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# BURKINA FASO

Impact of fall armyworm on maize production, livelihoods  
and food security

DIEM-Impact report  
July 2023





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# Contents

Acknowledgements .....	v
Abbreviations and acronyms .....	vi
Executive summary .....	vii
Introduction .....	1
Global Action for Fall Armyworm Control.....	3
Objectives.....	4
Expected outcomes.....	5
Methodology.....	6
Step one: household survey.....	6
Step two: field scouting.....	6
Step three: yield assessment .....	7
Sampling framework .....	7
Results and discussions .....	11
Farming systems and hazards affecting crop production .....	11
Impact of FAW on maize production .....	19
Farming and FAW management practices.....	22
Knowledge of FAW .....	24
Access to information and training on FAW control .....	25
Livelihoods and vulnerability to FAW.....	26
Food security and coping strategies.....	27
Needs.....	30
Feedback from members of an FAO or GA supported FFS on FAW-IPM.....	31
Recommendations .....	33
Short-term recommendations.....	33
Long-term recommendations.....	33
References.....	34
Annexes.....	35
Annex I.....	35
Annex II.....	37

## Figures

Figure 1. Severity of FAW damage in the 2020–2021 growing season in West Africa and the Sahel.....	2
Figure 2. FAW assessment activities in relation to the maize cropping cycle.....	7
Figure 3. Percentage of farmers that grow maize as their main crop.....	11
Figure 4. Proportion of maize farmers by planted area of maize during the mid-season and harvest period.....	12
Figure 5. Percentage of households practicing selected agricultural practices.....	13
Figure 6. Use of fertilizer by maize farmers.....	14
Figure 7. Main source of income of maize growers.....	14
Figure 8. Shocks experienced by the maize farmers over the last season.....	16
Figure 9. Crop production difficulties across the three regions (percentage of respondents)	17
Figure 10. Perception of FAW infestation from 2018 to 2022 across the three regions.....	19
Figure 11. FAW incidence by sampled provinces.....	19
Figure 12. Estimated yield loss due to the main crop production difficulty – lack of access to fertilizer – reported by households.....	22
Figure 13. Average yield loss due to FAW by standardized household agricultural expenditures quintiles.....	24
Figure 14. HDDS across the three regions.....	28
Figure 15. HHS across the three regions.....	29
Figure 16. LCSl.....	30
Figure 17. Needs for assistance.....	31

## Tables

Table 1. FAW impact assessment sample distribution.....	8
Table 2. Level of damage per province.....	20
Table 3. Distribution of the mean level of FAW incidence by level of damage on whorls and leaves.....	20
Table 4. Predictors of yield loss resulting from the linear regression across the three regions	21
Table 5. Specific responses provided by maize farmers in the knowledge test – the correct responses have been provided in red.....	25
Table 6. Sources of information, advice or support for the management of FAW accessed by farmers.....	26
Table 7. Percentage of household food consumption coming from self-production.....	27
Table 8. Reasons for not applying knowledge gained (percentage of respondents).....	32

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## Abbreviations and acronyms

<b>AAW</b>	African armyworm
<b>CCE</b>	crop cutting experiment
<b>CH</b>	Cadre Harmonisé
<b>CHIRPS</b>	Climate Hazards Center at the University of Southern California Santa Barbara
<b>DGESS</b>	Division of Studies and Statistics
<b>DGPV</b>	Division of Plant Production and Plant Protection
<b>DIEM</b>	Data in Emergencies Information System
<b>FAMEWS</b>	Fall Armyworm Monitoring and Early Warning System
<b>FAO</b>	Food and Agriculture Organization of the United Nations
<b>FAO-BF</b>	FAO Representation in Burkina Faso
<b>FAOSFW</b>	FAO Subregional Office for Western Africa
<b>FAW</b>	fall armyworm
<b>FIES</b>	Food Insecurity Experience Scale
<b>FFS</b>	Farmer Field School
<b>GA</b>	Global Action
<b>HDDS</b>	Household Dietary Diversity Score
<b>HHS</b>	household hunger score
<b>IPM</b>	integrated pest management
<b>LCSI</b>	livelihood coping strategies index
<b>NGO</b>	non-governmental organization
<b>NSP</b>	Plant Production and Protection Division (FAO)
<b>OER</b>	Office of Emergencies and Resilience (FAO)
<b>RFI</b>	recent food insecurity
<b>RPCA</b>	The Food Crisis Prevention Network
<b>USDA</b>	United States Department of Agriculture
<b>VIF</b>	variance inflation factor

## Executive summary

Native to the tropical and subtropical regions of the Americas, FAW, *spodoptera frugiperda*, was introduced in Africa in 2016 and then spread across Africa (Day *et al.*, 2017). The geographic expansion of FAW to West Africa and the Sahel region was fast paced, despite the efforts of the Governments and their partners to limit its spread.

Since its appearance in 2016, fall armyworm has spread to many countries and remains one of the main threats to agriculture and food security in Africa, causing around 73 percent maize yield loss, a cereal on which 208 million people in the region depend, corresponding to USD 9.8 billion loss (FAO, 2021).

Impacts in terms of FAW damage reduction have been seen in Burkina Faso over recent years, where the percentage of maize area seriously affected by FAW and yield losses has reduced (FAO, 2022). However, yield losses were still estimated to be between 5 and 15 percent in 2022 (Ministry of Animal and Fisheries Resources [MRAH], 2023). The overall objective of this study was to assess the impact of FAW on maize production, and the livelihoods and food security of maize farmers in Burkina Faso. The specific objectives were to:

- Establish the magnitude and severity of FAW maize infestations as the main food crop. Determine the level of damage of FAW infestations on plants while considering the occurrence of other pests and hazards.
- Determine the impact of FAW infestations on maize yield.
- Determine the impact of FAW infestations on farmers' livelihoods and food security due to actual crops losses and to resources mobilized to fight the pest.
- Understand the different control measures adopted by farmers and their efficiency.
- Identify and profile cropping systems and farmers more vulnerable to the impacts of FAW.
- Identify farmers' priorities and needs for the next cropping seasons.
- Provide recommendations for action.

The study targeted the following three regions in Burkina Faso: Centre-Ouest, Hauts-Bassins and Sud-Ouest. A total of 732 farmers were interviewed, (233 in Centre-Ouest, 243 in Hauts-Bassins, and 256 in Sud-Ouest). This impact assessment follows a methodology developed by OER's Data in Emergencies Information System (DIEM) team, articulated in three steps: a household survey, a scouting exercise to measure the level of FAW infestation, and a crop cutting experiment (CCE) conducted at harvest time to determine the yields.

The study determined that:

- The most practiced interventions to control FAW across all regions were: regular monitoring of maize after germination to check for signs of FAW (66 percent) and

application of synthetic pesticide (64 percent), followed by timely planting (23 percent), regular weeding (14 percent), crop rotation (14 percent) and hand picking (9 percent). No respondents reported the use of practices such as push-pull, pheromone traps and biocontrol.

- Approximately 94 percent of respondent households reported crop production difficulties like access to fertilizer (54 percent), pest outbreak (19 percent) and plant diseases (7 percent).
- Approximately 93 percent of the visited plots were infested by FAW at the time of field scouting, with an average of 25 percent of maize plants affected in the selected plot.
- Based on the results of the regression on FAW incidence, the two most influential factors on FAW incidence were previous damage, meaning that the higher the previous damage, the higher the FAW incidence, and altitude, meaning that the higher the altitude, the lower the FAW incidence. In addition, increases in density, earlier planting dates, presence of pathogens and control of predators and FAW are all farming practices that allow for better yield based on our regression.
- There is still margin for improving the knowledge of the farmers, in terms of capacity to recognize FAW, but also the appropriate time to start scouting and what time of day is more effective for applying pesticide. Overall, maize farmers in Sud-Ouest seem to have better knowledge across the various elements for which they were tested, when compared to farmers in Hauts-Bassins and Centre-Ouest.
- According to the household hunger score (HHS), 92 percent of the households experienced little to no hunger, 5 percent experienced moderate hunger and 3 percent experienced severe hunger.
- The Food Insecurity Experience Scale (FIES) highlights a situation of food insecurity which is higher in Centre-Ouest compared to the other two regions. There is a significant and positive correlation between yield loss due to FAW and the prevalence of recent moderate or severe household food insecurity. The more yield loss due to FAW, the higher the percentage of households affected by recent food insecurity (RFI) at moderate or severe levels.
- There is a significant difference between households classified at the crisis level of the livelihood coping strategies index (LCSI) (with a mean yield loss due to FAW of 524 kilograms/ha) and those using no coping strategies (losses of 352 kilograms/ha).
- About 78 percent of the maize farmers declared the need for assistance in the three to six months following the survey, in particular crop inputs (79 percent), training (39 percent) and cash (38 percent).
- With respect to the farmers who are members of an FAO or Global Action (GA) supported Farmer Field School (FFS) or FAW-IPM group, the majority (35 percent) declared that the lessons learned from the FFS sessions, in terms of managing FAW on maize crops, were very useful, 29 percent thought that the information was quite useful, and about 16 percent thought it was a little useful. The knowledge gained was used in a partial way by 36 percent and completely by 35 percent. The reasons behind the partial use of the knowledge gained were associated with the fact that it was too

late to implement the recommendations received (72 percent) and the lack of money (26 percent).

Based on the results, the following term recommendations emerged:

#### Short-term recommendations

- Centre-Ouest is where most of the households employ emergency coping strategies. There may be additional difficulties beyond FAW to explain this. Additional support outside of FAW, such as cash and food assistance, should be provided to farmers in Centre-Ouest.

#### Long-term recommendations

- Awareness and knowledge of best practices on how to control FAW should be boosted across all regions. There is room to improve the farmers' capacity to recognize FAW, their knowledge of the appropriate time to start scouting, and the most effective time of day to apply pesticide.
- Rural media are among the preferred sources of information on best practices to manage FAW. However, their use is still limited, and extension services should be leveraged over rural media to boost farmers' need for information.
- Access to fertilizer has become a more pronounced crop production difficulty in the last season compared to the previous five years. Conduct further assessments to understand the challenges accessing fertilizer.
- Results from the study show that the presence of pathogens and control of predators allow for better yield. Practices that conserve natural enemies, such as reduction of pesticide use, should be highlighted in future training and communication on FAW IPM.



# Introduction

Native to the tropical and subtropical regions of the Americas, FAW, *spodoptera frugiperda*, was first detected in early 2016 in Sao Tome and Principe (Central Africa), and Nigeria, Benin and Togo (West Africa). The geographic expansion of FAW across West Africa and the Sahel region was fast paced, despite the efforts of the Governments and their partners to limit its spread. In late 2016 and early 2017, FAW was observed in the following countries: Angola, Botswana, Burundi, Democratic Republic of Congo, Ethiopia, Ghana, Kenya, Malawi, Mozambique, Namibia, Niger, Rwanda, Sierra Leone, South Africa, Tanzania, Uganda, Zambia and Zimbabwe.

FAW was detected for the first time in Burkina Faso in October 2017 (FAO, 2021). Impacts in terms of FAW damage reduction have been seen in Burkina Faso over recent years, where the percentage of maize area seriously affected by FAW and yield losses has reduced (FAO, 2022). However, yield losses were still estimated to be between 5 and 15 percent in 2022 (MRAH, 2023).

As shown in Figure 1, the severity of FAW damage during the 2020–2021 growing season ranged from high to critical for the sub-region. Cabo Verde, Cote d'Ivoire, Guinea Bissau, Liberia, Mauritania and Sierra Leone reported critical levels of damage, and Burkina Faso reported a very high level of damage. The reported cumulative damage mainly affected maize.

Since its first appearance in 2016, FAW has spread in many countries and remains one of the main threats to agriculture and food security in Africa. FAW has caused around 73 percent maize yield loss, a cereal on which 208 million people in the region depend, corresponding to USD 9.8 billion in losses (FAO, 2021). The situation was further exacerbated by the COVID-19 pandemic, because the provision of technical assistance and support to farmers was limited or non-existent.

Among the countries affected by FAW in West Africa and the Sahel, Burkina Faso was selected for this assessment based on the data of the Cadre Harmonisé that indicated twelve percent of the population were in phase 3+ (The Food Crisis Prevention Network [RPCA], 2023) over the second half of 2022, the highest in West Africa. The selection of Burkina Faso was based on the following additional criteria:

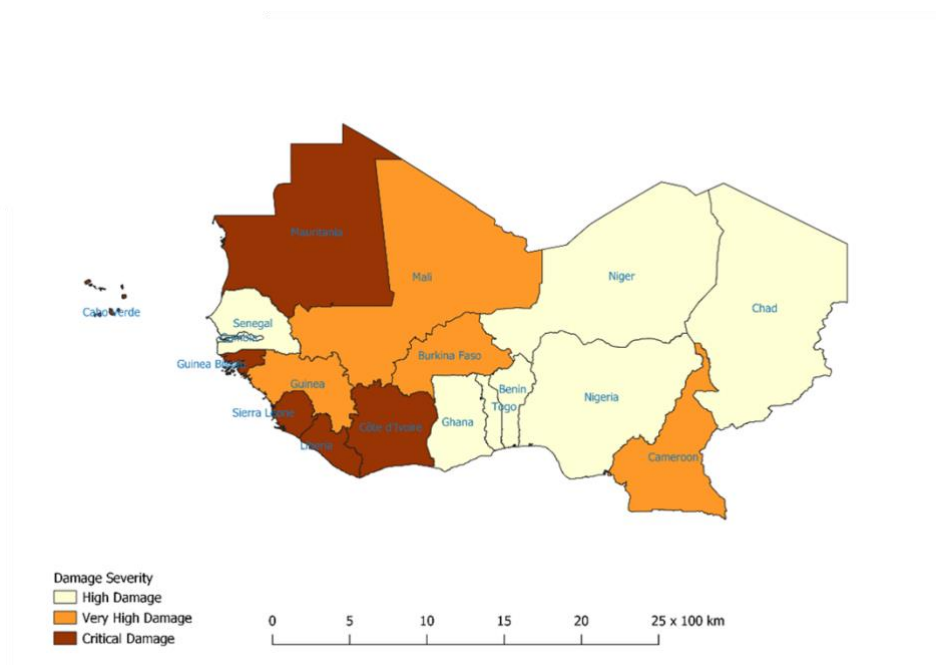
- *Production level of maize.* Burkina Faso recorded a production level of about 2 million tonnes of maize in 2022 (US Department of Agriculture [USDA], 2023).
- *Level of FAW infestations this season.* The maize surface infested by FAW in Burkina Faso has shrunk from 2018 to 2022 overall (FAO, 2022). However, yield losses were still estimated to be between 5 and 15 percent in 2022 (MRAH, 2023).
- *Level of recorded or estimated crop losses due to FAW.* Based on estimates from the GA, the estimated maize yield losses due to FAW were between 5 and 15 percent, a slight decrease compared to the previous four years.

