

The Pennsylvania State University

The Graduate School

College of Agricultural Sciences

**CHOCOLATE AND CLIMATE CHANGE: INVESTIGATING GENDER DYNAMICS
OF SMALL-SCALE CACAO PRODUCERS IN LAMPUNG AND SOUTH SULAWESI
INDONESIA**

A Dissertation in

Rural Sociology and Human Dimensions of Natural Resources and the Environment

by

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Submitted in Partial Fulfillment

of the Requirements

for the Degree of

Doctor of Philosophy

August 2019

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ABSTRACT

Small-scale agriculture-dependent communities face increased pressures and challenges linked to anthropogenic climate change. While social-environmental systems gradually evolve to accommodate such variability, there is growing evidence to suggest that increased incidence of drought, flooding, and natural disasters exacerbates vulnerability of marginalized populations, such as small-scale commodity producers and more specifically, women. Small-scale agricultural producers in the Global South rely on crop production to meet basic needs and will experience the most severe impacts from climate change as they often lack resources and capacity to adapt. Due to current sociocultural landscapes, women are disproportionately affected by the impacts of climate change, facing economic, cultural, and social constraints with regard to access to paid employment, asset distribution, opportunities, and resources, often limiting them to unpaid care and labor tasks. Climate change impacts will likely overload women's workload and time burdens, and these disproportionate burdens will be exacerbated as these unpaid labor tasks, while both a critical component of household economic activity and household wellbeing, are often overlooked by development initiatives and capacity building programs.

This research study presents an intra-household analysis of gendered divisions of labor and its implication for household adaptive capacity to impacts of climate change for small-scale cocoa producers in Indonesia. In small-scale cocoa producing households, women's labor contributions are essential to the sustainable supply of cocoa. They are involved in all stages of cocoa production but are not considered the household farmer and as such, are often overlooked for capacity or skill building opportunities or trainings. Much of the current literature examining gender and small-scale cocoa production is contextualized to West Africa, the leading global

producing region of cacao. None has yet to examine the gender dynamics of small-scale cacao production in Indonesia, the third largest global producer of cacao.

Drawing on qualitative case studies from two Indonesian provinces, this study explores intra-household dynamics of small-scale cacao producers to understand household gender divisions of labor, and how men and women perceive and adapt to impacts of climate change. Primary qualitative data were collected over a seven-month period in 2017 in two Indonesian provinces (Lampung and South Sulawesi), including 11 focus group discussions with 117 participants, and 49 in-depth interviews with men and women small-scale cacao producers and women within small-scale cacao producing households. Quantitative data on divisions of labor was assessed from a random sample of 221 small-scale cacao producers.

This analysis presents the first evidence of divisions of labor in cocoa-producing households in the Indonesian context. It employs contextual and gender-disaggregated quantitative data to reveal intra-household dynamics on decision-making, time allocation, divisions of domestic and agricultural labor, and how these relate to (in)abilities to adapt to impacts of climate change. Results show that women are actively involved in small-scale cocoa production in Indonesia, albeit to varying degrees. Their participation is shaped by socio-cultural norms, and hindered by a lack of access to training, skill building, or resources. Although men are considered the “chocolate farmer” (as cocoa farmers are referred to in Indonesia), women are responsible for several production and post-harvesting steps and make critical adaptation decisions related to optimal production and sale of household cocoa production, particularly in light of a changing climate.

Climate change has tangible impacts on both men and women’s activities in the cocoa value chain, requiring various adaptation strategies that have implication for production. Men

and women interpret and discuss impacts of climate change differently, as men consider these in terms of agricultural production whereas women describe impacts with regard to household wellbeing. This research provides qualitative insights into how climate change impacts men and women within the same household differently, and how men and women are able to respond to those impacts. Policy, programming, and further research must address intra-household dynamics and the women's labor role in family farming as well as income-generating activities. And as global demand for cacao rises and impacts of climate change increase with severity and frequency, it is essential to address women's participation in the Indonesian cocoa value chain.

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Acknowledgements

This dissertation research would not have been feasible without the multitude of support and encouragement I've received from many people (spanning several continents) throughout the process. Over the past four years, I have been inspired, challenged, and supported by countless mentors, colleagues, friends, collaborators, and family who I couldn't possibly give the proper thanks required in a short acknowledgements section. Here is an attempt, but it is no way comprehensive.

At the International Center for Tropical Agriculture Asia, thank you to Dr. Peter Laderach and Tiffany Talsma for their support, guidance, logistical help, and feedback in pushing this research forward, and for facilitating many key connections in the field to make this data collection possible. To colleagues at Swisscontact SPCP, thank you for your assistance in establishing connections throughout South Sulawesi and for the field support. To my two translators, Ari and Aksan, your company made long field days even more enjoyable and your insights were indispensable. And of course, to the many farmers who graciously spent their time speaking with me, sharing their perspectives and challenges, and opening their homes – this research is indebted to you.

I would like to highlight and thank the institutions that have funded this research, including the Borlaug Graduate Research Fellowship for Food Security, the National Geographic Young Explorers Program, and the Inter-institutional Center for Indigenous Knowledge at Penn State. Obviously without this support, this entire research process would not have been feasible.

To Dr. Deanna Behring, a longtime mentor and continuously enthusiastic supporter of my work and development as an international researcher, I cannot thank you enough for your continued support and guidance. My doctoral committee at Penn State: Drs. Carolyn Sachs, Ann Tickaymer, Dan Azzara and Siela Maximova, many thanks for providing indispensable insight, constructive criticism, feedback, and direction as my ideas and plans progressed, as well as many helpful comments throughout the defense process. In particular, thank you to my advisor Dr. Mark Brennan for always being supportive and open to my ideas, no matter how large and abstract, and taking the time to distill them into concrete and investigable questions. Your guidance and support throughout these past years have been immeasurable.

To my Kenley roommates, Waffle Shop crew, sisters, parents, and countless other friends – thank you for your unwavering support and encouragement during these past years navigating graduate school, international research, and life. And finally, to Porter: the best partner I could have asked for. You have always been the most supportive of me following my goals, even as my research takes me around the world, sometimes for weeks and months at a time. And to Ted: our adorable, nutty rescue pup that was the best writing partner while finishing this dissertation. I love you both.

Chapter 1. Introduction

Since the 1995 Fourth United Nations World Conference on Women in Beijing, gender mainstreaming has been established as a major global strategy for the promotion of gender equity and women's empowerment at every level. From the transition of the Millennium Development Goals (MDGs) to the Sustainable Development Goals (SDGs) in 2015, gender has remained a critical component and measurable indicator of success throughout the entire seventeen-point framework. Unlike the MDGs, the SDGs incorporate an entire goal dedicated to gender equality (goal 5) as well as indicators of gender sensitivity and mainstreaming throughout the other sixteen goals (Koehler 2016). Goal 13 highlights the need for climate action, under which approaches to reducing vulnerabilities for marginalized groups are needed. The nexus of climate change and gender equality issues are of timely and critical importance, as is understanding unique and complex intersections of vulnerability and adaptive capacity that marginalized groups – such as women – harness and possess.

Climate change has serious implications for the current and future state of agricultural production, particularly for high value commodity crops that are highly dependent on specific climatic conditions for optimal growth, such as cacao (Beddington et al 2012; Brown & Funk 2008; Burke & Lobell 2010; IPCC 2014; Morton 2007; Pye-Smith 2011; Schmidhuber & Tubiello 2007; Thornton 2012). More importantly, it has serious implications for the farmers that rely on cacao's production to sustain their and their families' livelihoods (Kelly & Adger 2000; McCarthy, Lipper & Branca 2011; Morton 2007). Women, in particular, are overlooked in the global discourse surrounding climate change, despite their being disproportionately impacted by climate variation (Khamis et al 2009; Mainlay & Tan 2012). The reality is that women and girls

are neither entirely vulnerable nor unique agents of change, rather complex sociocultural norms and established gender roles unique affect the ways in which women are impacted by and able to respond to the impacts of climate change (Khamis et al 2009; Mainlay & Tan 2012). Bodies of literature tend to depict women as one homogeneous victimized group, ignoring the complex inequalities that exist across women, geographic and social contexts, and cultures to harness adaptive capacity and reduce vulnerabilities.

While much of the climate change research has focused on investigating and quantifying the biophysical impacts, the social impacts, particularly those that are gender disaggregated, are not as well understood. Albeit growing, there is limited understanding of how men and women perceive, are impacted by, and able to adapt to climate change differently (Kaisjer & Kronsell 2014). Specifically, in Indonesia, the third largest global producer of cacao and greenhouse gas (GHG) emissions, there is a gap in the literature regarding the gender dynamics of small-scale producers in response to climate change. This dissertation explores the gender dynamics in response to climate change for one of the most vulnerable groups in the world: small-scale commodity farmers. Based on seven months' worth of qualitative and quantitative data collection, this research employs a feminist political ecology perspective to male and female small-scale cacao farmers' perceptions, vulnerabilities, and adaptations to impacts of climate change in two provinces of Indonesia.

Short-term climate variability and long-term climate change have serious implications for sustaining rural livelihoods that depend on agricultural production (Beddington et al 2012; Burke & Lobell 2010; IPCC 2014; Morton 2007). The Intergovernmental Panel on Climate Change (IPCC) predicts increases in global mean temperatures between 1.1°C and 4.0°C by the end of the 21st century, but also acknowledges the vast amount of uncertainty regarding the intensity

and distribution of climate variability across different geographic locations (IPCC 2014; Pye-Smith 2011). The various biophysical effects of climate change will intensify environmental, biological, and social risks (Morton 2007; Pye-Smith 2011). These conditions hold serious implications for all dimensions of food security predominately in rural areas in developing countries, including food availability, access, utilization and stability (IPCC 2014; Schmidhuber & Tubiello 2007). Included in these risks is the global farmers' capacity to produce viable harvests each season, both for meeting global demand as well as sustaining their livelihoods (IPCC 2014; Wheeler & von Braun 2009).

