SUPPORT TO THE GOVERNMENT OF RWANDA IN SUSTAINABLE CONTROL AND MANAGEMENT OF FALL ARMYWORM

August 2020

SDGs:

Countries: Rwanda

Project Codes: TCP/RWA/3608

FAO Contribution USD 284 000

Duration: 28 December 2017 – 31 December 2019

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BACKGROUND

With the Fall Armyworm (FAW) pest affecting over 80 crop species in Rwanda in 2017 alone, many farmers saw their yields decrease and incomes depleted. Despite pest management and containment efforts, FAW in Rwanda has remained active since then, given its resistance and adaptability to the country’s climate and ecology. FAW was reported in all of Rwanda’s 30 districts by April 2017, affecting an estimated 38 percent of all maize crops (equal to 17 521 hectares), an essential cash and food crop among the national population at large. This was mainly due to limited capacities of the national research and extension service systems in ensuring early detection and timely response. As a transboundary insect with rapid spreading potential due its natural biological nature – and easily transmitted through trade and commerce – the FAW was found to pose a threat to livestock as well due to FAW-infested feed.

In response to the need for integrated pest management (IPM) and early warning systems, the Rwanda Agriculture Board (RAB) requested FAO’s technical support to mitigate FAW-related damage to crops and mitigate their impact on food security. Thus, in strengthening the capacities of the RAB, MINAGRI and District Directorates of Agriculture and Natural Resources, the project ensured a holistic approach to combatting the FAW by leading inter-institutional coordination consultations, capacity assessments, information management initiatives and community-based trainings for community farmers, district and sector agronomists, extension agents, Farmer Field School (FFS) Facilitators and RAB researchers. In addition, FAO’s Fall Armyworm Early Warning System (FAMEWS) mobile application and IPM guidance principles helped drive the training-of-trainers activities. As such, the project’s combination of programmatic coordination, technical assistance and equipment delivery made for a timely response ahead of the September - December 2017 agricultural season.

IMPACT

In strengthening Rwanda’s FAW information, monitoring and early warning systems, the project contributed to the long-term resilience of agricultural livelihoods to the threats on household incomes and food security. Through technical trainings, capacity assessments and knowledge management and outreach efforts, the project improved conceptual, programmatic, technical and surveillance capacities of governmental extension service personnel and farming communities.
ACHIEVEMENT OF RESULTS

In contributing to SDGs 1, 2, 13 and 17 by supporting farmers, rural cooperatives and extension workers around international FAW management, early warning surveillance systems and communication technologies (ICTs), the following noteworthy results were obtained:

- A participatory household survey to evaluate FAW impacts on income and food security was completed;
- Forty MINAGRI, RAB and district agronomists, 80 sector agronomists and 60 agricultural extension agents were trained on FAW biological and ecological principles and on monitoring and reporting modalities;
- A total of 1,200 households were trained on surveillance and equipment use (benefiting 2,481 farmers), and 120 FFS facilitators were trained on FAW biological and ecological principles and on monitoring and reporting protocols;
- Six meteorological data stations, 1,844 insect traps, 17,358 pheromone lures, 5,798 strips and 58 smart phones with the FAMEWS mobile application were delivered throughout the six target districts, including for RAB surveillance and demonstrative training plots; and
- A multi-stakeholder national task force for FAW management was restructured and technically supported to act as a coordinating, outreach and resource mobilization mechanism.

The national FAW management task force supported all other project activities, given its role in (i) providing technical inputs on IPM, (ii) reviewing sector laws and regulations, (iii) establishing an information sharing mechanism, (iv) coordinating a common communication strategy for FAW control and management, (v) validating FAW-related studies, and (vi) supporting advocacy initiatives for resource mobilization. In turn, these efforts supported the work of the RAB and contributed to the 2013-2018 Strategic Plan for Agricultural Transformation in Rwanda.