- *Presence of other environmental shocks.* Burkina Faso is a particularly vulnerable country, and is often exposed to a combination of shocks and risks including drought, flood and insecurity.
- *Risk of FAW infestations causing an impact on food security according to the FAW-Risk map (FAO, 2020).*
- *The capacity and availability of decentralized services of the Ministry of Agriculture to participate in the survey.*
- *The presence of the Global Action for Fall Armyworm control.* To counter the FAW threat, FAO initiated the Global Action for Fall Armyworm Control to ensure a strong coordinated approach at national, regional and global levels. Among the initiatives of the Global Action for Fall Armyworm Control aimed at Burkina Faso, studies were developed on biological control options.<sup>1</sup>

Other initiatives to control FAW in Burkina Faso included, for example, maize tolerant hybrid varieties studied by the International Wheat and Maize Improvement Centre, and extension and training initiatives, such as FFS.

Despite the efforts to contain the spread of FAW and limit its impact in Burkina Faso, more studies must be conducted to better understand and frame the impacts of FAW on the livelihoods of the vulnerable population.

Figure 1. Severity of FAW damage in the 2020–2021 growing season in West Africa and the Sahel



**Source:** ECOWAS *et al.* 2021. West Africa and the Sahel: FAW regional coordination meeting [internal presentation]. 8 October 2021. Map conforms to UN Geospatial. 2021. *Severity of FAW damage in the 2020–2021 growing season in West Africa and the Sahel*. New York, United States of America.

<sup>1</sup> Studies included: establishment of science-based data for the adaptation of IPM technologies; evaluation of the efficacy of local strains of entomopathogens against FAW; the identification of FAW tolerant varieties; evaluation of the biological control potential of local arthropod natural enemies; development of a methodology for mass production of the parasitoid *Telenomus remus*; evaluation of the efficacy of mass trapping (conventional traps) and the use of biopesticides; etc. (FAO, 2021).

## Global Action for Fall Armyworm Control

The Global Action for Fall Armyworm Control was launched in December 2019 to provide a global coordination mechanism for enhanced prevention, preparedness and, eventually, management of FAW.

The GA established a global coordination mechanism for open and collaborative dialogue around science-based solutions. This coordination mechanism consists of a Steering Committee, a Working Group on Resource Mobilization, a Technical Committee, and seven Technical Working Groups. In addition, National Task Forces on FAW at country level have been established and are receiving technical and financial support from the GA. Technical oversight for the GA is provided by FAO's NSP through the FAW Secretariat with the support of the International Plant Protection Convention Secretariat.

Eight demonstration countries have been identified in which regional IPM strategies are currently being developed – Burkina Faso, Cameroon, China, Egypt, India, Kenya, Malawi and the Philippines. These regional IPM strategies will consider input from the 54 pilot countries surrounding the demonstration countries. Efforts for capacity development, such as FFS, are underway in the demonstration countries and selected pilot countries. All pilot countries will benefit from the GA through online training and information sharing sessions conducted by the demonstration countries. As a demonstration country for Western Africa, efforts are underway in Burkina Faso for IPM technology validation, capacity enhancement and information sharing with other countries in the geographic zone.

## Objectives

The overall objective of this study was to assess the impact of FAW on maize production, and the livelihoods and food security of maize farmers in Burkina Faso. The specific objectives were to:

- Establish the magnitude and severity of FAW maize infestations as the main food crop. Determine the level of damage of FAW infestations on plants while considering the occurrence of other pests and hazards.
- Determine the impact of FAW infestations on maize yield.
- Determine the impact of FAW infestations on farmers' livelihoods and food security due to actual crops losses and to resources mobilized to fight the pest.
- Understand the different control measures adopted by farmers and their efficiency.
- Identify and profile cropping systems and farmers more vulnerable to the impacts of FAW.
- Identify farmers' priorities and needs for the next cropping seasons.
- Provide recommendations for action.

This list of specific objectives has been complemented by the analysis of the impact of the Global Action for Fall Armyworm Control, through ad hoc questions and tools.

In addition, through this study, a refined approach has been identified to scale-up to other countries that can provide useful data for potential calibration and update the FAW food insecurity risk map.<sup>2</sup>

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<sup>2</sup>The FAWRisk-Map incorporates diverse socio-economic and agro-ecological data so that responders can visualize where the underlying risk of household food insecurity due to FAW is highest (FAO, 2023).

## Expected outcomes

Stakeholders and policy makers in Burkina Faso are more informed of the impact that FAW has on the livelihoods of the affected population, and are able to develop more targeted strategies and policies to address these impacts, and strengthen their resilience.

A technically sound approach to assess the impact of FAW is consolidated, providing more systematic and scaled up assessments.

# Methodology

This impact assessment follows a methodology developed by DIEM articulated in three steps (Figure 2) including a household survey, a field scouting exercise to measure the level of FAW infestation and a CCE at harvest time to determine the yields. The approach built upon the FAW-Impact assessment set of tools developed by FAO's OER in partnership with NSP in 2017 (FAO, 2017). This set of tools can be replicated across other countries at global level.

## Step one: household survey

The household survey was administered to maize farmers a few weeks before the maize harvest when the crop was still standing and farmers had an idea of the harvest they could expect. Information collected through the survey referred to the household as a whole, not to a single member of the household.

The household questionnaire included questions on:

- Household profile, livelihoods and main income source;
- Main crop grown and crop production difficulties;
- Shocks and hazards;
- Cultural and FAW control practices on a selected maize plot;
- Knowledge of FAW and control practices;
- Access to information and training on FAW control;
- Food security indicators such as FIES, the Household Dietary Diversity Score (HDDS), HHS, and the LCSJ; and
- Needs for assistance.

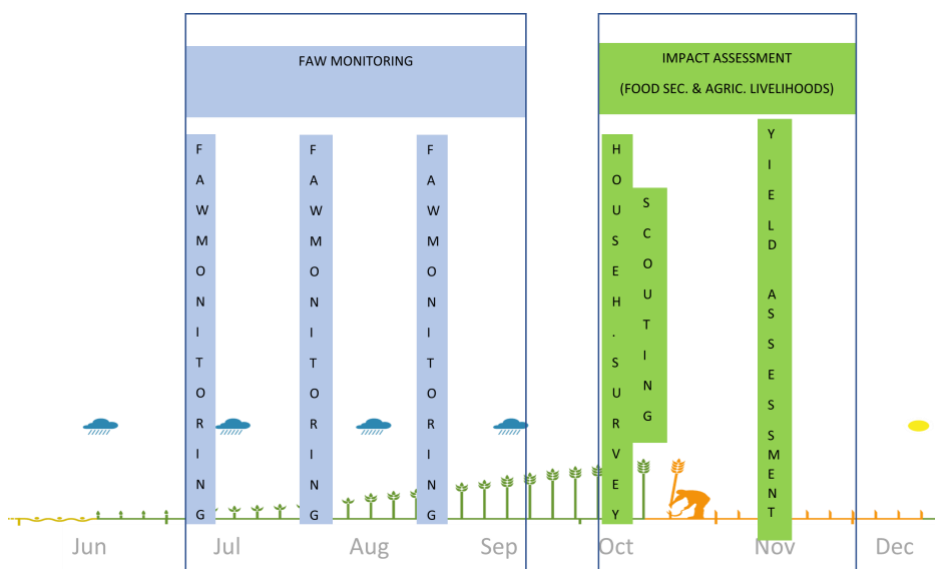
## Step two: field scouting

Field scouting was conducted in parallel with the household survey, using the FAO developed and deployed Fall Armyworm Monitoring and Early Warning System (FAMEWS) form, to capture the infestation level while pests were still present.<sup>3</sup> It was conducted before the crop become dry and when signs of pest and infestation were still present on the plants.

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<sup>3</sup> Through the FAMEWS app and platform, FAW data can be collected at farm level and collated to share at local, national and global levels in order to manage the pest, identify priority areas and foster early warning mechanisms for stakeholders (FAO, 2023).

Figure 2. FAW assessment activities in relation to the maize cropping cycle



Source: FAO. 2023. Burkina Faso: Impact of fall armyworm on maize production, livelihoods and food security – DIEM-Impact report, July 2023. In: *FAO Data in Emergencies Hub*. Rome. Cited 27 June 2023. [data-in-emergencies.fao.org](https://data-in-emergencies.fao.org)

### Step three: yield assessment

During this assessment, the yield is measured. The yield assessment was implemented at harvest time using CCE methodology (FAO, 2018). Two questionnaires were used. The first questionnaire captured information necessary to estimate loss and moisture rate, and the second captured information necessary to estimate yield loss through the CCE.

### Sampling framework

#### Study population – survey

The data collection for the household survey and field scouting took place between 3 October and 31 October 2022. The CCE took place between 18 October and 30 November 2022. The assessment was conducted during the mid-season and harvest period in Burkina Faso in the following three regions: Centre-Ouest, Hauts-Bassins and Sud-Ouest. The first region was moderately affected. The latter two were strongly affected by the presence of FAW and are considered hotspots.

Maize farmers were randomly selected in FAW hotspots and moderately affected areas. The assessment followed a stratified two-stage sample.

The sample size was calculated with the following formula:

$$n_{SRS} = \frac{z^2 * r * (1 - r)}{e^2} \times def$$

where:

- $n$  is the sample size in terms of the number of households to be selected
- $z$  is the statistic that defines the level of confidence desired (1.96 for the 95 percent confidence level)

$r$  is an estimate of the key indicator to be measured by the survey (taking 0.5 to maximize  $n$ )  
 $e$  is the margin of error desired (10 percent)  
 $deff$  is the design effect of clustering at 1.8

The sample size for each stratum was calculated considering a response rate of 100 percent in the field. The calculation of minimum sample sizes for clusters of five households yielded a minimum sample size of 175 households per regional stratum. To compensate for any risk of drop-off through the three steps of data collection, an oversample was incorporated, and the sample size increased to 245 households in each stratum.

The final sample size was 732 households (Table 1). The households interviewed in the household survey and field scouting were later interviewed for the CCE.

**Table 1. FAW impact assessment sample distribution**

Region	Number of households
Hauts-Bassins	243
Sud-Ouest	256
Centre-Ouest	233
<b>Total</b>	<b>732</b>

Source: FAO. 2023. Burkina Faso: Impact of fall armyworm on maize production, livelihoods and food security – DIEM-Impact report, July 2023. In: *FAO Data in Emergencies Hub*. Rome. Cited 27 June 2023. [data-in-emergencies.fao.org](https://data-in-emergencies.fao.org)

Data collection was done electronically on tablets. The surveys were pre-loaded into the KoBo Toolbox and were accessible to enumerators on tablets and smartphones on Kobo Collect.

The DGPV was responsible for identifying the zones of study and households, administration of the household questionnaire and field data collection. The DGESS contributed to data cleaning, analysis and interpretation.

### Data analysis

Quantitative analysis was conducted using primarily descriptive and inferential statistics performed through Stata. The data from the different surveys were then merged. Data on rainfall (in millimetres) were added from the Climate Hazards Center at the University of California Santa Barbara (CHIRPS) InfraRed Precipitation Station data (2018), using the average rainfall between the months of May and October 2022, the plant growing season for the targeted areas. The time period included a month preceding plant growth, as studies show that it can affect the growth of FAW (Paudel Timilsena *et al.*, 2022).

Multiple linear regressions were performed to understand the influence of different factors on the incidence of FAW and yield. Prior to conducting the regression analysis, the correlation of predictors was verified to avoid issues of multicollinearity within the models.

Two different regressions were run on the incidence of FAW and maize yield. Both regressions were run with different models to identify the model that fit the data better.

Multiple linear regression analysis was used with different sets of variables to identify the factors that contribute to higher yield losses due to FAW as well as factors that contribute to optimal management and control of FAW (see Annexes I and II). The formula is expressed as:

$$y_i = \alpha + \beta_1 x_{1,i} + \beta_2 x_{2,i} + \dots + \beta_n x_{n,i} + \beta x_i + \varepsilon_i$$

where:

$y_i$  represents the maize yield or FAW incidence for a given household  $i$   
each  $x_i$  represents a regressor or predictor, with the associated coefficient  $\beta$   
and  $\varepsilon_i$  is a random error term

The key indicator used to measure the contribution of FAW to yields is FAW incidence. In addition, other indicators were included as predictors in the model to estimate the contribution of the different factors to yields, including density, farming practices and expenditures on agriculture, among others.

In addition, the variance inflation factor (VIF) was used post-regression to test for multicollinearity of the independent variables. The VIF values were below five for all variables implying a lack of multicollinearity among the selected variables. Chi-squared ( $\chi^2$ ), ANOVA tests and t-tests were also used to compare the significance of categorical variables and continuous variables, where relevant. Qualitative interviews were transcribed and analysed thematically.

