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Author

Vergara, Marina Elizabeth

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“No Estamos Enseñando, Estamos Compartiendo”: A Phenomenological Study Exploring the Experiences of Model Farmers in Los Asientos, Panama

By

MARINA VERGARA
THESIS

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Approved:

Amanda Crump, Chair

Vikram Koundinya

Liza Grandia

Committee in Charge

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Abstract

Agricultural extension education traditionally follows a linear format, through a top-down dissemination of academic knowledge and technologies from researchers to extension officers to farmers (Haug, 1999). In this model, there is little space for farmers to play an active role in their own learning development. Shifts in extension methodologies have begun to include farmers in project planning and implementation using participatory tools, such as model farmers and model farm visits. Peer-to-peer learning has the potential to eliminate the hierarchy in the traditional extension approach and enhance learning for farmers on both sides. One organization that works with their farmers using these tools is Yale University's School of the Environment's Environmental Leadership and Training Initiative (ELTI). Since 2009, their Panama program has worked with a Panamanian cattle ranchers association on implementing silvopastoral practices on their cattle farms. The objectives of this study are to investigate the experiences of model farmers in ELTI's model, determine how these farmers view their role as co-facilitators working with visiting farmers, and explore how ELTI's participatory model facilitates farmer-to-farmer knowledge exchanges. Our¹ study findings suggest that model farmers do not always view themselves as teachers in a lesson with students, but rather sharers in an informal knowledge exchange with their peers. Here we report on the results of a summer-long phenomenological study of the model and discuss the three themes that emerged in this study: (1) a knowledge exchange among model farmers and visiting farmers is occurring, although it is not exactly a horizontal exchange among peers; (2) model farmers are thinking about, and in some instances applying, some of the practices and *cultivos* shared with them by the visiting farmers; and (3) model farmers enjoy this knowledge exchange, and are asking for more opportunities to engage

¹ Note that I use "our" and "we" throughout this thesis. This is because, in a phenomenological study, the research participants are not research subjects, but rather, co-researchers. I describe this further below.

with visiting farmers in different settings. Future work in this area should explore ways to increase opportunities for model and visiting farmers to exchange knowledge with one another.

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the skills you helped me develop with me on my next life chapter, as I keep asking questions, challenging the status quo, and pushing myself to be better.

List of Abbreviations

APASPE	La Asociacion de Productores Pecuarios y Agrosilvopastoriles de Pedasi
CR	Co-Researcher
ELTI	Environmental Leadership & Training Initiative
ESAD	Extension for Sustainable Agricultural Development
F2FE	Farmer-to-Farmer Extension
SALF	Sustainable Agriculture Learning Framework
PRA	Participatory Rural Appraisal
UNDP	United Nations Development Programme (Small Grants Programme)

Spanish Glossary

Buchu	Apple bananas (translated from Ngabere, the language of the Ngabe)
Café con yuca	Coffee with yucca
Confianza	Trust
Culantro	Coriander
Cultivos	Crops
Despedida	Farewell
Echar cuento	Tell stories
Guaba peluda	Common name for a species of guava
Huerto	Food garden plot
Junta	Reciprocal group work or work party
Manga	Parcel
Me gusta tu moda	I like your way
Merienda	Snack
Parcela	Parcel
Pasear	To visit, spend time
Penosa	Shy
Quitando la pena	Getting rid of the shyness
Quitar	To get rid of

Introduction

Agricultural extension education traditionally follows a linear format, through a top-down dissemination (i.e. Training and Visit, technology transfer) of academic knowledge and technologies from researchers to extension officers to farmers (Haug, 1999). This method enforces a teacher-student hierarchy, in which the extension officer is the teacher, and the farmer is the student. It implies that extension is information and technology transfer: the teacher holds all the answers, and the student is there to learn. In this model, there is little space for farmers to play an active role in their own learning development. Shifts in extension methodologies have begun to include farmers in project planning, content development, and project implementation using participatory tools, such as model farmers and model farm visits. In addition, peer-to-peer learning has the potential to eliminate the hierarchy in the traditional extension approach and enhance learning for farmers on both sides.

One organization that works with their farmers using these tools is Yale's Environmental Leadership and Training Initiative (ELTI). ELTI uses a participatory extension model, where they train farmers in silvopastoral and agroforestry systems, work with farmers to create a specialized farm plan for their farm, provide technical assistance and consistent follow-up, and through the process, empower farmers who have gone through the trainings to co-facilitate training sessions with farmers entering the program (model farmers to visiting farmers). ELTI does not work with farmers to create a cookie-cutter silvopastoral farm, but rather to incorporate elements of silvopasture that work best for the individual farmer and their land during the creation and implementation of their farm plan. This can be seen in the diversity across the silvopastoral farms created by their farmers.

Since 2009, ELTI's Panama office has been working with la Asociacion de Productores Pecuarios y Agrosilvopastoriles de Pedasi (APASPE), a Panamanian cattle rancher's association, on implementing silvopastoral practices on their cattle farms. APASPE farmers have been trained in silvopastoral practices such as sectioning off their farms into smaller parcels for rotational grazing, installing water systems with a central pump powered by solar energy, conserving riparian areas, planting multi-purpose native tree species in parcels, and utilizing live fences. Four of the APASPE farmers are now recognized as model farmers with model farms, all of which have included various silvopasture elements from their trainings. During ELTI's current trainings, the four model farmers engage with the visiting farmers by co-facilitating sessions, leading farm tours, demonstrating technical practices, and socializing. Their use of model farmers and model farms is not just an example of a horizontal knowledge transfer but is potential evidence of an informal knowledge exchange between model farmers and visiting farmers. There is plenty of literature on the impacts of visiting farmers learning from model farmers, but much less on the impacts of model farmers learning from visiting farmers (e.g., Davis et al., 2016; Taylor & Bhasme, 2018; Hailemichael, S. & Haug, R., 2020).

During the months of June and July 2022, I began this phenomenological study in collaboration with ELTI and the model farmers of APASPE. The objectives of our² phenomenological study were to investigate the experiences of model farmers in ELTI's model, and determine how these farmers view their role as co-facilitators working with visiting farmers. Below begins a literature review providing more information about the history and present state of livestock farming and agricultural extension in Panama. I continue with an explanation of my theoretical framework, methodological approach and data analysis. Lastly, I conclude with the

² Note that I use "our" and "we" throughout this thesis. This is because, in a phenomenological study, the research participants are not research subjects, but rather, co-researchers. I describe this further below.

findings of my study, a discussion of how these findings can be used to further understand how to support farmer learning, and suggestions for future studies.

