



# FEED THE FUTURE

The U.S. Government's Global Hunger & Food Security Initiative



## PROCESS EVALUATION OF THE PEACE CORPS/SENEGAL MASTER FARMER PROGRAM

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## Acknowledgements

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*Cover images provided by Danielle Stoermer.*

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## Acronyms and Abbreviations

IPM	Integrated Pest Management
MF	Master Farmer
PAPA	Participating Agency Partnership Agreement
PCV	Peace Corp Volunteer
USAID	United States Agency for International Development



Photos by Danielle Stoermer



Photo by Danielle Stoermer

From late 2013 to early 2014, Peace Corps/Senegal and Peace Corps/Washington collaborated on a process evaluation of the Master Farmer Program, which is supported through a partnership with the U.S. Agency for International Development (USAID) to support Feed the Future in Senegal. The program goal is to improve the lives of farmers and their families in the communities where Peace Corps Volunteers (PCVs) work by improving food security through the adoption of improved agriculture and agroforestry technologies. Peace Corps/Senegal trained its first Master Farmers (MFs) in March 2010. There are 40 MFs throughout the country.

The goal of the evaluation was to determine if the program is meeting its intended objectives to:

- Provide MFs with appropriate resources to develop “Master Farms.”
- Support MFs to conduct relevant training.
- Promote adoption of improved agricultural technologies and management practices by local farmers.

The evaluation also assessed the program’s applicability for other Peace Corps posts and identified best practices, lessons learned, and overall recommendations for improving the program as it continues.

The assessment used a mixed-method approach for data collection, including quantitative and qualitative data from interviews, observations, and review of secondary information about the program. The six-person evaluation team conducted structured interviews with four participatory groups:

- 15 MFs selected and trained by Peace Corps staff and PCVs.
- 16 PCVs working with the program.
- 14 Key Informants from Peace Corps, USAID, and the Government of Senegal.
- 192 Program Participants (local farmers who have been trained and advised by MFs in the application of improved technologies).

## Executive Summary

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To improve data collection and processing, the evaluation team's five enumerators interviewed all 237 respondents in the field using Google 7 Nexus tablets. All the data from the questionnaires were recorded on the tablets using DataWinners' online survey software, and survey results were uploaded to DataWinners for summarization. This process reduced transmission errors and shortened the time required for data analysis.

The greatest program benefits, as reported by all respondents, said that MFs/Master Farms serve as:

- Local demonstration sites for improved agricultural technologies.
- Permanent local sources of improved knowledge related to agriculture and agroforestry.
- Local sources of improved planting materials.

When asked how to increase numbers of MF training events, all the respondents suggested:

- Increasing advertising and explanation of this extension education model to local farmers.
- Continuing to increase MFs' agricultural technology knowledge and skills.
- Continuing to improve physical infrastructure on Master Farms, such as wells, fences, tools, and drip irrigation systems.
- Increasing training resources, such as lunches and travel expenses.

Program Participants specifically urged program managers to:

- Increase training to help the MFs be better extension agents.
- Encourage MFs to conduct more training activities.
- Help MFs collaborate more with local development agencies and the Government of Senegal extension service.
- Help local farmers with inputs such as fences, tools, and water.

More than half of the Program Participants interviewed reported having applied a new technology as a result of the Master Farmer Program. The most commonly reported technologies include composting, mulching, integrated pest management (IPM) in the garden, double digging, tree nursery establishment, and use of soil amendments (see **Annex E** for a list of all technologies). Reasons for applying the new methods were that



they observed success from the Master Farms, they expected beneficial outcomes, and MFs assisted with the implementation.

Key informant recommendations for the Master Farmer Program included more careful selection of MFs and adding more women; increasing the variety and amount of MF training, especially on business development, marketing, and learning to think like entrepreneurs; and urging MFs to work more closely with PCVs and the national extension service.

When asked about replicating the Master Farmer Program at other Peace Corps posts, Key Informants said “yes,” with the following specific recommendations:

- Peace Corps staff must have strong backgrounds and technical skills in agriculture and extension.
- The program must be careful to adapt to the local context.
- New posts should work closely with Peace Corps/Senegal at the beginning to benefit from lessons learned and promising practices.

Overall, the Peace Corps/Senegal Master Farmer Program demonstrates evidence of meeting its goals to improve food security and help other farmers apply improved technologies. Still, Key Informants shared specific suggestions for improving the program as it continues:

- Decentralize program management, especially in streamlining the process for holding training and empowering PCVs to better support MFs.
- Encourage continuous knowledge and skill development with ongoing training for MFs and networking among MFs and agricultural production and research sites.
- Increase and improve MF extension activities by having better demonstrations; more small, hands-on training opportunities; and more coordinated extension activities with PCVs.
- Generate more seed, seedlings, and cuttings so they are available to community members.
- Continue diverse technology demonstrations on the Master Farms.

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# Purpose, Scope, and Methodology of the Process Evaluation

## Purpose

Since the Peace Corps' creation in 1961, its volunteers have been working with individuals and groups in their host communities to reduce food insecurity by increasing agricultural productivity, increasing access and utilization of nutritious food, and improving economic outcomes. In 2009, three Peace Corps posts—Senegal, Ghana, and Mali—entered into a food security partnership with USAID missions in their countries to advance the work of Feed the Future presidential initiative. In 2011, Peace Corps/Washington and USAID's Bureau for Food Security signed the Global Food Security Agreement, which supports food security programming and training for the Peace Corps. Since then, six USAID country missions and one regional mission have provided funds to Peace Corps posts under the partnership.

Given the Peace Corps and USAID's commitment to supporting PCVs with activities to improve food security in their communities, Peace Corps/Washington and Peace Corps/Senegal collaborated in 2013 to conduct a process evaluation of the Master Farmer Program. The purpose of the evaluation was to assess the effectiveness of the following program objectives in Senegal:

- Provide MFs with appropriate resources to establish effective decentralized agricultural training centers, called "master farms"
- Support MFs to conduct relevant training activities at the Master Farms
- Promote adoption of improved agricultural technologies or management practices by Program Participants attending training activities held at the Master Farms

This process evaluation was also designed to identify best practices, lessons learned, and recommendations for improving the Master Farmer Program in Senegal, as well as assess the program's applicability for other Peace Corps posts focusing on projects related to food security.

## Scope

Given the focus of the program—and the evaluation—on the adoption of improved practices, it was important to follow up with MFs who had been involved long enough to affect change. Thus, the sample of MFs included in the evaluation was restricted to those who had been in the program for at least two years. Two years is a sufficient to account for the time necessary for an MF to establish a master farm and conduct extension and training activities, and to account for the lag time in adoption of improved technologies or management practices by Program Participants. Because of this time restriction, the potential sample was 23 out of a population of 40 MFs trained since March 2010. Due to constraints on time, logistics, schedules, and resources, the final evaluation sample was 15 MFs, as well as the associated PCVs and Program Participants.

## **Purpose, Scope, and Methodology of the Process Evaluation**

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To ensure that the evaluation enumerators interviewed only individuals in the communities that were familiar with the MFs, the master farms, and/or the Master Farmer Program, attendance records for extension/training activities were reviewed to identify Program Participants. Attendance records were not available in one case, so the enumerator asked for program participant referrals from that MF.

The results of this evaluation are intended to be used by:

- Peace Corps/Senegal's programming and training staff, to improve the Master Farmer Program.
- Other Peace Corps posts interested in starting similar programs; the results can be generalized to similar programmatic situations where the local and national context is similar to the Senegalese communities participating in this evaluation
- Peace Corps posts and Peace Corps/Washington to inform future program process evaluations

### **Methodology**

This evaluation was conducted using sound social science principles, including mixed methodology, randomized selection of the Program Participants, and standardization across interviews through use of survey instruments, which minimized bias and potential conflict of interest issues. The evaluation team was composed of three local language enumerators, two English language enumerators, and one advisor, who was also a coauthor on this report.



# Purpose, Scope, and Methodology of the Process Evaluation

## Key Evaluation Questions

The evaluation team members used the following questions to guide their data collection related to programmatic objectives for testing, demonstrating, and training on improved technologies or management practices of the Master Farmer Program during the previous year (roughly the 2013 calendar year):

- What improved technologies or management practices are being demonstrated and trained on at the master farm(s)?
- How many training activities (i.e., open field days, workshops, or informal visits) are occurring at each master farm?
- How many Program Participants are attending training activities at the master farm(s)?

The team used the following questions to guide their data collection related to the adoption rate and benefits of improved technologies and management practices during the previous year (roughly, the 2013 calendar year):

- Which Program Participants are adopting improved agricultural technologies or management practices? Which technologies or management practices are they adopting?
- What are the reasons for specific improved agricultural technologies or management practices being or not being adopted?
- What are the features of the Master Farmers, master farms, and improved technologies adopted that led Program Participants to adopt these technologies or management practices?
- According to the Program Participants, what are the food security benefits to the individual, household, or community of adopting an improved technology or management practices?



Photo by Danielle Stoermer

## Background: Master Farmer Program

Peace Corps/Senegal began implementing the Master Farmer Program as part of the post's Food Security Program in 2009, and the first master farmer training was held in March 2010. The program is partially supported by the Global Food Security Response Agreement with USAID/Senegal (signed on October 1, 2009) and the Growing Healthy, Productive Communities in Senegal Agreement, an amendment to the Global Food Security Framework Participating Agency Partnership Agreement<sup>1</sup> (signed on December 31, 2013).

Peace Corps/Senegal is implementing the Master Farmer Program to improve the lives of farmers and their families in the communities where Volunteers work by improving food security. The program is designed to expand the agricultural extension outreach of Peace Corps and USAID by expanding the capacities of MFs to serve as agriculture extension educators. The MFs and their master farms—demonstration and educational sites where the MFs can provide extension—serve as local sources of improved seeds and other agricultural inputs, technologies, and procedures to farmers in the community.

### **The four main objectives of the Master Farmer Program are to:**

- 1. Test, demonstrate, and adapt the best technologies that Peace Corps has to offer in the domains of field crops, gardening, agro-forestry, nutrition, and agribusiness<sup>2</sup>**
- 2. Create decentralized training centers for farmers**
- 3. Create decentralized sources of seed and other plant materials**
- 4. Demonstrate that a 1 hectare farm can improve a farmer's food security**

Peace Corps/Senegal modeled the Master Farmer Program on the concepts of “pilot farmers”<sup>3</sup> and community training centers. In the late 1990s, USAID/Senegal's Natural Resource Management Program established community training centers throughout the country. The centers were owned by the Senegalese government but operated by Peace Corps/Senegal and community leaders. They became educational and training centers that integrated

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1 The agreement was signed between USAID's Bureau of Food Security and the Peace Corps on July 28, 2011

2 Nutrition and agribusiness were not major foci of the program originally, but were more intentionally incorporated into the program in late 2012.

3 A “pilot farmer” is an experienced farmer who is typically more innovative than his peers and more willing to accept the risk involved in testing new technologies or methodologies. (“Model” farmers, “master” farmers, or “leading” farmers are all acceptable terms for a pilot farmer.) In many cases, pilot farmers can be used to bring new technologies or methodologies to their peers; thus, they are valuable for technology transfer.

## Background: Master Farmer Program

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improved technologies, information, and skills from Peace Corps programs. After the USAID-funded project ended in 2000, Peace Corps could not support the community training centers, and gave the communities full responsibility. Soon, most closed or fell into disrepair, but the successful extension model of using a few innovative farmers as trainers of localized, season-specific, and culturally appropriate improved agricultural techniques established the foundation of Peace Corps/Senegal's Master Farmer Program.

Since March 2010, 40 MFs throughout Senegal have been selected to participate in the Master Farmer Program. They were chosen based on eight required and two preferred selection criteria. An MF is typically nominated by a second-year PCV in the community. The MF signs a four-year agreement with Peace Corps/Senegal, which requires the farmer to:

- Provide a 0.5 – 1 hectare plot of land for the establishment of a demonstration site
- Conduct training and experimental demonstrations on the site (for example, "Open Field Days") to support and educate other farmers
- Attend an annual conference
- Participate in annual evaluations

The MFs are trained on food security concepts, including agricultural and agroforestry technologies such as cultivation of improved varieties, soil fertility improvement, conservation farming, composting, IPM, live fencing, alley cropping, wind breaks, tree nursery development, tree grafting, gardening technologies from nursery to harvest, drip irrigation, and the System of Rice Intensification (see **Annex E** for descriptions). They are also trained to design and implement demonstration plots, data collection, small accounting, nutrition, and provide extension services.

The "master farms" are established with as-needed resources provided by Peace Corps/Senegal through the partnership. The most common infrastructure needs for a Master Farm are in building a fence around the demonstration site, digging a well or installing a water tap, building a storage shed, and providing the MF with tools and planting materials. Throughout the program, PCVs and Peace Corps/Senegal support the MFs to design and purchase supplies, provide the MFs with technical and managerial capacity training; and assist the MFs to become local sources of improved agricultural inputs in the community. There are currently 40 MFs in the program, spread throughout the country (see **Map 1**).

