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Study of Fall Army Worm (*Spodoptera frugiperda*) Risk Communication Sources and Information Needs of Rural Maize Farmers in Imo State, Nigeria

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Army worm infestation has become a thorn on the flesh of maize farmers throughout the century. This is due to a lack of information available to farmers. This paper seeks to unravel the risk communication sources used to alert the farmers and information maize farmers need to combat or

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adapt to fall armyworm menace. The researchers purposively selected a total of 450 maize farmers randomly from a list of 4500 maize farmers. Questionnaire was used for information sourcing and data analyzed using percentages and mean presented in tabular form. Results showed that the farmers (100%) have knowledge of the fall army worm as they have seen it before; they can identify the larvae and egg (77.7%), know about damage to leaves (100%), have also seen the egg on maize leaves among others. They became aware of armyworm menace through personal observations (95.5%), family and friends (90%), cooperatives (89%), among other sources. The farmers need information on control measures (M=3.04), how to apply chemicals (M=3.50), when to apply chemical (M=3.45), training on chemical application (M=3.35), alternatives crops to cultivate (M=3.01), among others. They face the following challenges in accessing army worm information: communication/language barrier (98%), high level of illiteracy among farmers (96.6%), erratic power supply (100%), inadequate funds/capital (94.4%) and absence of extension staff (98.8%), and many more. It is recommended that use of clear local language on army worm education be encourage, power supply be improved, data charges reduced, communication facilities be improved and extension service delivery strengthened.

Keywords: Armyworm; information; maize; farmers; pests; risks; communication.

1. INTRODUCTION

Maize (*Zea mays*) belongs to the family of *Poaceae* and sub family of *Panicoideae*. It is one of the main cereal crops of West Africa consumed after sorghum, millet and rice in Nigeria [1]. It is a very important staple food eaten in Nigeria by several millions of farm families [2] and even given as animal feed. It is the most important grain crop of the savannah zones and fresh vegetable in the rain forest belt of Nigeria, where it is cultivated twice a year [3]. In Nigeria, over fifty-million farmers grow maize every year, while over ninety million people are employed in its processing and daily usage [3,4]. Maize provides energy, vitamins and little amount of protein as in the case of quality protein maize (QPM). The output continues to increase in Nigeria in response to the high demand of maize [4,5].

Maize supplies the highest calorie of about 19.5%, more than rice (16.5%) and wheat (15%) and for this reason, most smallholder farmers grow maize in sub-Saharan Africa [6]. Maize constitute about 70% of annual grains stock in the silos and 40% of grains in food aids during the era of the commodity boards [3]. And in sub-Saharan Africa, over three hundred million people depend on maize for their livelihood [7]. Despite its importance, maize production is constrained by several production factors including insect pests infestation, like the African stem borer (*Busseola Fusia*), pink stem borer (*Sesamia Calamistis*), and the major and current devastating one, the Africa army worm (*Spodoptera example* [8].

The fall army worm (FAW) (*Spodoptera frugiperda*) is a destructive insect pest native to the tropical and sub-tropical region of Africa. A highly destructive plant insect attacking more than 80 plant species and causing massive economic loss. The FAW prefer crops in the grass family to which maize and rice belong [9]. Since the year 2016, this invasive and destructive pest first appeared in Nigeria, it has since then, damaged maize, thus further constraining its production in the country [8]. Adult fall worms are moths that can lay eggs directly on the host plants, then at the larval stage is where the actual damage starts, destroying leaves, whorl tassels and kernel of maize plants. This pest according to ICIPE, [10] has already led to twenty to eighty million tons of losses of maize yield both in Nigeria and the Africa continent as well.

Maize farmers therefore need to be aware of the above information to cope and strategize for improved practices in the face of this fall Armyworm (FAW) risk. This is called risk communication. Risk communication is key to improving familiarity with and adherence to preventive measures, in normal times but also particularly during farm emergencies. Failure to communicate the right message effectively can result in loss of trust, damage to the economy, damage to the farm and loss of lives and property [11]. For risk communication to be effective, risk messages have to be shared with the public in an openly and timely manner, so as to reduce the knowledge gap and to convince the public to adjust their behavior during a crisis [12]. In addition to disseminating recommendations that are easy for the public to understand and

comply with, trust in the source of the message is important for an effective risk communication [11,13]. Agricultural risk communication is a crucial component of emergency responses to farm/agricultural threats capable of jeopardizing farmers' health and productivity. The exchange of real-time information and advice between farming populations at risk is a lifesaving activity. The purpose is to assist individual farm families and communicate, make informed decision to protect themselves and their farms from emergency situations affecting productivity and yield gradually [14,15]. Rick communication come from different sources to help the farming population prepare for any farm emergency. Therefore, due to death of research based studies on maize farmers FAW risk communication sources and their information needs, this study becomes imperative. The specific objectives include: a) to ascertain maize farmers knowledge of FAW; b) identify risk communication sources available to maize farmers; c) examine FAW information needs as perceived by the maize farmers; d) identify challenged faced by maize farmers in assessing FAW information; e) ascertain strategies for improved information sourcing on FAW.