The dependent variable for the first regression, incidence of FAW (in percentages), was computed using data from the field scouting survey. Enumerators were asked to randomly select and inspect five rows in different areas of the plot. They gathered information on the general state of the parcel and checked a minimum of ten plants for the presence of FAW in each row selected. The information was then used to compute the FAW incidence as:

$$FAW_{incidence} = \frac{\text{total \# of plants with presence of FAW}}{\text{total \# of plants inspected}}$$

For the dependent variable of the second regression, dry yield of maize, information from the CCE was used. During the follow-up, enumerators were asked to randomly place a 25 metre square crop cutting square in the parcel using stocks and string.<sup>4</sup> The enumerators gathered information on the net weight (kilograms) of the harvested crop (after threshing and winnowing) in the predefined square, the weight of the sample of grains (in grams) and the moisture rate. The weight of the sample and the moisture

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<sup>4</sup> To randomize the process, enumerators had to start from the most southern point of the plot, walk along the side with the plot on their right, and follow a randomly generated number of steps by Kobo Collect. They then had to enter the plot perpendicularly following another randomly generated number of steps.

weight were used to compute the dry weight. Estimates of weight for missing data were computed using the average moisture rate by the number of days of growth.

### Limitations

Unintentional reporting bias may have been introduced due to recall as respondents were asked about practices in place and the presence of FAW in the five years preceding the interview. Careful selection of the questions, testing of tools prior to data collection for clear understanding and in-depth enumerator training were employed to mitigate these potential limitations.

The study makes use of rating scales to capture how intense the attack of FAW on a plot was perceived to be by a maize farmer, along with rain performance, level of losses caused by a hazard, changes in maize harvest and changes in food expenditures.

Intervals between points on the scale do not present equal changes in attitude for all individuals. For example, the differences between “much lower” and “lower”, and even internal consistency of the scale may be difficult to achieve. Furthermore, it is assumed that the difference between “much lower” and “lower” is the same as the difference between “lower” and “similar”, for example, and all other adjacent pairs.

Rating scales are subject to outlier confusion. Respondents could be tempted to assign outlier responses. To mitigate this potential limitation, prior testing of the tools before data collection was conducted along with in-depth training of enumerators to ensure respondents would be allowed to elaborate on the magnitude of the change, and to be able to capture the nuances of the change or the intensity of the attack.

FAW infestation refers to the presence of an unusually large number of FAW to, typically, cause damage. A value of zero was assigned to plots that did not present FAW infestation, and a value of one was assigned to plots that presented FAW infestation.

FAW incidence is defined as the extent of infestation on maize plants in the field. It was calculated by expressing the number of infested plants as a percentage of the total number of plants in the field.

FAW damage refers to physical harm to crops in whorl and leaves caused by FAW which might lead to a different degree of reduced plant health.

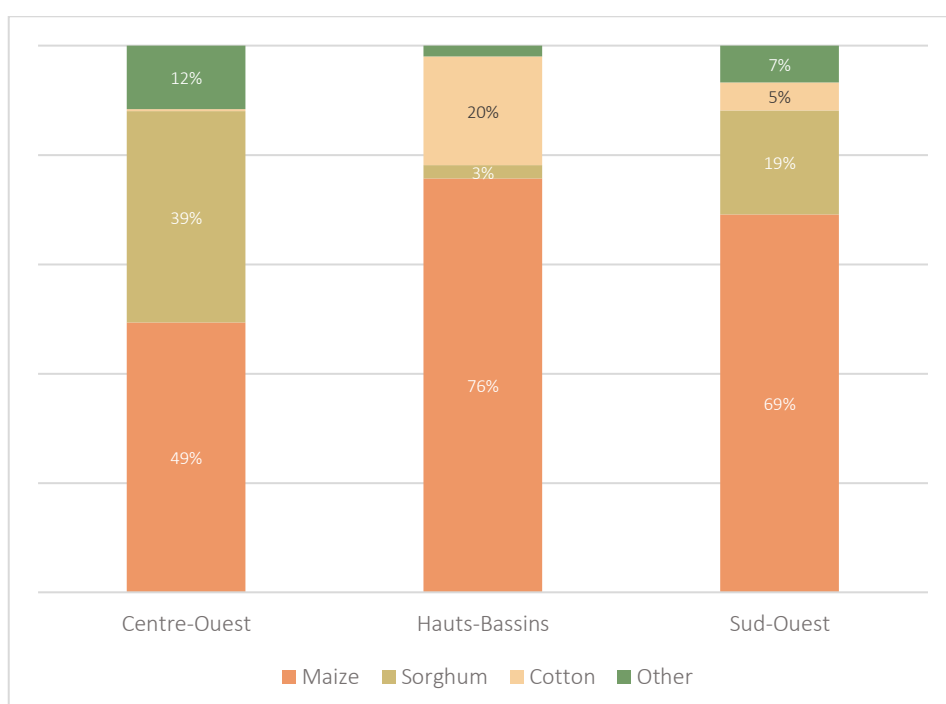
# Results and discussions

## Farming systems and hazards affecting crop production

### Main crops

Figure 3 provides the percentage of farmers that grow maize as their main crop. In Hauts-Bassins, it is estimated that 76 percent of farmers grow maize as their main crop, 69 percent in Sud-Ouest, and 49 percent in Centre-Ouest. The difference in prevalence of farmers growing maize is found to be statistically significant between Centre-Ouest and the other two regions. Sorghum follows maize, especially in Centre-Ouest (39 percent), and cotton is the third main crop produced, especially by farmers in Hauts-Bassins.

Figure 3. Percentage of farmers that grow maize as their main crop



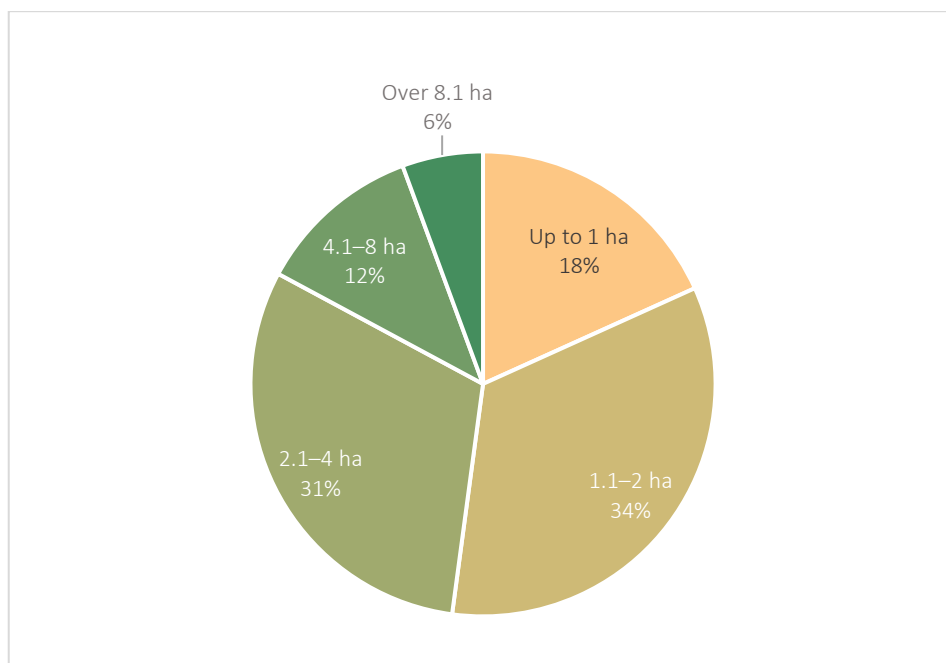
Source: FAO. 2023. Burkina Faso: Impact of fall armyworm on maize production, livelihoods and food security – DIEM-Impact report, July 2023. In: *FAO Data in Emergencies Hub*. Rome. Cited 27 June 2023. [data-in-emergencies.fao.org](https://data-in-emergencies.fao.org)

The majority of the farmers grow an improved variety of maize (64 percent), in particular in Centre-Ouest (69 percent), followed by Sud-Ouest (62 percent) and Hauts-Bassins (58 percent). About 38 percent of farmers grow local varieties, indicating that there is a small percentage of farmers (2 percent) that grow both local and improved varieties of maize.

## Farming practices to prevent or control FAW

About a third of the farmers cultivating maize as their main crop planted small areas between 1.1 and 2 ha (34 percent) and a third between 2.1 and 4 ha (Figure 4).

Figure 4. Proportion of maize farmers by planted area of maize during the mid-season and harvest period

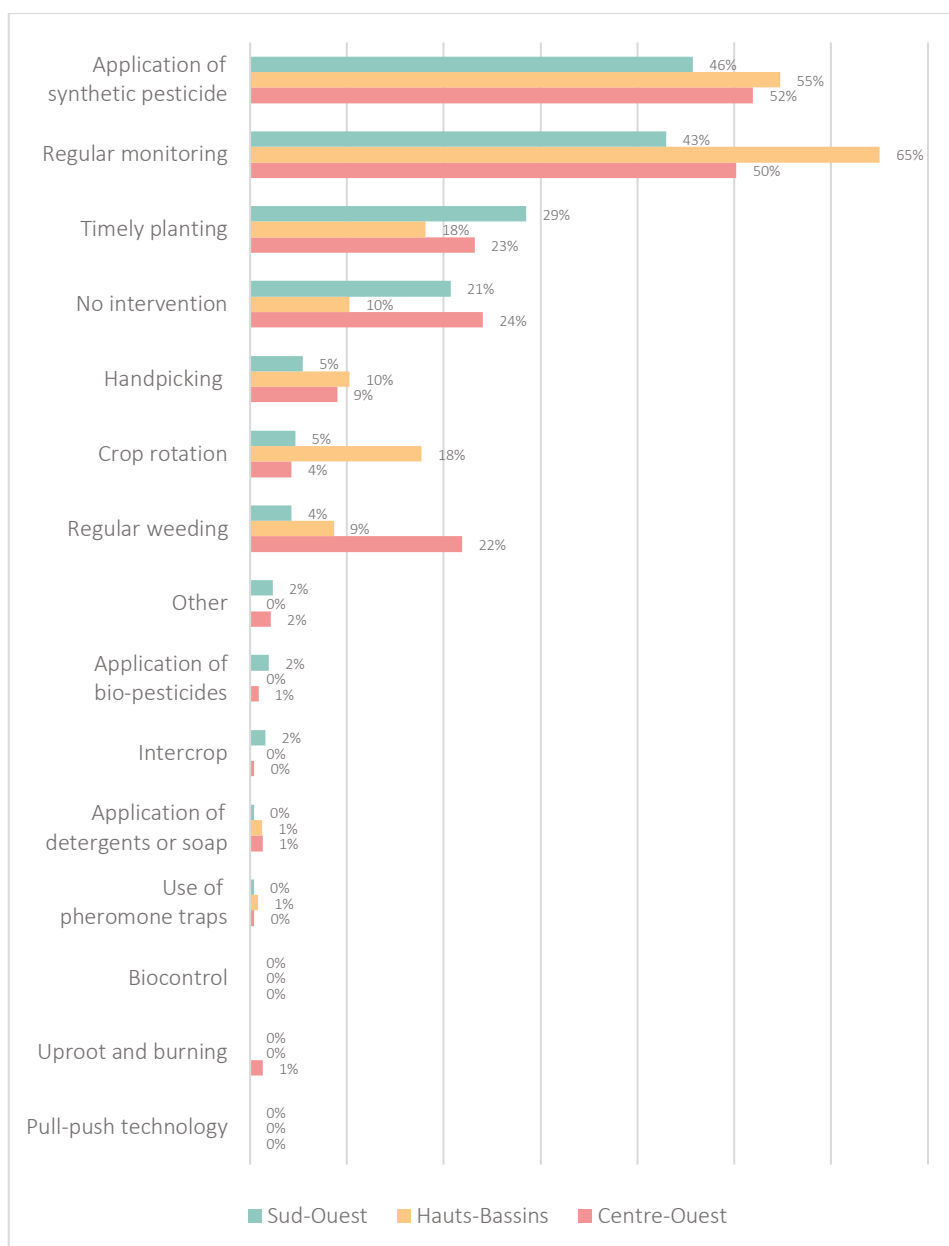


Source: FAO. 2023. Burkina Faso: Impact of fall armyworm on maize production, livelihoods and food security – DIEM-Impact report, July 2023. In: *FAO Data in Emergencies Hub*. Rome. Cited 27 June 2023. [data-in-emergencies.fao.org](https://data-in-emergencies.fao.org)

The farming practices in place to prevent or control FAW on the maize plots across the three regions have been provided in Figure 5. Overall, there is a significantly higher number of farmers implementing practices to prevent or control FAW in Hauts-Bassins when compared to the other two regions, which was confirmed by the Tukey's test. For farmers applying measures, the most practiced interventions across all regions were the regular monitoring of maize after germination to check for signs of FAW (66 percent) and the application of synthetic pesticide (64 percent), followed by timely planting (23 percent), regular weeding (14 percent), crop rotation (14 percent) and hand picking (9 percent). Crop rotation and timely planting were rated as the most efficient interventions by farmers using these practices. Application of synthetic pesticide received the lowest rating in terms of efficiency, with only 53 percent of farmers qualifying it as efficient.<sup>5</sup> No farmers adopted practices such as push-pull, pheromone traps and biocontrol. Nevertheless, the field scouting exercise revealed the presence of natural enemies (42 percent), with a significantly lower presence of natural enemies in Hauts-Bassins (33 percent) than in the other regions.

<sup>5</sup> For those interventions with sufficient respondents. For those with insufficient respondents, the efficiency ratings were intercropping (85 percent; 12 respondents); biopesticides (53 percent; 10 respondents); handpicking (36 percent; 62 respondents); and detergent (27 percent; 13 respondents).

