Bioscene

Bioscene
Volume- 21 Number- 04
ISSN: 1539-2422 (P) 2055-1583 (O)
www.explorebioscene.com

Prospects of Extension Intervention in Watermelon Production in Delta State, Nigeria

[1*]**Raymond Chukwuka Onyemekonwu**, [1]**Friday Akasiri Ehiwario,**
[2]**Felix Onyemekihian and** [3]**Josiah Chidiebere Okonkwo**
[1]Department of Agricultural Extension and Rural Development, Dennis Osadebay University, Asaba, Delta State, Nigeria
[2]Department of Agricultural Economics and Extension, University of Delta, Agbor, Delta State, Nigeria
[3]Department of Department of Animal Science, Nnamdi Azikiwe University, Awka, Nigeria

Corresponding Author: **Raymond Chukwuka Onyemekonwu**

Abstract: The study examined the prospects of extension intervention in watermelon production in Delta State, Nigeria. Key issues examined include the farmers' sources of information on watermelon production, the watermelon varieties currently cultivated, the farmer's reasons for involving in watermelon production, the extension needs of watermelon farmers, and the difference in the agricultural extension service needs of the farmers. Data collected from 163 respondents were analyzed using frequency, percentage, mean, and the Friedman test hypothesis. The result revealed that the farmers' foremost source of information on watermelon farming was fellow farmers (100%). The major reason motivating farmers to engage in watermelon production was to increase their income (61.96%) while the majority (63.8%) cultivated the Kaolack variety. The leading extension needs of the respondents were pest/ disease control methods and, support in procurement of credit (mean=3.82). Friedman test (χ^2=302.7; P<0.05) showed significant differences among the extension needs of the farmers, with assistance in credit procurement being the most significant. It was concluded that there is a high prospect for agricultural extension service in the State concerning watermelon production if the farmers are provided with agricultural extension services in line with their needs. It was recommended among others, that watermelon should be made a mandate crop of the State extension service.

Keywords: prospects, agricultural extension, needs, watermelon production, Delta State, Nigeria.

Introduction

Food has been a basic need for human survival. As such it has become pertinent to ensure its availability in adequate amounts. The challenge of ensuring an adequate food supply is more serious today because of the increased human population. The global human population is estimated at 7,975,422,393 in 2022, while that of Nigeria is projected at 216,746,934 in 2022 (United Nations, 2022). The agricultural sector is essential in the fight against food insecurity and equally for the promotion of economic development and poverty alleviation. Researchers have argued that nearly no country in the world has made a noteworthy economic development without previous advancement in agriculture owing to its immense contribution to sustaining food supply, poverty reduction and overall economic development of many nations (Oladeji et al., 2019). However, other researchers have argued that despite the availability of good climate and soil conditions, the output from crops in Nigeria is far lower than the output obtained in agriculturally advanced countries (Oladipo et al., 2015; World Bank Group, 2024).

This gap is partly blamed on a weak agricultural extension service in the country. Agricultural extension agencies carry out the responsibility of educating and disseminating useful and timely agricultural information to the farmers. It is an extension mandate to identify, package, and disseminate improved farm practices to farmers to improve farm productivity. The ultimate goal of agricultural extension service in Nigeria is to improve the standard of living of farmers through the transfer of improved farm knowledge and practices. But for the extension service to be effective, its service delivery must align with the needs or enterprise of the farmers. This agrees with the cardinal principles of extension service which emphasize that extension solves farmers' production problems and addresses their needs or interests (Danso-Abbeam et al., 2018). In Delta State, observations have shown that farmers are beginning to show interest in the cultivation of watermelons. Unfortunately, the State Agricultural Extension Service is yet to take this crop as a mandate crop. Watermelon has great potential to improve the economic livelihood of farmers in the study area. Most watermelons consumed in the State are supplied from the northern part of the country. However, as farmers in the State incorporate this enterprise into their production system, their income is likely to be enhanced. However, the potential income that is to be realized is conditioned upon the farmers' farmers' exposure to agricultural extension service delivery in line with their production needs. Since the crop is not, presently, a focus of the extension service, there is the likelihood that the agency may lack adequate capacity or knowledge for optimum production. For the agency therefore to effectively serve the production of this crop, there is a need to highlight the agricultural extension service needs of the farmers. This information will be quite useful to the extension service in building the capacity of its staff to promote watermelon production in the State.

