Gender Dynamics in the Adoption of Climate Adaptation Practices: A Case Study in the Cauca Department of Colombia

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ACRONYMS & ABBREVIATIONS

ASOCAMPO	Campesino Farmers' Association
ASOPROLGAN	Regional Cauca Livestock Association
CELAC	Community of Latin American and Caribbean States
CIESIN	Center for International Earth Science Information Network
CIAT	International Center for Tropical Agriculture
CGIAR	Consultative Group on International Agricultural Research
CCAFS	Research Program in Climate Change, Agriculture and Food
CRIC	Regional Indigenous Council of Colombia
CSA	Climate Smart Agriculture
DNP	Departamento Nacional de Planeación (*National Planning Department)*
ELN	National Liberation Army
ESSP	Earth System Science Partnership
FAO	Food and Agriculture Organization
FARC	Fuerzas Armadas Revolucionarias de Colombia (*Armed Revolutionary Forces of Colombia*)
FPCRP	La Fundación ProCuenca Río las Piedras (*Río las Piedras Watershed Foundation*)
FSRE	Farming System Research and Extension
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit (*German Society for International Cooperation*)
IDP	Internally Displaced Person
IFAD	International Fund for Agricultural Development
IGAC	Geographic Institute Agustín Codazzi
INCODER	Instituto Colombiano para el Desarrollo Rural (*Colombian Institute for Rural Development*)
MADR	Ministerio de Ambiente y Desarrollo Sostenible (*Ministry of the Environment and Sustainable Development)*
MDG	Millennium Development Goal
ONDCP	Office of National Drug Control Policy
REDI	Desarrollo Económico Reciente en Infraestructura (*Recent Economic Development Infrastructure*)
PLA	People's Liberation Army
PNACC	Plan Nacional de Adaptación al Cambio Climático (*National Climate Change Adaptation Plan*)
PTI	Puente Terrestre Inter-Oceanico (*Inter-Oceanic Land Bridge*)
SAAT	Alertas AgroClimaticas Temprana (*Early AgroClimate Alert System*)
SAVER	Municipal Waste Water Sanitation Program
SECC	Southeast Climate Consortium
SENA	Servicio Nacional de Aprendizaje (*National Learning Service*)
UNDP	United Nations Development Program
WB	World Bank
WEAI	Women's Empowerment in Agriculture Index
WHO	World Health Organization

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ABSTRACT

Agriculture is a climate-sensitive activity. There is a critical need for "climate-smart" agriculture (CSA) and mitigation practices to address growing vulnerability, particularly in the tropics. Although many poor farmers have developed methods and strategies to deal with climate variability, the extreme and unpredictable nature of global climate change threatens to undermine their livelihoods and welfare. Furthermore, despite a growing body of research about the adaptive capacity of households, there persists a lacuna about the role of women in agriculture as it relates to adaptation and mitigation strategies. This is a critical gap since women are often agents for change and adaptation within the household. The feasibility of CSA practices depends on an understanding of how information and innovation are diffused within and among communities.

Within the framework of the Climate Change, Agriculture and Food Security (CCAFS) program, this research explores the gender dynamics of small-scale agriculture in the Río las Piedras watershed, located in the Colombian Massif, as related to decision-making, access to information, distribution of assets, division of labor, and perceptions towards new CSA practices. A case study is presented which included a pilot questionnaire and the use of participatory rural appraisal tools with approximately one-third of the peasant farming community members that belong to ASOCAMPO, a regional *campesino* association that focuses on agro-ecological practices. The research focuses on the gender dynamics of the adoption of twenty-three, region-specific, climate-smart agricultural (CSA) practices. Additional data collection methods include semi-structured interviews with key stakeholders, participant observation, and other participatory tools such as Historical Timelines, Seasonal Calendars, and Venn diagram activities.

The study concludes that the perceptions of men and women differ substantially, as to which CSA practices are considered more beneficial. In addition, the study identifies traditional gender roles in agricultural activities and considerable gender gaps in terms of ownership of resources. Furthermore, an examination of how information is diffused throughout the region reveals certain inequalities in the method and degree to which information reach men and women. The vast majority of both male and female farmers seem familiar with the concept of climate change and had perceived its effects in the watershed. However, while most of the interviewed women stated that they had modified at least some of their activities due to these changes, less than half of the interviewed men had done so, suggesting that women may be more exposed or vulnerable to changes in climate, or alternatively, that their productive activities are more affected.

The high level of knowledge about and implementation of CSA practices in this community was largely due to the extensive resources provided by ASOCAMPO, La Fundación ProCuenca Río las Piedras, and other institutional actors and extension services in the area. This pilot study examines the dynamics of the institutional activity and outreach in the Río las Piedras region, and makes recommendations as to how these services can be improved to reach both men and women equally. This research also contributes towards the development of a gender methodology to be used by CCAFS for future projects related to gender and climate change adaptation in Cauca and other regions throughout the world.

Key Words: Climate Smart Agriculture (CSA), Gender, Diffusion of Information, Cauca, Colombia

RESUMEN

En la actualidad, hay una necesidad crítica para entender e implementar prácticas en la agricultura que son "climáticamente inteligentes" (CSA). Aunque muchos agricultores pobres han desarrollado métodos y estrategias para hacer frente a la variabilidad del clima, la naturaleza extrema e imprevisible del cambio climático global amenaza socavar sus medios de vida. Por otra parte, a pesar de un incremento considerable en la literatura sobre la capacidad de adaptación climática de los hogares, persiste un vacío sobre el papel de la mujer en la agricultura; sobre todo en lo que respecta a las estrategias de adaptación y de mitigación. Se trata de una brecha crucial ya que las mujeres suelen ser agentes de cambio y adaptación dentro del hogar. La viabilidad de las prácticas de CSA depende de una comprensión de cómo se difunden la información y la innovación dentro de y entre las comunidades.

En el marco del programa de Cambio Climático, Agricultura y Seguridad Alimentaria (CCAFS), esta investigación explora las dinámicas de género en la agricultura a pequeña escala en la Cuenca Río las Piedras, que se encuentra en el Macizo Colombiano, en relación con la toma de decisiones, el acceso a información, la distribución de recursos, la división del trabajo y las percepciones hacia nuevas prácticas de CSA. La metodología utilizada fue un estudio de caso, donde se implementó un cuestionario piloto y herramientas de evaluación participativa para las zonas rurales. Trabajamos con aproximadamente un tercio de la comunidad campesina que pertenecen a ASOCAMPO, una asociación campesina regional que se centra en las prácticas agro-ecológicas. Otros métodos de recolección de datos incluyen entrevistas semi-estructuradas con actores claves, observación participante, y otras herramientas de participación. La investigación se centra en las dinámicas de género en la adopción de 23 prácticas de CSA, específicas a la región.

El estudio concluye que las percepciones de los hombres y las mujeres difieren sustancialmente en cuanto a cuales prácticas de CSA consideran más beneficiosas. Además, el estudio identifica los papeles tradicionales de género en las actividades agrícolas. Por otra parte, un análisis de cómo se difunde la información en toda la región revela ciertas desigualdades en el método y el nivel en que la información llega a hombres y mujeres. La gran mayoría de los agricultores masculinos y femeninos percibe familiaridad con el concepto de cambio climático y se ha dado cuenta de sus efectos en la Cuenca. Sin embargo, mientras que la mayoría de las mujeres entrevistadas declararon que habían modificado algunas de sus actividades debido a estos cambios climáticos. Menos de la mitad de los hombres entrevistados lo habían hecho, lo que sugiere que las mujeres pueden estar más expuestas o vulnerables a los cambios en el clima, o alternativamente, que sus actividades productivas se ven más afectadas.

El alto nivel de conocimiento y aplicación de las prácticas de CSA en esta comunidad fue en gran parte debido a los extensos recursos proporcionados por ASOCAMPO, La Fundación ProCuenca Río las Piedras, y otros actores institucionales. Este estudio piloto examina la dinámica de la actividad institucional en la región, y hace recomendaciones sobre cómo estos servicios pueden mejorarse para llegar a los hombres y mujeres por igual. Esta investigación también contribuye al desarrollo de una metodología de género para ser utilizada por CCAFS para proyectos futuros relacionados con el género y la adaptación al cambio climático en el Cauca y otras regiones.

Palabras Claves: Cambio Climático, Género, Acceso a la Información, Cauca, Colombia

INTRODUCTION

Agriculture is a climate-sensitive activity. There is a critical need for "climate-smart" agriculture (CSA) and mitigation practices to address growing vulnerability, particularly in the tropics. Although many poor farmers have developed methods and strategies to deal with climate variability, the extreme and unpredictable nature of global climate change threatens to undermine their livelihoods and welfare. Furthermore, despite a growing body of research about the adaptive capacity of households, there persists a lacuna regarding the role of women in agriculture as it relates to adaptation and mitigation strategies. Because women are often agents for change and adaptation within the household, this is a critical gap in the literature. The feasibility of CSA practices depends on an understanding of how information and innovation is diffused within and among communities.

Within the framework of the Climate Change, Agriculture and Food Security (CCAFS) program of the CGIAR centers, this research explores the gender dynamics of small-scale agriculture in the Río las Piedras watershed, located in the Colombian Massif, an Andean mountain range in south-central Colombia. The focus is on decision-making, access to information, distribution of asset ownership, the gender division of labor, and perceptions of new CSA practices. This study was made possible through the support of two organizations: the Fundación ProCuenca Río las Piedras (FPCRP), a non-profit that works towards land, food and water security, and ASOCAMPO, a *campesino* (farmers') association, both which serve the Río las Piedras watershed community.

The case study included a pilot questionnaire and the use of participatory rural appraisal tools with approximately one-third of the watershed farming population of the watershed that belong to ASOCAMPO, the local *campesino* association that focuses on agro-ecological practices. The research focused on the gender dynamics of the adoption of twenty-three, region-specific, climate-smart agricultural (CSA) practices. Additional data collection methods used included semi-structured interviews with key stakeholders, participant observation, and other participatory tools such as historical timelines, seasonal calendars, and Venn diagram activities.

These instruments and methods of analysis were developed in conjunction with the "Gender and Climate Change" Team at CCAFS, with the objective of contributing to the development of a gender methodology to be used by CCAFS for future projects related to gender and climate change adaptation in Cauca and other regions throughout the world. The purpose of

this practicum project was to conduct a pilot study in the region to test research instruments, collect baseline data, further networks and relationships with local stakeholder, and assess the viability of certain CSA practices and how they can be introduced to farmers in the region.

In order to understand the complexity of these issues it is critical to have a full understanding of the background and context. The first section of this report discusses the background on climate-smart agriculture and on gender research methods and analyses. Also included is a description of the context of the Department of Cauca, local agriculture and climate considerations, and the history and dynamics of local actors. This background contextualizes the research and its importance, and also places it within the larger, climate-adaptation framework. Following this discussion, the specific objectives for this study are outlined and the instruments used are explained and justified. The results regarding household, community and institutional levels are presented, and then recommendations and conclusions are drawn from these results. The purpose of this report is to share this experience and further the discussion on climate adaptation strategies for smallholder male and female farmers.

BACKGROUND

The government of Colombia is currently in discussions with the Fuerzas Armadas Revolucionarias de Colombia (FARC) in what have been the first planned peace talks in over a decade. The election of President Juan Manuel Santos in 2010 inaugurated a new era of "post-conflict politics" for Colombia. This is no less an expression of the diminishing power of the FARC over the past two decades than it is a reflection of a larger national movement impelled by massive internal migration and a shifting global market. During over half a century of civil war, conflict chased large segments of the population from their agricultural lands and into a constellation of rapidly developing, tenuously tied together cities. Colombia is second in the world in the size of its internally displaced population (IDPs), with about three million living abroad and the same amount having relocated to more urbanized areas (DANE, 2005). Despite rapid economic growth, Colombia still faces considerable socioeconomic and political inequalities. The political and socioeconomic status quo is inherently tied to the country's sixty-five years of civil war, one of the longest ongoing conflicts in the world.

Colombia has experienced rapid economic growth in recent years – among the fastest in South America – yet continues to face numerous challenges relating to inequality among regions, and rural and urban areas (UNDP, 2007). These challenges are exhibited within key development sectors, such as infrastructure and health, and were set into motion most recently by the state's decentralization process of the 1990s. Colombia's development challenges today are shaped by a sustained armed conflict, a large IDP population, and a growing political and economic engagement with the West. In the past twenty years, Colombia's relationship with the United States has been largely defined through successive free trade agreements (most recently the U.S. – Colombia Trade Promotion Agreement (TPA)) and a collaborative effort on the "War on Drugs," an initiative known as Plan Colombia.

Location and Governance

Colombia is located in northwest South America with a coastline on both the Atlantic and Pacific oceans. It is listed as one of the world's "megadiverse" countries and hosts close to 10% of the planet's biodiversity (CBD, 2012). Colombia encompasses a wide complexity of ecological, climatic, biological and ecosystem components, shaped by its Andean, Amazonian, Pacific, and Caribbean regions, among others.

With 1.14 million sq. km., Colombia is the fourth-largest country in South America, roughly the equivalent of California and Texas combined. The national population as of 2011 is 46.04 million – the third most populous country in the region after Brazil and Mexico (DANE, 2012). Much of Colombia's population is concentrated around the northern and western departments. Approximately three-quarters of Colombia's population live in urban areas where there is a high concentration of economic activity and government institutions (Wong, 2008).

The Constitution of 1991 outlined a territorial model for the country, defining it as a decentralized, democratic state, organized as a single republic with autonomous territorial entities divided into 4 special districts (Bogota, Cartagena, Santa Marta, and Barranquilla), 31 departments and 1,120 municipalities (UNDP, 2007). Individual territories are empowered to manage their own interests, within the limits of the Constitution and the law. They have by virtue the following rights: to govern themselves

through their own authorities; exercise the powers allocated to them; administer resources and establish the necessary taxes for the performance of their duties; and participate in the national income (Article 286, 287). Territorial divisions and autonomies established by the Constitution become relevant in consideration of the federal government's role in developing and aiding social programs, as well as for their role in developing a geographic and imagined sense of community.

Political and Socioeconomic Environment

Colombia is a medium-income, post conflict nation. Despite rapid economic growth in recent years and an HDI value for 2011 of 0.710 – in the high human development category – it is still characterized by pervasive inequality and conflict. Taking into account inequality, Colombia's HDI falls to 0.479 (a decrease of 32.5%) due to inequality in the distribution of income (UNDP, 2011). Thus, while the country is home to a diversified economy, an abundance of natural resources and an educated workforce, (for example) 1.1% of landowners control more than 55% of exploitable land (Rocha and Gómez, 2007).

It is important to note briefly that while Colombia does not officially have a National Adaptation Programme of Action (NAPA) (no Latin American countries do as they were originally intended for Least Developed Countries (LDCs)), it does has National Adaptation Plan (NAP) that is part of the 'Plan Nacional de Adaptación al Cambio Climático' (PNACC) and comprises a national strategy document entitled: *Estrategia de Adaptación del Sector Agropecuario a los Fenómenos Climáticos* ("Adaptation Strategy to Climatic Phenomena for the Agricultural Sector"). This strategy document was first commissioned in the *Estrategia Institucional para la articulación de Políticas y Acciones en Materia de Cambio Climático en Colombia* ("Institutional Strategy for the Articulation of Policy and Action on Climate Change in Colombia") (CONPES 3700) as part of the National Development Plan (PND). The *Estrategia de Adaptación del Sector Agropecuario a los Fenómenos Climáticos* in Colombia – known simply as *Estrategia*, "was created with the goal of fomenting new strategies of adaptation against climatic phenomenon rather than engendering adaptation strategies to combat the daily realities of climate change" (CIAT, 2013). Within the *Estrategia,* a *Plan*

de Acción identifies and outlines five specific problems and describes the actions to be taken as a response to each. The creation of this strategy falls under the responsibilities of the National Planning Department (DNP) and the Ministry of the Environment and Sustainable Development (MADR) who spent several years working on the document, though progress has been delayed as of late due to lack of funding (ibid). To date, there is no mention of gender in the official *Estrategia* document.

Agriculture and Food Security

Over the past few decades, hunger has been significantly reduced in Colombia and throughout the greater Latin America region. Food price inflation, compounded by climatic phenomenon (El Niño) and high transportation costs due to high oil prices, has risen in recent years, though the country maintains a "low hunger" status on the Global Hunger Index (Food Security Portal, 2008). Although eradicating extreme poverty and hunger is the United Nation's Millennium Development Goal (MDG) 1 for 2015, Colombia's priorities are more directed towards environmental challenges and developing more effective agricultural strategies for its farming population.

Colombia's diverse climate and topography enable the cultivation of a wide variety of crops, including cacao beans, sugarcane, bananas and plantains, flowers, cotton and livestock. National agriculture contributes 6.8% to the GDP, a share that has fallen steadily over the past decade due to urbanization – down from 8.8% in 2002 (World Bank, 2011). Forest products are growing more important to the national economy, including mangrove and coconut trees in the Caribbean Coast, and more commercialized varieties, such as mahogany, and walnut, near the Amazon Forest (CIESIN, 2003). Much of Colombia is in fact covered with a lush, humid tropical forest that is home to one of the richest biological reserves in the world (CIESIN, 2003).

In the Latin American region, the country is noted for its balanced delivery of major agricultural services; "there are for all services two or even three actors sharing the dominant role: public sector and NGOs for training; the last two and producer organizations for extension; and the public and private sectors for research and irrigation" (CIESIN, 2003). CIAT claims, "few developing countries play a more productive and multifaceted role than Colombia does in the evolving system of international agricultural

research" (CIAT, 2012). The organization describes Colombia as a "steadfast and pro-active partner of various CGIAR-supported centers as well as a major beneficiary of collaborative research for development" (CIAT, 2012). They have a successful partnership, implementing diverse projects around the country, including: enabling more productive forages for tropical savannas; enhancing market prospects for cassava (which can be consumed fresh or provide raw material for processing into livestock feed) starch, and increasingly, bioethanol; tapping the potential of high-value tropical fruits; and compensating rural people for environmental services, particular in vital Andean watersheds, which support agricultural livelihoods and harbor biodiversity (CIAT, 2012).

Department of Cauca

Cauca is a major center for agriculture, water production and biodiversity within the country. Located in the southwestern region of the country, the department belongs to the Andean system, and encompasses five major national basins. Cauca is referred to as a "national benchmark," due to its incredible biodiversity, hydrological importance, and "multiethnic and multicultural society building" (UN, 2010). It is considered a strategic ecosystem in Colombia for three main reasons: 1) it is the main source of water supply for the capital of Cauca; 2) it forms part of the buffer zone of Puracé and three natural parks; and 3) it is the only wilderness area in the municipality of Popayán (Convention No. 007, 2005). There are a total of 42 municipalities across five sub-regions, and the Department contains five large water basins and 145 sub-basins. This study was conducted in the Río las Piedras Watershed, northwest of the capital city of Popayán. The basin (**Figure 1**) has a total area of 6,625 hectares; altitudes range from 1900 and 3800 masl, and there are four main thermal levels: páramo (59%), cold (12%), temperate (24%) and warm (51%) (MDG-F, 2011). The Hydrologic Institute (IDEAM, 2002) predicted for this area, and the entire upper basin of the Cauca River, a decrease in precipitation of 0.2 and 0.3 %, respectively, per year and a temperature increase of 0.1 to 0.2 degrees Celsius per decade due to the effects of climate change.

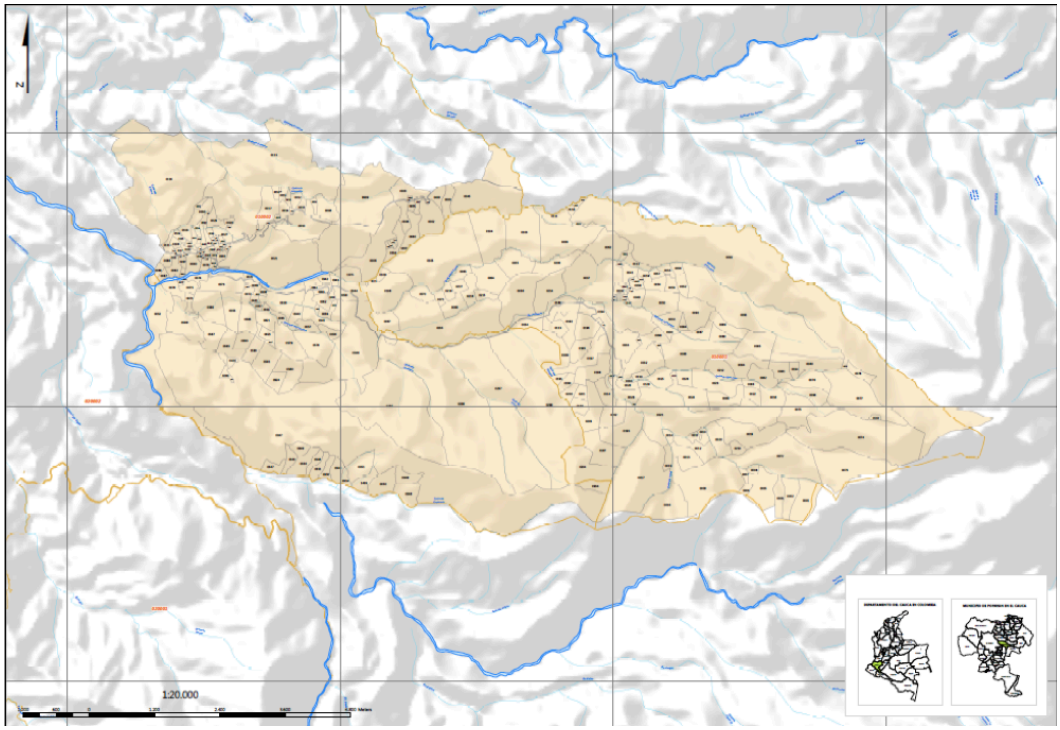

Figure 1: Map of the Río las Piedras Watershed, Popayán Municipality, Department of Cauca. (Source: Acosta, Devereux & Twyman, in collaboration with the Popayán Land Titling Office, 2013).

In terms of ethnic diversity, 60.2% of the population is white or mestizo, 20.1% is Black or Afro-Colombian, and 19.7% is American Indian or Indigenous (DANE, 2005). In contrast to national tendencies towards high rural-urban migration, in this department such has been lower and remained relatively steady over the past 25 years, with a slight increase in the rate of growth of the urban population during the last decade (ibid). Cauca is home to the second largest population concentration of indigenous people in Colombia (DANE, 2005). Indigenous communities or "cabildos" are organized through the highly influential Regional Indigenous Council of Colombia (CRIC). The history of the indigenous movement can be traced to the government land reformation of the 1970s, during which peasant farmers protested inequitable land tenure policies that allowed vast properties to be concentered in the hands of a few wealthy land owners. Consequently the government granted the indigenous community in Colombia additional communal land and allowed for independent judicial and education systems (Velasco, 2009). Around this time, peasant farmers in the region began to self-identify as either indigenous or *campesino*, based on respective preferences for land tenure – whether they wanted to own private property or farm on communal land – and other cultural practices. This marked

the beginning of an inter-ethnic conflict in the region, compounded by poverty, violence and population growth. A 2008 participatory enquiry of the local governments in the region documents the most relevant factors causing social and environmental conflicts related to water, local food production, food security and access to land (NWO, 2013). These include: air contamination (burning), water pollution (agro- chemicals), water and soil depletion (desertification), and forced displacement due to increased industrial sugar cane cultivation and transnational mining activities.

The study population of this project is composed of members of ASOCAMPO, the oldest and largest *campesino* association in watershed, established in 2001 as a response to pressure and conflict over land ownership between the *campesino* and indigenous communities in the Río las Piedras and Río Palacé Basins. The formation of ASOCAMPO was an expression of *campesino* identity, and created an opportunity to organize and combine forces in defending the land rights of *campesino* farmers in the region, many of whom felt that they had not been granted the same national rights and benefits as the indigenous communities. In the Río las Piedras Watershed region there are four collective actors: two indigenous reserves (Quintana and Puracé) and two *campesino*[1] associations (ASOCAMPO and ASOPROQUINTANA[2]). The ongoing conflict over land tenure and use between the indigenous and *campesinos* escalated in 1998 and 2002, when the indigenous members of the two reserves advanced on lands inhabited by *campesinos,* claiming a need for more fertile land (Espinel, 2006). The Director of La Fundación ProCuenca Río las Piedras (FPCRP) notes that these conflicts over land tenure caused a serious environmental crisis due to the practices mentioned above, as well as general pressure on the land from population growth, and heightened social clashes between indigenous and peasant communities in the basin (Recaman (2013). **Figure 2** outlines the evolution of land conflict over the last few decades.

[1] In this context, *campesino* is defined as a smallholder peasant farmer who does not identify as indigenous nor belongs to any indigenous "cabildo" or organization.
[2] ASOPROQUINTANA is an offshoot of the original ASOCAMPO association, created by and for farmers living in the most remote areas of the watershed. Although they have distinct leadership, there is much overlap in membership and activities.

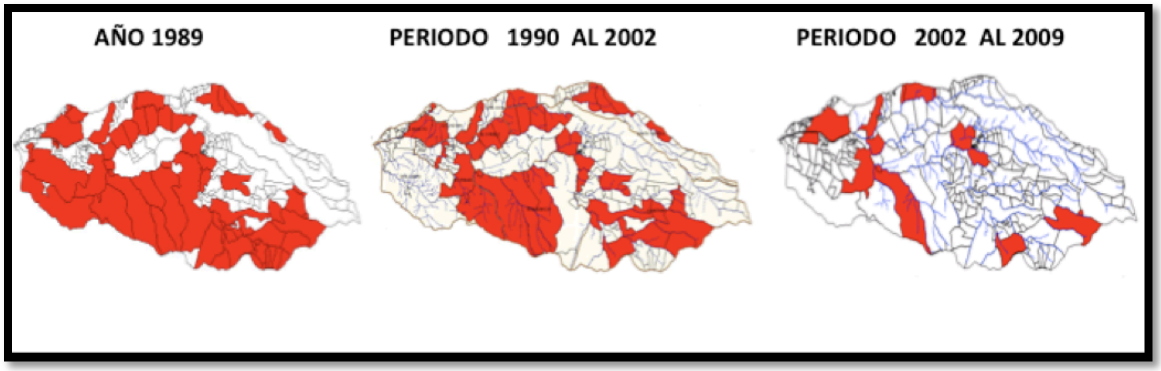

Figure 2: Historical Evolution of Land Conflicts between the Indigenous and Campesinos of the Río las Piedras Basin (Source: Recaman 2013)

Peace was tentatively reached when the different stakeholders in the region agreed to sign "El Pacto de Convivencia" – "Pact of Coexistence" in 2002. The document is the product of a long process of reconciliation between the two communities, settling the conflict over land tenure by addressing respective interests, and setting a precedent for coexistence between environmental conservation and social development in the region. The Pact also effectively recognized ASOCAMPO as the representative authority of *campesino* interests. ASOCAMPO has since emerged as an important source of social capital and networking among the *campesino* population. The group functions as an advocate for the community's rights and well-being, and provides information and resources to its members. The group's basic goals include environmental conservation, incentivizing integrated, sustainable and organic production systems, and facilitating the process of securing land tenure for *campesinos* by protecting properties that border indigenous land. As of the summer of 2013, ASOCAMPO has 118 members spread across eight "veredas" (small village communities that make up the region). In the Río Piedras Basin there are: Las Huacas (31 members), El Canelo (13), La Laguna (9), Los Laureles (7), Quintana (28), San Juan (7) and Santa Teresa (3); and in the Palacé Basin, El Cabullo (20). This research focused solely on members in the Río las Piedras Basin region, which is divided both politically and geographically into three main areas: the lower part of the basin, from 1900 – 2070 masl (which includes Las Huacas); the middle part of the basin, from 2070 – 2350 masl (which includes villages of El Canelo, La Laguna, Los Laureles and San Juan), and the upper part of the basin from 2350 – 3800 masl (the villages of Quintana, San Ignacio and Santa Teresa).

Gender

This project draws heavily upon a spectrum of resources related to gender methodologies and analyses in order to understand the role that gender plays in the adoption of climate adaptation practices. We wanted to understand how socially constructed roles – and the concomitant responsibilities and rights – affect decisions related to agricultural production and processing, as well as climate change adaptation. This in turn provides a better understanding for developing sustainable and meaningful policy interventions. It is therefore critical to perform intra-household analysis using sex-disaggregated data to understand the complexities of agricultural production, ownership of assets, division of labor, decision-making processes, and the relationships between family members. The trajectory of gender and agriculture research can be traced to 1970, when Ester Boserup published the groundbreaking work *Women's role in Economic Development*, which highlighted the historical devaluation of women's labor in agriculture and in the household, and why these factors matter for economic analysis. Since then, there has been a growing body of research on the productive roles and social identities male and female farmers. Notably, Carmen Diana Deere and Magdalena Leon de Leal (1982) conducted a comparative study of three Andean regions (two in Colombia and one in Peru) to analyze the degree of capital development in these regions and its impact on the participation of women in agricultural activities. They found that the participation of women in agriculture was higher in the Peruvian region than in the two regions studied in Colombia, although all three were mestizo regions. The study concluded that the differences in women's agricultural participation were related to the respective systems in place in these regions: in an *egalitarian* system, labor and decision-making fell within the domain of both men and women; in a *patriarchal* system, both men and women contributed labor to the household but decision-making was within the male domain.