Literature Review

Livestock Farming in Panama

History of Livestock Farming

The first bovine animal to arrive in the New World was in the year 1493, and official exportation to the New World began about thirty years later (Villalobos-Cortés et al., 2009). The first bovine animals to arrive to the continental Americas was sometime in the early- to mid-1520s, and in Panama the first shipment of cattle is documented in 1521 (Villalobos-Cortés et al., 2009). In Panama, the first cattle arrived in Darien, and moved throughout the country to better-suited locations such as Panama City, Nata, and Remedios (Villalobos-Cortés et al., 2009). Although cattle were introduced to Panama, they have become an integral part of the predominantly Latino population's culture on Panama's Azuero peninsula. This is seen through bull games, parades with ox-drawn carts, sacrificial slaughters, lasso competitions and song (Slusser et al., 2022).

Conventional Ranching Systems

Conventional ranching systems are the most common systems to be found in Panama, especially in the Azuero peninsula, as they were introduced with the introduction of cattle by the Spanish (Heckadon-Moreno, 1983). Conventional systems require maintaining cattle in big, undivided parcels or pastures with monoculture pasture grass and few trees, with long grazing periods and short resting periods, using many damaging practices such the excessive use of agrochemicals and cattle drinking directly from the natural water sources (Slusser et al., 2022). Agrochemical runoff damages waterways and has negative effects on human health. Cattle drinking directly from the water sources on the farm can contaminate the water and damage the riparian buffer zone around it. These practices contribute to climate change, as the deforestation

used to establish these pastures leads to the loss of ecosystem services provided by the forest, such as a decline in soil fertility, increased soil erosion and compaction, and reduced water infiltration (Steinfeld et al., 2006). The Azuero peninsula is facing the threats of climate change, as precipitation levels are decreasing and the dry season is elongating, which affects the cattle's water sources and pasture grasses (Dominguez, 2023, May 16). Its people are also facing these threats, as when the cattle struggle, which are the source of their livelihood, the people struggle economically and socially as well (Dominguez, 2023, May 11). Since the culture of the region is so tied to cattle, it is not culturally appropriate for the people to give it up, even though their conventional systems are exacerbating the challenges they face. Instead, it makes more sense to explore options to tend cattle more sustainably, such as implementing silvopastoral systems.

Silvopastoral Systems

An alternative to a conventional system, a silvopastoral system is an integrated system that combines woody perennial trees, shrubs and herbaceous forage with livestock production (Palmer, 2014). Cattle prefer this mixture because it provides a more complete diet of proteins, nutrients, and minerals which can ultimately lead to an increase in meat and milk production (Slusser et al., 2022).

The five components of silvopasture are: sectioning of the farm into small parcels for rotational grazing, protection of water sources through the establishment of riparian zones around natural water sources, livestock aqueduct system to pump water to troughs located in the grazing parcels, forage banks in the parcels, and the use of trees in the parcels and enclosing the farm as live fences (Slusser et al., 2022). Not only does the implementation of these practices help recuperate the ecosystem services lost in using a conventional system, but a silvopastoral system allows the farmer to increase the productivity of their land and their cows, and increase

the value of their farm through an increase in the diversity of their production and thus increase their earnings.

Agricultural Extension in Panama

Agricultural extension education, as we see it through the public sector today, was developed throughout Latin America by the United States (U.S.) in the 1940s and 1950s and thus mirrors the development of public extension programs in the U.S. (Klerkx et al., 2016). By the 1990s, as a result of recommendations from international aid organizations and a shift in extension programming funding, an increase in the diversity of extension providers, focus on family farming and rural poverty, and increase in understanding of the need for farmers to participate in the extension process began (Klerkx et al., 2016). However, the transfer of the U.S. agricultural extension model to the Third World was only partially transferred, as elements such as connections to agricultural universities are missing in many systems in the Third World (Rogers, 1988). In Panama, the breakdown lies in the dissemination of agricultural research through their public extension agencies. These public extension offices are generally understaffed and thus lack capacity to fully support the farmers they work with. They also experience a staff turnover every five years with the change in administration, making it challenging for extension agents to build community relationships.

Throughout time, there has been a shift in agricultural extension practices from simple technology transfers to more complex co-program development. In 1971, Paulo Freire introduced a new education mentality. In opposition to the technology transfer model, which emphasizes a “transmission mentality” from giver to receiver, in which the receiver passively receives the information, Freire argues for a different model, one in which the giver and the receiver are both learners, and both can more actively engage with the material being presented

(Bordenave, 1976). Panama is in an interesting situation because both systems are present. Much of its public extension agencies utilize technology transfer, whereas the limited private sector presence has incorporated alternative methods. ELTI uses a combination of alternative extension methods, mostly centered around their main tool, farmer-to-farmer extension.

Farmer-to-Farmer Extension

Farmer-to-farmer extension (F2FE), as defined by Franzel et al. (2015), is training by farmers to farmers through the creation of farmer-trainers and has been used throughout Central America since the 1970s. I will be referring to farmer-trainers as model farmers. Coinciding with the spread of the Green Revolution and Central America's revolutionary uprising and conflicts of the 1970s, this movement (also named by Holt-Gimenez et al. (2010) the Campesino a Campesino movement) was given the means to grow as an alternative to the traditional technology transfer model. The extension services brought by the Green Revolution failed to accurately support smallholder farmers (Holt-Gimenez et al., 2010). As a result, smallholder farmers looked to non-governmental organizations, who were employing Campesino a Campesino practices in their programs, to better meet their agricultural needs (Holt-Gimenez et al., 2010).

According to Taylor & Bhasme (2018), model farmers take on three roles: knowledge transferers, material resource brokers, and legitimacy generators. In the knowledge transferer role, model farmers take what extension officers offer and apply it in a way that works for them and is more accessible to other farmers (Taylor & Bhasme, 2018). They also set the standard for and share their experiences with other farmers through hosting farm visits, advocate for and explain the new technologies they use (Taylor & Bhasme, 2018). As material resource brokers, model farmers transfer materials, such as seeds, to other farmers (Taylor & Bhasme, 2018).

Finally, in the legitimacy generator role, model farmers prove that the projects and practices being extended by the extension agents are successful. They are the success stories (Taylor & Bhasme, 2018). This model can be used as a mode of dissemination in a technology transfer model, or as an element to a participatory model (Franzel et al., 2015). A participatory model does not just include model farmers as dissemination tools, but actively includes them in project conceptualization and planning (Taylor & Bhasme, 2018). ELTI utilizes F2FE in their participatory model. In their model, they strengthen model farmer communication skills by facilitating training-of-trainers and other opportunities to refine their leadership skills, co-facilitate trainings and engage with other Panamanian farmers.

