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# Farmers' Perception on the use of Agrochemicals in Crop Production in Nsukka, Enugu State

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***Abstract***

*The study sought to ascertain the perception of farmers on the use of agrochemicals in crop production in Nsukka Local Government Area of Enugu state. This study sought to identify the perception of farmers on the types of agrochemical, economic benefits of agrochemicals in crop production, constraints to the effective use of agrochemical to crop production and measures for effective utilization of agrochemicals on crop production in Nsukka Local Government Area of Enugu state. Four research questions were posed to guide the study. The study adopted survey research design and was carried out in Nsukka Local Government Area of Enugu state. The population of the study was 168 crop farmers. The entire population was studied since population was small and manageable. The instrument was face validated by three experts of agricultural education. Data were collected using structured questionnaire. Data were analyzed using frequency/percentage for research question one while mean and standard deviation were used for research questions two and three. The result obtained revealed that only nine agrochemicals were utilized in crop production. Also, the study identified eleven constraints to agrochemical use as well as nine measures to effective utilization of agrochemicals. The study therefore recommended; that extension agents should provide information to the crop farmers on the different types of agrochemicals available for crop production through the use of mass media, farm visits, agrochemical dealers should give the right information about agrochemicals which will help educate farmers on the benefits associated with the right use of agrochemicals on crop production, crop farmers should be trained by extension agents through workshops and seminars on the skills for effective utilization of agrochemicals, as well as governments and other financial institutions providing credit facilities to crop farmers at low interest rate which could be inform of grants or loans from Microfinance banks.*

***Keywords:*** *Agrochemicals, Crop production, Farmer's Perception*

## Introduction

Agriculture is the science and art of cultivating the soil, production and management of crops, livestock production, preparation and processing of their products and by-products for the use of man. Agriculture refers to the production of crops and rearing of livestock for man's benefit (Harris & Fuller, 2014). Agriculture plays a critical role in the life of man and the entire economy. It is the backbone of the economic system of a given country (Ofuoku, 2011). In addition to providing food for man and raw material for industries, agriculture also provides employment opportunities to very large percentage of the population. It acts as a source of livelihood to farmers, contributes to the income of a nation, supply food for man, fodder for livestock and encourages international trade (Nwakile, Ejiofor & Ali, 2017). A very important aspect of agriculture is crop production.

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Crop production is the science which deals with the cultivation of crops and vegetables on a field scale, either under rain-fed or irrigation conditions. According to Okwor (2018), crop production is the cultivation of soil for growing of crops such as vegetables, fruits, cereals, roots and tubers, legumes, latex, ornamental spices, oil crop and fibre which are mostly used as food for man, feed for animals and raw materials for industries. Uguru (2005) defined Crop production as the art and science of breeding the crops, growing and management of desired crops for maximum productivity. Crop production can be enhanced through effective farming practices such as the correct use of agrochemicals.

Agrochemical is a chemical used in farming to improve the quality and quantity of farm produce. Agrochemical refers to substances used to help manage an agricultural ecosystem or the community of organism in a farming area (Ademoye**,** Fadipe, Adigun & Animashaun, 2014). They are important agricultural input useful for sustaining and increasing yields of agricultural products. Agrochemicals

refers to the broad range of pesticides including insecticides, fertilizers, hormones, herbicides, fungicides, and other growth chemicals and concentrated stores of raw animal manure (cow dung and poultry droppings) (Jamala, Ari, Tsunda & Waindu, 2013). Agrochemicals are important for a lot of reasons.

Agrochemicals are economical, increases yield and quality of crops and decrease of other inputs like labour and fuel (Damalas, 2009). Moreover, it is seen from the last few decades that different pesticides are used to save the crops from pest damage and thereby increase crop production (Delcour, Spanoghe, & Uyttendaele, 2015). Growth of crops are hindered by several biotic (weed, insect and pest infestation) and abiotic stresses (reduced soil fertility) which are managed by extensive use of fertilizers and pesticide (Lamichhane, Saaydeh, Kudsk & Messean, 2016). The application of these agrochemicals has resulted in increased soil fertility and insect/pest management with consequent yields of crops during the last 40 years (Abdul, 2018). Increasing demand for food supply due to rapid growth in human population has triggered agricultural intensification during the last few decades. However, despite the contribution of agrochemicals to agricultural production, evidence in the last few years have shown that they could also be detrimental to human health and the ecosystem when misused (Tadesse & Asferachew, 2018)