Small-scale producers, particularly in developing countries, generally rely on agriculture to meet their basic needs and will most likely experience the most severe impacts from climate change since they often lack the resources and capacity to adapt (Kelly & Adger 2000; McCarthy, Lipper & Branca 2011; Morton 2007). Women, in particular, are of the most marginalized and vulnerable groups, often limited in their ability to build adaptive capacity, gain access to necessary resources or opportunities, and are the least empowered (Agarwal 2001). Due to current sociocultural gender norms, relations and practices, women and girls are disproportionately affected by the impacts of climate change (Skinner 2011). They face economic, cultural, and social constraints regarding their access to paid employment, asset distribution, opportunities, and resources, often limiting them to unpaid care tasks that depend on climatic factors, such as subsistence agriculture or water collection (Agarwal 2001; Jost et al 2015). Women are generally viewed as vulnerable beneficiaries rather than capable change agents with skills, knowledge and experience to contribute to solutions (Jost et al 2015; Nightingale 2006; Rocheleau 1996; Skinner 2011). According to Bennett (2005), "climate change has pervasive and far-reaching social, economic, political and environmental

consequences. The challenge cannot be met without the collective power and knowledge of women and men” (2). The effects of climate change and natural hazards are also socially differentiated (Ray-Bennett 2009). Social factors, like cultural attitudes, religious practices, caste, and the legal system influence gender roles, responsibilities, and decision-making authority (Cornwall 2001; Mollet & Faria 2013). However, the nature of how social relationships and contexts shape climate change adaptation is significantly less explored in the literature (Alston 2013; Onta & Resurreccion 2011).

Assessing vulnerability is an important, albeit complicated, task for researchers and practitioners to fully understand the landscape in which smallholders, gender roles, and climate change interact. Vulnerability is assessed via exposure, sensitivity, and adaptive capacity (IPCC 2014; Sietz, Sabino & Ludeko 2012). Locally-based indexes are important sources of information as they assess the types of changes that are commonly utilized by particular regions and intensity (Sietz et al 2012). Additionally, farmers’, household members’, and local community members’ perceptions of climatic changes and its impacts are crucial to assess, as they indicate when and how climatic threats are first recognized and responded to as well as the predominance and effectiveness of externally or internally generative adaptive solutions. Viable adaption strategies, or inhibitions to adoption, will most likely be identified when including local and stakeholder perceptions into research (Chaudhury et al 2012; Gbetibouo 2009). The need for adaption is imposed upon smallholders by uncontrollable effects of climate change and is facilitated through increasing resilience of these localities to respond. Developing strategies to strengthen local resiliency that account for gender differences will contribute to the adaptive capacity to respond to climate change and its risks (Nelson et al 2007; Skinner 2011).

The human dimensions of climate change are particularly relevant to the smallholders producing and relying on high-value commodity crops, such as cacao, to support their livelihoods. Cacao is heavily reliant on specific climatic conditions for optimal growth, thus its production is highly vulnerable to climate change (Läderach et al 2013; Läderach et al 2010). Indonesia is the third largest global producer of cacao; 70% of its national supply is produced by 400,000 small-scale farmers and their families, who are dependent on only cacao yields for their source of income and livelihoods (Yasa 2009). Farmers must maintain high or at the very least, sufficient, yields each harvest to have purchasing power in order to uphold their livelihoods (Achterbosch et al 2014). Men and women both hold active roles in cacao production and post-harvesting in Indonesia; however, these roles vary across regions and there is a lack of literature regarding their full extent. The Indonesian cacao sector has experienced tremendous growth over the past 25 years; yet, the impacts of climate change are exacerbating the constraints already faced by Indonesian small-scale cacao farmers as well as the bottlenecks faced by the private sector in securing a sufficient quantity of quality cacao beans. Cacao production is estimated to decline by up to 6% in El Niño Southern Oscillation years (Läderach et al 2010; 2013). As a strategic and important source of global cacao, Indonesia has received significant attention to increase production in the face of climate change. It is essential that production increases are conducted in a sustainable and climate-smart way that supports rural livelihoods and integrates the empowerment and voices of men and women in local communities. Best practices and adaptive strategies must be integrated with an understanding of local adaptive capacity to effectively combat climate change for smallholding cacao producers throughout Indonesia.

As global demand for cacao continues to increase, and given smallholders, particularly women, are among the most vulnerable and impacted groups of people by climate change, there

is a current and urgent need to address these issues (Alston 2013; IPCC 2014; Skinner 2011). The future of climate change's impact on rural livelihoods requires more research, particularly on best mitigation and adaptation practices for smallholder farmers utilizing a gender-sensitive approach, understanding the human dimensions of climate change and integrating it with development planning, and regional-specific climate change knowledge (IPCC 2014; Wheeler & von Braun 2009).

One such solution is the promotion of climate smart agriculture (CSA), an approach used to transform and reorient agricultural development in light of the new realities and complex challenges posed by climate change in pursuit of sustainability and global food security (Lipper et al 2014). According to FAO (2013), CSA is “agriculture that sustainably increases productivity, enhances resilience (adaptation), reduces/removes GHGs (mitigation) where possible, and enhances achievement of national food security and development goals”. This research explores how women's empowerment in small-scale cocoa production has the capacity to promote CSA and vice versa.

This research employs a mixed-method comparative case study approach to understand the human dimensions of climate change for small-scale cacao farmers in Indonesia. This dissertation is rooted in a gender-sensitive approach, such that feminist theories and perspectives are utilized and applied, and ultimately, the goal is to understand the differing ways in which men and women contribute labor to cocoa farming, and perceive, are vulnerable to, and adapt to the impacts of climate change. This research aims to answer three overall questions, accompanied by specific objectives, as displayed in Table 1.

Table 1-0-1 Research Questions and Objectives

RQ1.	What are the gender roles in small-scale cacao producing households in Lampung and South Sulawesi, Indonesia?	
	O.1.	Assess division of labor and time allocation for activities
	O.2.	Assess decision-making patterns within the household
	O.3.	Assess levels of community participation
RQ2.	How do men and women within small-scale cacao producing households perceive impacts of climate change?	
	O.1.	Assess definitions of climate change [causes and impacts] by men and women
	O.2.	Assess perceptions of fear, highest risks, and worry related to climate change and for the future by men and women
	O.3.	Assess perceptions of impact on household food security and health by men and women
	O.4.	Assess perceptions of impact on agricultural and income generating activities by men and women
RQ3.	What strategies do men and women within small-scale cacao producing households employ to adapt to impacts of climate change?	
	O.1.	Assess how men and women perceive, access, and utilize available resources to respond
	O.2.	Assess which specific strategies (i.e., how resources are leveraged) men and women use to adapt to impacts of climate change

Using a mixture of a household survey, key informant interviews with stakeholders across the cocoa value chain and focus group discussions and in-depth interviews with men and women from small-scale cacao producing households, this dissertation seeks to answer the above questions. The following chapters present: a thorough review of the relevant literature (Chapter 2), a detailed theoretical context (Chapter 3), description of employed methods and measures (Chapter 4), results (Chapter 5), and discussions, recommendations, and conclusions (Chapter 6).

Chapter 2. Literature Review

This research explores the nexus of gender, climate change, and small-scale agriculture, fundamentally looking at emergent power relationships situated within a localized context to better understand how individuals can employ strategies to adapt (or fail to adapt) to impacts of climate change. A review of relevant research is presented to understand the current state of knowledge and background regarding these several intersecting concepts. With the establishments of the Sustainable Development Goals (SDGs), gender became an important global indicator of progress, such that a gender indicator was included under each of the seventeen goals and comprised one entire goal. The shift from the Millennium Development Goals (MGDs) to the SDGs signified a global shift in prioritizing gender as an important indicator of progress, as well as identifying climate change and environmental issues of justice as important domains under which the global community must address to progress. This literature review first presents a discussion of this global shift to lay a foundation as to why and how this research study fits within the current global discourse of international development. A discussion of women in Indonesia is then presented to better understand the interaction of gender, feminism, self-identity, and religion situated in the Indonesian context. As this research study focuses on the intersection of gender, climate change, and small-scale commodity agriculture, the following sections present critical discussions describing and linking these general concepts. A discussion of the global discourse of climate change and justice is presented next, followed by climate change and agriculture (focused on cocoa), and climate change and gender. And finally, a discussion and description of intersectionality as a critical praxis is presented.

Gender as a Global Indicator

The UN member states adopted the 2030 Agenda for Sustainable Development on September 25, 2015. This agenda provided a revised global framework for advancing sustainable development, an update from the previous Millennium Development Goals (MDGs). The MDGs established an eight-point framework for eradicating poverty and promoting gender equality, education and environmental sustainability. While it established quantifiable targets for member states to reach by 2015, they weren't hailed as successful in motivating or enabling states to reach these targets. The Sustainable Development Goals (SDGs), adopted and accepted at the expiration of the MDGs, provide a new global framework from which to achieve these similar goals. However, the shift from MDGs to SDGs represents a shift in fundamental thinking regarding these goals and development as a whole. Additionally, this shift represents a more accountable and inclusive approach to ensuring *all* human rights and enabling member states to reach these goals.

From Millennium Development Goals to Sustainable Development Goals

The SDGs outline a seventeen-point global framework for UN member states to follow for advancing the three dimensions of sustainable development: economic, social and environmental (Koehler 2016). The SDGs are a revision and expansion of the MDGs – as the MDGs were criticized as ineffective in guiding member states to achieve the goals (Esquivel 2016; Sen & Mukherjee 2014). In contrast to the MDGs, the SDGs were established in a commitment to realizing human rights and acknowledging the interrelated links between inequality, marginalization and poverty. The vision of the 2030 Agenda is more nuanced and complex than that of the previous agenda (Fukuda-Parr 2016; Koehler 2016).

The MDGs were conceived in a top-down bureaucratic approach that failed to resonate with the realities and people with whom they were intended to impact (Fukuda-Parr 2016). While Norton & Stuart (2014) valued the simplified structure and inclusion of measurability in the MDGs in providing a framework around which everyone could rally, Fukuda-Parr (2013) cautioned against this. Reducing complex challenges – such as development – to simplified constructs led to a distortion in actual policy and program implementation to over-focus on reaching the goal while ignoring the multifaceted objectives causing them; it also led to an undermining of human rights (Fukuda-Parr et al 2014; Merry 2011). Koehler (2016) addresses the establishment of the SDGs in a human rights approach that represents a fundamental global shift in understanding the complex nature of development – one that incorporates social, political and sustainable dimensions. And it inaugurates the link between human rights and the quest for a healthy planet for all on a global scale.

