

Nicaragua Community Gardening, Crop Rotation, Water Quality, and Pesticide Safety Education Project Farmer-to-Farmer

EXECUTIVE SUMMARY

I volunteered for Farmer to Farmer from July 3-17, 2011. The experience was amazing. Elisa Estrada is an excellent interpreter and educator. Together, we developed education curriculum for water sanitation, crop rotation, basic organic gardening practices, and safe use of pesticides. We also created a new partnership with Julio Lopez, the National Director of PROMIPAC, Zamorano University of Honduras. In addition, Elisa and I decided to make videos to 1) better educate future FTF volunteers about the specifics of each FTF project so that volunteers are better prepared for their FTF Nicaraguan experience; videos will be uploaded to the FTF blog, and 2) document the good food security/agricultural practices that are currently being used in Nicaragua; the videos (in Spanish) will be shown to other schools, communities, farms, and cooperatives to demonstrate sustainable practices. I was also asked by Ronaldo Blandon to film one of the dairies in Camoapa to help recruit FTF volunteers who can help the dairies diversify the types of cheese they are making. These videos can be uploaded to the FTF blog. During my last day in Managua, I trained Elisa and other FTF staff with filming, editing and developing movies/DVDs. Elisa said she will ask the Washington office for video equipment and editing software so that this video program can be sustainable.

During my 2 weeks with the Farmer to Farmer program in Nicaragua, I identified the following concerns and recommendations:

- FTP volunteers need to find education materials that are in Spanish. I found dozens of educational videos, manuals, and brochures that are in Spanish. FTF Nicaragua now has them. I will also send the videos to the Washington DC office. I recommend that volunteers make all their paper copies in Managua, where it is cheaper. I donated a portable DVD player (rechargeable battery) and portable speaker to FTF Nicaragua so that educational DVDs can be shown in the schools.
- While in Nicaragua, I met someone who has experience with the transfer of appropriate agriculture technology. He told me about a book that was written in Nicaragua, but that very few people are aware of. It's called "Machete Verde". He gave me the electronic file for the book. I gave copies to Elisa Estrada and plan to provide them to the Washington, DC office for uploading to the FTF blog. It is written in Spanish and incorporates simple information/directions and diagrams for soil conservation (terraces using an A frame), compost toilets, water sanitation, integrated pest management, medicinal plants, etc... All the supplies used are local, easily available materials. I recommend that all future FTF volunteers read this manual. If volunteers want to make copies for distribution for their educational programs, I suggest they make them in Managua to reduce baggage weight and to get a better price for the copies.
- Many of the schools don't have electricity, so I suggest volunteers do NOT bring anything to the schools that need to be operated on electricity. Also, there is no refrigeration and many of the schools don't have potable water or cooking facilities. Volunteers should keep this in mind when they're planning activities.
- The schools do not have soap for proper hand-washing. The "Machete Verde" book has directions for making a very inexpensive soap. I recommend that future FTF volunteers donate soap to all the schools they visit and demonstrate the proper method for washing hands. Also the proper method for disposing of the dirty wash water to prevent the contamination of drinking water.
- Many of the schools do NOT have potable water. For example, the Community Sarrigo school uses dirty river water for drinking. The children and the teachers walk quite a distance to the river to get the water. It is always muddy due to erosion and run-off of nearby soil (high percentage of clay). Elisa and I demonstrated how to use a

2% iodine solution to treat the water BEFORE using. The water still appears dirty, but any pathogenic organisms will be dead. Elisa and I also gave directions for saving rain water in their reservoir that is located next to their school. I was surprised to discover that many people believe rain water is worse than river water. Elisa and I educated them about how rain water is actually pure and is much better than river water. Plus, they don't have to walk to the river to get water. Currently the reservoir is very dirty. The parents promised to clean it up using soap and the iodine solution before the next FTF volunteers arrive. The new volunteers will need to make a mosquito-proof cover for the reservoir and will need to reinforce proper sanitation techniques for the reservoir. I encourage future FTF volunteers to read the Machete Verde book to develop additional projects for improving the water quality for students at this and other schools.