There is widespread recognition that farmers misuse agrochemicals while protecting crops from incidences of pests, diseases, and weeds (Issa, Atala, Akpoko & Sanni, 2015). This could be because many crop farmers are inadequately informed about the potential short and long-term risks, and the necessary precautions in the correct application of such toxic chemicals. Also, some farmers are so conservative to adopt the use of agrochemical as a new technology for improved farming. Farmers will purchase pesticide products for individual use, but may not be sufficiently literate to read the instructions or be comfortable in the language the Instructions are written in (Oruonye & Okrikata, 2010). Particularly in remote areas, the only source of advice may be the pesticide seller, who may also be poorly informed and whose advice may be guided by commercial self interest. This has led to high incidence of pesticide misuse and unprecedented level of pesticides related accidents and their attendant consequences on the people's health is quite alarming (Abdullahi, 2008). Developing countries like Nigeria face the many challenges in achieving the sound management of pesticides (Oruonye & Okrikata, 2010). To solve the problems associated with misuse of agrochemicals, stakeholders in crop production have a role to play.

Key stakeholders such as research institutes and extension agencies have provided information on research-based Recommended Agrochemical Practices (RAPs) (Laary, 2012; Zyoud*et al*, 2010; Asogwa & Dango, 2009). It is the duty of the stakeholders such as agro-industries, growers, dealers of agrochemicals and policy makers to sensitize the rural farmers and equip them with the right information on agrochemicals (Abdul, 2018). Importantly, all farmers must get acquainted with the correct application of registered agrochemicals for use and ensure that all safety measures are strictly adhered to. This will help improve famers' perception on agrochemical use in crop production as an input for improved productivity.

Perception is defined as an act of being aware of the environment through physical sensation, which denotes an individual's ability to understand. According to Reitz (as cited in Rachna, 2013), "Perception includes processes by which an individual receives information about his environment (seeing, hearing, feeling, tasting and smelling). Perception in this study is defined as the way farmers conceive agrochemicals. This depends on its efficiency to control, repel, or destroy pest, weed, insect, fungi and to improve crop yield on farmlands in towns like Nsukka

Nsukka is a town in Enugu state. It is an agricultural-trade centre for the yams, cassava (manioc), corn (maize), pigeon peas, and palm oil and kernels. Its indigenes are Igbos and are predominantly crop farmers (Mckenna, 2009). Crops mainly grown by farmers in the study area are cereals like maize, sorghum; legumes like groundnut; root and tuber crops like cassava, sweet potatoes, cocoyam; vegetables like tomatoes, okra, pepper, garden egg, fluted pumpkin, and rhizomes like ginger. Others include tree crops like mango, citrus and oil palm. A pre study discussion with many crop farmers who adopt the use of agrochemicals for improved crop protection and yield revealed that these objectives are not being attained. This could be because many farmers lack proper information on the different types of agrochemicals used for different production purpose, the safety precautions to ensure during application; the effects of different agrochemicals on crop yield and protection, on animals and man while some believe it as has nothing good to offer man thereby avoiding its use in crop production. This indicates the need to investigate on farmers' perception on the use of agrochemicals in crop production.

**Purpose of Study**

The main purpose of the study was to determine farmers' perception on the use of agrochemicals in crop production in Nsukka local government area of Enugu state. Specifically, the study sought to ascertain farmer's perception on:

1. Identify different types of agrochemicals used in crop production in Nsukka.
2. Constraints to the effective utilization of agrochemicals in Nsukka local government area.
3. Measures for effective utilization of agrochemicals in crop production in Nsukka local government area.

**Research Questions**

The following research questions guided the study.

1. What is the perception of farmers on the types of agrochemicals used in crop production in Nsukka local government area of Enugu state?
2. What are the constraints to effective utilization of agrochemicals in crop production in Nsukka local government area of Enugu state?
3. What are the measures for effective utilization of agrochemicals in crop production in Nsukka local government area of Enugu state?