ELTI's F2FE Approach

In working with APASPE and the model farmers, ELTI utilizes what Leeuwis (2013) calls interpersonal communication, or group and one-on-one in-person and over the phone meetings. One of the reasons why ELTI has been successful in their partnership with the members of APASPE is their commitment to establishing and nurturing the relationships they have built with the farmers. ELTI works with their program alumni for extended periods of time, an uncommon approach for environmental conservation and sustainable agriculture organizations to use. Leeuwis (2013) refers to this functional quality as high relational support. ELTI's model capitalizes on interpersonal communication, and their high relational support is shown through the strong, trustful relationships ELTI staff have built with APASPE members.

ELTI also utilizes participatory rural appraisal (PRA) techniques in their program implementation. PRA, as defined by Chambers (1994), is a set of approaches and methods used with local people to share and review their lived knowledge and experiences and plan a course of action. The example Chambers (1994) illustrates local people sharing their knowledge and

experiences is something built formally and informally into ELTI's model. During ELTI trainings, the APASPE model farmers are given time to share their knowledge and experiences with visiting farmers during their farm tours. Additionally, throughout the trainings, model farmers and visiting farmers are given down time, or unstructured break times during the training week, where more knowledge and experiences are shared, and exchanged between model and visiting farmers.

ELTI chose their model farmers organically. In APASPE, four farmers out of the group were most willing to experiment with the new practices on their farms, receive researchers to conduct research on their farms, collaborate with outsiders, and share their successes and their failures in implementing silvopasture (J. Slusser, personal communication, September 25, 2023). By agreeing to be a model farmer for APASPE, the farmer knows that the role is ongoing, and they are encouraged to co-facilitate trainings, promote silvopasture, and receive visiting farmers (J. Slusser, personal communication, September 25, 2023). Given the majority of older, Latino, and male farmers in the region, ELTI strived to have their model farmer group represent some diversity in age and gender. Even though this process happened organically, if ELTI was trying to be intentional about it, they would have still looked for the same qualities that they found in their model farmers (J. Slusser, personal communication, September 25, 2023).

Challenges in Extension

The eight challenges in extension that Feder et al. (1999) identify are scale and complexity, dependence of extension on policy and agency functions, inability to trace effects of inputs, lack of commitment and political support, lack of accountability to farmers, liability to perform other public service functions, lack of monetary resources, and the irrelevancy research and technologies. In the Panama context, these eight general challenges are evident. In a few

ways, ELTI is a good example of how a program promoting sustainable systems uses some of the innovations Feder et al. (1999) write about to address the general challenges in extension. For example, their use of participatory approaches such as the model farmer/model farm, helps to address the challenge of scale and coverage, adjusts to fit farmers needs and thus addresses accountability and relevancy of research, high levels of trust and ownership which also addresses accountability, cost-effectiveness, and benefits to knowledge co-generation.

Haug (1999) also writes about the challenges in international agricultural extension, focusing on public extension. The issues Haug (1999) discusses include: objectives of the state and the farmer are not always the same; a need for policy support, public and private partnerships as each sector can serve a different populations with different needs, and improvement in recognizing different forms of knowledge; irrelevancy of technologies and programming targeting women; gap between participatory extension theory and practice; and the use of one-size-fits-all extension programs. Many of these challenges are present in Panama's public extension system. ELTI in many ways is addressing the challenges of recognizing different forms of knowledge, the gap between participatory extension theory and practice, and the use of one-size-fits-all extension programs by being a free alternative to the public extension agencies.

Theoretical framework

This research is conducted under the premise that traditional agricultural extension does not support all farmers (Firkus, 2010). Traditional agricultural extension refers to the top-down dissemination of Western technology and knowledge. In this model, the extension officer is seen as the holder of knowledge, or the teacher, and the farmer is seen as only the learner, or student. Because the farmer is not seen as a knowledge holder, their knowledge and experiences are discredited, and they are not given the space to apply the new information presented to them to their existing physical system and knowledge system. In contrast, what I will refer to as a participatory model of extension, is an alternative mode of extension which considers Mezirow's theories of adult education and Radcliffe's theory of co-knowledge creation in extension work (e.g. Mezirow, 1997; Radcliffe, 2017). This study is using these theories to further understand the type of F2FE that ELTI uses.

According to Mezirow (1997), adults learn socially and prefer synthesizing new information autonomously. Adult learners value becoming and being autonomous thinkers. As children, they learn the foundations. As adults, they are tasked with building on the foundation and becoming more critically reflective of their assumptions. Adult educators should recognize this need of adult learners, and adult educators should help learners critically reflect and participate in discourse (Mezirow, 1997). Extension educators can also draw on these principles in their practice by using methods that center the experiences of adult learners, such as group discussions, simulation exercises, and role-play (Ghimire et al., 2023). To do this, extension officers should take on the role of facilitator as opposed to authority or lecturer, to provide adult learners with the space to synthesize information and apply it to their existing system. The way that ELTI incorporates these tools into their extension work is consistent with Mezirow's

suggestions. For example, ELTI strives to work themselves out of a job by transferring leadership to the group they work with. They also incorporate aspects of discovery learning in their trainings through the co-creation of a specialized farm plan between ELTI staff and visiting farmers and the use of formal and informal spaces for interactions between model and visiting farmers. These activities help the visiting farmers, or learners, engage with silvopastoral concepts more tangibly.

Radcliffe takes Mezirow's theories of adult education and places them into practice, with his approach called Extension for Sustainable Agricultural Development (ESAD), which incorporates his model of extension called the Sustainable Agriculture Learning Framework (SALF). The SALF is a holistic philosophy, which centers the farmer and incorporates philosophies of adult education to create an integrated response which combines indigenous knowledge with research and technology (Radcliffe, 2017). In this model, the extension officer is not a teacher, but rather a facilitator. This design also values the farmers' knowledge and experiences, leading to a system which incorporates useful aspects of the extension officers knowledge for each individual farmer, rather than a complete transformation of a system (Radcliffe, 2017). The ESAD, which includes the SALF, centers the farmer by entwining science knowledge with indigenous knowledge, and the extension officer acts as a facilitator of this new knowledge (Radcliffe et al, 2021). The ESAD does this in four stages: construction of the knowledge repository, thematic analysis of the knowledge, collaborative creation of new knowledge, and practical workshops (Radcliffe et al, 2021). The third stage of the ESAD utilizes the SALF (Radcliffe et al, 2021). Another application of a collaborative, knowledge co-creation-based approach to extension is developed by Halbleib, called the Adaptive Learner-Centered Approach. This approach merges three forms of knowledge: farmer's expressed needs, the needs

identified by the researcher, and the knowledge to address those needs (Halbleib & Dinsdale, 2023). ELTI's steps to provide space for model and visiting farmers to share more about their farms with one another and their work at the end of the training course creating specialized farm plans with each new participant allows for this co-creation of knowledge to organically occur in conversation and more structurally occur during scheduled training sessions.