IMPLEMENTATION OF WORK PLAN

With the exception of three cancelled activities, all remaining project activities were completed within the envisioned timeline, which included a one-month extension from 30 November to 31 December 2019, and were delivered within the original budget. However, a budgetary revision was necessary in order to reallocate resources between human resource, equipment, travel, training and technical support services budget lines.

As for Activities 1.4 and 3.4, these were cancelled as they would have otherwise duplicated similar FAO efforts elsewhere, while Activity 3.1 was erroneously included under Output 3, as it went beyond the scope of the project and was not reflected in the agreed upon work plan and budget. Moreover, the national task force for FAW management proved essential during all project phases, as it ensured an active two-way communication between the project and governmental stakeholders and other interested actors.

With beneficiaries having been pre-selected by the MINAGRI and the RAB before the start of the project, the initial consultations, assessments and capacity building sessions were delivered in a timelier manner. Similarly, a well-informed risk management strategy on project sustainability, delivery and multi-stakeholder implementation contributed to the inclusive and timely delivery of results. Most notably, the potential risk of insufficient participation and commitment from beneficiaries, especially women, in project activities was not only duly managed, but also turned into a project milestone, as around 70 percent of direct beneficiaries from trainings were women.
FOLLOW-UP FOR GOVERNMENT ATTENTION

In order to ensure inter-institutional coordination, all members of the revamped national FAW monitoring task force are strongly encouraged to continue meeting on a quarterly basis, thus enabling a coordination platform for private sector representatives, civil society organizations, farmer federations, resource partners and extension service personnel.

Furthermore, the members of the national FAW monitoring task force, the FFS facilitators and governmental extension workers are invited to make use of the best practices that were documented throughout the project in order to identify windows of opportunity for scalability and replicability of results. Linked to this, a comprehensive assessment of the project’s key achievements and impacts may prove timely. FAO, the MINAGRI and the RAB are thus invited to consider carrying out this task. Similarly, a socio-economic impact assessment survey targeting project beneficiaries and non-beneficiaries – with the support of the community-based FAW monitoring and information capacities in place – could help promote the value added of adopting FAW monitoring tools.

With respect to the FAMEWS mobile application, all governmental and district authorities are reminded of the importance of supporting community focal points in charge of collecting and sharing information using the FAMEWS tool, especially as new farmers adopt these tools.

SUSTAINABILITY

1. Capacity development

Based on the FFS approach to capacity development, all training activities ensured participatory approaches to knowledge sharing, demonstrative workshops on disease surveillance and guidance on internationally accepted data reporting modalities. As such, the programmatic, monitoring and technical capacities of extension specialists, district agronomists, community promoters and farmers were strengthened.

Given the Rwandan government’s commitment to fostering innovation for agricultural development, the project’s ICT-based solutions contributed to this national effort, evidenced by the RAB integrating these toolsets into their work on crop protection. These solutions contributed to the restructuring of the FAW monitoring task force and its coordinating mandate with implementing and resource partners and end users of FAW-related data.

In turn, this programmatic coordination fostered strategic partnerships with the Ministry of Local Government and the United States Agency for International Development (USAID), as well as with the European Union, United Kingdom Department for International Development, International Centre for Tropical Agriculture and Crop Intensification Programme stakeholders, all of whom integrated FAW monitoring into their 2017-2018 agriculture work plans.

2. Gender equality

With all farmers, irrespective of gender and age, affected by the effects of the FAW infestation, the project designed gender-responsive capacity building initiatives so gender-specific limitations and opportunities could be documented and integrated into programmatic and outreach efforts. Additionally, the project responded to the needs of men and women through their respective agricultural cooperatives, the majority of which were led by women. As such, about 70 percent of all direct beneficiaries were women.

