Assessment of Indigenous and Chemical Pest Control Measures for Arable Crops in Ejigbo Local Government Area, Osun State, Nigeria

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ABSTRACT

The importance of pest control measures in the management of post-harvest losses and ensuring food security cannot be overemphasized. This paper identified the indigenous and chemical pest control measures known and used by farmers, determined farmers' frequency of usage, perceived effectiveness of measures used, and assessed the constraints encountered by farmers. A multi-stage sampling procedure was used to select 150 respondents in five communities and a structured interview schedule was used to obtain data. Results revealed that eight indigenous and nine chemical pest control measures were identified out of 37 listed measures. The frequency of usage was low, with grand mean scores of 0.36 for the indigenous and 0.27 for chemical measures. In contrast, the chemical pest control measures were more effective than the indigenous measures with scores of 1.47 and 1.26, respectively. Also, inadequate extension and training services were the only major constraint experienced by the farmers in both measures. The results of correlation analysis showed that farmers' age (r = -0.310) had a significant negative relationship with the frequency of usage of chemical pest control while years of formal education (r = -0.082), annual income (r = -0.400) and farm size (r = -0.262) had a significant negative correlation with usage frequency of indigenous frequency of usage of indigenous pest control. In conclusion, with most farmers not using many of the indigenous and chemical pest control measures in addition to inadequate extension service delivery, the quality and quantity of arable crops produced will be adversely affected. Consequently, food security and the rural household economy would be at risk without quick intervention.

Key words: Indigenous measure, chemical measure, pest control, arable crop, food security.

INTRODUCTION

As the global human population continues to increase, there is increasing demand for staple food crops to meet the daily energy and nutrient needs of the teeming population. A substantial proportion of these staple food items are mainly produced by rural farmers (Sabo *et al.,* 2017; Ma *et al.,* 2022). The option to maintain a balance between arable crop production, availability and supply require mitigating the avoidable losses, which include post-harvest losses to poor storage and preservation techniques, losses to pest and diseases, and poor handling. Pest and diseases have been estimated to account for some (25%) of the total crop losses per annum in sub-Saharan Africa (Oerke, 2005; Cerda *et al.,* 2017).

Agricultural pests include animals, insects, fungi, and bacteria that cause loss or reduction in crop yield (Waterfield and Zilberman, 2012; Zekeya *et al.,* 2022). Oerke (2005) defined a pest as any animal, insect or plant having harmful effects on crops, livestock, human health and the ecosystem. Historically, the massive pest infestation of staple crops on Irish potato in the 1840s suggested that the crop pest is inherent. Still, the recent losses to pest have been phenomenal and more exceptional to the general rule. If not controlled, the menace caused by pest is a threat to food security and the national economy. Thus, globally, an enormous estimated cost of about USD 10 billion is spent annually to control pests (Pimentel, 2005; Mesterházy *et al.,* 2020).

Pest control measures are as old as agriculture since there has always been the need to preserve and protect crops from pests to enhance the quantity and quality of food production to ensure man's safety. For example, in Africa and Asia, farmers have been using several indigenous pest control measures. For instance, in Nigeria, several biological and traditional methods exist. They include sprinkling of wood ash and extracts from neem and tobacco on plants, use of dried pepper, manual removal of pests, beating the crops with leaf branches, crop rotation, intercropping and land fallowing which are readily available and cheap but of relatively limited impact and are labour intensive (Amusa *et al.,* 2003; Zhang *et al.,* 2018; Kinuthia, 2019). However, some of these farmers do not commonly control pests (Ofor *et al.,* 2009; Kinuthia, 2019), and those who do rely principally on chemical pesticides (Banjo *et al.,* 2003).

In recent times, many rural farmers have turned to chemical pest control measures, which they found to be labour saving and reduce crop losses. However, despite the huge quantity (more than 2 million tons) of pesticides used annually, about one-third of the world's agricultural production is still lost to pests (Oerke, 2005; Cerda *et al.,* 2017). Over time, some of the pesticides, for instance, DDT,

were discovered to negatively affect human health and the environment (Bretveld *et al.,* 2006; Nicolopoulou-Stamati *et al.,* 2016; Parra-Arroyo *et al.,* 2022). Thus, the need to limit the harmful effects of pests is as important as limiting the unintended consequences of pesticides on crops, human health and the environment. The growing number of pesticide-resistant pests, indiscriminate use and highly toxic substances have adverse effects on human health, wildlife, local food sources like cattle, fish and beneficial insects and biodiversity. In addition, the release of toxic chemicals into the ecosystem poses severe danger to the environment. Thus, human health and the environment are greatly impaired due to the use of chemical pest control measures.