**Methodology**

The study adopted a descriptive survey research design. Three research questions were developed and answered. The population of the study consisted of 168 registered crop farmers. The entire population was utilized since it is a manageable population. A structured questionnaire was used to obtain data from the respondents for the study. The questionnaire was validated by three experts from the department of Agricultural Education, University of Nigeria, Nsukka. 168 copies of the questionnaire were administered by the researcher. There was a 93%% retrieval of the questionnaire answered which equates 157 copies retrieved.

Data collected were analysed using frequency distribution and percentage for research question 1 while mean and standard deviation were used to analyze data collected for research question 2 and 3 with the help of the SPSS statistical package. Percentage/ highest frequency were utilized in taking decision for research question 1. Any item where a majority (highest percentage) chose the Utilized option, it was concluded that the item was utilized while any item where a majority chose the Not utilized option, it was concluded that such items were not utilized in the area. For research questions 2 and 3, analysis was carried out using real limits of numbers. Items that had mean values ranged 3.50 to 4.00 were regarded as Strongly Agree (SA). Items that had mean values ranged 2.50-3.49 were regarded as Agree (A). Items that had mean values ranged 1.50-2.49 were regarded as Disagree (D). Items that had mean value ranged 1.00-1.49 were regarded as Strongly Disagree (SD).

**Results**

**Research Question 1**

What is the perception of farmers on the types of agrochemicals used in crop production in Nsukka Local Government Area of Enugu state?

**Table 1:** Frequency Distribution and Percentage of the Different Types of Agrochemicals Used in Crop Production

N = 157

| S/N | Variable | U | %U | NU | %NU | Remark |
|---|---|---|---|---|---|---|
| 1 | Force-up | 41 | 58.6 | 29 | 41.4 | U |
| 2 | Uproot | 40 | 57.1 | 30 | 42.9 | U |
| 3 | Slasher | 55 | 78.6 | 15 | 21.4 | U |
| 4 | Force Top(pre-emergence) | 26 | 37.1 | 44 | 62.9 | NU |
| 5 | Butastar (pre-emergence) | 26 | 37.1 | 44 | 62.9 | NU |
| 6 | Amino Force (selective) | 24 | 34.3 | 46 | 65.7 | NU |
| 7 | Force Uron | 22 | 31.4 | 48 | 68.6 | NU |
| 8 | Total Control | 50 | 71.4 | 20 | 28.6 | U |
| 9 | Team | 29 | 41.4 | 41 | 58.6 | NU |
| 10 | Ridomil Gold | 25 | 35.7 | 45 | 64.6 | NU |
| 11 | Funguran-OH | 24 | 34.3 | 46 | 65.7 | NU |
| 12 | Red Force | 43 | 61.4 | 27 | 38.6 | U |
| 13 | Tanderm | 21 | 30.0 | 49 | 70.0 | NU |
| 14 | Army Force | 40 | 57.1 | 30 | 42.9 | U |
| 15 | Daksh | 27 | 38.6 | 43 | 61.4 | NU |
| 16 | D D Force | 39 | 55.7 | 31 | 44.3 | U |
| 17 | Lara Force old | 34 | 48.6 | 36 | 51.4 | NU |
| 18 | Imi Force | 33 | 47.1 | 37 | 52.9 | NU |
| 19 | Punch | 47 | 67.1 | 23 | 32.9 | U |
| 20 | Crack | 21 | 30.0 | 49 | 70.9 | NU |
| 21 | Dime Force | 27 | 38.6 | 43 | 61.4 | NU |
| 22 | Rocket | 20 | 28.6 | 50 | 71.4 | NU |
| 23 | Spike | 18 | 25.7 | 52 | 74.3 | NU |
| 24 | Iron Force | 26 | 37.1 | 44 | 62.9 | NU |
| 25 | V-power | 20 | 28.6 | 50 | 71.4 | NU |
| 26 | No Fear | 18 | 25.7 | 52 | 74.3 | NU |
| 27 | Super Care | 30 | 42.9 | 40 | 57.1 | NU |
| 28 | N.P.K | 66 | 94.3 | 4 | 5.7 | U |
| 29 | D.I Grow(growth booster and soil conditioner) | 24 | 34.3 | 46 | 65.7 | NU |
| 30 | Delfan plus | 9 | 12.9 | 61 | 87.1 | NU |
| 31 | Boramin Ca | 13 | 18.6 | 57 | 81.4 | NU |