The MGDs were too specific and narrow in their focus and quite frankly, not as complex as needed to establish a framework that integrates all interrelated aspects of the established goals (Fukuda-Parr 2014 2016). They simplified extremely complex issues and, as harshly analyzed by Antrobus (2006), they served as a “major distracting gimmick” that undermined local agendas and political dynamics. Additionally, the MDGs also only included some of the points listed from the major UN conference agendas during the 1990s. Major challenges, such as inequality, unemployment and stagnant wages, climate change, financial market volatility, and migration, were left out (Fukuda-Parr 2016). In response to the frustration felt and expressed by stakeholders across the globe regarding the MDGs inefficiency and oversimplification, the SDGs were consciously set up as a process of political negotiations over three years. And in contrast

with the MDGs, the SDGs were developed with the input and direct consultation with different groups from civil society (Norton & Stuart 2015).

In many places where the MDGs failed, the SDGs were aimed to reverse and redirect on a stronger and more effective course. The MDGs, were dubbed the “Minimum Development Goals” (Harcourt 2005, 1) as a result of the top-down bureaucratic approach in which they were conceived (Sen & Mukherjee 2014). Poverty alleviation was viewed solely as a result of economic inequalities, not addressing the many intersectional factors that cause them; they also divorce poverty from peace and human rights initiatives (Esquivel & Sweetman 2016). Themes such as inequality and sustainability were altogether absent from the MDGs, which many scholars believed to have done injustice to the Millennium Declaration (Kabeer 2010; Saith 2006; Sen & Mukherjee 2014; Vandermoortele 2012).

The MDGs were also considered a North-South aid agenda; not all of the goals were relevant to developed countries (Fukuda-Parr 2016). According to Fukuda-Parr & Hulme (2011) the MDGs were conceived by development ministers and heads of development agencies seeking a new rationale for aid in post-Cold war global politics and neoliberal globalization. However, the SDGs incorporated the perspectives and input from civil society and serve as global agenda for sustainable development (Fukuda-Parr 2016). The goals and targets are relevant for all countries – from the USA to Sierra Leone.

Additionally, the SDGs call for an accountability framework, such that while they are universal in character, they “need to be adapted to national contexts, according to specific sets of constraints and opportunities” (CDP 2015, 1). While the MDGs set forth biased metrics which proved to be unfair to countries farthest behind, the SDGs’ establishment of a global accountability framework leaves room for country-specific adaptation (Fukuda-Parr 2016). This

aspect is critical in understanding how the SDGs could play a more productive role in international policy than the MDGs.

SDGs for Gender Equity, Gender Mainstreaming and Women's Empowerment

The Journal of *Gender and Development* dedicated the first issue of their 2016 volume to the SDGs, to understand and evaluate how they might change or impact the ways in which gender is accounted for in the global politics of development. The contributors to this issue are women activists and advocates, who were part of the development process for the SDGs. However, as the SDGs have yet to be in place for long enough to assess measurable impact compared to the MDGs, Esquivel & Sweetman (2016) qualify these evaluations as tentative, by “assessing the SDGs’ potential, while cautiously embracing them” (2).

Gender Equity vs. Equality

Gender equity refers to the equivalence in life outcomes for women and men. It incorporates an understanding for men’s and women’s different needs, preferences and interest, and it requires a redistribution of power and resources (achieving empowerment) (de Waal 2006). Achieving gender equity – also referred to as substantive equality – is more than achieving equality of opportunity; it requires transformational change to address the power structures at play (Reeves & Baden 2000). The SDGs recognize the fundamental need to first address human rights – including women’s rights – over economic interests and to eliminate social and structural barriers for women’s ability to realize their human rights. These include “political issues” of sexual and reproductive rights and unpaid care – which were previously perceived and treated as

too “private, too sensitive, or irrelevant to the concerns of development” (Fukuda-Parr 2016, 47). In this sense, the SDGs’ framework is broader and potentially more transformative by the way they address many more aspects (in the goals and targets of goals) of the complex realities of women’s lives (Fukuda-Parr 2016; Koehler 2016).

Each goal has at least one target that addresses the need to incorporate an understanding and perspective of the unique ways in which women and girls experience the reality of the goal. While there is a goal established solely for achieving gender equality and women’s empowerment (Goal 5), it is not a silo goal, as it was for the MDGs (Sen & Mukherjee 2014). Gender equality is incorporated into every one of the seventeen goals as a target. For example, Goal 6 is to “Ensure availability and sustainable management of water and sanitation for all,” under which are several targets, and target 6.2 is: “By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations” (United Nations 2015, 18). Goal 13, “Take urgent action to combat climate change and its impacts” includes a sub-target, 13.b: “Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth, and local and marginalized communities” (United Nations 2015, 23). The goals and targets of the SDGs address and incorporate the many issues that civil society groups or developing countries believe will address the power structures that produce and reproduce gender inequality and poverty. By addressing these complex aspects across all goals, the SDGs provide a potentially more transformative framework from which the global community can focus on and achieve gender equity.

Gender Mainstreaming

Gender mainstreaming, a term and practice adopted at the 4th World Conference in Beijing, is the strategy that involves going beyond just increasing the number of women participating in development projects by incorporating an increased gender perspective across all aspects of development (de Waal 2006). The ultimate goal of gender mainstreaming is to achieve gender equality by “transforming the mainstream” (de Waal 2006, 209). Gender mainstreaming is often included and measured in the implementation of a project rather than the outcomes (Moser et al 1995). Gender mainstreaming seeks to “remedy patterns of gender inequality as it focuses on the transformation of gender norms and values” (de Waal 2006, 210).

The SDGs represent a considerable shift from the MDGs for gender mainstreaming in two ways. First, as explained in the above section, they incorporate targets for gender equality under each of the 17 goals. This brings gender into question across the goals and calls for stakeholders to bring into gender perspectives for the process of strategizing implementation in achieving each goal. Second, the SDGs open the framework for national adaptation in a way that challenges each nation to think about their structural and systematic inequalities *across* the goals, not just for a silo gender equality goal. The SDGs also challenge nations to think about power in the multifaceted, intersectional and complex ways that their women experience them – in public/private spheres; marginalization in political, social and economic leadership; reproductive and sexual rights/bodily autonomy (Kabeer 2010; Koehler 2016) – in other words, to transform their mainstream. As explained by Koehler (2016), “no economic, ecological, social, or political issue is gender-neutral. Hence, all SDGs relate to gender issues” (56).

Women's Empowerment

Empowerment, as understood by Batliwala (1994) and Sen & Mukherjee (2014, 190), is the “transformation of unequal power relations,” including the processes by which those unable to exercise agency or autonomy gain such abilities. Empowerment requires external resources and internal capacities, which shape people’s ability to act upon decisions or perceptions and lead their desired path in life (Sen & Mukherjee 2014). It requires shifting these unequal power structures experienced by women, but also in shifting the consciousness and agency that challenge patriarchal structures (Batliwala 1994; Sen & Mukherjee 2014). Empowered women are not only able to access resources or participate in politics and public life, but also enjoy autonomy of their bodies, integrity and freedom from violence (Sen & Mukherjee 2014). The actual empowerment of women cannot be done without addressing the complex inter-linkages of gender inequalities that individual women experience daily (Sen & Mukherjee 2014).

While the SDGs call for women’s empowerment and inequality reduction across all of the goals, the implementation of such goals are really the crux to empowering women. It is the dismantling of social, economic, structural, or political barriers that leads to the equalization of power relationships and women being able to exercise agency and autonomy. The SDGs provide thin improvement over the MDGs in laying out potential policy changes or interventions to dismantle these barriers (Koehler 2016). They do include pointed calls for policy change or action, but guidance for implementation of these changes are vague (Koehler 2016). For example, Goal 5 calls for “reforms to give women equal rights to economic resources, as well as access to ownership and control over land and other forms of property, financial services, inheritance and natural resources, in accordance with national laws” (UN 2015, 17). This is an actionable call for policy change, which would ultimately bolster women across nations to

realize empowerment but means for implementation or allocation of resources to address this change is missing, a major flaw of the SDGs.

Are the SDGs a Productive Policy?

In one sense, the SDGs seem like lofty principles only accessible to a few compared to the many. They are written in a few majority languages and kept in places privy to those only with access to the internet or a physical copy, excluding the world's poor and marginalized. However, these goals and similar international agreements of the like are potentially impactful by directing policy decisions and resources to social goods (Esquivel & Sweetman 2016). Whereas the MDGs were generally viewed as a donor driven strategy, they did little to challenge the structural causes of poverty and inequality (UNRISD 2010). They failed to acknowledge or address the complex interlinking factors of gender inequality (Sen & Mukherjee 2014). From collecting and incorporating the voices of civil society (including women's rights and feminist movements) into their strategic development, the SDGs are predicted to serve global women more effectively (Esquivel & Sweetman 2016). The SDGs incorporate strong gender language and account for women's complex social locations, roles, and identities and their intersections (Gabizon 2016).

The conceptual framework from which the SDGs were conceived also lend Esquivel & Sweetman (2016) to remain optimistic about their ability to actually effect change for women and girls. Compared with the MDGs, the SDGs are fundamentally based in a human rights approach. Women's rights are human rights; in each of the SDGs' seventeen objectives, there is a call for gender disaggregation and special attention to understanding the unique ways in which women's and girls' experience the respective goal. The MGDs' narrowness – by not

incorporating multilateral targets for gender equality – disconnected the MDGs from each other and served to create “development silos” in practice (DAWN 2012; Duran 2012).

The accountability framework provides more promising outlooks to productive policy measures, in that it calls for localized adaptation of the greater SDG framework. There is a more recent push for localized approaches in development, as the vast array of diversity in each locale greatly affects the ways in which a community or area can adapt such practices (Bankoff et al 2004; Bengtsson et al 2007; Laukkonen et al 2009; Parikh 2000; Satterthwaite et al 2007). Additionally, the SDGs include Goal 17 as a “means for implementation” to address the need to policy change and transformation of institutions to realize social change in achieving each goal (Fukuda-Parr 2016).