To reduce the harmful effects of chemical control and those inherent in the indigenous measures on human health and the environment, researchers and governments have resorted to promoting Integrated Pest Management (IPM) as an effective and environmentally sensitive approach. However, despite the advantages of this approach, it remains unpopular among rural farmers. Research on farmers' adoption of IPM in Nigeria revealed that majority (84.4 %) were yet to adopt IPM and only 15.7% adopted it (Eze *et al.,* 2006; Uwagboe *et al.,* 2016, Kughur *et al.,* 2017; Misango *et al.,* 2022). The subsistence nature of rural agriculture, poor information dissemination, high cost and irregular supply of synthetic pesticides were the reasons for farmers' low adoption (Ogendo, 2004).

Therefore, finding sustainable solutions to losses caused by pests requires assessing the indigenous and chemical pest control measures used by farmers for sustainable farming practices. It is on this premise that this paper seeks to identify pest control measures available to farmers, assess farmers' perceived effectiveness of both control measures; determine the frequency of usage and assess the constraints to their usage.

MATERIALS AND METHODS

The study was carried out in Ejigbo Local Government Area, Osun State, Nigeria. A multi-stage sampling procedure was used to select the respondents. At the first stage, five communities (Ejigbo, Isoko, Isudunrin, Ilawo, and Olla) were purposively selected based on the predominance of arable crop cultivation. At the second stage, 30 respondents were randomly selected from each of the five communities to give 150 respondents. Structured interview schedule was used to elicit information from the respondents. Indigenous and chemical pest control measures known to farmers were identified. Arable farmers' perceived effectiveness of pest control measures were assessed on a 4-point Likert scale of very effective (3), effective (2), less effective (1), and not effective (0). The mean score was obtained by multiplying the frequency with the corresponding scale and divided by the total number of respondents. The grand mean score is the summation of all the mean scores of the different control measures divided by the number of variables that make up the control measures.

Similarly, the mean scores for the frequency of usage of the indigenous and chemical pest control measures (a 5-point Likert scale of very frequently used (4), frequently used (3), occasionally used (2), seldomly used (1) and never used (0)) was used for measurement. The frequency was multiplied by the corresponding scale and divided by the total number of respondents to obtain the mean score. Again, the grand mean score was estimated by the summation of all the mean scores for each of the two methods (indigenous and chemical control), and divided by the number of control measures. Descriptive statistics such as frequency, percentages, mean and standard deviation, and inferential statistics (correlation analysis) were used to summarize the data and draw inferences. Data analysis was done using the Statistical Package for Social Sciences (SPSS) version 20.

RESULTS AND DISCUSSION

Socio-economic characteristics of respondents

The results in Table 1 show that more males (67%) than females (33%) were involved in arable crop production. The mean age of the respondents was 58.1±4.5 years. This implies a mature and experienced agricultural workforce with substantial knowledge about pest control measures. Also, the majority (81.0 %) of the respondents were married, with 12.0% widowed while a few (5.0 % and 2.0 %) were separated and single, respectively. A substantial proportion (54.7 %) of the respondents had a household size of greater than 5 people that could enhance productivity through family labour contribution. Over half (58.0%) of the respondents were not literate and had no formal education, 32.0 percent had primary education, while a few (10.0 %) had secondary education. This finding may limit access to information, especially the ability to read the instructions on chemical control measures. Thus, farmers' wrong use of chemical control measures with unintended consequences is a common occurrence. Farmers' level of education was reported by Faborode (2011) and Fadeyi *et al.* (2022) to be significantly related to farmers' technology usage.

Also, the average farm size of arable crop farmers in the study area was 2.1 ha, a small farm holding which may be due to the excessive land fragmentation in rural communities of South West Nigeria. Further analysis showed that the average annual income of respondents was NGN 205,319±1,522, which is equivalent to N8,554.96 monthly. This amount is considered very low.