- Additional food security programs should be explored. For example, the Community Trincheras school has agreed to be the first FTF school to have chickens for egg production. A new chicken raising program is being developed and will be implemented by future FTF volunteers. The Machete Verde book has an entire chapter about raising chickens.
- If possible, FTF volunteers should NOT use powerpoints. They tend to be boring and too technical. Instead, volunteers can give short talks that incorporate interactive activities. Elisa Estrada is an excellent interpreter. The people that FTF volunteers present to will remember the material better if it's presented in a more interactive way. Demonstrations are very good to use as well, but it's better to get the audience involved with the demonstration. FTF volunteers will be amazed at how much their audience will appreciate the effort.
- FTF volunteers should wait to purchase seeds and planting supplies until they arrive in Nicaragua. The prices are lower and plants will be grown that are familiar to the people and better adapted to the tropical climate.
- FTF volunteers need to let Elisa Estrada decide when it's appropriate to give seeds away. She wants to make sure the people first know how to grow the plants, and then she wants to give seeds away at the same time that the seeds are planted. She would like volunteers to participate in planting the gardens.
- Teachers and parents at the schools have been growing, caring and harvesting the garden plants. Future volunteers need to encourage the teachers to set aside sections of gardens or the entire garden for the students. This is a new idea for the communities. They are not accustomed to active learning techniques in teaching. Future volunteers should bring science, math, social science curricula (in Spanish) that incorporate "hands on" active learning activities about gardening, sanitation/hygiene, safe water, raising chickens, etc... The teachers welcome new teaching strategies. They are very open to all new ideas. If FTF food security programs are going to be sustainable, then student involvement must be encouraged.
- FTF Nicaragua has decided to develop "good practices models" for the Camoapa area. Videos will be made of the entire process; these will be incorporated into educational DVDs. These DVDs will be used at future schools to demonstrate sustainable food security programming.
 - The Augustina Miranda School, located in the town of Camoapa, has agreed to be the community garden model for the town. In the future, this site will be used for FTF demonstrations for people living near the town, such as women involved with Casa de Las Mujeres. For example, short talks can be given at the Casa de Las Mujeres, but then everyone can walk over to the school for "hands on" demonstrations.
 - The Community Trincheras School has agreed to be the rural food security model school. They are already getting their students involved with growing a new organic garden. Future FTF volunteers will help initiate a chicken/egg production program to further improve food security. Volunteers will also help create educational programming that incorporates student involvement with saving seed, making/using natural pesticides, identifying and increasing the diversity of beneficial insects, making/using solar ovens, and better sanitation practices (proper hand-washing technique).

- The directors of the Coopanor Matagalpa Potato Cooperative would like future FTF volunteers to conduct hands-on demonstrations and trainings that educate farmers directly so they will be empowered to educate other farmers in their communities. Going to the fields and diagnosing is nice, but it isn't sustainable unless "hands-on" teaching is also provided.
- The Cooperative El Chimborazo in Jinotega needs technical assistance with greenhouse best management practices. The video I made will help future volunteers understand the current conditions and needs.
- Farmer to Farmer should continue to collaborate with Julio Lopez, the National Director of PROMIPAC, Zamorano University in Honduras. Julio organizes field schools throughout Nicaragua and has agreed to invite 4 members of the Coopanor Potato Cooperative to join the potato field school in Miraflores. This is extremely important because currently the producers of this cooperative are NOT using best management practices in the production and storage of potatoes. FTF volunteers can provide demonstrations and technical assistance with the field schools. Julio is also very interested in working with Farmer to Farmer in Camoapa to help build the capacity for vegetable production in that area.
- Farmer to Farmer should continue to cultivate the new relationship with PCI. Franklin Rivera is an excellent person to collaborate with. He has a wonderful relationship with the farmers. They seem to absorb every word he says and actively engage in discussions with him. Elisa and I gave the Tracer Kit to Franklin. Since he's in charge of the Rural Development School (training field technicians), we believe he'll be able to educate hundreds of students about pesticide safety by using the innovative and interactive methodology incorporated in the kit.
- The field officers and staff learned about to edit and produce videos. This new skill will be useful in integrating photos into movies that can then be presented at conferences and workshops. Field officers can also film "best practices" that can then be shown to other producers who are still struggling with understanding and incorporating those practices. The field officers and staff currently only have Microsoft Movie Maker installed on their laptops. This software is very difficult to use and is very limited in its capabilities. I recommend that the Washington DC office purchase a copy of Sony Creative Software Movie Studio HD Platinum Suite 11 V.11 <http://www.amazon.com/gp/product/B0051M6IPIA> . If this is too expensive, then versions 9 or 10 would also work.