However, as with the MDGs, the SDGs’ language and strategies present some challenges to effective implementation. First, they lack clarity on policies needed to motivate and craft international will to implement these policies and how to do so, in addition to locating sufficient resources (Esquivel & Sweetman 2016). Norton & Stuart (2014) caution the SDGs specifically for their complexity, as they find the diversity in goals and targets to be too overwhelming for civil society and local stakeholders to rally around. Fukuda-Parr (2016) also caution against the risk for national adaptation. It opens individual nations to achieve the goals essentially on their own terms, which can be problematic in motivating each nation to do what is necessary to challenge power structures and inequality within their own social, culture, and economic models (Nicolai et al 2015).

While the SDGs can go further to better reach the populations in which they are intended to support as well as give better direction to actionable items, they lay the foundation upon which the global community uses to reach progress. Therefore, this research uses the SDGs as a

guideline for which to base these important questions on the basis of development. This research study aims to address several components of the SDGs to better understand social impacts of climate change, particularly focusing on how men and women experience these impacts differently and what this means for the global discourse.

Gender and Development

The SDGs placed an emphasis on gender mainstreaming, such that each goal incorporates indicators on decreasing gender inequality and enhancing women's empowerment (Koehler 2016). Gender inequalities in agriculture and other sectors are well-documented around the world. Agriculture is central to women's livelihoods across the globe, particularly in developing countries, where a majority of women indicate agriculture as their priority source of livelihood (FAO 2011; Huyer 2016; Quisumbing et al 1995). As men are increasingly migrating out of agriculture into seasonal or paid labor jobs, women are more and more responsible for agricultural tasks and labor than is traditional (Slavchevska 2016; World Bank 2018). Concurrently, women have less access to resources, capacity-building opportunities, or productive inputs to sustain these agricultural responsibilities, particularly during this changing climate (Deere & Doss 2008; Huyer 2016; Quisumbing et al 1995). Women also experience the time and labor burden of primary responsibility for reproductive labor, such as care work and domestic chores, in addition to their productive tasks, such as income-generating activities or agricultural labor (Blackden & Wodon 2006; Hirway 2010).

The issue of women's care work is widely discussed and addressed in the development literature. Care work can be described as the essential tasks required to support the development of the physical, emotional, and cognitive capabilities of individuals (Bakker 2007); these include such activities as childcare, cleaning, washing, cooking and food preparation, as examples. These

are also referred to as ‘social reproduction’ activities, as they are the inputs required for the development and wellbeing of families; and this care work – unpaid, social reproductive work – is disproportionately the responsibility of the global woman (UNDP 1995). Time survey studies from the Global South highlight the sheer number of hours women spend on unpaid, care labor activities in comparison to men (Budlender 2007; Floro & Komatsu 2011). For example, Budlender (2007) found that women in India spent 5 hours on unpaid care labor compared to 24 minutes spent by men. This gendered division of labor has impacts beyond just time spent on which activities, as it creates a separation of life purposes, with men more active and engaged in the public sphere, whereas women are restricted to the private sphere (Bakker 2007). The volume of work and restricted mobility ultimately leaves little time, energy, and opportunity for women to gain access to important resources, such as education, food and healthcare (Robeyns 2003). And further, these divisions of labor raise issues of justice and power imbalances, as unpaid care labor is often overlooked and devalued, removing women from the productive sphere, and ultimately, reducing their value and power (England 2005). However, as Marphatia & Moussié (2013) describes, challenging these gender norms are extremely complex as these hierarchies are not only “produced by men, but also reproduced by women” (586); creating a more egalitarian division of care labor is a complicated goal. And while these divisions of labor are gendered, they vary by other social indicators as well, such as age, marital status, socioeconomic status, and others (Marphatia & Moussié 2013; Johnston et al 2015). This unequal distribution of time constraints has important implications for women’s empowerment and gender equality.

Prior research examining the role of women in agriculture have suggested women’s large contribution to agricultural production in the form of unpaid labor (figures cited at 60-80%) and their limited access to similar resources as men to bolster production (Quisumbing 1996;

Palacios-Lopez et al 2015). However, with new and wider panels of gender disaggregated big data available, researchers investigating the question of gender roles in agricultural production have been able to challenge these former claims to present a more critical and realistic view of women's role in agriculture (Doss 2014; Doss et al 2015; Kieran et al 2016). For example, recent estimates suggest that women contribute at most 40% of the labor to agricultural production, citing that given their time burden on domestic and reproductive tasks, "it would be surprising if they produced most of the food" (Doss 2017). Regional differences exist, as women in sub-Saharan African spend up to 50% of the labor on food production, whereas 20% of women in Latin American are actively engaged in the agricultural sector (FAO 2011). However, research shows the direct link of women's involvement in the pathway from agriculture to nutrition outcomes for households (Johnston et al 2015). Food production includes agricultural labor on the farm, but also includes food provisioning, preparation, cooking, and serving, which are sometimes missing elements in the food production variable (Johnston et al 2015). Women are engaged in the agricultural sector, but as current literature highlights, the extent to women's role is highly contextual and not as well understood, and therefore more research is needed to understand how women and men spend their time on different activities.

Time is a crucial variable in understanding who and how divisions of labor target different activities, particularly for women. Reproductive labor, food preparation, searching for food, agricultural labor, income-generating activities, these all require time, so spending more time on one activity inevitably has trade-offs for other activities. Therefore, it's crucial for development projects and more research to understand how time is spent, and to be careful that interventions do not place additional undue time burdens on women in the name of increasing

either productivity or empowerment. How time is spent also varies across social categories, influenced by socioeconomic, cultural, and religious constraints.

Research from Southeast Asian societies reveals great heterogeneity and diversity in understanding gender roles, such that factors of education, socio-economic status, religion, and ethnicity greatly influence the ways in which women and men engage in social roles within the household and community (Atker et al 2017; Haug 2017). The next section presents a contextual discussion of modern women in Indonesia, drawing heavily from the work of Rinaldo (2008a,b; 2010; 2011; 2013; 2014) of the intersection of Islam, feminism, and activism in the Indonesian context.

Women in Indonesia

This review of the literature presents a contextual background of women in modern Indonesia, exploring how the influence of power, gender norms, spirituality, politics, religion, and socioeconomic status shape the ways in which Indonesian women experience everyday life. The current literature strongly applies to urban areas, focusing on women's activism and their connection of Islam to their mobility in public and private spaces. It highlights the interconnectedness of religious doctrine to action and self-identity, while also demonstrating the intersectionality of the Islamic woman in Indonesia – where based on class or region, the women would have varying views and relationships to their practice of Islam in both the public and private spheres, and the power relationships that emerge within society between these different types of 'practicing Muslim women'.

Gender roles and relations in Indonesia are closely bound to ethnic and religious norms (Tickamyer & Kusujiarti 2012). For example, in Javanese culture, the largest ethnic group by population in Indonesia, these norms are tied to both biological and spiritual differences and hold strong connotations for distributions of power within the very hierarchical society. These spiritual differences stem from the concepts of *wadah* and *isi*, such that “*wadah* is...the essence of what being female means in the culture. It is receptive, providing the vessel in which something is deposited, protected, sheltered. *Isi* [the male identity] literally means ‘seed’ and is given priority as the source of life” (98). Men and women within a household have their own power, but these gendered sources of power have limitations; it is the men’s divine role to serve as the head of household, to make the money and operate in the public sphere, whereas women manage the money and operate within her bounds of power within the household (Tickamyer & Kusujiarti 2012). Women may very well earn an income and or be the household’s primary earner, but this role is subordinate to their managerial role within the household. The divisions of labor within Javanese culture are closely bound to divinely inspired gender roles and complex understandings of power.

In addition to ethnicity, religious identity also heavily shapes and influences gender roles in private and public spheres in complex ways that intertwine with histories of secularism, diverse ethnicities, and periods of colonization. A majority of Indonesia’s population is Muslim and has been for centuries. However not until recent decades did Islam play a significant role in Indonesia’s public sphere. Indonesia is conventionally considered a secular state, yet the government maintains its guidance under the philosophy of Pancasila. Pancasila, derived from Javanese and Sanskrit, means ‘five principles’ which are inseparable and interrelated: 1) belief in the one and only God, 2) just and civilized humanity, 3) the unity of Indonesia, 4) democracy

guided by the inner wisdom in the unanimity arising out of deliberations amongst representatives, and 5) social justice for all peoples of Indonesia (Smith 1974). Indonesian Islam combines pre-Islamic mystical beliefs, is often considered more socially liberal than traditional Islam, and is read in ways that emphasize social equality and challenging social hierarchies (Wahid 2001).

The Suharto dictatorship regime (from 1965-1998) never fully suppressed religion but did maintain a control over the ways in which Indonesians were able to practice and express their religious identities. In fact, in efforts to modernize Indonesia and its people, the Suharto regime compelled Indonesians to subscribe to a religious identity and seek religious education. The steady inclusion and representation of a religious identity in the increasingly modernized Indonesia laid the foundation for the Islamic revival (Sidel 2006; Rinaldo 2010). The Suharto regime marginalized women, both secular and religious, from the public sphere (Rinaldo 2008; 2011; 2013).

The multiplicity of Indonesia's Islam practice began to shift as Indonesians began interacting with other Muslims around the world, reinterpreting the Quran's texts and reflecting on what truly constitutes proper Muslim behavior, and how religion should be incorporated into the state (Hefner 2000; Rinaldo 2010). The effects of globalization and porous borders of knowledge, trade and thought spurred the Islamic revival in Indonesia, where over the last 20 years, people began to view praying 5 times a day, adhering to strict dress code in public, and abstaining from pork and alcohol as essential to being Muslim, which are noticeable changes in Indonesian public (Rinaldo 2008).

Modernity and the Muslim Woman

The Islamic revival began in the late 1990's raising the question of how did this impact or affect the ways in which women participated in the public and private spaces in Indonesia? As women were increasingly removed from the public sphere under the Suharto regime, the Islamic revival not only allowed, but encouraged, religious and pious Islamic women into the public sphere via women activism (Rinaldo 2008a,b; 2010). A common unity now between public women – both Muslim or secular – is mounting over growing conservatism and legislation to implement Shariah law across Indonesia. However, not *all* Muslim women in Indonesia practice in the same way, nor do they all oppose Shariah law. The Prosperous Justice Party (PKS), that Rinaldo (2008a) spends much of her field work studying, is a more conservative party, whose women support a different vision of Islam in Indonesia than other Muslim activists. The PKS, unlike many other Indonesian activist groups, follow a gendered division of labor and a book of *fatwahs* – prohibitive acts, such as shaking hands between men and women. The essence of Rinaldo's (2008a) work with the PKS highlights from an extreme standpoint the vision and feminist approaches of women in conservative Islam and draws attention and support for an intersectional interpretation – not all women's experience in Islam in Indonesia is the same.