## Background: Master Farmer Program

Map 1: Master Farmer in Peace Corps/Senegal's Master Farmer Program

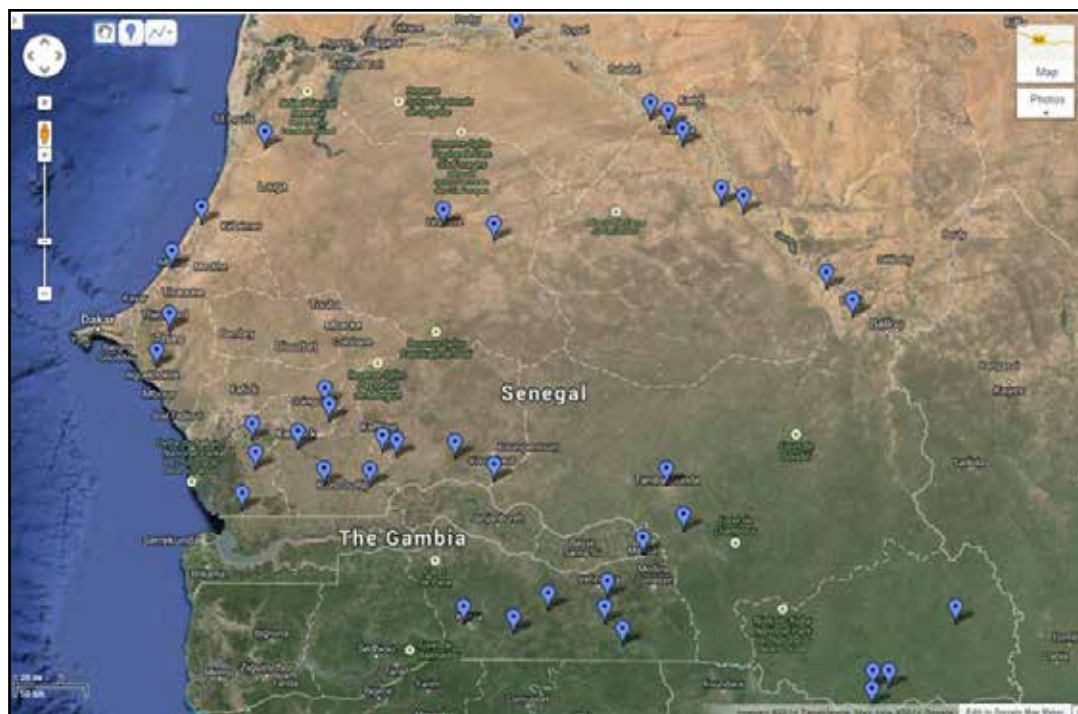


Table 1: Department and Region of Master Farmers Interviewed and Number of Program Participants and Peace Corps Volunteers Interviewed per Master Farmer

Region	Program Participants Interviewed	PCVs Interviewed
Kaolack	11	1
Kaffrine	15	1
Kaolack	10	2
Kaffrine	13	1
Kaolack	17	1
Kaolack	11	1
Fatick	11	0
Kaffrine	15	1
Kaffrine	14	2
Kedougou	12	1
Fatick	11	1
Kolda	11	0
Fatick	13	1
Kolda	14	2
Tambacounda	14	1



## Evaluation Design

The evaluation team used a mixed-methodology approach of data collection combining quantitative and qualitative data from interviews with MFs, PCVs, Program Participants, and Key Informants, along with documentation of applied improved technologies or management practice through photos and geospatial coordinates. The evaluators also utilized quantitative and qualitative data from secondary data sources, such as MF interviews at the December 2013 Annual Master Farmer Conference and programmatic reports on extension/training activities. This approach allowed the evaluators to obtain and document extension/training activities (which types and how many) being conducted by the MFs and improved technologies or management practices being applied (types, number, reasons for application, length of application, and perceived benefits).

A novel approach for this process evaluation was the introduction of tablets for electronic transcription of participant responses during interviews. The system worked well even in areas with minimal electricity, reducing the time needed for summarizing results and enhancing data accuracy.



Photo by Danielle Stoermer

Specifically, the evaluation team conducted the following data collection activities:

### 1. Desk Research/Background Review

This activity included a review of the original partnership agreement and programmatic documents, such as the MF application process/selection criteria documents, program contracts between Peace Corps/Senegal and MFs, planned schedule of yearly goals for Master Farms, Master Farm training material, attendance logs from extension/training activities, narrative reports, press releases, and interview data set from the 2013 Annual Master Farmer Conference. **Annex A** provides a comprehensive list of the documents the team reviewed.

The review of attendance records resulted in the evaluation team's creating a randomized program participant lists for the MFs. This list provided an initial guide for the enumerators to identify Program Participants to interview for the evaluation.

# Evaluation Design and Tools

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## 2. Structured Interviews

Five members of the evaluation team conducted 237 structured interviews with the following four groups associated with the Master Farmer Program:

- Master Farmers (n = 15)
- Peace Corps Volunteers (n = 16)
- Key Informants (n = 14)
- Program Participants (n = 192)

All interviews with Program Participants and MFs took place in-person. Four of the key informant interviews and seven of the PCV interviews were also conducted in-person, with the remainder conducted by phone.

Two of the authors conducted the PCV and key informant interviews; all of the MF and program participant interviews were conducted by a native-speaking Senegalese enumerator. The enumerators hired for this evaluation were contracted language and culture facilitators<sup>4</sup> who have an average of nine years of experience working with Peace Corps/Senegal. The enumerators were familiar with the Master Farmer Program and Peace Corps' model of community development, and they received training from Peace Corps/Senegal and Peace Corps/Washington staff to gain an understanding of and practice in survey data collection techniques. The training included presentations on the basics of program evaluation, conducting interviews, use of the randomized program participant lists to identify interview respondents, and group and individual practice in conducting interviews with four stakeholder groups. **Annex B** presents a copy of the agenda for the enumerator training. **Annex C** shows a map of sites the enumerators visited.

## 3. Direct Observation

When practical, the evaluation team asked all MFs and Program Participants to visit the locations where improved technologies or management practices had been applied.<sup>5</sup> When observing the site of an improved technology or management practice, the evaluation team collected photos and geospatial coordinates when possible.

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4 Language and culture facilitators teach Peace Corps trainees and PCVs the language they need to learn to work and live effectively in their communities. They also assist trainees and PCVs in understanding Senegalese culture and how best to adapt to the culture during their time in Senegal.

5 Because the evaluation occurred during the Senegalese dry season, visual evidence of some improved technologies or management practices was not available.

### Evaluation Tools and Instruments

The evaluation team used DataWinners survey software installed on Google Nexus 7 tablets to collect interview data and geospatial coordinates. The team developed four similar interview instruments, one for each group of interviewees. All survey instruments are provided in **Annex D**. Photos were collected using the built-in cameras on the Nexus 7 tablets and saved in Google Drive. The evaluation team was able to use DataWinners and Google Drive in “offline” mode, which is necessary when collecting data in regions without Internet connectivity or cellular reception. When Internet connectivity was available, all interview data—including qualitative and quantitative data, geospatial coordinates, and photos—were uploaded.

The evaluation team used four different surveys to collect data from the four groups of interviewees (MFs, PCVs, Program Participants, and Key Informants). A fifth survey was applied to collect data on each improved technology or management practice applied by a program participant. The improved technology or management practice survey was necessary due to the functionality of DataWinners and the desire to gather information on the reasons and benefits of each improved technology or management practice in use. All surveys were field-tested and revised before the evaluation team starting the formal data collection phase.

### Limitations

Using such technology on a tight schedule presents some risks in a developing country. Due to thoughtful planning, however, disruptions to the survey plan were minimized. One tablet was broken but was quickly replaced with an extra tablet that had been purchased for the evaluation. Minimal vehicle problems were resolved quickly and created only minor disruption to the survey plan.

The survey instruments provided for uniformity across interviews and languages while allowing some flexibility. There were few limitations associated with the survey instruments. The main limitations for the evaluation were constraints related to finances, timing, and logistics that limited the number of MF and Program Participants who could be interviewed.

### Data Analysis

When the interviews were finished, the data were exported from DataWinners as Excel files. The data were carefully cleaned and tabulated. “Other” comments were categorized during analysis, and comments that had been recorded in French were translated into English.



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## Demographics of Evaluation Sample

All but one of the 15 MFs interviewed were male; MF4 is the only female MF in the evaluation. The MFs live in 11 departments in Senegal. Seven are literate in French and five are literate in Arabic. They had a mean of five and a median of four people helping them on their Master Farms during 2013. Nine of the MFs had only paid labor, and six had a combination of paid and family labor.

A total of 192 Program Participants were interviewed (123 male and 69 female). An average of 13 Program Participants were interviewed per MF; the MF with the highest number was 17, and the MF with the lowest number was 10.<sup>6</sup>

Sixteen PCVs were interviewed (5 male and 11 female). Due to the timing of the arrival of PCVs in Senegal, five had worked with their MFs for 1–3 months, another five for 12–15 months, five for 15–18 months, and one for 21–24 months (see **Table 2**).

Fourteen Key Informants were interviewed (11 male and 3 female). Ten Key Informants work for Peace Corps/Senegal. The rest work for Peace Corps/Gambia, Peace Corps/West Africa, USAID/Senegal, and Senegal’s Department of Agriculture.

**Table 2: Length of Time Peace Corps Volunteer Worked in the Master Farmer Program**

Time	Men	Women
1–3 months	3	2
12–15 months	2	3
15–18 months	0	5
21–24 months	0	1
Total	5	11

<sup>6</sup> Variability in the number of Program Participants interviewed per MF is the result of travel and other logistical constraints around each Master Farm. Master Farmer MF5 had the highest number, because Danielle Stoermer stayed in his village each night rather than traveling to a hotel. She was able to interview Program Participants in the evenings during her stay.

## Results

### Greatest Benefits

All four groups interviewed were asked what they thought was the greatest benefit of the Master Farmer Program. During enumerator training practice interviews, respondents had difficulty saying just one “greatest” benefit, so they were given the option to say more than one greatest benefit and enumerators were instructed to try to limit the coding of responses to two benefits. The options were coded A through E, as follows:

- A. Master Farmer serves as a local and permanent source of improved agriculture/agroforestry information and knowledge
- B. Master Farmer serves as a local source of improved planting materials (for example, improved field crop seed and improved fruit tree varieties)
- C. Master Farm serves as a local demonstration site for improved agricultural/agroforestry technologies
- D. Other
- E. No benefit

More than two-thirds of each group chose more than one option. MFs and Program Participants listed option A the most, although option C was a close second and several also chose option B (see **Table 3**). Only 6 percent (12 out of 192) of Program Participants said that the Master Farmer Program did not have any benefits (option E). PCVs chose option C most often, followed by option A; only one PCV chose option B. Key Informants also selected option C most often, followed by option B (and then option C). Program Participants mentioned that the primary planting materials provided by the MFs were vegetables, fruit and live fence trees, cowpeas, corn, and Moringa.

Many people in each group also listed other unexpected benefits. Several Program Participants said that a benefit of the Master Farmer Program is the infrastructure: the tools, the fence that creates an area to garden and have trees year-round, and a well everyone can use if there is a water shortage in the community. Another benefit is that the MF provides fresh vegetables to the community, so they have more vegetables to eat, and the vegetables are cheaper. Program Participants, PCVs, and Key Informants all said that another benefit of the program is that the Master Farm model encourages people to see the value of agriculture—in terms of addressing poverty and acting as a profitable endeavor—so they are proud to farm. It also contributes to behavior change: farmers are interested in changing their practices and applying improved techniques. PCVs and Key Informants said that it builds up the confidence of MFs and PCVs so they act as better extension agents. Some Program

Participants and Key Informants also said the program teaches people the importance of using organic pesticides and the dangers of using synthetic pesticides.

Following are a few direct quotes related to the value of the Master Farmer Program:

“

- *“[The MF] represents a model, a VIP for the community. He positively influences people to adopt new technologies.”*
- *“[The MF] sold me many seeds and transplants, which were all very successful when I seeded and planted them in my garden. And [he sold them to me for] very cheap prices.”*
- *“I saw big differences between the traditional way to garden and the new technologies, so I gain more now with less work.”*
- *“The MF is a school because people come there every day to learn. Also, the MF gives most of his time for free, and he gives his knowledge, seeds, and plants. He is always available—at any time one needs his services, he comes.”*
- *“Besides farming, the MF has a program teaching people how to use foods and nutrition. He has changed people’s mind about trying new agricultural techniques—he has contributed to behavior change like changing culture so people are interested in trying new things, such as having Moringa trees in their compounds (they used to be scared of that), having gardens in their compounds, etc.”*

”

## Results

Table 3: Greatest Benefits of the Master Farmer Program

What do you think is the greatest benefit of the Master Farmer Program?	MFs <i>n=15</i>	Program Participants <i>n=192</i>	PCVs <i>n=16</i>	Key Informants <i>n=14</i>
A. MF serves as local and permanent source of improved agriculture/agroforestry information and knowledge	11	116	10	5
B. Master Farmer serves as a local source of improved planting materials (e.g., improved field crop seed and improved fruit tree varieties)	4	42	1	6
C. Master Farm serves as a local demonstration site for improved agricultural/agroforestry technologies	9	106	13	10
D. Other	4	50	4	12
No benefit	0	12	0	0
<b>Number of people who gave multiple answers</b>	<b>10</b>	<b>118</b>	<b>9</b>	<b>13</b>

### Master Farmer Program at the National Level

Some questions in the surveys for MFs, PCVs, and Key Informants examined the Master Farmer Program at the national level, such as the positive aspects of the program, the training events held at Master Farms, and MFs visiting other farmers to provide extension services.

#### Positive Aspects of the Program

In addition to being asked about the greatest benefits of the program, Key Informants were asked to explain some of the program's positive aspects. Eight Key Informants said the program is improving food security in rural Senegal by increased application of improved agricultural technology/technologies (see **Table 4**). Six Key Informants also said a positive aspect of the program is the creation of a network of demonstration sites that provide extension services to communities throughout Senegal, and the creation of a network of suppliers for improved seed varieties and other agricultural inputs. One key informant commented that a positive aspect of the Master Farmer Program is that it is improving cross-sector collaboration among staff and encouraging staff to work together more, which is beneficial for Peace Corps/Senegal in all programmatic and training areas.