3. Environmental sustainability

The project promoted a holistic understanding of IPM and FAW monitoring and information systems in a context of climate change adaptation. This approach was rooted in reducing harmful pesticide use to mitigate human health and environmental risks. Therefore, the project promoted the use of technologies, guidelines and international best practices to protect and conserve at-risk crops, soils and ecosystems. In addition, the project’s ICT-based solutions and multi-stakeholder coordination platforms helped obtain the buy-in from government authorities and partners in order to mainstream environmental sustainability from an early warning-early action perspective.

4. Human Rights-based Approach (HRBA) – in particular Right to Food and Decent Work

By strengthening the timeliness and reliability of FAW information systems, the project ensured that all data-driven insights produced can to policies that safeguard the income-generating activities of farming communities and their progressive realization of their right to food. As such, the project empowered farmers and extension service personnel through the FAMEWS application and multi-stakeholder monitoring systems that document the plights and risks to rural livelihoods in a non-discriminatory, accountable and transparent way.
5. Technological sustainability

With the FAMEWS mobile application available in Kinyarwanda, this solution enabled farmers to collect and share information on the spread and impact of FAW more effectively. Also, since the mobile application can be used in different operating systems and farmers can send their recorded data to a global server, this equipment and the data collection knowhow have afforded farmers flexibility and adaptability to their local circumstances, including to the varying degrees of internet connectivity and remoteness of their farms. Thus, the trainings on using the FAMEWS mobile application, coupled with the provision of pheromone traps and lures, among other key inputs, has significantly developed technical capacities on FAW monitoring and early response.

With the FFS approach guiding the project’s capacity development activities, the tools distributed to farmers can be replicated in other farms and contribute to local knowledge development. Overall, the interest in these tools manifested by beneficiaries exceeded expectations, evidenced by high degrees of ownership.

6. Economic sustainability

No additional resources were identified beyond the project’s end date, but the relevance, affordability and adaptability of the technological inputs provided can incentivize new beneficiaries and stakeholders in replicating the experience. Moreover, in light of reliable and affordable internet data plans, farmers stand to benefit from the FAMEWS mobile application and its cost-effective approach to collecting, recording and reporting FAW data. These efforts, coupled with the work of the national FAW monitoring task force, shall contribute to the 2013-2018 Strategic Plan for Agriculture Transformation in Rwanda and, more broadly, to the FAO Global Action for FAW Control, through which additional funding can be identified and best practices exchanged.

**DOCUMENTS AND OUTREACH PRODUCTS**

## Expected Impact

Protected livelihoods and food security of population living in FAW affected areas and developed capacities of main stakeholders in surveillance, monitoring and management of the FAW.

### Indicators

<table>
<thead>
<tr>
<th>Capacities at all levels to monitor and manage the FAW infestations are strengthened and its spread is significantly derailed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Trained experts and forecasters engaged in routine FAW monitoring (Output 1).</td>
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<tr>
<td>2. Number of villages implementing community-based monitoring and forecasting methods (Output 2).</td>
</tr>
<tr>
<td>3. Type and number of publicity materials produced and distributed (Output 2).</td>
</tr>
<tr>
<td>4. Maize and sorghum cropped areas protected (Output 3).</td>
</tr>
</tbody>
</table>

### Baseline

- 1. 0
- 2. 0
- 3. 0
- 4. 0

### End Target

- 1. 202 technical personnel trained on FAW management from district level to sector level.
- 2. 60 villages in targeted districts equipped with tools to control FAW and information sharing (insect traps with pheromone lures, rain gauge, stationery, record sheets and information materials).
- 3. 3,000 printed materials (e.g., leaflets written in appropriate local languages).
- 4. 50,000 hectares of maize and sorghum-planted areas.

### Comments and follow-up action to be taken

The project outcome was achieved, driven by the following results on capacity building, stakeholder and beneficiary ownership of the frameworks and equipment provided and enhanced access to data-driven insights for farmer and extension workers.