Yet, what appeals to young Indonesian women to engage in the Islamic women's activist movement to begin with? Indonesian women shy away from the term *feminist* in discussing their activism due to the word's connection to secularism and communism (Rinaldo 2008a,b; 2010). But the literature identifies several themes surrounding *why* Muslim women engage, from notions of identity to the pressures of a contemporary lifestyle (Chong 2006; Göle 1996; Rinaldo 2014). A major emergent theme is one of modernity (Brenner 1996; Göle 1996; Rinaldo 2008b). From the literature, women are attracted to Islamic movements in Indonesia because “Islam

appears to them as modern...[its] egalitarianism contest the conventional status hierarchies they see around them and links them to a horizontal community of Muslims” (Rinaldo 2008b, 29). Islam is a break from tradition, one that entails the fundamentals of a modern life: education, professionalism, and urbanity.

Women’s Dress: Public Mobility and Transforming Subjectivities

The literature engages in discussion to unveil the meaning, statements and subjectivities emerging from the ways in which Muslim women dress. Mahmood (2005) stresses the agency in creating a pious self; it is an act of choice, and thus clothing is a deliberate choice and statement. In Indonesia, traditional Muslim clothing for women consists of the *jilbab* (headscarf) and the *busana Muslim* (Muslim clothing). *Busana Muslim* ranges from colorful headscarves, loose fitting long shirts and jeans, to long black veils that only reveals the eyes. However, all clothing covers the hidden areas of a woman’s body – from her chest to the bottom of her legs (Rinaldo 2008; Rinaldo 2013). Indonesian women’s choice and coloration of their dress falls more along a continuum compared to women in the Middle East (Rinaldo 2013; 2014).

Women use their bodies in ways to transform subjectivities regarding gender, ideologies and social statements (Brenner 1996; Rinaldo 2008; 2013). Through veiling, women demonstrate their pious practices of self-discipline, making statements regarding who they are as an individual. It is an act of rebellion against the gender ideology of the Suharto regime and local gender ideologies (Brenner 1996). The Suharto regime heavily promoted the way of female dress as the traditional Javanese *kain* and *kebaya*, a lacy blouse and batik skirt, thus selecting the veil

and Muslim dress is a rejection of the gender identity put forth by the Suharto regime (Brenner 1996).

By choosing a way to dress that adheres to the Muslim code, women exhibit agency in demonstrating their pious identities. Rinaldo (2008) argues that dress demonstrates a middle-class *habitus* by which women make statements regarding their class, education, and level of piety. The women in PKS, who don a more conservative style of dress, are the most noticeably pious women members of activist groups. In Indonesia, the *jilbab* is not considered a mandatory practice; most women believe it is a requirement of Islam and must do so in order to fulfill their duties to the Islamic life, but Islam does not *force* members of its following to adhere to practices of dress – as interpreted in Indonesia. The *jilbab* represents a form of collective solidarity and unionized identity with other women practicing the similar forms of Islam in Indonesia (Rinaldo 2008; 2013; 2014).

The choice to follow these guidelines and rules, particularly in public, women exhibit a level of self-discipline, education and class status in being able to wear *jilbabs* (Rinaldo 2014). Self-discipline and education are essential to being considered a good Muslim. The Quran is in Arabic – to be a good Muslim is to be able to read the original text, and thus a form of education is essential to read, understand and interpret the holy text (Rinaldo 2013). By choosing such forms of clothing, Muslim women demonstrate to the public their ability to enact self-discipline and their level of education by understanding the importance of such self-discipline. Dress is a means of cultivating piety, which is in and of itself a public matter. Not only does dress enable women to demonstrate their agency in choice of wear, it also serves to follow Islamic *fikh* law and Hadiths – which are in debate across Indonesia. In addition to dress, women must publicly

show their ability to self-discipline and be educated to understand Islam and how it should be practiced. Dress is a means to do so in the public sphere (Rinaldo 2008; 2014).

The continuum of choice along an Indonesian women's options for dress in adherence to the Muslim code for dress allows pious Indonesian women to use dress as a tool to enable their public participation (Rinaldo 2008). The traditional Muslim dress serves a purpose to desexualize women's bodies, to render them less threatening or distracting or enticing in the public sphere. The color, contour and choice exhibited by Indonesian women's dress does not desexualize the woman's body but renders her feminine; it maintains gendered differences in the public sphere, yet ones that are attributed to cultural values (religion, class, region) as opposed to sexual attributes (Chatterjee 1993). In a similar discussion regarding the Indian woman's *sari*, Chatterjee (1993) examines how once gendered differences were fixated by the ways in which women dress, the public sphere could then accept said gender differences as cultural values rather than sexual attributes, and thus the public domain could be structured around those differences: "once the essential femininity of women was fixed in terms of certain culturally visible spiritual qualities, they could go to schools, travel in public conveyances, watch public entertainment programs, and in time even take up public employment outside the home" (Chatterjee 1993, 130).

Women have always had ability to participate in the public sphere in Indonesia; yet during the Islamic revival of the past few decades, their participation is weighted against their adherence to Islamic traditions and teachings. Through choice of dress, women have been able to both adhere to teachings of Islamic tradition, demonstrate their piety, while maintaining their ability to mobilize in the public sphere by structuring dress to reserve gender identity. While

women's participation is in fact encouraged in Indonesia, almost an anomaly in traditional Islamic societies, the *weight* of their voice is a different discussion.

Mobility in the Private Sphere

To Indonesian Muslim women and men, the differences in gender division of labors are considered divinely inspired (Rinaldo 2008). The idea, based on Rinaldo's (2013) research with members of the PKS, is that men and women are both tasked with different roles in life, but are equal in the face of Allah, and thus will be judged and valued equally based on their abilities to follow the Quran's teachings and fulfill their earthly duties.

As delineated by Allah, men are required to provide for the family and women are required to care for the children and the household. This is interpreted as though men and women must work together to help one another achieve their duties, and also, women are allowed to have careers so long as they prioritize their duties prescribed by Allah. Even within political activism, Rinaldo (2008) observed a gendered division of labor as the men conducted "the intellectual and ideological work of the party and dealing with matters of religious interpretation and practice, while women generally deal with 'women's issues,' such as education and family" (28). Yet, both the men and women will join the activist group together to achieve similar goals. Additionally, it is part of a husband's duty to allow his wife to engage in public participation or pursue a career, so long as she cares for her household and motherly tasks. In Rinaldo's (2008) research, many of the women she talked with considered their husbands as partners; while although not actual equals, they view each other as companions.

Adhering to the divided household practices can be traced to fulfilling pious obligations set forth by Islam: individual morality and national virtue (Abu-Lughod 1998; Rinaldo 2013). In Islam, the family is the central unit from which all teachings are imparted, how individuals grow and learn to be good Muslims. Marriage, reproduction and maintaining the integrity of the family unit is viewed as a woman's duty. The idea of a nuclear family within traditional structures, such that the man provides income and security while the woman cares for the children and the household, demonstrates a form of modernity and privilege. Women enabled to choose between seeking outside employment or staying at home signals a privilege of financial security, of middle-class modernity. As the Suharto regime intensely promoted a gender ideology of women as housewives, an identity the middle class accepted, it did not appeal to the realities of millions of households that could not afford to have the wife stay at home (Brenner 1998; 2013). Yet their decision of dress acted to reject the claims of the Suharto regime, while concurrently continuing their practice through a more fundamental identity with the Islamic Revival (Brenner 2005; Rinaldo 2013). The Islamic Revival appealed to the middle class, particularly women, as they were drawn to its emphasis on modernity, self-discipline, and a strong relationship with God.

The role that piety, adherence to Islamic law through dress, worldviews and actions, is demonstrated here in a review of the literature regarding gender and Islam in Indonesia. The focus of this literature review was to illuminate the ways in which religion and gender intersected in the public and private spheres. Most of the current research in Indonesia focuses on urban women in activist groups on their relation to Islam, particularly the Islamic revival. Their dress, habitus and mobility within the public sphere are relevant to understanding the lived experiences, especially power structures that might emerge across these intersections. This

review of the literature also illuminated the historical contexts of the effect of the fall of Suharto and the rise of the Islamic Revival on the women's role and place in Indonesian society.

Future research is required to better understand the connection between Islam, gender, agriculture and those in lower socioeconomic classes in Indonesia. Particularly, future research should explore the role and influence of religion and ethnic identity on gender norms and empowerment across rural/urban areas and varying socioeconomic classes. However, this review of the literature supports the claim for an intersectional approach and sought to illuminate aspects of a Muslim woman's life in Indonesia during the Islamic Revival.

Climate Change and Distributive Justice: Situating the Discourse

Certain nation states currently and historically have contributed the lion's share of global GHG emissions – the United States and China contribute almost 40% of total global GHG emissions – whereas a majority of nation states – most in the developing world – barely contribute a fraction of global emissions. A debate of equity and global justice arises. Those who contribute the least to the human causes of climate change are impacted the most by its unforeseen and variable stressors and disturbances. These are often populations dependent on natural resources for their livelihoods – such as small-scale agricultural producers, small island nations, coastal dwellers, indigenous communities, and pastoralists – who have limited ability and capacity to adapt and are, more often than not, excluded from decision-making processes. Likewise, those contributing the most have the means and capacity to adapt and are often those making decisions on policies, protocols, and adaption measures (Thomas & Twyman 2004). Table 2.1 features a range of issues surrounding both justice implications for mitigation and adaptation. The conversation of justice in the governance of climate change requires an understanding of both “the historical responsibility for enhancing atmospheric concentrations of the main [GHGs] and in allocating

present and future responsibility for action” (Adger 2001, 923). This section traces justice in climate change at both the global and local governance scales.