More recently, research efforts have raised awareness about the value of methodologies that take gender into account, as a way to strengthen data and arrive at more nuanced and accurate findings. In particular, the shift from the household as the unit of study to the individual allowed for a better understanding of the decision-making dynamics within a household, and in particular, "intra-household" methodology considers the interactions that occur between individual members of a household, and how male

and female members arrive at decisions regarding the household unit. The discourse around the role of women in agriculture and development has further shifted in policy circles, with growing international efforts to integrate gender into development objectives and specific projects, including the United Nations' Millennium Development Goals (MDGs).

Adaptive capacity is based on the stability of social relations, the maintenance of social capital, and economic prosperity. This in turn builds resilience in times of uncertainty or shock. Not only do men and women within the same household and community experience changes in climate differently, but their respective adaptive capacities are shaped by multiple factors, such as access to information and resources, household decision-making processes, and socially constructed identities and roles (McOmber, et al., 2013; Goh, 2012; Patt, Dazé and Suarez, 2009; Lambrou and Nelson, 2010; Beuchelt and Badstue. 2013). Yet historically, women's capacity for creating changes within the household has been overlooked and this represents a critical gap in research and policy interventions. The efficacy and sustainability of the projects and measures being proposed through more recent agricultural development initiatives, including Climate-Smart Agriculture (CSA) depend on the inclusion of gendered research and analysis appropriate to specific geographic and cultural contexts.

According to the Cauca-specific Millennium Development Goals, developed by the United Nations in collaboration with IDEAM, the University of Cauca, the Cauca Governorate, the Joint Integration Program on Ecosystems and Climate Change Adaptation in the Colombian Massif ('Programa Conjunto'), and the UN Project Area for Poverty and Sustainable Development (PNUD), the main challenges for MDG "Objective 3: Promoting Gender Equality and the Autonomy of Women" are confronting intra-family violence, reducing unequal access to labor markets, and correcting women's far lower participation in political processes compared to their male counterparts (UN 2010). Within the framework of climate change adaptation, this document also considers the intersection between territorial security and the MDGs, defining a sustainable future as one that advances human well-being and conserves the natural environment, stating:

> "... It follows that the attainment of the MDGs in a global context affected by climate change is not just a problem of the struggle against poverty, but also of greater integration

> in the understanding of the interplay between policies that address different dimensions of development"[3] (UN 2010; 58).

Climate Change and "Climate-Smart Agriculture"

Climate change poses a major and largely unknown global challenge, and is considered one of the leading drivers of societal change in this century (Jarvis, et al., 2013). The tropics in particular are often more vulnerable than their temperate counterparts, partly due to high levels of population growth compounded with a low per capita income. The tropical zone encompasses 36% of the world's surface area, and a striking diversity of people, cultures, agricultural enterprises and production of crops for local consumption and export; smallholder farmers in this region however, are among the most vulnerable to climate change, due to their lower adaptive capacity (Gallup & Sachs, 2000; Morton, 2007). Furthermore, although many "tropical economies" remain largely dependent on agricultural production, both for food security and for export, agricultural yields based on traditional cropping systems and methods are unable to sustain the levels needed to support these populations.

For a variety of social, historical and geographical reasons, almost all tropical countries are in the poor to middle income range. Gallup and Sachs (2000; 731) argue however, "the disparity in agricultural productivity between the tropics and the temperature zones is even greater than the disparity in income levels." In fact, their research shows that "income per capita in non-tropical countries was 3.3 times the level of income per capita in tropical countries in 1995, but agricultural output per worker in the non-tropical countries was 8.8 times the level in the tropics" (ibid).

These agricultural deficiencies can be traced to a variety of reasons related to the region's environment and climate, as well as the distribution of land. For one, typical humid tropical soils are low in nutrients and organic matter and are susceptible to erosion and acidification, and are often damaged rather than improved by the application of synthetic fertilizers (Gallup & Sachs, 2000). These soil deficiencies are largely due to the long term effects of tropical climate, wherein "high temperature and humidity cause

[3] Spanish: "De aquí se desprende que fomentar el logro de los ODM en un marco global afectado por el cambio climático no es tan solo un problema de lucha a la pobreza, sino de mayor integralidad en la comprensión de la interrelación entre políticas que abarcan todas las dimensiones del desarrollo."

organic matter in the soil to break down quickly, robbing the soil of nutrients as well as the structure needed to absorb fertilizers and slow erosion" (2000; 734). Another factor that affects both crop yields and labor productivity is the higher incidence of agricultural pests and human tropical diseases, due to the lack of freezing temperatures.

Furthermore, these regions often lack the capacity to address these challenges, partly because advances in agricultural technology have been developed largely for the richer temperate crops and markets, and it is difficult to successfully transfer and adapt temperate zone technologies to tropical climate zones. These technological advances also tend to be limited to commercial agriculture, particularly export-oriented crops and enterprises that use intensive, mono-cropping systems. For smallholder farmers then, agricultural development is often put forth as the solution to these challenges. Improving cropping systems and methods through the adoption of climate-smart practices and other improved agricultural strategies offer a bridge for struggling farmers – particularly smallholders – to ensure food security and improve their potential to sell to market, by increasing their capacity to mitigate and adapt to climate change (FAO, 2010).

Climate-smart agriculture (CSA) represents a dynamic model that encompasses these three critical factors: adaptation, mitigation and increased production – also known as the three pillars of CSA. The Food and Agriculture Organization (FAO) defines climate-smart agriculture (CSA) as "agriculture that sustainably increases productivity, resilience (adaptation), reduces/removes GHGs (mitigation), and enhances achievement of national food security and development goals" (ibid). "Eco-efficiency" adds another layer, in thinking through how the different pillars can successfully function together, and also overlap with eco-efficient practices: "while an eco-efficient practice is highly likely to also be climate smart, some climate-smart practices are probably more eco-efficient than others if a number of such measures are taken into account," including the relation of inputs, such as labor, capital, nutrients and water, and with desired outputs, such as the harvested product or economic profit (Jarvis, et al., 2013: 46). Matthew and Ortiz (2013) define eco-efficiency as a system that produces maximum results with minimum inputs and that harmonizes economic, social and environmental needs into one strategy. The challenge moving forward is to expand research regarding indicators for the agricultural practices of each of the three CSA pillars, and better assess their efficacy of climate-

smart practices in varying geographic ranges and socio-economic spheres (Jarvis, et al., 2013). This report draws from the definition proposed by Jarvis, et al. (2013) that defines a CSA agriculture system as one that 1) uses practices on the farm that adapt to climate change by strengthening the security of food systems; 2) helps to mitigate climate change through sequestration or the prevention of carbon emissions; and 3) increases agricultural productivity – but will focus primarily on the first and third pillars.

Since 2010, CSA concept has gained considerable international support. However, as the FAO notes, "implementing this approach is challenging, partly due to lack of tools and experience (FAO, 2010). Although the FAO Climate-Smart Agriculture Sourcebook dedicates an entire section (A) to making a case for CSA and establishing a conceptual framework, different authors and institutions have raised ethical, political and logistical concerns about the CSA agenda and its viability across different contexts. Among these criticisms is that the CSA definition proposed by the FAO makes no direct reference to the relationship between mitigation, resilience and productivity. The technologies and land uses put forth are not considered within their greater institutional and political contexts: in order to implement effective policies, research and development efforts must focus not only on the level of the agricultural plot but also its relation to the larger system in which it operates, i.e. the broader political economy (Swallow, 2012). According to Swallow (2012), CSA practices then should be tailored to the unique needs and interests of the different types of farms (e.g. smallholder vs. commercial) that might adopt them. Furthermore, other literature points to the risk of excluding or marginalizing the needs and interests of smallholder farmers, the need to support and improve existing practices rather than simply introducing unfamiliar new ones, and the shaky ethical basis of encouraging smallholder farmers to participate in carbon markets (Pearce, 2011; Meinzen-Dick, et al., 2012; Tschakert, 2004; Actionaid, 2012).

Moreover, although CSA has been recently built as new, global paradigm for solving the world's toughest challenges, many of the practices that are now considered "climate-smart" have existed on farms for generations and/or have long been promoted by different agricultural research and development organizations. The important distinction is that previously, these practices were in concert with only one or two of the CSA pillars, but rarely all three simultaneously. Regional interpretations of "climate-smart" are also

central to establishing a framework for testing the feasibility of certain practices. The vast majority of the farmers in this study understood "climate change" in terms of "climate variability," in that the past decade had seen especially rainy and dry seasons, heavy winds, and most critically, inconsistent weather patterns and growing seasons for crop production. Chemical fertilizers and pesticides overwhelmingly were not used nor desired on farms, with human and environmental health given as the two main reasons, even though they are technically considered "climate-smart." These nuanced informed the compiled list of climate-smart practices included in the pilot survey, and also the method of analysis.

Resilience (Conceptual Framework)

Because of its high level of biodiversity and hydrological potential, Cauca is considered a strategic territory for the development of sustainable conservation and natural resource management initiatives, as an important pathway towards the prevention of environmental deterioration and climate change adaptation nationally (UN 2010). The ASOCAMPO community in Cauca faces multiple external challenges that impede their capacity for climate change adaptation. This includes the variability of the climate, an often discussed topic among the farmers, lack of access to a formal and/or consistent markets to sell agricultural products; insecure land tenure, which prevents some farmers from joining certain conservation projects, such as the Red de Reservas program; and to a lesser degree but still a relevant consideration, the historical conflict between the indigenous and the *campesinos*.

These stresses affect the ASOCAMPO farmers' adaptive capacity for climate change adaptation, along with the inherent vulnerabilities that exist within the community: the vast majority of farmers interviewed have no bank account, savings, or access to credit; and certain resources and services available to the farmers are not equally distributed among men and women. However, in addition to a widespread cultural mindset towards environmental conservation, and the lush national resources available, the institutional resources – namely ASOCAMPO and FPCRP – have the potential to strengthen the farmers' capacity to respond to climate change by providing appropriate and effective strategies for adaptation.

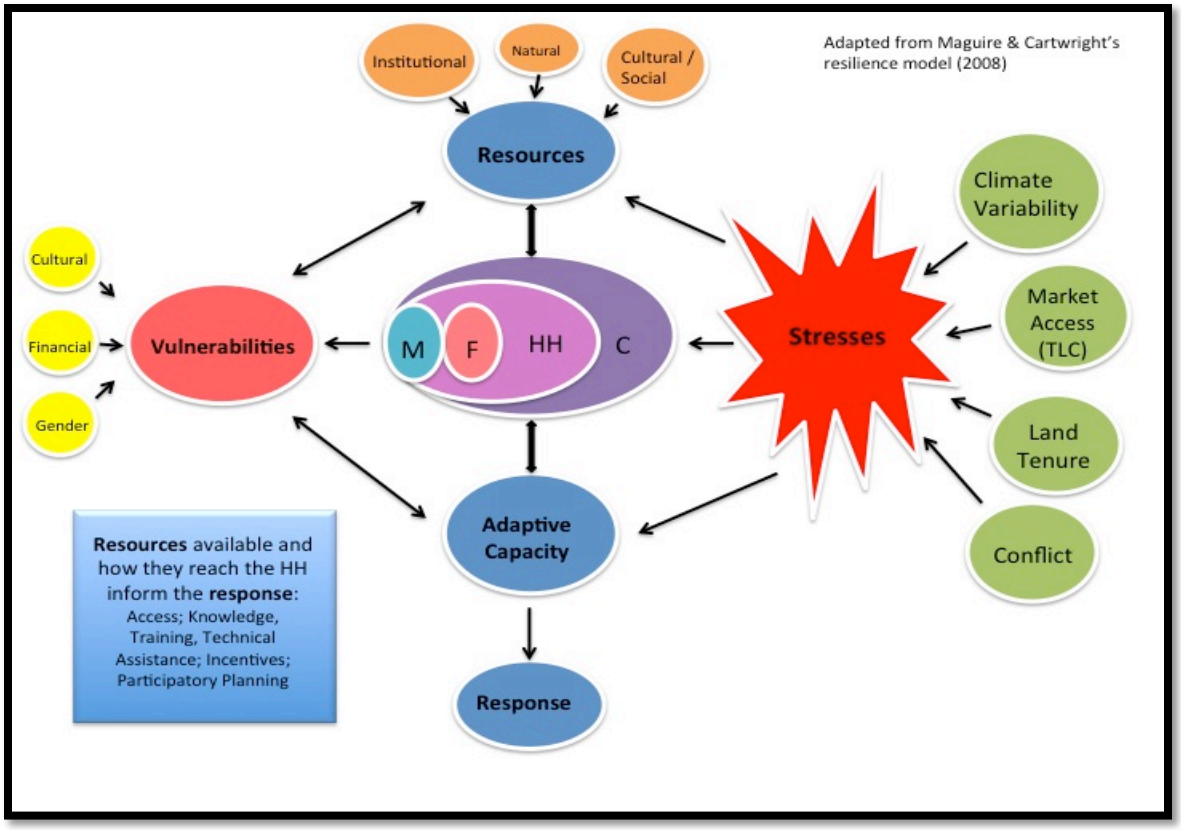

Figure 3: Conceptual Framework, Adapted from Maguire & Cartwright's resilience model (2008)

Historical and cultural factors, coupled by land insecurity and a growing concern about climate variability, engendered a renewed sense of community identity among many of the *campesinos* living in the basin region, which led to the formation of a set of institutional foundations that organize and structure community interactions. This affiliation, as well as that with other active local organizations, creates a social space where "participants with diverse preferences interact, exchange goods and services, solve problems, dominate one another, or fight" (Ostrom, 2005). This study partly draws upon the Institutional Analysis and Development Framework (Ostrom & Polski, 1999) to think about how the local stakeholders and organizations (e.g. ASOCAMPO, FPCRP, etc.) inform the interactions between local actors and the collective action taken towards environmental conservation and climate change adaptation. These interactions include a high level of organizational affiliation, attendance at workshops and other community meetings, and collective participation in indigenous seed, water and forest conservation efforts.

In particular, this study examines the underlying inequalities and differences in the method and degree of information made available to men and women. The ability of and degree to which the farmers participate in the action arena – and therefore have a stake in the institutional interactions that determine outcomes – has a gendered dimension. Gender analysis examines how the roles of men and women – and their rights and responsibilities – interact and how they affect research findings. In agriculture, gender analysis provides insight into how socially constructed roles and responsibilities affect countless decisions related to agricultural production and processing. By breaking down the traditional household unit of analysis, research methods and data analysis are strengthened. This study applies intra-household analysis using sex-disaggregated data to understand the full range of agricultural production, rural livelihoods, ownership of assets, division of labor, decision-making processes, and the relationships between family members.

PRACTICUM OVERVIEW

Placement & Host Organization

Field Practicum Site: Río las Piedras Watershed region in Popayán, Department of Cauca, Colombia, and the surrounding area and communities. The International CIAT headquarters in Cali, Colombia.
Host Institutions: International Center for Tropical Agriculture (CIAT) and the CGIAR program on Climate Change, Agriculture and Food Security (CCAFS).
In-Country Supervisor: Jennifer Twyman, UF post-doctoral social scientist at CIAT/CCAFS

Local Stakeholders / Institutional Landscape

This project was sponsored by the agricultural economist, Dr. Jennifer Twyman, leader of the Gender and Climate Change team at the International Center for Tropical Agriculture (CIAT), under a joint research program on Climate Change, Agriculture and Food Security (CCAFS). CIAT is an international research center headquartered in Cali, Colombia, whose mission is to reduce hunger and poverty and improve human health in the tropics through research aimed at increasing the eco-efficiency of agriculture. CIAT is one of fifteen research centers that make up the CGIAR Consortium, a global alliance created in order to reduce rural poverty, increase food security, improve human health

and nutrition, and to ensure a more sustainable management of natural resources. CIAT leads the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS), whose objective is to address the increasing challenge of global warming and declining food security by improving agricultural practices, policies and measures. This project is to serve as a pilot study for subsequent CCAFS case studies, with the aim to collect and analyze gender disaggregated information that can be built upon and improved in new contexts.

The project was carried out in coordination with the La Fundación ProCuenca Río las Piedras (FPCRP), a nongovernmental organization (NGO) that has been working in environmental management with different stakeholders in the region since its establishment over 22 years ago. Another key collaborator was the Ecohábitas Foundation, an NGO whose primary mission is the study and management of conservation areas, as well as the supply of environmental services. The two organizations have worked together on various environmental projects in the region. Through these organizations, the project team established contact with the *campesino* association ASOCAMPO, which facilitated field research among its members. Other key collaborators include the Popayán Land Titling Office, Asprolgán, the regional livestock association, and others.

This research was conducted in coordination with two other graduate students: Mariola Acosta Frances (Master of Science, AgrisMundus at the University Montpellier SupAgro), and Seth Marsala-Bell, a fellow student enrolled in the Master of Sustainable Development Practice at the University of Florida. The team targeted three main dimensions related to climate change and gender: an analysis of information flows (author), an analysis of the adoption of new agricultural practices (led by Mariola Acosta Frances) and an analysis of food security (led by Seth Marsala-Bell). Since the three focus areas are interrelated, the work was done jointly and in close collaboration.

Objectives

Given the paucity of information that relates to gender-specific experiences, the plan was to collect qualitative data about perceived climate change (or the lack of such), information about the distribution of rights, resources and power relations within the

community, vulnerabilities to climate change, practices already adopted and/or considered by farmers within the community, and plans put forth by the community to adapt to these vulnerabilities – all disaggregated by gender, as well as age and geographic zone. The goals and objectives for my practicum included both personal goals for my academic and professional development, as well as the larger goals of the project itself and its relative impact on local community development. The specific project objectives are:

1. Identify men's and women's perceptions about the effects of climate change on local agriculture;
2. Understand how information is diffused throughout the community;
3. Identify how men and women learn about CSA practices, why they decide to implement them on their farm, and who makes that decision for the household;
4. Identify benefits and barriers of various CSA practices and technologies at the local level.

Practicum Requirements

This project complies with the criteria for the MDP summer field practicum. The project is inherently interdisciplinary, as it focuses on the intersection between climate change, gender, agriculture, natural resource management, human security and community and state governance. Given the main objective of CCFAS in the region, I believe my contribution supplements existing research and initiatives and potentially introduces new insight regarding gender and social networks. My practicum will also incorporate three of the four foundation areas of the MDP, including the social sciences, natural sciences and management.

METHODOLOGY

Multiple quantitative and qualitative methods were used to assess baseline farmer knowledge, agricultural practices and priorities, land and resource ownership and use, and perceptions about climate change. All data collected is disaggregated by gender. The research methodology for this approach is based on published research instruments by CCAFS, the FAO, the Southeast Climate Consortium (SECC), and the Florida Climate Institute (FCI), among others, with valuable and extensive feedback from my supervisory

committee. I also performed an extensive literature review of technical, academic and organizational documents provided by our local partners, which offered wide-ranging information and data about community history, agricultural practices, land tenure, institutional management plans and other records.

1. Participant Observation

The underlying approach throughout my fieldwork was to use participant observation as a way to learn about and from the *campesino* community in the Río las Piedras Watershed, to the extent that it was feasible. In this method, "the researcher takes part in the daily activities, rituals, interactions, and events of a group of people as one of the means of learning the explicit and tacit aspects of their life routines and culture," and employs a particular approach to the recording of those observations (DeWalt & DeWalt, 2011). Furthermore, "participant observation is characterized by such actions as having an open, nonjudgmental attitude, being interested in learning more about others, being aware of the propensity for feeling culture shock and for making mistakes, the majority of which can be overcome, by being a careful observer and a good listener, and by being open to the unexpected in what is learned" (DeWalt & DeWalt, 1998).

The timing of my fieldwork coincided with the summer holiday, a few months prior to the next major planting season (September). For the most part, the degree of my involvement can be characterized as "moderate participation," in that I was "present at the scene of the action, identifiable as a researcher, but [did] not actively participate or only occasionally interact[ed] with people in it" (ibid). This role is also known as the "observer as participant stance," wherein "the researcher is an observer who is not a member of the group and who is interested in participating as a means for conducting better observation and, hence, generating more complete understanding of the group's activities" (Kawulich, 2005).

My 10-week fieldwork experience included attending community workshops, meetings and *capacitaciones;* shadowing the *Alertas AgroClimaticas Tempranas* (SAAT) ("Early Warning AgroClimate System") team on their visits to the farms; and doing a guided tour of the farms we surveyed. By being present and attentive during these moments I was able to deepen my understanding of the local context, establish a rapport

with community members, and better focus subsequent research methods. This did present challenges, however, in finding a balance between the assimilation-driven efforts of being a "participant," and my role as a "researcher," with a responsibility to take notes, record sounds and images, and ask critical questions.

My Spanish is proficient enough that language was not a barrier towards a direct and natural learning experience. However as a foreigner, and particularly as a North American, there were certain cultural challenges that affected my ability to connect with the community and address certain topics. For example, the history of conflict and drug-related violence in the region, while a relevant contextual dimension, was often too sensitive a topic to bring up even after some rapport had developed. Although one of my original objectives was to better understand the role of conflict in the ability of local agricultural communities to deal with climate change, I took a passive approach to learning about this topic and allowed members of the community to first introduce it into a conversation before I would follow up with carefully considered questions.

Despite making multiple appeals to our local partners, I was unable to secure a homestay for the duration of my fieldwork, the reason given that it would not be safe for a foreigner to be in the area at night. Instead I stayed in downtown Popayán, about two blocks away from the offices of Ecohábitas, the Land Titling Office, and the Popayán Municipal Aqueduct building where FPCRP has their offices. We traveled to the Río las Piedras Basin community by bus several days a week, depending on the schedules of our partners and the farmers. The option to spend a night at a farm was not provided until the last week of my stay, at which point the one night arrangement would have conflicted with other interviews that had long been scheduled.

Although the focus of my fieldwork was on the *campesino* farming community of Río las Piedras Basin, the participant observation approach extended to other dimensions of my stay. This includes purchasing my food at local farmers markets and noting the price for certain products; "breaking bread" with our local partners and many of the surveyed farmers as a means for more informal and intimate conversations; and speaking with a wide variety of Colombians and expats in several cities across the country (Cali, Popayán, Bogotá, San Agustín) about a multitude of political, economic and social issues,

as a way to gauge different perspectives and attitudes across class, race, age and gender lines.

2. Gender, Agriculture and Climate-Change Surveys

Our research team developed a semi-structured pilot survey based on previous CIAT / CCAFS materials and with feedback from our CIAT project supervisors and fellow researchers, the local partners, and committee members and faculty from the University of Florida and the Université Montpellier III. A total of twenty-seven households were selected to participate in the survey through one of our host organizations, ASOCAMPO, who identified members of the *campesino* farming population in the region who would be able to participate. An ASOCAMPO representative accompanied our research team to each farm. This person introduced us, clarified any language or cultural confusions, and guided us through the region from house to house.

Of the 35 respondents, 19 were women and 16 were men. In married or partnered households, we attempted to interview the husband and wife separately and successfully interviewed two people in 8 of the 18 dual-headed households, for a total of thirty-five participants. Of the 27 total households, five are headed by unpartnered women, and four households are headed by unpartnered men. Multiple respondent household surveys are a critical tool to ensure that both the male and female perspectives are equally reflected in the data. This technique, however, at times proved to be a challenge. Typical for many households in this region, oftentimes one spouse would remain close to the house during the day, while the other spouse would be either working in a remote area of the property, working as a *jornalero* or laborer on another farm, buying or selling products in the market in town, or running another errand outside of the household. Therefore, it required special coordination to ensure both members would be present at the time of our visit, or scheduling a follow-up interview with the absent member at a later day. Although Saturdays were typically the best day to survey both the man and the woman of the household, the reason they were home together meant they didn't necessarily want to deal with a survey on their rest day.

Furthermore, even when both spouses were present at the time of the scheduled visit, conducting the survey with the man and the woman separately posed a cultural

challenge, as the man of the household often assumed that he was capable of answering any of our questions and would state that his wife was "busy" or "sick," and therefore unable to participate. In order to navigate the cultural dynamics but still collect sex-disaggregated data, we employed our local guide to help introduce the idea of understanding the "roles of the family" and why we wanted to hear different perspectives on the same topics.

The population of the Río las Piedras is referred to as being divided into three local strata by the community. We surveyed the lower region first, followed by the upper region, and finally the middle region. Depending on the location of the farm, our transportation situation, the ASOCAMPO guide, and the schedule of the farmer, we visited one to three households per day.

We began each farm visit with a tour of the property, including the home, *la huerta* or the household garden, any livestock or *especies menores*, fields for major crops, water sources, areas that had been put into fallow and/or forests ceded to the state to be "protected," and any climate-adaptation practices being used, such as a compost or a greenhouse. The survey itself lasted about an hour, and the entire visit ranged from one to three hours. Informed consent to participate in the survey and to have the conversation recorded was obtained using the Internal Review Board (IRB) Protocol; written consent was obtained from literate participants, and for those that were illiterate the informed consent form was read in its entirety and verbal consent was obtained.

3. Semi-structured interviews

During my stay, I carried out 11 semi-structured interviews with key community stakeholders and representatives by networking through our local hosts. We were able to build on relationships using mutual association, and targeted individuals who offered a particular knowledge or experience about the community as related to agriculture, environmental management, land ownership, gender, and climate change (see **Appendix 1, List 1** for full list of interviewees).

Because we relied in part on recommendations from our hosts as to who we should contact for interviews, there are some limitations related to bias. However, this approach enabled us to effectively reach out to a variety of key informants within the

community at an accelerated pace. Additional interviews were attempted and scheduled with other key community stakeholders, including a member of the local indigenous community. Despite multiple efforts and having been referred by other community leaders, this person was unwilling to be interviewed for cultural reasons: there is a particular hierarchical structure of the indigenous *cabildos* in the region, and speaking out as a representative for the *cabildo* requires authorization from the indigenous leaders.

The objective of the semi-structured interviews was to establish a local context for subsequent data collection and research on a particular issue. The interviews with key informants, e.g., community leaders, provided information and insight about past and current issues and events, strengthened the focus and approach of other research methods (e.g., the participatory workshop), and forged a more robust professional rapport. In a few cases, the semi-structured interview was used to follow up on a particularly interesting or insightful informal interaction, where the participant could be interviewed in a more structured setting.

These interviews were based on five key discussion points, relating to the history of the community, the organizations within it, local livelihoods, agricultural practices, and perceptions about climate change; each section included a question related to the gendered aspects of that topic. The questions were designed as open-ended talking points that could be easily modified depending on the participants' roles within the community, and their willingness to respond. Prior to the interview a specific list of questions based on this framework was compiled to guide the conversation; however, the style of the interview allowed both the participants and researcher to transition into new topics.

The interview time and location was scheduled according to the convenience of the participants. Prior to the interview, written consent was obtained, and participants were given the opportunity to decline having the interview recorded. Each interview took approximately one hour.

4. Historical Timeline

Historical timelines are useful for understanding the important events, patterns and challenges experienced by the local community. This includes both "official" events, such as the creation of a farmer's association or the signing of a peace agreement, as well

as “unofficial,” more localized changes, such as a shift towards a certain type of crop production. Often this information is passed through generations in a form of oral storytelling. This exercise produces a written form of community history and allows multiple participants from different ages and genders to come together and identify those moments of significance.

Our team organized a small focus group discussion through the local partners, by inserting this activity amid other meetings scheduled on a Saturday for members of the community. During the activity we divided the participants into three different groups based on the *vereda* that they lived in. We helped to guide the first group discussion as an example for the rest of the participants, asking for and giving suggestions for the types of events that could be listed, such as village history, river and forest history, and the types of crops they grow. We then asked the remaining two groups to create their own timelines, and brought the three groups together to discuss any differences or similarities.

5. Seasonal Calendars and Production Systems Activity

A seasonal calendar offers the opportunity to understand and break down seasonal variations in activities of people in the community. We based our seasonal calendar activity on the model used by one of our local partners, Ecohábitas, during a workshop on climate change in the neighboring watershed of Palace on May 25, 2013.

During our main community workshop, we divided the participants into six groups: by male and female, and also by geographic location within the Cuenca (the lower, middle and upper regions). The groups consisted of anywhere from 2 – 10 participants, and a facilitator was assigned to guide the conversation and encourage the farmers to actively diagram the calendar. Earlier in the workshop, the farmers had listed the top three crops produced in each of the three regions. The small groups then indicated on the seasonal calendar the tasks required by each of these three crops (e.g., planting, fertilizing, harvesting, clearing the fields, etc.), and glued small cut outs of “men,” “women,” and “families,” to indicate who participated in each of the activities. The groups were then brought together to share their calendars and to discuss the activity.

6. Venn Diagram Activity

The Venn diagram exercise is used to map organizations and their institutional relationships within a community. I adapted this activity from the FAO's Gender and Climate Change Module 3 Field Research Tool Box. In this model, the exercise is used "to document the key local groups and institutions that are used by the target population or that are part of providing a specific service….it can be used to clarify linkages between different groups and institutions."