2. METHODOLOGY

The study was conducted in Imo State. It lies between latitude 5o 10' and 6o 35' North of the equator and longitude 6o 35' and 7o 31' East of the Greenwich Meridian. It is in the tropical rainforest zone. Imo State has three agricultural zones namely; Owerri, Okigwe and Orlu, subdivided into 27 Local Government Areas (LGAs). Purposive random sampling technique was used in selecting 450 maize farmers from a list of 4500 maize farmers obtained from the Maize Growers Association Zonal Offices, in Imo State. Data were collected using structured questionnaire complimented with oral interview. Basically, descriptive statistics were used to analyze the data. This involves the use of percentages and frequency counts, for objectives 1,2,4,5. While objective 3 was analyzed using a 4-point likert type scale of strongly agreed, agreed, disagreed and strongly disagreed to examine maize farmers fall army worm information needs. The responses were assigned weight of 4, 3, 2 and 1 respectively and added to give 10 divided by 4 to give a mean of 2.50. A mean score of 2.50 and above indicated fall army worm information needs, while a mean score lower than 2.50 indicated no information needs.

3. RESULTS AND DISCUSSION

3.1 Knowledge of Fall Army Worm (FAW) by Maize Farmers

Table 1 showed the maize farmers have knowledge of fall armyworm. All (100%) of the farmers agreed to have seen the fall armyworm in their farms, they know about damages done to leaves of maize plants and know about the control measures. Others said they can identify the Larvae of eggs (77.7%), know about the spread/transmission (83.1%), can employ cultural control measures (88.8%), know signs & symptoms of Fall armyworm (78.8%), know the color of caterpillar (86.4%), seen the eggs on maize leaves (88.4%), differentiate old armyworm and new (78.6%) and damage to maize whorl (76.6%). Knowledge is the rational basis for action, it is the pre-requisite for action and adoption of innovation. The final decision to use a new practice by famers is a result of knowledge and attitude (Shashikiran, et al. 2020). Therefore we can conclude here that the maize farmers have knowledge of fall armyworm infestation in the study State.

3.2 Information Sources on Fall Armyworm

An information source is a person, thing or place from which information comes, or is obtained. These source could be primary or secondary. Therefore, Table 2 showed the various sources of information available to the farmers on fall armyworm. These include town criers (87.5%), the church (63.1%), cooperative societies (89.1%), fellow farmers (84.4%), personal observation (95.5%), family/friends (90%) and from input dealers (68.8%). These agrees with Adio, et al. (2016) who position that agricultural information is meant to get to rural farmers via works, radio, television, film shows, pamphlets, and other agricultural agencies, including universities and research institute contest farmers and lay leaders neighbors, relations and even friends are used information sources in addition to major mass-media communication channels, through which farmers receive information [16,17].

3.3 Fall Armyworm Information Needs of Maize Farmers

Information need refers to a person's desire or requirement for specific information to satisfy a

certain goal or task. This happens when there is a gap between what a person knows or has access to and what they are to know, to achieve their objectives. It is a persons or groups desire to locate and obtain information to satisfy a conscious or unconscious need [18,19].

Table 3 showed the information needs of fall army worm of maize farmers. With a discriminating mean index of 2.0, the following needs are identified; identification of army worm (M=3.50) type of damage (M=3.25), differentiation of eggs/larvae (M=3.16), growth stage information (M=2.95), spread/transmission (M=3.16). how to manage/control army worm (M=2.94), alternative crops to plant/cultivate(M=3.01),pesticides/insecticides to apply (M=3.20), training on application/handling of chemicals (M=3.35), cultural and biological practices to control (M=2.70), when to apply the chemicals (M=3.45) , how to apply chemical (M=3.50), and signs and symptoms of fall army worm appearance (M=2.97).

