

## Strategic Pest Management Booklets for Farmers in Kaffrine, Senegal

### Executive Summary

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When Kaffrine, Senegal faces the threat of a locust plague, farmers tend to struggle to determine what actions should take place and when to prevent a plague. This issue has persisted due to the lack of historical institutional arrangements, proper education, and often late preventative techniques. With this, farmers been set up for failure on how to restrict outbreaks.

Locust behaviors are either characterized as solitary or gregarious. Solitary locusts are innocuous and do not pose a threat to agriculture. However, when locusts undergo phase polyphenism they become gregarious and tend to favor highly dense populations that exhibit swarming characteristics. It is critical to identify these early threats, the time before locusts congregate and undergo phase change, to prevent an outbreak. If these early threats are not addressed in a timely and appropriate manner, locust outbreaks will impact the functionality of Senegal's ecosystems, the welfare of its social systems, and the peoples' economic opportunities.

The project was initiated from a \$500,000 grant issued to the Global Locust Initiative (GLI) by the United States Agency for International Development (USAID) and the Office of U.S. Foreign Disaster Assistance (OFDA). To best assist Senegalese farmers, I teamed up with GLI to co-create 300 pest identification booklets that provide five villages in Kaffrine the proper education to improve early detection awareness. The booklets are to be considered an addition to the 300 control and management booklets as well as other on-the-ground soil amendments solutions to keep locusts at bay.

Before creating these booklets my team and I researched early warning systems, locust identification, preventative approaches, and other identification booklets. We then combined these studies with peer-reviewed research on how to best communicate about pest control with farmers. Our team then worked closely alongside subject matter experts that have experience creating identification booklets and looked towards these individuals for guidance.

Once the booklets were completed, our team had to account for the obvious language barrier. To overcome this, and to ensure all community members had access to the booklets, our team translated the material into two languages: French and, the local language, Wolof. Our team also leveraged informative graphic designing, a common Social and Behavior Change Communication (SBCC) tool, to aid individuals with lower literacy in understanding the ideas and material presented. In other words, descriptive visuals were added to each page to accompany text to provide context and help illustrate messages. In all there are a total of four different sections in the booklet. Section one summarizes the booklet and acknowledges the international cooperation between project partners to bring this project to life. Section two focuses on the characterization of locusts, locust anatomy, and other general background information. Section three covers each of the 13 different species. For each species, there are pictures and illustrations, descriptions of where

each species lives and what it eats, and details of other important characteristics (size, life cycle, etc.). Lastly, section four covers the contact information for the Plant Protection Directorate (DPV) located in each region in case of an emergency.

We then traveled to Kaffrine (February 22 – March 8, 2020) to conduct training workshops that enabled us to test our pilot project and gather feedback in each village. During each workshop, our team presented results of the on-the-ground nitrogen fertilization experiment, handed out and discussed the completed control and management booklet, and piloted the identification booklet material. The workshops allowed the Senegalese community to ask questions, pose comments, and provide us with feedback before moving forward with the final printing process. For instance, individuals would gather in groups to discuss images and material that described the habitats in which each species live, the diets of each locust, which season each species is spotted in, and so on. The community's feedback regarding these illustrations helped us adjust and better reflect critical details of what they actually experience in their own plots of land. The attention to detail is of high importance for the community members and these changes can be seen in the final booklet.

The results from the training workshops also provided an insight into the success of the entire project. This can be seen by the Senegalese community's ability and dedication to learning fast as well as their commitment to continue utilizing these methods to prevent locust outbreaks. For example, during the training workshops our team presented pictures of several species, such as the Senegalese locust (*Oedaleus senegalensis*). After presenting some of the identifying characteristics of *O. senegalensis*, most notably the shape and markings on the top of the pronotum, the community was able to distinguish this species from others within a matter of minutes. Being able to distinguish different species is critical for identification and prevention purposes as it suggests the potential severity of which species might be on the verge of an outbreak. It is also significant to identify which species are seen as it will later help the DPV.

For now, our team is waiting to return to Senegal to finish out the remaining workshops. Unfortunately, due to COVID – 19 the trip where we would have been passing out the finalized version of the identification booklet and gathering feedback about the project has been postponed to a later date (July 8 – 9). The feedback will be completed through interview questions that our team is prepared to ask community members and will serve as a significant component to measuring our team's success. Although this poses a complication to the project, our team has been in contact with the community to ensure individuals are aware of the issue and are able to attend our future workshop. Staying in contact with the community has enabled us to still move forward and allowed us to overcome this barrier.

In conclusion, the intended outcomes of this project include improved well-being of the farming community, increased millet yields, and enhanced global food system sustainability. Ideally, to provide a full measurement, observations will also need to be conducted over the long-term to measure this and monitor the locust levels in the villages where the project was located. These observations will need to be investigated years into the future to provide an accurate representation of the project effectiveness. However, in the short-term it is safe to say that the testimonials provided by community members during the final interview allows us to measure our project success.