This activity was first implemented at the office of the FPCRP with the participation of 14 employees. There were two objectives: to practice doing the activity before the community workshop as a way to identify what worked and what could be improved; and secondly, to obtain the "institutional" perspective on the roles and interactions of the various local institutions that could be later compared to the "popular" perspective of the farmers. The activity began with the participants naming all of the different social organizations, institutions, programs, and informal groups that have influence in the region. Then the participants assigned a large, medium, or small circle to each organization depending on their level of influence within the Basin community. Gathered around a large table, the participants then created a Venn diagram to indicate the various interactions between the organizations, using overlap to represent a relationship. During the second Venn diagram activity with the farmers, we followed the same steps but used simpler language, and instead of having the farmers create a Venn diagram on a table, we used a large piece of paper that had been divided into quadrants, and asked the farmers where each circle should go in relation to each other, starting with the largest circles first. During this activity, the men and women were divided into separate groups, and came together at the end for discussion.

7. Perception of Gender Roles

This activity was based on the experience of our CIAT supervisor, Dr. Jennifer Twyman, who had implemented a similar activity during her work in Kenya on Gender and Climate Change. We conducted this activity during our main community workshop with the men and the women divided into separate groups. With feedback from our local partners, we compiled a list of 20 concepts related to agricultural production and community conservation in the region, such as "potato," "compost," and "milking." Participants were

given a red card to representative “female” and a blue card to represent “male,” and asked to hold up the first one that came to mind as we went through the list. We counted the proportion of each and marked it on the list in the front of the room, but held all discussion until the end. Some participants refused to choose and instead held up both cards. Afterwards we brought the men and women together and talked about the differences in the list. This method was useful in teasing out more stereotypical gender roles and prompting discussion among the participants, though the results are not to be interpreted as accurate depictions of the actual division of labor on the farms.

8. Means of Adaptation of Climate-Smart Strategies

This activity was created in conjunction with the director of FPCRP, as a means to evaluate the different practices that have been introduced into the region in recent years by the organization. Their goal was to identify the reasons why farmers continue to use some practices and stopped using others.

The participants were divided into separate groups for men and women. We started by giving the farmers the opportunity to make changes to the lists we had created, both for the organizational capacity list and the practices list. We then asked the farmers to evaluate each of the practices from 1-5, with 5 representing the best possible outcome from that practice and 1 being no beneficial outcome. Once they were rated, the group then chose the three adaptation measures most frequently used, and the three that are no longer used. For each of those six practices we discussed the benefits and inconveniences of each, prompting the farmers to share their perspective.

9. Problems / Limitations

The original design for this fieldwork project called for the use of multiple focus groups as a means to collect qualitative data from the community. However, given the high level of organizational activity, the limited free time of the farmers, and the large distances between their households, hosting focus group meetings was not feasible and quickly rejected by our host organizations. The survey approach allowed us to reach individual households in a way that was both familiar and convenient to the farmers.

Nonetheless, there are several limitations to the survey that was implemented, and hence we consider the process a "pilot survey." This was due to our field team's limited time to develop and test the questionnaire appropriately. Moreover, given the dynamics of the region, we were unable to select a random sample and instead focused on a purposive sample of the ASOCAMPO membership in the Río las Piedras Basin. These participants were selected by the President and other representatives of ASOCAMPO, based on their perceived willingness to participate in our survey. The ASOCAMPO representatives went through a list of members and designated the third that would be best to include in our project. Furthermore, although we almost reached our goal of surveying one-third of the ASOCAMPO membership, we fell well short of the 100 participant minimum credible size for cross-tabulation.

Despite attempts, the study was not able to conduct any activities with members of the local indigenous community. This was due in part to time restrictions, since making contact with indigenous leaders and representatives requires substantial time and effort, and even then it is not guaranteed that the indigenous community would be open to speaking with foreigners. Therefore, the data collected in this project is limited to *campesinos* who are members of ASOCAMPO and represents a significant bias in regional coverage, which is reflected particularly in issues regarding community history and culture, *campesino* identity, participation in local organizations, environmental management, land tenure, and certain agricultural practices (e.g., slash and burn). To educate myself of how the indigenous might differ from *campesinos*, I did significant research on the history and dynamics of the indigenous population, and attended the 14th annual *Congreso del Consejo Regional Indigena del Cauca*.

RESULTS and ANALYSIS

Data Analysis

Data collected through the semi-structured farm interviews was compiled and coded, and responses were analyzed using primarily a quantitative approach. Although this data is not representative of the region given the small sample size and (purposive) discriminate selection process, quantitative analysis is useful to identify trends and patterns among the

farmers interviewed. Data entry and analysis was conducted using the statistical software package StataSE 13, and the construction of descriptive statistics with Microsoft Excel.

All stakeholders and participants in the pilot survey were affiliated with ASOCAMPO, the *campesino* farmers' association. For this reason, all analyses and subsequent interpretations of the results should be treated as representing a case study of the members of this farmers' organization. The institutional foundations created through ASOCAMPO – and other local organizations – shape the action arena in which decision-making about individual farms and shared natural resources are made by the farmers.

We carried out interviews in twenty-seven households in the Río las Piedras watershed region. For eight of those households, both the male and female head of household participated in the survey separately, for a total of 35 participants – sixteen men and nineteen women. In terms of household demographics and other general information, the unit of analysis is the household (n=27). For other variables – including productive activities, access to resources, perceptions about climate change, and the adoption of climate-adaptation practices – the unit of analysis is the individual (n=35). Household structure is also taken into account: of the 35 participants, 26 are married, 4 are unpartnered females, and 5 are unpartnered males. Certain data (e.g., decision-making) are broken down by household structure, so as to compare unpartnered versus partnered men and women, and also to compare the responses from the intra-household surveys.

Agriculture in the Rio las Piedras Watershed

Agriculture practiced by the *campesino* community in the Río las Piedras watershed region is largely "semi-subsistence oriented." The majority of farmers interviewed sell their products on the market – or more often, to friends and neighbors – only when there is a surplus above household needs. The share of production sold varies by household, with some farmers reporting little or no sales, while others sell 40-50% of their farm production. Farming activities are carried out with little mechanization. While the both the farmers and other key stakeholders identified market access as the principle challenge, other constraints to production include limited access to capital and land resources.

The majority of the families have lived in the Basin for multiple generations, and most maintain strong ties with extended family members. For the twenty-seven families who participated in the survey, the average household size is 4.3 members, ranging from 2 to 8 people. The age distribution among household members is somewhat skewed towards an older generation; although approximately a quarter of all households have children under the age of 6, more than a third of all household members across the 27 families are older than 50, and the average age of the survey respondents is 60 years old. Young adults ages 18-25 however, represent only 14% of all household members (**Figure 4**).

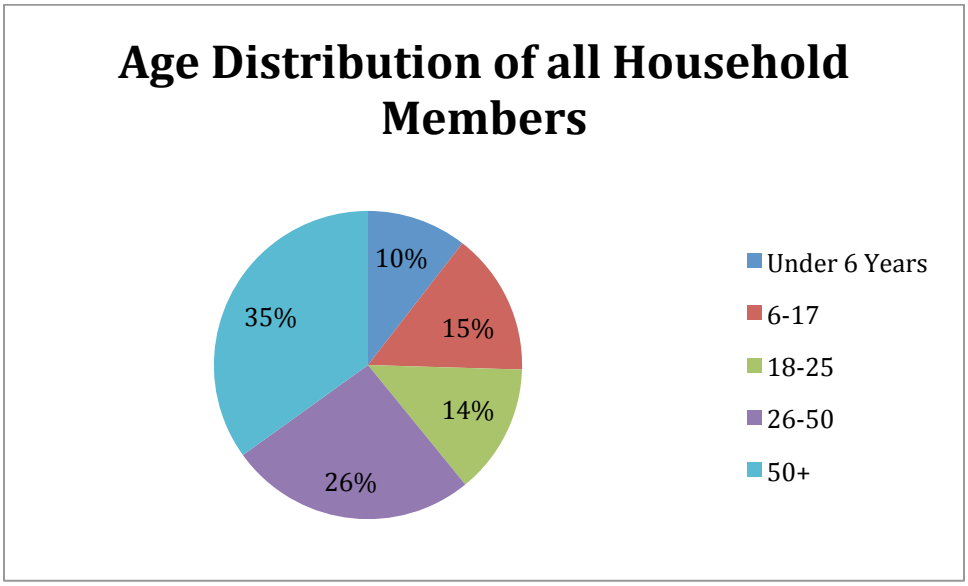

Figure 4: Age Distribution of all Family Members of the Survey Households (Source: Pilot Survey, 2013)

The age distribution suggests a small but growing shift in rural-urban migration, likely due to increased education among the younger generation. The average level of education of the respondents was 2.6 years (2^{nd} – 3^{rd} level in primary school), with the highest level of education reported being 6 years. However, among the younger generation, education is significantly higher, with an average of approximately 9 years of education as reported among those ages 18-25. In this group as well as the lower end of the 26-50 are several farmers who received technical training after secondary school through SENA or at the University of Cauca. Households with members pursuing higher education tended to be more active within the local organizations (e.g. serve as community representatives for ASOCAMPO), and implemented more CSA practices on

the farm. Multi-generational households are not uncommon, and even when adult children have moved out of the family home, they often maintain an important presence through ownership of assets (e.g., purchased livestock which is raised on the farm), visiting the house during critical sowing and harvest seasons when extra labor is needed, and by participating in certain key decision-making.

For the vast majority of the farmers interviewed, food security was not an issue. Household consumption needs were met mostly through agricultural production on the farm, often supplemented by certain market purchases such as flour, sugar and oil. Both male and female farmers reported that crop cultivation occurs throughout the year, with carefully considered crop rotation strategies, "*para que podamos comer*" ("so that we can eat"). Although the farms are productive, they are not highly monetized and rely predominantly on organic inputs from within the farm, with very few farmers using chemical fertilizers and pesticides or (genetically) improved seeds.

All households had at least once source of income. Although 83% of the households reported that they earned income by selling agricultural products, for many of the respondents a principle challenge was being able to generate sufficient cash income through sales. Other sources of income include working as a *jornalero* or wageworker on another farm (26% of 35 respondents), receiving a government pension (20% of respondents), and receiving economic assistance from children (20% of respondents). A small minority also reported income derived through ecotourism (3 respondents from 2 households) (See **Appendix 2, Table 1).**

Unpartnered men were almost twice as likely as unpartnered women to report income earned through the sale of agricultural products, and unlike the men, no unpartnered females received a government pension. For them, remittances and wage work were just as important as market sales. Income from market sales was more common among partnered couples; in particular, among the intra-household couples, this was the main source of income for all households, though one male respondent – unlike his wife – did not identify market sales as an income. In two of the eight cases where both the male and female in the couple were interviewed, the participants identified slightly different sources of income; for both cases, the female identified one source more than her husband, beyond the income sources they agreed upon.

Access to market was limited due to the physical remoteness of the zone, the lack of transportation infrastructure, and the inability of farmers to maintain a steady and consistent production of products. The average bus ride from the base of the Basin to the city of Popayán is about 45 minutes; depending on their location in the Basin, for many farmers this meant three or more hours of travel just to bring products to market. Depending on the yield of a certain product or crop (product includes milk/meat), many households will typically sell or exchange with neighbors or nearby family members; others reported selling products through family members who worked in the city and could sell to co-workers, or had established and long-term clientele. When the harvest was plentiful, these products were also sold at informal market stands along main roads and in some cases, in the main market in Popayán. Although the large downtown market offered superior prices, getting products there increased risk due to increased competition and the time and effort required to get there. As one female farmer stated in an email correspondence,

"When the harvest is abundant, what can't be sold within the community is sold in the market plaza at the same price, sometimes you gain, sometimes you lose."[4]

The lack of marketing channels is a critical concern of the farmers as well as the community stakeholders, who often identified improving access to market as a key objective for ASOCAMPO. The FPCRP organizes monthly "green" markets at the Municipal Aqueduct in Popayán, where farmers who are members of the *Custodios de Semillas* group can sell produce, eggs and milk. The group is part of a larger program funded by GIZ in the region*: Alertas AgroClimaticas Tempranas* (SAAT), an initiative implemented by FPCRP. The SAAT team trains local farmers to participate in climate and bio-indicator monitoring, and does strategic farm planning with local producers. They also offer workshops that cover relevant local topics including recent weather patterns and climate trends, integral pest management practices, organic fertilizer practices, advice on seed selection, and particularly, recommendations to commercialize products.

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[4] Spanish: *"Cuando la cosecha es abundante lo que no se alcanza a vender [en la comunidad], se vende en la plaza de mercado a como este el precio, a veces se gana, a veces se pierde."*

However, even with institutional support, the low level of production on many farms means that getting products to (more formalized) markets often does not justify the time and effort required, a challenge that according to the interviews, impacts single female farmers, many of whom stated that they did not feel comfortable or secure leaving their property for extended periods of time. Some of the farmers were able to sell items such as milk and cheese through an intermediary who visited the communities and resold the products at higher prices in more urban areas. These market channels however, are increasingly disrupted. This is in part due to the rising formalization of the dairy sector – meaning more strict conditions to legally sell these products – as well as the effects of free trade agreements with the United States and Europe, whose heavily subsidized crops and animal products enter and disrupt Colombian markets. In an interview with the Gentíl Armando Ortega, the president of Asprolgán, the regional livestock association, he cited the lack of markets and increased regulation as the main challenges for farmers in the region, and emphasized the disruptive effect that the recently re-ratified free trade agreement and an influx of imported goods have had on the local economy.

Productive Activities

Farm Management and Type

Among the households interviewed for this study, the average property size was 8.3 hectares. In Colombia, Forero and Galeano (2010) estimated the number of smallholders per Department using the 2004 National Agricultural Survey, dividing smallholder farms into those at 10 ha or less and those between 10 and 20 ha. In twelve of the 22 Departments reported, smallholdings of less than 10 hectares comprise 50% or more of the total number of farms; in Cauca, these account for 86% of all farms in the department.

The Río las Piedras Basin is situated at around 1750 masl, and is characterized by a semi-arid tropical climate, with two wet seasons (March-May and September-November) and two dry seasons (January-February and June-July). Typical of hillside soils in the region, soils here are of low intrinsic quality (shallow, phosphorus deficient, acid, rocky, etc.) [and] require careful management and active soil-building efforts to maintain or increase yields (Scherr, 2000; Ayarza et al., 2007). Crop residue management is common and varied, most often for mulch to protect the surface of the soil, to reduce evaporation, control weeds, and recycle nutrients (McDowell & Hildebrand, 1980).

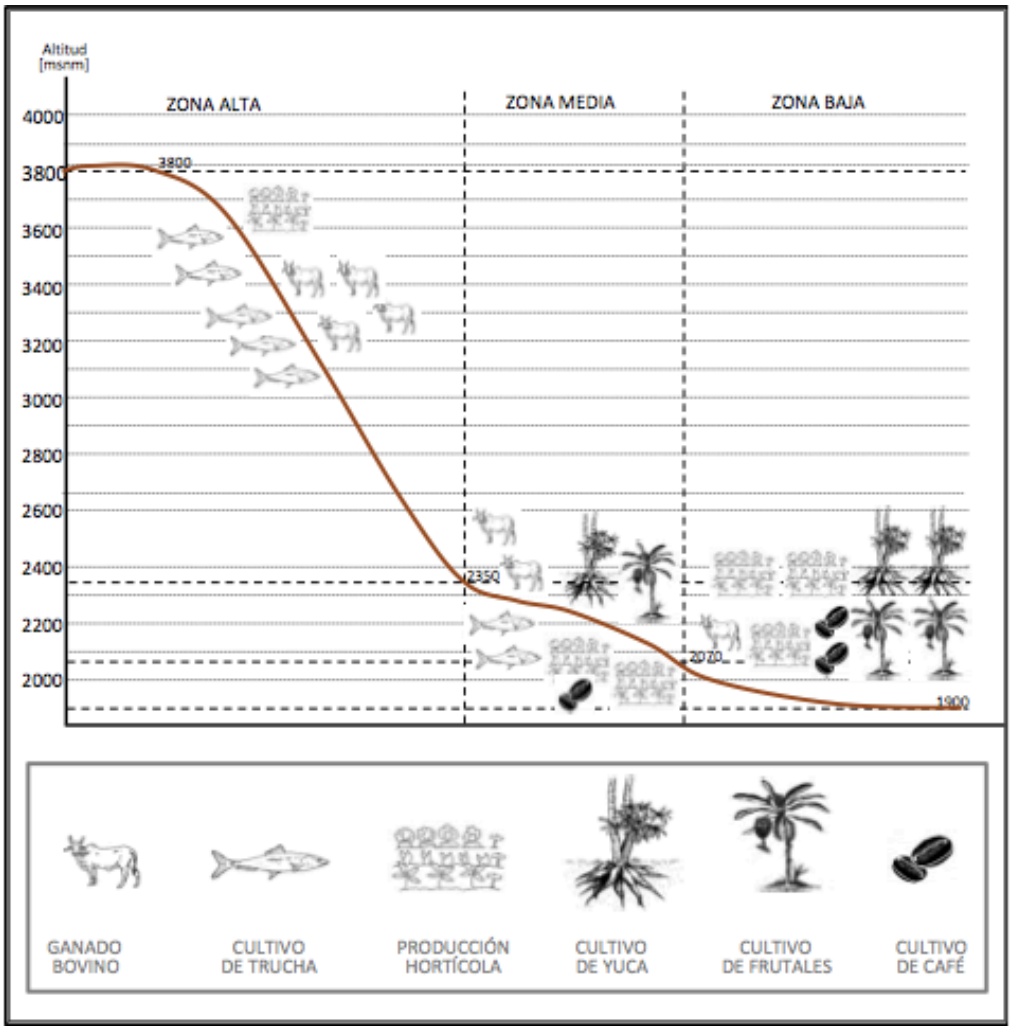

Figure 5: Altitudinal Profile of the Productive Systems in the Río las Piedras Watershed. Source: Mariola Acosta Frances (2013)

Precipitation and temperature vary according to the differences in altitude and orography within the watershed, conditions which in turn determine the agricultural systems within each community. The high part of the watershed (2350-3800 masl) is characterized primarily by extensive cattle and trout cultivation; many crops such as yuca, plantain, citrus and some vegetables are unable to grow here. In the lower zone of the watershed (1900-2070 masl), properties tend to be smaller and closer together, and there is less trout and livestock; however, the climate conditions are favorable for the cultivation of fruit, coffee and many vegetables. The middle zone of the region (2070-2350 masl) represents a transition between these two zones. **Figure 5** illustrates these differences.

Typical of family farming systems, the smallholder farms in the Basin region can be classified as extensive agricultural systems, in that mechanization is largely absent, fertility inputs are few and most often derived from available farm products (e.g. manures, compost), and there is a high level of crop diversity - common among subsistence and semi-subsistence farmers. The main farming activities and products of these households are summarized in **Table 1**.

Table 1: Overview of Land Use among Interviewed Households in the Río las Piedras Basin (Source: Author)

Category	Land Use	Main Products	Location
Home garden	Vegetables	Spinach, chard, lettuce, carrots, cilantro, tomato, onion, cabbage;	Near the home
	Herbs	Rosemary, rue, thyme; aromatics and medicinals;	Near the home
	Fruits	Blackberries, strawberries, apples, citrus, tree tomato, plantains, lulo, uchuva, and peach.	Dispersed intermittently through the property, often concentrated near the home gardens or larger crops.
Larger cropping systems	Tubers	Different varieties of potatoes, corn, beans and peas.	Large plot(s) separated from the household
	Grasses	White corn (human consumption); forages for cattle	Large plot(s) separated from the household
Large Livestock	Pasture	Male calves – "*terneros*" (typically raised and then sold)	Large pasture further away from house
		Cows (milk, cheese)	
Small Livestock	Fenced in yards; sheds and lean-tos with cages; trout ponds	Chickens and cocks, guinea pigs, rabbits, geese, ducks (and in one case, a pig) → meat, eggs	Near the house / home garden
		Irrigated farming ponds using trench systems from water sources along hillsides.	Near the house / home garden
Protected forest	No agricultural activity; two farms used this space for EcoTourism	Income through Tourism; Tax reduction on protected land	Large forested land further away from the household

The farms of this region are highly diverse and typically consist of anywhere from ten to thirty different crop species, often with multiple varieties of certain crops. The main crops include beans, corn, and potatoes, with various vegetable crops grown in multiple

and relay cropping systems. Melons and other gourds are used as cover crops, and not typically consumed by the household. Each farm tends to have several different species of animals, including milk cows, hens, guinea pigs, rabbits, and trout. The presence of milk cows and calves however, depends on having sufficient land available for pasture. Ownership of cattle often serve as a type of "savings" system for farmers unable to access credit and savings account through regional banks. One of the effects of increased climate variability in the region is a rise in animal sickness during the rainy, winter months, a trend that has left many farmers more vulnerable.

The distinct agricultural characteristics of each zone determine the respective activities performed by men and women on the farm. The seasonal calendar activity carried out with male and female participants from each of the three zones sought to collect information about how labor time is distributed throughout the year. The breakdown of these reported activities is found in **Appendix 1, List 2**. During this activity, participants were divided into two groups by sex, and with a facilitator diagrammed a seasonal calendar based on the four crops they considered most important, and indicating the agricultural activities for each (e.g. planting, fertilizing, harvesting, clearing the fields, etc.), as well as two activities related to livestock. Both the lower and middle zones designated cattle and chicken as the most important livestock activities, while the participants from the high zone selected cattle and trout. Similarly, participants from the higher and middle parts identified vegetables, potatoes, corn and beans as the primary agricultural activities, while participants from the lower region selected coffee, yucca, beans and corn.

Participants diagramed the timeframe for each activity and marked the household member(s) typically associated with that activity (male, female, couple, or family). Although many of the differences recorded between the men and women's calendars can potentially be attributed to inconsistent data collection and/or facilitation methods, the main takeaways from this activity are that while men across all zones tend to be responsible for large livestock (i.e., cattle), they also tend to credit themselves with more of the farm work than the women. Women, in contrast, associate those same activities as being carried out by the entire family (see **Appendix 1, List 2)**.

Division of Labor

In most of the households in the Basin, both the male and female heads of household work on the farm. In a few cases one or both members (or an adult child) also work 2 to 3 days as a "jornalero" or day laborer off of the farm, typically for large-scale commercial operations during high-demand periods (e.g. clearing land to prepare for planting, harvesting crops). This was more common for males, and only one of the interviewed, partnered women reported to work as a "jornalera." The dynamics of agricultural and domestic labor among these households was varied and complimentary, and was often spread across multiple family members, including adult children and siblings. Many participants would describe certain activities as "trabajo de familia," or work of the family. In this sense, either the entire activity was shared among the different members, or the individual components (e.g. feeding livestock, managing forages, milking cows and processing milk and cheese all being part of dairy production) were divided between household members who assumed complimentary roles. For other agricultural activities, male and female participants identified clear-cut responsibilities. This was reflected in questionnaire responses, as well as in the results of the activity implemented during a community workshop on the collective evaluation of gender perceptions, which prompted participants to associate certain crops and agricultural activities with men or women (see **Appendix 2, Tables 2, 3 & 4)**. Although this activity provided us with insight as to the gendered perceptions regarding certain agricultural concepts, these responses reflect regional gender stereotypes rather than actual gender division of labor on the farms.

In **Figures 6 and 7** certain associations of a particular farming concept with male or female roles are consistent among both men and women. For example, both men and women are generally in agreement that selling to market, vegetables, small livestock, seed recuperation and cheese are associated with women's work on the farm; cabuya production and processing (a plant that produces a natural fiber) is associated with men's work. During the Perceptions of Gender Roles activity (**Appendix 2, Tables 2, 3 & 4**), both men and women stated that these activities are more commonly associated with a woman because she spends more time in or close to the house, and she typically is responsible for buying and selling products to market.

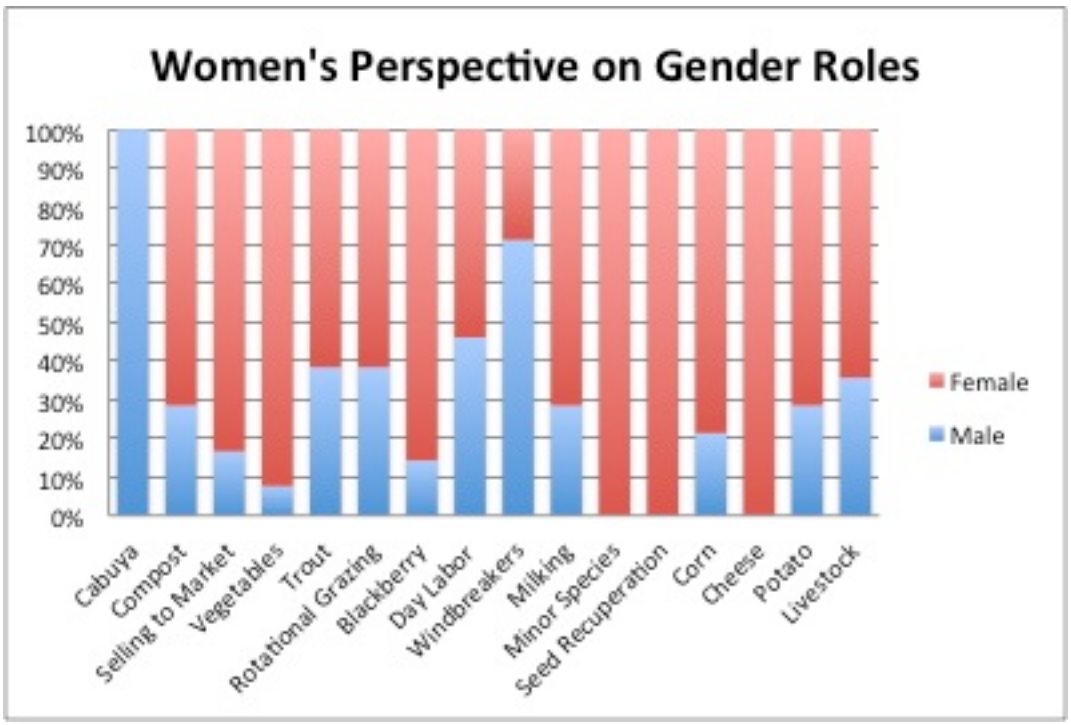

Figure 6: Results from Perceptions of Gender Roles Activity: Women's Perspective (Source: Participatory, Community Workshop 7/18/2013)

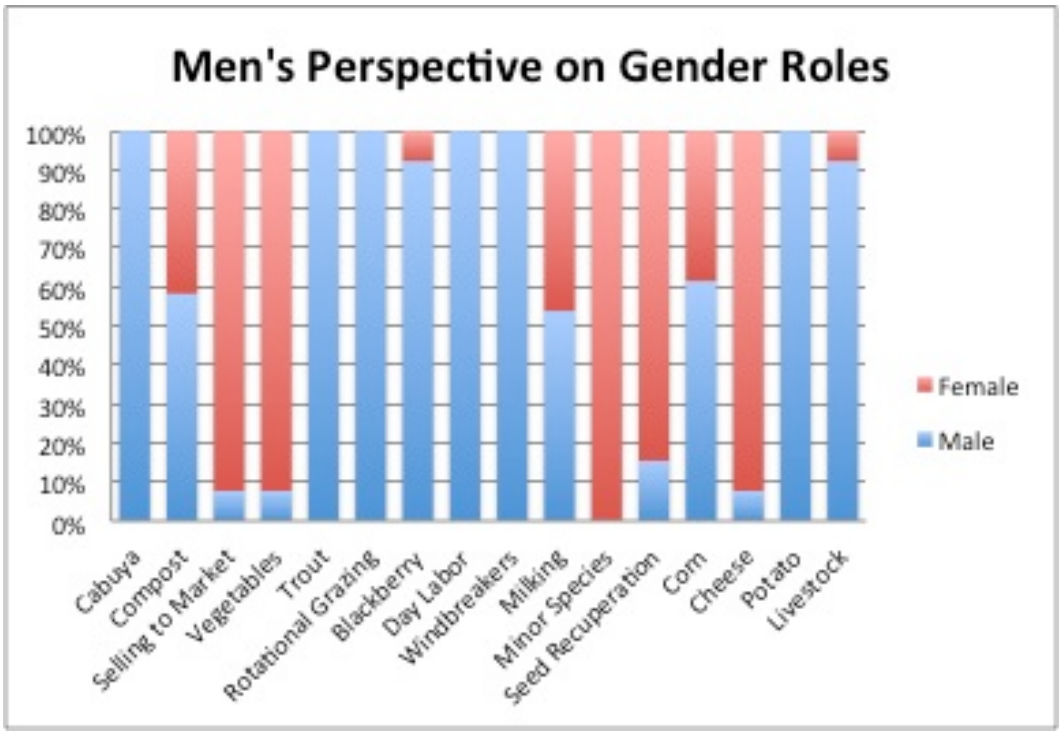

Figure 7: Results from Perceptions of Gender Roles Activity: Men's Perspective (Source: Participatory, Community Workshop 7/18/2013)

This is consistent with informal conversations and many survey responses, where the women were identified as responsible for making decisions about what food to purchase and prepare, as well as the decision about how to use the income earned from the sale of products. Otherwise, in this same activity, men identified themselves as being solely or almost solely responsible for trout, rotational grazing, potatoes, and livestock, while the women gave a much more mixed response as to which gender was associated with these concepts. The structure of this activity can compel participants to resort to gender stereotypes in describing work and concepts related to the farm, and a few participants from both the male and female group would select both male and female for certain concepts. However, this information is valuable in that it provides context for more "typical" gender roles, and opens up conversation for the participants to explain the more nuanced reasons why these associations exist.