- A multi-stakeholder national FAW task force was established and is still operational, serving as a coordinating, outreach and resource mobilization mechanism;
- A host of ICT-based solutions were provided and well received by farmers and governmental stakeholders, most notably the FAMEWS mobile application, made available in Kinyarwanda;
- Overall, 40 MINAGRI, RAB and district agronomists, 80 sector agronomists, 60 agricultural extension workers, 120 FFS facilitators and 1,200 households (equal to 2,481 farmers) were trained on FAW biological and ecological principles and on FAW monitoring and reporting protocols; and
- Six meteorological data stations, 1,844 insect traps, 17,358 pheromone lures, 5,798 strips and 58 smart phones were delivered, including for RAB surveillance and training.

A continuous support shall be guaranteed to community focal points charged with collecting and sharing information via the FAMEWS tool, in order to build on the established community-based capacities for FAW monitoring and early warning.

## Output 1

FAW impact assessed and national capacities for FAW surveillance, monitoring and early warning system improved

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Target</th>
<th>Achieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trained experts and forecasters engaged in routine FAW monitoring.</td>
<td>202</td>
<td>Yes</td>
</tr>
</tbody>
</table>

### Baseline

0

### Comments

As part of Output 1, a total of 226 technical experts working on FAW monitoring and management and over 2,000 farmers were trained and are now able to detect and manage the incidence of FAW. These results surpassed the initial end target of 202. Overall, 2,950 farmers, technical personnel, experts, community representatives, farmer facilitators and promoters were trained in routine monitoring and management of FAW, early warning, integrated pest management and pesticide reduction. They are now able to detect and manage the incidence of FAW.

As a suggested follow-up action, a socio-economic impact assessment survey targeting project beneficiaries and non-beneficiaries, with the support of the community-based FAW monitoring capacities in place, shall be explored in coordination with FAO and the MINAGRI and RAB.

Activity 1.4 was cancelled in coordination with the Lead Technical Officer (LTO) in the interest of avoiding the duplication of efforts, as a similar activity had already been completed by a team in FAO headquarters.
<table>
<thead>
<tr>
<th>Activity</th>
<th>Description</th>
<th>Achieved</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activity 1.1</td>
<td>Assessing losses caused by FAW and its impact on food security and household income will be evaluated</td>
<td>Yes</td>
<td>A participatory household survey was completed to evaluate the impact of FAW on household income and food security. In turn, a socio-economic impact assessment report, including on the availability of FAW monitoring tools, was also completed.</td>
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<tr>
<td>Activity 1.2</td>
<td>Establish national task force on fall armyworm to oversee coordinated, concerted stakeholder action</td>
<td>Yes</td>
<td>A national task force for FAW management was established and it is currently operational. It has supported resource mobilization efforts and outreach/awareness campaigns and has the potential to continue serving as a national coordination mechanism to ensure concerted stakeholder actions for FAW surveillance and response.</td>
</tr>
</tbody>
</table>
| Activity 1.3 | Provide forecasting surveillance material and equipment | Yes | The following forecasting and surveillance equipment was provided to each target district.  
- Muhanga District (236 insect traps, 1,780 pheromone lures, 100 strips; 8 smart phones);  
- Nyagatare District (350 traps; 4,774 pheromone lures; 1,924 strips; 10 smart phones);  
- Nyamagabe District (195 traps; 1,905 pheromone lures, 150 strips; 10 smart phones);  
- Nyanza District (223 traps; 1,983 pheromone lures; 1,018 strips; 10 smart phones);  
- Ruyigi District (170 traps; 2,295 pheromone lures; 534 strips; 10 smart phones);  
- Kayonza District (220 traps; 2,221 pheromone lures; 516 strips; 10 smart phones).  
Likewise, 450 traps, 2,400 pheromone lures and 1,556 strips were distributed to the RAB for FAW monitoring in demonstration plots. |
| Activity 1.4 | Evaluation of the capture of commercial pheromone blends | No | Activity 1.4 was meant to carry out a pilot study of commercial pheromone blends and trap designs as part of an FAW monitoring system for vulnerable crops. However, in consultation with the project’s former LTO, the activity was cancelled because FAO headquarters personnel had already conducted this type of study and compiled a list of pre-qualified vendors. |
| Activity 1.5 | Conduct a training of trainers | Yes | A series of training-of-trainers sessions were successfully conducted for 40 participants from the MINAGRI, RAB and District Directorates for Agriculture and Natural Resources. The trainings centered on FAW biological and ecological traits and on IPM monitoring and reporting protocols. |
| Activity 1.6 | Training of technical personnel on FAW management | Yes | A total of 80 sector agronomists and 60 agricultural extension agents received training on the biological and ecological traits of FAW and on the FAMEWS mobile application. |
| Activity 1.7 | Evaluation of spread and damage of FAW in Rwanda | Yes | Several surveys were successfully conducted to establish the magnitude of spread and damage of FAW. The results were included in a report made available to the pertinent stakeholders. |
| Activity 1.8 | Knowledge sharing on FAW management | Yes | Several reports on FAW management, equipment use and impact assessments were shared with stakeholders, including an FAO training manual on FAW monitoring and early warning. |
## FAW information sharing and farmers capacities for FAW monitoring and early warning system strengthened