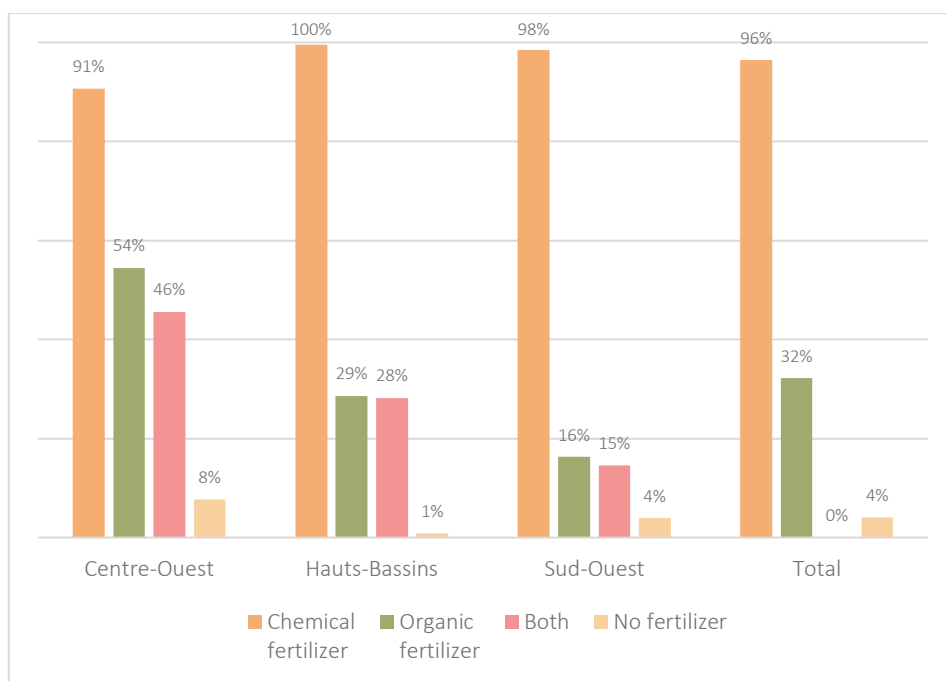
Figure 5. Percentage of households practicing selected agricultural practices



Source: FAO. 2023. Burkina Faso: Impact of fall armyworm on maize production, livelihoods and food security – DIEM-Impact report, July 2023. In: *FAO Data in Emergencies Hub*. Rome. Cited 27 June 2023. [data-in-emergencies.fao.org](https://data-in-emergencies.fao.org)

Nearly all respondents reported the use of fertilizer (97 percent). The majority used chemical fertilizer (94 percent) and a third used organic fertilizer (32 percent) (Figure 6).

Figure 6. Use of fertilizer by maize farmers

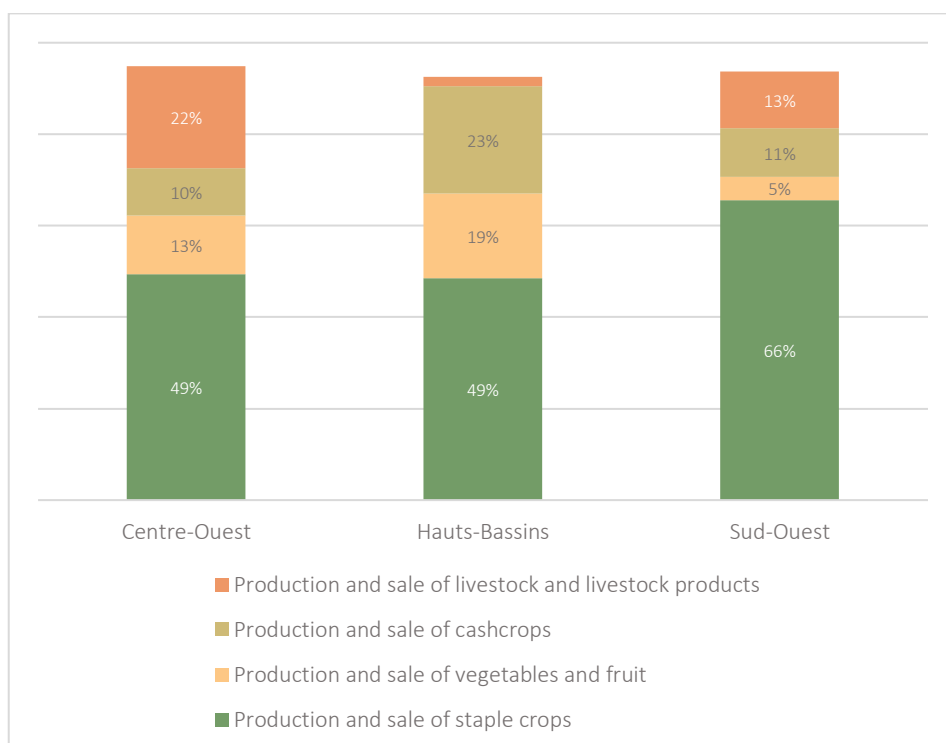


Source: FAO. 2023. Burkina Faso: Impact of fall armyworm on maize production, livelihoods and food security – DIEM-Impact report, July 2023. In: *FAO Data in Emergencies Hub*. Rome. Cited 27 June 2023. data-in-emergencies.fao.org

### Livelihoods and sources of income of respondents

The highest percentage of households practicing mixed crop and livestock production was found in Centre-Ouest (85 percent) (Figure 7).

Figure 7. Main source of income of maize growers



Source: FAO. 2023. Burkina Faso: Impact of fall armyworm on maize production, livelihoods and food security – DIEM-Impact report, July 2023. In: *FAO Data in Emergencies Hub*. Rome. Cited 27 June 2023. data-in-emergencies.fao.org

In the 12 months preceding the survey, maize was sold by 50 percent of respondents, on average. The highest number of respondents were found in Hauts-Bassins (64 percent), followed by Sud-Ouest (47 percent) and Centre-Ouest (31 percent).

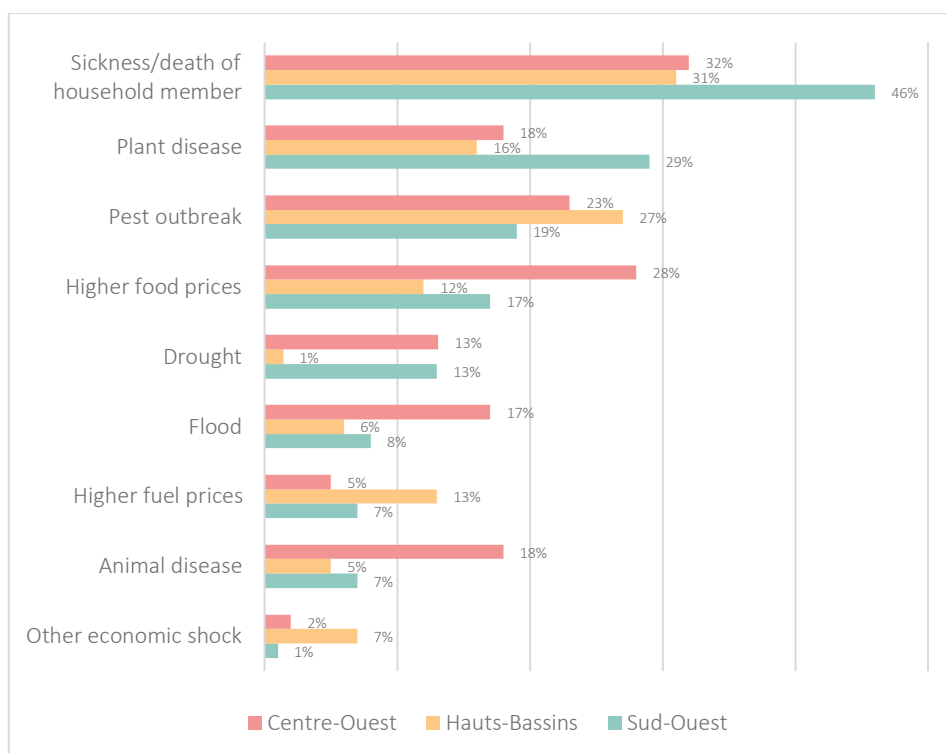
Over half of the households that sold harvested maize (54 percent) reported selling 40 percent or less of it. For about 23 percent, the percentage of the total harvested maize sold was equal to, or more than, 60 percent. Sixty-three percent of the households that sold maize declared that the income from the sale of maize represented 40 percent or less of their total household income. Only around 16 percent of households declared that the sale of maize contributed to over 60 percent of their total household income.

The share of maize kept for household consumption was between 40 and 60 percent for 27 percent of the households reporting sales of their harvested maize (32 percent in Hauts-Bassins, 22 percent in Centre-Ouest and 19 percent in Sud-Ouest). About 33 percent declared that the share of the total maize consumed represents an important part, or the entirety of, the total maize harvested (i.e. over 60 percent of the total harvest). The highest values were found in Sud-Ouest (60 percent), followed by Centre-Ouest (36 percent) and Hauts-Bassins (25 percent). Only a very small percentage of farmers reported the use of maize for animal feed, and the share of total maize harvested for animal feed was mostly very low (below 20 percent).

### **Shocks, hazards and crop production difficulties**

Interviewed households were asked to indicate whether their household had faced any shock or crisis affecting them or their community to the extent that it affected the ability to make an income and/or produce food for self-consumption in the three months preceding the survey. On average, 33 percent of the respondents reported sickness or death of a household member as the main shock, followed by pest outbreak (28 percent), plant disease (22 percent), higher food prices than usual (19 percent) and floods (12 percent). Figure 8 presents the reported shocks across the three regions.

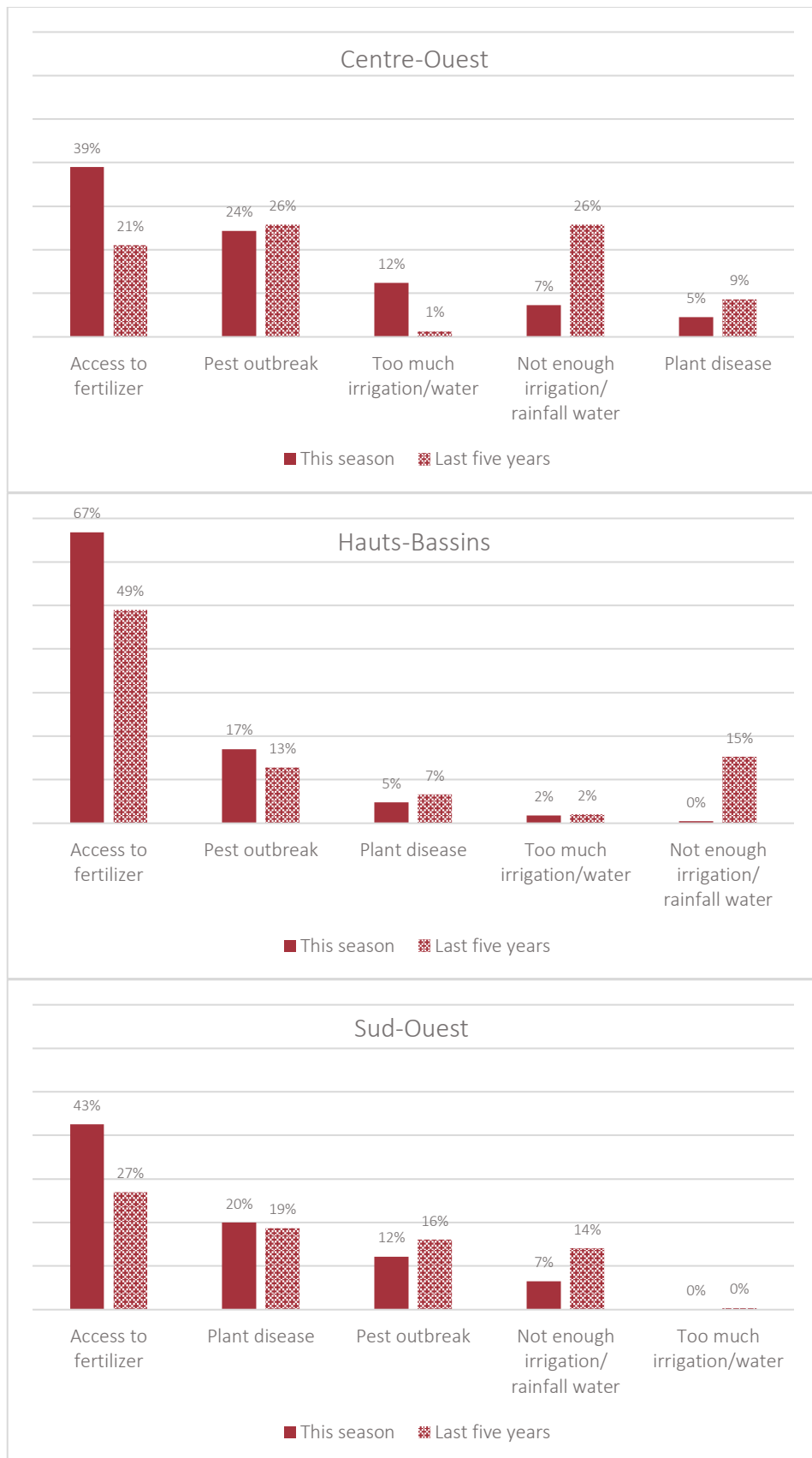
Figure 8. Shocks experienced by the maize farmers over the last season



Source: FAO. 2023. Burkina Faso: Impact of fall armyworm on maize production, livelihoods and food security – DIEM-Impact report, July 2023. In: *FAO Data in Emergencies Hub*. Rome. Cited 27 June 2023. [data-in-emergencies.fao.org](https://data-in-emergencies.fao.org)

When asked about crop production difficulties over the last season, 94 percent of the surveyed households reported facing difficulties, with respondents from Sud-Ouest reporting slightly less difficulties (87 percent) than the other two regions (95 percent). The most cited crop production difficulties were access to fertilizer (54 percent), particularly in Hauts-Bassins (68 percent), followed by pest outbreak (19 percent) and plant disease (7 percent) (Figure 9). Over the previous five years, households reported access to fertilizer (37 percent) and pest outbreak (20 percent) as the two major crop difficulties, followed by insufficient irrigation/rainfall water (19 percent compared to 3 percent over the ongoing season). Based on these findings, access to fertilizer seems to have become a more pronounced difficulty in the last season when compared to the previous five years, whereas insufficient irrigation or rainfall was not considered a major difficulty for farmers in the last season of 2022.