Table 4: Greatest Benefits of the Master Farmer Program

Could you please explain some of the positive aspects of the Master Farmer Program?	Key Informants n=14
Improving food security in rural Senegal by increased application of improved agricultural technology/technologies	8
Improvements in livelihoods for the Master Farmer	4
Creation of a network of demonstration sites throughout Senegal, which provide extension services to the communities	6
Creation of a network of suppliers for improved seed varieties or other agricultural inputs	5
Opportunity to build capacity of Master Farmers in agricultural techniques	3
Opportunity to build capacity of Master Farmers in nonagricultural areas, such as time management, bookkeeping, etc.	3
Creation of a network of demonstration sites that could be utilized by other development partners (including the Government of Senegal) to provide agricultural information to rural communities [Collaboration Potential]	0
Provides a structured project for Volunteers in their communities in the hopes of improving Volunteer moral	1
Consistency of project for multiple Volunteers in a site	1
Other	5
<b>Number of people who gave multiple answers</b>	<b>10</b>

## Results

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Another key informant said the program has improved training for PCVs and work partners and is utilizing staff as training partners. One key informant said the program develops a social structure to empower people to make decisions and take actions. Another said the program is showing people that they do not need certain inputs to have a good farm; for example, the MFs are teaching live fencing to show that chain-link fences and barbed wire are not necessary for gardening—and a live fence is even better than those options because it can prevent thieves, in some cases.

### Trainings held at Master Farms

MFs, PCVs, and Key Informants were asked what would allow the MF to hold more training activities on meaningful topics at the Master Farm. The MFs most frequently said that increasing training activity resources, such as funding for lunch and travel reimbursements for participants, would allow the MF to do more training (see **Table 5**). The second most common response was to increase demand or interest from other farmers. Some of the MFs said if they had more technical training, better physical infrastructure on the Master Farm, and a better supply of seasonal agricultural inputs, then they would have better demonstrations that would allow them to conduct more training activities. One MF said it is important to have specific “live” demonstrations to show at the Master Farm when hosting training. Another MF said PCVs should visit more often to see the results of the farm and help the MFs organize other training events that depend on the results of the field.

The most common response from PCVs was to increase advertising about the existence of the Master Farmer, Master Farm, and Master Farm extension model to other farmers in the community. Similarly, several PCVs said to increase demand or interest from other farmers. One PCV said the MF is already providing excellent extension services so nothing more was needed in terms of training activities at the MF. PCVs said that if the MFs had more time, had more attractive farms, and/or were more confident and motivated in training, they would conduct more training activities.

Several Key Informants reported that increasing training for MFs on agricultural and agroforestry technologies would allow them to hold more training activities. One key informant said that although it takes time to establish the Master Farm and all the demonstrations, once that is done, the MFs would start to conduct more training activities. The same informant also said that selecting highly motivated MFs and increasing motivation from PCVs to help the MFs would motivate them to hold more training activities.

In addition, a few Key Informants said MF trainings are very Peace Corps intensive; they typically require approval by Peace Corps staff, involve the PCV writing a budget and getting funding, and are often facilitated by Peace Corps staff,<sup>7</sup> whereas if the MFs were better able to organize and run the trainings themselves, with some assistance from PCVs, they would hold more. A few Key Informants also said that if the trainings were smaller, focused on a specific topic, and involved more follow-up from the MF and PCVs, training activities would be more effective and MFs would hold more of them. One key informant said that if Peace Corps did a better job of clustering PCVs from different sectors around each MF, then the MF would hold more training because the MF would have more topics to present.

Table 5: Suggestions to Encourage Master Farm Training Activities

What will allow the Master Farmer to hold more training activities at the Master Farm?	Stakeholders <i>n</i> =45
Increase demand or interest from other farmers	11
Increase advertising of the existence of the Master Farmer, Master Farm, and Master Farm extension model to other farmers in the community	9
Increase training to Master Farmers on technical knowledge or skills required to implement improved agricultural/agroforestry technologies	10
Increase investment in physical infrastructure on the Master Farm, such as well, fencing, tools, drip irrigation, etc.	4
Increase supply of seasonal agricultural inputs to the Master Farm, such as seeds, tree seedlings, fertilizers, etc.	3
Increase training activity resources, such as funding for lunch, travel reimbursement for participants, etc.	17
Nothing, the Master Farmer is providing excellent extension services	1
Other	22
<b>Number of people who gave multiple answers</b>	<b>29</b>

7 For an MF to hold an Open Field Day or some other major training event, one of the Peace Corps/Senegal's food security staff must have visited that Master Farm, seen the demonstrations and given approval for the MF to conduct training. If the PCV does not already have MF funds available to pay for lunch and other necessary aspects of the training, then the PCV must write a budget and get it approved before the training can be held.

## Results

### Master Farmers Visiting Other Farmers to Provide Extension Services

MFs, PCVs, and Key Informants<sup>8</sup> were asked what would make it possible for the MFs to conduct more visits to other farmers' fields to provide extension services. The most common response for MFs was to provide a travel allowance for them (see **Table 6**). Six MFs also said that increasing training on how to provide high-quality extension services to other farmers would allow them to conduct more visits, because they would know how to do that better. Six PCVs and eight Key Informants also said that increasing training for MFs on providing extension services would urge MFs to conduct more of these visits. The most frequent response from PCVs was that increasing demand or interest from other farmers for the MF to visit would promote more visits. One MF and one key informant said the MF needs someone who can work his/her farm while he/she is gone. Similarly, several PCVs said their MFs need more time. One PCV and several Key Informants said that if the MFs and PCVs collaborated more on extension activities, the MFs would be encouraged to conduct more visits. Two Key Informants also said that it is important to select MFs with the personality and background that will allow them to be motivated and able to conduct visits. One PCV and two Key Informants were not sure what would allow the MFs to conduct more visits.

Table 6: Suggestions for Master Farmers to Visit Other Farmers to Provide Extension Services

What would allow the Master Farmer to conduct more visits to other farmers' fields to provide extension services?	Stakeholders <i>n=45</i>
Travel allowance for Master Farmer	19
Increase demand or interest from other farmers for the Master Farmer to visit	13
Increase advertising of the existence of the Master Farmer, Master Farm, and Master Farm extension model to other farmers	8
Increase training for Master Farmers on providing quality extension services to other farmers	20
Increase training for Master Farmers on technical knowledge or skills required to implement improved agricultural/agroforestry technologies	3
Nothing, the Master Farmer is providing excellent extension services	0
Other	19
Don't know	3
<b>Number of people who gave multiple answers</b>	<b>31</b>

<sup>8</sup> "Stakeholders" from Table 5 are the combined responses from MFs, Key Informants, and PCVs.

## Master Farmer Program at the Local Level

Other questions of the surveys address aspects of the Master Farmer Program at the local level, such as sources of agricultural information, training events held at Master Farms, MFs and PCVs visiting other farmers to provide extension services, and MFs visiting other MFs and non-MF farms.

### Sources of Agricultural Information

Program Participants were asked what sources, besides the Master Farmer, they use to obtain agricultural information. Of the 192 Program Participants, 36 percent said that they have no other sources (see **Table 7**). Of those who have other information sources, more than half (68 Program Participants) said they obtain agricultural information from a representative of a development organization (such as PCVs or Peace Corps staff, Trees for the Future, Wula Naafa, Yaajende, Symbiose, Environmental Development Action in the Third World, and missionaries). Thirty-one Program Participants said they get information from other farmers, and 25 said they get information from Senegal government extension agents (Agence Nationale de Conseil Agricole et Rural or Eaux et Foret agents). Institut Sénégalais de Recherches Agricoles was the most commonly mentioned other Senegal government agency. The two sources listed as “Other” were private agricultural companies in Senegal.

Table 7: Farmers’ Sources of Agricultural Information

What other sources (besides the Master Farmer) do you utilize to obtain agricultural information?	Stakeholders <i>n</i> =192
Village official (e.g., village chief)	2
Relative	16
Senegal government extension agent	25
Another Senegal government representative	7
Fellow farmer group member	5
School’s Parent Teacher Association member	0
Development organization representative (e.g., NGO worker)	68
Other farmers	31
Media (e.g., radio or television or newspaper)	1
Other	2
No other sources besides the Master Farmer	69
<b>Number of people who gave multiple answers</b>	<b>25</b>



## Results

### Training Events Held at Master Farms

All but one of the 15 MFs held at least one training event during 2013. The MFs held a total of 62 training events in 2013; the average per MF was four and the median was three. Ten MFs said that at least one of their training events was about the implementation of a specific technology or technologies. Four said at least one of their training events was an Open Field Day under the “old” model, and an equal number said at least one of their events was an Open Field Day under the “new” model.<sup>9</sup>

### Master Farmers and Peace Corps Volunteers Visiting Other Farmers

MFs and PCVs were asked if they had visited other farmers to provide extension services. For PCVs, this question was qualified with the requirement that the farmers had to have attended a training session at the Master Farm. All of the MFs responded that they have visited other farmers to provide extension services (see **Table 8**). Ten of the 16 PCVs have visited farmers.

Table 8: Visits to Other Farmers to Provide Extension Services

Have you visited other farmers to provide extension services?	MFs n=15	PCVs n=16
Yes	15	10
No	0	6

The 15 MFs were asked how many individuals and how many groups they visited in 2013, and how many people, on average, were in each group. Similarly, the PCVs were asked how many individuals and how many people who were part of a group they had visited in 2013. MFs visited a total of 145 individuals and 52 groups last year to provide extension services (see **Table 9**). The number of individuals visited ranged from 2 to 51 per MF, and the number of groups ranged from 0 to 17 per MF. The mean number of people in each of the groups the MF visited was 18; the median was 15.

The MFs were then asked how often they visited those individuals and groups in the past year. Nine MFs visited both individuals and groups 3 to 5 times in the past year. The most common

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9 In the “old” model of Open Field Days, participants moved around the Master Farm as a group, visiting all of the demonstrations, and the Master Farmer would explain each demonstration; if there were a large number of participants, they were split up into two or three groups. In the “new” model, several stations are set up, and the MF hosting the Open Field Day has assistance from other MFs, Peace Corps staff, PCVs, and/or other technical trainers, who demonstrate and explain the specific technology at that location.

reason MFs gave for visiting was the individual/group had requested the MF's extension services (12 MFs; see **Table 9**). Six MFs said they had visited those individuals/groups because their fields or homes were close to the MF's. Seven MFs said they go because they want to encourage the farmers, see how the technologies are working, or learn from the farmers. One MF said he goes because the individuals he visits show motivation.

Ten PCVs reported providing direct extension services to farmers who had attended MF training by visiting 42 individual farmers and 62 farmers who were part of a group, the result being that 104 farmers receiving training from MFs and extension services from PCVs. The number of individuals PCVs visited ranged from 2 to 20, and the number of farmers who were part of a group ranged from 1 to 15.

**Table 9: Master Farmer and Peace Corps Volunteers' Visits to Individuals and Groups**

Activity	MFs <i>n=15</i>		PCVs <i>n=10</i>	
	Individuals	Groups	Individuals	Groups
<b>People visited at their farms to offer extension services during 2013</b>	145	52	42	62
<b>Frequency</b>				
Once	4	4		
2-5 times	9	6		
Monthly	1	0		
Biweekly	2	2		
Weekly	2	2		
<b>Reason for visit</b>				
Requested my extension services	12			
Proximity to Master Farm and/or MF home	9			
Provided compensation for extension service	2			
Encouraged by PCV	5			
Other	8			

## Results

Program Participants were asked how many times they had visited the MF in the past year and how often the MF had visited their fields. Their visits to the Master Farm last year ranged from 0 to 365, with an average of 17 visits and a median of 3 visits. According to the Program Participants, the number of visits MFs made to their fields last year ranged from 0 to 330, with an average of 8 visits and a median of 2 visits.

MFs were asked if they had visited other Master Farms in the past year. Seven MFs said they had, visiting an average of two other MFs, and 10 MFs said they had visited a non-MF agricultural production or research site (see **Table 10**). These 10 MFs visited a total of 33 non-MF sites, with a mean and median of three sites per MF. Five MFs visited a Government of Senegal demonstration site, four visited a private farm, three visited a local group farm such as a women's group garden, and three visited farms run by local or international NGOs.

As a follow-up question, MFs were asked the reasons for their visits to other Master Farms and non-Master Farms. Their responses varied: to learn a specific new technology, because the PCV encouraged the MF to do so, to provide technical assistance to another MF, and to support another MF during a training activity. The primary reasons MFs visited non-MF sites were to learn a specific new technology and to provide technical assistance.

Table 10: Master Farmer Visits to Other Master Farms and Agricultural Sites

Activity	Yes	No
<b>Visited another Master Farm</b>	<b>7</b>	<b>8</b>
<b>Visited a non-Master Farm agricultural production or research site</b>	10	5
Government of Senegal demonstration site	5	
University research site	0	
Private farm	4	
Local group farm	3	
Local/international NGO farm	3	
Reason for visit	Visited Other MF(s)	Visited Non-MF
Learn a specific new technology	5	9
Support fellow MF extension agent	2	1
Provide technical assistance	3	3
Encouraged by PC Volunteer	4	0
Better acquainted with other MF	3	NA

MFs and PCVs were asked what methods or techniques would likely increase the adoption of technology application by the MFs and other farmers (see **Table 11**). Among MFs, the most common responses focused on adapting technologies to local conditions (nine MFs) and improving MFs’ extension activities (nine MFs). Among PCVs, the most common responses focused on showing evidence of a technology’s success through testimonials, images, and video (nine PCVs); adapting technology to local conditions (six PCVs); and shortening the time to return on investment through creative use of technology (six PCVs).