ACTIVITIES, OBSERVATIONS, RECOMMENDATIONS and RESULTS

From July 4-8th I was in Camoapa with Elisa Estrada:

1. **Activity: July 7th, 2011, Field Visit to Casa de la Mujer Nuestra about organic gardening, crop rotation, saving seeds, and testing the germination of seeds (15 women).**

Observations:

- a. The women enjoyed watching the videos (in Spanish) about Organic Gardening and Organic Gardening in Containers.
- b. I also gave each woman a copy of the booklet "Manual del Cultivo Biointensivo de Alimentos".
- c. During the videos, most of the women were taking notes.
- d. After the videos, Elisa and I went through the booklet page by page, spending most of the time talking about crop rotation. We had them copy the list of plants for each plant family so they will know which plants to grow in a rotation.
- e. After a discussion about crop rotation, we showed a short video about how to save tomato seeds (fermentation).
- f. After the presentation, Elisa demonstrated how to test the germination of seeds. We explained that if they test the germination of seeds, they won't have to plant all their seeds; only the number of seeds needed to produce

their crop.

- g. The women appreciated the DVDs and booklets. They said the booklet is very simply written and will help them a lot.
- h. I left copies of all the DVDs. Four DVDs are short courses for Organic Gardening, all in Spanish: "El Curso de Huerta Organica". One DVD has 10 short video clips, such as making a solar oven, saving tomato seeds, beneficial insects, and other integrated pest management examples. All the videos are in Spanish.

Recommendations:

- a. The women are very interested in planting flowers around their vegetable gardens to attract beneficial insects. Elisa would like future volunteers to purchase flower seeds in Nicaragua, rather than bringing seeds from the United States. However, future volunteers need to help Elisa research which types of flower seeds are available and which ones are suited for attracting beneficial insects.
- b. There is an interest in incorporating plantain and melon production, but it would be better to buy the seeds in Nicaragua.
- c. Future volunteers need to demonstrate saving seeds for the plants commonly grown in this community, such as lettuce, spinach, swiss chard, carrots, beans, tomatoes, melons. For the FTF community garden program to be sustainable, people need to learn how to save seeds, focusing on harvesting seeds from those plants that appear to be better adapted to the tropical climate. Volunteers need to find literature in Spanish that includes instructions for saving seeds. This information should be left with the community leaders.
- d. Future volunteers also need to demonstrate making natural pesticides, making a simple solar oven and cooking in the oven (video found for a simple design can be found at: <http://www.youtube.com/watch?v=wzy9tHD9jVc>)
- e. Future volunteers also need to bring recipes in Spanish for preparing okra, swiss chard, and kohlrabi- plants they are growing in their gardens, but don't use because they don't know how to prepare them.

Results:

When Elisa and I visited a community leader who represents Barrio San Martin, the woman said she totally ran out of seeds. Elisa and the volunteers working at Casa de Mujeres believe some women are selling the seeds, not planting or distributing them to their community members. The prices of the seeds are listed on the seed packet, in dollars. We believe the women see that dollar amount and decide to sell them to make money. Elisa, myself and other Casa de Mujeres volunteers made a decisión to require women to watch the entire "Curso de Huerto Organica" before they can receive seeds. They will also receive a certificate of graduation. Mayra Arroliga, volunteer with Casa de Las Mujeres, has agreed to sponsor this education program for the Camoapa Community. She has the full set of DVDs for the course. She will have people sign in and she will keep track of who has completed the course. When the next FTF volunteers come, those people who have participated in the course will receive seeds.

2. Activity: July 6-7, 2011, Field Visit to Community Trincheras school to teach about crop rotation, water sanitation/proper hand washing, and to help with their community garden (2 teachers, 4 parents, 30 children).

Observations:

- a. Each teacher was given a copy of the booklet "Manual del Cultivo Biointensivo de Alimentos" and a flash drive with all the educational materials and videos (in Spanish). On the second day we visited the school, one of the teachers said he looked at all the electronic files and the book and was surprised at how much he learned.
- b. On July 6th, we showed an animated video about the safe use of pesticides. Many of the children said their parents use bad practices. They said they will tell their parents about how to use pesticides more safely so that no one gets sick and so that their water doesn't get contaminated. "Seguro Uso de Plaguicidas" coloring books and crayons were given to the youngest children.
- c. We also bought and distributed milk and cheese to all the children to help supplement their government issued beans/rice meal.
- d. Later, we presented a crop rotation activity. We had the students work in groups with either a teacher or parent working with each group. Each group was given a small poster board to draw 2 rows of 5 squares each that represent their garden. Students then wrote the names of garden plants on small pieces of paper. They then

planted the first row of squares with plants of their choosing using the Plant Families Chart that we drew on the board to guide their planting. After they planted their imaginary garden, they then had to plan their gardens for the following year. However, they could NOT grow plants from the same family in the same year. After each group finished, we had groups switch places and analyze each others' results to make sure proper crop rotation was used. This type of hands-on activity was new to the teachers, especially the part about having students analyze each others' work. The teachers were amazed at how much the students and adults learned by using an interactive teaching strategy.