Table 1: Socio-economic characteristics of the respondents (N = 150)

Variables	Frequency	Percentage	
Sex			
Male	67	67.0	
Female	33	33.0	
Age (Years)			
<45	17	12.0	
46 – 55	50	33.0	
>55	83	55.0	
Marital status			
Single	3	2.0	
Married	121	81.0	
Separated	8	5.0	
Widowed	18	12.0	
Household size			
<5	68	45.3	
>5	82	54.7	
Level of formal education			
Not literate	87	58.0	
Primary education	48	32.0	
Secondary education	15	10.0	
Farm size (ha)			
< 2	138	92.0	
>2	12	8.0	
Annual income (₦ 000)			
<100	4	3.0	
100 – 199	49	32.0	
200 – 299	64	43.0	
300 – 399	19	13.0	
400 – 499	8	5.0	
>500	6	4.0	
Sources of information			**Ranking order**
Co-farmers	97	65.0	1
Parents	60	40.0	2
Chemical sales dealer	49	33.0	3
Radio	45	30.0	4
ADP	40	27.0	5
Co-operative society	22	15.0	6
Television	14	9.0	7
NGO	12	8.0	8

Source: Field survey, 2013.

The finding of this study conforms to those of Faborode *et al.* (2020), on the small monthly income of rural pig farmers in South West, Nigeria. In addition, analysis of the results in Table 1 showed respondents' sources of information (in ranking order) on indigenous and chemical pest control measures. Co-farmers ranked first, followed by parents, while chemical sales dealers ranked third. These sources of information were the closest link with the arable crop farmers in the study area. Incidentally, radio, ADP (extension agents), cooperative society, television and Non-Governmental Organisations (NGOs) were less preferred sources of information. The extension agents who are expected to link farmers and other stakeholders along the innovation value chain ranked fifth out of eight sources. This may constitute an information gap on improved pest control measures that may put the farmers behind new technological improvements, while they continue with their old practices.

Distribution of respondents based on identified and used indigenous and chemical pest control measures

Results in Table 2 show the list of pest control measures for arable crop production and preservation by rural farmers. Out of the 37 listed indigenous and chemical pest control (18 and 19 respectively); farmers identified only 45.9% (21.6% of indigenous and 24.3% of chemical pest control measures). More than half of each pest control measure was unknown to the arable crop farmers in the study area. The low awareness of available pest control measures may be partly due to their level of education and cosmopoliteness which may have limited their access to useful information on pest control measures. This finding implies that low awareness may adversely affect arable crop production. Importantly too, only a few (21.6% of indigenous and 24.3% of chemical) pest control measures were used by farmers.

Table 2: Distribution of farmers based on available pest control measures identified and used

Available pest control measure	Measures identified		Measures used	
	F	%	F	%
Indigenous pest control				
Use of neem extract	✓		10	6.7
Application of wood ashes	✓		7	4.7
Application of cow dung	✓		3	2.0
Application of plants such as lemon grass, incense leaf			-	-
Use of onion bulbs to control weevils	✓		9	6.0
Application of chilli pepper			-	-
Application of neem soap solution			-	-
Application of tobacco solution			-	-
Application of kerosene soap solution			-	-
Application of locust water			-	-
Use of fermented cassava water	✓		4	2.7
Use of smoke			-	-
Use of traps for rodents	✓		26	17.3
Use of scare objects (Deruboko)	✓		66	44.0
Natural enemy/destruction			-	-
Intercropping	✓		35	23.3
Use of other predator like fowls for control of grasshopper			-	-
Crop rotation			-	-
Total pest control measures used	8	21.6		
Chemical pest control				
Alderin dust	✓		26	17.3
Karate	✓		30	20.0
Vetox 75	✓		20	13.3
Phostoxin	✓		12	8.0
Apron plux	✓		19	12.7
Lindane			-	-
Alachlor			-	-
Kombat	✓		17	11.3
No pest			-	-
Pest off	✓		13	8.7
Cypermethrin	✓		37	24.7
Cyperforce			-	-
DD force	✓		15	10.0
DD com			-	-
Termex			-	-
Captan			-	-
Perfect killer			-	-
Delta force			-	-
Daksh			-	-
Total pest control measures used	9	24.3		

F = frequency; % = percentage

Source: Field survey, 2013**.**

This showed that only very few of pest control measures known to the farmers were used. This implies that farmers' quantity and quality of arable crop production would be adversely affect. The result is in contrast to the findings of Singh *et al.* (2022) on adoption of chemical pesticides under commercial vegetable cultivation in Sri Ganganagar district of Rajasthan.