Purpose

In a conversation with a farmer who later became a co-researcher of mine in which I was asking him about the ways in which he teaches the visiting farmers, I was quickly corrected. “No, no, I’m not teaching the visiting farmers,” he explained to me, “I’m sharing with the visiting farmers. It’s like an exchange. I’m sharing my knowledge and experiences [of] farming in a silvopastoral system, and they are sharing their knowledge and experiences from their farms back home with me.” This concept of a model farmer-visiting farmer knowledge exchange is not a theme that I had seen before in the literature, and so I was interested in exploring this more, with a focus on the experiences of the model farmers in this knowledge exchange.

This conversation is what led to my research question. I wanted to explore the role of model farmers in a knowledge exchange rather than in a teaching role and see if this exchange and relationship did indeed go both ways. Were the model farmers learning practices from the visiting farmers, and were they thinking about trying to implement any of those practices on their farms? As a result, this study aims to answer the question: **how** do APASPE farmers/co-facilitators **perceive** their **role** in **Yale’s Environmental Leadership and Training Initiative (ELTI)’s participatory extension model**?

How: denotes openness and how I am coming into the interviews with limited expectations of how my co-researchers will answer; it also denotes the qualitative nature of this study

Perceive: denotes the nuance in the experiences of my co-researchers in the model due to differences in their identities and life experiences

Role: describes how my co-researchers are designated as sharers during ELTI trainings. ELTI trainings are held in my co-researchers’ community, and trainings host farmers from all over the country, who are interested in learning more about silvopastoral and agroforestry systems

ELTI’s participatory extension model: refers to the way in which ELTI extends knowledge generated by academics and researchers to farmers and ranchers in Panama. Although ELTI uses a variety of participatory tools for a variety of audiences, this study will focus on their use of model farms and model farmers in their farmer training courses.

Methods

Methodology

This is phenomenological study³. Rooted in psychology and sociology, this research design aims to describe and analyze what a particular experience means for a particular group of people (Moustakas, 1994). From each description of the experience, general meanings are derived, and themes are created, which capture the overall essence of the experience for the group of people (Moustakas, 1994). Research participants are referred to as co-researchers, as they are working closely with the principal researcher to recount and reflect on their experiences relevant to the study. I, the principal researcher, with the help of my research partner at ELTI, identified four potential co-researchers to participate in the study with me. Through building relationships and one-on-one semi-structured interviews, we were able to deeply explore their experiences in a model farmer role during ELTI's farmer-to-farmer trainings.

Researcher Positionality Statement

As the principal researcher, I conducted all data collection. I am a 27-year-old woman from the northeastern United States, first-generation Mexican and second-generation Eastern-European Jewish. I grew up hearing Spanish, but not speaking it until I moved to Panama at 22 years old. I come from a close-knit immediate family, and grew up in small, non-agriculture towns. I graduated from Cornell University with a bachelor's degree in environmental and sustainability sciences with a concentration in sustainable agriculture and development. Not growing up with agriculture, my experience in practice is in Panama and Texas. I now study International Agricultural Development at University of California, Davis, resulting in me

³ I received IRB research approval from UC Davis in June 2022.

attending two large 1862 land-grant institutions. Given my educational background and where I was born, there is a power imbalance between me and my co-researchers that should not be ignored.

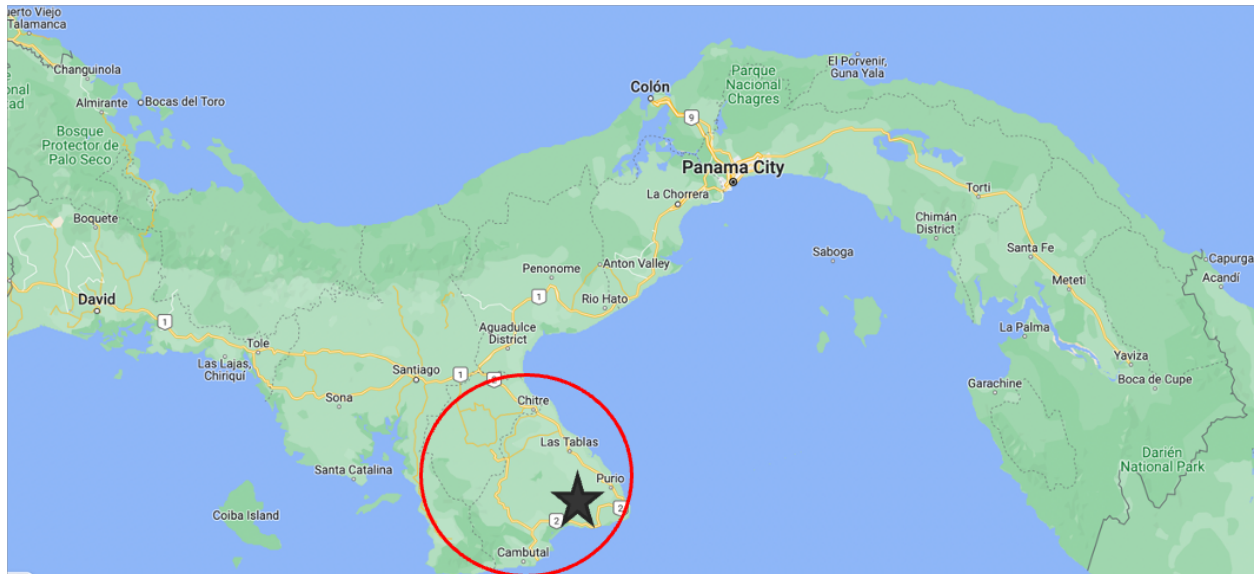
Data Collection

In order to delve deeply into this question, I needed to understand more about the place and the people that I was going to work with. So, I spent the first few weeks of my stay in Los Asientos getting to know the place and the people, asking questions and journaling along my way. Although I lived in Panama before, I had never lived in this part of Panama.