- e. After the crop rotation activity, we visited the schools community gardens. They have 2 garden areas, one in front of the school that is more established and a newer area at the back of the school. The garden in front of the school was in great shape; I demonstrated how to harvest and cook swiss chard, a plant they are not accustomed to. The garden in back of the school is new and needs a lot of work. The next volunteers will help create 10 new garden plots. I helped the teachers transplant some tomato seedlings that were very crowded. However, before planting I demonstrated how the soil was very sticky because of the high clay content. I reminded them of what they learned from the other FTF volunteers. I showed them how simple it was to stick my fingers into the soil where the tomato seedlings were growing because compost had been incorporated into the soil before planting. I had the teachers stick their fingers into each type of soil, the composted and the uncomposted soil so they could feel the difference. I showed them how to add compost to their new tomato bed and how to properly transplant the tomato seedlings. I asked the teachers to get their classroom students involved with any new gardens. When Elisa and I returned the next day, all the tomato seedlings had been transplanted by the students! Each student proudly showed which plant was theirs. They each promised to care for their plants. I told them future FTF volunteers will also want students to be involved in all aspects of the community garden. I gave the teachers ideas for incorporating science lessons in organic gardening.
- f. The teachers and parents asked if it was possible to raise chickens/eggs to help diversity the children's diet. Elisa and I researched the cost for chickens, feed and other supplies. We ask that future FTF volunteers help further develop this food security program. The Machete Verde book (will be uploaded to the FTF blog) has great information in Spanish for raising chickens.
- g. On July 7th, Elisa and I gave the teachers a bottle of 2% iodine solution and demonstrated how to use it for proper hand washing. The school doesn't have soap, so the students just use well water to clean their hands. We had the students, teachers and parents first rinse their hands in a pail to remove all dirt, then we had them rinse their hands in a pail of water with iodine solution. They had to let their hands air dry to give the solution time to kill any pathogenic organisms. We emphasized the importance of treating the water in the pail 30 minutes BEFORE the students use the water- that way the iodine has time to kill the pathogenic organisms. We also asked parents to donate 2 containers for placement next to the latrine so that students can wash their hands after using the latrine (using the iodine sanitation method). We left a large bottle of iodine with the school. Future FTF volunteers should check to see if the teachers are still using this technique or additional techniques can be used, such as those recommended in the Machete Verde manual.

Recommendations:

- a. Future FTF volunteers should encourage student involvement in all aspects of the community garden. If possible, give teachers ideas/lessons in Spanish for incorporating science, math, social studies lessons in organic gardening.
- b. Work with Elisa Estrada to expand the food security program for this school. A chicken/egg raising project should be developed. The teachers and families are highly involved and are dedicated to improving food security for their community. The Machete Verde book has great information in Spanish for raising chickens.
- c. Future FTF volunteers should read the Machete Verde book and explore the use of other sustainable practices for improving sanitation/hygiene and food security.
- d. Volunteers will also help create educational programming that incorporates student involvement with saving seed, making/using natural pesticides, identifying and increasing the diversity of beneficial insects, making/using

solar ovens, and better sanitation practices (proper hand-washing technique).

Results:

FTF Nicaragua has decided to develop “good practices models” for the Camoapa area. Videos will be made of the entire process; these will be incorporated into educational DVDs. These DVDs will be used at future schools to demonstrate sustainable food security programming. The Community Trincheras School has agreed to be the rural food security model school. They are already getting their students involved with growing a new organic garden. Future FTF volunteers will help initiate a chicken/egg production program to further improve food security. Volunteers will also help create educational programming that incorporates student involvement with saving seed, making/using natural pesticides, identifying and increasing the diversity of beneficial insects, making/using solar ovens, and better sanitation practices (proper hand-washing technique).

3. Activity: July 7, 2011, Field Visit to Casa de la Mujeres Empalme de Boaco to teach about water sanitation/proper hand washing (30 women, 3 children).