Respondents' perceived effectiveness of indigenous and chemical pest control measures for arable crops

The results in Table 3 show respondents' perceived effectiveness of indigenous and chemical pest control measures for arable crops. Only two of the indigenous pest control measures (use of traps for rodents and scare objects (Deruboko)) with 1.71 and 1.73 points, respectively, scored above the mid-point score of 1.5 out of the maximum obtainable score of 3.0 points. Reports by Mihale *et al.* (2009); Faborode and Ajayi (2015), and Hasan and Chaudhuri (2018) revealed that the use of scare objects (Deruboko) and traps for rodents were effective in controlling pests in the nursery field. The scores for the remaining six indigenous pest control measures were in the range of 0.04 to 1.17, which were all below the mid-point score of 1.50. Also, the grand mean score (1.26) for the indigenous pest control measures was below the mid-point score. This implies that the respondents generally had low perception of the effectiveness of the indigenous pest control measures.

Similarly, three out of the nine chemical pest control measures known for arable crop production/preservation, namely pest off (1.89), cypermethrin (1.67) and karate (1.53) scored above the mid-point score of 1.50 and were found to be effective. However, the scores for the remaining six pest control measures were below the mid-point. Also, the grand mean score (1.47) for the chemical pest control measures was low. Comparatively, the grand mean scores for both the indigenous and chemical pest control measures were low, but the chemical measures scored slightly higher than the indigenous. It implies that the extension service providers would need to intensify efforts to change farmers' attitudes towards better use of best practices of pest control measures.

Frequency of usage of indigenous and chemical pest control measures by arable crop farmers

The usage frequency of pest control measures for arable crops is shown in Table 4. All the eight identified indigenous pest control measures except one (use of scare objects (Deruboko (1.35)) had mean scores below 1.0 out of the maximum obtainable score of 4.0 points.

Table 3: Distribution of respondents based on perceived effectiveness of Indigenous and Chemical pest control measures.

Control measures	VE	E	LE	NE	Mean
Indigenous control					
Neem extract	10(30)	5(10)	135(135)	0(0)	1.17
Wood ashes	4(12)	6(12)	140(140)	0(0)	1.09
Cow dung	0(0)	4(8)	146(146)	0(0)	1.03
Onions	4(12)	10(20)	136(136)	0(0)	1.12
Traps	18(54)	70(140)	62(62)	0(0)	1.71
Scare objects (Deruboko)	25(75)	60(120)	65(65)	0(0)	1.73
Intercropping	5(15)	13(26)	132(132)	0(0)	1.15
Fermented cassava water	2(6)	4(8)	144(144)	0(0)	1.05
Grand mean					1.26
Chemical control					
Alderin dust	30(90)	6(12)	114(144)	0(0)	1.44
Karate	35(105)	10(20)	105(105)	0(0)	1.53
Vetox 75	23(69)	7(14)	120(120)	0(0)	1.35
Phostoxin	29(87)	4(8)	117(117)	0(0)	1.41
Apron plux	27(81)	2(4)	121(121)	0(0)	1.37
Kombat	21(63)	5(10)	124(124)	0(0)	1.31
Cypermethrin	45(135)	10(20)	95(95)	0(0)	1.67
DD force	17(51)	6(12)	127(127)	0(0)	1.27
Pest off	15(45)	4(8)	131(131)	0(0)	1.89
Grand mean					1.47

VE = Very effective; E = effective; LE = Less effective; NE = Not effective
Source: Field survey, 2013

Table 4: Distribution of respondents based on the usage frequency of indigenous and chemical pest control measures