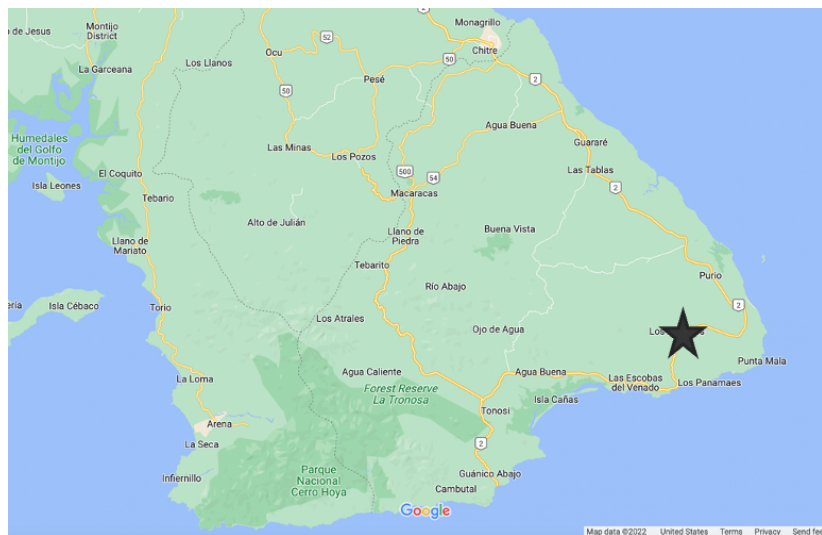
Research Context

Location

Los Asientos is historically an agricultural community, transformed into a predominantly ranching town. Before the arrival of the Europeans, Indigenous peoples managed the dry tropical forests of Panama's Azuero peninsula (Griscom & Ashton, 2011). With the arrival of the Europeans in the 1500s came the arrival of cattle, and thus the clearing of the dry tropical forest for large haciendas for cattle ranching, the main cause of deforestation (Griscom & Ashton, 2011). In the 1800s, landless peasants began to move to the peninsula to clear more land for conventional cattle ranching (Griscom & Ashton, 2011). Today, the ranches there are a mixture of conventional and silvopastoral systems. The community at large has maintained a longstanding relationship with my other community partner, ELTI, for the past fourteen years.



Map of Panama. Azuero peninsula circled, Los Asientos starred (Google, n.d.-a).



Province of Los Santos. Los Asientos starred (Google, n.d.-b).

Sample Demographics

Co-Researcher (CR)	Age (all between 40-80)	Gender	Occupation	Landowner
CR1	45	M	Part-time farmer	No
CR2	80	M	Full-time farmer	Yes
CR3	65	M	Retired police officer, now full-time farmer	Yes
CR4	45	F	Part-time farmer	Yes

Building Relationships

Building personal relationships with potential work-partners in Panama is crucial to successful and longstanding professional relationships with the same people. Establishing a firm social foundation is what builds the trust, or *confianza*, needed of the farmer to the extension agent, and the extension agent to the farmer. Given this, I knew that it was important that I spent as much time as I could with my co-researchers before beginning the interview process. I spent four weeks focusing on building relationships with my four co-researchers. I did this in the following ways: through farm visits, casual conversations, social visits, and sharing things about myself.

Farm Visits

I came to Los Asientos with very little practical experience working with livestock. And so, I had a lot to learn about the day-to-day work of a cattle farmer and ranch maintenance. I asked a lot of questions about different pasture grasses and trees and toured my co-researchers' farms with them to get a better feel for the land. I also learned a lot about the different elements of silvopasture used in practice. I had previously read, in textbooks, about elements such as rotational grazing systems, living fences, and water systems. Seeing the diversity in implementing these elements in practice was interesting, as elements such as parcel amounts and sizes varied depending on the farmer and the land that they were working with.

As part of their promotion of silvopastoral systems, ELTI encourages the members of APASPE to establish garden plots, or *huertos*, on their ranches or alongside them. These *huertos* were especially welcoming to me, as I was much more familiar with their corn, peppers, yucca, and *culantro*. One morning, after spending time on CR3's ranch, he led me to his *huerto*, where I offered to help him plant some peppers he had been meaning to sow. This was a great personal

and work moment for me, as I could talk about and spend time doing an activity that was familiar to me with a new person, and a great way to build *confianza*.

Casual Conversations

Due to my limited practice experience with cows and cattle ranchers, I had a lot to learn about having casual conversations about cows. For one, I did not know much of the Spanish vocabulary around the topic. So, I asked questions and listened carefully to pick it up, looking things up along the way. Another quirk to this was the regional vocabulary on the subject that farmers of Los Asientos use. For example, in Spanish, a parcel is generally called a *parcela*, however, in Los Asientos, it is often referred to as a sleeve, or *manga*. Additionally, most people do not refer to the trees used in their living fences and interspersed on their ranches by their scientific names. Instead, they refer to them with common names. While I received some help from another researcher and her field technician in identifying the tree species scientifically, I asked my co-researchers for the common names that they used and recorded them on my phone, to be able to understand which trees they were referring to in future conversations.

Social Visits

During this time, I also visited folks with the purpose of just having a conversation. Panama has a huge visiting culture, where it is common and expected to *pasear*, or stop by houses and visit people while they are sitting outside on their porches, to drink a cup of coffee or eat a snack and tell stories, or *echar cuento*. Here is a reflection of mine after a particularly fun social visit with CR4:

“I got her laughing. Um, when I asked her about the interview she was like “sure, like, I’ll just let you know” but by the end of the day she was like “hey, yeah, I’ll definitely text you about that. I’m going to let you know” so, I feel like work-wise, that was a win, and then just like human-wise, it was also a win, just to like have a fun, spontaneous day with someone I barely know” (3 July 2022, audio transcription).

This day with CR4 definitely increased my level of *confianza* with her, which helped to schedule the interview as well as deepen our conversation during the interview.

Sharing Things About Myself

As previously discussed, because I was asking my co-researchers to trust me with their sharing about themselves, I decided that it was just as important for me to open up to them and trust them with my sharing about myself. And so I shared a lot about where I come from in the States and my family in the States. I talked a lot about my identity as a Latina and growing up in the States as a Latina.

I also shared with them the life I lived and work I did as a Peace Corps Volunteer in Nokribo, Comarca Ngabe-Bugle, Panama. This was especially important, given the people of Los Asientos' very positive relationship with the Peace Corps, beginning in the 1960s. I shared photos of my host family, the farms, and the chocolate my friends produce. I shared stories about my life there: stories about the fun times I had and the successes we achieved, and stories about the hardships I faced and the barriers in our work that made things a bit harder for us.

Self-Reflection

During my time in Los Asientos, I kept a written and spoken journal, reflecting on my positionality doing the work and my process building relationships with my co-researchers. I began this journal when I first started building relationships with my co-researchers, and finished writing in it after I completed my interviews. As my time in Los Asientos progressed, my journal reflects the progress I made in building relationships with my co-researchers, and my increasing comfortability with them and them with me. My early entries focus mainly on my uncertainty in myself and my struggle to connect with folks:

“Am I being too *penosa*? I don't think I'm underdoing it, but I may be overdoing it. I think as I'm getting more comfortable with people, they are with me, and we're both

quitando la pena. But, in those first few interactions, like with CR2 (hopefully today), I just need to (respectfully) *quitar*. Use what I know – listen, learn, ask basic questions, shoot the shit” (28 June 2022, written).

As time progressed and my relationships with my co-researchers began to form, my confidence increased:

“I had CR2’s wife laughing! And CR2, a little bit. I feel like I’m a little less strange now, and am building *confianza*. Yesterday, I think the fact that I told CR3 I was coming back after I analyzed the data sealed the deal...I want to make this clear to everyone” (1 July 2022, written).