Observations:

- a. The Empalme de Boaco is a skill development program with Casa de Las Mujeres. There are about 30 women who are learning bakery skills. In addition to learning how to bake, they are also learning book-keeping, sanitation, and food security training. I made a video of Fanny Matus with the women in the bakery. She talked in Spanish and described the program while the women were busy mixing batter. Several of the women in the group, as well as Julia Castillo (the teacher), also spoke to the camera, describing how the program is benefitting their families. The video will be made into a DVD and will be given to Fanny so she can use it to develop similar programs in Nicaragua.
- b. During the time that the cakes were baking, Elisa and I gave a water sanitation presentation. We used a product called “germ glow” for the demonstration. This is a non-toxic lotion that was developed to demonstrate safe hand-washing practices; it fluoresces with black light. We asked for 2 volunteers. One woman rubbed the solution over her hands. We asked her to then shake hands with the next woman. Using a black light, we showed the women how germs can be transferred from one person to another. We then demonstrated how to wash their hands, using soapy water first, then iodine/water rinse.

Recommendations:

The women were very vocal about the water/sanitation problems that exist in their community. Many said there’s no latrine. They have to go in the woods. They also said they have to use river water for drinking. They said many children get cholera. We taught them how to use iodine to sterilize water and how to use solarization to clean water (using clear plastic bottles that are readily available). We also demonstrated how they can use rainwater, instead of river water. The women said they always thought rain water was contaminated. They didn’t understand it is actually very clean and is preferably to using dirty river water.

Results:

Elisa and I gave a large bottle of 2% iodine to the leader of the community. She was very grateful and said she would share it with other families. She said the price for the iodine is very affordable. She also said she would work with other families to collect rain water and to practice solarization of water, which is free.

4. Activity: July 8, 2011, Field Visit to Augustina Mirando, a school located in the downtown area of Camoapa, to establish “model” community gardens for the urban area of Camoapa (principal and 2 teachers).

Observations:

- a. Elisa, Mayra and I had a meeting with the principal of Augustina Mirando to see if there was interest in establishing a “model community garden” for the urban sector of Camoapa. The teachers have already established one area for gardens.
- b. Elisa explained to the teachers that we have initiated a new procedure for participation in FTF community gardening. People are now required to complete the Curso de Huerto Organica (DVD program) before receiving donated seeds and planting assistance. They agreed to watch the movies on August 5th, 2011 when FTF volunteers (Arthur Kneeland and Chuck Bomar) are available for questions/answers.
- c. After the educational program, student leaders will work with FTF volunteers to plant the established garden

and prepare/plant a new garden on the opposite side of the school. Local government officials and a filming crew from the local TV station will also be there for the planting. Elisa and volunteers will provide lunch/beverages to all in attendance (54 expected).

- d. Elisa will work with FTF volunteers to film the entire process. The movie will be used to promote community gardens in other communities.

Recommendations:

- a. Student leaders will work with the FTF volunteers on August 5th.
- b. Later these same student leaders will work with their fellow classmates to maintain and harvest the garden.
- c. The teachers were given a copy of the booklet "Manual del Cultivo Biointensivo de Alimentos" and a flash drive with all the educational materials and videos (in Spanish).

Results:

This school will be an excellent model for sustainable community gardening. The teachers and principals are committed to having the students take leadership roles in all aspects of the garden.

5. **Activity: July 8, 2011, Field Visit to Community Sarrigo school to demonstrate techniques for sanitizing water for consumption and proper hand-washing.**

Observations:

- a. The Community Sarrigo school is very enthusiastic about their community garden. They are very proud of all the produce they've been growing.
- b. The teachers were given a copy of the booklet "Manual del Cultivo Biointensivo de Alimentos" and a flash drive with all the educational materials and videos (in Spanish). They were also given crayons and Uso Seguro de Plaguicidas coloring books.
- c. This school has no electricity. There's no kitchen to prepare food or to boil water.
- d. The school uses dirty river water for drinking. The children and the teachers walk quite a distance to the river to get the water. It is always muddy due to erosion and run-off of nearby soil (high percentage of clay).
- e. Elisa, Mayra and I walked with the teachers and some of the parents to collect the water from the river. The walk is long and the water is very murky. We showed them how to use a smaller container to collect water from the surface and to avoid collecting water from the bottom.
- f. When we returned to the school, Elisa and I demonstrated how to use a 2% iodine solution to treat the water BEFORE using. The water still appears dirty, but any pathogenic organisms will be dead. We also explained how they can use solarization to sterilize their water. They can fill clear water bottles with water and expose them to sun for 6 hours. The UV light destroys pathogenic organisms.
- g. After the students, parents and teachers demonstrated proper handwashing using the iodine technique, donated milk and cheese were distributed to the children. We emphasized that students should always wash their hands BEFORE eating and AFTER using the latrine.
- h. Parents committed to donating additional containers that will be located next to the latrine. That way students can wash their hands after using the latrine (using water treated with iodine).
- i. Elisa and I also gave directions for saving rain water in the reservoir that is located next to their school. I was surprised to discover that many people believe rain water is worse than river water. Elisa and I educated them about how rain water is actually pure and is much better than river water. Plus, they don't have to walk to the river to get water.