Objectives of the study

The overall objective of the study is to examine the prospects of extension intervention in watermelon production in Delta State, Nigeria. The specific objectives are to

i. ascertain farmer's sources of information on watermelon production,
ii. examine farmers' motivation for venturing into watermelon farming
iii. identify the varieties of watermelon currently cultivated by the farmers
iv. examine the agricultural extension service needs of watermelon for watermelon production among watermelon farmers in the study area

Hypothesis of the study

There is no significant difference among the agricultural extension service needs of watermelon farmers in the study area.

Materials and Methods

Study area

This study was carried out in Delta State, the state is one of the six states in the south-south geopolitical zone of Nigeria, lying between Latitude 5˚00" and 6˚30"N of the equator and Longitude 5˚00" and 6˚45" of the Greenwich Meridian and shares common boundaries with Edo, Ondo, Imo and Anambra, Rivers and Bayelsa states with a projected population of 5,636,100 in 2022 using 2.0% annual population change (National Population Commission, 2015; Nigeriagalleria, 2022). The state has a land area of 17,239.240 comprising dry land and water bodies suitable for various agricultural activities including diverse crop production and animal husbandry (National Population Commission, 2015).

Sampling technique and data collection

Multi-stage sampling procedure was used in the respondent's selection. Purposive selection of two agricultural zones (Delta North and Delta Central) was carried out in the first stage. This was based on higher-intensity farmers involved in watermelon. In the second stage, Aniocha South, Ika North East, Ika South; and Ethiope East Local Government Area were selected. This selection was based on the prevalence of watermelon farmers. The third stage also involved the purposive selection of three communities each from the selected local government areas in Delta North and only one community from Delta Central (where watermelon farmers were found). In the fourth and final stage, the snowball sampling technique was employed to sample 163 respondents across the communities selected (Table 1). Data for the study was collected with the aid of questionnaires which comprised both open-ended and closed-ended questions. The questionnaire was administered directly to the farmers by the researchers with the assistance of trained enumerators who understand the

local dialects, culture and prevailing farmers system in the study area. The result obtained was analysed using frequency count, percentage, means and Friedman (chi-square) test.

Table 1: Sampling frame of Watermelon farmers

Agric. Zone	LGAs	Communities	No. respondents sampled
Delta North	Ika North	Mbiri	41
		Umunede	18
		Ute-Ogbeje	14
	Ika south	Abavo	18
		Alisimie	6
		Emuhu	8
	Aniocha South	Obior	12
		Ubulu-uku	14
		Oguashi-uku	18
Total	3	9	149
Delta Central	Ethiope East	Abraka	14
Total	1	1	14
Grand Total	4	10	163

Measurement of measurement

The variables in the study were measured as follows:

Sources of information on watermelon farming: The farmer's sources of information on watermelon farming were measured by asking the farmers to indicate their sources of information on watermelon farming from a list of multiple options of information sources provided to them. The frequencies and percentages of these responses were calculated.

Farmer's reasons for engaging in watermelon production: Respondents were made to indicate their reasons for venturing into watermelon production, from varieties of reasons presented to them. From their responses, the frequencies and percentages were calculated

Watermelon varieties cultivated: The farmers were strictly asked to indicate the watermelon varieties they were currently cultivating. The frequency and percentage of their responses were calculated.

Agricultural extension needs of respondents on watermelon production: The extension need of farmers was determined using a four-point Likert type scale scored as follows: very important (coded 4), important (coded 3), less important (coded 2), and not important (coded 1). The weight score of 2.50 was the benchmark on which needs were graded as important (mean ≥ 2.50) or not important