For many of the productive activities on the farm, the male and female household members have distinct roles at different stages of cultivation. For example, for cheese production, the man was often responsible for tending to the cattle and maintaining the pastureland, while the woman milked the cow, processed the cheese and sold it to market. This finding was reiterated during the seasonal calendar activity, where participants identified along a timeline the different activities associated with each primary crop, and who was responsible for that activity. Furthermore, according to responses from both the questionnaire and the seasonal calendar activities, men typically ascribe to themselves more individual responsibility for the farm, while women are more likely to identify themselves or the entire family as contributing to a certain task.

Another concept presented for discussion during the Perceptions of Gender Roles activity was "areas of conservation." This produced interesting results in that all members of both the male and female groups independently reported that areas of conservation fell into the domain of both men and women equally. Men and women both expressed that people in the region have a high level of awareness about the importance of conservation and reforestation. They pointed out that reforestation tasks were performed communally, and included the participation of men, women, children and the elderly. The coordinator of the environmental division of the Popayán Aqueduct also noted that reforestation and the creation of areas of conservation have been the product of a process of training and

raising awareness that is aimed at the whole family. Composting was another interesting case because it is a clear example of how gender roles and the division of tasks can influence the implementation and maintenance of CSA practices. In discussions it was found that although men are typically responsible for installing the bio-factory and making repairs when needed, women perform most of the compost work, being the ones who spend more time at home and are responsible for using the household food waste for compost.

It is important to note that the division of labor in agriculture can vary widely depending on the type of households and its characteristics, so the generalizations made in this section should be taken as such. Furthermore, for a more complete analysis of the division of labor, the study should have included an analysis of days and hours dedicated to each activity by women and men throughout the year. However, due to time constraints, such was not possible to include as part of this research. Nonetheless, this study finds that the division of labor among the surveyed households appears to be complimentary among men and women. There is a significant gender component to many of the household responsibilities and farm products, though this does not appear to cause any challenge or concern to the respondents. The differences in responses among men and women however, are relevant to understanding how a new practice might be used on the farm and by whom. The gendered division of labor contextualizes the climate-smart agriculture (CSA) use and preferences, described below.

Distribution of Assets

Land Ownership

There is a long and contentious history regarding rural land ownership in Colombia. The current structure of land ownership is shaped by historical factors, the rigidity of land markets, incentives for the accumulation of unproductive land, and past and current armed conflict (Ibáñez & Muñoz, 2011). The high concentration of land ownership dates back to state distribution policies implemented during colonization, which incentivized large landowners to purchase property in isolated territories (ibid). By the 1920s however, this land became more valuable and agricultural production had expanded greatly, leading to the expulsion of the earlier, poor settlers and creating conflict. In

response, the State passed Law 200 in 1936, which called for clear land titles, stricter restrictions for the expulsion of tenants, the productive use of land, and a program of agrarian reform (ibid). Yet the Law's poor design prompted tenants to challenge these land processes against their landlords, who in return intensified the massive expulsion of the settlers (ibid).

By 1961, then President Carlos Lleras enacted Law 135, with the objective to carry out aggressive land reformation. This Law ultimately was a failure, in that it never resulted in a true redistribution of property in Colombia (ibid). Much of the redistributed land was of poor quality and in isolated areas, and the reform was accompanied by public policies that favored large producers and promoted the modernization of their properties. By the early 1970s, large landowners had successfully pressured the government into signing the *Chicoral Pact* that effectively ended the land reform (ibid). In the mid-90s, the government designed a new agrarian reform through the enactment of Law 160, based on market mechanisms for the transfer of land, with one of the goals being to restore land to farmers who had been displaced by conflict. Although the goal of this reform was to redistribute 1 million hectares, only about 560,000 ha have been achieved; furthermore, most of the redistribution was based in a four, centralized departments (ibid).

Today, 1.1% of landowners control more than 55% of exploitable land (Rocha and Gómez, 2007). According to the official statistics of the Geographic Institute Agustín Codazzi (IGAC), land concentration in Colombia is among the highest in the world, with a Gini coefficient of 0.8417 in 2009 (IGAC, 2012). The Gini coefficient measures the inequality among values of a frequency distribution, wherein a coefficient of zero represents perfect equality, and a coefficient of one expresses maximal inequality among values (e.g. one person holds all of the wealth). IGAC also designates the Department of Cauca as having the second most unequal land distribution in the country with a Gini coefficient of 0.838. According to the Land Titling Office of Popayán, the index for the Río las Piedras Basin is below the provincial average, with a Gini coefficient of 0.7818. However, land tenure in the Río las Piedras basin reflects a different situation: 90% of land is held by 10% of the population (ibid).

Private ownership is the most common form of tenure among *campesinos* in the Río las Piedras basin (CRC, 2006). According to an IGAC analysis, 43% of the land in the basin is held by private, non-commercial owners, while the remaining 57% belongs to the State, the Quintana and Puracé indigenous reservations, or private commercial companies. Within the non-commercial private poverty in the region, 61% of the properties are registered in the name of men, 21% in women's names, 8% as joint marital property, and the remaining 11% is non-marital joint property (**Figure 8**). This data is consistent with other figures for Latin America, where the distribution of land ownership is largely unequal and women rarely represent more than a quarter of landowners (Deere & León, 2003). Land in the region has been undergoing a process of fragmentation due to successive processes of inheritance: properties are broken into smaller and smaller plots, resulting in a process that leads to what is referred to as "pancoger" or food plots. Smallholder properties are the most common among the private non-commercial properties visited in the Río las Piedras Basin, with an average size of 8.3 ha; yet properties of non-marital joint ownership are in fact the largest in the region with an average land area of 12.3 ha – often properties owned between siblings. This is followed by land in the name of a man (8.6 ha), and land under joint marital ownership (7.4 ha). The average farm size owned by women is 6.4 ha (IGAC, 2012).

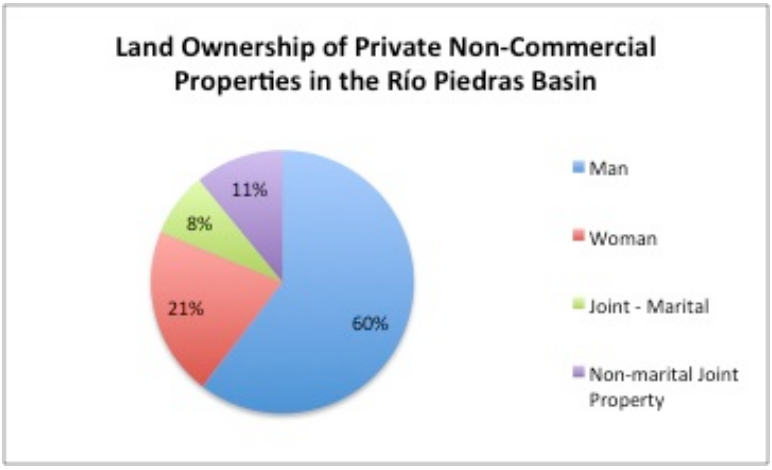

Figure 8: Distribution of Private, Non-Commercial Land Ownership in the Rio las Piedras Basin (IGAC, 2012)

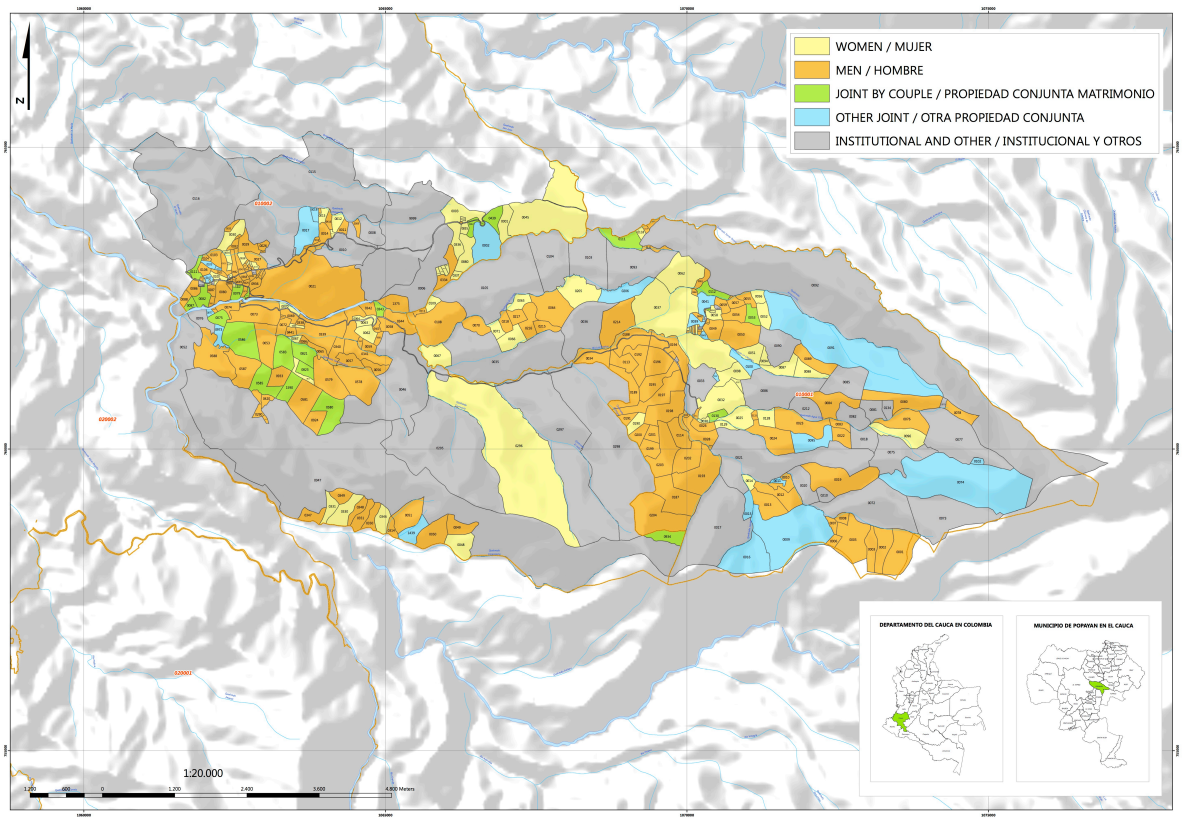

Figure 9: Map of the Distribution of Land Tenure in the Río las Piedras Basin (Source: Data from IGAC 2012; Map designed by Acosta, Devereux & Twyman in collaboration with the Popayán Land Titling Office, July 2013)

Resource Use

The pilot questionnaire also covered ownership of animals and other resources on the farm. Most of the households did not have a car or motorcycle, or any mechanized tools. This analysis therefore looks primarily at livestock ownership by household structure. Among the households interviewed, 22 (81%) have cattle. Among the five households that do not own cattle, four live in the lower zone where cattle ownership is not as common due to smaller property sizes. Responses as to ownership were coded as male, female, couple (joint), or family.

Unpartnered respondents – both male and female – either reported themselves or their entire family (i.e. adult children or siblings) as the owner. Among all *partnered* respondents, men were reported as owners approximately 37.5% of the time, while women were reported as owners 12.5% of the time, with couples reported at 33.3% and family at 16.6% (**Appendix 2, Tables 5 & 6**). Although 40% of all partnered women

identified their husband at the sole cattle owner, no married man named his wife as owner (**Figure 10**). The three men that chose joint ownership were part of the intra-household survey group, while among the partnered men interviewed alone, three chose the family but none chose joint. Similarly, only the partnered women interviewed alone self-identified as the cattle owner; with one exception, women in the intra-household survey group identified either her spouse or the couple as the cattle owner. This suggests that the dynamics of the survey method – i.e., whether or not the respondent's spouse was also interviewed – potentially affected the responses, so as to reflect a more equitable distribution of ownership. Another possibility is that the couples that were either able or willing to be interviewed separately are more likely to have an equal distribution of ownership than those partnered respondents interviewed alone. Among households where both the man and woman were interviewed, six of the couples were in agreement: two couples identified the man, three identified the couple, and one identified the entire family. As to the two couples that were in disagreement, in one case, the woman reported that cattle was owned by the couple, while the man stated that ownership was by the entire family; and in another, the man considered himself the sole owner while the woman thought ownership was by the entire family.

In the Río las Piedras Basin, cattle are an important source of income for many rural households through the sale of milk, cheese and calves. Many farmers saw calves as an investment and source of savings. When asked whether they had savings in a bank, several farmers responded that their cows represented all of their savings, and in times of economic necessity they were sold off to generate cash. That women are individual owners of this type of livestock in only 10% of all households – dropping to 7% among partnered households – potentially suggests an economic dependence on their husbands. While this might indicate that cattle ownership is inherently gendered in this region, another factor might be that women's responses are shaped more by the interview structure: only the married women who were interviewed *without* their husbands present named themselves as owners. The other married women named their husbands, the couple or the family as owner. Married men's responses however, do not seem to be affected by the presence of their wives.

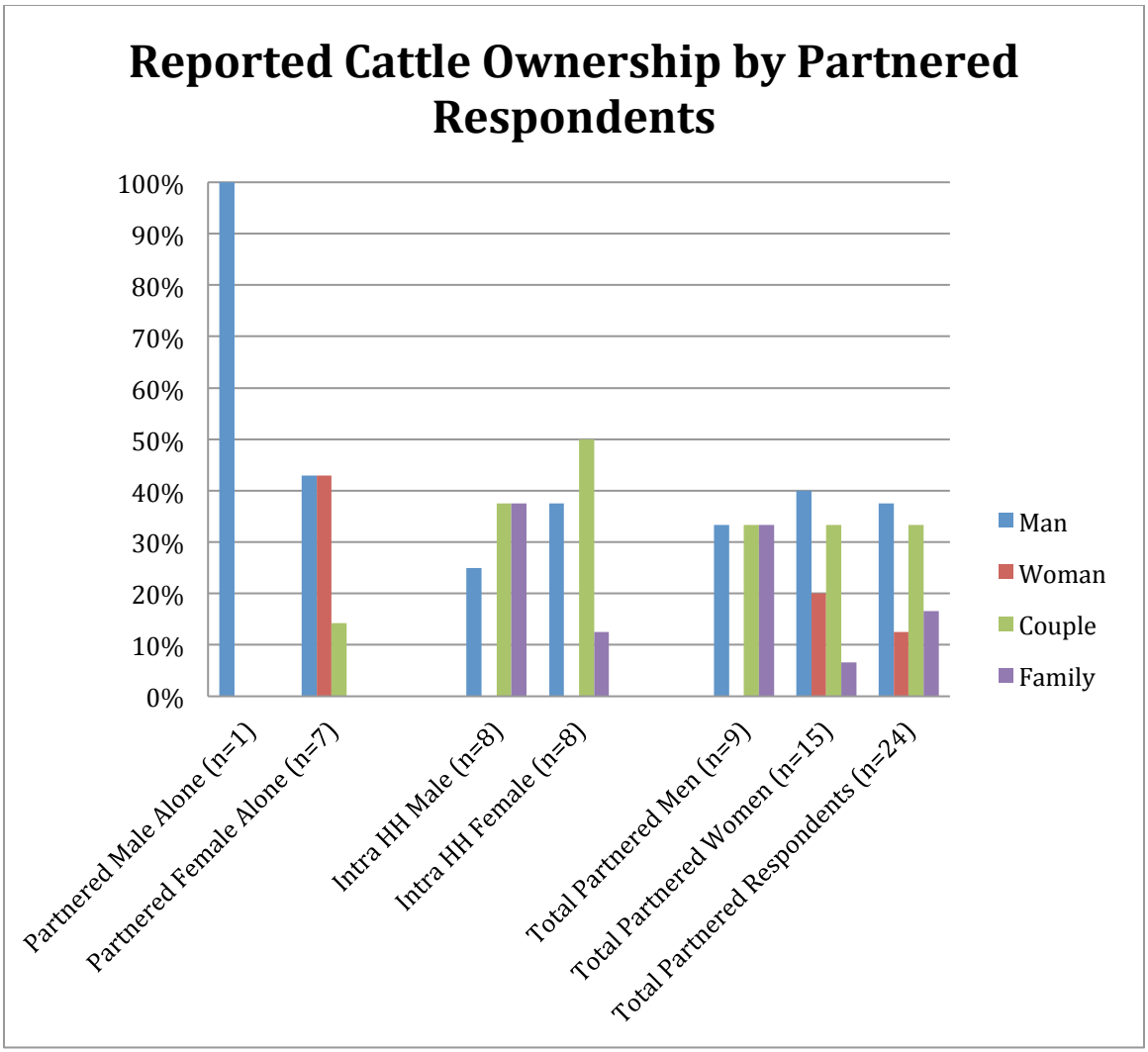

Figure 10: Reported Cattle Ownership by Partnered Respondents (Source: Pilot Survey, 2013)

Decision-Making

The dynamics of decision-making and whether men and women make decisions independently or in concert with their partner and/or other family members is a critical consideration for understanding patterns of ownership and resource use on the farm. This information also provides insight as to the rights and responsibilities associated with the ownership of these resources. During the survey, respondents were asked as to whom makes the majority of the general decisions for the household[5]. If needed, this was further explained as who is the principle decision-maker for the household. These responses

[5] Survey Question 1.2.4: "¿Quien toma la mayoría de las decisiones para el hogar? (Appendix 3)

were then coded as male household member, female household member, joint (couple), or family meaning three or more family members).

Similar to the cattle ownership, unpartnered men and women either designated themselves as the primary decision-maker or the entire family. The distribution of general household decision-making becomes more nuanced when considered specifically among the partnered farmers. This analysis distinguishes between the *partnered* respondents who participated in an intra-household survey, and the *partnered* respondents whose spouse was not interviewed. Beyond the eight men and eight women who were interviewed separately during an intra-household survey, there were three men and seven women interviewed alone but who had a partner who lived in the household. This data set therefore is too small to have statistical significance, yet certain response patterns between men and women are noted (**Appendix 2, Tables 7 & 8**).

Generally speaking, men are more likely than women to identify themselves as the primary decision maker for the household, and while one partnered woman named her husband, no man named his wife (**Figure 11)**. Interestingly, women are more likely to report that the marital couple makes decisions together, while men are more likely to report that general household decisions are made as a family. Given that both of these respondent groups have adult children living in the household, these patterns are likely a cultural phenomenon or simply the personal preferences of these particular respondents.

The three, partnered men who were interviewed alone reported either themselves or the couple as the primary decision-maker, while among the seven partnered women interviewed alone, over half designated the couple and the rest reported themselves or the family. Among the eight households where both husband and wife were interviewed, there is slightly more variation in responses and the rate of self-reporting drops for both men and women. Half of these couples were in agreement on the decision-making processes within the household, and reported that decisions were made either by the husband or the couple together. Among the other four households, two of the couples reported family and joint decision-making (women reporting the couple, men reporting the family); for the other two households, in one the woman identified herself as the principle decision-maker and the man, the family; and in the other, the man identified himself as the decision-maker and the woman reported joint decision-making.

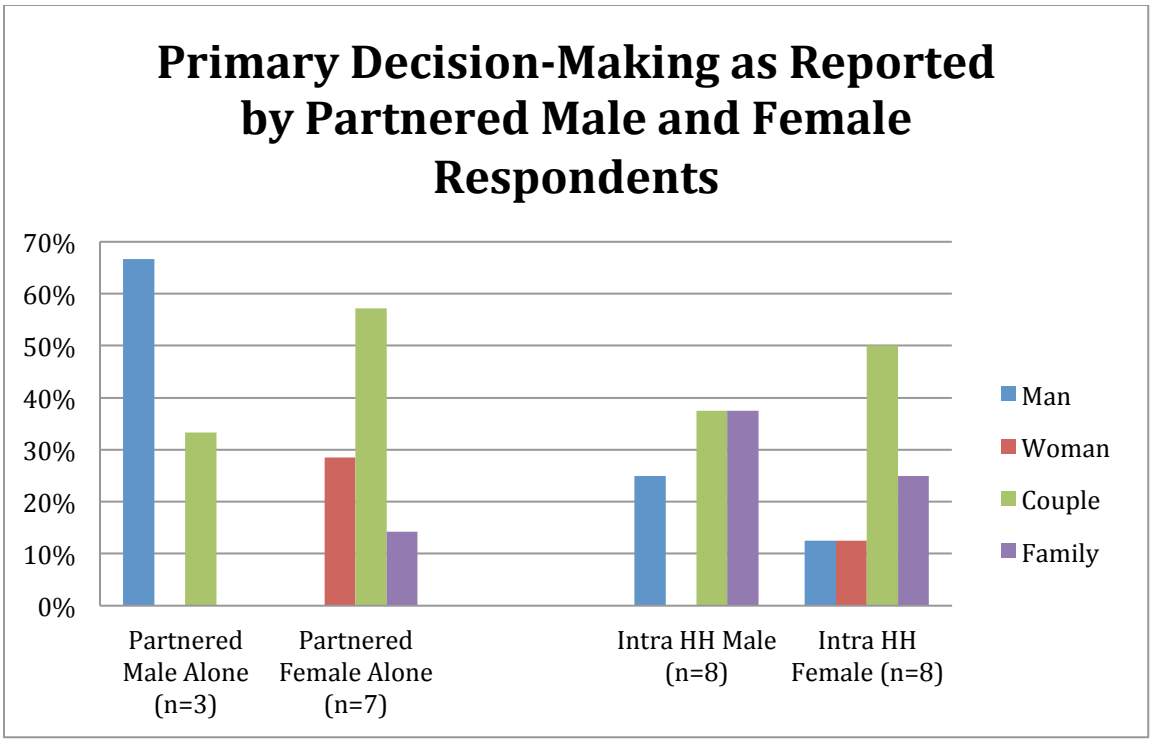

Figure 11: Primary Decision-Making as Reported by Partnered Male and Female Respondents, including Intra-Household Participants (n=26)

Therefore, although there is a gender bias, both in reporting and the predominance of men being considered the decision-makers, for many of the families interviewed making household decisions was a collective matter. The dynamics of the intra-household survey method also potentially contributed to these findings, as respondents might have been influenced by the fact that their partner was also being interviewed.

These findings however, differ somewhat from responses about decisions made regarding specific activities. Although this survey question worked better with some respondents than with others, and therefore offers no significant insight regarding household structure, one key finding emerges. After the respondent chose four products they considered most important for the home (two products representing household consumption, and two products intended for sale), they were then asked who in the household made the decision regarding: 1) planting the crop; 2) the maintenance of the crop (e.g., fertilization); 3) crop harvesting; 4) animal nutrition; 5) final use of the product (whether for sale or consumption); and 6) the use of the income earned from the sale (**Appendix 3, Survey Question 5.2**). For the first four activities, decision-making is

fairly evenly distributed between the man and the woman. However, in terms of the final use of the product and the use of the income, women are in fact more likely to make the decision (45.1% v. 21%, and 41.2% v. 15.1%, respectively). This was reiterated during informal conversations with various farmers in the region; as stated by one male farmer from the upper zone village of Quintana:

> *"She is the one who knows the needs of the home. For example, when I need boots I ask her and she tells me whether there is money available or not, depending on other household needs."*[6]

All factors considered, the internal dynamics of the household are complex, and decision-making processes depend not only on the particular issue being decided but also other socio-economic and cultural factors. The complete picture of these processes cannot be fully investigated here, and further research is needed for a more nuanced understanding of factors that influence the decision-making processes.

In terms of organizational affiliation, almost all respondents – men and women – stated that it was either their individual decision to join a certain group, or that they made that decision together with their partner. Some farmers, particularly those who were older in age and had adult children, mentioned that they had joined an organization upon the recommendation of their children. When asked who made the decision to join ASOCAMPO, one woman responded that her niece had in fact signed her up. Two women responded that they decided to join the organizations because of their husbands: of these women, one reported that her husband made the majority of the household decisions, while the other identified herself as the principal decision-maker.

Access to News and Information

The *campesino* farmers in this region are characterized for a particularly high level of social connection and organization. Over the summer our team observed that many farmers attended workshops, meetings or other group activities on average about twice a week. Many of these events were coordinated through ASOCAMPO or FPCRP; however others included those of Asprolgán, of the Community Action Board (*Junta de Acción Comunal*), *mingas* or communal workdays that brought members of the community

[6] Spanish: "Ella es la que sabe las necesidades del hogar. Por ejemplo cuando necesito unas botas le pregunto y ella me dice si hay dinero disponible o no, dependiendo de las otras necesidades del hogar".

together to collaborate on large-scale reforestation efforts. Graduate students from the University of Cauca and SENA (National Service of Learning, a technical school) also hosted a series of *capacitaciones* or empowerment workshops on "Servicios Ecosistémicos" (EcoSystem Services) that covered environmental conservation and climate change. Furthermore, at the time of the project, the FPCRP was implementing a project funded by the German Cooperation Agency (GIZ): "Project to establish a participatory, agro-climate early warning system with the organizations and *campesino* and indigenous families of the Upper Cauca River."[7] See **Appendix 1, List 3** for full list of local stakeholders.

Typically at these events only one of the two main members of a household attended, though there were a few households where the husband, wife and an adult child all attended together. Many of the farmers reported during informal conversations that the were concerned about leaving the house alone in the event of theft – a fear expressed more often by women. Among female-headed households, this fear was particularly strong since they lived without a man in the household, and were reluctant to leave the property to attend meetings. Furthermore, according both formal and informal conversations with some of the events' organizers, the man in the couple households is more likely to attend because "*workshops normally take place in the morning and the woman usually stays at home looking after the children and doing other household chores, and making lunch."*[8]

Institutional factors and the dynamics of the outreach efforts are also relevant. On numerous occasions, invitations to these events were not explicitly extended to both heads in coupled households, likely contributing to the unequal proportion of men observed at the community events and workshops we attended. Although our field team attended multiple events, including an Empowerment Workshop hosted by Ecohábitas in the neighboring Palacé basin region, as well as a Venn Diagram activity we hosted at the FPCRP office with the employees, attendance by gender is analyzed by looking

[7] Spanish: "Proyecto de establecimiento de un sistema de alertas agroclimáticas tempranas participativas con organizaciones y familias de custodios indígenas y campesinos de la cuenca alta del río Cauca."

[8] Spanish: *"Normalmente los talleres se realizan por la mañana y la mujer por lo general se queda en casa cuidando de los niños y haciendo almuerzo y demás oficios domésticos."*

specifically at local events that were populated by the community we worked with. By noting the number of male and female attendees at each of these five events, it was found that on average, the attendance of men was 20.6% higher than that of women (**Appendix 2, Table 5**). During informal conversations some female farmers commented that if their husbands attended the meetings, afterwards he would fill her in on the information and provided any news. For some women this was expressed as a relief; the numerous weekly events represented a time drain for many farmers we met, who often lost a day or two of labor per week to attend these workshops. Having a partner who can go and bring back important information was considered a benefit by some of the female farmers we spoke to. Nonetheless, in the situation wherein only one member of the couple attends agricultural extension meetings, information provided during these meetings is then filtered through that person who relays what he/she considers to be important – not necessarily reflecting the interests and priorities of the other partner. Some degree of information loss inevitably occurs to the person who was unable to attend.

Furthermore, in terms of those female farmers who do attend a meeting or workshop, their participation is typically less active than that of men, and many remain silent for the duration of the event. There is a clear male dominance in the discourse in all events, though women's participation improved significantly when men and women were separated into different groups. This phenomenon was corroborated by the coordinator of the FPCRP, who stated that this was mainly due to cultural factors:
"Women sometimes speak very little. It is a cultural factor: He is the man of the house, the head of the household."[9]

Nonetheless, although rural women in the region have lower attendance rates and may seem to be less involved in social processes, during the Venn Diagram exercise they mentioned more groups and institutions than men (**Figure 13**). That they assigned a large circle to the ASOCAMPO, the Mairie, the Aqueduct of Popayán and the FPCRP highlights the relative influence of these institutions in the region – a finding that is reinforced by responses on how women came to learn about a particular climate

[9] Spanish: "*Las mujeres a veces hablan muy poco. Es un factor cultural: él es el hombre de la casa, el jefe del hogar".*

adaptation practice. While women tended to think of the existing institutional framework as vertical – that is, aware of the larger institutions that have possible influence on the region (e.g., National Park System) – men tended to have a wider, more horizontal scope of the institutional landscape, largely confined to a regional level but including such actors as the two indigenous communities. Furthermore, the male participants gave the groups that they named either medium or large circles, whereas for the women the smaller circles represented those larger, national organizations. This suggests that what men find important are those actors that they interact with on a regular basis, possibly through personal ties – such as a neighbor or an acquaintance from working as a *jornalero* – that are connected to these organizations. Women on the other hand, as elaborated in subsequent sections on perceptions about climate change and the adoption of climate-smart agriculture, are more dependent on institutional services and typically have smaller networks than men.