Issues of Justice: Scale of Global Governance

The impacts of climate change are pervasive across the globe, and potentially catastrophic for a majority of the marginalized and most vulnerable groups, who often have little to no relative contribution to its cause (Adger 2001; Okereke & Coventry 2016). In 2015, the United Nations Framework Convention on Climate Change established the Paris Agreement, a non-binding agreement that introduced the new model of self-ratification for convening nation-states to declare their own targets for reducing CO₂ emissions (Northrop & Smith 2016; Okereke & Coventry 2016). At time of writing, 193 Parties¹ have signed the Paris Agreement – with intent to continue in the ratification process – and of those 193 Parties, 116 have submitted their ratification, outlining their plans and target measures to reduce emissions of Greenhouse Gasses.

Table 2-0-1 Justice Issues and Governance Scale in Climate Change

	Issue	Governance Scale
Mitigation Issues	Historical responsibility	International
	Burden sharing mitigation & adaptation measures	International
	Impacts of domestic mitigation	Local
Impact Issues	Spatial distribution of impacts	Local to global
	Social distribution of impacts, resilience and adaptive capacity	Local to global
	Threats to non-human species	International

Source: Adapted from Adger (2001, 923)

Three of the four major CO₂ emitters – China (20.09%), the United States (17.89%)², and India (4.10%) – have signed and ratified the agreement, while Russia (7.53%) has signed but not yet ratified (“Paris Agreement Tracker” 2016). This section asks the questions: what is the role of responsible agents (highest emitting nation-states) in their contribution to global mitigation? What is their role in global adaptation? What major elements are missing from the global discussion of justice for climate change?

The Kyoto Protocol from 1997 was mostly viewed as a failure as it called for the greatest emitters of GHGs to dramatically reduce emissions but did not impose sanctions on developing nations – who, it is important to note, were not contributing a significant portion of total GHG emissions. It followed the “Polluter Pays” Principle (Caney 2005), along with many other international legal agreements – holding those responsible for producing the most GHGs to foot the bill and rectify the situation. Yet, despite this historical moral obligation prescribed by the international academic and legal communities alike (Caney 2005; Neumayer 2000; Shue 1999), major industrialized nations did not listen, as evident by the Kyoto Protocol’s failure. For example, George W. Bush refused to ratify the Kyoto Protocol on the basis that doing so would severely undermine the US economy, while allowing other countries (re: low-to-no emission developing countries) to continue development unimpeded. Barrett (1998) suggests that protocols provide an adequate and perceivable cost-benefit ratio for participation for *each* member; consequently, Barrett (1998) attributes the failure of the Kyoto Protocol to its failure to provide a perceivable beneficial outcome to each member, disincentivizing its adoption, and, thus, many countries refused to ratify it (Okereke & Coventry 2016). Additionally, “the reality of allocation of responsibility and hence ‘burden-sharing’ within the [United Nations] process is a

² At time of writing, the United States announced pulling out of the Paris Agreement in 2017.

fundamentally pragmatic and political process subject to both national and diverse lobbying interests” (Adger 2001, 924). An idea of moral obligation is not the only factor weighed in decision-making for a nation state to alter its emissions or contribution to the mitigation or adaptation strategies against climate change.

The literature surrounding “polluter pays” principle models (Brown 2013; Caney 2005; Neumayer 2000; Shue 1999; Tilton, 2016) raises questions of what exactly the ‘polluter’ is paying for? Caney (2010) builds onto this argument by outlining the two duties to which ‘polluters’ must adhere: the duty of mitigation and the duty of adaptation. In practice, ‘polluters’ must advise and change individual and institutional behavior through regulation and policy reform to reduce contribution to GHG emissions and to protecting carbon sinks. Caney (2010) introduces the duty to adaptation, with the understanding that where we are now in terms of our historical contribution to GHG emissions, some level of adaptation is and will continue to be required (Appell 2005).

However, Caney (2010) argues that the “polluter pays” principle model is flawed and unable to be put into practice as is. The “polluter pays” principle argues that those contributing most to climate change must rectify the problem and bear a larger responsibility for engagement in mitigation measures and funding adaptation. A consistently raised criticism remains: what changes in the climate are directly attributed to human causation and by how much versus those directed to other causes (such as environmental degradation or local exploitation of natural resources); thus, for which areas or *specific* climate change impacts must the ‘polluter’ pay? For example, predictions of impacts of climate change – from sea level rise, to temperature, rainfall, humidity, drought level changes – are becoming more confident, yet are admittedly not absolute (Houghton 2004; Okereke & Coventry 2016). Sea level rise in Bangladesh is estimated at just

under 2-meters by 2100; however, due to soil erosion, only about 70cm of this rise will be a result of anthropogenic climate change (Houghton 2004). Within the lines of this argument, who is then responsible for adaptation costs for Bangladesh in response to sea level rise? Opponents use these indeterminacies as an argument for not paying to reconcile for historical GHG emissions and against the “polluter pays” principle.

Caney (2010) introduces a supplemental principle to combine as a hybrid model for filling in such a gap: The Ability to Pay Principle, which looks at who is the most advantaged with the means to contribute to solutions (either mitigation strategies or funding adaptation) regardless of measured contribution to the causes. Both principled approaches are flawed, but as Caney (2010) argues, the solution to climate change and responsibilities of those who must share the cost burden of mitigation and adaptation is “more complex than any crude slogan” and the global community must draw upon the qualified versions of both principled models to establish a hybrid model in making steps forward (226).

I argue that what is missing from Caney’s (2010) view, in addition to the global communities’ view of justice in the climate change debate, is the differentiation between polluters and the differentiation between heterogeneous groups constantly treated as homogenous groups in the face of climate change. The “polluter pays” principle ascribes a responsibility onto polluters to rectify their contribution – yet does not differentiate between who these polluters are; however, surely, there is a vast difference between an individual polluting out of luxury (such as owning several cars or pursuing a lavish jet-set lifestyle) and an individual polluting out of necessity (such as burning cow dung for warmth or fuel, or producing drinking water). There is a clear distinction between victims of circumstance and agents of consumerism (Brown & Vergragt 2015); these should be incorporated into justice discussions for accepting responsibility

and cost-bearing in the global climate change challenge and solution development. At the global governance scale, an intersectional approach is essential so as to avoid the dangers of homogenizing groups that are inherently heterogeneous. An intersectional framework is essential to tackling the global challenge of climate change (Kaisjer & Kronsell, 2014; Shields, 2008).

As Adger (2001) adeptly points out in response to the 1997 Kyoto Protocol, “the greatest single equity issue, and the spectre which overshadows all mitigation debates, is that of the differential impacts of climate change and the highly skewed costs of adaptation at global and local scales” (922). Whereas major international discussions focus on how nation states can curb emissions and contribute to mitigation strategies, the global discussions on adaptation policies and strategies are not as well addressed or assessed (Fankhauser et al 1999; Kelly & Adger 2000; Smit et al 2000). Justice issues within strategic mitigation approaches run from global to national levels, where nation states must enter into global agreement to diminish their contribution to the global commons; and only when they enter these global agreements do they feel the impacts of the localized distributive justice issues due to socially differentiated effects of policies and strategies. However, the justice implications are reversed when discussing issues of adaption, as the appropriate governance scale remains with the individual resource user and their management of the impacted natural or livelihood resource (Adger 2001; Klinsky et al 2016).

The Paris Agreement presented a new model for GHG regulations through self-ratification. At time of writing, this is an ongoing process for how countries will self-ascribe target goals for emissions reductions and strategies to achieve them. As a new model from the Kyoto Protocol, the Paris Agreement provides a means for international bodies to commit to one another in reducing national GHG emissions by meeting self-ascribed targets and means to do so, Intended Nationally Determined Contributions (Okereke & Coventry 2016). The Paris

Agreement, unlike the Kyoto Protocol, is written to take normative stances to climate change mitigation and adaptation, such that issues of equity are deliberately included (Klinsky et al 2016; Okereke & Coventry 2016). As presented in this section, the global governance and justice in regard to climate change is complex, rooted in the ills of history with a confusion of how to move forward in a way that does not unjustly burden the victims of circumstance while justly holding accountable those with the greatest contribution. It will be a continued conversation for understanding how to best approach climate change justice at a global scale, particularly with so many intervening factors and agents at play.

The Paris Agreement is non-binding, with no consequences for failing to meet intended targets. Despite the lack of consequences to major producers of GHG emitters, the consequences to those most vulnerable to impacts of climate change – least developed and small island nations, and populations highly dependent on natural resources – are of utmost urgency, and likely to be the most extreme. The impacts of climate change and those of global and national mitigation strategies are socially differentiated; it is paramount to better investigate and understand the inequities of impacts between and within social groups. This is a critical issue of both global and localized governance (Adger 2001; Klinsky et al 2016).

Localized Impacts: How to Adapt?

As environmental challenges pose a global threat requiring a global response, the localized impacts of these challenges require localized responses, particularly given the variety of cultural and social settings in which these challenges present themselves; given this diversity, the most appropriate adaptation responses are multi-level (Ostrom et al 1999; Okereke & Coventry 2016).

Adaptation to impacts is a critical discussion in which to engage the global community, as it has, and will increasingly serve, as a means of survival for a large majority of the world's population, principally those whose livelihoods are most vulnerable to climate change (Rauken et al 2015). However, the discussion at the global level should keep in mind that adaptation is the culmination of collective actions by individuals and groups within their means to respond to the lived experiences of climate change to maintain livelihoods (Adger 2001; Okereke & Coventry 2016). Adaptation requires localized policy and decision-making that serves to build adaptive capacity of individuals and groups within communities; "it is not a global scale issue" (Adger 2001, 929; Rauken et al 2015). The vulnerability of an individual or social group increases as adaptive capacity decreases; yet the vulnerable are differentiated social groups within countries rather than countries themselves (Kates 2000; Rauken et al 2015).

As defined by Adger (2001), "vulnerability is determined by social entitlements and differentiated by levels of equity, livelihood diversity, potential climate impacts and appropriate institutional forms" (925). According to Parry et al (1998), "adapting to climate variability has a substantially greater effect of reducing impact than does mitigation" (741). The cyclical and reinforcing nature of the cause and effect of climate change *require* that global resources are spent on both mitigation and adaptation strategies (Okereke & Coventry 2016). However, measures to support adaptation must be done at the local level in order to respond to and incorporate the intersecting factors of cultural and social nuance and normative understandings of equity across international scales (Klinsky et al 2016). To situate this understanding to small-scale agricultural producers, a brief discussion of a livelihood framework will follow, along with a discussion regarding small-scale cacao producers in an effort to highlight the unique ways in which they are particularly vulnerable to the impacts of climate change.