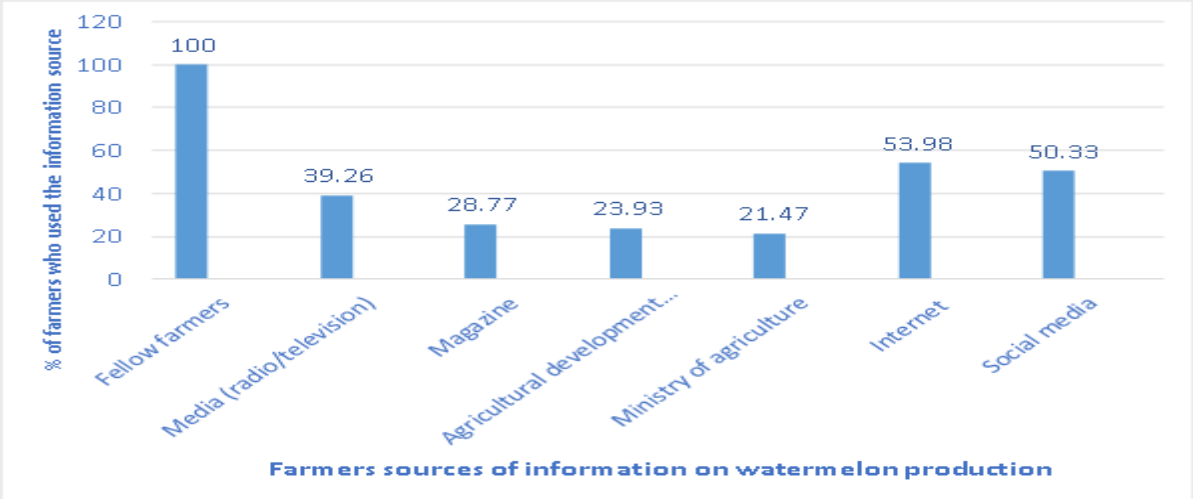
(mean<2.50). The weighted mean was determined as follows: (4 + 3 + 2 + 1) ÷ 4=2.50.

Results and Discussion

Source of information on watermelon

Fig. 1 shows the information sources of respondents on watermelon production practices. The result revealed that all the respondents (100%) sourced their information from fellow farmers. Other information sources used by the respondents include the internet 53.98%, social media (50.30%), media (radio and television) 39.26%, magazines (25.77%), ADP (23.93%), and Ministry of Agriculture (21.47%). This suggests that the farmers explore diverse information sources in watermelon production. It is possible that the farmers utilized the information sources accessible to them. The result further indicates that there is a high level of information flow among the farmers, suggesting farmers could be used for the dissemination of agricultural innovation since agricultural information can effectively flow among the farmers. This result is in line with Onyemekonwu et al. (2019) who reported that the major source of agricultural information among farmers in Delta State, Nigeria is through their fellow farmers. This result further agrees with Fidelugwuowo (2021) who reported multiple sources of agricultural information among rural farmers in South-East Nigeria, with information flow through friends and co-workers (fellow farmers) being the major source of agricultural information utilized by the farmers.

Fig. 1: Farmers' sources of information on watermelon production

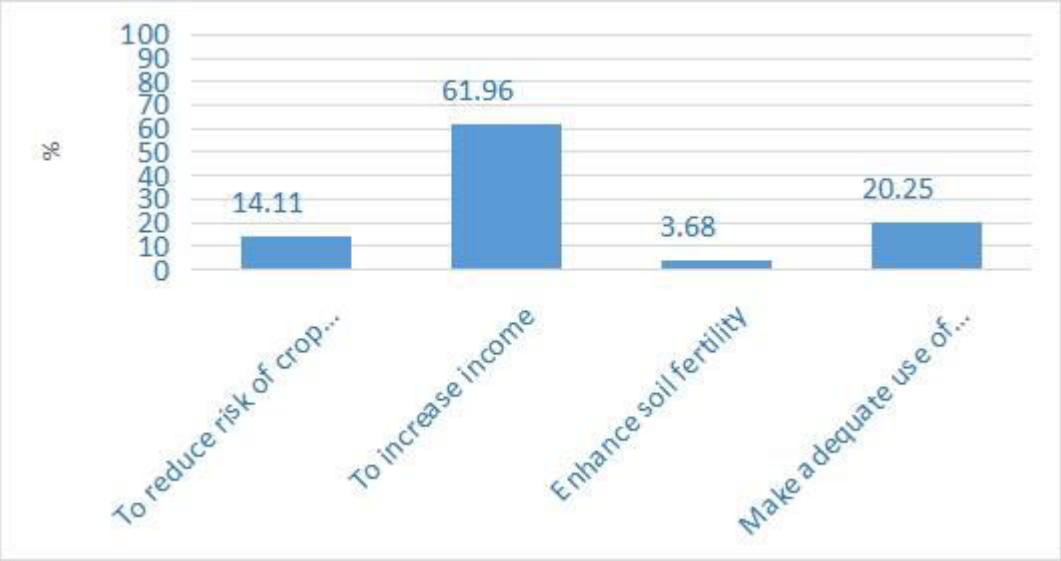


Motivations for respondents' participation in watermelon production

Fig. 2 shows the reasons for respondents' involvement in watermelon farming. The result showed that the majority of the respondents (61.96%) got involved to increase their income, 20.25% of them got involved to make adequate use of