Figure 9. Crop production difficulties across the three regions (percentage of respondents)



Source: FAO. 2023. Burkina Faso: Impact of fall armyworm on maize production, livelihoods and food security – DIEM-Impact report, July 2023. In: *FAO Data in Emergencies Hub*. Rome. Cited 27 June 2023. [data-in-emergencies.fao.org](https://data-in-emergencies.fao.org)

One in seven households reported more than 40 percent loss in production over the ongoing season and the previous five years. Most households (44 percent) reported a significant production loss (20 to 40 percent) due to main crop production difficulties over the 2022 agriculture season, while primarily reporting moderate losses (less than 20 percent) in the five years preceding the survey. This trend was also observed for loss due to lack of access to fertilizer. Over the past five years, 48 percent of the respondents considered losses due to issues with fertilizer as moderate, whereas the majority of farmers considered the losses as significant in the 2022 season.

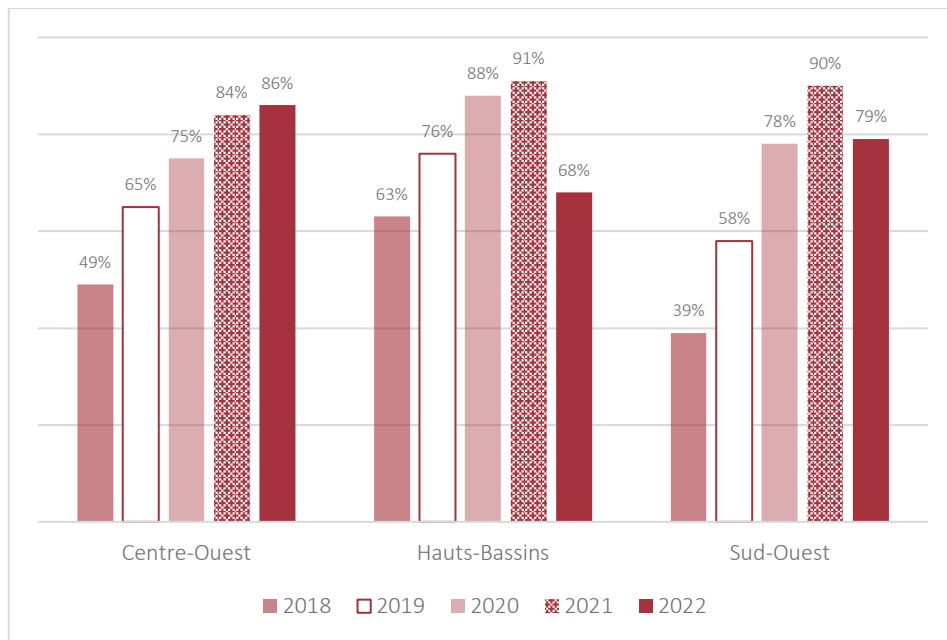
About 13 percent of the households reported that their main crops were not affected by any pests during the 2022 mid-season and harvest period. FAW reportedly affected a significantly larger share of those that reported pest infestations on the main crop (80 percent), especially those in Hauts-Bassins and Sud-Ouest (84 percent and 81 percent respectively, followed by 72 percent in Centre-Ouest). Borer affected about 14 percent of the households and African Army Worm (AAW) affected 7 percent.<sup>6</sup>

Respondents were asked to identify the years in which their crops were affected by FAW. Six percent indicated that they had not observed FAW infestations affecting their crops from 2018 to 2021. Figure 10 provides the percentage of households that reported a gradual increase in the effects of FAW over the past five years. A stark increase was observed in 2020/2021 across the three regions. It is possible that this increase was connected to the COVID-19 pandemic and the subsequent lack of access to inputs and reduced extension services due to movement restrictions. This can also explain the slight decrease in 2022 in Hauts-Bassins and Sud-Ouest. In Centre-Ouest, the trend seems to have continued to increase.

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<sup>6</sup> This is the result of a self-assessment given to farmers based on their capacity to recognize and distinguish between FAW, AAW and Borer.

Figure 10. Perception of FAW infestation from 2018 to 2022 across the three regions



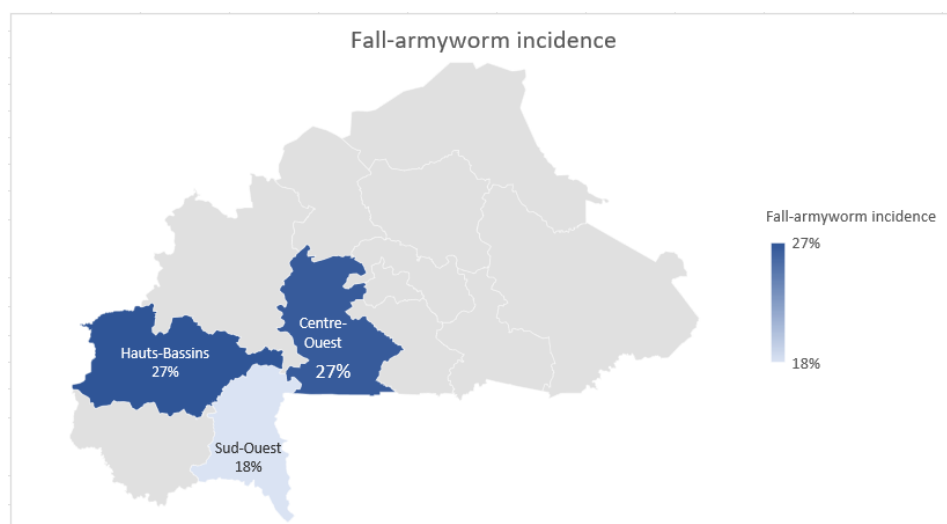
Source: FAO. 2023. Burkina Faso: Impact of fall armyworm on maize production, livelihoods and food security – DIEM-Impact report, July 2023. In: *FAO Data in Emergencies Hub*. Rome. Cited 27 June 2023. [data-in-emergencies.fao.org](https://data-in-emergencies.fao.org)

While many factors influence FAW infestations in a field, based on the perception of the survey respondents, Figure 10 may indicate a trend of increasing infestations (and subsequent yield losses) in a given field season after season. As the data rely on the capacity of the respondents to detect FAW in the early stages of its introduction in Burkina Faso, the results should be interpreted with caution and further investigated as reliable data from FAW monitoring becomes available over time.

## Impact of FAW on maize production

### FAW infestation

Figure 11. FAW incidence by sampled provinces



Source: FAO. 2023. Burkina Faso: Impact of fall armyworm on maize production, livelihoods and food security – DIEM-Impact report, July 2023. In: *FAO Data in Emergencies Hub*. Rome. Cited 27 June 2023. [data-in-emergencies.fao.org](https://data-in-emergencies.fao.org)

Overall, 93 percent of the plots visited were infested by FAW at the time of field scouting, with an average of 25 percent of maize plants in the selected plot affected. The infestation level was lowest in Sud-Ouest (18 percent), and reached 26 and 27 percent of plants observed, on average, in Centre-Ouest and Hauts-Bassins respectively.

The observed relationship between infestation levels and levels of damage to the plants supports the hypothesis that the higher the infestation level, the higher the degree of damage (Table 2). There is a correlation between the incidence and the level of damage, as observed by the enumerators during field scouting against the four categories of damage prescribed in FAMEWS: no damage, low, moderate or high damage. Fields with high levels of damage had an average incidence of 51 percent compared to 17 percent for fields with no damage (Table 3).

Table 2. Level of damage per province

Level of damage	Centre-Ouest	Hauts-Bassins	Sud-Ouest
High	5%	1%	5%
Moderate	16%	12%	9%
Low	45%	58%	47%
None	33%	29%	39%

Source: FAO. 2023. Burkina Faso: Impact of fall armyworm on maize production, livelihoods and food security – DIEM-Impact report, July 2023. In: *FAO Data in Emergencies Hub*. Rome. Cited 27 June 2023. [data-in-emergencies.fao.org](https://data-in-emergencies.fao.org)

Table 3. Distribution of the mean level of FAW incidence by level of damage on whorls and leaves.

	Damage level			
	None	Low damage	Moderate damage	High damage
Mean level of incidence	17.4%	26.5%	31.5%	50.5%

Source: FAO. 2023. Burkina Faso: Impact of fall armyworm on maize production, livelihoods and food security – DIEM-Impact report, July 2023. In: *FAO Data in Emergencies Hub*. Rome. Cited 27 June 2023. [data-in-emergencies.fao.org](https://data-in-emergencies.fao.org)

Based on the results of the regression on FAW incidence, the two most influential factors on FAW incidence appear to be previous damage, meaning that the higher the previous damage, the higher the FAW incidence, and altitude, meaning that the higher the altitude, the lower the FAW incidence.

### Yield losses due to FAW and determinants

Using a linear regression model with a set of explanatory variables, the percentage of yield losses that can be attributed to FAW infestations was assessed (Table 4). The average (dry) yield per hectare varies between the three regions, from 2 368 kilogram/ha in Sud-Ouest to 3 584 kilogram/ha in Hauts-Bassins.

Table 4. Predictors of yield loss resulting from the linear regression across the three regions

	Centre-Ouest	Hauts-Bassins	Sud-Ouest
Predicted yield with FAW attack ( <i>Model 4</i> ) (kg/ha)	2 169	3 077	2 122
Potential yield in case of no FAW attack (kg/ha)	2 536	3 584	2 368
Yield loss due to FAW (kg/ha)	367	507	246
Percent yield loss due to FAW at area level	17.3%	17.1%	12.5%

**Source:** FAO. 2023. Burkina Faso: Impact of fall armyworm on maize production, livelihoods and food security – DIEM-Impact report, July 2023. In: *FAO Data in Emergencies Hub*. Rome. Cited 27 June 2023. [data-in-emergencies.fao.org](https://data-in-emergencies.fao.org)

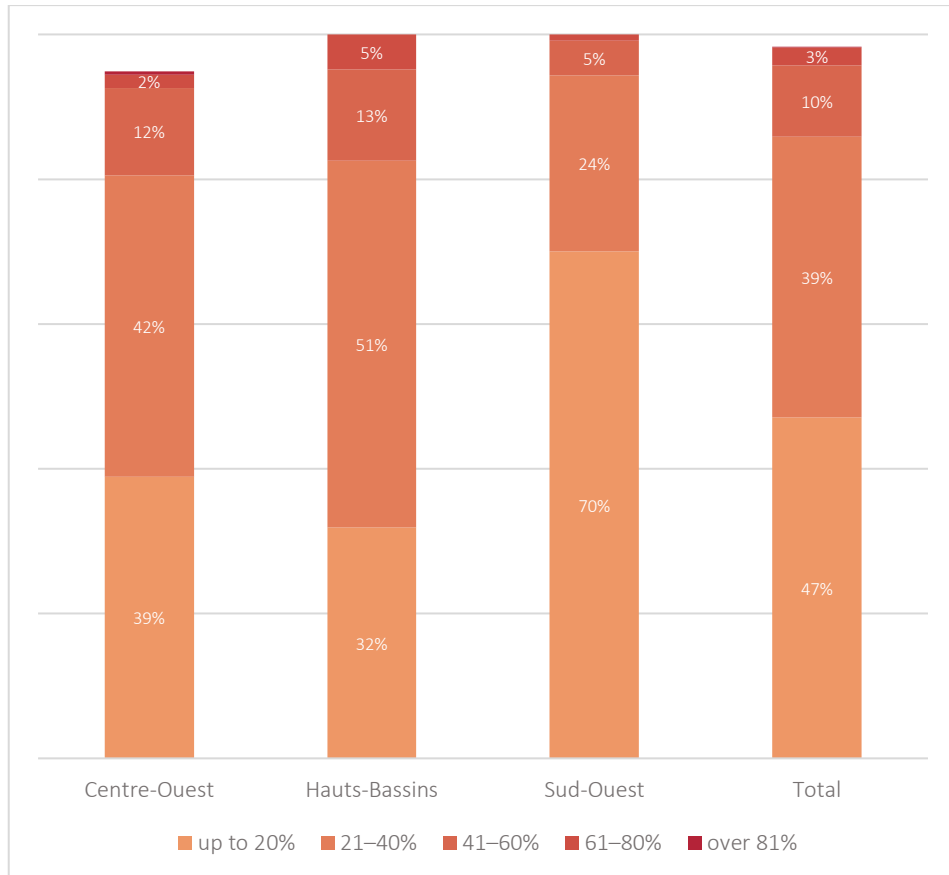
Overall, there is a negative relationship between dry yield (kg/ha) and FAW incidence (percent). A one unit increase in FAW incidence (or one percentage point) will lead to a 0.79 percent decrease in yield per hectare.<sup>7</sup> The explanatory variables with the strongest effect on yield (Annex II, Model 4) are the incidence of FAW (-), density (+), and crop health (from average to good, +), and planting date (-). Previous damage also indicated some positive correlation with dry yield. Lastly, while predators have a negative impact on dry yield, pathogens had a significant and positive relation.

#### *Estimated yield loss*

Respondents were asked to estimate yield losses due to the main difficulty into one of five categories: 45 percent of the farmers estimated between 21 and 40 percent of yield losses; 11 percent estimated having lost between 41 and 60 percent; and 3 percent reported losing over 60 percent of their yield (Figure 12). Across the three regions, the lowest proportion of households suffering from more severe self-reported yield losses was found in Sud-Ouest, whereas the highest was in Hauts-Bassins.