**Table 11: Suggestions to Increase Application of Improved Technologies**

<b>What methods or techniques would likely increase technology application by the Master Farmer and/or other farmers?</b>	<b>MFs n=15</b>	<b>PCVs n=16</b>
Adapt technology for local conditions	9	6
Provide Master Farmers more flexibility to decide which technologies to apply on the Master Farm	2	4
Provide a new name in a local language for the technology	0	3
Show evidence of technology's success through testimonials, images, video, etc.	5	9
Shorten return period on technology investment through creative technology use	4	6
Improve Master Farmers’ extension activities	9	2
Other	2	1
<b>Number of people who gave multiple answers</b>	<b>12</b>	<b>11</b>

MFs, Program Participants, and PCVs were asked how the Master Farmer Program could improve extension services and increase application rates of technologies (see **Table 12**). The most common answer for MFs and Program Participants, and the second most common answer for PCVs, was “increase community engagement in the Master Farmer model of extension” (10 MFs, 100 Program Participants, and 6 PCVs). Other common answers for MFs and Program Participants, and the most common answers for PCVs, were to encourage Master Farmer to visit other farmers and help them implement technologies (9 MFs, 71 Program Participants, and 7 PCVs) and to encourage MFs to hold more training activities on the Master Farm (eight MFs, 81 Program Participants, and 7 PCVs). [See **Table 12**]

## Results

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Several Program Participants had unique comments for their “Other” answer. One said the MFs, and the Master Farmer Program in general, need to ask people what they want and need to know; the program should also diversify into animal raising activities. Another said MFs should “invite people who have started a field already and/or have the means (manpower and/or money) to start a field so you make sure that the knowledge shared at the training is actually used.” One program participant said the program should encourage people to visit the Master Farm after they attend a training activity.

Another program participant cited the Wolof proverb, “Leket kese menu! nax bey” (“an empty calabash cannot tease a goat”). In other words, the goat will only come when it sees that there really is food inside the container. Senegalese use this proverb to imply that people need incentives to help them adopt an idea, take on a project, or do anything new or different. Thus, the MFs need to keep showing the success of the different improved techniques for people to be interested in adapting them.

Another program participant said the program needed to account for local conditions (for example, water is expensive in his area). Several Program Participants said the program should increase the number and diversity of PCVs around MFs because, as one participant stated, “the PCV is often the link between the MF and the rest of the community.” Another program participant said that the program should give the MF set prices for seeds, tree seedlings, and other materials for community use. One program participant said that the program should sensitize people so they know they need to be patient when trying new things. Another said the MF should allow other people to try techniques in the Master Farm, since not all of the space is being used anyway. One program participant said the program should support women more in gardening.

One program participant said the MF “is doing an excellent job; his field is always open for people. He is ready to come and find us here at any time when we need his help, and he is very professional and knowledgeable.” Similarly, another program participant said, “I do not have any recommendations, for the MF is doing an excellent job. He goes to all surrounding villages and they visit him regularly. He offers plants and seeds.”



Table 12: Suggestions to Improve Master Farmers' Extension Services<sup>10</sup>

How can the Master Farmer Program improve extension services to increase application rates of technologies?	MFs <i>n=15</i>	Program Participants <i>n=192</i>	PCVs <i>n=16</i>
Increase training for Master Farmer on how to be a better extension agent	3	40	5
Increase training for Master Farmer on farm management and organization to implement more effective extension programs	3	8	1
Incentives for Master Farmer to conduct extension activities (both on the Master Farm and in the community)	0	11	3
Increase community engagement in the Master Farmer model of extension	10	100	6
Increase training for Master Farmer in agricultural/ agroforestry technical areas	3	13	1
Collaboration with other development organizations	0	10	4
Collaboration with Senegal Government Extension Service (ANCAR)	0	3	3
Increase training and motivation for Volunteers to assist Master Farmers in providing extension services	1	4	2
Encourage Master Farmer to hold more training activities in the Master Farm	8	81	7
Encourage Master Farmer to visit other farmers and help them implement technologies	9	71	7
Provide Master Farmer with more means to host trainings	2	7	1
Provide Master Farmer with means to visit other farmers	1	6	1
Provide other farmers with tools/water/fence like the Master Farmer receives	2	33	0
Increase the number of Master Farmers in the area	0	15	0
Other	4	32	3
<b>Number of people who gave multiple answers</b>	<b>14</b>	<b>144</b>	<b>11</b>

<sup>10</sup> The last four options were not listed as options in the survey, but they were added during analysis because of the relative frequency at which they were listed as "Other" ways to improve extension services.

## Results

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### Local Application of Improved Technologies

Other survey questions address the application of specific improved technologies by Program Participants. **Annex E** provides a brief description of each technology.

To track application rates of technologies demonstrated on the Master Farms, Program Participants were asked which technologies they are applying or have applied. Of the 192 Program Participants (123 male and 69 female) surveyed, 137 (71 percent) have applied at least one improved technology (see **Table 13**), and 97 (70 percent) of those 137 have applied more than one technology. Fifty-two of the female Program Participants (75 percent) are applying an improved technology, and 85 of the male Program Participants (69 percent) are applying an improved technology. The most common improved technologies are establishing tree nurseries (42 Program Participants), composting (34), mulching (32), and double digging (30). Other commonly mentioned improved technologies include IPM in garden (28 Program Participants), use of soil amendments (21), proper plant spacing (18), and grafted fruit trees (15). Additional improved technologies Program Participants said they had applied are improved varieties of cassava, hot pepper, and jujube, proper tree outplanting, proper fruit tree pruning, reforestation, proper trenching around trees, mulch used for shading vegetable nursery, and honey beekeeping.

PCVs were asked which of the improved technologies demonstrated on MFs they have assisted in applying. Of the 10 PCVs who have assisted other farmers in applying an improved technology, all of them have helped farmers apply more than one technology. The most common technologies are using soil amendments (six PCVs), tree nursery establishment (five), live fencing (five), cultivation of improved varieties of corn (four) and cowpeas (four), IPM in the garden (four), companion planting (four), and alley cropping (four). The other improved technologies that PCVs are assisting in applying are proper fruit tree pruning, intercropping with corn and cowpeas, and cashew firebreak. The three technologies that overlap among the lists of most commonly applied technologies are tree nursery establishment, IPM in the garden, and use of soil amendments.

Table 13: Technologies Program Participants Applied and Technologies Peace Corps Volunteers Assisted in Application

Of the technologies demonstrated on the Master Farm, which have Program Participants adopted? Which have PCVs assisted farmers in applying?	Program Participants <i>n=137</i>	PCVs <i>n=10</i>
Improved varieties of millet	6	2
Improved varieties of sorghum	0	1
Improved varieties of corn	6	4
Improved varieties of rice	2	3
Improved varieties of cowpeas	10	4
Thinning of millet	3	1
Thinning of sorghum	0	0
Thinning of corn	5	2
Conservation farming with ripper	1	1
Zai holes with field crops (e.g., corn)	1	1
System of Rice Intensification	3	2
IPM with cowpeas (e.g., Neem solution and yellow sticky traps)	7	0
Proper plant spacing (refers to field crops, vegetables, and trees)	18	2
Proper seed storage	0	1
Composting	34	1
Mulching	32	3
IPM in garden	28	4
Companion planting	13	4
Double digging	30	1
Use of soil amendments	21	6
Hexagonal spacing	2	0
Zai holes in garden	16	1
Use of permanent beds	7	0
Drip irrigation	3	0
Tree nursery establishment	42	5
Windbreak	2	0
Alley cropping	0	4
Live fencing	12	5
Grafted fruit trees	15	3

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Integration of fruit trees into garden	5	2
IPM with fruit trees	8	0
Earthworks	0	3
Moringa trees (e.g., in compound and as live fence)	1	3
Intensive Moringa beds	3	1
Other	10	4
None	55	6
<b>Number of people who gave multiple answers</b>	<b>97</b>	<b>10</b>

Many Program Participants are applying/have applied a technology: an average of nine (median of 10) Program Participants per MF have applied a technology (see **Table 14**). The percentage of Program Participants interviewed per MF who are applying a technology varies: 100 percent of those interviewed for MF1 are applying a technology, for example, compared with 41 percent of those interviewed for MF5.

Table 14: Number of Program Participants Applying Improved Technology, per Master Farmer

Master Farmer	Number of Program Participants Who Have Applied a Technology <i>n=137</i>	Percentage of Program Participants Interviewed Who Have Applied a Technology <i>n=192</i>
MF1	11	100%
MF2	7	47%
MF3	6	60%
MF4	10	77%
MF5	7	41%
MF6	6	55%
MF7	10	91%
MF8	11	73%
MF9	6	43%
MF10	10	83%
MF11	6	55%
MF12	10	91%
MF13	12	92%
MF14	13	93%
MF15	12	86%
<b>Total</b>	<b>137</b>	<b>71%</b>
Mean	9	
Median	10	

Due to time constraints, the enumerators were not able to conduct in-depth interviews about all 346 improved technologies that Program Participants said they applied. Instead, the 137 Program Participants who had applied at least one improved technology were asked about 287 of the 346 improved technologies (83 percent). Tables 15 through 19 were developed from this data. The types of technologies<sup>11</sup> and the total number of technologies applied by Program Participants varied depending on the MF conducting the training activities or implementing extension services. An average of 19 total improved technologies was applied by Program Participants per MF (see **Table 15**). The median number of types of technologies applied by Program Participants per MF was nine.

**Table 15: Total Number and Number of Unique Technologies Applied by Program Participants per Master Farmer<sup>12</sup>**

Master Farmer	Number of Technologies Applied by Program Participants	Types of Technologies Applied by Program Participants
MF1	25	9
MF2	12	8
MF3	15	8
MF4	16	9
MF5	15	10
MF6	9	5
MF7	32	15
MF8	13	11
MF9	12	7
MF10	21	10
MF11	11	6
MF12	18	11
MF13	28	10
MF14	24	8
MF15	36	17
<b>Total</b>	<b>287</b>	<b>38</b>
Mean	19	10
Median	16	9

<sup>11</sup> Program Participants applied a 38 unique technologies: 29 technologies were on the pre-created list, and Program Participants listed an additional 9 technologies.

<sup>12</sup> The total number and types of improved technologies applied by Program Participants is a reflection of the evaluation sample. No ranking of MFs should be derived from this data.



## Results

Program Participants were asked how long they have been implementing the technology (or had been before they stopped implementing it). The most common answer was more than two years<sup>13</sup> (99 technologies; see **Table 16**).

Table 16: Length of Time an Improved Technology Has Been Applied

For how long have you been implementing this technology?	Program Participants <i>n</i> =287
<1 month	3
1–3 months	17
3–6 months	18
6–12 months	62
1–2 years	88
>2 years	99

Program Participants were also asked why they were implementing the improved technology (see **Table 17**). The most common response was because the person had seen the MF experience success from implementing the technology (221 technologies). The second most common response was because the person expected beneficial outcomes from implementing the technology (165 technologies). According to the Program Participants, MFs assisted with the implementation of 39 improved technologies, and PCVs assisted with 27 technologies; three of those technologies received support from both an MF and a PCV. Seven Program Participants said another reason they are implementing the technology was that the improved technology is organic, so it eliminates the health concerns (for people and the environment) that are associated with using chemical pesticides or synthetic fertilizers. Three others said they are implementing the improved technology because it provides them and their families with a healthier diet from Moringa leaves or cowpeas.

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<sup>13</sup> If a program participant had been implementing an improved technology before learning about it from the MF, enumerators were instructed to clarify with the participant that he/she had changed how he/she implemented the technology based upon how the MF does the technology. If not, the enumerator was not supposed to count it.

Table 17: Reason for Applying an Improved Technology<sup>14</sup>

Why are you implementing this technology?	Program Participants <i>n</i> =287
Observed success from the Master Farmer	221
Expected beneficial outcomes	165
Master Farmer assisted with the implementation	39
Could not afford an alternative (e.g., used organic soil amendments because could not afford synthetic fertilizer; used water-saving techniques to save money on water bill)	20
Support from other development organizations	7
Observed success from other farmers (not just Master Farmer)	24
Technology applied by someone else in the household	0
Peace Corps Volunteer assisted with implementation	27
Other	12
<b>Number of people who gave multiple answers</b>	<b>174</b>

Program Participants were then asked what specific benefits they saw from implementing the improved technology. They said they were seeing more than one benefit for 83 percent of the improved technologies (see **Table 18**). The benefit most often stated was increased yield (176 technologies), followed by protection of plants (104 technologies), which can take many forms: the technology creates a physical barrier from pests (such as a live fence); the technology kills pests when they attack the plant (such as IPM); or the technology protects plants from stress from limited watering or poor soil nutrients (such as mulching and composting). Many Program Participants also said the technology improves the soil and/or environment (94 technologies), leads to a higher income (89 technologies), is cheaper than the alternatives (79 technologies), or leads to a shorter time to harvest (69 technologies).

Some Program Participants listed other benefits; for example, that the technology is healthier for people/the environment because it is organic and/or produces healthier fruit (9 technologies). Several said that a benefit of grafting is that the trees produce fruit at different times, produce bigger fruit, and produce fruit that spoils less than non-grafted trees. Two Program Participants said that one benefit of the technology (IPM with fruit trees and tree nursery establishment) is that it is easy enough to teach others, which they are doing. Another said that a benefit of the technology (proper plant spacing) is that it can be applied to other crops. Three Program Participants said they have not yet seen any benefits from the three technologies they are implementing, because it was too early or because their test plots had

<sup>14</sup> The reason "Peace Corps Volunteer assisted with implementation" was not in the original list of choices, but was added during analysis due to the large number of Program Participants who gave this reason.

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been destroyed by flooding. Two Program Participants said that though they have seen some benefits of the technology (compost), it actually requires more work and takes longer to see the result (compared with synthetic fertilizer).