Recommendations:

- a. Currently the reservoir is very dirty. The parents promised to clean it up using soap and the iodine solution before the next FTF volunteers arrive.
- b. The next volunteers will need to make a mosquito-proof cover for the reservoir and will need to reinforce proper sanitation techniques for the reservoir. I encourage future FTF volunteers to read the Machete Verde book to develop projects for improving the water quality.
- c. FTF volunteers should also encourage the teachers to actively engage their students with all aspects of

- gardening. Currently, the parents and teachers are assuming all responsibility for the gardens.
- d. Any educational materials and lessons (in Spanish) would be greatly appreciated.
 - e. Future FTF volunteers should donate soap to this school. Also the proper method for disposing of the dirty wash water to prevent the contamination of drinking water.

Results:

This school is in great need. There's no source of potable water, no electricity, and no kitchen. The teachers, students and parents are very proud of their community garden. Earlier in the week, someone robbed the school of all their government issued food (beans and rice) and stole all the produce from the community garden. This was very sad for the students, teachers, parents, and FTP staff and volunteers.

From July 11-14th I was in the Matagalpa area with Elisa Estrada:

1. **Activity: July 11th, 2011, Field Visit to Grupo de Esquipulas to make a movie of their model community garden so that people from other communities and schools can see best management practices in gardening (2 women, 2 technicians).**

Observations:

- a. Grupo de Esquipulas is located in a remote, mountain area. The group is focuses on organic production of vegetables for household consumption. Seventy-one women work family gardens with some limited financial support and technical assistance by the organization.
- b. Elisa and I gave "Manual del Cultivo Biointensivo de Alimentos" to Jironima, the leader of this women's group. We also gave the technicians a flash drive that contained all the Spanish materials.
- c. Jironima gave us a tour of the community gardens. We asked if we could film the tour because we would like to use their garden as a "model" for other communities that are just starting FTF food security projects.

Recommendations:

- a. This community is an excellent example of small scale permaculture.
- b. They use crop rotation, transplant seedlings, grow a diversity of vegetables and fruits, and never use pesticides. They also grow many different types of plants in containers and old tires.
- c. The community has requested the following assistance from future volunteers: seed saving, natural insecticides, preservation of food (carrots, onions, beets, etc...).
- d. They would like FTF volunteers demonstrate how to save the following seeds: peppers, lettuce, spinach, kale, carrots, squash, tomato, celery, and cucumber.

Results:

This community is well on its way to food security. In my opinion, their greatest need is intensive instruction in saving seed (selecting, harvesting, and preservation). The video we made will be used by Elisa to demonstrate best practices in gardening.

2. **Activity: July 12th, 2011, pesticide safety and crop rotation presentation to the directors of the Cooponor Matagalpa Potato Cooperative. Field visit to a local potato farmers field to make a video of the potato fields so that future FTF volunteers will have a better idea of the growing conditions and production problems (8 directors). Field visit to the cooperatives potato storage building to film the condition and problems of the facility (3 directors).**

Observations:

- a. Elisa and I showed a 20 minute video about pesticide safety (Spanish). Then we showed a 5 minute video that shows a farmer demonstrating using a backpack sprayer. The farmer doesn't know the backpack sprayer is actually full of fluorescent tracer, not pesticides. The video shows the farmer demonstrating how he sprays his potato crop; he uses no personal protection equipment (PPE) and even lets his 3 year old daughter stay near him while he's preparing the spray and equipment. After the farmer finishes spraying, a black light is shown on his and his daughter's body to demonstrate how pesticides contaminate their clothes and their skin.
- b. After the videos, Elisa and I used the same fluorescent tracer mix. We had the men put gloves on, and then sprayed the hands of one volunteer. We asked him to shake hands with everyone in the room. We asked

another volunteer to answer his cellphone using the hand he just shook hands with. We also sprayed a baseball cap with the tracer and asked a volunteer to wear the hat, and then take it off several times to wipe sweat off his forehead. After this activity, we used the black light to demonstrate how the imaginary pesticide spread to their clothes, body and cellphone.