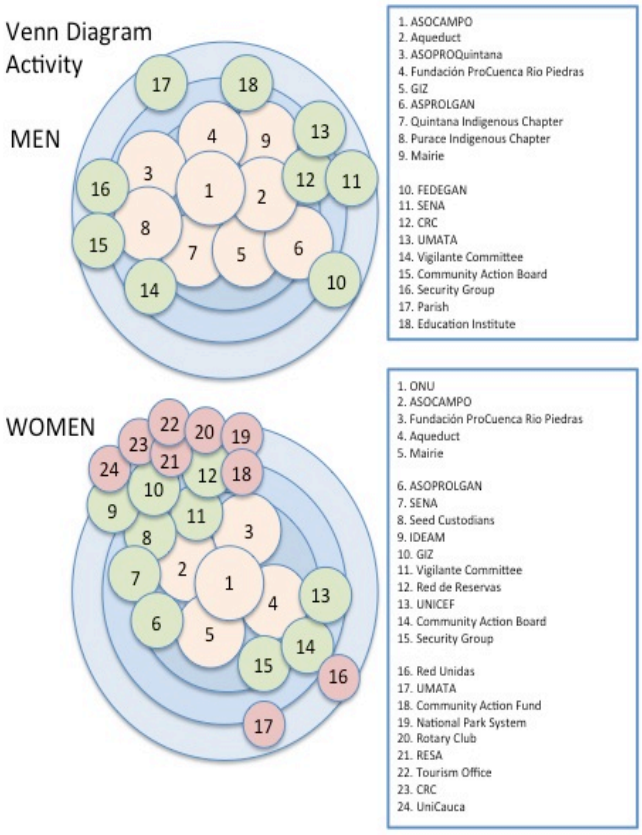

Figure 12: Venn Diagram Activity (FAO) in the Río las Piedras Basin (Source: Community Workshop on 7/18/2013)

Another consideration is the composition of membership within ASOCAMPO: of a total of 118 members, 44.9% are women and 55.1% are men. Many of the ASOCAMPO affiliates are family members: having couples and adult children within the same household be paying members of the organization is not uncommon. The ASOCAMPO management board and representative committees are also quite equal: of the 27 people who hold these positions, 14 are men (including the President) and 13 are women. Many of these representatives, particularly the women, are the adult children of local farmers who received technical training / education in Popayán and/or had served in Colombia's compulsory military service. The composition of the membership of ASOCAMPO contrasts strikingly with that of Asprolgán, the regional livestock association. Of 184 members, only 13.6% are women and 86.4% are men. This is likely related to the distribution of livestock ownership, where only 10% of women, and 43% of men, individually own cattle. Therefore, this suggests that even for cases where cattle is owned jointly (27%) or by the entire family (20%), men are more likely to be involved with services that provide information and resources about livestock management.

There are interesting differences in terms of preferences towards different sources of news – how men and women preferred to learn about community happenings, local news or even national events. During the survey, respondents were asked about the way in which they receive news, categorized into three main groups: 1) Personal networks, which included family, friends, neighbors and community leaders; 2) Communication and Information Technology (CIT), where we asked if the respondent had access to a radio, television, mobile phone or computer within the household; and 3) their affiliation and engagement with local institutional actors. Once they had identified the sources of news that they use, we followed by asking about their preferred source. We left the question open-ended and simply asked the respondents how they liked to receive news and information, i.e. which sources of news they relied on the most. Respondents were allowed to choose more than one, and this was the case for about half of the farmers. While 31% of women claimed a preference for news obtained through family members, only 5% of men responded that family members were their preferred source (**Figures 14 & 15**). Women typically rely much more on informal sources of news, such as adult

children or spouses, for information, while men preferred mass media, particularly television.

These findings hold true across partnered and unpartnered respondents, wherein men largely prefer CITs and women prefer personal, family-based networks (**Appendix 2, Tables 10 & 11**). Among the intra-household couples, five of the eight were in agreement over at least one preferred source of news, though only one couple had the same response. Only two men named more than one source, while five of the women named multiple preferred sources; again these choices were generally divided between CITs (men) and personal sources (women).

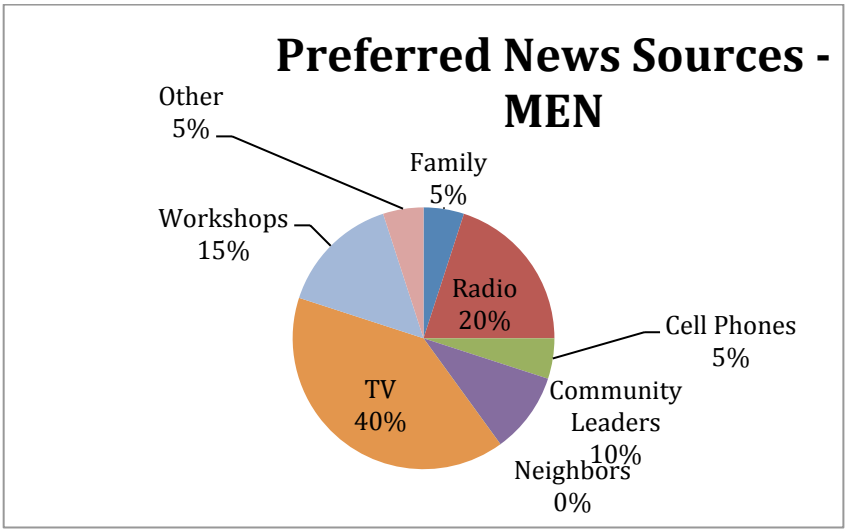

Figure 13: Preferred Sources of News, by men (n=16) (Source: Pilot Survey, 2013)

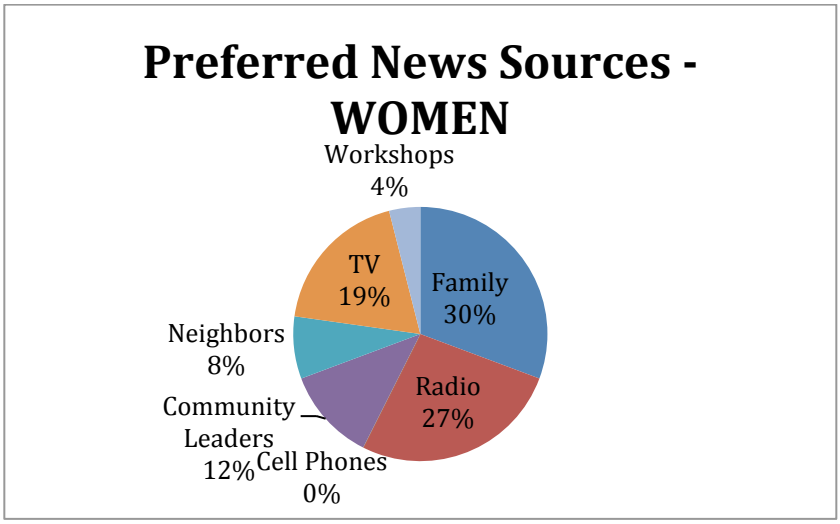

Figure 14: Preferred Sources of News, by women (n=19) (Source: Pilot Survey, 2013)

Perceptions about Climate Change

Perceptions about climate change and its effects on the region are potentially indicative of the farmers' ability and desire to adapt. The ASOCAMPO community is very familiar with the concept of climate change, and many report that they have felt its effects over the last ten years. In fact, among those interviewed, the vast majority of male (94.74%) and female (93.75%) respondents from the Río las Piedras Basin have heard of climate change. This high familiarity is largely due to the influence of a pilot program that took place in this region, that sought to develop a methodology for vulnerability and risk analyses associated with climate change – "Programa de Integración de Ecosistemas y Adaptación al Cambio Climático en el Macizo Colombiano[10]." The project was supported by the United Nations and locally managed by the FPRCP. From 2008 to 2011, multiple activities related to climate change and climate change adaptation were developed, and starting in 2011, was the "Proyecto de establecimiento de un sistema de alertas agroclimáticas tempranas participativas con organizaciones y familias de custodios indígenas y campesinos de la cuenca alta del río Cauca" (SAAT), funded by the German cooperation agency (GIZ).

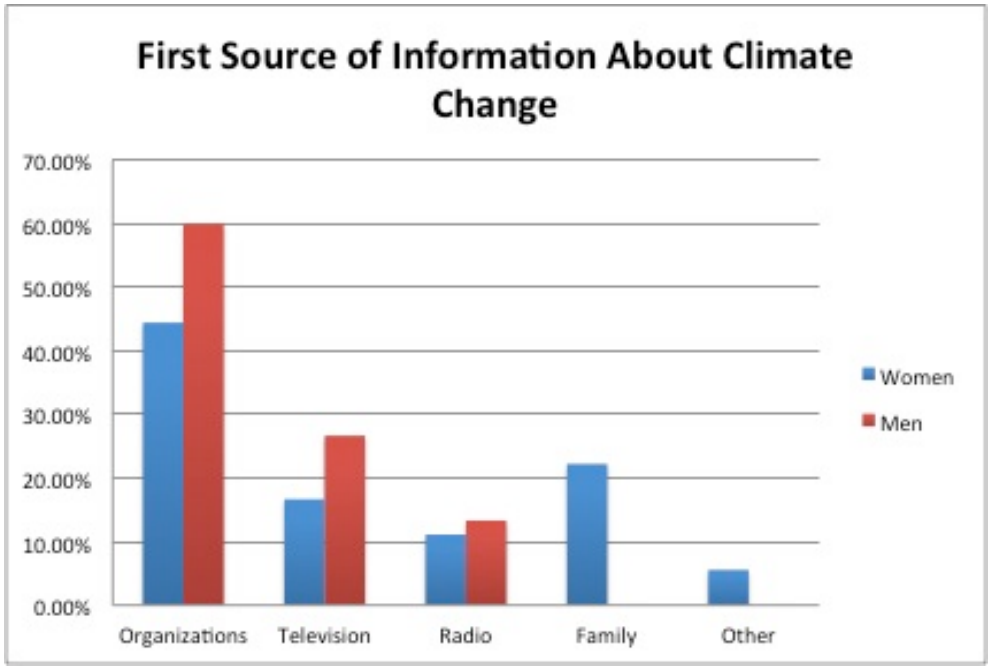

Figure 15: Male and Female Respondents First Reported Source of Information about Climate Change (Source: Pilot Survey, 2013)

[10] English: Program for Ecosystem Integration and Climate Change Adaptation in the Colombian Massif.

Although most of farmers have noticed changes in climate over the last decade, their high awareness of "climate change" as a formal term and concept can be traced to the institutional actors who first introduced this information in this region (**Figure 11**). Of the respondents, 60% of men and 44% of women reported to have first heard of climate change through organizations and their respective workshops and activities in the past decade. Similar to the data presented in the previous section, where about one-third of women reported that the family was their preferred source of information, 22% of female respondents reported to have heard of climate change through a family member, while no male respondent mentioned the family as their first source of information. In terms of the actual effects of climate change, during the survey the majority of male (81%) and female (100%) farmers reported that they had perceived changes in the Basin's climate over the last decade.[11] The distribution of their responses reveals some patterns about how men and women perceive the changes in climate: although both male and female farmers largely describe these changes as "climate variability," i.e. the loss of traditional weather patterns, men tend to be slightly more specific as to the changes they have observed (**See Table 2**).

Table 2: Perceptions about Changes in Climate by Male and Female Respondents (Source: Pilot Survey, 2013)

Climate Changes	Climate Variability	Decreased water resources	Increase in Temperature	Increase in Frequency of Strong Winds
Women	78.3%	4.3%	8.7%	8.7%
Men	56.3%	18.8%	12.5%	12.5%

Also widely reported during the surveys, workshops and in informal conversations was the increased unpredictability of the growing seasons. Men and women from all three of the regional zones (higher, middle and lower) mentioned this as

[11] Survey Question 7.5: ¿Ha notado algún cambio en el clima a lo largo de su vida? ¿Desde cuándo ha notado este cambio?

an effect of the past decade's climate variability. Cultivation corresponded to the two wet seasons (March-May and September-November) and two dry seasons (January-February and June-July), though the activities associated with certain crops varied (See **Appendix 1, List 2** for Seasonal Calendar Activity results). For example, during the interviews many farmers reported that 2007 – 2009 had been a particularly wet period, particularly 2008; since 2010 however, the climate has grown increasingly dry in the region, with many reporting that 2012 was an especially dry year. Wet climate was mostly associated with increased pests, sun damage to plants, and increased illness among cattle, though the death of bees, grass root rot, and erosion were also occasionally mentioned as effects. The farmers reported that dry climate caused dried out grass, sun damage to plants, difficulty growing green vegetables, and illness among cattle. In addition, one married female farmer reported that the rainy winter caused damage to the wooden fence posts on the property, and the intense, dry summers caused water scarcity and affected the family's trout production system. Her family's greenhouse was also vulnerable to intense changes in climate: strong winds affected the structure of the greenhouse and damaged plants inside, and the strong summer temperatures at times caused the plants in the greenhouse to burn.

When respondents were asked if their farming had been directly affected by changes in climate, all but four respondents said yes. Two were men (one from an intra-household couple and the other unpartnered) and two were women (one partnered and one from a different intra-household couple). We then followed by asking if the respondents had modified at least some of their farming activities because of any changes in climate (**Appendix 2, Table 12**). There is no significant difference in responses of unpartnered men and women: two of the four men and two of the three women reported they had made changes. Among partnered respondents however, a pattern emerges, wherein men are more likely to report they had not made any changes and women were more likely to report that they had (**Figure 16**).

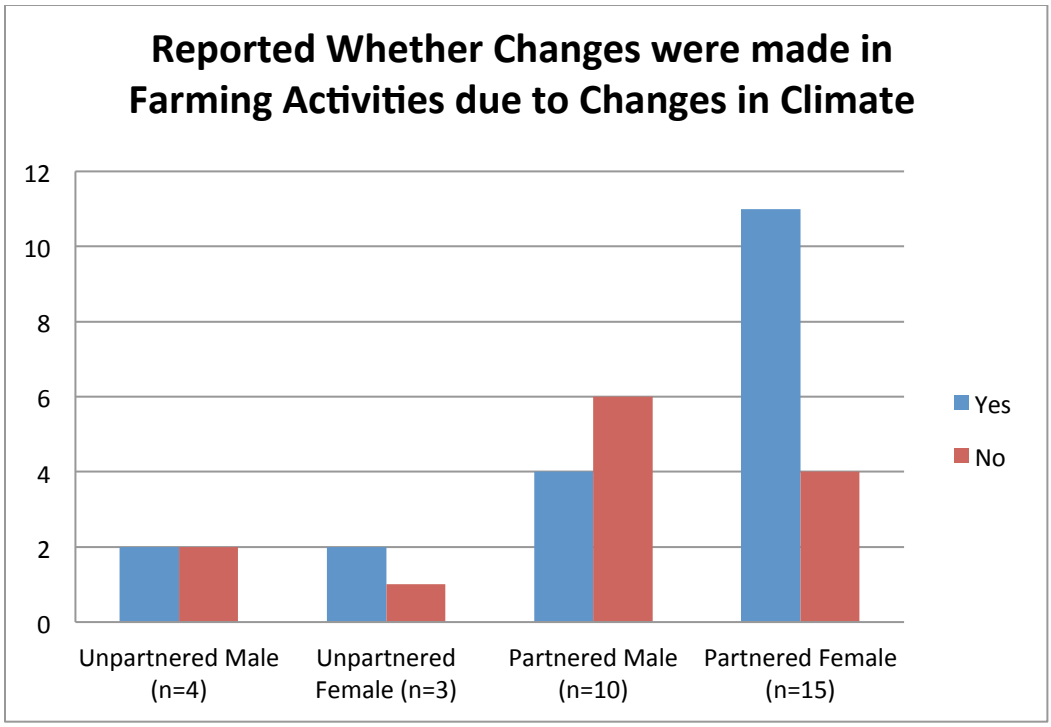

Figure 16: Reported Responses on Changes in Farming Activities due to Climate Change, by Household Structure (Source: Pilot Survey, 2013)

These gender dynamics are further reflected in the responses from the intra-household couples. Half of the eight couples agreed on whether or not they had made changes, with three stating yes and one stating no. Among the four that disagreed, the man reported to have made no changes in farming activities while the woman reported that she had. Although the sample size is too small to draw any substantial conclusions, these responses possibly reflect larger gendered adaptation strategies and perceptions in the region, and open multiple interpretations as to why there is a gendered difference. Women may be more exposed or vulnerable to changes in climate, or that their productive activities on the farm are more affected. Conversely, men might not think of modifications made in farming activities as a direct response to the effects of climate change, but rather the natural adaptation strategies traditionally used by farmers. Furthermore, all but one of the male farmers who reported to not have made any modifications had stated in the question before that they had been affected by changes in climate. This potentially suggests that men in this community do not feel the same sense of agency, or are not as proactive as women in adapting to changes in climate. Yet when

asked if they had access to information about climate change, the vast majority of ASOCAMPO male (93.75%) and female (83.33%) farmers reported so, though this might reflect the trust and access farmers feel they have through the institutional actors, rather than actual capacity for adaptation.

Knowledge, Use and Maintenance of Climate-Smart Practices (CSA)

Decision and justification for using the CSA practices included in the study

In designing the pilot survey, our field team started by first identifying the status of the different CSA practices that were being implemented in the Basin region. We began with a literature review of local, primary sources on agriculture, published and unpublished CCAFS documents, FAO sourcebooks on CSA, and other relevant literature. After compiling an initial list of possible practices to include in the study, we refined this list through key interviews with technicians and other experts at the FPCRP, along with preliminary visits to the area. Based on this information, we limited the list to 23 practices that were already being implemented or improved in the watershed, as well as less common practices that were potentially appropriate for the region. **Appendix 1, List 4** shows the full list of practices included as well as the justification for their inclusion with reference to the CSA pillars: adaptation, mitigation and food security.

The language used to identify and describe the practice took into account that the ASOCAMPO farmers were not well versed with CSA terminology, and we focused on the individual practices without explicit reference to CSA. Without a context, many farmers might perform a CSA practice without implicitly identifying it as CSA (Peterson, 2013). Another strategy used in order to obtain the best results was recommended by a fellow CCAFS researcher who had recently returned from fieldwork in Ghana: during the survey, we introduced the CSA practices along with a printed out image representation, as a way to clarify without leading the participants, who might be carrying out the practice but not recognize the scientific name (Peterson, 2013). Although this technique was largely effective, and helped to revitalize the exchange with the participants towards the end of a long survey, on occasion this created new challenges for communication. For example, if the practice was represented in the image was associated with a specific crop or practice – e.g., “Improved livestock” with a picture of Holstein cattle – the

respondents would focus on the specific representation rather than the general idea of the practice. Where appropriate, we also provided the farmers with simple definitions of the practice, using local, basic vocabulary that could be understood by the rural Basin community, with feedback and assistance from the ASOCAMPO guide who accompanied us to the household.

Gendered comparisons of knowledge and implementation of CSA practices

Similar to the high level of familiarity about climate change, many of the ASOCAMPO farmers expressed a significant degree of knowledge about the different CSA practices. It is noteworthy that the knowledge about CSA practices is about equal for male and female farmers. The interviewed men and women displayed the same high rate (86%) of general knowledge about the different CSA practices named in the survey.

Every man and woman interviewed was familiar with chemical fertilizers and pesticides, composting, crop rotation, irrigation, manure management, and water tanks (**Appendix 2, Table 13**). This high familiarity by both men and women is directly correlated with the CSA practices that were chosen for this study, as they are relevant to the farming systems and have been discussed if not implemented by many in the region for years.

When the farmers had not heard of a particular practice, for the most part it was assumed that they did not use that practice on their farm. The practices were explained using local language and color images. Before doing the survey with the respondents, our field team toured the property and would make note of any practices observed. Then, during the survey, if we had noticed a particular practice being used and the farmer was unsure about the label given to that practice, we would clarify, point to that practice and connect our terminology with their implementation. However, this happened very infrequently, and for the most part if a farmer had not heard of a practice, he or she was not using it on their farm.

The overall implementation of these CSA practices is also similar between men and women, who use 51% and 56% of the practices, respectively. Again, due to the small sample size, that women by this measurement are implementing 5% more of these practices is not statistically significant, though certain patterns emerge when CSA implementation is considered by household structure. The average difference between

male and female implementation is 10%, with nine practices having a difference of more than 10% (**Figure 17**; **Appendix 2, Table 14**).

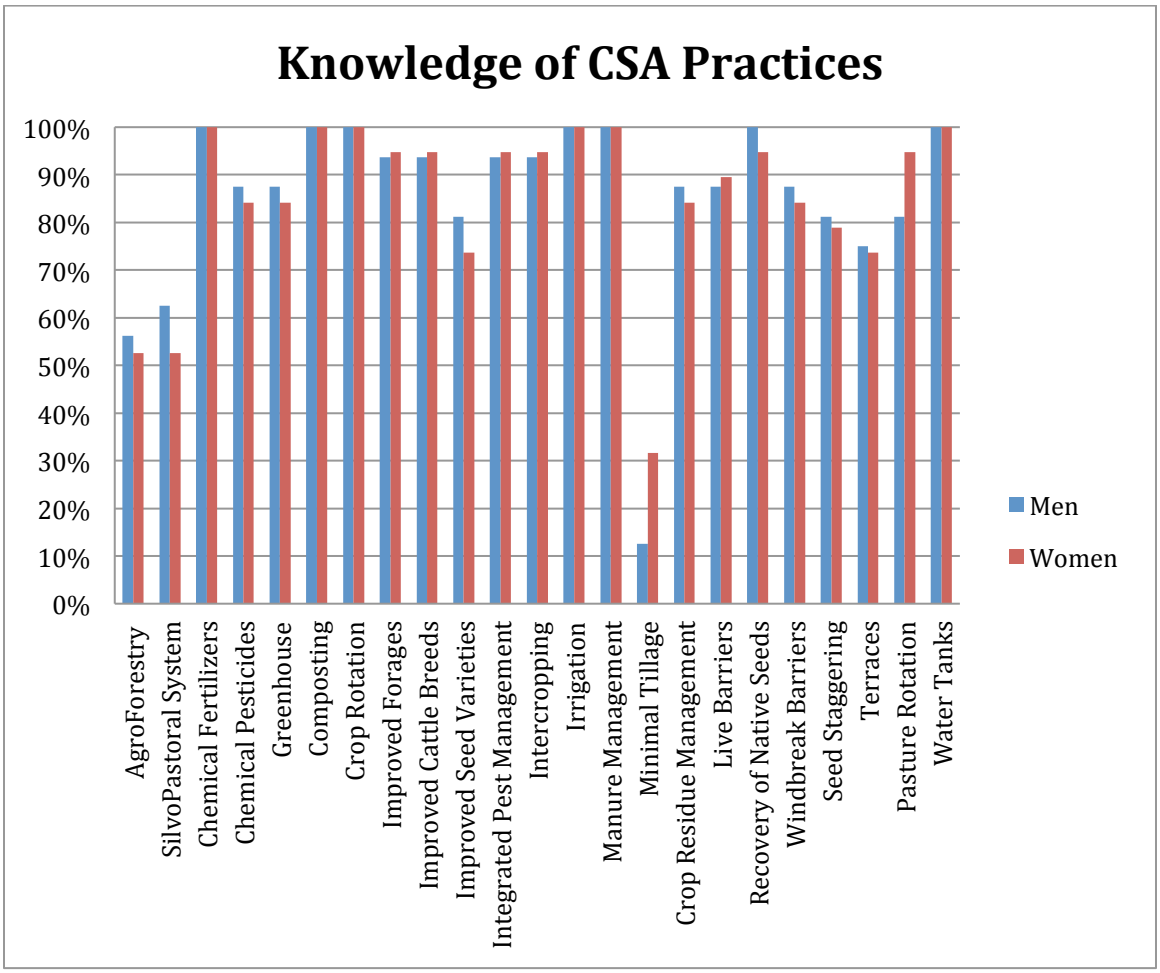

Figure 17: Reported Knowledge about CSA Practices by Gender (Source: Pilot Survey, 2013)

Five of these practices are related to livestock: silvopastoral systems, improved forages, improved cattle breeds, live barriers, and pasture rotation. With the exception of silvopastoral systems, women reported to use these practices more so than men. In fact, among the intra-household couples, women often reported use of these practices while their husband did not; for example, regarding improved forages, in half of the eight couples the women reported using this practice on the farm while the man did not (**Appendix 2, Table 15)**. This contrasts with the traditional male association with livestock in the area; despite the fact that livestock is not perceived as within the traditional sphere of female ownership or division of labor, livestock-based practices are

used more frequently by women. This likely relates to the fact that women are more likely to milk cows, process dairy products (milk and cheese), sell those products at market, and decide how to use the income earned, and most practices are reported to improve the quantity and quality of milk. This suggests that market viability and cash income is more important to women, or that women are more aware of the potential or realized value.

Conversely, silvopastoral systems, which men implement more than women, are reported to be beneficial for cattle, providing shade and allowing them to grow healthily. Men are more likely than women to feed and tend to large livestock during the day, and among the surveyed farmers, men are more likely to have ownership and go out into the pastures. Among the intra-household couples, one couple agreed that the did not use silvopastoral systems on the farm while three couples did agree; however, among the other four intra-household couples, the man reported that the practice was used while the women reported that it was not – in all of these cases the woman was not familiar with / had no knowledge of the practice (**Appendix 2, Table 15**).

Another practice with a significant gendered difference implementation are windbreak barriers: women are more likely than men to implement windbreakers on the farm by a difference of 24%, and in fact all partnered women reported using this practice, regardless of the answer her husband gave if he was also interviewed. Furthermore, unpartnered men actually use the practice more than partnered men, but even more significantly, the only women who reported this practice are partnered. Although two of the intra-household couples agreed that this practice is used on the farm, the other 6 were in disagreement, in that the women reported that windbreak barriers were used, and men reported that they were not.

This is somewhat curious, given the results from the activity on gender roles (See **Figures 6 & 7**) where both men and women were more likely to associate windbreakers with men. When asked why, one man stated during that activity that "[Men] need to plant trees," which is considered a more physically difficult activity. However, windbreakers often serve to protect tall grass crops such as maize, which women typically associate with themselves more than with men (84.6% vs. 23%), and men also associate with themselves (61.5% vs. 38.5%), though to a lesser degree.

For the remainder of the CSA practices, the differences in implementation among men and women were 15% or less. All unpartnered women implemented irrigation practices on their farm, while none used any improved cattle breeds. Some of the responses corresponded with the particular zone of the farm (e.g. higher, middle, lower); silvopastoral systems, for example, were more common in the middle and upper regions, where properties were larger and tended to include more forested land. For both men and women the most commonly implemented practices are composting, manure management and native seed recovery.

Among the intra-household surveys, more often than not the couples were in agreement as to the practices being used on the farm (**Appendix 2, Table 15)**. The same couples tended to disagree on certain practices. The most disagreed upon responses were over **silvopastoral systems** (4/8 couples: the man said yes, women said no); **improved forages** (4/8 couples: women said yes, man said no); **live barriers** (4/8 couples: women said yes, man said no); **windbreak barriers** (5/8 couples: women said yes, man said no). These differences can be attributed to division of labor – what men and women respectively use on the farm during their daily activities – or, possibly, that men and women perceive these practices differently. Women were overall more likely to report use on the farm, but this might be because they are more aware of the labels for these practices. There is no statistically significant difference of CSA implementation by household structure (e.g., among partnered vs. unpartnered men and women).