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Target</th>
<th>Achieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Number of villages implementing community-based monitoring and forecasting methods.</td>
<td>- 60 villages in targeted districts equipped with tools to control FAW and information sharing (insect traps with pheromone lures, rain gauge, stationery, record sheets and information materials).</td>
<td>Yes</td>
</tr>
<tr>
<td>- Type and number of publicity materials produced and distributed.</td>
<td>- 3 000 printed materials (e.g. leaflets written in appropriate local languages).</td>
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### Baseline

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### Comments

In light of the project success stories, programmatic milestones and lessons learned that were documented and given the community-based capacities in place, a more comprehensive project impact assessment may be conducted. Likewise, a field survey to assess project achievements and its impacts on beneficiaries in the target districts and a control group would be beneficial after the project concludes.

## Learn lessons from army worm community in the affected areas of the country

### Activity 2.1

**Achieved**

The documenting of lessons learned, as part of a series of community-level discussions from the most affected areas, was completed, with a Back-to-Office Report outlining the most salient points. As a follow-up task, conducting an assessment and documentation of key project achievements and impacts may prove timely, thereby contributing to the project’s strong knowledge management component.

### Activity 2.2

**Comments**

In collaboration with the RAB, a one-day knowledge sharing and consultation workshop on 19 December 2019 was carried out with the participation of 45 key project stakeholders. The workshop centered on community-based FAW monitoring and forecasting at all levels, aiming to share knowledge on FAW management and control. In addition, project success stories, noteworthy project milestones and programmatic lessons learned were identified and documented in preparation for the official project closure and for record-keeping purposes.

### Activity 2.3

**Comments**

The establishment of community-based FAW monitoring, forecasting and early warning system capacities was successfully completed for 10 villages from each of the six selected districts. As a follow-up complementary action, conducting a field survey to assess longer term impacts among beneficiaries can be considered moving forward.

## Support establishment of community-based FAW monitoring and forecasting

### Activity 2.4

**Comments**

A total of 1 200 insect traps with pheromone lures were installed to set up trap sites in potential infestation areas of maize production across all target districts. As part of this activity, six meteorological data stations (one per target district) were expected to be installed; however the project team agreed to change this deliverable and focus instead on purchasing mobile phones that would use the FAMEWS mobile application in light of the observed patterns of the spread of FAW at the time. Moreover, an additional 1 200 pheromone lures and 550 traps were distributed to farmers at the beginning of 2020 Agricultural season B (February – June).