Adaptive Capacity and Vulnerability

Adaptive capacity building and reducing vulnerability to risk are critical for small-scale producers, who more often than not lack the resources to accomplish such tasks. Drawing from Yohe & Tol (2002) and Chambers (1989) frameworks for sustainable livelihoods, small-scale producers, among the poorest and most vulnerable, make strategic use of the limited resources available to them to build resilience in the face of climate change and other external stressors (Tanner et al 2015). Yohe & Tol (2002) delineate eight major factors leading to adaptive capacity; however, they are challenged to fully explain the complex realities in which small-scale producers live in the face of climate change. Resilience in the face of climate change requires stronger attention to human livelihoods to address differing adaptation strategies (Tanner et al 2015). Chambers (1989) found that “most poor people do not choose to pull all their eggs in one basket” (35). Poor people do not reduce their vulnerability by maximizing income, but by diversifying assets (Banerjee & Duflo 2011; Scoones 1998; Tanner et al 2015). A livelihoods framework posits that five areas of “assets” that individuals can build and leverage are: human, natural, financial, social and physical (Scoones 1998; Tanner et al 2015). These “assets” are areas of resources from which small-scale producers either utilize or build upon to reduce their vulnerability or build their adaptive capacity in the face of climate change. Common resources needed on the farm for best management and production include resources such as access to scarce inputs (use of inputs, ability to get inputs), access to information (trainings attended, exposure to media, relationship with extension agents), access to labor (non-family or family labor employment), access to technology (technology use), and access to assistance (support network, infrastructure) (Feder & Umali 1993; Feder et al 1985; Knowler & Bradshaw 2007; Rogers 2003). Additionally, factors such as social identities, marital status, socioeconomic status,

education, among others also influence ability to build adaptive capacity (Van Aelst & Holvoet 2016). Small-scale farmers must strategically utilize and leverage available resources to adapt to climate change, however the extent to which these resources are socially differentiated (Gbetibouo et al 2010a, b; Tanner et al 2015).

Climate Change and Agriculture

Impacts of climate change pose exacerbated risk to small-scale agricultural producers in the Global South as a substantial portion of their livelihoods rely on consistent climatic conditions. Cacao, for example, can only be produced under specific ranges for conditions such as fairly constant temperatures, high humidity, ample rain, nitrogen-rich soils, and protection from the wind (IPCC 2014; Läderach et al 2011; 2013). If any of these factors is impacted by the systematically changing climate – such as a change in amount or distribution of rainfall, change in temperature or humidity levels – the viability of the cacao harvest is jeopardized; more often than not, the small producers will lose a substantial portion of their harvest, the investments made into the years' harvest, and annual projected income (Ameyaw et al 2018; Salazar et al 2018). Although small-scale producers do have considerable experience and knowledge of their natural resources to cope during periods of stress and unforeseen disturbance, the unprecedented and sustained levels of variability associated with long-term climate change are beyond the scope for which traditional coping methods can account (Pettengell 2010; Ameyaw et al 2018). More often than not, these producers receive little-to-no governmental support in building additional or immediate coping strategies (Vermuelen 2014). Small-scale producers – particularly those in the Global South – are indeed a marginalized group (Thomas & Twyman 2005; Ameyaw et al 2018; Salazar et al 2018).

The human dimensions of climate change are particularly relevant to the smallholders producing and relying on high-value commodity crops, such as cacao, to support their livelihoods (Ameyaw et al 2018; Hirons et al 2018). Farmers on less than five hectares globally produce more than 90% of the world's cacao supply (World Cocoa Foundation 2012). Smallholder farmers often rely on traditional production methods, which can sometimes be less productive or environmentally detrimental (Altieri & Nicholls 2013; Hirons et al 2018). While smallholders are most impacted by climate change, their methods of production also contribute to GHG emissions and unsustainable practices (Altieri & Nicholls 2013). Climate-smart agriculture (CSA) practices serve to build household resilience, income diversification, purchasing power, environmental stewardship, and overall, food security, particularly for small-scale cacao producers, who depend on cacao yields for household incomes and livelihoods (Vaast et al 2016). As a perennial tree crop, cacao can be cultivated with diverse and integrated food crops such as plantain, cassava, fruit trees, coconuts, and oil palm in permanent association. This production diversification is far more profitable per hectare, diversifies income and thus mitigates risk, aids household food availability, and contributes to environmental stewardship (Vaast et al 2016). Additionally, improving cacao production practices and reducing impact of climate change through CSA strategies can increase household food security by strengthening and increasing household purchasing power (Achterbosch et al 2014; Tschardt et al 2012).

Climate Change and Agriculture: Cacao

Cacao is heavily reliant on specific climatic conditions for optimal growth, thus its production is highly vulnerable to climate change (Läderach et al 2010; 2013). Climate change impacts cacao production at every level of production: seedlings, planting and maintenance, processing and post-harvest. Cacao crops are highly reliant on ideal amounts of sunlight, rainfall, temperature (due to effects of evapotranspiration), and shade for optimal growth of the trees as well as the fruit production (cocoa pods, which yield cacao beans). Many cacao pests and diseases are propagated through wind transmission and can thrive in increasingly moist environments; thus, farmers report increase in diseases during prolong wet seasons (Oyekale et al 2009). Prolonged wet seasons or increase in rainy/cloudy days increase the time for post-harvest drying and can increase risk of mold or destruction of drying seeds. In contract, prolonged dry seasons increase seedling mortality (Oyekale et al 2009).

Indonesian Cacao

Indonesia's competitive advantages make its cacao supply a strategic source for the global market. Indonesia has an incredibly high production capacity, efficient infrastructure, and favorable business environment (open trading/marketing system) (Panlibutan & Lusby 2006). Within the global market for cacao supply, there are two general types of beans: fine flavor and bulk. As the name would imply, fine flavor beans are higher quality beans that are fermented and produced with attention to the unique flavors and tastes attractive to large and small industry to produce chocolate and chocolate products. Bulk beans are considered filler beans; they are of lesser quality, more robust and resistant to external factors for production, and are cheaper on the

market. Bulk beans are used to produce non-flavor reliant products (such as cocoa butter) and used to mix with fine flavor beans at an ideal ratio for optimal flavor in chocolate products. Indonesia is the largest producer of bulk cacao beans; these beans are not fermented and have an incredibly high fat content³ (Moriarity et al 2014). In terms of production and labor, non-fermentation practices reduce the time between production-to-post-harvest by a few days, saving a large amount of time and financial resources for farmers. The global demand for these unfermented bulk beans has become relatively inelastic and is not significantly affected by changes in global market price (Panlibutan & Lusby 2006).

As a strategic and important source of global cacao, Indonesia has received significant attention to ways to increase production in the face of climate change and its variable impacts (Utomo et al 2016). Two major contributors to reduction in yield are aging trees and pest infestations (Moriarty et al 2014; Utomo et al 2016). Production is threatened by poor quality and inconsistent management practices. Widespread pest infestations, particularly the cocoa pod borer (CPB) increases poor quality in cacao beans across Indonesia (Panlibutan & Lusby 2006). Despite industry, NGO, and governmental efforts to increase improved production and post-harvest practices across the small-scale farmer population, adoption of these practices has been limited (Utomo et al 2016). Smallholder Indonesian cocoa farmers have little incentive to change production or post-harvest practices as they can generally find a market channel for their quality of supply. The Indonesian cocoa buying market differentiates little for quality and the major demand is unfermented ‘bulk’ beans. Changes in these practices would include upgrading or adopting more labor-intensive methods, such as fermentation to increase quality of beans (Panlibutan & Lusby 2006). However, increased variability in rains, drought, and disasters have

³ Fermentation is the process in which the beans gain their flavor profiles before drying.

had an inconsistently damaging effect on cacao production and smallholder farmers' ability to produce high enough yields.

Changes in dry/wet season timings, rainfall (including amount and intensity levels), wind patterns, and droughts have very serious implications for the viability of cacao plantations, as well as the socioeconomic supports and infrastructure available to bring yields to market, particularly for smallholder farmers in increasingly remote areas. Many farmers of cash crops rely completely on the cash crop for household purchasing power (Ameyaw et al 2018); thus, a farmer's inability to produce a viable harvest (as a result of any number of the above risks indicated) or get their harvest to market (as a result of socioeconomic or infrastructure damage) increases their household vulnerability to climate change (Nelson et al 2009). Climate change has particularly damaging effects on smallholder producers reliant on cocoa as a cash crop for their livelihoods (Ameyaw et al 2018; Salazar et al 2018).

Farmers must maintain high or at the very least, sufficient yields each harvest to have purchasing power in order to uphold their livelihoods (Achterbosch et al 2014; Ameyaw et al 2018). Men and women both hold active roles in cacao production and post-harvesting in Indonesia; however, these roles vary across regions and there is an overall lack of literature regarding their full extent. In Sulawesi, men are typically responsible for planting and pruning while women weed, and both men and women harvest. Women are responsible for household finances as well (Atker et al 2017; Moriarty et al 2014; Wartenberg et al 2018). The literature to date has not described these gendered labor roles in Lampung. While both are heavily engaged in the cacao production, women are often excluded from decision-making autonomy, trainings, and access to resources regarding improved practices (Atker et al 2017).

It is essential that efforts to intensify cocoa production are conducted in a way that is sustainable, climate-smart, and overall, that supports rural livelihoods and integrates the empowerment and voices of men and women in local communities. Best practices and adaptive strategies must be integrated with an understanding of local adaptive capacity to effectively combat climate change for smallholding cacao producers throughout Indonesia.