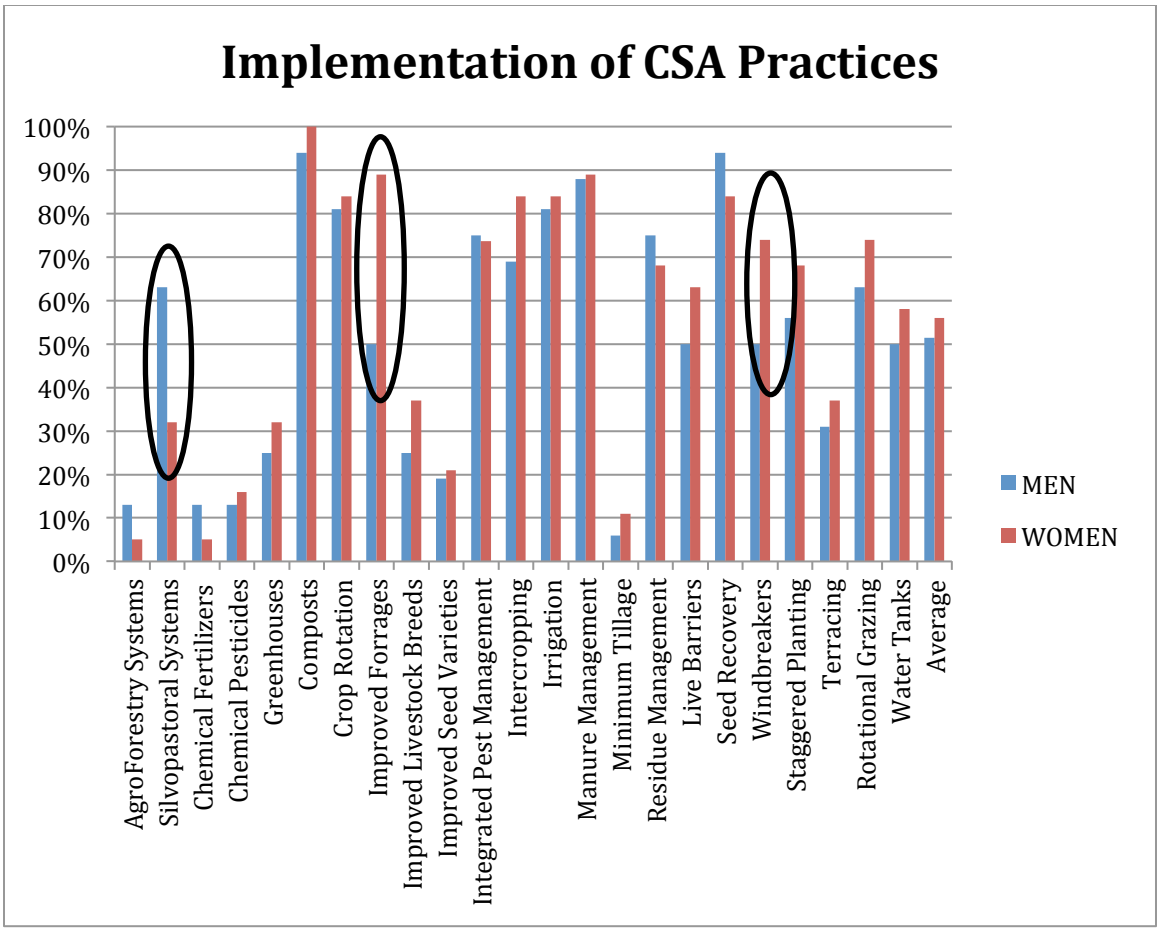

Figure 18: Reported Implementation of CSA Practices by Gender (Source: Pilot Survey, 2013)

CSA practices considered most beneficial (by Gender)

To understand which of the CSA practices men and women considered to be most beneficial for the questionnaire, we asked the respondents to choose three practices they considered the most important or most beneficial, of the practices they already implemented on the farm.

This resulted in a total of 54 choices for women and 44 for men.[12] For the group of female respondents (**Table 3**), the three most frequent responses were composting, rotational grazing, and integrated pest management; these practices comprised 50% of all responses. All other practices were chosen by less than 8% of the female respondents. Among the male respondents (**Table 4**), the selection of most beneficial practices was much more distributed across all practices. The top four practices considered most

[12] Some participants only named one or two practices during this question.

beneficial – composting, seed recovery, greenhouses, and manure management – only comprise 41% of all responses (**Appendix 2, Table 16**).

Compost	22.5%
Pasture Rotation	17%
Integrated Pest Management	11%
Manure Management	7.5%
Crop Rotation	5%
Intercropping	5%
Seed Recovery	5%
SilvoPastoral Systems	4%
Greenhouses	4%
Improved Forages	4%
Residue Management	4%
Live Barriers	4%
Water Tanks	4%
Improved Seed Varieties	2%
Irrigation	2%

Table 3: CSA Practices Reported as Most Beneficial to the Farm, by Women (Source: Pilot Survey, 2013)

Compost	11.5%
Seed Recovery	11.5%
Greenhouses	9%
Manure Management	9%
SilvoPastoral Systems	7%
Improved Livestock Breeds	7%
Residue Management	7%
Pasture Rotation	7%
Water Tanks	7%
Crop Rotation	5%
Improved Forages	5%
Irrigation	5%
Seed Staggering	5%
Integrated Pest Management	2%
Intercropping	2%

Table 4: CSA Practices Reported as Most Beneficial to the Farm, by Men (Source: Pilot Survey, 2013)

Composting, the number one practice considered most beneficial by both men and women (along with native seed recovery for men), is highly valued among ASOCAMPO

members. A 2012 UN sponsored project, implemented through the FPCRP, provided the resources and training to create sustainable composting systems on dozens of farms throughout the region, many of which are ASOCAMPO members. The compost system was often the first stop on the tours of the farms, and many were proud and enthusiastic to talk about its perceived benefits.

Among the intra-household couples interviewed, they were far more likely to disagree on the practices that they consider most beneficial than to agree. Unpartnered males and females had similar distributions across their choices. Certain practices however, seemed to be of particular value to partnered women: composting, pasture rotation, and live barriers were most commonly chosen by this group, with exclusively partnered women choosing live barriers. Only women – both unpartnered and partnered – identified intercropping as a top three practice. Furthermore, water tanks were particularly among unpartnered men and women, who might consider the tank a time and labor saving measure on the farm.

Perceived advantages and disadvantages towards the implementation and maintenance of CSA practices, by gender

In order to arrive at a more nuanced understanding as to why male and female farmers preferred certain CSA practices over others, we asked the participants about the relative advantages and disadvantages of implementing the three practices they had identified as most beneficial on the farm. Because men and women – particularly, partnered men and women – varied so significantly in their responses as to which practices are the most beneficial, it is difficult to compare the perceptions about those practices by gender. Men and women reported the same benefits and drawbacks at roughly the same frequency, although there are a few distinctions, based on survey responses and informal conversations. **Appendix 2, Table 17** shows the reported advantages and disadvantages of the crops chosen as most beneficial, by men and women.

The main advantages for the different CSA practices related to increasing production on the farm (CSA Pillar 1), maintaining a steady food supply for humans and animals (CSA Pillar 1), improving resistance to the elements, such as intense heat or wind (CSA Pillar 1), and improving soil and water quality (CSA Pillars 1 & 3). Pest control was also of importance. In terms of disadvantages or “inconveniences” associated

with the practices, 56% were considered by respondents to have none. Costs for certain practices – such as improved livestock breeds, live barriers, and improved forages – were among some of the reported disadvantages. The most significant related to the maintenance of the practice after it had been established on the farm: the degradation of certain materials over time or due to intense weather conditions constituted the main disadvantage for both male and female farmers. This suggests a potential disconnect between the introduction of these practices by international projects or local NGOs, and the long-term sustainability of these practices by the *campesinos*. One such example is the greenhouses that several of the farmers in the region have recently adopted, through the support of the institutional actors. Although these are prized structures, with high reported benefits, a few farmers noted that the plastic tarps become damaged within a year or two, due to intense wind or heat. Another example is the case of rotational grazing. Many farmers in the Basin began the practice of rotational grazing with support from the FPCRP and the *Programa Conjunto* ("Joint Program") of the United Nations. To set up this system, farmers use wire and fencing to partition their pastureland into small areas to limit livestock movement. Sometimes this wire is electrified with a small battery; however over time many of these batteries have stopped working, and the wooden polls have since rotted and need to be replaced. Many of the farmers cannot afford to replace these materials – and without available funds from the institutional actors – have allowed all or part of this practice to lapse and have returned to the traditional grazing system.

However, the local actors are responsible for supporting and funding many of the practices that the farmers feel strongly about. The FPCRP, ASOCAMPO, and other groups have created a "culture of organic" within the community that's led to the abandonment by many of chemical fertilizers and pesticides. Both men and women reported that an organic system was better than using chemicals, due to the financial savings from not having to purchase inputs, and the healthier food production for family consumption and for sale to the market.

Decision-making about the adoption of CSA practices

At the end of the survey participants were asked about how they had arrived at a particular decision regarding the adoption of CSA practices (among the three practices

they had selected earlier). To note, because we only discussed those three practices considered most beneficial to the farm, this is not representative of the decision-making processes behind the implementation of CSA practices in general. However, key patterns emerge and are worthy of discussion. I analyzed the decision given by the respondents for all of these practices (n=90). In general, almost half of these decisions were made by the male of the household, with 27% by the couple, 17% by the woman, and 10% by the family (**Appendix 2, Table 22**).

It is important to note that the decision to implement a CSA practice is dependent on the type of practice and the specific conditions of the household. Unpartnered men only identified themselves as the decision-maker for the implementation of all practices, as did all of the partnered men who were *not* part of an intra-household couple. Unpartnered women mostly reported themselves, but about a third reported that the decision to implement was made by the family (i.e., with adult children or siblings). Among partnered women whose husbands were not also interviewed, most reported that the decision was made by the couple (44%), though 38% identified themselves, and 19% identified their husband. Women in general relied on a multiple decision-making strategies that varied according to practice and household. Alternatively, men almost always reported themselves as the decision-maker, with the exception of the men from the intra-household couples, who also reported the couple (35%) and the family (19%), in addition to themselves (47%).

The decision-making dynamics typically varied from practice to practice. For example, for one couple in the middle zone, the woman reported that she alone decided to do seed recuperation, her husband and adult children decided on the improved forages, and her husband alone decided to implement pasture rotation; the husband reported that the entire family had decided to implement a greenhouse, and he had decided to use irrigation and crop rotation. A positive finding is that for the practices that were introduced through the institutional actors (e.g. composting, greenhouses) the decision to implement is generally made by the family or the marital couple.

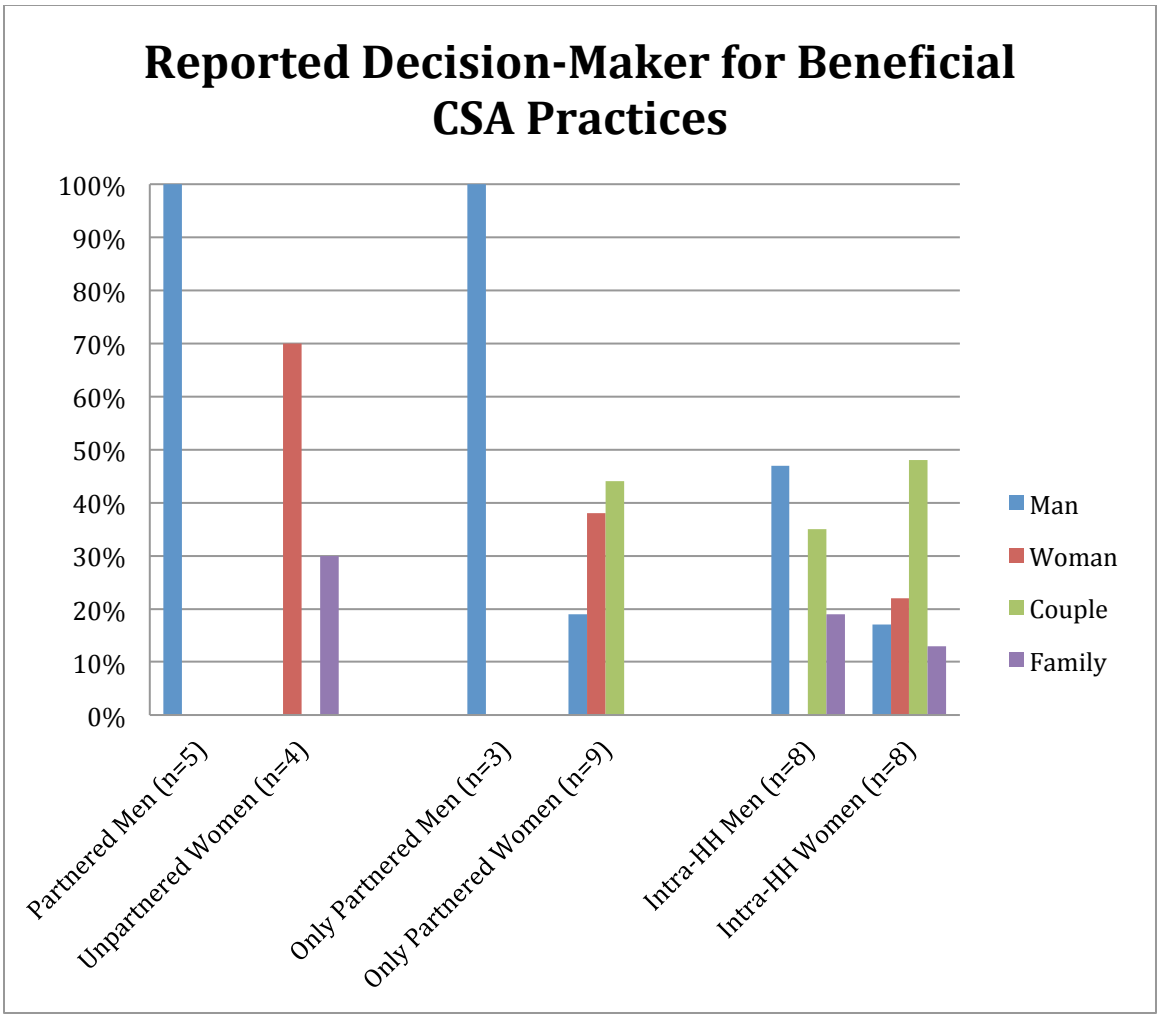

Figure 19: Reported Household Decision-Maker for the Implementation of CSA Practices (Source: Pilot Survey, 2013)

Men were more likely to cite a wider variety of sources as to how they first came to learn about the practice (e.g. through a former job, neighbor, friend), while women almost exclusively referred to the organizational actors in the region (ASOCAMPO, FPCRP) or their adult children/spouse as the source of information. This suggests, compounded by their responses about sources of news, that their networks are smaller and centered mostly around the family.

CONCLUSION & RECOMMENDATIONS

The vast majorities of both male and female farmers in this study seem familiar with the concept of climate change and had perceived its effects in the watershed. However, while most of the interviewed women stated that they had modified at least some of their activities due to these changes, less than half of the interviewed men had done so; this was especially true for the partnered men. This suggests that women may be more exposed or vulnerable to changes in climate, or alternatively, that their productive activities are more affected. Regarding the latter, although livestock was reported by some to have been affected by changes in climate – through damage to forages and illness brought on by excessive rains – multiple crops were reported to be affected at different times throughout the year. For many of the households in this community, these crops fell within the domain of women, while livestock grazing was typically the responsibility of men; this might account for the discrepancy between reported changes in household activities by men and women.

An important ethnographic finding is that for most of the farmers in the Basin region, climate change was understood as "climate variability," reflecting a key critical distinction in scale and how smallholders perceive these effects. In addition to increased temperatures and especially rainy or dry years, the disruption of traditional growing seasons and weather patterns is a significant challenge for farmers, as they are unable to rely solely on traditional / inherited knowledge about agriculture.

In terms of climate-smart agricultural practices, both men and women seemed familiar with most of practices discussed in the survey, and had similar levels of implementation on the farm, with some distinctions among specific practices. These differences in implementation tend to relate to the respective productive activities typically associated with men and women, but also to the different stages of labor involved for certain activities: so while grazing and other livestock management practices typically fall within the male domain, certain CSA practices related to livestock are used *more* by women, because they improve the quantity and quality of the final (dairy) product. More often than not the intra-household couples agreed as to which practices are used on the farm, and there is no statistically significant different of CSA implementation by household structure (e.g., among partnered vs. unpartnered men and women.)

The study concludes that the perceptions of men and women differ significantly on which CSA practices are considered more beneficial. The men interviewed (n=16) identified a wider range of practices that they consider beneficial on their farm, while for the women interviewed (n=19), the same three CSA practices were chosen 50% of the time. Top practices such as composting (both), integrated pest management (women) and native seed recovery (men) are among those introduced by the local actors – ASOCAMPO and La Fundación ProCuenca Río las Piedras. Among the intra-household couples interviewed, they were far more likely to disagree on the practices that they consider most beneficial than to agree. Live barriers were of particular importance to partnered women, and water tanks were popular among single men and women, who might consider the tank a time and labor saving measure on the farm. Various benefits and inconveniences were identified during the surveys and informal conversations with the farmers. With the exception of chemical fertilizers and pesticides, most of the CSA practices being used in the region were described positively with few drawbacks. However, that the continued maintenance of the CSA practice is cited as the main drawback associated with its implementation suggests a potential disconnect between the introduction of these practices by international projects or local NGOs, and the long-term maintenance of these practices by *campesinos*.

The decision to implement a CSA practice depends on the type of practice and the specific conditions of the household. Men are more likely to cite a wider variety of sources as to how they first came to learn about the practice (e.g., through a former job, neighbor, friend), while women almost exclusively referred to the social organizations in the region (ASOCAMPO, FPCRP) or their adult children / spouse as the source of information. In terms of who decided to implement a particular practice, among unpartnered men and women, the decision was typically made alone, or in one case, the woman decided with her adult children. Among partnered women whose husbands were not also interviewed, most reported the decision was made by the couple (44%), though 38% identified themselves, and 19% identified their husband. Women in general relied on multiple decision-making strategies that varied according to practice and household. Alternatively, men almost always reported themselves as the decision-maker, with the exception of the men from the intra-household couples, who also reported the couple

(35%) and the family (19%), in addition to themselves (47%). A positive finding is that for the practices that were introduced through the institutional actors (e.g. composting, greenhouses) the decision to implement is generally made by the family or the marital couple. Based on the pilot survey results and multiple informal conversations with the farmers, the high level of knowledge about and implementation of CSA practices was found to be largely related to the extensive services provided by the FPCRP, ASOCAMPO and other development projects and extension services in the area.

The presence of adult children within the household has a significant impact on households: participants and their spouses belonged to more community organizations, had higher attendance and participation, and they used more CSA practices on their farm. Although the average education level of the participants was 2.6 years, among the younger generation ages 18-25 this rose to approximately 9 years, with some going on to receive technical training or attend at university. Adult children represent valuable social capital for the community, and are often the key conduits through which information is passed on to different members of the household, particular older family members who are the main decision-makers. Households with family members pursuing higher education tended to be more active within the local organizations (e.g. serve as community representatives for ASOCAMPO), and implemented more CSA practices on the farm. Multi-generational households are not uncommon, and even when adult children have moved out of the familiar home, they often maintain an important presence through ownership of assets (e.g. purchased livestock which is raised on the farm), visiting the house during critical sowing and harvest seasons when extra labor is needed, and by participating in certain key decision-making. Many of the farmers interviewed, when asked about a particular practice that was recently adopted, would report that the idea was introduced to them by their adult children. Women in particular are dependent on family members – in addition to the institutional actors in the region – for news and information. Men prefer communication technology for news, such as television or radio, and have wider social networks in general. Community leaders however were important to both men and women as sources of news.

The region is characterized by a high level of social connection and organization. Many of the participants attend about 2 meetings a week, with some up to 4 or 5. Although the vast

majority of the farmers were grateful for the institutional services and resources offered through the local actors, a few expressed a sense of "burnout," and indicated that attendance often meant a lost day of labor on the farm. For that reason, many couples would often take turns attending the different meetings. An examination of how information is diffused throughout the region reveals certain inequalities in the method and degree to which information reach men and women. Women attend community meetings and workshops at a lower frequency than men, and participate less during discussions. Attendance is most difficult for single women who reported not feeling secure leaving their property unattended, women with small children, and men and women who live in the remote upper regions.

General household decision-making is typically a collective matter, although certain patterns emerge among married couples. Both male and female *unpartnered* participants made household decisions individually, or with their family (e.g. adult children or siblings). Among *partnered* couples, men are more likely than women to identify themselves as the primary decision maker for the household, and while married women occasionally referred to her husband as the decision-maker – for both general household decisions and specific decisions regarding the implementation of new practices – no man named his wife. Women are more likely to report that the marital couple makes decisions together, while men are more likely to report that general household decisions are made as a family. This is true for the intra-household surveys as well: although half of the eight couples were in agreement, for the four that disagreed, the man reported either himself or the entire family, and the women typically reported the marital couple.

Furthermore, there is a significant gender gap in terms of land and livestock ownership within the watershed. Within non-commercial private property in the region, 61% of the properties are registered in the name of men, 21% in women's names, 8% as joint marital property, and the remaining 11% is non-marital joint property. Many *campesinos* reported that land in the region has been undergoing a process of fragmentation due to successive processes of inheritance; being broken into smaller and smaller plots results in a process that leads to what is referred to as "pancoger" or food plots. Properties of non-marital joint ownership are in fact the largest in the region with an average land area of 12.3 ha, followed by land in the name of a man (8.6 ha), and land under joint marital ownership (7.4 ha). The average farm size owned by women is 6.4 ha. Insecure land tenure and smaller properties might influence the level at which

women are willing to invest long term in their land and adopt new farming practices.

About 80% of the surveyed households have cattle; among those that do not, four of the five live in the lower zone where cattle ownership is not as common due to smaller property sizes. *Unpartnered* respondents – both male and female – either reported themselves or their entire family (i.e. adult children or siblings) as the owner. Among all *partnered* respondents, men were reported as owners approximately 37.5% of the time, while women were reported as owners 12.5% of the time, with couples reported at 33.3% and family at 16.6%. Although 40% of all partnered women identified their husband at the sole cattle owner, no married man named his wife as owner. The three men that chose joint ownership were part of the intra-household survey group, while among the partnered men interviewed alone, three chose the family but none chose joint. Similarly, only the partnered women interviewed alone self-identified as the cattle owner; with one exception, women in the intra-household survey group identified either her spouse or the couple as the cattle owner. This suggests that the dynamics of the survey method – i.e., whether or not the respondent's spouse was also interviewed – potentially affected the responses, so as to reflect a more equitable distribution of ownership. Another possibility is that the couples who were either able or willing to be interviewed separately are more likely to have an equal distribution of ownership than those partnered respondents interviewed alone. Among households where both the man and woman were interviewed, six of the couples were in agreement: two couples identified the man, three identified the couple, and one identified the entire family. As to the two couples that were in disagreement, in one case, the woman reported that cattle was owned by the couple, while the man stated that ownership was by the entire family; and in another, the man considered himself the sole owner while the woman thought ownership was by the entire family.

In the Río las Piedras Basin, cattle are an important source of income for many rural households through the sale of milk, cheese and calves. Many farmers saw calves as an investment and source of savings. When asked whether they had savings in a bank, several farmers responded that their cows represented all of their savings, and in times of economic necessity they were sold off to generate cash. That women are individual owners of this type of livestock in only 10% of all households – dropping to 7% among

partnered households – potentially suggests an economic dependence on their husbands. While this might indicate that cattle ownership is inherently gendered in this region, another factor might be that women's responses are shaped more by the interview structure: only the married women who were interviewed *without* their husbands present named themselves as owners. The other married women named their husbands, the couple or the family as owner. Married men's responses however, do not seem to be affected by the presence of their wives.

Although about 80% of the farmers interviewed reported that sales from market were the main source of income for the household, the lack of more formal and reliable channels of commercialization represented a significant challenge for the farmers. Very few farmers had access to savings or credit. The ability to generate cash income can increase resilience in the face of unpredictable climatic events and shocks. Furthermore, if the objective of introducing CSA practices into the region is to increase production to the point of the farmers being able to generate a cash income from sales, without a viable marketing system in place this will continue to be out of reach for many.

Recommendations

In this pilot study we have described the dynamics of the institutional activity and outreach in the Río las Piedras region; here, the report makes recommendations as to how these services can be improved to reach both men and women equally. This research also contributes towards the development of a gender methodology to be used by CCAFS for future projects related to gender and climate change adaptation in Cauca and other regions throughout the world. The recommendations are considered at various levels, in terms of future actions in the community, the role of research and donor organizations such as CIAT and the United Nations, and the needed long-term infrastructural changes by the Colombian government.

Community

The local organizations have been remarkably adept at serving the needs for much of the Basin's population. These organizations have provided the farmers with information and resources, created spaces for collective action, helped secure land tenure and quelled historical conflicts with the indigenous. The Fundación ProCuenca Río las Piedras in particular has also served as a key conduit through which national and international projects can disperse funding and

implement agricultural projects on a local level. FPCRP is also cultivating a growing relationship with local research institutions, such as the University of Cauca, as well as international organizations, such as CIAT. The local actors help translate the information and resources provided from these external entities into accessible and meaningful projects for the farmers. Their influence is such that when we asked the farmers a particular question about conservation, almost all would respond with the stock definition or interpretation originally given by those organizations; for example, when we asked farmers who participated in Colombia's Red de Reservas program why they decided to join, almost every single one – during both surveys and informal conversations – responded with the same exact phrase: "to protect the water and conserve the trees[13]" – word for word the message being delivered by the local actors.

In terms of the workshops and other extension service meetings currently being offered, particularly those offered through the University of Cauca, the organizers should adopt an improved pedagogical approach – one which understands education as an exchange of information rather than a top-down transfer of knowledge – and make information and language used relevant to farmers. The local institutional actors – and especially any foreign researchers or development practitioners – when planning events should organize meetings for different groups on the same day in the same location, whenever possible, to reduce any (time) stress that attending the meeting might pose for the farmer, and to prevent "burnout" among the affiliates. For the workshops, women should be explicitly invited to attend these workshops, even if their spouse is attending. Women would be more likely to attend if a snack or small meal was provided for free (and therefore they did not need to bring their own food to the workshop), and if someone was appointed to monitor and/or facilitate a basic activity with the small children who are brought along. Women's participation can be encouraged during discussions by breaking up the men and women into groups for certain activities and discussions. These groups can then be brought back together at the end of each component, and a representative can summarize for the larger group the key points. In addition, when covering CSA, workshops and extension agents should also cover the long-term maintenance of the practices, and provide strategies for inexpensive repairs and labor-minimum upkeep.

A few of the respondents mentioned that their children had participated in a local youth-oriented organization, Jóvenes en Acción, which brought together young *campesinos* for

[13] Spanish: "Para proteger el agua y conservar los arboles."

agricultural and environmental workshops and activities. This was not very common however, and the organization no longer seemed to be very active. Given the gradual increase in urban migration in the area among the younger generation, and the important potential that they have for the future of the *campesino* community, the local actors should either revive Jóvenes en Acción, or develop a new youth organization that can regularly bring local children together to get them excited about agriculture and the environment, and teach them leadership and other skills.

Research & Donor Organizations

Looking forward, given the observed gender dynamics of the region, the task at hand for researchers and development practitioners working towards climate change adaptation strategies is to identify:

1. The suitability of a CSA practice for a particular context;
2. The benefits it will provide;
3. Who will benefit;
4. The potential sustainability of this practice over time.

These organizations should employ a gender methodology for collecting climate variability data, and a gendered approach to educate about resilience strategies. There is potential for a future study of this region to build upon the research presented here: to better assess the effect that the local organizations have had on the adoption of CSA practices, I propose a representative survey of randomly selected *campesinos* across the entire Basin region, regardless of membership to ASOCAMPO, FPCRP, or another other local actor. Another interesting dimension to expand this research would be the design and implementation of a comparable representative survey with the indigenous population of the same region, to explore not only institutional structures but also land tenure and cultural identities.

Government

Although the local actors can advocate for and potentially help facilitate the creation of more formal and reliable channels of commercialization for the farmers, political powers in Popayán need to develop a more stable and accessible market system for all farmers, so as to improve rural livelihoods and build resilience among farmers in the face of unpredictable climate. As is, many farmers wake up around 2 or 3 in the morning, spend hours traveling down to the city, pay

a market “official” a fee for setting up a stand (I heard more than once that some or all of this money was simply pocketed), and try to sell their products before they go bad or wilt in the heat. If they do not arrive by a certain time they risk losing a space in the market. When the lost farm labor for that day is considered, this is inherently a risky endeavor for many farmers. Yet a more structured and reliable marketing system – and potentially, the creation of smaller markets in different sections of Popayán – would give farmers more opportunities to generate cash income, and therefore increase their resilience. This also ties into infrastructural issues, namely the quality of the roads reaching the lower part of the Basin from the city, and the undependable roads and paths that connect the different Basin zones. Furthermore, governments can work with the local actors to make it easier for the farmers to apply for and manage savings accounts.