- c. After a discussion about pesticides, Elisa and I led a crop rotation discussion. We had the men work in groups and plan crop rotations. The activity helped them to understand the importance of rotating crops from different families.
- d. I gave the group the BioIPM Potato Handbook that Deana Knuteson gave me (UW-Extension). They were extremely interested in the book and will work with local English speaking people to have it translated into Spanish.
- e. After the presentations and discussions, 3 of the directors took Elisa and I to the potato field of one of the members of the cooperative. I made a video of the potato field so that future FTF volunteers can see the conditions and problems. While we were in the field, the directors educated the farmer about pesticide safety and the proper method to rotate his crops.
- f. The directors then took us to the potato shed so that I could make a video. While we were there, we saw that all the workers were shirtless and were spraying pesticides all over the potatoes. The directors said "Oh well, there's nothing we can do because those potatoes belong to a different farmer". Elisa and I convinced the directors that it is their responsibility to make sure all the workers are being safe. They said we should come back some time to give a demonstration. We said it would be best if the directors could give a safety demonstration right now. We told them they already know all the information and it would be best for them to take a leadership role. They agreed and immediately brought all the boys and young men to the office area where they showed the pesticide safety video and then talked to the workers about how things were going to change. The directors will make sure there is proper PPE and will set aside an area for the workers to clean their bodies and clothes. The directors also committed to making sure that workers had to have pesticide safety training before they could work for the cooperative.

Recommendations:

- a. In my opinion, it is very important to keep emphasizing that Farmer to Farmer is a transfer of knowledge. Our goal is for FTF projects to be sustainable. For this reason, Elisa and I insisted that the directors conduct the pesticide safety training. That way, they can provide the training as needed.
- b. The directors wanted Elisa and me to buy PPE for them. However, I said FTF will help find higher quality PPE in Nicaragua, but it is the responsibility of the cooperative to purchase the PPE for their employees. I emphasized that if NGOs purchase the PPE, then it isn't being sustainable.

Results:

The directors would like future FTF volunteers to conduct hands-on demonstrations and trainings that educates farmers directly so they will be empowered to educate other farmers in their communities. Going to the fields and diagnosing is nice, but it isn't sustainable unless "hands-on" teaching is also provided.

3. **Activity: July 13th, 2011, visit to Cooperative El Chimborazo to organize the pesticide safety and crop rotation presentation planned for July 14th (1 Director). Visited the cooperative's greenhouses to make a video of the greenhouse to document the current conditions and needs (2 Technicians). Also met with Julio Lopez Montes, the Director Nacional of PROMIPAC (Programa de Manejo Integrado de Plagas en America Central) of the University of Zamorano in Honduras- a famous agricultural school of Central America (2 Directors).**

Observations:

- a. Elisa and I visited the Cooperative El Chimborazo in Jinotega to organize the pesticide safety and crop rotation training for 25 producers scheduled for July 14th. We also organized 2 different presentations that will be given by the next FTF volunteers, Chuck Bomar and Arthur Kneeland; one presentation will be integrated pest management for producers, and the second presentation is teaching strategies for the technicians using integrated pest management as the theme.
- b. Next, 2 technical staff from the cooperative took us to one of the greenhouses where I made a video of the

facility. The video will be used to help future volunteers be more prepared to work with the producers on greenhouse best management practices

- c. Later, Elisa and I met with Julio Lopez Montes, the National Director of PROMIPAC at a local restaurant. We also invited one of the directors from the Coopanor Potato cooperative. I made contact with Julio before I left the United States. Stephen Sherwood, a potato specialist from Ecuador, recommended him to me. I acquired 3 copies of the BioIPM Potato Handbook from Deana Knutson (UW-Extension). She gave me permission to give the manual and electronic file to Julio for translation to Spanish. During our working lunch, we discussed how PROMIPAC and Farmer to Farmer could collaborate on future projects. Julio organizes field schools throughout Nicaragua. Julio will invite 4 members of the Coopanor cooperative to join the potato field school in Miraflores. This is extremely important because currently the producers of this cooperative are not using best management practices in the production and storage of potatoes.

Recommendations:

- a. Continue to collaborate with Julio Lopez. FTF volunteers can provide demonstrations and technical assistance with the field schools.