Table 18: Benefits of Applying an Improved Technology

What are the benefits you see from implementing this technology?	Program Participants <i>n</i> =287
Less work/labor	74
Increased yield	176
Diversified farm	11
Higher income	89
Diversified food for family	27
Technology is cheaper	79
Conveys social prestige	7
Faster return on investment	31
Shorter time to harvest	69
Improves soil and/or environment	94
Protects plants	104
Other	39
<b>Number of people who gave multiple answers</b>	<b>238</b>

When Program Participants were asked if they would continue implementing the technology, they said “yes” for 282 technologies and “maybe” for five technologies (see **Table 19**). The reason most gave for continuing the application of an improved technology was that they saw its importance. The reasons Program Participants gave for why they might continue implementing the technology are varied: they were not sure if the improved technology is really that much better than their traditional technology; factors such as wind could destroy their trees; and they did not know if they would continue to have the inputs, such as seeds, to continue implementing the technology.

Table 19: Outlook for Applying an Improved Technology

Do you plan to continue implementing this technology for the indefinite future?	Program Participants <i>n</i> =287
Yes	282
No	0
Maybe	5

### Program Improvement and Replication Recommendations

The remaining questions in the survey addressed ways the program could be improved in general, and recommendations for other Peace Corps posts that are thinking about replicating the Master Farmer Program.

#### Recommendations for Improvement

Key Informants were asked what aspects of the Master Farmer Program should be improved (see **Table 20**). Of the pre-created options, the most common answer was “Selection of Master Farmers” (nine Key Informants) and “Training of Master Farmers” (seven Key Informants). Five said that MFs should receive more training on business development, such as in financial management, marketing, food transformation, viewing their farm as a business, and thinking like entrepreneurs. Four said the Master Farmer Program should dig deep into the background of potential MFs before selecting them: the program needs to do a better job of making sure potential MFs are interested in the program for the right reasons and are good communicators with strong interpersonal skills, besides being good farmers and hard workers. One key informant said that more women should be selected as MFs, because it would encourage more women to learn improved technologies. One of the two Key Informants said that the program should collaborate more with external partners to expand, and that it should be part of the national extension system.

Five Key Informants described other aspects they thought should be improved. One said the trust that MFs have in PCVs, especially of their knowledge of the improved technologies, needs to be improved, as does the communication between some MFs and PCVs. Another said MFs need to be better at communicating and teaching new technologies to other farmers. One key informant said communication among staff, MFs, and PCVs needs to be improved, because communication between staff and MFs sometimes excludes PCVs. Another said there should be ways to reduce initial funding requirements for the program. And another said the total number of MFs should be increased in order to expand the coverage area of agriculture extension.

## Results

Table 20: Suggestions to Improve the Master Farmer Program

What aspect(s) of the Master Farmer Program need(s) to be improved?	Key Informants <i>n=14</i>
Training of Master Farmers	7
Selection of Master Farmers	9
Providing motivation for Volunteers to work with Master Farmers	1
Increase effort to collaborate with external partners to support or expand the Master Farm Model	2
Other	5
<b>Number of people who gave multiple answers</b>	<b>7</b>

Key Informants were also asked what policies or procedures could be implemented to improve Master Farms as a source of improved agricultural inputs to the communities (see **Table 21**). The most common option selected from the pre-created options was, “Provide Master Farmers [with] training on business management and sales” (six Key Informants). One key informant said the Master Farmer Program should provide MFs with information on marketing of agricultural inputs and improve market development to enable MFs to sell their products.

Eleven of the 14 Key Informants had other suggestions for ways to improve Master Farms as sources of improved inputs. One said the program should have one-on-one discussions with MFs to assess specific problems, which could result in one-on-one, à la carte training for MFs. Another said the program should encourage other farmers to seek out improved inputs and teach other farmers to be local sources of inputs, so all of the inputs are not limited to just Master Farms. Similarly, another key informant said that the program should sell and advertise the Master Farms better and expand their zone of influence. This informant said one way to do this would be to increase collaboration with Senegalese ministries and connect different individuals and institutions with the Master Farmer Program.

Another key informant said that MFs are vulnerable to thieves and demands for food and money from their families, and the program should find a way to reduce these things. One key informant said that although selling tree seedlings is practical, selling improved field crop seed is impractical due to the size of the Master Farms, so MFs need to be encouraged to plant other fields in improved seed if they wish to sell it as seed. Similarly, another key informant said each MF should be encouraged to devote one quarter of the farm to producing gardening inputs (such as improved vegetable seeds or seedlings). Another key informant said the program should develop more Master Farms and expand on the MF association, or even create associations that are regional or geographically clustered in some way. Two Key Informants said the selection of the MF is important because the MF needs to be willing to



share his/her inputs with other farmers (or sell them cheaply) and be motivated, professional, and well-respected in the community or no one will buy from him/her. Finally, one key informant noted the importance of making sure water is easily available for MFs, or they will not be able to produce a lot of inputs.

**Table 21: Policies and Procedures to Improve the Master Farmer Program as Source of Improved Agricultural Inputs**

<b>What policies or procedures could be implemented to improve Master Farms as a source of improved agricultural input to the communities?</b>	<b>Key Informants <i>n=14</i></b>
Provide Master Farmers with training on seed storage	1
Provide Master Farmers with subsidized seeds that could be resold to other community farmers	0
Provide Master Farmers with additional training on tree seedling grafting and nursery management	2
Provide Master Farmers training on business management and sales	6
Other	11
<b>Number of people who gave multiple answers</b>	7

### Replication of the Master Farmer Program by Other Peace Corps Posts

Key Informants were asked if the Master Farmer Program could be replicated in other Peace Corps posts. Thirteen of the 14 said “yes,” that the program could be replicated by other posts; the fourteenth said, “it depends.” Several Key Informants said that if other posts replicates the Master Farmer Program, then it will be important to adapt the program to the local context, whether that means they adapt it based on the amount of funding, specific local challenges (water and fencing are important in Senegal, but that is not necessarily the case elsewhere), and local needs for agricultural information (i.e., which improved technologies to demonstrate, potentially incorporating animal production). One key informant said it would be essential for other posts to have experienced staff and good training for PCVs. Another said it would be useful to establish an exchange program for MFs from different countries to visit each other.

The Key Informants were asked what they think are the basic requirements for the Master Farmer Program to be successfully replicated in another post (see **Table 22**). Of the pre-created options, the most commonly cited option was “Staff with a background in agricultural extension and extension techniques” (eight Key Informants). Several of those Key Informants

## Results

said it would be essential for Peace Corps staff to have strong technical skills in order to adapt the program to fit the local context and to train the MFs and PCVs.

Eleven Key Informants had other requirements for replicating the program successfully at other Peace Corps posts. Two said the Master Farmer Program adds a lot of work for staff, so replicating the program would likely require those posts to hire new staff. Two other Key Informants said the selection of MFs is the key to successfully implementing the program. Two also said it would be useful for other posts to work closely with Peace Corps/Senegal staff to learn from their experiences when implementing the program. Two Key Informants said that a post implementing the program should develop a demonstration and training site for training MFs and PCVs. One key informant said a new post implementing the program should start out small, with 10 or fewer MFs, and see how things go. One key informant said it would be essential for MFs to be able to find a field that can be fenced in, protected from animals, with water access, so they can farm year-round. Another said it would be important for Peace Corps staff to understand the land tenure system in the country. Finally, one key informant said the program needs to be integrated into project frameworks for it to be successfully implemented at other posts.

Table 22: Basic Requirements to Replicated Master Farmer Program at Other Peace Corps Posts

<b>What do you think are the basic requirements for the program to be successfully replicated in another Peace Corps post?</b>	<b>Key Informants <i>n=14</i></b>
Financial resources to support Master Farm development	4
Staff with background in agricultural extension and extension techniques	8
Commitment of staff to the model	7
Engagement of Volunteers to assist with the selection, training, and development of Master Farmers and/or Master Farms	2
Other	10
<b>Number of people who gave multiple answers</b>	<b>11</b>

## Conclusions and Recommendations

The goal of the Master Farmer Program is to improve the lives of farmers and their families in the communities where PCVs work by enhancing food security. To enhance food security, the program is designed to expand Peace Corps/Senegal's agricultural extension outreach by developing the capacities of MFs to serve as agriculture extension agents. The MFs and their Master Farms serve as local sources of improved seeds and other agricultural inputs, technologies, procedures, and teachings to farmers in the community.

The Master Farmer Program is already seeing signs of success, in terms of improving the food security of MF through adoption of improved technology. The results of this evaluation show that the program is also successfully assisting other farmers in those communities to apply some of the improved technologies demonstrated on Master Farms. Thus, the food security situation of these other farmers is also improving. However, the achievement of widespread improvements in food security will require more community engagement in the program. There are several ways Peace Corps/Senegal can improve the program to increase community engagement:

- A. Decentralize program management; particularly, streamline the process for training activities and empower PCVs to better support MFs.**
- B. Encourage continuous MF knowledge and skill development through ongoing training for MFs, networking among MFs, and agricultural production and research sites.**
- C. Increase and improve MF extension activities by having better demonstrations; more small, hands-on training activities; and more coordinated extension activities with PCVs.**
- D. Generate more seed, seedlings, and cuttings so they are available to community members.**
- E. Continue diverse technology demonstrations on the Master Farms.**

In addition, there are opportunities for other Peace Corps posts. For another post to successfully implement its own version, the Master Farmer Program needs to be adapted to the local context, the post needs dedicated staff members with backgrounds in agriculture extension, and the post should learn from Peace Corps/Senegal's experiences, especially the importance of MF selection, because the success of the program depends a great deal on the individual MFs.

# Conclusions and Recommendations

## A. Decentralize Program Management

When asked about the positive aspects of the Master Farmer Program, Key Informants focused on the ways the program is improving the food security of families throughout Senegal. They also talked about how it is improving the operation of Peace Corps/Senegal by breaking down programmatic barriers, improving training for PCVs, and better utilizing staff as training partners.

The Master Farmer Program has been improving aspects of programming and staff relations within Peace Corps/Senegal, but it has also put additional pressure on Peace Corps staff. To make the program more efficient and effective, program management should be decentralized in some areas, particularly with respect to streamlining the process for training activities and empowering PCVs to better support MFs.

### 1. Streamline Process for Holding Training

The MFs, PCVs, and Key Informants all expressed increased confidence that the MFs are doing a better job holding training activities at the Master Farms than visiting other farmers. But even some of those who said the MFs are holding enough training at the Master Farm noted that there should be more. Numerous MFs, PCVs, and Program Participants said that one way for the Master Farmer Program to increase application rates of technologies is for MFs to hold more training activities at their farms. Also, numerous MFs, PCVs, and Key Informants said one way to help the MFs hold more training activities would be to increase resources for training activities, particularly funding. As described earlier, the process for an MF to host a training, particularly a large Open Field Day, involves several steps and can take a great deal of planning and time.

There are things that can be changed or improved to support more training activities and make those activities more effective. One way is to streamline the training process so all steps—from planning the training to securing approval from Peace Corps staff for the funding—can happen more effectively and efficiently. When MFs begin in the program, it is important for Peace Corps staff to be heavily involved in the planning and implementation of training activities to ensure quality. Once MFs have conducted several training activities and have proven themselves, they should be allowed and encouraged to plan and host their own (with assistance from nearby PCVs), especially for smaller training events.

Funding is a delicate yet critical step for hosting a training activity. The MFs reported that they need more resources for training activities, such as money for lunches and reimbursement for participants' travel. Because of the nature of funding for the Master Farmer Program, money for training activities must go through the PCVs, but the process should be streamlined to increase efficiency. PCVs should receive training on how to obtain and manage funds, and funding approval decisions should be made faster. Volunteers should be encouraged to continue to maintain a small amount of funding in their MF budget at all times for training, and MFs should be encouraged to hold smaller training events that require minimal funding.

# Conclusions and Recommendations

## 2. Empower Peace Corps Volunteers to Better Support Master Farmers

Volunteers are the heart and soul of the Peace Corps. Day in and day out, they are the ones in the field and on the ground. As such, they, rather than Peace Corps staff, should be the ones interacting with and supporting MFs on a regular basis. PCVs and Key Informants mentioned how staff-intensive the Master Farmer Program is, particularly involving interactions between Peace Corps staff and MFs. These interactions are very draining on Peace Corps staff members. One way to lighten the workload for staff is to empower PCVs to better support MFs. PCVs should be given more training and more support so they can better serve as “frontline” support for the MFs. In particular, PCVs should be better trained to support MFs in developing demonstrations, organizing training with MFs at their farms, and visiting others farmers with MFs. In addition, new PCV–MF teams should be encouraged to visit PCV–MF teams who have worked successfully together for a while to learn best practices and get advice.

## B. Encourage Continuous Master Farmer Knowledge and Skill Development

As MFs begin to master certain concepts and technologies, they should receive training in more complicated material. Therefore, they should be provided with continuous training opportunities and be encouraged to network with other MFs and agricultural production/research sites to expand their knowledge and skills.

### 1. Provide Ongoing Training for Master Farmers

MFs already accompany their PCVs to an annual training workshop, where they learn more advanced techniques, troubleshoot problems, and share best practices. This practice should continue, particularly as MFs become confident with easier technologies and seek to learn more complicated technologies. Numerous individuals from all four groups queried said that to improve MFs’ capacity to conduct training and other extension activities, the MFs should receive more training, particularly in farm management and how to be better extension agents. More challenging technologies, such as grafting and IPM, will likely require several workshops before MFs feel comfortable teaching them to others. Additionally, MFs should be trained in extension approaches and specific techniques, such as teaching a group, following up with farmers, and record keeping. With more training, MFs will feel more confident about planning and executing their own training activities, and Peace Corps staff will feel more comfortable letting them do it.