N=Population, U= Utilized, NU= Not Utilized, %U= Percentage of Utilized, %NU=Percentage of Not Utilized

In Table1, 9 items (1, 2, 3, 8, 12, 14, 16, 19, and 28) were categorized as Utilized (U) because a majority of farmers (55.7% - 94.3%) accepted that such items were used in crop production in the area. On the other hand, 22 items (items 4, 5, 6, 7, 9, 10, 11, 13, 15, 17, 18, 20, 21, 22, 23, 24, 25, 26, 27, 29, 30 and 31) were categorized as Not Utilized (NU) because a majority of farmers (51.4% - 87.1%) accepted that such items were Not Utilized for crop production in the area.

**Research Question 2**

What is the perception of farmers on the constraints to the effective utilization of agrochemicals in crop production in Nsukka Local Government Area of Enugu state?

**Table 2:** Mean Ratings and Standard Deviation of Responses of Respondents on the Constraint to Effective Utilization of Agrochemicals in Crop Production

| | | N=157 | | |
|---|---|---|---|---|
| **S/N** | **Item statement of the constraints** | **x̄** | **S.D** | **Remark** |
| 1 | High cost of pesticide | 3.30 | 1.00 | A |
| 2 | Cost of procuring agrochemical spraying implement such as knapsack sprayer | 3.31 | 0.77 | A |
| 3 | Complexity of user's manual | 2.77 | 0.87 | A |
| 4 | Misguiding information from agrochemical dealers | 2.63 | 0.94 | A |
| 5 | Health hazards associated with misuse of agrochemicals | 2.93 | 0.94 | A |
| 6 | Irritation from agrochemical spills | 2.96 | 0.91 | A |
| 7 | Unpleasant odour of most agrochemicals | 2.69 | 0.97 | A |
| 8 | Complexity of application equipment | 3.00 | 0.92 | A |
| 9 | Misconception on the efficacy of agrochemicals | 2.66 | 1.03 | A |
| 10 | Most agrochemicals in the markets are expired | 2.60 | 0.98 | A |
| 11 | Unavailability of instrument for measuring the quantity of agrochemicals to be utilized | 2.67 | 1.07 | A |

The data presented in Table 2 revealed that all the items (items 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, and 11) had their mean ($\bar{X}$) values ranged from 2.60 - 3.31 which falls within the category of Agree. This indicated that all the items are constraints to effective utilization of agrochemicals in crop production. The table also showed that the standard deviations (SD) of the items ranged between 0.77 - 1.07 and were all less than 1.96 which indicated that the responses of the respondents were close to each other and the mean.

**Research Question 3**

What are the measures for effective utilization of agrochemicals in crop production in Nsukka Local Government Area of Enugu State?

**Table 3:** Mean Ratings and Standard Deviations of Responses of Respondents on the Measures for Effective Utilization of Agrochemicals in Crop Production

| | | N=157 | | |
|---|---|---|---|---|
| **S/N** | **Item statement of measures** | **x̄** | **S.D** | **Remark** |
| 1 | Access to credit at low interest rate | 2.91 | 1.03 | A |
| 2 | Use of mass media for disseminating agrochemical-related information | 3.36 | 0.72 | A |
| 3 | Organisation of workshops and seminars to educate farmers on the use of agrochemicals | 3.53 | 0.63 | SA |
| 4 | Belonging to cooperatives to help get right information on the use of agrochemicals | 3.34 | 0.72 | A |
| 5 | Competent extension services | 3.09 | 0.81 | A |
| 6 | Correct information from agrochemical dealers | 3.17 | 0.88 | A |
| 7 | Government policies to regulate standards | 3.13 | 0.83 | A |
| 8 | Enlightenment campaigns by public and private sectors | 3.11 | 0.77 | A |
| 9 | Well detailed user's manual | 3.49 | 0.76 | A |

The data presented in Table 4 revealed that one item (item 3) had its mean ($\bar{X}$) value of 3.53 which falls within the category of Strongly Agree. This indicated that item 3 is an efficient measure for effective utilization of agrochemicals in crop production. Furthermore, 8 items, (items 1, 2, 4, 5, 6, 7, 8 and 9) had their mean ($\bar{X}$) values ranged from 2.91 - 3.49 which belongs to the category of Agree.