Finally, as I walked away from interviews, I recorded and wrote down my preliminary reflections, focused on the influence of my presence and positionality during the interviews:

“Interviews have been going well. People are a little bit nervous, but I think the time I’ve spent here showing my face and getting to know people has lowered that impact. I’m now less of an outsider (albeit, still a weird outside researcher, but less so) and more of a friendly face. This was affirmed to me by X, CR2’s wife. She mentioned that I talk more than the other [researcher there], and she likes that. “*Me gusta tu moda.*” She also apologized for not giving me *café con yucca* the other day, and fed me dinner. And, CR2 asked her to send me home with some *buchu*.

I would also like to note CR2’s difference on and off recording. He was happy to chat and hang out, less happy about doing the interview. This could be for a multitude of reasons. I am always of the mindset “friend first, work partner second,” so this is fine with me. After the interview, they did ask me to stay and hang out, so all is well. There may have been something about me (my Spanish?) that threw him off in the interview. I read this as him being frustrated because he couldn’t understand me. I’m interested to hear how it plays back in the recording” (8 July 2022, written).

I reflected a lot on the time I spent building relationships with my co-researchers, focusing on any successes and challenges, and tying those into my positionality in the community. It was an interesting place to be. Being Latina, speaking Spanish, and previously living in Panama differentiated me from the other researchers who were there and who had previously been to Los Asientos; however, it did not make me an insider. As Chavez (2008) writes, it allowed me to occupy the space of an outsider-insider. Some of my identities allowed

my co-researchers to feel more comfortable with me, but these identities did not erase the parts of me that contributed to a discomfort with me. I recognize that presenting myself as a researcher from the U.S. gives me an inherent power and presents a hierarchy of power to the community members that I am working with. I think that this comes across most evidently in my interview with CR2, and my written reflections show it. I could establish some sort of level of friendship with this power; however, the power structure did influence the experiences shared by CR2 in his interview.

Interviews

My co-researchers and I completed the interviews for our study the fifth week that I was in Los Asientos. Each interview lasted somewhere between thirty minutes to an hour. I began the process by asking each co-researcher if they would like to be involved in the study. All four co-researchers agreed, and so the study includes three male co-researchers and one female co-researcher. Once they agreed, I had each of my four co-researchers set a date, time, and location of our interview. Once the day came for each interview, I met each co-researcher at their desired location and obtained oral consent. Before beginning with my questions, I shared with them the summary guide to the study (translated to English below). In this summary guide, I shared a little bit more about the logistics of the study, as well as why this research question was important to me. I shared with each co-researcher again a little bit about my work as a U.S. Peace Corps Volunteer, and how the members of the community I lived and worked in were not supported by the extension entities available to us. I shared with them how, after learning about ELTI's model and how they do things a bit differently, I was interested in exploring it further, to learn more about how to support my friends.

To complete the research project required for my MS degree in International Agricultural Development, I am interested in exploring how knowledge is intentionally

and unintentionally transferred in participatory extension with model farmers and farms. I am interested in this because I think this topic could help inform us in how to better support the farmers that we work with. I watched my friends I made during Peace Corps not be well-supported by extension agents, and so I want to learn more about how to support them and other farmers like them. You work a lot with ELTI (and Jacobo and Jorge), and so I want to learn from you. Since I am interested in the stories that you will share with me, I will use qualitative research methods to learn about the essence of your experiences. I will interview 4-5 co-researchers and adhere to the ethical principles of human science research. Your stories will be used to formulate a synthesis of my co-researchers experiences as a whole.

Data Analysis

Transcribing

I used ExpressScribe Transcription software to transcribe my four interviews. During this process, I noticed a few things:

As I was transcribing each interview, I could not help but laugh because CR1 was joking with me, and CR2 and CR3 were gossiping with me during their interviews. Listening back to these interviews, it's these moments that make me realize the importance of my time building a foundational relationship with them. Showing enough comfortability to joke around with me during what sounds like a scary formal interview assures me that the work I did building relationships paid off, and that our conversations were dipping below the surface.

One more thing I noticed was I had to constantly steer the conversation away from student visits and back to farmer visits. Quite a few times, CR2 and CR3 would share exchanges and events that happened during student trainings with me, and I would have to omit their answers because they were referring to student groups who had come to visit for another type of training that ELTI offers.

Coding

Data were coded using NVivo, following thematic analysis as outlined by Braun & Clarke (2006). My coding tree went through four iterations. The first three iterations I read through each transcription and coded for phrases related to the two topics of the interview: andragogy and horizontal knowledge transfer. I looked at how the model farmers described their pedagogical role in the program, and how they described the knowledge exchanges happening with the visiting farmers. I also marked anything novel or interesting they mentioned during their interview.

CODE TREE – first iteration

Pedagogy (working with ELTI)

- Sharing (during formal aspects of the training)

 - Visiting to Model

 - Model to Visiting

- Teaching (during formal aspects of the training)

 - Hierarchy

 - Horizontal

 - Vertical

Leadership

Other f2f role

Silvopastoral practice

Horizontal knowledge transfer

- Location

- F2F Sharing (during informal aspects of the training)

 - Visiting to Model

 - Model to Visiting

- Something learned

 - Thought about

 - Applied

Interesting

Gender

Identity

Perception

During this iteration, I noticed a few things. Firstly, there was lots of talk about how much each co-researcher loves ELTI. I read this as a testament to their approach. It also seemed that at first my questions may have seemed a little strange to my co-researchers. Is this because

I'm looking at other benefits to the approach that are less explored? Secondly, I noticed some themes begin to emerge around the knowledge exchanges and their relationship to each CR's identities.

To begin my second iteration, I added in two codes: one-sided, and quotables. The first new code was created to reflect the idea that some co-researchers did not consider their interactions with visiting farmers as a two-way knowledge exchange, and the second was to extract phrases more easily to be used in presentations and quotes for writing pieces.

In the third iteration, I reorganized the pedagogy section of the tree, to avoid the overlap in codes that I was seeing. I also added a location code to the pedagogy section.

CODE TREE – third iteration

Pedagogy (working with ELTI)

 Sharing, teaching (during formal aspects of the training)

 Visiting to Model

 Model to Visiting

 Horizontal (f2f) – meaning f2f like in the literature

 Vertical

 Hierarchy

Leadership

Location

Other f2f role

Silvopastoral practice

Horizontal knowledge transfer

 F2F Sharing (during informal aspects of the training)

 Visiting to Model

 Model to Visiting

 Location

 One-sided

 Something learned

 Thought about

 Applied

Interesting

Gender

Identity

Perception

Quotables

Beginning the fourth iteration, I reorganized my codes. I reviewed all four interviews and re-coded them according to the three emerging themes: not exactly a horizontal knowledge exchange, farm experimentation, and a desire for more two-way street engagement.