<sup>7</sup> The dependent variable was transformed using the natural log in the regression.

Figure 12. Estimated yield loss due to the main crop production difficulty – lack of access to fertilizer – reported by households



Source: FAO. 2023. Burkina Faso: Impact of fall armyworm on maize production, livelihoods and food security – DIEM-Impact report, July 2023. In: *FAO Data in Emergencies Hub*. Rome. Cited 27 June 2023. [data-in-emergencies.fao.org](https://data-in-emergencies.fao.org)

## Farming and FAW management practices

### Influence of farming practices and control measures on yield losses due to FAW

Increases in density, earlier planting dates, presence of pathogens, and control of predators and FAW are all farming practices that allow for better yield based on the regression.

Timely planting and regular monitoring of FAW are the only two control measures that showed a significant and positive relationship with yield. Handpicking had a negative relationship to yield.

### Agricultural expenditures and yield losses due to FAW

Households were asked to estimate if their food expenditures had increased in the month preceding the survey compared to the same time last year. On average, 32 percent of the respondents declared that their expenditures were slightly higher over the month preceding the survey. About 17 percent of the respondents declared that their food expenditures were significantly higher in the past month. The comparison between the three regions, in terms of expenditures, shows that the differences are significant between Hauts-Bassins and Centre-Ouest (<0.05). This could be because the damage

from FAW is perceived to have decreased in Hauts-Bassins in 2022 and increased in Centre-Ouest, exposing people to major food expenditures.

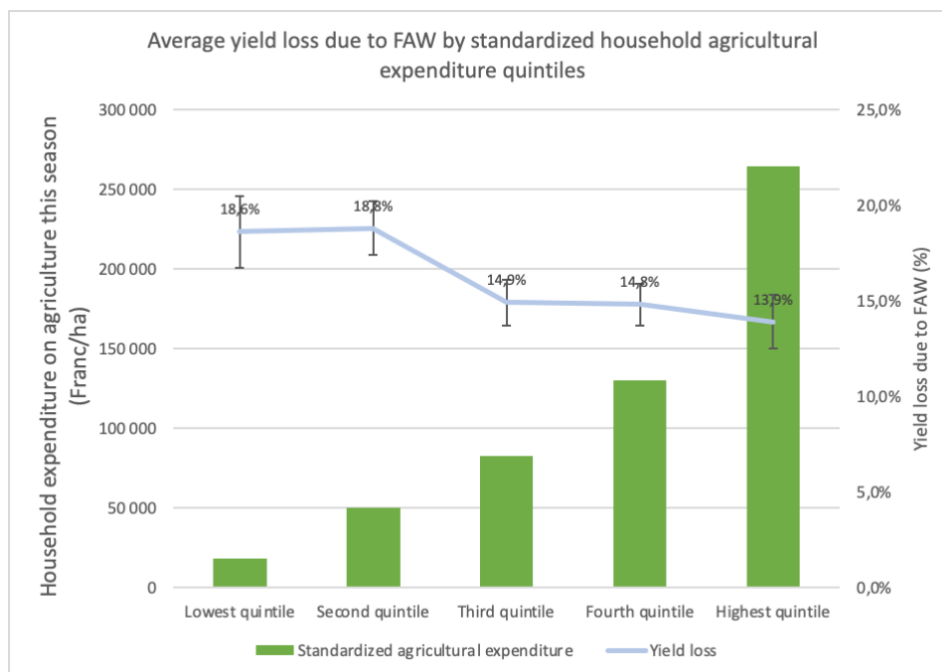
Households incurred total expenditures of about USD 200 during the month preceding the interview. Food expenditures represented an average of 33 percent of the total expenditures of the households for the month preceding the interview, with Centre-Ouest presenting food expenditures equal to 37 percent of the total expenditure.

To control FAW during the 2022 mid-season and harvest period, maize farmers spent, on average, USD 3.60 (CFA 2 176 CFA), compared to USD 3.20 (CFA 1 927) over the last season. Overall, the control costs have increased this season, except in Hauts-Bassins. The control costs were the highest in Sud-Ouest compared to the other two regions.

When dividing maize farmers in five quintiles based on their agricultural expenditures, a trend between yield losses due to FAW and household expenditure on agriculture is apparent (Figure 13). There appears to be a bigger difference between the second and third quintile in terms of FAW incidence, which decreases from 19 percent to 12 percent, respectively. While there is no significant difference of FAW incidence between the quintile groups, there is a negative correlation between household expenditure on agriculture (cost of chemical fertilizer, seeds, machinery, hired labour, herbicide, synthetic pesticide or bio-pesticide) and percentage of yield losses due to FAW (p-value -0.15\*\*\*). The more the households incur on agricultural expenditures, the less they experience yield losses. However, there seems to be a certain threshold after which further expenditure does not improve yield as much.

Household expenditure has been used as a proxy of wealth and does not correlate with yield losses due to FAW. Households with less money do not seem to suffer from higher yield losses due to FAW but it is instead linked to the extent of expenditure on agriculture.

Figure 13. Average yield loss due to FAW by standardized household agricultural expenditures quintiles



Source: FAO. 2023. Burkina Faso: Impact of fall armyworm on maize production, livelihoods and food security – DIEM-Impact report, July 2023. In: *FAO Data in Emergencies Hub*. Rome. Cited 27 June 2023. [data-in-emergencies.fao.org](https://data-in-emergencies.fao.org)

## Knowledge of FAW

Maize farmers were asked some questions to understand their level of knowledge of FAW, and of the planting practices that can help prevent and manage FAW (Table 5). About 91 percent of maize farmers in both Sud-Ouest and Hauts-Bassins had the capacity to recognise FAW, compared to 75 percent of farmers in Centre-Ouest.

The appropriate time to start scouting maize was identified, on average, by 65 percent of maize farmers, with the majority aware that after germination is the right time to start scouting in Sud-Ouest (82 percent). The less effective time for pesticide use was identified by 54 percent of the respondents, most of which were in Sud-Ouest (70 percent).

Overall, 74 percent of the farmers could identify planting practices that can help prevent or reduce FAW, and the majority of farmers aware of these practices were in Sud-Ouest.

In terms of the first step when it comes to managing FAW, either the respondents had trouble understanding the question, as the majority indicated pesticide, or respondents did not know what the first step to managing FAW is. It is also possible that the only control measure available to the respondents is pesticide.

There is still room to improve the knowledge of the farmers in terms of capacity to recognize FAW, the appropriate time to start scouting and the most effective time of day to apply pesticide. Overall, maize farmers in Sud-Ouest seem to have better knowledge across the various elements for which they were tested. Maize farmers in Centre-Ouest performed the worst on the knowledge test.

Table 5. Specific responses provided by maize farmers in the knowledge test – the correct responses have been provided in red

Questions	Hauts-Bassins	Sud-Ouest	Centre-Ouest	Total
<b>Picture identification</b>				
Borer	8%	6%	19%	11%
<b>FAW</b>	<b>91%</b>	<b>91%</b>	<b>75%</b>	<b>85%</b>
AAW	0%	1%	4%	2%
Don't know	1%	2%	3%	2%
<b>Planting practices to prevent<sup>8</sup></b>				
<b>Planting early</b>	<b>73%</b>	<b>83%</b>	<b>72%</b>	<b>74%</b>
Staggered planting	0%	6%	9%	4%
Late planting	1%	4%	3%	2%
Don't know	26%	14%	26%	24%
<b>First resort to manage FAW</b>				
Spray pesticides	83%	56%	70%	73%
<b>Cultural methods</b>	<b>5%</b>	<b>21%</b>	<b>14%</b>	<b>11%</b>
Combination of cultural methods and spray pesticides	11%	19%	7%	11%
Don't know	2%	4%	9%	5%
<b>Appropriate time to start scouting maize</b>				
<b>After germination</b>	<b>75%</b>	<b>82%</b>	<b>33%</b>	<b>65%</b>
When the maize is knee-high	23%	13%	60%	31%
When the maize is at the tasselling stage	0%	0%	2%	1%
Don't know	2%	4%	4%	3%
<b>Less effective time for pesticide</b>				
Morning	27%	14%	35%	28%
<b>Afternoon</b>	<b>55%</b>	<b>70%</b>	<b>43%</b>	<b>54%</b>
Evening	17%	12%	12%	14%
Don't know	1%	4%	9%	5%

Source: FAO. 2023. Burkina Faso: Impact of fall armyworm on maize production, livelihoods and food security – DIEM-Impact report, July 2023. In: *FAO Data in Emergencies Hub*. Rome. Cited 27 June 2023. [data-in-emergencies.fao.org](https://data-in-emergencies.fao.org)

## Access to information and training on FAW control

Maize farmers were asked if they think that they have adequate information on how to control FAW and limit the impact to crops. Overall, only half of the respondents (50 percent) thought they had adequate information, with the most found in Sud-Ouest (62 percent) and Hauts-Bassins (61 percent), followed by Centre-Ouest (27 percent). It is recommended that awareness and knowledge of the best practices on how to control FAW should be boosted across all regions, Centre-Ouest in particular.

The sources of information, advice or support for the management of FAW accessed by farmers are presented in Table 6. Government and extension agents (outside FFS) constitute the main source of information for maize farmers, followed by more informal

<sup>8</sup> Note that this question was programmed as multiple choice, therefore, the percentages will not total 100 percent.

sources such as neighbours, friends and relatives. The third source used by farmers is media (radio, tv and newspapers).

Table 6. Sources of information, advice or support for the management of FAW accessed by farmers

Source	Centre-Ouest	Hauts-Bassins	Sud-Ouest	Total
Media (radio, tv, newspaper)	43%	53%	38%	47%
Government extension agents (outside of FFS)	66%	79%	81%	75%
Plant clinics	7%	0%	0%	2%
Neighbours/Friends/ Relatives	51%	67%	65%	61%
Agro-dealers/input suppliers	2%	1%	0%	1%
Demonstration plots/field days/shows	9%	2%	3%	4%
Farmer association (not FFS group)	5%	4%	1%	4%
Messages received on the phone	0%	0%	0%	0%
Information gathered on Internet (websites, videos, social media)	0%	1%	0%	1%
Non-governmental organization (NGO) workers	2%	0%	1%	1%
Other	3%	0%	0%	1%

**Source:** FAO. 2023. Burkina Faso: Impact of fall armyworm on maize production, livelihoods and food security – DIEM-Impact report, July 2023. In: *FAO Data in Emergencies Hub*. Rome. Cited 27 June 2023. [data-in-emergencies.fao.org](https://data-in-emergencies.fao.org)

Maize farmers declared that the most useful source of information is government extension agents (69 percent), followed by the media (37 percent) and neighbours, friends and relatives (31 percent).

Only one respondent in Centre-Ouest was aware of the FAMEWS mobile app but said that the app was not used by anyone in their household.

## Livelihoods and vulnerability to FAW

### Food self-sufficiency

Table 7 depicts how much of the household food consumption comes from self-production. For the majority of maize farmers (68 percent), the entirety, or almost the entirety, of crops consumed by the household came from self-production. In addition, cereal stock last eleven months, on average, across the three regions, and are expected to last about the same for the 2022 mid-season and harvest period.

Table 7. Percentage of household food consumption coming from self-production

Percentage	Centre-Ouest	Hauts-Bassins	Sud-Ouest	Total
None (0%; household sells entire crop production)	1%	0%	0%	0%
Up to one quarter (up to 25%)	5%	3%	4%	4%
Between one quarter and a half (25 to 50%)	6%	5%	13%	7%
Between a half and three quarters (50 to 75%)	19%	19%	25%	20%
The entire or almost the entirety of crops consumed by the household comes from self-production (75 to 100%)	69%	72%	58%	68%

**Source:** FAO. 2023. Burkina Faso: Impact of fall armyworm on maize production, livelihoods and food security – DIEM-Impact report, July 2023. In: *FAO Data in Emergencies Hub*. Rome. Cited 27 June 2023. [data-in-emergencies.fao.org](https://data-in-emergencies.fao.org)

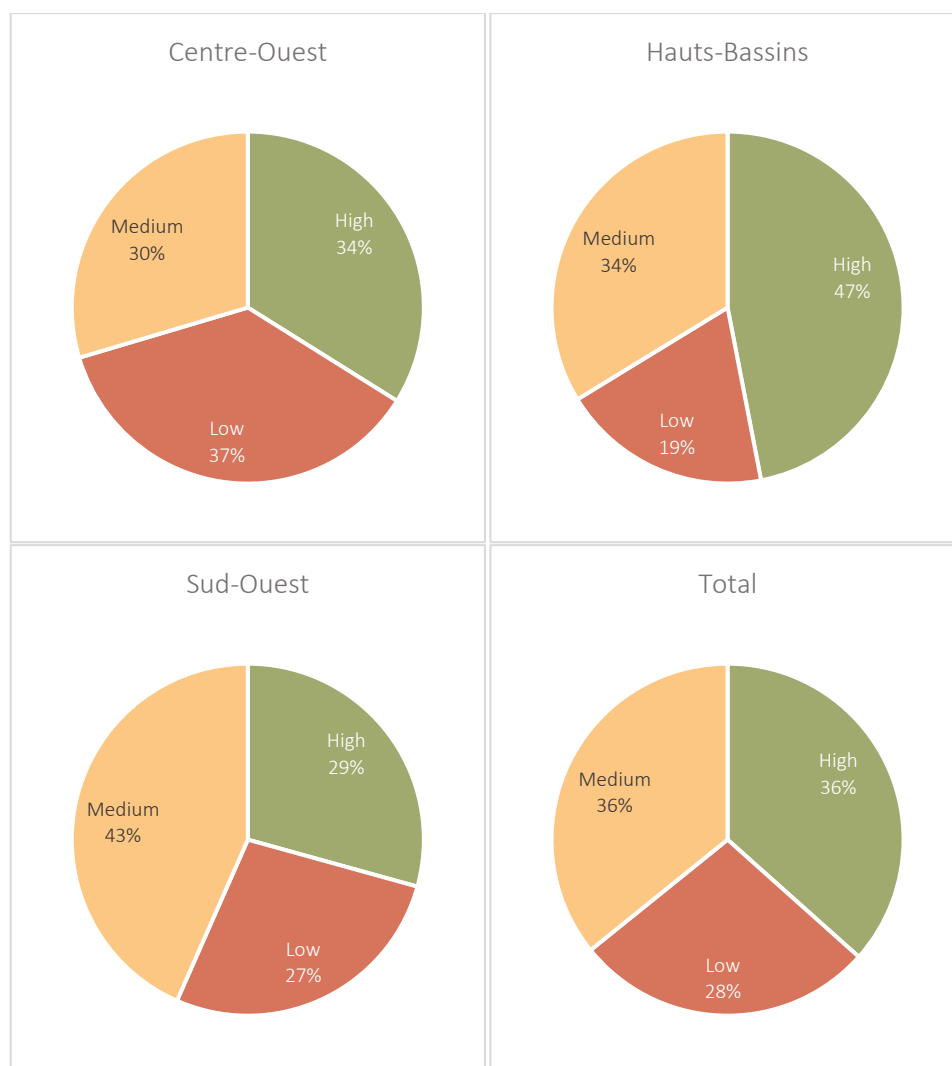
About 74 percent of the respondents believe their harvest will enable them to feed their household until the next harvest, especially respondents in Hauts-Bassins (78 percent) compared to 70 percent in Centre-Ouest and Sud-Ouest. Twenty-four percent of the respondents believe that the current harvest will not allow them to feed their households until the next harvest (27 percent in Centre-Ouest and Sud-Ouest, and 20 percent in Hauts-Bassins). If they are unable to feed their household with their own harvest, respondents expected to use savings (49 percent), sell livestock (48 percent), sell assets (25 percent), borrow (12 percent), work (6 percent) and use food assistance (5 percent).