This indicated that items1, 2, 4, 5, 6, 7, 8 and 9 are also measures to effective utilization of agrochemicals in crop production. The table also showed that the standard deviations (SD) of the items ranged between 0.63 - 1.03 and were all less than 1.96 which indicates that the responses of the respondents were close to each other and the mean.

**Discussion of Findings**

The findings that emanated from the study were discussed based on the research questions answered.

Findings of the study revealed that the agrochemicals used in crop production in Nsukka Local Government include Force-up, Uproot, Slasher, Total Control, Red Force, Army Force, D D Force, Punch and N.P.K fertilizer.

This shows that the level of usage is low because only 9 agrochemicals out of the identified 31 items were utilized in crop production in the area. These findings were in agreement with those of Issa, Atala, Akpoko & Sanni (2015) that the level of adoption of recommended agrochemical practices was generally low despite high level of awareness.

The findings of the study further revealed that the constraints to the effective utilization of agrochemicals in crop production include; high cost of pesticides, high cost of procuring agrochemical spraying equipment, complexity of user's manual, misguiding information from agrochemical dealers, health hazards associated with misuse, irritation from agrochemical spills, unpleasant odour of most agrochemicals, complexity of application equipments, misconception on the efficacy of agrochemicals, buying of expired agrochemicals and unavailability of instruments for measuring the quantity of agrochemical used in crop production. These findings were in agreement with the findings of Jamala, Ari, Tsuda, & Waindu (2013) that the major constraints to adoption of agrochemicals is inadequate fund and low competency of farmers in the use of agrochemicals the equipment on their farm.

The findings of the study revealed that the measures for effective utilization of agrochemicals include; access to credit at low interest rate, use of mass media in disseminating agrochemical related information, organization of workshops and seminars to educate farmers on the use of agrochemicals, farmers belonging to cooperatives to them get right information on the use of agrochemicals, competent extension services, correct information from agrochemical dealers, government policies to regulate standards, enlightenment campaigns by public and private sectors and well detailed user's manual. These findings are in agreement with the findings of Jamala, Ari, Tsuda, &Waindu (2013) that effective extension service to educate the farmers on the necessary skills require in the use of agrochemicals will help minimize the observed constraints in the use of agrochemicals by farmers. The findings are also in agreement with the findings of Issa, Atala, Akpoko&Sanni (2015) that stakeholders should collaborate to mount a powerful campaign for attitudinal changes among farmers on the need to adopt Recommended Agrochemical Practices (RAPs)

## Conclusion

A majority of agrochemicals are not utilized in crop production in Nsukka local Government area. The utilized ones are Force-up, Uproot, Slasher, Total Control, Red Force, Army Force, D D Force, Punch and N.P.K fertilizer. Utilization of the few ones is hindered by high cost of pesticides, high cost of procuring agrochemical spraying equipment, complexity of user's manual, misguiding information from agrochemical dealers, health hazards associated with misuse, irritation from agrochemical spills, unpleasant odour of most agrochemicals, complexity of application equipments, misconception on the efficacy of agrochemicals, buying of expired agrochemicals among others. To mitigate these hindering factors, enhancing measures have to be utilized and these factors include; access to credit at low interest rate, use of mass media in disseminating agrochemical related information, organization of workshops and seminars to educate farmers on the use of agrochemicals, farmers belonging to cooperatives to them get right information on the use of agrochemicals, among others. Adhering to these measures will assist farmers in attaining the intended benefits of agrochemicals in Nsukka

## Recommendations

Based on the findings of this study, the following recommendations were made by the researcher.

1. Extension agents should provide information to the crop farmers on the different types of agrochemicals available for crop production through the use of mass media and farm visits.
2. Dealers of agrochemicals should give the right information about agrochemicals which will help educate farmers on the benefits associated with the right use of agrochemicals on crop production.
3. Government and other financial institutions should provide credit facilities to crop farmers at low interest rate which could be in form of grants or loans from Microfinance banks.
4. Government should ensure that agrochemical sellers sell only original products that have not expired by inspecting the imported agrochemicals regularly.

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