MFs should also receive more training in business management. Many MFs, PCVs, and Key Informants suggested that MFs receive this type of training to achieve the fourth objective of the Master Farmer Program: to demonstrate that a 1 hectare farm can improve a farmer’s food security.

## Conclusions and Recommendations

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### 2. Expand Networking Among Master Farmers and Agricultural Production and Research Sites

Another way for MFs to improve skills, expand their networks, and create extension opportunities is to visit other MFs and other agricultural production/research sites. Several MFs are already making these visits, and this practice should continue to be encouraged. Of the 15 MFs interviewed, seven said they had visited another MF during 2013, and 10 said they had visited at least one non-MF agricultural production or research site. This shows that there is already significant networking happening among MFs and between MFs and other agricultural organizations. This kind of networking should continue to be encouraged, because it creates opportunities for MFs to learn new things and teach others. Exchange visits with other MFs will motivate MFs to improve their demonstrations, farm management, and extension activities. By visiting other production/research sites, MFs will likely pick up new technologies to try on their Master Farms, and develop a network of other extension agents with whom to exchange ideas and develop new opportunities.

### C. Expand Master Farmer Extension Activities

MFs are already seeing results from their extension activities. To continue increasing technology adoption rates, MFs need to expand their extension activities, especially considering that more than one-third (36 percent) of farmers interviewed said that the MF is their only source of agricultural information. MFs can improve their extension activities by improving the demonstrations on their Master Farms; holding smaller, hands-on, progressive training events; and coordinating more with PCVs to build stronger extension teams.

#### 1. Improve Demonstrations on Master Farms

To increase community involvement in the Master Farmer Program and improve MF training, MFs should hold relevant and interesting demonstrations on a regular basis, especially when they are hosting a training activity. If the Master Farm has more relevant and consistent demonstrations, community interest in the program and attendance at the training activities should increase. To achieve this, MFs will need additional training in farm management. They will also need to think carefully about which technologies are most appropriate for farmers in their communities, and focus on demonstrating those changes. MFs also need further investment in the physical infrastructure on the Master Farms, such as wells, fencing, tools, and drip irrigation systems. If the program is not able to continue to re-supply the MFs with these materials, then the MFs need to be trained in better management of available resources, and be connected with local companies that can repair wells or fences and provide them with replacement tools or drip tape.



# Conclusions and Recommendations

## 2. Hold Smaller, Hands-On, Progressive Training Activities

Another way to increase and improve MF training is to make sure the MFs hold more focused training sessions on specific topics with small groups of people. In the past, MFs have held large open field days, with upwards of 50 participants. It is hard to keep so many people engaged throughout the large open field days and farm tour. This type of training results in less learning about each technology because of the limited amount of time spent on each one. MFs have recently started holding smaller and more frequent training events, and should be encouraged to continue doing this. Such events should focus on teaching a handful of technologies to a small group of people, with opportunities to practice using the technologies in the field. The events should also be tailored to participants' needs, desires, and abilities, and allow for gradual progression to more complex technologies. For example, a women's group with a garden would first learn about basic gardening technologies; over time, the group would advance to more complicated technologies. Similarly, a group of men who are starting orchards can learn about proper tree nursery care, then outplanting, then how to graft, and finally proper fruit tree pruning. Such an approach makes training much more effective and will likely increase community interest in the farm.

It is important to make trainings more accessible to women, who represent a significant portion of the agricultural workforce and should have access to information and training on improved agricultural technologies. MFs and their PCVs should reach out to female farmers and see how they can provide them with assistance and training. Training for women could also include management and business skills, which will empower women to take on higher roles in farmers' associations.

## 3. Build Stronger Master Farmer–Volunteer Extension Teams

The data show that PCVs help MFs with their extension activities, but MFs do not necessarily help PCVs with their extension events. PCVs often are full-time extension agents, working with many farmers. MFs, on the other hand, have to maintain their farms in addition to training and visiting other farmers. Thus, MFs might not always have time to visit all of the farmers PCVs visit. Of the 63 technologies that Program Participants reported implementing because MFs or PCVs assisted them with implementation, only three technologies received support from the combined efforts of both a PCV and an MF. There appears to be little overlap between the extension activities of MFs and PCVs. Although individual assistance helps the program reach a variety of participants, their extension activities will likely be more sustainable if they work as a team. MF–PCV extension teams should continue to be encouraged and strengthened so MFs and PCVs can collaborate and coordinate their extension activities.

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### D. Generate More Seed, Seedlings, and Cuttings

Another way to increase and improve the Master Farmer Program is to encourage MFs to produce more seeds, seedlings, and cuttings to give away, or sell at a reasonable price, to community members. The MFs, Program Participants, and PCVs agreed that the MF serves as a local and ongoing source of improved agriculture and agroforestry information and knowledge, and that the Master Farm serves as a local demonstration site for improved agricultural and agroforestry technologies. This suggests that MFs are recognized for their knowledge and that Program Participants have access to improved information on a regular basis. It also suggests that those involved with the program acknowledge how important it is to see the technologies demonstrated.

The Key Informants have a different vision for the program's time frame. They reported that one of the greatest benefits of the program is that the MF serves as a local source of improved planting materials, such as better field crop seed and improved fruit tree varieties. This benefit is not yet clearly evident to Program Participants or PCVs. Once the grafted mango and citrus trees are large enough to allow a significant number of scions to be cut from them, MFs should be encouraged to increase their grafted tree nurseries and make them available to other community members. These grafted trees will become a unique and important addition to the communities, because most of those tree varieties are only available in Dakar or Ziguinchor, far from most farmers. In several years, the fruit trees at the Master Farms and the trees grafted by MFs and planted by other farmers will start producing fruit, likely increasing the variety and length of time fruit is available in those communities.

Because it is difficult for the MFs to produce a large amount of field crop seed on their Master Farms, the MFs should be encouraged to devote a portion of another field to seed replication so they can produce more improved seed that can be sold at a reasonable price to other farmers. Increasing the availability of improved seed, seedlings, and cuttings is important not only because it will increase diversity and availability of food, but also because it provides an access point for MFs to share other improved technologies with farmers.

### E. Continue Diverse Technology Demonstration on Master Farms

The Master Farmer Program is designed to meet the needs of a diversity of clients, and the Master Farms demonstrate diverse technologies to meet those needs. The technologies that are being applied by the highest number of Program Participants (tree nursery establishment, composting, mulching, double digging, and IPM in gardens) are simple, lower-cost technologies with relatively short returns on investment. However, all 42 technologies demonstrated on Master Farms are being implemented by at least one program participant. Some of the technologies being implemented by several Program Participants are precursors to other technologies; for example, tree nursery establishment is a precursor to alley cropping, live fence, and windbreak establishment. Other technologies being implemented by several

## Conclusions and Recommendations

Program Participants are aspects of other technologies; for example, mulching is one aspect of conservation agriculture. Many of the technologies that are not being implemented by many Program Participants are more complicated, take longer to become established, or require more initial investment and are therefore practical for fewer farmers. The Master Farmer Program should continue to demonstrate a diversity of technologies on the Master Farms, because doing so will enable them to continue to reach a diversity of farmers.

### Adapting the Master Farmer Program to Other Peace Corps Posts

Nearly all Key Informants reported that they think the program can be replicated by other posts. They identified key areas other posts should be aware of in understanding what is required to replicate the program. First, each post must be careful to adapt the program to the local context. Second, Peace Corps staff should have strong backgrounds and technical skills in agriculture and extension. Third, posts should work closely with Peace Corps/Senegal at the beginning to benefit from lessons learned and promising practices. For example, they need to be careful in selecting the MFs, because the individual farmer has a huge impact on the success of the Master Farmer Program.

#### 1. Adapt the Program to the Local Context

The Master Farmer Program is seeing success in Senegal because it promotes improved technologies that are applicable to large portions of the country. It also fills a large gap in Senegal: a strong, countrywide agriculture extension system that seeks to assist even the poorest of farmers. PC posts that want to implement their own programs will need to carefully assess the situation in their own countries and adapt the program accordingly. The Master Farmer Program is quite resource-intensive, so other posts will also need to assess the possibility for this and adapt the program as necessary.

#### 2. Hire Staff with Strong Agriculture Extension Backgrounds

While based on a simple, decentralized model of adult extension education, the Master Farmer Program requires coordination among numerous actors (Peace Corps staff, PCVs, MFs, potential MFs, other farmers, and other development workers), and it requires extensive knowledge of existing agricultural practices and applicable improved technologies. The program also requires a solid understanding of the agriculture extension and development landscape. Thus, Peace Corps posts interested in starting their own Master Farmer Programs must have staff with strong backgrounds and technical skills in agriculture extension. According to Key Informants' statements about the workload requirements to replicate the

## Conclusions and Recommendations

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program, posts may need to hire additional staff members to carry the increased work the program creates.

### 3. Learn from Peace Corps/Senegal's Experiences

Decision-makers at other Peace Corps posts should review several documents before implementing a Master Farmer Program, including this report, a Master of Professional Studies project paper,<sup>1</sup> and Peace Corps/Senegal's quarterly and annual food security reports. It will also be important for those posts to communicate directly with Peace Corps/Senegal to ask questions and seek advice. For example, one of the most noteworthy things Peace Corps/Senegal has learned as it has implemented the program is the importance of care in selecting MFs. This lesson has led the post to revise and expand its selection process. Other posts should consider Peace Corps/Senegal's experiences and coordinate with key players to benefit from the lessons and promising practices that have emerged.

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<sup>1</sup> Stoermer, Danielle. 2013.

## Background Documents on the Master Farmer Program

1. Overview of Master Farmer Project Application Process
2. Food Security Program Master Farmers and Demonstration Sites Selection Criteria
3. What a Master Farmer Is? What a Master Farmer Does? What Peace Corps Does? What the PCV Does?
4. Partnership Agreement between Peace Corps and Master Farmer
5. Yearly (Minimum) Goals for Master Farmers
6. The Master Farm Effect (Training Presentation)
7. Agroforestry Technologies (Training Presentation)
8. Gardening Components (Training Presentation)
9. Field Crops (Training Presentation)
10. Attendance Records for Training Activities at 14 or 15 Master Farm Sites in Evaluation Sample
11. Peace Corps/Senegal Global Hunger and Food Security Initiative Participating Agency Partnership Agreement (PAPA) with USAID/Senegal Report 2009–2010
12. Peace Corps/Senegal President’s Global Food Security Initiative Feed the Future PAPA with USAID/Senegal Report Fiscal Year 2011
13. Peace Corps/Senegal President’s Global Food Security Initiative Feed the Future PAPA with USAID/Senegal Report January–March 2012 (FY 2012 Q2)
14. Peace Corps/Senegal President’s Global Food Security Initiative Feed the Future PAPA with USAID/Senegal Report April–June 2012 (FY 2012 Q3)
15. Peace Corps/Senegal President’s Global Food Security Initiative Feed the Future PAPA with USAID/Senegal Report Fiscal Year 2012
16. Peace Corps/Senegal President’s Global Food Security Initiative Feed the Future PAPA with USAID/Senegal Report October–December 2012 (FY 2013 Q1)
17. Seeding Change: The Past and Future of Peace Corps Senegal’s Master Farmer Program
18. Peace Corps’ Master Farmer Program Boosts Food Security and Economic Growth in Senegal
19. Interview Dataset from 2013 Annual Master Farmer Conference

## Annex B

### Enumerator Training Agenda for Master Farmer Process Evaluation

	<b>Monday, February 3</b>	<b>Tuesday, February 4</b>	<b>Wednesday, February 5</b>
8:00 – 8:20	Participant Introductions	Technology Learning and Review of Survey Instruments	Debrief of Live Practice
8:20 – 9:00	History of Master Farmer Program		
9:00 – 9:30	Background of Master Farmer Program Review		Survey Instrument Adjustments and/or Challenges
9:30 – 10:00	General Program Evaluation		
10:00 – 10:15	BREAK	BREAK	BREAK
10:15 – 11:00	General Program Evaluation (cont.)	Live Practice – Master Farmer and Peace Corps Volunteer: Tawa Fall Site	Live Practice – Program Participants and Improved Technology: Tawa Fall Site
11:00 – 11:45	Enumerators’ Roles and Responsibilities		
11:45 – 1:00	Interviewing Procedures		
1:00 – 2:00	LUNCH	LUNCH	LUNCH
2:00 – 2:45	Interviewing Techniques and Tips	Informal Practice Among Enumerators	Debrief of Live Practice
2:45 – 3:30	Introduction of Technology		
3:30 – 3:45	BREAK	BREAK	BREAK
3:45 – 5:30	Technology Learning and Review of Survey Instruments	Informal Practice Among Enumerators (continued)	Final Logistics



### Map for Evaluation Enumerators



## Annex D

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### Survey Instruments for Master Farmer Process Evaluation

#### Master Farmer Survey Instrument

1. What is today's date?
2. Master Farmer
  - a. MF1
  - b. MF2
  - c. MF3
  - d. MF5
  - e. MF4
  - f. MF6
  - g. MF7
  - h. MF8
  - i. MF9
  - j. MF15
  - k. MF12
  - l. MF11
  - m. MF13
  - n. MF14
  - o. MF10
3. Has the Master Farmer signed the consent form?
  - a. Yes
  - b. No
4. Master Farmer's sex
  - a. Male
  - b. Female
5. What do you think is the greatest benefit of the Master Farmer Program?  
(multiple select)
  - a. Master Farmer serves as a local and permanent source of improved agriculture/ agroforestry information and knowledge
  - b. Master Farmer serves as a local source of improved planting materials (e.g., improved field crop seed, improved fruit tree varieties)
  - c. Master Farm serves as a local demonstration site for improved agricultural/ agroforestry technologies
  - d. No benefit
  - e. Other