### Food security and coping strategies

HDDS (Figure 14) captures the quality and diversity of food consumption. Overall, 37 percent of maize farmers have a high level of dietary diversity, 36 percent have a medium level and 28 percent have a low level. The highest level of dietary diversity was found in Hauts-Bassins (47 percent) and the lowest in Centre-Ouest (37 percent).

There was a variety of responses regarding the perception of current food consumption, compared to last year. The current food consumption was perceived to be much worse by 7 percent of respondents, especially in Centre-Ouest (17 percent); worse by 32 percent; about the same by 31 percent; slightly better by 27 percent, especially in Hauts-Bassins (32 percent); and much better by 4 percent.

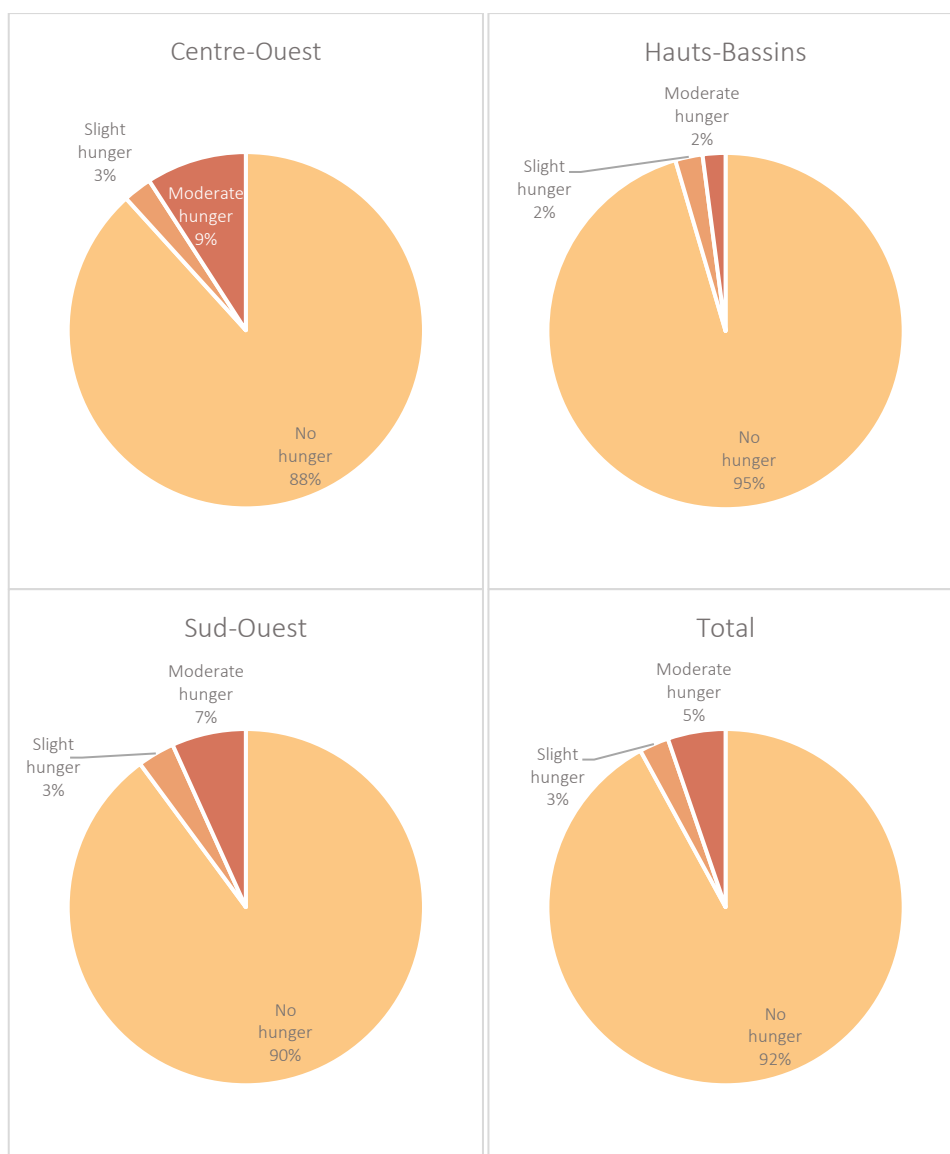
Figure 14. HDDS across the three regions



**Source:** FAO. 2023. Burkina Faso: Impact of fall armyworm on maize production, livelihoods and food security – DIEM-Impact report, July 2023. In: *FAO Data in Emergencies Hub*. Rome. Cited 27 June 2023. [data-in-emergencies.fao.org](https://data-in-emergencies.fao.org)

According to HHS, 92 percent of the households experienced little to no hunger, 5 percent experienced moderate hunger and 3 percent experienced severe hunger (Figure 15).

Figure 15. HHS across the three regions

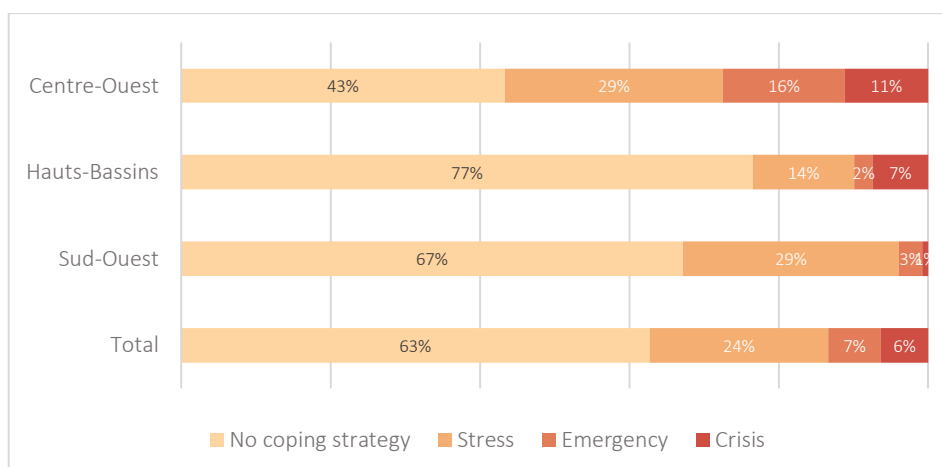


Source: FAO. 2023. Burkina Faso: Impact of fall armyworm on maize production, livelihoods and food security – DIEM-Impact report, July 2023. In: *FAO Data in Emergencies Hub*. Rome. Cited 27 June 2023. [data-in-emergencies.fao.org](https://data-in-emergencies.fao.org)

According to the FIES, about 12 percent of the households experienced moderate or severe RFI and about 3 percent experienced the prevalence of severe food insecurity. Moderate or severe levels of food insecurity, with values above average, were found in Centre-Ouest (17 percent), and Sud-Ouest (12 percent), while Hauts-Bassins presented values below average (7 percent). Prevalence of severe food insecurity with values above average were found in Centre-Ouest (5 percent), and Sud-Ouest (4 percent). In Hauts-Bassins, 1 percent of the respondents experienced the prevalence of severe food insecurity. FIES values highlight a situation of food insecurity which is higher in Centre-Ouest compared with the other two regions.

The majority of households did not put in place any coping strategy, while 24 percent put in place stress coping strategies, 7 percent emergency coping strategies and 6 percent crisis coping strategies. The majority of the households adopting emergency coping strategies were located in Centre-Ouest (16 percent) (Figure 16).

Figure 16. LCSl



Source: FAO. 2023. Burkina Faso: Impact of fall armyworm on maize production, livelihoods and food security – DIEM-Impact report, July 2023. In: *FAO Data in Emergencies Hub*. Rome. Cited 27 June 2023. [data-in-emergencies.fao.org](http://data-in-emergencies.fao.org)

### Association between household food security indicators and yield losses due to FAW

According to the LCSl, there was a significant difference between households classified at crisis level (with a mean yield loss due to FAW of 524 kg/ha) and those using no coping strategies (losses of 352 kg/ha). There were no discernible or statistically significant differences for other group comparisons.

This finding aligns with results from the FIES. There was a significant and positive correlation between yield loss due to FAW and the prevalence of recent moderate or severe household food insecurity. The more yield loss due to FAW, the higher the percentage of households affected by RFI at a moderate or severe level. There was no difference in yield loss between groups for HDDS and HHS.

### Needs

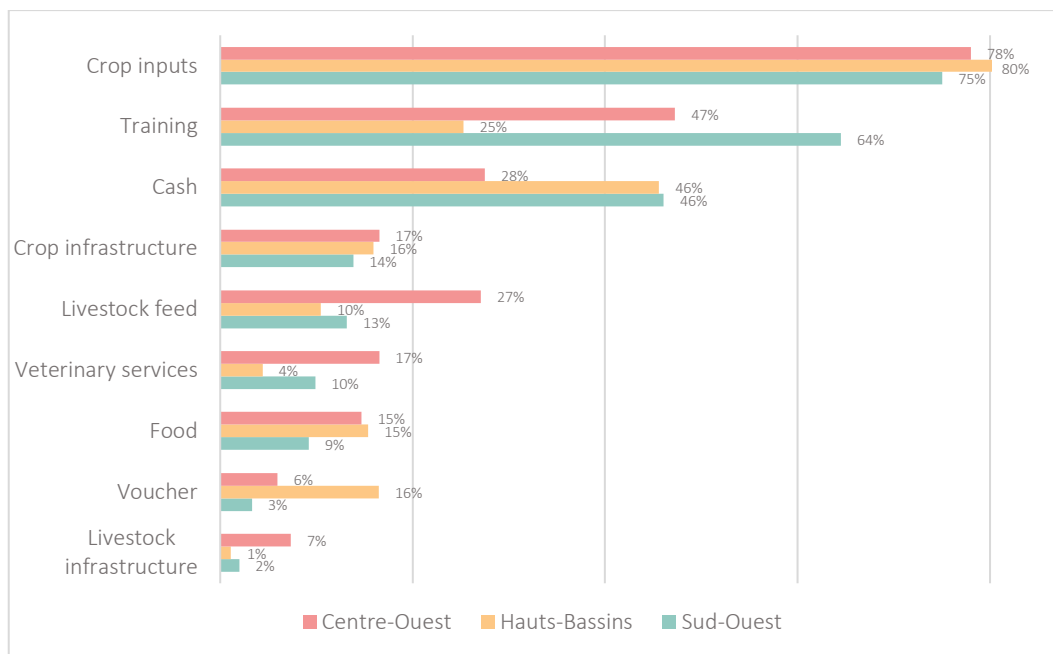
About 55 percent of maize farmers received inputs as assistance (69 percent in Sud-Ouest, 52 percent in Hauts-Bassins and Centre-Ouest). The inputs were in the form of fertilizer for 93 percent of the maize farmers (96 percent in Hauts-Bassins, 91 percent in Centre-Ouest and 88 percent in Sud-Ouest), seeds for 61 percent (70 percent in Sud-Ouest, 67 percent in Centre-Ouest and 53 percent in Hauts-Bassins), and chemical pesticide for 5 percent of maize farmers. Assistance was mainly provided by the Government (97 percent) and NGOs (3 percent).

Close to two thirds (67 percent) of the recipients who received assistance were satisfied with the assistance provided. For the one third that were unhappy with the assistance, the main reasons were that the quantities were insufficient (98 percent), the assistance was not received on time (51 percent), notably in Centre-Ouest (85 percent), or the assistance did not meet the needs (8 percent).

About 78 percent of the maize farmers declared to need assistance in the three to six months following the survey. Ninety-four percent of these farmers were in Centre-Ouest, compared to 75 percent and 59 percent in Hauts-Bassins and Sud-Ouest

respectively. The type of assistance needed is summarized in Figure 17. Farmers reported needing crop inputs (79 percent), training (39 percent) and cash (38 percent).