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APPENDICES

Appendix 1 – Lists

List 1: Key Informants from Semi-Structured Interviews (Source: Author, 2013)

Name	Title	Interview Date	Summary
1. Yully Esneda Padilla	Agricultural Technician and Treasurer of ASOCAMPO	June 5, 2013	History and overview of ASOCAMPO and its management strategy. How representatives are elected, and the relationship between ASOCAMPO and the FPCRP.
2. "Zoraida"	*Campesina* of the El Laurel village; Agricultural Technician for the FPCRP; works on the SAAT team.	June 6, 2013, plus multiple informal conversations throughout the summer.	History and overview of La Fundación ProCuenca Río las Piedras, and its relationship to ASOCAMPO. Her role on the Alertas AgroClimaticas Tempranas (SAAT) team.
3. Mauricio Lame	ASOCAMPO Representative from the Canelo village	June 12, 2013	Responsibilities as Representative; History of the Basin; Conflict between indigenous and *campesinos*
4. Doris Aleja	Agronomist in the Land Titling Office of Popayán	June 14, 2013	History of the Río las Piedras Basin and other Basin communities in Cauca; Focus on land tenure and security; Experiences of other foreign researchers working in the area
5. "Lilia"	Agricultural Engineer with the Foundation ProCuenca Río las Piedras	June 17, 2013, plus multiple informal conversations over the summer.	History of the Río las Piedras Basin. Focus on historical land conflicts and emerging indigenous and *campesino* identities, current conflicts between the two communities, farming activity in the region, the roles of women and men.
6. Evelio Campo	*Campesino* of the Las Huacas village; member of the Red de Reservas program; ASOCAMPO	June 22, 2013	The Red de Reservas program and the process of becoming a registered member. His motivation for joining the program. How the Red de Reservas program functions in conjunction with other local organizations (e.g.

	committee member.		ASOCAMPO and FPCRP)
7. Francisco Lame	*Campesino* of the Las Huacas village; Coordinator for the Río las Piedras Security Group	July 11, 2013	History of the "Grupo de Seguridad" – why the group formed, how it functions, what types of conflict does it address and for which population, the relationship the Group has with the Cauca police, etc.
8. "Lizardo"	Engineer with the Foundation ProCuenca Río las Piedras	July 12, 2013	History of the Red de Reservas national program and its regional implementation through the FPRLP.
9. Liliana Recamen	Technical coordinator / director of the FPCRP.	July 2013, plus multiple informal conversations throughout the summer.	Her experience working for the FPRLP – as the only female director of an Aqueduct division, and working with the *campesino* families of the Basin region. Background on the conflict / tension between the *campesino* and indigenous populations; women's participation in local agricultural and environmental programs.
10. "Ernesto"	President of the Red de Reservas in the Río las Piedras Basin; committee representative for ASOCAMPO	July 31, 2013	Background on the Red de Reservas program; how local families can and do participate in the program; land tenure in the region.
11. Gentíl Armando Ortega	President of ASPROLGAN, the regional livestock association	August 1, 2013	History and overview of ASPROLGAN; demographics of its membership; challenges and objectives for the organization; free trade politics and other restrictions that affect smallholder farmers.

Seasonal Calendar Activity

List 2: Seasonal Calendar Activity, answers compiled by sex (Source: Participatory, Community Workshop 7/18/2013)

Male Perspective			**Female Perspective**		
Time / Climate	**Activity**	**HH Member Responsible**	**Time / Climate**	**Activity**	**HH Member Responsible**
All Year	Feeding chickens	Everyone	**All Year**	Livestock management	Men
	Feeding the cattle	Everyone		Chicken management	Women
	Selling eggs	Everyone			
	Milking the cows	Everyone			
	Selling the dairy products	Men			
January	Preparing the terrain for beans	Everyone	**January**	Preparing the terrain for	Women

(Summer; windy)	Preparing the terrain for potatoes Preparing the terrain for vegetables	Men Everyone	(Humid)	vegetables Planting the vegetables	 Women
February (Summer; windy)	Plant bean seeds Plant vegetables Fertilize the land for potatoes	Everyone Everyone Everyone	**February** (Humid)		
March (Winter)	"Tying" the beans Picking the beans Harvesting the vegetables	Men & women Men Everyone	**March** (Winter)	Preparing the terrain for beans Planting and fertilizing beans Harvesting the vegetables	Women Women and men Everyone
April (Winter)	Tending the chicken sheds	Everyone	**April** (Summer, windy)	Planting beans	Everyone
May (Winter)	Planting the forage grass for the cattle Harvesting the potatoes	Men Everyone	**May** (Humid)		
June (Summer, Windy)			**June** (Summer, strong winds)	Preparing the terrain for corn Preparing the terrain for potatoes Planting and fertilizing the potatoes	Everyone Everyone Everyone
July (Summer, Windy)	Harvesting the corn	Everyone	**July** (Summer, windy)	Harvest beans	Everyone
August (Summer, Windy)	Preparing the terrain for corn	Everyone	**August** (Summer, windy)	Harvest corn	Everyone

September (Half summer & wind, half winter)	Plant potatoes	Everyone	**September** (Humid; winter starts)	Plant corn	Everyone
October (Winter)	Plant grass forages Crop Rotation (Sept-Dec)	Man Everyone	**October** (Winter)	Harvest potatoes	Everyone
November (Winter)	Plant corn Continue crop rotation	Everyone Everyone	**November** (Winter)		
December (Winter)			**December** (Winter)		

List 3: Directory of Local Stakeholders

ORGANIZATION	DESCRIPTION	MEMBERSHIP	AFFILIATIONS
ASOCAMPO	Campesino Farmers' Association for the Río las Piedras Basin region	118 members; 44.9% female, 55.1% male	FPCRP University of Cauca
La Fundación ProCuenca Río las Piedras (FPCRP)	Non-profit organization created through the Popayán Aqueduct Municipality (b. 1991) Focuses on land, food and water security. Runs the SAAT team, and the local implementation of the Red de Reservas program. Also hosts regular "green markets" at the Aqueduct for farmers in the Custodio de Semillas program.	Approximately 12 employees; Interacts with majority of population of the Basin, both *campesino* and indigenous.	ASOCAMPO SAAT Red de Reservas program SENA University of Cauca EcoHábitas
EcoHábitas	Non-profit organization that works in the neighboring basin Palacé, deals with climate-change adaptation strategies.	5 employees, work in different communities; no set membership.	FPCRP
Asprolgan (La Ganadería)	Regional livestock association. Provides education and resources to members. Connects members to relevant veterinary services.	184 members; 13.6% female, 86.4% male	FPRCP ASOCAMPO
La Junta de Acción Comunal ("The Community	Community organization and official governing body of the villages.	Essentially all community members have access to this organization.	FPCRP ASOCAMPO

Action Board")			
SAAT "Proyecto de establecimiento de un **sistema de alertas agroclimáticas tempranas** participativas con organizaciones y familias de custodios indígenas y campesinos de la cuenca alta del río Cauca"	SAAT is a project funded by the German Corporation Agency (GIZ) and managed through the FPCRP. It has created an early agro-climate alert system, that allows indigenous and *campesino* farmers to participate in bio-indicator monitoring, native seed recovery, and other agro-environmental initiatives. The SAAT team regularly hosts workshops on climate change adaptation, organic agriculture, and commercialization.	Team of 7 members: Victor Hugo (Environmental Engineer); Oliver (Agricultural Engineer); Hernan (Quintana / Indigenous Representative & Agricultural Technician); Zoraida (ASOCAMPO Representative & Agricultural Technician); Lilia ("Social Component"); Osvaldo (Purace / Indigenous Representative); Lazlo (Engineer).	FPCRP ASOCAMPO
SENA	"Servicio Nacional de Aprendizaje," a public technical school with a major campus in Popayán.	Works with other stakeholders to host workshops in the community; several members of the younger, *campesino* community attended the agriculture technical school here.	FPCRP ASOCAMPO University of Cauca
Grupo de Seguridad ("Security Group")	A security and conflict mediation volunteer team that handles disputes in the region; has contact with the Popayán police.	About 5 volunteer members; both *campesinos* and indigenous have access to their mediation services.	FPCRP
Red de Reservas Naturales de la Sociedad Civil ("Network of Natural Reserves of Civil Society")	"Proyecto Consolidacion de la Red de Reservas Campesinas de la Cuenca del Río Las Piedras, Convenio No. 007" Red de Reservas is a national reforestation program that allows smallholders to participate in conservation efforts, by protecting designated areas of their property. This program is locally run by ASOCAMPO and FPCRP.	In the Río Piedras Basin region, about 60 households participate in the Red de Reservas program.	ASOCAMPO FPCRP Programa de Formalizacion de la Propiedad Rural ('Rural Property Formalization Program")

Custodios de Semilla	Indigenous seed recovery program run through the SAAT team. The goal is to maintain genetic diversity of traditional, regional crops, and to improve crop production among local smallholder farmers organically.	Approximately 60 members, both *campesinos* and indigenous.	SAAT FPCRP
Programa Conjunto de las Naciones Unidas. "Integración de ecosistemas y adaptación al cambio climático en el Macizo Colombiano."	UN funded program implemented locally through FPCRP. Distributed information and resources for CSA projects: water filters (didn't take), compost systems, irrigation techniques, etc.		FPCRP
ASOPROQUINTANA	Branch of ASOCAMPO that functions in a remote part of the upper zone: Quintana.	Approximately 12 members.	ASOCAMPO
SISBEN	System of Identification of Potential Beneficiaries of Social Programs, part of the National Department of Planning. Conducts censuses in the region.	N/A	FPCRP
Programa de Formalizacion de la Propiedad Rural ("Rural Property Formalization Program")	A program financed by the Ministry of Agriculture and Social Development that is run locally through the Popayán Land Titling Office. Helps smallholders achieve land security and secure titles for their properties.	Staff of about 10.	EcoHábitas FPCRP Red de Reservas

List 4: Status of CSA Practices in the Río las Piedras Watershed, and Justification for Inclusion in the Study (Sources: Various; based on a table created by Acosta, 2013)

Practice	History in the Basin	Justification to be considered CSA	References
AgroForestry Systems	Although AgroForestry has not caught on as a popular practice in the region,	Agroforestry and silvopastoral systems can be a means of diversifying	FAO, 2013a Verchot et al., 2007

Silvopastoral Systems	Silvopastoral systems have been widely promoted since the founding of FPCRP, who initiated reforestation efforts of certain tree species in pastures, such as the black acacia and eucalyptus, and certain native species, including huarango (*prosopis pallida)*, elderberry (*sambucus)* and nacedero (*trichanthera gigantea*).	agricultural production and enhancing food security on small farms. Trees also serve to prevent erosion and therefore improve soil quality over the long-term. Furthermore, the content of carbon in (aboveground) biomass is typically higher than that of an otherwise equal, treeless terrain. Tree planting is known to increase carbon sequestration.	
Chemical Fertilizers **Chemical Pesticides**	Although most of these products are sold in farm stores in the city, over the last decade the large majority of farmers have stopped using chemical fertilizers and pesticides on their crops and started producing organically, developing their own natural pesticides and fertilizers. This shift can be attributed to the high prices of these products, as well as the institutional influence to produce organically. Many of the farmers we spoke to stressed that organic was healthier and safer for consumption.	The *efficient* – and minimal – use of chemical fertilizers and pesticides can contribute to increased global production. Reducing the use of chemical fertilizers is a primary way of reducing nitrogen oxide emissions. Furthermore, by increasing crop yields, these products can generate increase in carbon residue that leads to increased carbon stored in the soil. The increased availability and affordability of mineral fertilizers can contribute significantly to the restoration of carbon storage of soils and soils productivity.	Ploetz, 2007 UNFCCC, 2008 Smith et al, 2007 Follett, 2001
Greenhouse Cultivation	Some of the producers in the Basin area have greenhouses on their properties, many of which were funded by the United Nations' "Programa Conjunto." They are used largely for beans and vegetables, and many report a significant increase in productivity. They also can help improve soil quality. The major drawback reported by some farmers is the maintenance and replacement of structural	Greenhouses are adaptable to a variety of climatic conditions and desired crops. They products plants from strong winds and intense sun, creating conditions for higher crop production.	FAO, 2013b Follett, 2001

	materials.		
Composting ("Bio-Factories")	The introduction of the bio-factories was driven by the FPCRP, about 10 years ago. This project was enabled through financing from the UN's "Programa Conjunta." They are very popular and well liked among farmers in the region.	When applied correctly, composting manure organically can increase crop yields. Applying compost year after year can indirectly improve the supply of organic nitrogen by increasing the soil's humus content. Composting is also a noted measure to fortify food security in the face of climate change.	FAO, 2013b. Chilón, 2011
Crop Rotation	Crop rotation is the practice of growing a series of different types of crops in the same area in sequential seasons. Many farmers follow this practice, often learned through inherited knowledge from older generations.	Crop rotation reduces pest incidence and plant disease, thereby improving crop production and food security for farmers. An appropriate rotation of crops can increase the organic matter content in soil, increasing production.	Follett, 2001
Improved Forages	Improved forage species are often of better quality for cattle grazing. This practice is considered expensive, although some farmers in the area have begun to implement it on their farms with the support of FPCRP and the livestock association, Asprolgan. Cutting grasses are used (e.g. imperial grass), along with forage plants (e.g. marafalfa and buttercup).	Pasture improvement leads to better livestock nutrition and health, and therefore improved quantity and quality of dairy production. This bolsters food security for the household, and is an important cash product for many farmers.	Alcock & Hegarty, 2006
Minimal Tillage	This practice is not widespread in the basin and has never been promoted in the area extensively.	Minimal or no soil tillage decreases soil loss through erosion. This practice also increases the carbon content in the soil by preventing increases in soil respiration, which converts carbon dioxide.	Willey & Chameides, 2007
Improved Cattle Breeds	In the Basin region, Creole and Norman breeds (or "crosses") are most traditionally used. Some of the farmers have started to purchase semen injections to improve the breed of	Improved livestock breeds are more productive, and more adapted to the new conditions created by recent changes in climate.	Boadi et al. 2004

	their cattle, through the support of Asprolgan.		
Improved Seed Varieties	In the region, if and when the farmers purchase seeds, they are for horticulture. Many however, stated that they prefer their own seeds that are well-adapted to the region.	Improved varieties that tolerate, for example, high temperatures could be very useful in certain areas to adapt to climate change and contribute to food security. In addition, improved varieties can lead to increases in production, and generate increases in carbon residue that could cause increases in carbon storage in the soil.	FAO, 2013b. Follett, 2001
Integrated Pest Management (IPM)	In order to achieve a farm free of chemicals, many of the households have adopted IPM. Some examples including homemade sprays made from chili and garlic extracts, boil fern extracts, and of nettle and sage. Farmers also employ allelopathic cropping techniques, planting mustard or rue to attract pests away from other crops.	Climate change can lead to increases in temperature and changes in precipitation that can increase the incidence of pests and weeds. Being able to stop these pests and weeds will strengthen household food security by reducing losses. In addition, certain practices of IPM – where for example, instead of using broad-spectrum herbicides – less intensified production systems that reduce reliance on pesticides will also reduce the greenhouse gases that are associated with intensified production.	FAO, 2013b. Paustian et al., 2004
Irrigation **Water Tanks**	Some of the farmers in the region have irrigation systems that make more efficient use of their water. These systems are connected to the Piedras River Basin source. The FPCRP or the Programa Conjunto provided most of the materials needed to install these systems.	Improved water management is a basic adaptation strategy in regions where there are restrictions on the water supply, or in anticipation of a drought. In addition, a more effective irrigation system can improve the storage capacity of soil for carbon, through increases in production and waste.	Follett, 2001 Lal, 2004

	Some also have water tanks with 1000L capacity.		
Manure Management	Farmers practice manure management with large livestock on their farms. Some without – or with very few – cattle also employ this practice, but need to transport manure from neighboring farms. The manure is collect either for direct application in the fields, or to be used in composting.	When cattle manure is used as compost, it can help increase the yield of the crops or the pasture. This is can also generate increases in plant debris, which causes increases in carbon storage in the soil.	FAO, 2013b. Paustian et al., 2004 Follett, 2001
Crop Residue Management	A few farmers in the region have been using this practice for several years. Most of the farmers today prefer to use crop and weed residues in their composts.	Covering the soil with crop residues created microclimate conditions that favor decomposition and mineralization of organic matter. This practice also protects the soil from erosion. Furthermore, by leaving the residue in the fields, the farmers can increase the soil's carbon content, as these residues are the precursors for organic matter.	Smith et al, 2007
Live Barriers **Windbreak Barriers**	The use of live barriers and windbreak barriers was prompted by the FPCRP, as well as other projects through Programa Conjunto. The barriers in the Basin are mostly strips of tall forage grasses (e.g. guarango, elderberry, etc.).	This practice is implemented by some local farmers, who consider it very useful as an adaptation measure to protect crops and the house. Many reported an increase in the frequency and intensity of high winds. The implementation of hedgerows and windbreaks can also help in preventing soil erosion, and therefore potentially increasing production. Increases in yields can result in greater amounts of carbon residue that can lead to increased storage of carbon in soil.	Follett, 2001 Ellis-Jones & Manson, 1999
Intercropping	Intercropping is a common, traditional practice within *campesino* agriculture.	By associating certain crops, the farmers can ensure greater soil fertility.	West & Post, 2002 Rochette & Janzen,

	Many farmers plant maize, potatoes and beans together. Another common association are planting maize with squash.	For example, intercropping potatoes, maize and beans – the latter being in the legume family and has the ability to fix nitrogen in the soil – can therefore naturally fertilize the corn and potatoes. Intercropping also helps in controlling pests and weeds. Both of these benefits can reduce dependence on chemical pesticides and fertilizers, and thus the greenhouse gases associated with the chemical production cost will decrease. However, the fixation of nitrogen from legumes may also be a source of nitrogen oxide.	2005
Recovery of Native Seeds	The recovery of native seeds is an ancient cultural practice that has been taking place in the basin since many decades. The farmers claim that these indigenous varieties have increased production.	The use of native seeds that are adapted to local conditions have better production, and contribute to improving household food security. In addition, by increasing production, carbon residue and therefore carbon storage is increased in the soil.	Follett, 2001
Seed Staggering	Although this practice was introduced by FPCRP about five years ago, it is still not a very common practice among the *campesinos*.	Seed staggering can be a viable option for climate change adaptation, in that by having a crop grow in multiple stages at the same time, some of those stages might be more resilient than others in the event of severe weather (e.g. heavy rain). Seed staggering should not involve monoculture planting, but rather the ability to combine several crops.	FAO, 2013b.
Terraces, Contour Levees	This practice is not very common and is only used by farmers with very steep slopes on their properties, typically in the middle and	Terraces can increase yields by preventing soil erosion and improving soil quality. Contour levees, as a water drainage	Branca et al., 2011 Monteny et al., 2006

	higher zones.	mechanism in very wet areas, can cause productivity gains (and therefore carbon content).	
Pasture Rotation	This practice has been introduced and encouraged by the FPCRP and is commonly used in the Basin community. The most reported disadvantage associated with this practice is maintaining the fencing wire and posts.	Pasture rotation improves pasture quality and therefore yield per animal and per hectare. Furthermore, a system of rotational grazing is less intensive than other methods of grazing, and can increase production by providing the livestock access pasture more continuously. Grazing intensity and times can influence the growth of grass and other prairie flora, increasing their carbon content and thus affecting the level of accumulation of soil carbon. The carbon content in soils with optimum grazing systems are usually higher than in intensified grazing systems.	Conant & Paustian, 2002 Rice & Owensby, 2001

APPENDIX 2 – TABLES

Household Income

Table 5: Sources of Income by Household Type*

Household Type	Respondent	Sale from Ag Products	Wage Work	Gov Pension	Remittances	Eco-Tourism	Other	Total
Unpartnered, sole head (n=9)								
(n=5)	Male	4	0	1	2	1	0	8
(n=4)	Female	2	2	0	2	0	0	6
Partnered (non-intra) (n=10)								
(n=3)	Only Male	2	1	1	1	0	0	5
(n=7)	Only Female	6	4	3	1	0	1	15
Intra-Household Couples	Two Respondents							
(n=8)	Male	7	1	1	0	0	1	10
(n=8)	Female	8	1	1	1	1	0	12
Total (n=27)	**Total (n=35)**	29	9	7	7	2	1	55
TOTAL	**% of Respondents**	83%	26%	20%	20%	6%	6%	
	% of Households	81%	30%	22%	26%	7%	7%	

*Respondents were allowed to identify more than one source of income.

Gender Roles Activity

Table 6: Results from Perceptions of Gender Roles Activity (Source: Participatory, Community Workshop 7/18/2013)

CONCEPT	Women's Report		Men's Report	
	Blue*	Red	Blue	Red
Cabuya	13	0	13	0
Composting	4	10	7	5
Sale in Market	2	9	1	12
Vegetables	1	12	1	12
Trout	5	8	13	0
Rotational Grazing	5	8	13	0
Blackberries	2	12	12	1

Wage Laborer	6	7	13	0
Milking	4	10	7	6
Minor Species	0	14	0	13
Seed Recuperation*	1	13	2	11
Corn	3	11	8	5
Manure	7	5	0	13
Livestock	5	9	12	1
Cheese	1	13	1	12
Conservation Areas	13	13	13	13
Potato	4	10	13	0
Fence Repair	10	4	13	0
Cooking	2	12	2	11
Beans	4	10	12	1
Windbreakers	10	4	13	0
Peach	2	8	11	2
Staggered Planting	5	8	12	1

***Key: Blue = Male; Red = Female**

Table 7: Selected Results: Female Perspective on Gender Associations (Source: Participatory, Community Workshop 7/18/2013)

Concept	Female	Male
Cabuya	0%	100%
Compost*	71.42%	28.57%
Selling to Market	76.90%	15.40%
Vegetables	92.30%	7.70%
Trout	61.50%	38.40%
Crop Rotation	61.50%	38.40%
Blackberry*	85.71%	14.28%
Day Labor	53.80%	46.10%
Milking*	71.42%	28.57%
Minor Species	100%	0%
Seed Recuperation*	92.85%	0.07%
Corn*	78.57%	21.42%
Cheese*	92.80%	0.07%
Potato*	71.42%	28.57%
Livestock*	64.28%	35.71%

*Out of 14 responses

Table 8: Selected Results: Male Perspective on Gender Associations (Source: Participatory, Community Workshop 7/18/2013)

Concept	Female	Male
Cabuya	0%	100%
Compost	38.50%	53.80%

Selling to Market	92.30%	7.70%
Vegetables	92.30%	7.70%
Trout	0%	100%
Crop Rotation	0%	100%
Blackberry	7.70%	92.30%
Day Labor	0%	100%
Milking	46.10%	53.80%
Minor Species	100%	0%
Seed Recuperation	84.60%	15.40%
Corn	38.46%	61.50%
Cheese	92.30%	7.70%
Potato	0%	100%
Livestock	7.70%	92.30%

Cattle Ownership

Table 9: Reported Cattle Ownership by Household Type

Household Type	Respondent	Male HH Member	Female HH Member	Joint (Couple)	Family
Unpartnered, sole head (n=8)					
(n=5)	Male	3	0	0	1
(n=4)	Female	0	1	0	1
Partnered (n=19)					
(n=1)*	Only Male	1	0	0	0
(n=7)	Only Female	3	3	1	0
(n=16)	Two Respondents:				
(n=8)	Male	2	0	3	3
(n=8)	Female	3	0	4	1
Total (n=27)	Total (n=35)				

*Only one partnered male respondent interviewed alone reported to own cattle.

Table 10: Reported Cattle Ownership by Partnered Respondents

Respondent	Man	Woman	Couple	Family
Partnered Male Alone (n=1)	100%	0%	0%	0%
Partnered Female Alone (n=7)	43%	43%	14.2%	0%
Intra HH Male (n=8)	25%	0%	37.5%	37.5%
Intra HH Female (n=8)	37.5%	0%	50%	12.5%

Total Partnered Men (n=9)	33.3%	0%	33.3%	33.3%
Total Partnered Women (n=15)	40%	20%	33.3%	6.6%
Total Partnered Respondents (n=24)	37.5%	12.5%	33.3%	16.6%

Primary Decision-Making

Table 11: Reported Primary Decision-Making by Household Type

Household Type	Respondent	Male HH Member	Female HH Member	Joint (couple)	Family
Unpartnered, sole head (n=9)	Total				
(n=5)	Male	4	0	N/A	1
(n=4)	Female	0	2	N/A	2
Partnered (n=26)	Total				
(n=3)	Only Male	2	0	1	0
(n=7)	Only Female	0	2	4	1
(n=16)	Two Respondents:				
(n=8)	Male	2	0	3	3
(n=8)	Female	1	1	4	2
Total (n=27)	Total (n=35)				

Table 12: Reported Primary Household Decision Making – All Partnered Respondents

All Partnered Respondents	Respondent	Male HH Member	Female HH Member	Joint (couple)	Family
8 Intra-HH Males + 3 Males Alone = 11	Men (n=11)	36.4%	0%	36.4%	27.3%
8 Intra-HH Females + 7 Females Alone = 15	Women (n=15)	6.6%	20%	53.3%	20%
Total	(n=26)	19.2%	11.5%	46.2%	23.1%

Attendance at Community Events

Table 13: Attendance at Community Events in the Río las Piedras basin region, summer 2013 (Author Observation)

Event	Male Attendance	Female Attendance	Total Attendance
1st Empowerment Workshop (Universidad de Cauca)	14	8	22
2nd Empowerment Workshop	12	11	23

(Universidad de Cauca)			
Historical Timeline Activity (Field Team)	6	5	11
Participatory Community Workshop (Field Team)	14	12	26
Custodio de Semillas Workshop (FPCRP)	30	27	57
TOTAL	76	63	139
Proportion of Men and Women	76 – 63 = 13 13 / 63 = **20.6%**		

Preferred Sources of News

Table 14: Preferred Sources of News by Gender (Source: Pilot Survey, 2013)

NEWS SOURCE	All Male Responses (n=20)*	% Preferred - Male	All Female Responses (n=26)*	% Preferred – Female
1 = Family	1	5%	8	30.8%
2 = Neighbors	0	0%	2	7.7%
3 = Community Leaders	2	10%	3	11.5%
4 = Radio	4	20%	7	26.9%
5 = TV	8	40%	5	19.2%
6 = Cell Phones	1	5%	0	0%
7 = Workshops	3	15%	1	3.8%
8 = Other	1	5%	0	0%

* *Respondents allowed to select more than one source of news*

Table 15: Preferred Sources of News by Household Structure (Source: Pilot Survey, 2013)

NEWS SOURCE	**FREQ**	UnP. Men (n=5)	UnP. Women (n=4)	Part. Men (n=13)	Part. Women (n=13)	**Intra HH Choices**	Men (n=4)	Women (n=4)
1 = Family	9	0	**2**	1	**6**	HH #9	3, **4**, 5	**4**
2 = Neighbors	2	0	0	0	2	HH #12	**4**	3, **4**
3 = Community Leaders	5	**1**	0	1	**3**	HH #13	5, 6	1, 2
4 = Radio	11	0	**1**	**4**	**6**	HH #17	**4**	**4**
5 = TV	13	**3**	**2**	**5**	**3**	HH #18	**1**	**1**, 4
6 = Cell Phones	1	0	0	1	0	HH #19	**5**	3, **5**
7 = Workshops	4	**1**	0	**2**	1	HH #24	5	1
8 = Other	1	**1**	0	0	0	HH #26	5	3, 7

* *Respondents allowed to select more than one source of news*

Perceptions about Climate Change

Table 16: Reported Responses on Changes in Farming Activities due to Climate Change, by Household Structure (Source: Pilot Survey, 2013)

RESPONDENTS	**YES**, at least some activities have been modified due to changes in climate	**NO,** no activities have been modified because of the effects of climate change
Unpartnered Male (n=4)	2	2
Unpartnered Female (n=3)	2	1
Partnered Male (n=10)	4	6
Partnered Female (n=15)	11	4
TOTAL (n=32)*	19 (6 M, 13 F)	13 (9 M, 4 W)

** Not every participant responded to this question*

Knowledge, Use and Maintenance of Climate-Smart Practices (CSA)

Table 17: Reported Knowledge of CSA Practices by Gender (Source: Pilot Survey, 2013)*

CSA Practice	Men	Women	Average
AgroForestry	56%	53%	54%
SilvoPastoral Systems	63%	53%	58%
Chemical Fertilizer	100%	100%	100%
Chemical Pesticide	100%	100%	100%
Greenhouse	88%	84%	86%
Composting	100%	100%	100%
Crop Rotation	100%	100%	100%
Improved Forages	94%	95%	95%
Improved Cattle Breeds	94%	95%	94.5%
Improved Seed Varieties	81%	74%	77%
Integrated Pest Management	94%	95%	94.5%
Intercropping	94%	95%	94.5%
Irrigation	100%	100%	100%
Manure Management	100%	100%	100%
Minimal Tillage	13%	32%	22%
Crop Residue Management	88%	84%	86%
Live Barriers	88%	89%	88.5%
Recovery of Native	100%	95%	97.5%

Seed Varieties			
Windbreak Barriers	88%	84%	86%
Seed Staggering	81%	79%	80%
Terracing	75%	74%	74.5%
Pasture Rotation	81%	95%	88%
Water Tanks	100%	100%	100%
Average	**86%**	**86%**	**86%**

*Calculated as total practices known among the 23 CSA practices included on the survey.

Table 18: Reported Implementation of CSA Practices by Gender (Source: Pilot Survey, 2013)*

CSA Practice	Men	Women	Total*	Difference
AgroForestry	13%	5%	9%	8%
SilvoPastoral Systems**	63%	32%	46%	31%
Chemical Fertilizer	13%	5%	9%	8%
Chemical Pesticide	13%	16%	14%	3%
Greenhouse	25%	32%	29%	7%
Composting	94%	100%	97%	6%
Crop Rotation	81%	84%	83%	3%
Improved Forages	50%	89%	74%	39%
Improved Cattle Breeds	25%	37%	29%	12%
Improved Seed Varieties	19%	21%	20%	2%
Integrated Pest Management	75%	74%	74%	1%
Intercropping	69%	84%	77%	15%
Irrigation	81%	84%	83%	3%
Manure Management	88%	89%	89%	1%
Minimal Tillage	6%	11%	9%	5%
Crop Residue Management	75%	68%	71%	7%
Live Barriers	50%	63%	57%	13%
Recovery of Native Seed Varieties	94%	84%	89%	10%
Windbreak Barriers	50%	74%	63%	24%
Seed Staggering	56%	68%	63%	12%
Terracing	31%	37%	34%	6%
Pasture Rotation	63%	74%	69%	11%
Water Tanks	50%	58%	54%	8%
Average	**51%**	**56%**	**54%**	**5%**

*Calculated as total practices that are taking place on the farm, among the 23 CSA practices included on the survey.