available farmland, 14.11% were engaged in watermelon farming to reduce the risk of other crop failures while 6% claimed their involvement in watermelon farming was to enhance the fertility of the soil. The fact that the majority of the respondents were involved in watermelon farming to increase their income is an indication that the respondents' income from other farm enterprises was low, hence the need to diversify enterprises to watermelon production. This result corroborates the report of Yusuf et al. (2013), who reported that 62.0% of watermelon farmers in Oyo State engaged in watermelon to improve their income. The result further agrees with the report of Belonwu et al. (2024), that rural farmers diversify their income sources in order earn more income to better their living conditions.

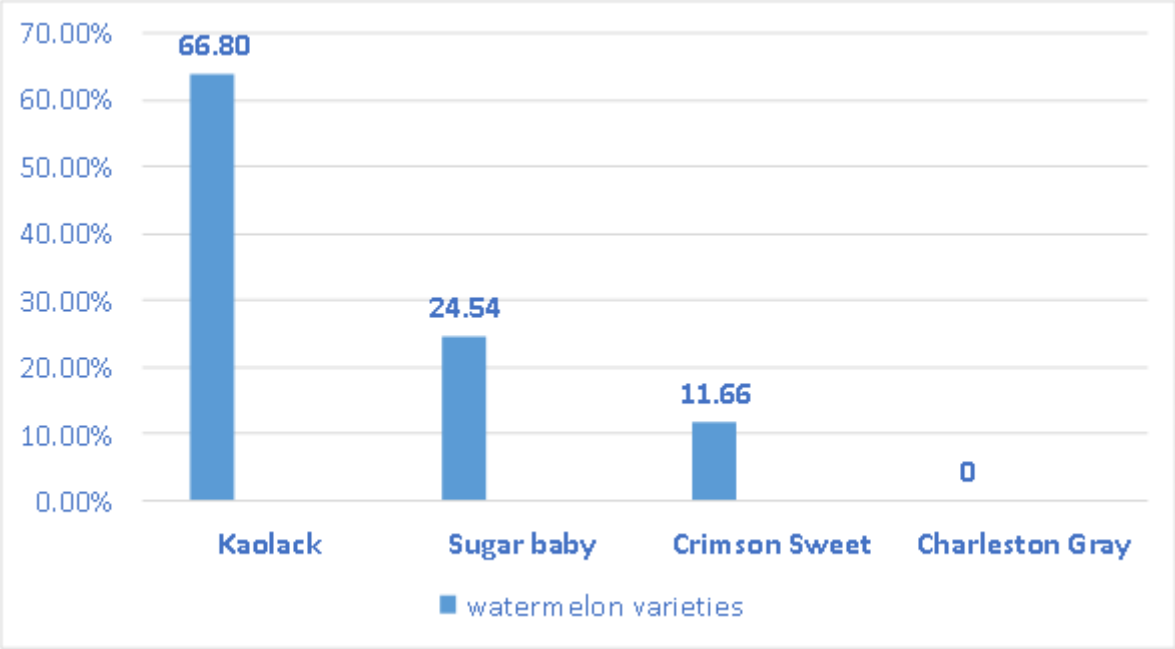
Fig. 2: Reasons for respondents' involvement in watermelon production



Watermelon varieties cultivated by farmers

Fig. 3 shows the type of watermelon varieties cultivated by the respondents. The result shows that the majority (63.80%) of the respondents cultivated Kaolack, 24.50% cultivated Sugar baby, and 11.66% cultivated Crimson sweet while none of the respondents cultivated Charleston grey. This result suggests that Kaolack was the main variety that farmers cultivated in the area. The reasons for this may be attributed to its characteristics of big size, sweetness, ability to store very well, and command of high prices at the markets. This result differs from that of Adeoye et al. (2011) and Adojutelegan et al. (2015), who reported that the majority of watermelon farmers in Oyo and Ekiti States cultivated Sugar baby variety.

Fig. 3: Watermelon varieties cultivated by respondents.