6. If other, please explain.
  
7. What methods or techniques would likely increase technology application by you (the Master Farmer) and/or other farmers? (multiple select)
  - a. Adapting technology for local conditions
  - b. Providing Master Farmers more flexibility in deciding which technologies to apply on the Master Farm
  - c. Providing a new name in a local language for the technology
  - d. Show evidence of technology's success through testimonials, images, video, etc.
  - e. Shorten return period on technology investment through creative technology use
  - f. Other
  
8. If other, please explain.
  
9. How can the Master Farmer Program improve extension services in order to increase application rates of technologies? (multiple select)
  - a. Increase training for Master Farmer on how to be a better extension agent
  - b. Increase training for Master Farmer on farm management and organization to implement more effective extension programs
  - c. Incentives for Master Farmer to conduct extension activities (both on the Master Farm and in the community)
  - d. Increase community engagement in Master Farmer model of extension
  - e. Increase training for Master Farmer in agricultural/agroforestry technical areas
  - f. Collaboration with other development organizations
  - g. Collaboration with Senegal Government Extension Service (ANCAR)
  - h. Increase training and motivation for Volunteers to assist Master Farmers in providing extension services
  - i. Encourage Master Farmer to hold more training activities on the Master Farm
  - j. Encourage Master Farmer to visit other farmers and help them implement technologies
  - k. Other
  
10. If other, please explain.

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11. How many training events did you hold at your Master Farm this past year?
12. Describe those training events. [Classify them into these three broad categories.]
  - a. Old model of Open Field Days (i.e., without stations)
  - b. New model of Open Field Days (i.e., with stations)
  - c. Training on specific technology/technologies
  - d. NA
13. Do you think you are organizing an appropriate number of training activities at the Master Farm?
14. What will allow you to hold more training activities at the Master Farm? (multiple select)
  - a. Increase demand or interest from other farmers
  - b. Increase advertising of the existence of the Master Farmer, Master Farm, and Master Farm extension model to other farmers in the community
  - c. Increase training to Master Farmers on technical knowledge or skills required to implement improved agricultural/agroforestry technologies
  - d. Increase investment in physical infrastructure on the Master Farm, such as well, fencing, tools, drip irrigation, etc.
  - e. Increase supply of seasonal agricultural inputs to the Master Farm, such as seeds, tree seedlings, fertilizers, etc.
  - f. Increase training activity resources, such as funding for lunch, travel reimbursement for participants, etc.
  - g. Nothing, the Master Farmer is providing excellent extension services
  - h. Other
15. If other, please explain.
16. How many individual people have you visited at their farms to provide extension services in the past year?
17. How often have you visited these individuals in the past year?
  - a. Once
  - b. 3–5 times
  - c. Once a month
  - d. Biweekly
  - e. Weekly
  - f. Other
  - g. NA

18. If other, please explain.
19. How many groups have you visited at their group farms/gardens in the past year?
20. How often have you visited these groups in the past year?
  - a. Once
  - b. 3–5 times
  - c. Once a month
  - d. Biweekly
  - e. Weekly
  - f. Other
  - g. NA
21. If other, please explain.
22. How many people are in each group, on average?
23. Why are you visiting these individuals and/or groups?
  - a. Because they requested my extension services
  - b. Because their fields are close to the Master Farm and/or your home
  - c. Because the individual's home is close to my home
  - d. Because they provide compensation for my extension services
  - e. Because I was encouraged by the Volunteer
  - f. Other
  - g. NA
24. If other, please explain.
25. Do you think you are conducting an appropriate number of visits to other farmers' fields to provide extension services?
26. What will allow you to conduct more visits to other farmers' fields to provide extension services? (multiple select)
  - a. Travel allowance for Master Farmer
  - b. Increase demand or interest from other farmers for the Master Farmer to visit
  - c. Increase advertising of the existence of the Master Farmer, Master Farm, and Master Farm extension model to other farmers
  - d. Increase training for Master Farmers on providing quality extension services to other farmers
  - e. Increase training for Master Farmers on technical knowledge or skills required to implement improved agricultural/agroforestry technologies
  - f. Nothing, I (the Master Farmer) am providing excellent extension services
  - g. Other

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27. If other, please explain.
28. In the past year, have you visited other Master Farms (with the exception of MF11 and MF7 during the MF conference in December)?
- Yes
  - No
29. If so, which ones?
30. Why did you visit those Master Farms? (multiple select)
- To learn a specific new technology
  - To support a fellow Master Farmer during a training activity
  - To provide technical assistance to that Master Farmer
  - Because I was encouraged by the Volunteer
  - So we could get to know each other better
  - Other
  - NA
31. If other, please explain.
32. In the past year, how many non-Master Farm agricultural production or research sites have you visited?
33. If so, what type of sites? (multiple select)
- Government of Senegal demonstration site
  - University research site
  - Private farm
  - Local group farm
  - Other
  - NA
34. If other, please explain.
35. Why did you visit those agricultural production or research sites? (multiple select)
- To learn a specific new technology
  - To support a fellow extension agent during a training activity
  - To provide technical assistance
  - Because I was encouraged by the Volunteer
  - Other
  - NA



36. If other, please explain.
37. Has the Volunteer participated in your extension activities outside the Master Farm?
  - a. Yes
  - b. No
  - c. NA
38. If no, why not?
39. If yes, who took the lead in providing assistance to the farmer?
  - a. You (the Master Farmer)
  - b. The Volunteer
  - c. The work was split more or less evenly between the PCV and the MF
  - d. Senegal Government Extension Service (ANCAR)
  - e. Another development organization, such as an NGO (if so, please specify)
  - f. Other
40. If Other or Another NGO, please specify.
41. List 2–3 other farmers who have applied a technology on your Master Farm.
42. Do you have any additional comments?

## Annex D

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### Key Informant Survey Instrument

1. What is today's date?
2. Name of key informant?
3. What is the position of the key informant?
4. What organization does the key informant work for?
  - a. Peace Corps/Senegal
  - b. USAID/Senegal
  - c. Senegal Government Extension Service (ANCAR)
  - d. Another Peace Corps post, please specify
  - e. Other
5. If another Peace Corps post or other, please explain
6. Please explain your association to Peace Corps/Senegal's Master Farmer Program? (multiple select)
  - a. Working closely with the program (it is part of my job description)
  - b. Act in a supervisory role for the program
  - c. Collaborate with the program on projects and activities (within Senegal)
  - d. Collaborate with the program on projects and activities (outside of Senegal)
  - e. Toured/visited a Master Farm and discussed the program with PC/Senegal programming staff
  - f. Other
7. If other, please explain.
8. What do you think is the greatest benefit of the Master Farmer Program? (multiple select)
  - a. Master Farmer serves as a local and permanent source of improved agriculture/ agroforestry information and knowledge
  - b. Master Farm serves as a local source of improved planting materials (e.g., improved field crop seed, improved fruit tree varieties)
  - c. Master Farm serves as a local demonstration site for improved agricultural/ agroforestry technologies
  - d. No benefit
  - e. Other
9. If other, please explain.

10. In general, do you think the Master Farmers participating in the program are conducting an appropriate number of training activities at their Master Farms?
11. What will allow the Master Farmer to hold more training activities at the Master Farm? (multiple select)
  - a. Increase demand or interest from other farmers
  - b. Advertising the existence of the Master Farmer, Master Farm, and the Master Farm extension model to other farmers in the community
  - c. Increase training to Master Farmers on providing quality extension services to other farmers
  - d. Increase training to Master Farmers on technical knowledge or skills required to implement improved agricultural or agroforestry technologies
  - e. Increase investment in physical infrastructure on the Master Farm, such as wells, fencing, tools, drip irrigation, etc.
  - f. Increase supply of seasonal agricultural inputs to the Master Farm, such as seeds, tree seedlings, fertilizers, etc.
  - g. Increased resources, such as funding for lunch, travel expense of participants, etc., for Master Farmers to conduct training activities
  - h. Nothing, the Master Farmer is providing excellent extension services
  - i. Other
12. If other, please explain.
13. In general, do you think the Master Farmer is conducting an appropriate number of visits to other farmers' fields to provide extension services?
14. What would allow the Master Farmer to conduct more visits to other farmers' fields to provide extension services? (multiple select)
  - a. Travel allowance for Master Farmer
  - b. Increase demand or interest from other farmers for the Master Farmer to visit
  - c. Increase advertising of the existence of the Master Farmer, Master Farm, and the Master Farm extension model to other farmers
  - d. Increase training to Master Farmers on providing quality extension services to other farmers
  - e. Increase training to Master Farmers on technical knowledge or skills required to implement improved agricultural or agroforestry technologies
  - f. Nothing, the Master Farmer is providing excellent extension service
  - g. Other

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15. If other, please explain.
16. Could you please explain some of the positive aspects of the Master Farmer Program? (multiple select)
- a. Improving food security in rural Senegal by increasing application of improved agricultural technology/technologies
  - b. Improvements in livelihoods for the Master Farmer
  - c. Creation of a network of demonstration sites throughout Senegal, which provide extension services to the communities
  - d. Creation of a network of suppliers for improved seed varieties or other agricultural inputs
  - e. Opportunity to build capacity of Master Farmers in agricultural techniques
  - f. Opportunity to build capacity of Master Farmers in nonagricultural areas, such as time management, bookkeeping, etc.
  - g. Creation of a network of demonstration sites that could be utilized by other development partners (including the Government of Senegal) to provide agricultural information to rural communities
  - h. Provides a structured project for Volunteers in their communities in the hopes of improving Volunteer morale
  - i. Consistency of project for multiple Volunteers in a site
  - j. Other
17. If other, please explain.
18. What policies or procedures could be implemented to improve Master Farms as a source of improved agricultural input to the communities? (multiple select)
- a. Provide Master Farmers with training on seed storage
  - b. Provide Master Farmers with subsidized seeds that could be resold to other community farmers
  - c. Provide Master Farmers with additional training on tree seedling grafting and nursery management
  - d. Provide Master Farmers training on business management and sales
  - e. Other
19. If other, please explain.

20. What aspect(s) of the Master Farmer Program need(s) to be improved? (multiple select)
  - a. Training of Master Farmers
  - b. Selection of Master Farmers
  - c. Providing motivation for Volunteers to work with Master Farmers
  - d. Increase effort to collaborate with external partners to support or expand the Master Farm Model
  - e. Other
  
21. If other, please explain.
  
22. Could the Master Farmer Program be replicated at other Peace Corps posts?
  - a. Yes
  - b. No
  - c. It depends
  
23. Why or why not? Please explain.
  
24. What do you think are the basic requirements for the program to be successfully replicated in another Peace Corps post? (multiple select)
  - a. Financial resources to support Master Farm development
  - b. Staff with background in agricultural extension and extension techniques
  - c. Commitment of staff to the model
  - d. Engagement of Volunteers to assist with the selection, training, and development of Master Farmers and/or Master Farms
  - e. Other
  
25. If other, please explain.
  
26. Do you have any additional comments?

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### Peace Corps Volunteer Survey Instrument

1. What is today's date?
2. Master Farmer
  - a. MF1
  - b. MF2
  - c. MF3
  - d. MF5
  - e. MF4
  - f. MF6
  - g. MF7
  - h. MF8
  - i. MF9
  - j. MF15
  - k. MF12
  - l. MF11
  - m. MF13
  - n. MF14
  - o. MF10
3. Volunteer's name
4. Has the Volunteer signed the consent form?
  - a. Yes
  - b. No
5. What do you think is the greatest benefit of the Master Farmer Program?  
(multiple select)
  - a. Master Farmer serves as a local and permanent source of improved agriculture/ agroforestry information and knowledge
  - b. Master Farmer serves as a local source of improved planting materials (e.g., improved field crop seed, improved fruit tree varieties)
  - c. Master Farm serves as a local demonstration site for improved agricultural/ agroforestry technologies
  - d. No benefit
  - e. Other
6. If other, please explain. (Write NA if no other.)



7. Do you think the Master Farmer is organizing an appropriate number of training activities at the Master Farm?
8. What will allow the Master Farmer to hold more training activities at the Master Farm? (multiple select)
  - a. Increase demand or interest from other farmers
  - b. Increase advertising of the existence of the Master Farmer, Master Farm, and Master Farm extension model to other farmers in the community
  - c. Increase training to Master Farmers on technical knowledge or skills required to implement improved agricultural/agroforestry technologies
  - d. Increase investment in physical infrastructure on the Master Farm, such as well, fencing, tools, drip irrigation, etc.
  - e. Increase supply of seasonal agricultural inputs to the Master Farm, such as seeds, tree seedlings, fertilizers, etc.
  - f. Increase training activity resources, such as funding for lunch, travel reimbursement for participants, etc.
  - g. Nothing, the Master Farmer is providing excellent extension services
  - h. Other
9. If other, please explain. (Write NA if no other.)
10. Do you think the Master Farmer is conducting an appropriate number of visits to other farmers' fields to provide extension services?
11. What would allow the Master Farmer to conduct more visits to other farmers' fields to provide extension services? (multiple select)
  - a. Travel allowance for Master Farmer
  - b. Increase demand or interest from other farmers for the Master Farmer to visit
  - c. Increase advertising of the existence of the Master Farmer, Master Farm, and Master Farm extension model to other farmers
  - d. Increase training for Master Farmers on providing quality extension services to other farmers
  - e. Increase training for Master Farmers on technical knowledge or skills required to implement improved agricultural/agroforestry technologies
  - f. Nothing, Master Farmer is providing excellent extension services
  - g. Other
12. If other, please explain. (Write NA if no other.)

