0.02**  |
| Years of experience            | -0.02   | -0.28   | 0.78    |
| Main actors’ knowledge          | 0.19    | 2.06    | 0.04**  |
| Benefits derived                | 0.30    | -3.14   | 0.00**  |
| Needs and Priority              | -0.02   | -0.25   | 0.80    |

**Significant p ≤ 0.05.

Source: Field survey 2020.
TABLE VI: NEEDS AND PRIORITIES OF THE RESPONDENTS BASED ON THEIR PARTICIPATION IN THE VALUE CHAIN OF ORGANIC FRUITS, VEGETABLES AND SPICES

| Need and priority items | Critical and immediate 50-100 | Critical but not immediate 25-49 | Not critical but immediate 1-24 | Weighted score |
|-------------------------|-----------------------------|---------------------------------|-------------------------------|----------------|
| More fertile land       | 95.0                        | 4.3                             | 0.8                           | 294.4          |
| Increased market        | 85.0                        | 13.3                            | 1.7                           | 283.3          |
| Broader value chain for organic fruits, vegetables and spices | 85.0 | 10.8 | 4.2 | 280.8 |
| Irrigation facilities   | 80.0                        | 17.5                            | 2.5                           | 277.5          |
| Research into affordable organic inputs such as organic fertilizers, pesticides, herbicides etc. | 72.5 | 25.0 | 2.5 | 270 |
| More public acceptability of organic fruits, vegetables and spices | 73.3 | 23.3 | 3.3 | 269.8 |
| Storage facilities      | 69.2                        | 28.3                            | 2.5                           | 266.7          |
| Easier source of organic inputs | 70.0 | 25.0 | 5.0 | 265 |
| Research into packaged organic inputs such as organic fertilizers, pesticides, etc. | 68.3 | 27.5 | 4.2 | 264.1 |
| Processing facilities   | 68.3                        | 25.0                            | 6.7                           | 261.6          |
| Loan                    | 62.5                        | 32.5                            | 5.0                           | 257.5          |
| Improved seeds          | 61.6                        | 34.2                            | 4.2                           | 257.4          |

Source: Field survey 2020.

G. Test of Difference in Main Actors’ Satisfaction with Issues related to the Value Chain of Organic Fruits, Vegetables and Spices across the States in the North-Eastern Part of Nigeria

Table VIII shows that test of difference main actors’ satisfaction with issues related to the value chain of organic fruits, vegetables and spices across the states was significant (F=4.35, p=0.02). This means that while main actors differed in their satisfaction with respect to the issues related to the value chain of organic fruits, vegetables, and spices across the states.

TABLE VIII: TEST OF DIFFERENCE (ANALYSIS OF VARIANCE) OF MAIN ACTORS’ SATISFACTION WITH RESPECT TO THE ISSUES RELATED TO THE VALUE CHAIN OF ORGANIC FRUITS, VEGETABLES AND SPICES

| Source of variation | Mean Square | df | F-value | p-value |
|---------------------|-------------|----|---------|---------|
| Between groups      | 465.10      | 3  | 4.35    | 0.02**  |
| Within groups       | 107.01      | 117|         |         |
| Total               | 572.1       | 120|         |         |

**Significant p ≤ 0.05.
Source: Field survey 2020.

Further analysis in Table IX reveals that the significant difference was between main actors’ satisfaction from Gombe and Taraba with mean difference of 6.80 (p =0.00), as well as between those actors from Taraba and Adamawa with mean difference of 2.95 (p =0.00). The implication is that main actors differed greatly in their satisfaction with issues related to the value chain of organic fruits, vegetables and spices across states in the North-Eastern part of Nigeria. The difference could be because of several factors such as level of knowledge as well as benefits derived from organic fruits, vegetables and spices.

TABLE IX: POST HOC (LSD) TEST OF DIFFERENCE OF MAIN ACTORS’ SATISFACTION WITH RESPECT TO THE ISSUES RELATED TO THE VALUE CHAIN OF ORGANIC FRUITS, VEGETABLES AND SPICES ACROSS THE STATES IN THE NORTH-EASTERN PART OF NIGERIA

| Main actors’ state | Main actors’ state | Mean difference | p-value |
|--------------------|-------------------|-----------------|---------|
| Adamawa            | Gombe             | 3.85            | 0.09    |
| Gombe              | Taraba            | 6.80            | 0.00**  |
| Taraba             | Adamawa           | 2.95            | 0.00**  |

**Significant p ≤ 0.05.
Source: Field survey 2020.

IV. CONCLUSION AND RECOMMENDATIONS

Conclusively, majority of main actors are female, youth, married with average household size, they are smallholder farmers and are not organically certified due to lack of fund. Respondents dealt with cucumber, banana, watermelon, okro, lettuce, onion and pepper were among organic fruits, vegetables, and spices. They have high level of knowledge, benefit derived and satisfaction but their needs and priorities such as more fertile land, increased market and research into affordable organic inputs are critical and immediate. Main actors’ farm size, level of knowledge and benefits derived determined their satisfaction with issues related to the value chain of organic fruits, vegetables, and spices.

It is therefore recommended that production and consumption of certified organic fruits, vegetables, and spices (especially cucumber, banana, watermelon, okro, lettuce, onion, and pepper) should be supported, promoted, and encouraged by international donors and organisations as well as governments. This can be done by increasing their tentacles of financial assistance to these actors as this will enable them to be able to register for organic certification. The fact that respondents were satisfied with issues related to the value chain of organic fruits, vegetables and spices is positive development and an indication that the production and consumption of organic fruits, vegetables and spices should be encouraged. However, there is need to be wary of actors’ critical and immediate needs and priorities which could pose danger in the participation in the value chain. Frequent workshop and training about issues related to the value chain of organic fruits, vegetables and spices should be organised by all the developmental agencies for actors involved in the value chain. This is important to update respondents’ knowledge about issues related to the value chain because this is one of the determinants of their satisfaction with issues related to the value chain of organic fruits, vegetables, and spices.

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2. Ogundijo, O. J. and Fardeen, D. (2015). Agricultural Development in Rural Nigeria: A review of approaches. *African Journal for Sustainable Development* (AJSD), Vol. 5(3) pp. 59-69 respectively.

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