Figure 17. Needs for assistance



Source: FAO. 2023. Burkina Faso: Impact of fall armyworm on maize production, livelihoods and food security – DIEM-Impact report, July 2023. In: *FAO Data in Emergencies Hub*. Rome. Cited 27 June 2023. [data-in-emergencies.fao.org](https://data-in-emergencies.fao.org)

About 95 percent of farmers indicated the need for support in order to prepare for or control pests. For them, the top priority for support included information and training on how to recognize FAW and other pests, and different ways to control them (46 percent), and provision or support to access seeds of varieties more resistant to FAW (19 percent).

### Feedback from members of an FAO or GA supported FFS on FAW-IPM

Among all farmers interviewed, about 12 percent were members of an FAO or GA supported FFS on FAW-IPM (14 percent of respondents in Hauts-Bassins, 12 percent in Centre-Ouest and 11 percent in Sud-Ouest) Among them, the majority (35 percent) declared that the lessons learned from the FFS sessions, in terms of managing FAW on maize crops, were very useful (45 percent in Centre-Ouest, 29 percent in Hauts-Bassins and 32 percent in Sud-Ouest). Twenty-nine percent thought that the information was quite useful (43 percent in Sud-Ouest, 39 percent in Hauts-Bassins and 9 percent in Centre-Ouest) and about 16 percent thought it was a little useful (19 percent in Centre-Ouest, 18 percent in Hauts-Bassins, and 8 percent in Sud-Ouest).

When asked about the use of knowledge gained, about a third of the respondents (36 percent) declared that they have been using the gained knowledge in a partial way (62 percent in Hauts-Bassins, 30 percent in Sud-Ouest and 15 percent in Centre-Ouest), 35 percent said they were using the knowledge gained completely (51 percent in Sud-Ouest, 40 percent in Centre-Ouest and 16 percent in Hauts-Bassins). There was a small percentage of these farmers (10 percent) that did not use the knowledge gained at all (17 percent in Centre-Ouest, 8 percent in Hauts-Bassins and 3 percent in Sud-Ouest).

When asked about the reasons why some, or all, the knowledge gained with the support of FAO or a GA supported FFS on FAW-IPM group was not applied (Table 8), 72 percent of the maize farmers declared that it was too late to implement the recommendations received. This response was mostly provided by farmers in Centre-Ouest (87 percent) and Hauts-Bassins (85 percent), and to a very limited extent by farmers in Sud-Ouest (17 percent). Another reason for not implementing the recommendations was lack of money (26 percent), especially farmers in Sud-Ouest (58 percent).

According to the feedback provided, one farmer that received information shared it with twelve other people.

These results indicate that there is room to improve the delivery of adequate information on how to control FAW and limit its impact on crops. Further investigation into what is currently preventing farmers from fully appreciating the information provided by FAO or a GA supported FFS on FAW-IPM group is needed.

**Table 8. Reasons for not applying knowledge gained (percentage of respondents)**

Recommendations	Centre-Ouest	Hauts-Bassins	Sud-Ouest	Total
Did not understand what was taught at the FFS sessions	0%	0%	0%	0%
FFS recommendations were too complex/difficult to implement	20%	9%	0%	10%
Lack of money to implement	13%	21%	58%	26%
It was too late to implement the recommendations	87%	85%	17%	72%
Did not expect the recommendations to work	0%	0%	33%	7%

**Source:** FAO. 2023. Burkina Faso: Impact of fall armyworm on maize production, livelihoods and food security – DIEM-Impact report, July 2023. In: *FAO Data in Emergencies Hub*. Rome. Cited 27 June 2023. [data-in-emergencies.fao.org](https://data-in-emergencies.fao.org)

# Recommendations

## Short-term recommendations

- > Centre-Ouest is where most of the households employ emergency coping strategies. There may be additional difficulties beyond FAW to explain this. Additional support outside of FAW, such as cash and food assistance, should be provided to farmers in Centre-Ouest.

## Long-term recommendations

- > Awareness and knowledge of best practices on how to control FAW should be boosted across all regions. There is room to improve the farmers' capacity to recognize FAW, their knowledge of the appropriate time to start scouting, and the most effective time of day to apply pesticide.
- > Rural media are among the preferred sources of information on best practices to manage FAW. However, their use is still limited, and extension services should be leveraged over rural media to boost farmers' need for information.
- > Access to fertilizer has become a more pronounced crop production difficulty in the last season compared to the previous five years. Conduct further assessments to understand the challenges accessing fertilizer.
- > Results from the study show that the presence of pathogens and control of predators allow for better yield. Practices that conserve natural enemies, such as reduction of pesticide use, should be highlighted in future training and communication on FAW IPM.

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# Annexes

## Annex I

### Regression model of FAW incidence on predictors

Variable	Model 1	Model 2	Model 3
Intercept	0.04 (0.03)	0.03 (0.05)	0.36 (0.09)***
Current damage: Low	0.05 (0.02)***	0.08 (0.02)***	0.04 (0.01)***
Moderate	0.08 (0.02)***	0.11 (0.02)***	0.07 (0.02)***
High	0.19 (0.04)***	0.25 (0.04)***	0.25 (0.04)***
Previous damage: Low	0.07 (0.02)***	0.09 (0.02)***	0.08 (0.02)***
Moderate	0.13 (0.02)***	0.14 (0.02)***	0.17 (0.02)***
High	0.24 (0.03)***	0.25 (0.03)***	0.26 (0.03)***
Rain performance: Around average	0.03 (0.03)	0.03 (0.02)	0.00 (0.03)
Above average	0.11 (0.02)***	0.11 (0.02)***	0.04 (0.03)
Fertilizer use		0.03 (0.03)	-0.01 (0.03)
Altitude		0.00 (0)	0.00 (0)***
Date of planting		0.00 (0)	0.00 (0)
Presence of parasitoids		-0.06 (0.02)***	-0.03 (0.02)
Presence of pathogens		-0.07 (0.02)***	-0.04 (0.02)**
Presence of predators		-0.11 (0.02)***	-0.05 (0.02)***
Density			0.01 (0.01)*
Shock - Drought			-0.02 (0.02)
Field size (maize only)			0.00 (0)
Received assistance during season			0.00 (0.01)
Use of improved seeds			0.02 (0.01)
Admin 3: Bieha			0.04 (0.04)
Bobo-Dioulasso			0.02 (0.03)
Bouroum-Bouroum			-0.15 (0.05)***
Dalô			0.10 (0.05)*
Dano			-0.03 (0.05)
Didyr			-0.14 (0.04)***
Dissihn			-0.13 (0.05)***
Diébougou			0.04 (0.05)
Dolo			-0.19 (0.04)***
Founzan			0.08 (0.03)**
Gaoua			0.01 (0.05)
Houndé			0.09 (0.03)***
Kordié			-0.08 (0.04)**
Koudougou			-0.11 (0.03)***
Koumbia			-0.14 (0.03)***
Kôlôkô			0.28 (0.04)***
Lèna			-0.06 (0.04)
Léo			-0.13 (0.05)**

Variable	Model 1	Model 2	Model 3
Nanoro			0.31 (0.04)***
Orodara			0.16 (0.05)***
Ouessa			-0.15 (0.05)***
Périgban			-0.16 (0.05)***
Réo			0.12 (0.08)
Sabou			-0.15 (0.04)***
Tiankoura			0.01 (0.05)
Toussiana			0.05 (0.05)
R-Squared	0.27	0.35	0.60
Adjusted R-Squared	0.26	0.33	0.57

**Source:** FAO. 2023. Burkina Faso: Impact of fall armyworm on maize production, livelihoods and food security – DIEM-Impact report, July 2023. In: *FAO Data in Emergencies Hub*. Rome. Cited 27 June 2023. [data-in-emergencies.fao.org](https://data-in-emergencies.fao.org)

## Annex II

### Regression model of yield on predictors

Dependent variable	Model 1	Model 2	Model 3	Model 4 (log)
Intercept	1 715.06 (194.81)***	-614.97 (459.93)	3 291.46 (893.92)***	7.72 (0.3)***
FAW incidence	-667.14 299.71)**	-520.69 (374)	-1 406.25 (412.6)***	-0.6 (0.14)***
Density	245.37 (39.49)***	245 (41.67)***	161.51 (58.64)***	0.07 (0.02)***
Expenditure on agriculture (per ha)	0 (0)***	0 (0)	0 (0)	0 (0)
Crop health: Poor		-465.1 (293.48)	-372.13 (265.18)	-0.21 (0.09)**
Good		325.82 (124.65)***	460.24 (123.95)***	0.21 (0.04)***
Current damage: Low		137.65 (147.41)	-42.53 (147.64)	-0.01 (0.05)
Moderate		528.52 (209.98)**	273.04 (201.9)	0.07 (0.07)
High		-497.11 (391.71)	100.62 (372.4)	0 (0.13)
Previous damage: Low		215.42 (174.8)	390.03 (165.69)**	0.12 (0.06)**
Moderate		-24.51 (203.47)	317.5 (200.49)	0.11 (0.07)
High		335.98 (305.85)	801.87 (313.32)**	0.28 (0.11)***
Rain performance: Around average		454.56 226.66)**	93.92 (253.98)	-0.01 (0.09)
Above average		259.49 (213.64)	-185.87 (248.35)	-0.07 (0.08)
Fertilizer use		468.89 (296.8)	259.36 (277.63)	0.11 (0.09)
Presence of parasitoids	322.14 (163.15)**	372.78 (181.68)**	245.52 (169.49)	0.03 (0.06)
Presence of pathogens	440.45 (158.83)***	677.6 (177.6)***	531.99 (196.95)***	0.19 (0.07)***
Presence of predators	77.85 (146.68)	-42.95 (162.06)	-485 (158.5)***	-0.13 (0.05)**
Altitude		3.33 (0.8)***	-3.49 (1.79)*	0 (0)
Field size (maize only)			28.01 (13.33)**	0.01 (0)**
Use of improved seeds			-194.65 (116.62)*	-0.05 (0.04)
Date of planting			-17.64 (3.91)***	-0.01 (0)***

Dependent variable	Model 1	Model 2	Model 3	Model 4 (log)
Access to information on FAW			319.53 (124.37)**	0.06 (0.04)
Member of FFS group			246.68 (366.31)	0.05 (0.12)
Received assistance during season			-34.79 (110.32)	0.02 (0.04)
<b>Intervention:</b> Timely planting			261.63 (153.7)*	0.11 (0.05)**
Reg. monitor of FAW <sup>9</sup>			281.01 (130.49)**	0.1 (0.04)**
Crop rotation			188.57 (208.94)	0.06 (0.07)
Intercrop w other crop			234.03 (663.02)	0 (0.22)
Regular weeding <sup>10</sup>			166.03 (210.84)	0.1 (0.07)
Synthetic pesticide			-48.52 (118.23)	-0.04 (0.04)
Handpicking			-720.64 (202.55)***	-0.17 (0.07)**
Household expenditure			0 (0)	0 (0)
Gender of head of household			-178.23 (262.18)	-0.05 (0.09)
Knowledge index of FAW			-105.84 (281.71)	-0.09 (0.1)
<b>Admin 3:</b> Bieha			-152.01 (361.67)	-0.01 (0.12)
Bobo-Dioulasso			323.48 (347.18)	-0.02 (0.12)
Bouroum-Bouroum			410.6 (475.11)	0.1 (0.16)
Dalô			1 265.53 (482.98)***	0.5 (0.16)***
Dano			-935.84 (513.09)*	-0.38 (0.17)**
Didyr			-707.34 (439.3)	-0.52 (0.15)***
Dissihn			-282.32 (460.74)	-0.08 (0.16)
Diébougou			-659.27 (452.13)	-0.22 (0.15)
Dolo			-1073.45 (456.15)**	-0.45 (0.15)***
Founzan			327.86	0.19

<sup>9</sup> After maize germination.

<sup>10</sup> Of maize and surrounding areas (field sanitation)

Dependent variable	Model 1	Model 2	Model 3	Model 4 (log)
			(352.6)	(0.12)
Gaoua			521.05 (452.26)	0.28 (0.15)*
Houndé			189.22 (336.16)	0.15 (0.11)
Kordié			-693.17 (401.1)*	-0.45 (0.14)***
Koudougou			-482.77 (351.05)	-0.19 (0.12)
Koumbia			-1462.27 (359.81)***	-0.49 (0.12)***
Kôlôkô			490.3 (446.58)	0.09 (0.15)
Lèna			2 185.38 (383.9)***	0.49 (0.13)***
Léo			-940.09 (491.94)*	-0.28 (0.17)*
Nanoro			1 383.94 (441.88)***	0.53 (0.15)***
Orodara			843.95 (475.41)*	0.24 (0.16)
Ouéssa			-1 205.72 (500.43)**	-0.47 (0.17)***
Périgban			-30.25 (475.99)	-0.02 (0.16)
Réo			-24.27 (957.29)	0.05 (0.32)
Sabou			-296.56 (466.59)	-0.16 (0.16)
Tiankoura			-1 131.24 (479.9)**	-0.45 (0.16)***
Toussiana			2 703.99 (450.27)***	0.62 (0.15)***
R-Squared	0.08	0.13	0.49	0.51
R-Squared Adjusted	0.07	0.11	0.44	0.46

Source: FAO. 2023. Burkina Faso: Impact of fall armyworm on maize production, livelihoods and food security – DIEM-Impact report, July 2023. In: *FAO Data in Emergencies Hub*. Rome. Cited 27 June 2023. [data-in-emergencies.fao.org](https://data-in-emergencies.fao.org)

## Contact

FAO Representation in Burkina Faso  
FAO-BF@fao.org | @FAOBurkinaFaso  
Ouagadougou, Burkina Faso

FAO Subregional Office for Western Africa  
FAO-SFW@fao.org | [fao.org/africa/west-africa/en/](https://fao.org/africa/west-africa/en/)  
Dakar, Senegal

Office of Emergencies and Resilience  
[data-in-emergencies@fao.org](mailto:data-in-emergencies@fao.org) | <https://data-in-emergencies.fao.org>  
Rome, Italy

**Food and Agriculture Organization  
of the United Nations**