Control measures	VFU	FU	OU	SU	NU	Mean
Indigenous control						
Neem extract	0(0)	3(9)	3(6)	4(4)	140(0)	0.13
Wood ashes	1(4)	3(9)	2(4)	1(1)	143(0)	0.12
Cow dung	0(0)	0(0)	3(6)	0(0)	147(0)	0.04
Onions	0(0)	1(3)	5(10)	3(3)	141(0)	0.11
Traps	0(0)	14(42)	7(14)	5(5)	124(0)	0.34
Scare objects (Deruboko)	33(132)	19(57)	10(20)	4(4)	84(0)	1.35
Intercropping	23(92)	5(15)	5(10)	2(2)	115(0)	0.79
Fermented cassava water	0(0)	0(0)	1(2)	3(3)	146(0)	0.03
Grand mean						0.36
Chemical control						
Alderin dust	0(0)	1(3)	16(32)	9(9)	124(0)	0.29
Karate	0(0)	4(12)	26(52)	0(0)	120(0)	0.42
Vetox 75	0(0)	0(0)	15(30)	5(5)	130(0)	0.23
Phostoxin	0(0)	1(3)	17(34)	4(4)	128(0)	0.27
Apron plux	0(0)	1(3)	14(28)	4(4)	131(0)	0.23
Kombat	0(0)	0(0)	13(26)	4(4)	133(0)	0.20
Cypermethrin	0(0)	2(6)	30(60)	5(5)	113(0)	0.47
DD force	0(0)	0(0)	12(24)	3(3)	135(0)	0.18
Pest off	0(0)	0(0)	10(20)	3(3)	137(0)	0.15
Grand mean						0.27

VFU = Very frequently used; FU = frequently used; OU = occasionally used; SU = seldom used; NU = never used
Source: Field survey, 2013.

The grand mean score for the indigenous pest control measures was very low (0.36). This implies that these pest control measures were not frequently used. This may not be unconnected with the low level of education reported in Table 1 among the farmers. Also, the farmers' more frequent use of scare objects (Deruboko) could imply that it is a more reliable and effective pest control measure. Again, this finding conforms to the reports of Bishop *et al.* (2003); Sharp *et al.* (2004); Maurice *et al.* (2019) and Singh *et al.* (2022).

Similarly, all the nine chemical pest control measures for arable crops had low frequency of usage. Pest off, cypermethrin and karate that were highly perceived to be effective were observed to have low frequency of usage as pest control measures. Again, the grand mean score of frequency of usage of chemical pest control was very low (0.27). Generally, both the indigenous and chemical pest control measures had low grand mean scores. The low frequency of usage may be due to the generally low perception of their effectiveness for pest control. Munyuli et al. (2017) and Maurice et al. (2019) reported similar findings. This implies that since most of them did not use both pest control measures, most arable crops may be lost to pest at the farm or during storage and preservation levels. This could constitute a threat to household food security.

Constraints experienced by farmers in the use of pest control measures

The constraints experienced by farmers in the use of chemical and indigenous pest control measures in the study area are presented in Table 5. The three leading constraints identified by the respondents in order of importance for indigenous pest control measures were slow action /result, inadequate extension and training services and inadequate raw materials. Similarly, the respondent's ranking of the constraints associated with the usage of chemical pest control in order of importance were the difficulty of usage in the mixed cropping system, high cost of purchase, inadequate extension and training services and effects on crops and animals. This implies that the indigenous and chemical pest control measures had their peculiar constraints while the only leading common constraint to both measures was inadequate extension and training services.

Correlation analysis

The results of correlation analysis revealed negative correlation between respondents' age and frequency of usage of chemical pest control measures. This implies that the higher the farmer's age, the lesser the frequency of usage of chemical pest control. Also, significant relationships exist between years of formal education, annual income and farm size.

Table 5: Constraints associated with the indigenous and chemical pest control measures

Control measures	Agree		
	F	%	Ranking order
Indigenous control			
Slow action / results	135	90	1
Inadequate extension and training service	123	82	2
Inadequate raw materials	101	67	3
Only suitable for small scale farming	97	65	4
Environmental pollution	97	65	4
Tediousness of application	94	63	5
Usually ineffective	85	57	6
Not suitable for control of certain pests	81	54	7
Problem of transportation	79	53	8
Chemical control			
The difficulty of usage in the mixed cropping system	127	85	1
High cost of purchase	101	67	2
Inadequate extension & training services	92	61	3
Effects on crops and animals	91	61	3
Health hazard	89	59	4
Non-availability of chemicals	85	57	5
Lack of technical know-how	83	55	6
Poor handling of storage chemicals	73	49	7
Harmful side effects on non-target organisms	45	30	8

F = Frequency; % = percentage
Source: Field survey, 2013

Table 6: Relationship between farmers' socio-economic characteristics and frequency of usage of chemical and indigenous pest control measures

Variables	Chemical pest control		Indigenous pest control	
	Correlation coefficient (r)	Coefficient of determination (r^2)	Correlation coefficient (r)	Coefficient of determination (r^2)
Age	-0.310*	0.0961	0.292*	0.0905
Years of formal education	0.350*	0.1225	-0.082	0.0067
Annual income	0.224*	0.0502	-0.400	0.0196
Farm size	0.227*	0.0515	-0.262	0.0686
Farming experience	0.218*	0.0475	0.214*	0.0466

*Significant at 0.01 level
Source: Field survey, 2013

These results imply that the higher the years of formal education, annual income and farm size, the more the usage frequency of chemical pest control measures by arable crop farmers.