3.4 Challenges of Accessing and Using Fall Army Worm Information

Table 4 showed that maize farmer face several challenges in assessing of fall armyworm information. These challenges involved; erratic and unreliable power supply (100%), communication and language barriers (98%), high level of illiteracy among farmers (96.6%), high cost of data subscription (95.7%), lack of proper farmer enlightenment (84.4%), poor communication network (91.1%), poor access to

Table 1. Knowledge level of fall armyworm by rural farmers

Knowledge of Fall Armyworm	Knowledge		No Knowledge	
	Frequency	Percentage	Frequency	Percentage
Have seen armyworm in maize farms	450	100	-	-
Can identify the larvae & egg	350	77.7	100	22.2
Know about damage to leaves	450	100	-	-
Know about the spread	374	83.1	76	16.8
Know about the control measure	130	28.8	320	71.1
Can use chemical to eliminate	240	53.3	210	46.6
Can employ cultural methods	400	88.8	50	11.1
Know the signs & symptoms of FAW	355	78.8	95	21.1
Know color of caterpillar	389	86.4	61	13.5
See the eggs on maize leaves	400	88.4	50	11.1
Old FAW have while mark on heads	354	78.6	96	21.3
FAW have 4 large dots on the body	320	71.1	130	28.8
Damage to maize whorl	345	76.6	105	23.3
Red-orange color seen after eating maize	410	91.1	40	8.8

Source: Field survey Data, 2023

Table 2. Risk communication sources on fall armyworm by farmers

Risk Communication sources	*Frequency	Percentage
Books	30	6.6
Journals	30	6.6
Family/Friends	405	90
Television	130	28.8
Town criers	394	87.5
Church	284	63.1
Cooperative societies	401	89.1
Extension agents	50	11.1
Fellow farmers	380	84.4
Input Doctors	310	68.8
Radio	250	55.5
Newspaper	110	2.4
Personal observation	430	95.5

**Multiple responses*

Table 3. Fall armyworm information needs of maize farmers

Fall Armyworm Information Needs	Mean	SD
How to Identify fall armyworm	3.50	0.91
Information on type of damage	3.25	0.65
Type of crops attacked	3.41	0.78
Differentiation of egg & larvae	3.05	0.61
Information of fall armyworm growth stages	2.95	0.49
Spread & transmission of fall armyworm	3.16	0.56
How to manage/control it	3.04	1.10
Alternative crops to plant/cultivate	3.01	0.99
Pesticides/insecticides to apply	3.20	1.09
Training on application of chemical	3.35	0.78
Information on total eradication , if possible	2.89	0.56
Cultural & biological practices to employ	2.70	0.87
When to apply chemicals to maize planet	3.45	0.91
How to apply chemicals to infested plants	3.50	0.76
Signs and symptoms of armyworm appearance	2.97	0.47

Accepted Mean= 2.50

Table 4. Challenges of Accessing and Using Fall Army Worm Information

Challenges	*Frequency	Percentage
Communication and languages barrier	441	98.0
High level of illiteracy among farmers	435	96.6
Erratic power supply	450	100
High cost of data subscription	431	95.7
Bad road network	450	100
Lack of proper farmer enlightenment	380	84.4
Too many information at a time	376	83.5
Poor communication network	410	91.1
Poor access to timely information	407	90.4
Lack of access to communicator facilities	420	93.3
Poor communication skills of experts	387	86.0
Inadequate funds/capital/savings	425	94.4
Inadequate extension visit/services delivery	439	97.5
Absence of extension staff	445	96.8

**Multiple response*

timely information (90.4%). This means that the information to tackle fall armyworm comes rather after damage has been done. Other challenges were poor communication skills (86%) to handle and retrieve needed information, inadequate funds/capital/services (94.4%), absence of regular meetings with farmers in the field and at home.

3.5 Strategies to Improve Fall Armyworm Information Spread

To improve on information service delivery, table 5 showed the following strategies: the use of clear local dialect (97.1%) in fall armyworm provision of information, education/training of farmers (99.5%), improve power supply and distribution (98%), improve road networks (90.4%), reduction in data charges (88.2%), improve communication coverage (83.1%), provision of information at the right time (91.1%). Information should be provided before outbreak and during so that the farmers will prepare before invasion and spread. Other strategies included provision of loans (100%), training on communication skills (98.8%), improving communication facilities (94%) for better connectivity and strengthen extension delivery system (94.2%). This could be done by improving the human resource capability of extension staff, better ICT facilities, provision of vehicles and equipment, improved remuneration and work environment to some as motivation among others.