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13. What methods or techniques would likely increase technology application by Master Farmers and/or other farmers? (multiple select)
  - a. Adapting technology for local conditions
  - b. Providing Master Farmers more flexibility in deciding which technologies to apply on the Master Farm
  - c. Providing a new name in a local language for the technology
  - d. Show evidence of technology's success through testimonials, images, video, etc.
  - e. Shorten return period on technology investment through creative technology use
  - f. Other
  
14. If other, please explain. (Write NA if no other.)
  
15. How can the Master Farmer Program improve extension services in order to increase application rates of technologies by other farmers? (multiple select)
  - a. Increase training for Master Farmer on how to be a better extension agent
  - b. Increase training for Master Farmer on farm management and organization to implement more effective extension programs
  - c. Incentives for Master Farmer to conduct extension activities (both on the Master Farm and in the community)
  - d. Increase community engagement in Master Farmer model of extension
  - e. Increase training for Master Farmer in agricultural/agroforestry technical areas
  - f. Collaboration with other development organizations
  - g. Collaboration with Department of Agriculture Extension Service
  - h. Increase training and motivation for Volunteers to assist Master Farmers in providing extension services
  - i. Encourage Master Farmer to hold more training activities at the Master Farm
  - j. Encourage Master Farmer to visit other farmers and help them implement technologies
  - k. Other
  
16. If other, please explain. (Write NA if no other.)

17. How long have you worked with this Master Farmer?
- 1–3 months
  - 3–6 months
  - 6–9 months
  - 9–12 months
  - 12–15 months
  - 15–18 months
  - 18–21 months
  - 21–24 months
  - More than 24 months
  - Have not yet worked with Master Farmer
18. Have you assisted other farmers (non-Master Farmers) after they attended a training at the Master Farm to apply an improved technology?
- Yes
  - No
19. If yes, how many of these farmers were part of a farming-related group?
20. If yes, how many of these farmers were NOT part of a farmer-related group?
21. If yes, which technology/technologies did you assist other farmers in applying? (multiple select)
- Cultivation of improved varieties of Millet
  - Cultivation of improved varieties of Sorghum
  - Cultivation of improved varieties of Corn
  - Cultivation of improved varieties of Rice
  - Cultivation of improved varieties of Cowpeas
  - Thinning of Millet
  - Thinning of Sorghum
  - Thinning of Corn
  - Conservation Farming with Ripper
  - Zai holes with field crops (e.g., Corn)
  - System of Rice Intensification (SRI)
  - IPM with Cowpeas (e.g., Neem solution, yellow sticky traps)
  - Proper plant spacing
  - Proper seed storage
  - Composting
  - Mulching
  - IPM in garden
  - Companion planting
  - Double digging

## Annex D

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- t. Use of soil amendments
  - u. Hexagonal spacing
  - v. Zai holes in garden
  - w. Use of permanent beds
  - x. Drip irrigation
  - y. Tree nursery establishment
  - z. Windbreak
  - aa. Alley cropping
  - bb. Live fencing
  - cc. Grafted fruit trees
  - dd. Integration of fruit trees in garden
  - ee. IPM with fruit trees
  - ff. Earthworks
  - gg. Moringa trees (e.g., in compound, as live fence post)
  - hh. Intensive Moringa beds
  - ii. Other
  - jj. NA
22. If other, what technology/technologies? (Write NA if no other)
23. Did the Master Farmer also participate while you were helping these other farmers implement the improved technology/technologies?
- a. Yes
  - b. No
  - c. NA
24. If no, why not? (Or write NA)
25. If yes, who took the lead in providing assistance to the farmer?
- a. You (the PCV)
  - b. The Master Farmer
  - c. The work was split more or less evenly between the PCV and the MF
  - d. Department of Agriculture Extension Service
  - e. Another development organization, such as an NGO (if so, please specify)
  - f. Other
26. If Other or Another NGO, please specify. (Or write NA.)
27. Do you have any additional comments? (If no, write No.)

## Program Participant Survey Instrument

1. What is today's date?
2. Master Farmer
  - a. MF1
  - b. MF2
  - c. MF3
  - d. MF5
  - e. MF4
  - f. MF6
  - g. MF7
  - h. MF8
  - i. MF9
  - j. MF15
  - k. MF12
  - l. MF11
  - m. MF13
  - n. MF14
  - o. MF10
3. Program Participant's name
4. Program Participant's village
5. Has the Program Participant signed the consent form?
  - a. Yes
  - b. No
6. Program Participant's sex
  - a. Male
  - b. Female
7. How many times have you visited the Master Farm in the past year?
8. How many times has the Master Farmer visited your field (or the field you help with, such as a school garden) in the past year?

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9. Of the technologies demonstrated on the Master Farm, which ones have you applied? (multiple select)
- a. Cultivation of improved varieties of Millet
  - b. Cultivation of improved varieties of Sorghum
  - c. Cultivation of improved varieties of Corn
  - d. Cultivation of improved varieties of Rice
  - e. Cultivation of improved varieties of Cowpeas
  - f. Thinning of Millet
  - g. Thinning of Sorghum
  - h. Thinning of Corn
  - i. Conservation Farming with Ripper
  - j. Zai holes with field crops (e.g., Corn)
  - k. System of Rice Intensification (SRI)
  - l. IPM with Cowpeas (e.g., Neem solution, yellow sticky traps)
  - m. Proper plant spacing
  - n. Proper seed storage
  - o. Composting
  - p. Mulching
  - q. IPM in garden
  - r. Companion planting
  - s. Double digging
  - t. Use of soil amendments
  - u. Hexagonal spacing
  - v. Zai holes in garden
  - w. Use of permanent beds
  - x. Drip irrigation
  - y. Tree nursery establishment
  - z. Windbreak
  - aa. Alley cropping
  - ab. Live fencing
  - ac. Grafted fruit trees
  - ad. Integration of fruit trees into garden
  - ae. IPM with fruit trees
  - af. Earthworks
  - ag. Moringa trees (e.g., in compound, as live fence)
  - ah. Intensive Moringa beds
  - ai. Other
  - aj. None
10. If other, please explain.

11. What other sources (besides the Master Farmer) do you utilize to obtain agricultural information? (multiple select)
  - a. Village official (e.g., village chief)
  - b. Relative
  - c. Senegal government extension agent
  - d. Another Senegal government representative
  - e. Fellow farmer group member
  - f. School's Parent Teacher Association member
  - g. Development organization representative (e.g., NGO worker)
  - h. Other farmers
  - i. Media (e.g., radio, television, newspaper)
  - j. Other
  - k. No other sources besides the Master Farmer
  
12. If other, please explain.
  
13. What do you think is the greatest benefit of the Master Farmer Program? (multiple select)
  - a. Master Farmer serves as a local and permanent source of improved agriculture/agroforestry information and knowledge
  - b. Master Farmer serves as a local source of improved planting materials (e.g., improved field crop seed, improved fruit tree varieties)
  - c. Master Farm serves as a local demonstration site for improved agricultural/agroforestry technologies
  - d. No benefit
  - e. Other
  
14. If other, please explain.
  
15. How can the Master Farmer Program improve extension services in order to increase application rates of technologies by other farmers? (multiple select)
  - a. Increase training for Master Farmer on how to be a better extension agent
  - b. Increase training for Master Farmer on farm management and organization to implement more effective extension programs
  - c. Incentives for Master Farmer to conduct extension activities (both on the Master Farm and in the community)
  - d. Increase community engagement in Master Farmer model of extension
  - e. Increase training for Master Farmer in agricultural/agroforestry technical areas



## Annex D

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- f. Collaboration with other development organizations
  - g. Collaboration with Senegal Government Extension Service (ANCAR)
  - h. Increase training and motivation for Volunteers to assist Master Farmers in providing extension services
  - i. Encourage Master Farmer to hold more training activities in the Master Farm
  - j. Encourage Master Farmer to visit other farmers and help them implement technologies
  - k. Other
16. If other, please explain.
17. Take GPS coordinates of Program Participant's location
18. Is this person a referral or from the Program Participant List?
- a. Referral from Master Farmer
  - b. Referral from another farmer
  - c. Program Participant List
  - d. Other
19. If other, please explain.
20. Do you have any additional comments?

## Improved Technology Survey Instrument

1. Which improved technology are you reporting on?
2. What is today's date?
3. Master Farmer's name
  - a. MF1
  - b. MF2
  - c. MF3
  - d. MF5
  - e. MF4
  - f. MF6
  - g. MF7
  - h. MF8
  - i. MF9
  - j. MF15
  - k. MF12
  - l. MF11
  - m. MF13
  - n. MF14
  - o. MF10
4. Project Participant's name
5. Project Participant's village
6. How long have you been implementing this technology?
  - a. <1 month
  - b. 1–3 months
  - c. 3–6 months
  - d. 6–12 months
  - e. 1–2 years
  - f. >2 years
7. Why are you implementing this technology? (multiple select)
  - a. Observed success from the Master Farmer
  - b. Expected beneficial outcomes
  - c. Master Farmer assisted with the implementation
  - d. Could not afford an alternative (e.g., Used organic soil amendments because could not afford synthetic fertilizer; Used water saving techniques to save money on water bill)
  - e. Support from other development organizations
  - f. Observed success from other farmers (not just Master Farmer)
  - g. Technology applied by someone else in the household
  - h. Other

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8. If other, please explain.
9. What are the benefits you see from implementing this technology? (multiple select)
  - a. Less work/labor
  - b. Increased yield
  - c. Diversified farm
  - d. Higher income
  - e. Diversified food for family
  - f. Technology is cheaper
  - g. Conveys social prestige
  - h. Faster return on investment
  - i. Shorter time to harvest
  - j. Improves soil and/or environment
  - k. Protects plants
  - l. Other
10. If other, please explain.
11. Do you plan to continue implementing this technology for the indefinite future?
  - a. Yes
  - b. No
  - c. Maybe
12. Why or why not?
13. Take GPS coordinates of location of technology
14. Did you take a picture of the technology (if possible)?
  - a. Yes, and I used the correct naming system for the picture
  - b. No, because there is nothing to see right now
  - c. No, because we could not get to the location of where the technology is being applied
  - d. No, for other reasons (please explain)
15. If no for other reasons, please explain.
16. Do you have any additional comments?

## Description and Abbreviations of Improved Technologies

Alley cropping (ALC)	Farmer has trees that are nitrogen-fixing, such as Leuceauna or Moringa, planted in rows in a garden, field, or orchard to improve the soil.
Companion Planting (CPL)	Farmer plants at least two crops together that associate well with each other for structural or biochemical reasons, such as green peppers and lettuce, corn and squash and beans.
Composting (COM)	Farmer composts by making piles of green materials (such as fresh green leaves), brown materials (such as dried leaves), and manure and turns them on a regular basis so they decompose into rich soil.
Conservation Farming (CFA)	Farmer uses the ripper machine to strip till the soil or digs Zai holes; farmer may use synthetic and/or organic soil amendments and may mulch around the plants.
Cultivation of Grafted Fruit Tree (GFT)	Farmer has fruit trees that are grafted in a garden, field, or orchard
Cultivation of Improved Varieties of Cowpea (ICO)	Farmer grows an improved variety of cowpeas developed by ISRA, such as Melakh.
Cultivation of Improved Varieties of Maize (IMA)	Farmer grows an improved variety of maize developed by ISRA, such as Suwan or Synthetic C.
Cultivation of Improved Varieties of Millet (IMI)	Farmer grows an improved variety of millet developed by ISRA, such as Souna 3.
Cultivation of Improved Varieties of Rice (IRI)	Farmer grows an improved variety of rice developed by ISRA, such as IRAT 10 or NERICA
Cultivation of Improved Varieties of Sorghum (ISO)	Farmer grows an improved variety of sorghum developed by ISRA, such as CE 145-66.
Drip Irrigation (DRI)	Farmer uses a drip irrigation system that is bought or homemade.
Double Digging (DDG)	Farmer digs deep into the soil, applying two layers of organic soil amendments.
Hexagonal Spacing (HXP)	Farmer plants vegetable crops with hexagonal spacing. 

## Annex E

Integrated Pest Management (IPM)	Farmer uses at least one of numerous possible techniques, such as organic solutions sprayed on plants, and crop rotation.
IPM with Cowpeas (IPC)	Farmer uses a chemical pesticide (called Dimethoate), an organic Neem oil solution, an organic Neem leaf solution, or yellow sticky traps to control pests (such as thrips) on cowpeas.
Integration of Fruit Trees into Garden (FTG)	Farmer has smaller fruit trees, such as bananas, guavas, or papayas, planted in his garden.
Live Fencing (LIF)	Farmer has a fence made of living plants, such as trees or shrubs.
Mulching (MUL)	Farmer applies dried materials (such as dried leaves, grass, weeds, corn stalks, millet stalks) around the base of plants to keep moisture in the soil and reduce erosion.
Proper on Seed Storage (PSS)	Farmer uses at least one of the following seed storage techniques: Phostoxin, sand, ash, and Neem leaves.
Proper Plant Spacing (PPS)	Farmer uses the proper spacing for field crops, vegetables, and/or fruit trees.
System of Rice Intensification (SRI)	Rice production method that changes management of plant, soil, water and nutrients to increase productivity
Thinning of Millet (TMI)	Farmer properly thins millet to one or three plants per hill.
Thinning of Sorghum (TSO)	Farmer properly thins sorghum to three plants per hill.
Thinning of Maize (TMA)	Farmer properly thins maize to one plant per hill (or two plants per Zai hole).
Use of Soil Amendments (OSA)	Farmer uses organic soil amendments, such as manure or compost, in a field, garden, or orchard.
Use of Permanent Beds (PBE)	Farmer uses permanent garden beds rather than moving and digging new garden beds every season.
Windbreak (WDB)	Farmer has trees that are planted in rows in a garden, field, or orchard to slow the wind.
Other (OTH)	Farmer is using another improved technology demonstrated on the Master Farm.