Extension Needs of Farmers

The watermelon production extension needs of the respondents are revealed in Table 2. The result shows that the respondents agreed that all needs captured in the table were important to them since they were above the benchmark of 2.50. These needs include pest and disease control methods (mean=3.82), support in procurement of credit (mean=3.82), improved seeds (mean=3.79) and farm chemicals (mean=3.56), and information on marketing opportunities for watermelon (mean=3.69). Other important needs of the respondents included training on watermelon best production practices (mean=3.50), training on preservation techniques of watermelon (mean=3.30), and organization of the watermelon farmers' association (mean=2.77). The farmers saw all the extension needs presented to them as important needs. This suggests that watermelon farmers in the study area are in direct need of agricultural extension services to help improve their production. This result further suggests that if provided with these needs, in a profitable manner that is sustainable, there is the possibility of these farmers to produce enough watermelon to improve their standard of living and contribute to the overall development of the country. In similar studies, linkages to sources of farm inputs, appropriate marketing channels, and sources of improved farm tools were found to be the leading extension needs of farmers (Abugu et al., 2013; Adebayo et al., 2020).

Table 2: Extension needs of respondents

Needs	Total		
	Mean	SD	Rank
Pest and disease control methods	3.82	0.40	1
Assistance in credit procurement	3.82	0.46	2
Procurement of improved seeds	3.79	0.43	3
Marketing opportunities for Watermelon	3.69	0.53	4
Farm visits by extension agents	3.67	0.54	5
Assistance in fertilizers/farm chemical procurement	3.56	0.59	6
Training on watermelon best production practices	3.50	0.62	7
Training on preservation techniques of watermelon	3.30	0.70	8
Organization of Watermelon Farmers Association	2.77	0.83	9

Important needs (mean=2.50)

Test of difference among extension needs of watermelon farmers

Friedman test was used to test the hypothesis that states that, there is no significant difference among the extension needs of watermelon farmers in Delta State. The result is presented in Table 3. The Friedman test result (Chi-square=302.7; df=8; $p < 0.05$) was significant at a 5% level, which means that there are significant differences among the extension needs of watermelon farmers in the study area. The post-hoc test revealed that the need for assistance in credit procurement (mean rank= 5.96), pest and disease control methods (mean rank=5.91), and support in accessing improved seeds were the most significant needs of the farmers in the study area. The least significant needs were training on the preservation techniques of watermelon (mean rank=4.049) and the organization of watermelon farmers' association (mean rank=2.709). The differences that exist among the extension needs of the watermelon farmers in the study area are an indication that some of the needs are likely to be more pressing to watermelon production and therefore need urgent attention. This is an indication that some of the extension needs appear to be more important to the farmers to enable them to produce effectively. This result suggests that credit procurement and pest and disease management were serious issues needing urgent attention concerning watermelon production in the study area as they were statistically different from other needs. This result agrees with Kareem (2022) who summated that farmers' poor access to finance to stabilize their production has been a major problem to crop production in Nigeria.

Table 3: Test of difference among extension needs of watermelon farmers (Friedman test)

Extension needs	Mean rank*	
Assistance in credit procurement	5.96	a
Pest and disease control methods	5.91	a
Procurement of improved seeds	5.80	b
Farm visits by extension agents	5.42	c
Marketing opportunities for Watermelon	5.38	c
Assistance in fertilizers/farm chemical procurement	5.05	d
Training on watermelon best production practices	4.68	e
Training on preservation techniques of watermelon	4.04	f
Organization of Watermelon Farmers Association	2.70	g

χ^2=302.7; df=8; P<0.01

*Means with different superscripts are statistically (significantly) different

Conclusion

The prospect for extension service in the area is high as this study revealed specific agricultural extension service needs for watermelon production. It indicates a huge gap between needed information and technologies and what is being practiced by farmers. There is therefore a need for the agricultural extension agency to enhance the capacity of its staff to address this emergent farm enterprise (watermelon) in the State, especially as the farmers rely majorly on fellow farmers in sourcing information on watermelon production. The implication of this is that, if the farmers production capacity is enhanced through appropriate intervention by extension agencies, there is the possibility of improving the farmers production output. It was, therefore, recommended that the State extension agency or ADP should develop extension programmes for watermelon production with the target of making watermelon a mandate crop. Such is presently non-existent in the State. The study revealed the specific extension needs of watermelon farmers. The State agency will be more relevant to the needs of the farmers if it focuses on addressing the identified needs particularly linkage to credit sources and improved seeds as well as training on pest/disease control methods.