Similarly, there was a significant correlation between farmers' age and frequency of usage of indigenous pest control measures. This implies that the higher the age of farmers, the more they use indigenous pest control measures. Conversely, years of formal education, annual income and farm size had significant negative correlation with indigenous pest control measures. The inferences from these results are that the higher the years of formal education, annual income and farm size, the lesser the frequency of usage of indigenous pest control measures. Therefore, these variables should be given utmost consideration in any planned intervention to promote best practices in pest control measures among arable farmers.

CONCLUSION

The findings of the study revealed that despite the numerous indigenous and chemical pest control measures available for arable crop production/preservation in the study area, many were unknown to most farmers. The farmers encountered several constraints, many of which were associated with extension service delivery and uptake of research outcomes. The results of the study have policy implications for promoting global best practices in diversity and integrated pest control measures to enhance the quantity and quality of arable crop production and protect humans, animals, and the potentials of the ecosystem. Policy measures and research-extension efforts directed towards creating awareness and organize trainings for farmers on available pest control measures are of great importance to achieving food security and

making arable crop production more economically viable. Re-directing extension delivery services through policy formulation, law, and implementation with better private sector participation is more expedient than ever before.

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الملخص العربي

تقييم تدابير مكافحة الآفات التقليدية والكيميائية للمحاصيل الصالحة للزراعة في منطقة الحكومة المحلية إيجيجبو، ولاية أوسون ، نيجيريا

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لا يمكن المبالغة في التأكيد على أهمية تدابير مكافحة الآفات في إدارة خسائر ما بعد الحصاد وضمان الأمن الغذائي. حددت هذه الورقة تدابير مكافحة الآفات التقليدية والكيميائية المعروفة والمستخدمة من قبل المزارعين، وحددت تكرار استخدام المزارعين، والفعالية المتصورة للتدابير المستخدمة، وتقييم القيود التي يواجهها المزارعون. تم استخدام إجراء أخذ العينات متعدد المراحل لاختيار ١٥٠ مستجيبًا في خمسة مجتمعات واستخدم جدول مقابلة منظم للحصول على البيانات. كشفت النتائج أنه تم تحديد ثمانية تدابير محلية وتسعة إجراءات كيميائية لمكافحة الآفات من بين ٣٧ إجراءً مدرجًا. كان تواتر الاستخدام منخفضًا، بمتوسط درجات كبير بلغ ٠,٣٦ للقياسات الأصلية و٠,٢٧ للقياسات الكيميائية. في المقابل، كانت تدابير مكافحة الآفات الكيميائية أكثر فعالية من التدابير المحلية مع درجات ١,٤٧ و١,٢٦ على التوالي. كما أن عدم كفاية خدمات الإرشاد والتدريب كان العائق الرئيسي الوحيد الذي واجهه المزارعون في كلا التدبيرين. أظهرت نتائج تحليل الارتباط أن عمر المزارعين (r = -0.310) له علاقة سالبة معنوية مع تكرار استخدام المكافحة الكيماوية للآفات بينما سنوات التعليم النظامي (r = -0.082) والدخل السنوي (r = -0.400) وحجم المزرعة (r = -0.262) لهما علاقة سلبية معنوية مع تكرار الاستخدام لتكرار السكان المحليين لاستخدام المكافحة المحلية للآفات. في الختام، مع عدم استخدام معظم المزارعين للعديد من تدابير مكافحة الآفات التقليدية والكيميائية بالإضافة إلى عدم كفاية تقديم خدمات الإرشاد، فإن جودة وكمية المحاصيل الصالحة للزراعة المنتجة ستتأثر سلبًا. وبالتالي، فإن الأمن الغذائي واقتصاد الأسرة الريفية سيكونان في خطر إذا لم يتم التدخل السريع.