Table 5. Strategies to improve fall armyworm spread

Strategies for improvement	*Frequency	Percentage
Use of clear local dialects	437	97.1
Education training of farmers	448	99.5
Improve power supply and distribution	448	98.0
Improve road network	407	90.4
Reduction of date charges	397	88.2
Improve communication coverage	374	83.1
Information provided at the right time	410	91.1
Communication facilities be improved	423	94.0
Training staff on communication skills	436	98.8
Provision of loans	450	100
Strengthening extension delivery system	424	94.2

**Multiple responses*

4. CONCLUSION

Information they say, is power. An informed farmer knows about fall army worm. This knowledge came through the use of town cries, family/friends, cooperative societies and from personal observation. Information helps them to meet their needs such as how to identify fall army worm, types of damages, pesticides/chemicals to use, the amount to apply, signs and symptoms among other needs. The following challenges are encountered in searching information of FAW: languages barriers, erratic power supply, high illiteracy level of farmers and high cost of communication/electronic gadgets. To improve there should be better network coverage, use of clear local languages and others.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of manuscripts.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. FAO. Fall Army worm in Nigeria: Situation Report, Food and Agricultural Organization Rome; 2018.
2. FAO. FAO advisory note on fall armyworm. Food and Agriculture Organization. Rome; 2017
3. Onyibe JE, Sani BM, Chindo H, Ibrahim IK, Malumfash M. Maize production, marketing, processing and utilization in Nigeria. National Agriculture Extension Researc Laison Services, Extension No. 217, Kaduna, Nigeria; 2004.
4. CBN. Monetary Policy Committee; CBN update. Central Bank of Nigeria, Abuja; 2022.
5. Shiferaw B, Prasanna BM, Hellin J, Binziger M. Crops that feed the world. 6 past success and future challenges to the role played by maize in global food security. Food Science. 2011;3:307-327
6. Macaulay H. Cereal crops: Rice, Mazie, Millet, Sordhum, wheat background paper. Conference on feeding Africa, darker siginal; 2015.
7. Food and Agriculture Organization Corporate Statistical Database, FAOSTAT. Crops: production; 2018.
   Available:http://www.fao.org/faostat/en/#data/QC/visualize
   [Accessed on:July27, 2020].
8. Ojumoola OA, Omoloye AA, Umeh VC. Seasonal difference in fall armyworm *Spodoptera frugiperda* (*Lepidoptera: Noctuidae*) abundance and plant injury on selected maize varieties in Ibadan, Southwest Nigeria. International Journal of Pest Management; 2022
   DOI: 10.1080/09670874.2022.2055809
9. FAO. Integrated Management of the full army worm on Maize: A guide for farmer field schools on Africa. Food and Agriculture Organization, Rome; 2018.
10. ICIPE. International Centre of Insect Physiology and Ecology, (2020). ICIPE launches mass release of indigenous

natural enemies to control fall armyworm; 2020.
Available:https://www.icipe.org/news/icipe-launches-mass-release-indigenous-naturalenemies control-fall-army

11. World Health Organization. Risk communication and community engagement (RCCE) readiness and response to the 2019 novel coronaviruses (2019- nCoV): interim guidance; 2019
Available:https://www.who.int/publications/i/item/risk-communication-and-community-engagement-readiness-and-initial-response-for-novel- coronaviruses.
12. Zhang L, Li H, Chen K. editors. Effective risk communication for public health emergency: Reflection on the COVID-19 (2019-nCoV) outbreak in Wuhan, China. Healthcare; 2020: Multidisciplinary Digital Publishing Institute; 2020.
13. Slovic P. Perceived risk, trust, and democracy. Risk analysis. 1993;13(6): 675–82.
14. WHO. International Health Regulation Implementation: Ensuring Effective Responses to Public Health Emergences, World Health Organization, New York; 2020a.
15. WHO. General Information on Risk Communication, Word Health Organization, New York; 2020b.
Available:www.who.int/thr/about07-risk communication.pdf
16. Okwu OJ, Dauds S. Extension communication channels usage and preference by Farmers in Benue State, Nigeria. Journal of Agric. Extension and Rural Development. 2011;3 (5):88-94.
17. Opara UN. Agricultural Information sources used by farmers in Imo state, Nigeria. Information Development. 2008;24(4):289 - 295
18. Hjorland B. Information seeking and subject representation; An activity theoretical approach to Information science. Greenwood press, West Point; 1997.
19. Harun AR. Information Needs, types of Information needs, components of Information needs; 2023.
Available:www.limb.org

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