Contribution to knowledge and existing literatures

The study provided baseline information on the situation of watermelon production among rural communities of emergent watermelon production in Delta State, Nigeria, by revealing the information sources of the farmers, the varieties cultivated by the farmers, their motivation or reasons for venturing into watermelon production and agricultural extension service needs of the farmers. Such information is needed for development agencies such as extension service providers for appropriate intervention. It equally adds to available literatures on watermelon production which will be valuable information for future researchers who may embark on similar study.

Conflict of interest

The authors declare that there is no conflict of interest among them.

Acknowledgements

The authors wish to acknowledge all watermelon farmers who were not reserved in providing the relevant information for during data gathering.

Authors' contributions

RCO: Conceptualization and development of instruments for data gathering, analysis and interpretation of data, writing and revision of manuscript. FAE: Conceptualization and development of instruments for data gathering, and interpretation of data, writing and revision of the manuscript. FO: data gathering and analysis and interpretation, writing, and revision of the manuscript. JCO: data gathering, analysis, revision and proofreading of the manuscript.

Orcid

Raymond Chukwuka Onyemekonwu: ocid.org/0000-0003-3406-2695,
Friday Akasiri Ehiwario: ocid.org/0000-0002-5733-2431
Felix Onyemekihian: Ocid.Org/0009-0003-1207-45716
Josiah Chidiebere Okonkwo: Ocid.Org/0000-0002-2367-4978

References

1. Abugu RO, Chah JM, Nwobodo C, Asadu AN and Igbokwe EM (2013). Agricultural extension needs of farmers in Telfairia production and marketing in Enugu State, Nigeria. Journal of Agricultural Extension, 17 (1): 49-60.
2. Adebayo SA, Ogunlade I and Ede EE (2020). Perceived extension needs of rubber production among farmers in Delta State, Nigeria, Agro-science 9 (4):30-36.

3. Adeoye IB, Olajide-Taiwo FB, Adebisi-Adelani O, Usman JM and Badmus MA (2011). Economic analysis of watermelon based production system in Oyo State, Nigeria, ARPN Journal of Agricultural and Biological Science, 6(7): 53-59
4. Adojutelegan OT, Adereti FO, Makanju TS and Olorunfemi OD (2015). Analysis of factors affecting watermelon production in Ekiti State, Nigeria. Science, Technology and Arts Research Journal, 4(2): 324-329.
5. Belonwu NE, Umeri C, Moseri H and Nwabeze GO (2024). Livelihood diversification among rural farm worker households in Edo State, Nigeria, Journal of Agricultural Extension, 28 (1): 12-18.
6. Danso-Abbeam G, Ehiakpor DS and Aidoo R (2018). Agricultural extension and its effects on farm productivity and income: insight from Northern Ghana, Agriculture & Food Security, 7(1): 1-10.
7. Fidelugwuowo UB (2021). Knowledge and skills for accessing agricultural information by rural farmers in South-East Nigeria, IFLA Journal 47 (2): 119-128.
8. Kareem K (2022). Crop production in Nigeria is falling and we should be worried. Available online at www.dataphyte.com
9. National Population Commission (2015). National population news bulletin, available online at www.nigeriagalleri.co (accessed on 5th September 2023)
10. Nigeriagalleria (2021). Brief history of Delta State; Nigeria information and guide, available online at www.nigeriagelleria.com (accessed on 10th December, 2023)
11. Oladeji SO, Adekunle CP, Tolorunju ET and Osinowo OH (2019). Technical efficiency of organic and inorganic leafy vegetable production in Ogun State, Nigeria, Journal of Agripreneurship and Sustainable Development, 2(2): 102-109.
12. Oladipo FO, Olorufemi OD, Badru B. M and Bolarin O (2015). Effects of access of extension service farmers' productivity in Osun State, South West Nigeria. International Journal of Family and Consumer Science 4 (1): 92-102.
13. Onyemekonwu RC, Belonwu EN and Ehiwario FA (2019). Analysis of small scale farmers' income in melon production in Delta State, Nigeria. Journal of Agripreneurship and Sustainable Development 2 (2): 147-155.
14. UN (2022). Demographic Statistical Bulletin 2022, Available online at: nigerianstat.gov.ng (Retrieved on 4th July, 2022).
15. World Bank Group, (2024). Agriculture and food. Available online at: www.worldbank.org (Retrieved on 9th July, 2024)
16. Yusuf SFG, Francois SL and Idris AA (2013). Profitability and adoption of watermelon technologies by farmers in Moro Local Government of Kwara State, Nigeria. Journal of Agricultural Science, 5(5): 91-99.