CODE TREE – fourth iteration

1. Not exactly horizontal
 - a. F2F sharing
 - i. Model to visiting
 - ii. Visiting to model
 - b. Sharing, teaching
 - i. Hierarchy (not completely peer to peer)
 - ii. Horizontal (F2F)
 - iii. Model to visiting
 - iv. One-sided (not an exchange)
 - v. Visiting to model
2. Farm experimentation
 - a. Something learned
 - i. Applied
 - ii. Thought about
3. More two way street engagement
 - a. Leadership
 - b. Other F2F role
 - i. APASPE farmer visiting other site
4. Interesting
 - a. Gender
 - b. Identity
 - c. Perception
 - d. Quotables

Data Confirmation

One year after collecting my data, I returned to Los Asientos to share my results. I met with each of my co-researchers individually to share my three emerging themes - doing member checks. Each co-researcher worked with me to either validate the findings or provide me more information or clarifications to improve each theme. I did receive some clarifications, which strengthened some existing themes and altered others to reflect the experiences of my co-researchers more accurately. For example, all four co-researchers agreed that theme one (not

exactly horizontal) was an accurate representation of their experiences. However, in regard to theme two (farm experimentation), CR1 corrected me in saying that it is not only practices that he experiments with, but also different *cultivos*; and CR3 corrected me in that the practice he shared with me that he learned from a training was not a practice that he learned from a visiting farmer, but rather a visiting extension agent from an organization that works closely with ELTI.

Schedule Analysis

During my second trip to Los Asientos, I met with each of my co-researchers individually to present my research findings and ask clarifying questions. To better understand the model-farmer-to-visiting-farmer-exchanges, I was curious to know during what times in the ELTI training schedule they occurred. During my first trip to Los Asientos, some of my co-researchers shared this with me. On this second trip, I was able to receive feedback on this question, and ask the co-researchers who did not originally share this with me for their opinions.

All co-researchers participate in the *despedida*, or farewell celebratory dinner, at the Achotines Research Station, where the visiting farmers lodge during the training. At the end of the training course, the members of APASPE are invited to Achotines for the *despedida*, where the visiting farmers receive certificates and the whole group shares a dinner and conversation.

The conversations they have over dinner are centered around their farms, and all co-researchers identified this as a time where knowledge exchanges occur.

CR1, CR3, and CR4 have all had visiting farmers tour their model farms. All three of these co-researchers identified these farm tours as a time when knowledge exchange occurs. CR1 also identified the walk to the farm as a time when knowledge exchange occurs, and CR3 identified the farm snack break (*merienda*) as a time where knowledge exchange occurs as well.

The data analysis focuses on these knowledge exchanges that occur in all these locations: during the *despedida* and on the farms.

In a later conversation with Jacob Slusser, Panama Coordinator for ELTI's Neotropics Program, I was also told that ELTI facilitates a WhatsApp group for each training, which includes the model and visiting farmers. These groups vary in activity use but are also an opportunity to continue the knowledge exchange during and after the training time.

Findings

The goal of my research question is to explore the role of the model farmers (co-researchers) in a knowledge exchange rather than a teaching role and see if their role facilitated a two-way knowledge exchange. In other words, are the co-researchers' learning things from the visiting farmers, and are they thinking about trying out these practices on their farms? As this study evolved, the central question evolved with it. The question became less about the existence of a knowledge exchange, and more about who this knowledge exchange is between: is the knowledge exchange amongst peers, or is there still some sort of hierarchical relationship? Do the model farmers view themselves as peers to the visiting farmers, or a hierarchical step above them?

In these findings, it is important to note that the differences in each co-researchers' identities and life experiences are key in supporting their varying experiences. Below are the three themes which emerged from the data.

Theme 1: Hierarchical knowledge exchange

Finding: A knowledge exchange among model farmers and visiting farmers is occurring, although it is not exactly a horizontal exchange among peers.

Supporting Evidence: Two of the four co-researchers shared that some sort of horizontal knowledge exchange was occurring during these trainings. However, three of the four co-researchers talked about these exchanges not being a completely horizontal, peer-to-peer exchange, but rather somewhat of a hierarchical knowledge exchange. The main explanation for the hierarchy these co-researchers shared was because of the physical visit only happening one way. CR3 explained it well:

M (Marina): si, entonces ustedes están aprendiendo, estaban aprendiendo algo de de ellos? y de de las fincas de ellos de allá? durante de ese tiempo?

CR3: es que por lo menos esta que donde nosotros por la finca de ellos no le un visitado pa tener pa tener mas o menos ideas. sabe?

M: mhm

CR3: porque la cosa diferente que a ti te fue la cosa que tu iba a visitar. porque cuando a ti te cuenta la cosa eh son la cosa y cuando tu visita tu tiene cuenta eh personalmente que lo que hay que lo que no hay que lo que hay que corri que lo que no hay que corri

M: mhm

CR3: que lo que te gusta que lo que no te gusta. esta bien porque son dos cosas algo diferente a verlo foto que a verlo personalmente

It is important to note that this hierarchy does not completely negate the effects of experimentation because of the exchange. For example, CR1, who agreed with the existence of the hierarchy in the knowledge exchange, has still experimented with a new intercropping practice and a new cultivar he learned from a visiting farmer.

Theme 2: Farm experimentation

Finding: Model farmers are thinking about, and in some instances applying, some of the practices *and cultivos* shared with them by the visiting farmers.

Supporting Evidence: Co-researchers shared instances of farm experimentation both in farm practice and in cultivars or trying out new varieties of seeds. CR1 shared with me that the parcel on his farm where he had sugarcane and cucumber intercropped, which I had viewed a few days before our interview, was an idea shared with him by a visiting farmer during a training:

M: mhm. Y, hay un parte o una práctica que usa en su finca que que usted aprendió con con de una visitante?

CR1: de los visitantes, si. Hay uno que nos dejó enseñar esa fue de la socio de de de de alguna cucurbitaceae. Con otro con otras plantas. Eh, por ejemplo, la socio que se puede dar entre la cana, el pepino

M: mhm

CR1: eh, la yuca, el zapallo, o sea la combinación que se puede darle diferente especios, porque una planta provee de otra cosa a otra. por ejemplo, también el maíz, y el frijol...entonces, todo esa cosas también la aprendimos y y siempre la utilizamos.

M: y, usted aprendió a eso con de de las visitantes de afuera?

CR1: si, correcto

M: ah huh

CR1: las personas que vinieron de visita. era permita que ellos utilizaban.

M: mhm. si

CR1: entonce, eh esa planta o plantas pues unas tienen algo que repele a los insectos pero como están cerca de la que no lo tiene

M: ah huh

CR1: la beneficia. entonce sean, un fin de esa cosa, que que una conversator (unclear) un intercambio estos aprendíamos unos conocimientos interesantes

M: que bien. si yo he visto como la cana con con pepino allá en su finca también.