Results:

The meeting with Julio Lopez of Zamorano University was extremely productive. He will arrange for 4 members of the Coopanor Potato cooperative attend the potato field school in Miraflores. He is also very interested in working with Farmer to Farmer in Camoapa to help build the capacity for vegetable production in that area.

4. Activity: July 14th, 2011, visit to Cooperative Sooprocom, Odorico de Andrea y PCI at Cuatro Esquinas San Rafael del Norte. Pesticide safety demonstrations, crop rotation talk, and beneficial insects video activity (12 farmers, PCI Director Franklin Rivera, 2 PCI technicians).

Observations:

- a. Elisa and I traveled to San Rafael del Norte to collaborate with PCI (Franklin Rivera) to give a talk and demonstrations about pesticide safety.
- b. We had the farmers divide up into 3 groups of 4 each. The PCI technicians and directors circulated among the groups to help as needed. We showed the men the pesticide safety video and then had them watch a different video that shows a farmer doing unsafe pesticide application. After the second video, we asked the men to analyze the video for unsafe practices.
- c. During the group session, the men were actively engaged in conversation. They didn't seem to want to stop talking- they had so much to share. After the group discussion, we had each group share 1 observation. They took turns until all ideas/observations were exhausted.
- d. Next, we used the Fluorescent Tracer Kit to demonstrate how pesticides can be easily transferred from hands, baseball caps, cellphones, and cigarettes. Using a backpack sprayer, we also demonstrated how application methods can also result in skin and eye contact with pesticides. During all demonstrations, we had the farmers participate as volunteers.
- e. Franklin then gave a short talk about integrated pest management. Elisa and I showed a wonderful video about pest and beneficial insects at was filmed at the macro level. Franklin described each beneficial insect and how it kills the pest insects.
- f. We also gave a short demonstration about crop rotation.

Recommendations:

- a. Farmer to Farmer should continue to cultivate the new relationship with PCI. Franklin Rivera is an excellent person to collaborate with. He has a wonderful relationship with the farmers. They seem to absorb every word he says and actively engage in discussions with him.

Results:

Elisa and I gave the Tracer Kit to Franklin Rivera. Since he's in charge of the Rural Development School (training field technicians), we believe he'll be able to educate hundreds of students about pesticide safety by using the innovative and interactive methodology incorporated in the kit.

5. Activity: July 15th, 2011, visit to CONAGAN office to train field officers and office staff about filming, editing and

making movies (2 field officers, 3 office staff, Ronald Blandon).

Observations:

- a. I worked all day with the field officers and office staff to train them to edit and make videos.
- b. Daniel Ingram and I edited the Ganadera de Nicaragua video so the staff can use the video at an upcoming conference.
- c. Elisa learned how to make movies by incorporating her hundreds of photos from previous projects.
- d. The other office staff also learned how to edit and produce movies.

Recommendations:

- a. The field officers and staff currently only have Microsoft Movie Maker installed on their laptops. This software is very difficult to use and is very limited in its capabilities. I recommend that the Washington DC office purchase a copy of Sony Creative Software Movie Studio HD Platinum Suite 11 V.11 <http://www.amazon.com/gp/product/B0051M6IPIA> . If this is too expensive, then versions 9 or 10 would also work. They can also be purchased on Amazon.com

Results:

The staff learned about to edit and produce videos. This new skill will be useful in integrating photos into movies that can then be presented at conferences and workshops. Field officers can also film “best practices” that can then be shown to other producers who are still struggling with understanding and incorporating those practices.



Community Sarrigo School- demonstrated how to sanitize the drinking water that they collect from the river. Also got a commitment from the parents to clean and sanitize the rainwater reservoir. The next FTF volunteers will make a mosquito screen to cover the reservoir.



Working with Franklin Rivera (left) of the Rural Development School to educate this group of coffee farmers about pesticide safety and integrated pest management.

PERSONAL REFLECTIONS

I had an amazing experience with FTF Nicaragua. We are very blessed to have Elisa Estrada as a field officer. She has connections with many organizations, schools, and communities. She’s an outstanding teacher and is always enthusiastic about what she does. With her support, I believe we were able to make a difference in the lives of others. We provided hands-on instruction with water sanitation, pesticide safety, and crop rotation. We also established the ground work for creating the first chicken/egg raising project, which will be initiated by the next FTF volunteers. We were also able to make a new connection with Julio Lopez of the Zamorano University. He will work with Elisa to invite farmers and producers to participate in the Zamorano field schools. My husband and I plan to return to Nicaragua in January. We will work on water quality projects in Camoapa.