### Activity 2.5

**Comments**

A hands-on training for 1 200 selected households was carried out on the use of surveillance equipment, from which a total of 2 481 farmers directly benefited.
### Activity 2.6
Integrate FAW management in the refresher courses and training of facilitators for farmer field schools currently conducted in Rwanda

<table>
<thead>
<tr>
<th>Achieved</th>
<th>Yes</th>
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<tbody>
<tr>
<td>Comments</td>
<td>A series of trainings for 120 FFS facilitators were delivered, focusing on the biological and ecological traits of FAW and on monitoring and reporting modalities. A report with key results was prepared.</td>
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### Activity 2.7
FAW information packaged and disseminated

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<thead>
<tr>
<th>Achieved</th>
<th>Yes</th>
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<tbody>
<tr>
<td>Comments</td>
<td>A total of 3,500 FAW informational leaflets in Kinyarwanda were delivered to farmers and extension service personnel. As part of these efforts, the RAB and the USAID Feed the Future Hinga Weze programme supported the development of a simple guide on FAW identification and management, with 300 guidance brochures in Kinyarwanda for farmers and extension personnel already delivered.</td>
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</table>

### Output 3
FAW information sharing and farmers capacities for FAW monitoring and early warning system strengthened

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Target</th>
<th>Achieved</th>
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<tbody>
<tr>
<td>– Maize and sorghum cropped areas protected.</td>
<td>– 50,000 hectares of maize and sorghum-planted areas.</td>
<td>Yes</td>
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<tr>
<td>– Number of farmers trained.</td>
<td>–</td>
<td></td>
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</table>

#### Baseline
A total of 2,481 farmers who had received training on FAW surveillance materials and equipment use and on the FAMEWS, also received additional training specific to pesticide risk reduction. From this cohort, 30 farmers from the different target districts took part in a training-of-trainers capacity development initiative on a new version of the FAMEWS, in order for them to share this knowledge and replicate the experience with fellow farmers in their respective districts. As part of these efforts, a total of 50,000 hectares of maize and sorghum-planted areas were also protected from potential FAW outbreaks.

However, two of the four activities under Output 3 were not completed, with Activity 3.1 cancelled as it was erroneously assumed to have been included in the work plan and budget, and it nevertheless extended beyond the scope of the project. As for Activity 3.4, it was cancelled given that FAO personnel in headquarters was already carrying out a similar task, hence it was best to avoid the duplication of efforts.

### Activity 3.1
Support RAB research capacity in advanced technologies to develop new varieties of maize

<table>
<thead>
<tr>
<th>Achieved</th>
<th>No</th>
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<tbody>
<tr>
<td>Comments</td>
<td>Activity 3.1 was cancelled after a technical review concluded it extended beyond the project’s scope and timeline; thus, it must have been erroneously included during the project formulation. This explains why the activity was not reflected in the final work plan and budget.</td>
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### Activity 3.2
Promote use of non-pesticide methods

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<thead>
<tr>
<th>Achieved</th>
<th>Yes</th>
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<tbody>
<tr>
<td>Comments</td>
<td>A promotional and outreach campaign was organized in collaboration with the RAB to promote the use of non-pesticide methods to manage FAW, such as handpicking, sex pheromone traps and bio-pesticides, and cultural methods, such as spraying sand or ash and mixed cropping systems.</td>
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### Activity 3.3
Carry out training on pesticide risk reduction

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<tr>
<th>Achieved</th>
<th>Yes</th>
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<tbody>
<tr>
<td>Comments</td>
<td>The training successfully reached 2,481 participants.</td>
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</table>

### Activity 3.4
Establish standard operating procedures (SOPs) linking surveillance/monitoring and control

<table>
<thead>
<tr>
<th>Achieved</th>
<th>No</th>
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<tbody>
<tr>
<td>Comments</td>
<td>Activity 3.4 aimed at developing SOPs linking surveillance/monitoring and FAW management. However, since FAO headquarters personnel were already developing this standard set of SOPs, the project team decided it not to carry out this activity.</td>
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