CR1: mm

M: que usted sembró. caña y también pepino. como mezclado como en un socio pues

CR1: exacto. si alla un socio

Additionally, CR1 and CR4 have both planted seeds given to them by visiting farmers during trainings. CR1 had limited success with cilantro seeds shared with him from a visiting farmer from the canal region. However, CR4 had more success with *guaba peluda*, a tree species, seeds given to her from a visiting farmer.

CR1: de la semilla que ellos trajeron que nos nos regalaron

M: ahhh

CR1: yo planté por aquí, pero no sirvió, y entonces allá en la playa donde trabajo, también plante allí sí allí sí. Quedó un área que siempre estaba sombra y siempre se mantiene húmedo, y entonces allí cabe culantro.

Theme 3: Model farmers enjoy interacting and exchanging knowledge with visiting farmers

Finding: Model farmers enjoy this knowledge exchange, and are asking for more opportunities to engage with visiting farmers in different settings.

Supporting Evidence: All four co-researchers spoke fondly of opportunities to visit other areas of Panama with ELTI. CR1 told me about a visit to a community in Herrera, a nearby province, where the members of APASPE learned about a composting toilet from a farmer in that community:

CR1: y, y me llamó la atención que tenía baño organico

M: ah, como una inodoro composta?

CR1: inodoro orgánico. el baño era, tenía esas divisiones, no? un lado la orina, en otro lado, iban las feces. y allí no había mal olores.

CR4 shared with me APASPE's opportunity to attend the United Nations Development Program (UNDP) ferias, and CR2 shared about their visit to Valle Riquito, another community in the Los Santos Province.

Discussion

The study findings show that the model farmer and visiting farmer interactions during ELTI trainings are likened to a somewhat hierarchical knowledge exchange. This is consistent with Radcliffe's theory of co-knowledge creation in extension work. Although Radcliffe (2017, 2021) writes about knowledge co-creation between extension officer and farmer, we see an iteration of this between the APASPE model farmers and the visiting farmers. Since the model farmers are placed in a co-facilitator role, and the trainings take place on their farms, it can be concluded that they are seen as having similar hierarchical power to an extension officer. However, their power is not equal to that of an extension officer, because they still hold the central identity of a farmer. Thus, a somewhat hierarchical knowledge exchange is occurring, although a different exchange than an extension officer to farmer exchange.

Although there is a hierarchy present, model farmers are thinking about, and in some cases applying what they've learned from the visiting farmers. This is where the difference between an extension officer and a model farmer is key. Although the model farmer is seen as having more power than the visiting farmer, the model farmer is still a farmer. The identity of a farmer amongst both groups can be concluded as a contributing element to this exchange, rather than a one-way dissemination we commonly see from extension officer to farmer. Additionally, ELTI's use of Mezirow's (1997) theories of adult education may also contribute to the theme of farm experimentation. Their emphasis on providing farmers with the space to synthesize the information presented to them could contribute to the model farmers synthesizing the information shared with them from the visiting farmers.

Lastly, the co-researchers' desire for more opportunities to interact with other farmers in different settings is supported by Mezirow's (1997) theories of adult education as well. As

Mezirow (1997) states, adults learn socially. Adults also enjoy discovery learning or engaging with the concepts presented by placing them in the context of one's own life (Mezirow, 1997). During the knowledge exchanges between model and visiting farmers, the opportunity to practice discovery learning is one-sided. Visiting farmers can tangibly engage with the material presented to them in a hands-on way, whereas model farmers are only able to engage with the knowledge shared with them from the visiting farmers in a conceptual way. Being able to increase these opportunities to engage in discovery learning in different settings can help to deepen the impact of the knowledge exchange and increase adult peer-to-peer learning for all farmers involved.

Conclusions

Study Limitations

The data collected in this study are limited to the experiences of the four model farmers of a specific participatory extension program in Panama. Thus, the results cannot be generalized for the entirety of extension programs in Panama, or participatory extension programs using model farmers in other parts of the world, or any variation. Additionally, because phenomenology is so personal, my previous experiences and existing identities and perspectives could have introduced unintentional bias into the study. Being a female Western academic researcher, my lens in analyzing a non-Western program with non-Western, mostly male participants are a few things that should be considered.

I was unable to attend and observe an ELTI training. Although conclusions can still be drawn from my existing data, it would be further strengthened with a set of training observations.

Remaining Questions

The themes derived from this data present some answers to the core of this study, but they also evoke a series of new questions. As the study progressed, the focus became more about understanding the knowledge exchange amongst the model and visiting farmers. Drawing from what we learned through the first theme, I wonder, how can we make this exchange more peer-to-peer? Does this mean more opportunities for knowledge exchange in different settings? A change in ELTI trainings? A shift in ELTI trainings?

Additionally, the desire of my co-researchers to have more opportunities to engage with farmers in different settings could be for plenty of reasons. However, I wonder, would it lessen the hierarchy in the present knowledge exchange? Would these opportunities create more two-

way street engagement, and lessen the hierarchy to a more peer-to-peer exchange? Is this the reason for the desire of my co-researchers? Or are they in any way related? Conversations with CR1 and CR3 discussed the imbalance in the horizontal knowledge exchange, as well as a desire to engage with the farmers in a different setting, but there is no way to know for sure if more interactions between farmers in different settings would create a more balanced knowledge exchange.

Recommendations

Future studies should explore how to lessen the knowledge exchange hierarchy further. ELTI has an interest in exploring ways to facilitate more knowledge exchanges between the model and visiting farmers. In addition to adding in more opportunities in the training schedule to chat, like an evening get together, a culturally appropriate activity like a *junta*, or work party, could be used as a vehicle for hands-on learning and knowledge exchange. *Juntas* are used throughout Panama to collectively complete farm work for a low cost. In a *junta*, a group of farmers will work one morning on each member's farm, in exchange for a meal at the end of the work day and the expectation that the farmers will work on their farm in an upcoming *junta*. Utilizing this practice could be a great way for APASPE farmers to see visiting farmers' farms, demonstrate the implementation of a silvopastoral practice in the visiting farmer's actual farm context, and share knowledge with one another in the field.

Additionally, one topic many of my co-researchers wished to discuss, but was outside of the research question, was their experiences with the student group visits. I wonder if this is a product of COVID, as at the time of the interviews, there had not been a visiting farmer group come to Los Asientos since the start of the pandemic, while there had been a couple of student

groups who had visited. Or, is there more interest from the model farmers in their interactions with students from the U.S. rather than other Panamanian farmers? Future research could explore this question, and a similar study could be conducted to explore the knowledge exchanges among these two sets of students: farmers and university students.

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