** SilvoPastoral Systems was not included in the original survey, and we decided to distinguish it from AgroForestry after the first couple of weeks in order to capture a more accurate picture of

land use in the community. Other farmers had not heard of this practice at all, or lived in the lower region where property sizes were smaller and most households did not have large livestock.

Table 19: CSA Practice Use by Intra-Household Couples (n=8)

CSA Practice	Couples in Agreement	Couples in Disagreement
AgroForestry	HHs 12, 18, 19, 24, 26 - No HHs 17 - Yes	HH 9 – He (No), She (Yes) HH13 – He (Yes), She (No)
SilvoPastoral Systems	HH 13 – No HHs 19, 24, 26 – Yes	HHs 9, 12 17, 18 – He (Yes), She (No)
Chemical Fertilizer	HHs 9, 12, 13, 19, 14, 26 - No HH 17 – Yes	HH 18 – He (Yes), She (No)
Chemical Pesticide	HHs 13, 18, 19, 24, 26 – No HHs 17, 18 – Yes	HH 9 – He (No), She (Yes)
Greenhouse	HHs 9, 24 – Yes HHs 13, 17, 18, 19, 26 – No	HH 12 – She (Yes), He (No)
Composting	HHs 9, 13, 17, 18, 19, 24, 26 – Yes	HH 12 – She (Yes), He (No)
Crop Rotation	HHs 9, 13, 17, 18, 24, 26 -Yes HH 12, 19 – No	
Improved Forages	HHs 12, 18, 19, 26 - Yes	HHs 9, 13, 17, 24 – She (Yes), He (No)
Improved Cattle Breeds	HHs 9, 12 – Yes HHs 17, 18, 19, 24 - No	HHs 13, 26 – She (Yes), He (No)
Improved Seed Varieties	HHs 9, 13, 17, 18, 19, 24, 26 – No	HH 12 – She (Yes), He (No)
Integrated Pest Management	HHs 9, 12, 13, 24 – Yes HHs 17, 18, 19 – No	HH 26 She (Yes), He (No)
Intercropping	HHs 9, 12, 13, 17, 24 – Yes HHs 18, 19 - No	HH 26 She (Yes), He (No)
Irrigation	HHs 9, 12, 13, 17, 24, 26 – Yes HH 19 – No	HH 18 She (No), He (Yes)
Manure Management	HHs 9, 12, 13, 17, 18, 24, 26 – Yes	HH 19 She (No), He (Yes)
Minimal Tillage	HHs 9, 12, 17, 18, 19, 26 – No	HH 13 – She (No), He (Yes) HH 24 – She (Yes), He (No)
Crop Residue Management	HHs 9, 18 – No HHs 17, 24, 26 – Yes	HHs 12, 19 – She (No), He (Yes) HH 13 – She (Yes), He (No)
Live Barriers	HHs 9, 24, 26 – Yes HH 19 – No	HHs 12, 13, 17, 18 – She (Yes), He (No)
Recovery of Native Seed Varieties	HHs 9 – Yes, 12, 17, 24, 26 – Yes HH 19 – No	HHs 13, 18 – She (No), He (Yes)
Windbreak Barriers	HH 19, 24 – Yes	HHs 9, 12, 13, 17, 18, 26 – She (Yes), He (No)
Seed Staggering	HHs 9, 13, 24, 26 – Yes HHs 18, 19 – No	HHs 12, 17 – She (Yes), He (No)

Terracing	HHs 9, 17, 18, 19, 24 – No HH 12 – Yes	HHs 13, 26 – She (Yes), He (No)
Pasture Rotation	HHs 12, 13, 17, 19, 26 – Yes	HH 9 – She (No), He (Yes) HHs 18, 24 – She (Yes), He (No)
Water Tanks	HHs 12, 13, 27, 28 – No HHs 19, 26 – Yes	HH 9 – She (Yes), He (No) HH 24 – He (Yes), She (No)

Practices Considered Most Beneficial

Table 20: Frequency of CSA Practices Chosen by Respondents as Most Beneficial to the Farm (Source: Pilot Survey, 2013)

CSA Practice	Unpartnered Men	Unpartnered Women	Partnered Men	Partnered Women
AgroForestry	0	0	0	0
SilvoPastoral Systems	1	0	2	2
Chemical Fertilizers	0	0	0	0
Chemical Pesticides	0	0	0	0
Greenhouse	1	0	3	2
Composting	2	2	4	10
Crop Rotation	0	2	2	1
Improved Forages	0	0	2	1
Improved Cattle Breeds	1	0	11	1
Improved Seed Varieties	0	0	0	1
Integrated Pest Management	0	2	2	0
Intercropping	0	1	0	1
Irrigation	0	0	1	1
Manure management	2	1	2	2
Minimal Tillage	0	0	0	0
Residue Management	2	0	1	2
Live Barriers	0	0	0	3
Seed Recuperation	2	0	3	2
Windbreak Barriers	0	0	0	0
Seed Staggering	0	0	2	0
Terracing	0	0	0	0
Pasture Rotation	1	2	2	7
Water Tanks	2	1	1	0

Beneficial CSA Practices

Table 21: Qualitative evaluations of those three practices the interviewed farmer identified as most beneficial to their farms (Source: Pilot Survey, 2013; Translation by Author)

Blue – represents male respondent
Pink – Represents female respondent

Composting (code #6)	Benefits	Inconveniences
1	Better; Organic; Economical	Have to buy worms separately to start process.
2	Organic, Economic	None
3	Produces much fresh manure, byproduct can be used in IPM; Economical	None
4	Better manure	The need to collect, and at times pay for livestock excrement
5	Better Manure, Healthy, Clean	None
6	Good for pasture grasses	None
7	Very good manure	You need to work to obtain the livestock excrement
8	Very good manure	Loading and removing the manure is difficult
9	Manure	Lack livestock excrement for the compost because have few cattle
10	Cheaper	None
11	Manure	None
12	Good Manure	None
13	Never lacking in manure; can sell the manure produced	None
14	Improved manure; no chemicals	None
15	Good for pasture grasses	None
16	Manure for the home garden	None
17	Manure, and byproduct used in IPM	Difficulty buying inputs
Improved Livestock Breeds (code #9)	**Benefits**	**Inconveniences**
1	Improved production	Expensive
2	Improved Production	Expensive
3	Improved milk production	Expensive
Live Barriers (code #17))	**Benefits**	**Inconveniences**
1	Maintains the soil, composting, better pasture	None
2	Prevents erosion, protects the trees from wind	None
3	Cultivating pasture grass	Expensive
Crop Rotation (code #7)	**Benefits**	**Inconveniences**
1	Controls pests; lets the land rest	None
2	To maintain the food supply	Difficult
3	Lets the land rest	None
4	Improved pest control	None
5	To maintain the food supply	None
Integrated Pest Management	**Benefits**	**Inconveniences**

(code #11)		
1	No chemicals; cheaper; no diseases	None
2	Can use compost byproduct; works well	None
3	Works well; stops pests	Sometimes, but mostly very easy
4	Does not harm plants, cheap	None
5	Effective	None
6	Organic	None
7	Pest control	N one
Greenhouse (code #5)	**Benefits**	**Inconveniences**
1	Improved horticulture production	When there's an intense summer, the plants burn
2	Improved production; rain resistant	The plastic tarp degrades
3	Protect plants from wind and heat	When there is intense wind, the plastic tarp is damaged
4	Produce more vegetables; earn more money	Strong Winds
5	Higher production; lets land rest	None
Silvopastoral Systems (code #2)	**Benefits**	**Inconveniences**
1	Improved shade for the cattle, nourishes the soil, provides firewood,	Acacia root systems makes it difficult to plant
2	Shade for the animals	None
3	Shade for the animals, better nutrients for the soil	Insects
4	Shade for the animals	None
5	Trees and pasture grass grow; economical	None
Pasture Rotation (code #22)	**Benefits**	**Inconveniences**
1	Fast recuperation of pasture grass	More time is needed
2	Improves production; reduces the trampling of cattle	Would be better if I could put in irrigation, to keep the grass from becoming dry
3	Allows pasture grass to grow	Need to repair the fence posts
4	Cattle	When there is no rain / water
5	Pest control, Fresh pasture grass	Areas without shade
6	Allows for constant production from the cattle; higher protection	None
7	Always have pasture grass	Lacking in electrical wiring, fence posts and circuits
8	Improves milk production	None
9	Helps the cows	None
10	Provides animal feed; improves milk production	In the summer
Water Tanks (code #23)	**Benefits**	**Inconveniences**
1	Connects the hoses for irrigation	None
2	Water	None
3	Keep it close to the trout ponds; it's useful for the cows; makes getting water easier	None

4	Good for watering plants, giving to animals, saving water	None
5	Available water	None
Intercropping (code #12)	**Benefits**	**Inconveniences**
1	Garden, seeds, aromatic and medicinal plants; protects against pests	None
2	Saves time; good for potatoes	None
3	Improves productions, better use of space	None
Improved Forages (code #8)	**Benefits**	**Inconveniences**
1	Improved milk production	Expensive
2	Better for the cattle	Need to fertilize
3	Better for the cattle; improves milk production	Summer heat
4	Better for the cattle	None
Irrigation (code #13)	**Benefits**	**Inconveniences**
1	Garden	None
2	Sustains the pasture grass in the summer	Need more (water) pressure
3	Good for tomatoes, maintain a water source all year	None
Manure Management (code #14)	**Benefits**	**Inconveniences**
1	Self-produced (on the farm)	When the pasture with manure is far
2	Improved crops	None
3		Need to collect the manure from neighbors who live far away
4		Without cattle, need to collect from far away
5	Prepares better manure	None
6	Manure	Takes a lot of time; the cattle excrement is far away
7	Can make your own manure	None
8	Better manure for the pasture	Difficult to carry it
Indigenous Seed Recuperation (code #18)	**Benefits**	**Inconveniences**
1	So that you are not without	Difficult to conserve
2	Crops	Weevils can destroy the seed
3	Better production	Weevils
4	Production for the next year	Weevils
5	Improved production	None
6	Improved production	Weevils
7	No need to spend money on inputs	Difficult when there is intense rain
8	Don't need to buy anything	None
Crop Residue Management (code #16)	**Benefits**	**Inconveniences**
1	Manure	None
2	Cheaper	None
3	Conserving soil; protection from	None

	the wind	
4	Manure; maintains humidity, protects against erosion	None
5	Manure	None
Seed Staggering (code #20)	**Benefits**	**Inconveniences**
1	Available animal feed	None
2	Gives good results, don't lack in anything	None

**The left hand column represents the number of participants who chose that particular practice as one of the three most beneficial to the farm.*

CSA Decision-Making

Table 22: Decision-Making About the Implementation of CSA Practices, by Household Structure

Household Type	Respondent	Male HH Member	Female HH Member	Joint (couple)	Family
Unpartnered, sole head (n=9)	Total				
(n=5)	Male	15 100%	N/A	N/A	0
(n=4)	Female	N/A	7 70%	N/A	3 30%
Partnered (n=26)	Total				
(n=3)	Only Male	9 100%	0	0	0
(n=7)	Only Female	6 (6/16 = 38%)	3 (3/16 = 19%)	7 (7/16 = 44%)	0
(n=16)	Two Respondents:				
(n=8)	Male	8 (8/17 = 47%)	0 0%	6 (6/17 = 35%)	3 (3/16 = 19%)
(n=8)	Female	4 (4/23 = 17%)	5 (5/23 = 22%)	11 (11/23 = 48%)	3 (3/23 = 13%)
Total (n=27)	Total (n=35)				

*Not all respondents answered this question for every practice chosen to be beneficial

APPENDIX 3 – PILOT SURVEY

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Cuestionario sobre prácticas agrícolas, adopción de nuevas prácticas agrícolas, seguridad alimentaria y flujos de información

0. INTRODUCION

Primero que todo queríamos darle las gracias por su tiempo y por haber accedido a colaborar con nuestro trabajo. Nosotros somos tres estudiantes de maestría y estamos en la Cuenca Rio Las Piedras realizando el trabajo de campo para poder llevar a cabo la tesis de maestría. Nuestro principal objetivo es poder conocer la región, conocer sus actividades diarias y prácticas agrícolas así como su relación con las distintas organizaciones y proyectos de la zona.

Clarificar que somos estudiantes, hemos venido a aprender de ustedes y por tanto no hay respuestas "buenas" o "malas", simplemente lo que ustedes opinan y quieran compartir con nosotros. También clarificar que no hay ninguna compensación económica, su participación es voluntaria y no hay riesgos asociados a su colaboración con esta encuesta.

1. INFOMACION GENERAL

1.1 Información del hogar	
1.1.1 Nombre Vereda	
1.1.2 Nombre Finca	
1.1.3 Nombre Familia	
1.1.4 Situación en la Cuenca	
1.1.5 ¿Quién o quienes en este hogar son miembros de Asocampo?	
1.1.6 ¿Desde cuándo esta/n afiliados con Asocampo?	
1.1.7 ¿Quien tomó la decisión de afiliarse a Asocampo?	
1.1.8 ¿Cuál fue su motivación para formar parte de Asocampo? (solo si es miembro de Asocampo)	
1.1.9 ¿Quien asiste a las reuniones/talleres?	
1.1.10 ¿Tiene usted áreas protegidas en alguna de sus parcelas?	
1.1.11 ¿Por qué decidió ceder una parte de su tierra para protección natural? (Si procede)	
1.1.12 ¿Quien tomó la decisión de ceder estas tierras para protección (Si procede)	
1.1.13 ¿Ha recibido algun tipo de ayuda para establecer/mantener esta área protegida? ¿Qué tipo de ayudas? ¿De quién? (Si procede)	

1.2 Información del encuestado/a	
1.2.1 Nombre	
1.2.2 Sexo (M=Mujer, H=Hombre, A= ambos)	

1.2.3 Rol en la familia (hija, madre, padre,..)	
1.2.4 ¿Quien toma la mayoría de las decisiones para el hogar?	
1.2.5 ¿Cuantos años hace que vive en el área? ¿Desde qué año?	
1.2.6. ¿Contrata mano de obra agrícola o todas las actividades son realizadas por la familia?	
1.2.7 *(Solo si contrata mano de obra agrícola)* **¿Para qué actividades contrata mano de obra?**	
1.2.8 *(Solo si contrata mano de obra agrícola)* **¿Con qué frecuencia contrata usted mano de obra? = ¿Cuantas veces por semana, mes?**	

1.3 INFORMACION DE LA FAMILIA

1.3.1 Listado familiar

Nos gustaría ahora poder tener una información detallada de los miembros de su familia (solo los que viven en el hogar).

ID	Nombre	Relación familiar (Padre, Madre, Hijo, Hija…)	Edad	Nivel estudios (Sin estudios, nº años primaria, nº años bachiller, tecnológico, universidad)	Trabajo principal
1					
2					
3					
4					
5					
6					
7					
8					

1.3.2 Fuentes de ingreso-crédito	
1.3.2.1 ¿Cuáles son las principales fuentes de ingreso del hogar?	
1.3.2.2. ¿Tiene acceso a …? **- créditos** **- ahorro** **- préstamos familiares/ de amigos**	

2. PERFILES INSTITUCIONALES / AFILIACION DE GRUPOS

Nos gustaría ahora poder tener una información detallada sobre los tipos de organizaciones locales que existen en esta región, y de las cuales es usted u otras personas en el hogar miembro. También, queremos saber si usted u otras personas en el hogar se ven o se han visto beneficiados/as de algún programa.

Lista de Ejemplos de Grupos: ASOCAMPO; La Fundación de Rio Piedras; El Acueducto; Asprolgan (La Ganadería); La Junta de Acción Comunal; SENA; EcoHabitas; Grupo de Seguridad; etc.

Lista de Ejemplos de Programas: Familias en Acción; Madres de Familia; Programa Resa; Programa conjunto; Programa alertas agroclimáticas; etc.

Grupo	**Afiliación / Participacion**	**Miembro(s) de Hogar**	**¿Se siente cómodo participando/hablando en este grupo?**	**¿Cuáles son los beneficios de pertenecer a este grupo?**
Programa				

3. DIFUSION DE LA INFORMACION

Nos gustaría ahora poder tener una información detallada sobre el tipo de noticias que escucha, y como las recibe.

3.1 Fuentes de Noticias		
3.1.1 ¿En su vida personal, de quién recibe usted noticias? e.g. Los Hijos/Las Hijas	**3.1.2 ¿Tiene usted acceso a…?**	**3.1.3 ¿Cuál es su fuente preferida de noticias? ¿En cuál confía más?**
La Familia	*El Radio*	
Los Vecinos	*La Televisión*	
Los Amigos	*Un teléfono celular*	
Los líderes en la comunidad	*El Internet*	

3.2 Los Talleres / Las Reuniones			
3.2.1 ¿Asiste usted algunos talleres, capacitaciones o reuniones, y cuáles son?	**3.2.2 ¿Asiste usted estos talleres solo/a, o con otro miembro de su familia? ¿Quién/es?**	**3.2.3 ¿Con que frecuencia asiste usted y/o los otros miembros de la familia a los talleres?**	**3.2.4 ¿Qué tipo de información de los talleres, capacitaciones y/o reuniones es más importante/beneficiosa para usted?**

Ejemplos de tipo de información: Informes meteorológicos; Próximos eventos; Acontecimientos de la comunidad; Asistencia Técnica; Practicas Nuevas / Informas; Eventos Nacionales; etc.

4. TENENCIA DE BIENES Y PRÁCTICAS AGROPECUARIAS

Ahora pasaremos a intentar conocer mejor su finca, sus cultivos y las actividades que realiza diariamente.

4.1 TENENCIA DE LA TIERRA	
4.1.1 ¿Cuál es el área/superficie total de su finca?	**Área total: _____ (ha)**
4.1.2 ¿Cuantas parcelas tiene su familia? ¿Cuál es el uso de cada parcela? (e.g. en producción, en descanso, alquilada a otra persona, etc)	1) 2) 3) 4) 5)
4.1.3 ¿Cuál es el área de cada parcela?	1) 2) 3) 4) 5)
4.1.4 ¿Son estas parcelas alquiladas o de propiedad?	1) 2) 3) 4) 5)
4.1.5 ¿Cómo se adquirió esa parcela? (e.g. heredada, de compra, etc.)	1) 2) 3) 4) 5)
4.1.6 ¿Quién es el propietario de estas parcelas?	1) 2) 3) 4) 5)
4.1.7 ¿Hay un título legal para estas parcelas?	1) 2) 3) 4) 5)
4.1.8 ¿A nombre de quien están estos títulos? (e.g. ¿solo a nombre del marido/solo mujer/ambos/a nombre de los hijos/as)	1) 2) 3) 4) 5)
4.1.9 ¿Quién o quienes toma/n la mayoría de las decisiones agrícolas en la parcela?	1) 2) 3) 4) 5)

4.2. TENENCIA DE OTROS BIENES	
4.2.1 ¿Tiene usted algún vehículo en casa? ¿Quién lo utiliza? **¿Quién es el propietario?**	
4.2.2 ¿Tiene usted algún tipo de maquinaria agrícola? ¿Quién la utiliza? **¿Quién es el propietario?**	

4.3 ACTIVIDADES PECUARIAS				
4.3.1 ¿Podría nombrarnos TODOS los tipos de animales (ganado y especies menores) que tiene en su finca?	**4.3.2 ¿Qué cantidad de animales tiene?**	**4.3.3 ¿Quién es el propietario?**	**4.3.4 ¿Quién se encarga del manejo de los animales?**	**4.3.5 ¿Son para autoconsumo, para venta de carne o para venta de leche/ productos lácteos?**

4.4. ACTIVIDADES AGRÍCOLAS		
4.4.1 ¿Qué cultivos cultivaba usted/ o sus padres (dependiendo de la edad de la persona encuestada) **hace 25 años?**	**4.4.2 ¿Se cultivan los mismos cultivos ahora? Si no, ¿Cuáles han cambiado?**	**4.4.3 ¿Por qué razones ya no se cultiva/n?**

4.4.4 ¿Podría nombrarnos TODOS los cultivos que tiene en su finca?	**4.4.5. ¿Qué superficie está dedicada a este cultivo?** *Alternatively…* **¿Cuantas plantas/árboles tiene?**	**4.4.6 ¿Vende este producto o es para autoconsumo o ambos?**
4.5. OTRAS ACTIVIDADES de la persona entrevistada (Interviewee's Off-farm activities)		
4.5.1 ¿Qué otras actividades realiza fuera de su finca? (e.g. venta en el mercado, jornaleo, etc.)	**4.5.2. ¿Cuántas horas a la semana dedica usted a estas actividades?**	**4.5.3 ¿Hay alguna época del año en que realice más estas actividades?**

5. ACTIVIDADES PARA CADA CULTIVO

Nos gustaría ahora poder tener una información detallada de las diferentes actividades que realiza en su día a día.

5.1 PRODUCTOS DE MÁS IMPORTANCIA	
5.1.1 De los productos que cultiva/produce en la finca **¿Cuáles son los 2 productos que considera más importante para el autoconsumo?**	1) 2)
5.1.2 ¿Qué actividades son necesarias para producir este producto? (autoconsumo) **¿Quién realiza cada actividad?** **Maiz:** Preparación del terreno, Siembra, Deshierbe y aporque, Abonono?, Deshoje, Cosecha **Frijol:** Preparación del terreno, Abonado, Siembra, Aporque, Cosecha **Papa:** Preparación del terreno, Siembra, Deshierbe, Aporque, Abonado **Arverja**: Preparación del tereno, Abonado, Siembra, Cosecha	1) 2)
5.1.3 De todos los productos que ha mencionado antes **¿Cuáles son los 2 productos que considera más importante para la venta?**	1) 2)
5.1.4 ¿Qué actividades son necesarias para producir este producto?(venta) **¿Quién realiza cada actividad?** **Mora:** se pica, se repica, siembra, poda, cosecha **Café:** se desyerba y abono cada 6 meses	1) 2)

5.2 TOMA DE DECISIONES
Para cada una de los productos de 5.1, podría decirnos **quien decide** sobre…

PRODUCTO (cultivos y ganado)	Cuando sembrar	Cuando y cuanto abonar	Cuando recolectar	Tipo de alimentación animal	Uso (venta, consumo propio, trueque)	Uso del beneficio económico (dinero) obtenido con la venta

6. SEGURIDAD ALIMENTARIA

6.1 Los alimentos para el consumo	¿Qué productos normalmente compra? En promedio, ¿cuánto compran en un mes?
6.1.1 Consume Cereales (Arroz, maíz, el trigo, o algún producto elaborado con estos granos: pan, la galleta)	
6.1.2 Consume Raíces Y Tubérculos Y Plátano (¿Papas, camote, yuca, mandioca o cualquier otro alimento proveniente de raíces o tubérculos?	
6.1.3 Consume Verduras (Acelga, ají, ajo, apio, lechuga, alcachofa, albahaca)	
6.1.4 Consume Frutas (Naranja, Guanábana, Pina, Manzana, Mora, Lulo, Coco, Banano, Chirimoya, etc.)	
6.1.5 Consume Carne, Pollo, Despojos (Vaca, cerdo, cordero, cabra, cui, conejo, gallina,…)	
6.1.6 Consume Huevos (Huevos de gallina, o de otros animales)	
6.1.7 Consume Pescado y Mariscos	

6.1.8 Consume Legumbres/ Leguminosas/ Frutos secos (Fríjoles, arvejas, lentejas, garbanzo, guaba, haba, maní)	
6.1.9 Consume Leche y Productos Lácteos (Queso, yogurt, leche, etc.)	
6.1.10 Consume Aceites/ Grasas (aceite, grasa, mantequilla o manteca)	
6.1.11 Consume Azúcar/ Miel (Azúcar o miel o ambos)	
6.1.12 Consume Alimentos Diversos (¿Otros alimentos, como condimentos, café, té, gaseosa?)	

6.2 ¿Hay alguna época del año donde usted debe comprar más comida del exterior? ¿Alguna época del año donde no le quede maíz propio y lo tenga que comprar?	
6.3 ¿Puede recordar un año que fue muy seco? ¿Cómo fue que afectan a su seguridad alimentaria?	
6.4 ¿Puede recordar un año que fue muy mojado? ¿Cómo fue que afectan a su seguridad alimentaria?	
6.5 ¿Cuáles son los cultivos que pueden crecer en verano intenso?	
6.6 ¿Cuáles son los cultivos que pueden crecer en invierno intenso?	
6.7 ¿Tiene acceso a agua potable?	
6.8 ¿Cómo se tiene acceso al agua? (de pozo, de las tuberías,…)	
6.9 ¿Bebe usted directamente el agua o la hierve primero?	
6.10 ¿Hay alguna época del año en la que se tenga que ir a recoger el agua (ya sea para los cultivos o para el hogar)? ¿Quién es el encargado de ir a recoger el agua? (preguntar esto solo en caso afirmativo)	

6.11 ¿Cocina con leña?	
6.12 ¿De dónde recogen la leña? ¿Qué tipo de leña utilizan?	
6.13 ¿Quién se encarga normalmente de recoger la leña?	

7. CAMBIO CLIMATICO, PERCEPCIONES Y EVENTOS PASADOS

Nos gustaría ahora poder tener una información detallada sobre sus percepciones del cambio climático.

7.1 ¿Ha oído hablar del Cambio Climático?	
7.2 ¿Para usted, que es el Cambio Climático?	
7.3 ¿Cuando escuchó por primera vez sobre el Cambio Climático? ¿A través de quién?	
7.4 ¿Aparte de la primera vez, donde escucha normalmente noticias/información sobre Cambio Climático?	
7.5 ¿Ha notado algún cambio en el clima a lo largo de su vida? ¿Desde cuándo ha notado este cambio?	
7.6 ¿De qué manera ha notado que cambia el clima?	
7.7 ¿Considera que la temperatura promedio de los últimos 10 años ha aumentado o disminuido?	
7.8 ¿Qué partes de la producción/de su finca son o han sido afectados por estos eventos? ¿Cómo?	
7.9 ¿Han cambiado sus actividades (cotidianas o agrícolas) debido a estos cambios en el Clima? ¿De qué manera han cambiado?	
7.10 ¿Tiene acceso a un tipo de servicio o información sobre el Cambio Climático? (e.g. un grupo o una organización)	
7.11 ¿Qué recurso o tipo de información le sería útil para prepararse contra la variabilidad climática? ¿Qué le gustaría conocer del Cambio Climático?	

8. ADOPCIÓN DE PRÁCTICAS CLIMÁTICAMENTE INTELIGENTES

8.1 Listado de prácticas

	8.1.1	8.1.2ª	8.1.2b	8.1.3	8.1.4
Práctica	¿Conoce usted la práctica?	¿Está usted usando la práctica actualmente o la ha estado usando en los pasados 12 meses?	¿Cuáles de estas prácticas considera más beneficiosas? ***Marque hasta 3 prácticas***	¿Usaba antes esta práctica aunque ahora ya no lo esté haciendo?	¿Si pudiera, implementaría esta práctica? ó ¿Volvería a reintroducir esta práctica? ¿Por qué//Por qué no?
Sistemas agroforestales					
Fertilizantes químicos					
Pesticidas químicos					
Cultivo en invernadero					
Compostaje, biofábricas, producción de abono orgánico					
Rotación de cultivos					
Mejoramiento de forrajes					
Mejoramiento razas de ganado					
Uso de variedades mejoradas					
Manejo integral de plagas					
Cultivos intercalados/asociados					
Irrigación					
Manejo de estiércol					
Labranza mínima					
Rastrojos en campo					
Barreras vivas/barreras multipropósito					
Recuperación semillas autóctonas					
Barreras cortavientos					
Escalonamiento de siembras					
Terrazas, zanjas, diques en curvas de nivel					
Pastoreo rotacional					

Almacenaje de aqua					

8.2 Beneficios y dificultades de cada practica

De las practicas que usted utiliza en su finca, ¿cuáles son los beneficios y posibles inconvenientes que encuentra para cada una de ellas? (**de las marcadas como si en 8.1.2ª)**

Practica	Beneficios	Dificultades para implentación o manejo de esta práctica

8.3. Barreras para la implementación de practicas
De las practicas que usted ya no usa o nunca ha usado (8.1.3; 8.1.4):

	8.3.1	8.3.2	8.3.3
Práctica	¿Por qué decidió dejar de utilizar la práctica?	¿Qué debería de cambiar, para que volviera a usar esta práctica? ¿Qué es lo que necesitaría para volver a implementar la práctica?	¿Por qué no usa o no está interesado en usar esta práctica?

8.4 Fuente información para la introducción de nuevas practicas
De las 3 prácticas que usted considera más importantes (8.1.2b):

	8.4.1	8.4.2	8.4.3	8.4.4
Práctica (de 8.2b)	¿Por qué decidió empezar a utilizar la práctica?	¿Cuál es la principal fuente de información para esta práctica?	¿Quién tomó la decisión de empezar a implementar esta práctica?	¿Quién es responsable de llevar a cabo/mantener esta práctica?