Gender and Cocoa: Evidence from West Africa

The current literature examining gender roles in small-scale cacao production is predominately concentrated in the West African context – the largest producing area of global cacao – while there has been little research that directly examined this nexus in Indonesia.⁴ The literature situated in West Africa highlights the intrahousehold dynamics for small-scale cocoa production. While women contribute a significant amount of family labor to household cocoa production, it is considered the men’s crop, and a lucrative cash crop at that (Kiewisch 2015; Friedman et al 2018; Oduol et al 2017). Women represent only 25% of cocoa farm owners across all of West Africa (Dalberg Global Development Advisors 2012). In West African households, incomes are separated between the men and the women. Men retain the incomes from their own crops, such as cocoa and other commodities, and prioritize this income for individual spending and larger household purchases for which they decide and are responsible (Kiewisch 2015; Oduol et al 2017). Women retain the incomes they generate from crops or activities under their domain, such as vegetables or small livestock rearing, often much less than those received from commodity

⁴ Exceptions include Wartenberg et al (2018), who did not directly study gender roles but highlighted no differences in cocoa knowledge based on gender in Sulawesi; and Mulyoutami et al (2015), who found that while women are actively engaged in several steps of the cocoa and coffee production chains in South and Southeast Sulawesi, they prioritize food and medicinal crops over cocoa, such as vegetables, clove, pepper and sago, whereas men prioritize cocoa crops.

production (Kiewisch 2015). Women's income is prioritized to reinvest into the household, for items such as food security, health, and children's education (Kiewisch 2015). Women have little decision-making influence on how their husband spends his income, but also have little opportunity to increase their own income streams due to time burdens and restricted access (Friedman et al 2018; Oduol et al 2017). Male cocoa farmers generally rely on family and communal labor, often wives or children, as sources of labor for their cocoa farm, whereas women cocoa farmers generally rely on hired labor or sharecroppers for their sources of labor on their cocoa farm (Fasina & Ayodele 2018). Overall, women have less access to resources, inputs, labor, and skill-building opportunity as cocoa farmers in West Africa, while contributing significant amounts of unpaid labor (i.e., family labor) on men's cocoa plots (Fasina & Ayodele 2018; Kiewisch 2015; Oduol et al 2017; Friedmen et al 2018). However, evidence presented by Oduol et al (2017) cautions that obstacles for women to participate in the cocoa value chain vary greatly based on a typology of women, influenced by intersecting social identities that further exacerbate existing inequalities when these intersecting identities are overlooked (Friedman et al 2018).

However, research in other contexts has illuminated that gender roles, with particular attention to agriculture, differ between African and Southeast Asian contexts (Booth 2016). Literature examining gender roles in other Southeast Asian small-scale agricultural systems can be used to parallel expectations for those in this study. Prior research in Southeast Asia has indicated that gender roles and relations are strongly influenced by cultural, social, and economic factors; and substantial gaps remain between men and women with respect to access to resources, economic opportunities, and influence in decision making (Hwang et al 2011; Illo 2010; Jha 2008; Layton & MacPhail 2013). In both urban and rural areas, women are responsible

for reproductive tasks (i.e. child care, household basic needs, food preparation, etc.) but also actively participate in productive tasks (i.e. agricultural labor or non-farm income generating activities), whereas men primarily engage in productive activities (Mason & Agan 2015; Mishra et al 2017; Booth 2016). Women customarily manage and allocate all household incomes and finances given to them by their husbands (Mason & Agan 2015). Yet women's labor contributions – both productive and reproductive – are often overlooked, undervalued, or invisible for women in both male- and female-headed households (Mishra et al 2017). For one example, Philippine women are marginalized in decision-making power and influence, as well as in access to land and other resources, capacity building, training, and income-generating opportunities (Lu 2010; Mishra et al 2017). This research will explore these divisions of labor and roles within the Indonesian context.

Climate Change and Women

Climate change is most experienced by the world's poorest, who are least able to respond to its adverse impacts. Amongst the poorest populations, women are often the most marginalized and vulnerable to the impacts of climate change. Vulnerability is determined by one's adaptive capacity, which is measured by one's accessibility and availability of necessary resources; across the globe, women are the among the most affected and least able to respond to climate change (Brody et al 2008; Mainlay & Tan 2012; UN Women Watch 2009). As described in Solar (2010), climate change consistently has disproportionate impacts on “men and women brought about by gender inequalities respective of access to natural and human resource, education, and or participation in society” (p. 8). Women are often unpaid family workers, generally with low levels of literacy or education; they have extremely limited options in the form of livelihood

alternatives or adaptive decision-making (GCCC 2014). Although the ways in which women (and other marginalized groups) are impacted by and able to respond to the impacts of climate change vary greatly and are situated in deeply rooted historical social contexts, a consistent theme emerges that women experience a lack of opportunity or capacity to change their status.

The literature points to many different ways in which women are disproportionately vulnerable to the impacts and risks of climate change. The effects of climate change and natural hazards are socially differentiated (Blaikie et al 1994; Ray-Bennett 2009). Individuals across the globe contribute to and experience the impacts and risks from climate change differently; yet due to current sociocultural landscapes, women and girls across the globe are disproportionately affected by the impacts of climate change (Arora-Jonsson 2011; Jost et al 2016; Skinner 2011). The woman's role, representation and contribution to the climate change narrative sparks a discussion of justice surrounding the way in which development and government approach women's vulnerability, adaptive capacity, and contribution to solutions within the fight against climate change (Arora-Jonsson 2011). The unique ways in which women are vulnerable to the impacts of climate change warrants a justified discussion and particular attention when developing policies and strategies to mitigate and support people in adapting to climate change.

According to Bennett (2005), "climate change has pervasive and far-reaching social, economic, political and environmental consequences. The challenge cannot be met without the collective power and knowledge of women and men" (p. 2). Women are disproportionately vulnerable to the major impacts of climate change yet are also disproportionality excluded from decision-making and strategy development in combatting climate change, both at global and local scales (Hemmati & Röhr 2009; Okereke & Schroeder 2009). Zahur (2008) reports that in

some ways, the gendered vulnerabilities and unique capacities to adapt and contribute to solutions are missed in communications to national and global policy makers.

In general, women face economic, cultural and social constraints regarding their access to paid employment, asset distribution, opportunities and resources, often limiting them to unpaid care tasks that depend on climatic factors (Jost et al 2016; Skinner 2011). Within their traditional roles, rural women do most of the agricultural work and are responsible for collecting household fuel and water (Terry 2009); climate change is predicted to negatively impact the ways in which women are going to be able to carry out these tasks and the burden of women's workload, which results in the failure for tasks to get done or serious health consequences (Jost et al 2016).

Increasing Workloads

Impacts due to climate change will overload and increase the burden of women's workload (Amin 1995; Balk 1997; Lambrou & Nelson 2010). For one example, women have to care for family members who fall ill due to impacts of climate change, such as the increase in incidence of waterborne diseases (Parikh et al 2012). As most of their tasks are dependent on natural resources and the environment, changes in the climate (such as land inundation, water shortages or contamination) can inhibit or increase difficulty in accomplishing these tasks, like water or fuel collection. Due to climate change shifting agricultural landscapes (such as increase in soil salinity, or droughts or floods ruining crops), men migrate to seek employment, leaving women single-handedly to care for the entire household and home-based agricultural activities (Jolly & Ahmad 2018). However, this phenomenon is not as well understood or researched in the climate change literature (Jolly & Ahmad 2018)

For other examples, increased incidence of drought can make water resources scarcer or unevenly spatially distributed, meaning women will have to walk further to gather their household water resources. As the distance increases, women will have to collect heavier loads of water to meet increasing demands during times of drought. Women's physical health suffers as well during periods of increased heat intensity due to the lack of humidity; they're therefore spending more time on unpaid household tasks than on potentially income generating activities (Figueiredo & Perkins 2013). Viewing this example from an intersectional lens, women within the same community will likely experience the effect of drought on water security differently – spatial, religious, age, caste, socioeconomic status, and health status are additional social factors that can alter the ways in which women of a similar community will be able to access their daily water source (Figueiredo & Perkins 2013). Thus, vulnerability is not only the accumulation of physical exposure and sensitivity to the biophysical impacts, but also the accumulation of stratified social differences that impart power dynamics within and between communities that hold implications for capacity building opportunity (Terry 2009). This is just one of many complex examples by which women are uniquely vulnerable and impacted by climate change, and why an intersectional approach (discussed later in this section) is integral in addressing social differentiation and power relationships.

Restricted Mobility and Health

Due to cultural and social norms, women's mobility and ability to seek refuge or assistance is restricted, furthering the adverse impact climate change has on women. For example, it is culturally inappropriate in Bangladesh for women to interact with other men in public spaces; thus, women tend to avoid seeking refuge in cyclone shelters where the potential

for interacting with men may occur (Cannon 2002). Women's restricted mobility increases their vulnerability to natural disasters and other impacts due to climate change (Solar 2010).

For another example, Bangladesh is prone to excessive flooding. During times of land-inundation, income-generating activities are often reduced to collecting water-lilies or catching fish. Women and adolescent girls take on this task and do so in nighttime or early morning hours to avoid being visible to men for a prolonged period of time. They stand waist-deep in contaminated water, exposing themselves to pollutants, pathogens, and wastes that often cause skin diseases. They develop these diseases particularly in sensitive areas, and often do not seek treatment as these types of diseases are seen as culturally "unacceptable" (Batan & Khan 2010, 7). Culturally, women can be shamed if men who are not their husbands see them in wet clothing, or when or if they use a public latrine (Rashid & Michaud 2000). This social restriction to public mobility is a disproportionate detriment to women's physical health and ability to gain skills for building adaptive capacity.

Climate change has serious implications for human health, from the spread of disease to the increase of nutritional deficiencies and overall health. Increased incidences of droughts, floods or natural disasters positively correlate with intensified incidence and spread of diseases (Solar 2010). Women and children have a heightened risk for health concerns such as dengue fever, malaria, Japanese B encephalitis, measles, or diarrhea and dysentery (Raksakulthai 2002). Pregnant women are particularly vulnerable to diseases, such as malaria and dengue (GCCC 2014). The spread of vector-borne diseases also disproportionately affects women, as they have less access to medical services than men, and moreover, their workload intensifies when they themselves are sick, or they have to care for those who are sick (Batan & Khan 2010; Sikder & Xiaoying 2014). During times of natural disaster, food prices rise, and poor families reduce the

quality and quantity of food purchased, often with women altering their consumption patterns to sustain the household's food security. Women and girls will alter their consumption patterns before male household members, and will reduce their food consumption before males, increasingly their physical weakness and susceptibility to disease (Haigh & Vallely 2010; Mak 2008; UN-DAF 2010).

Sanitation and hygiene problems occur during times of water-stress, particularly during droughts. Not only are women and children more susceptible to diseases due to compromised health, but women are responsible for caring for sick household members. More disease may increase women's workload within the household (Parikh et al 2012; Solar 2010), limiting their time and mobility to seek income-generating opportunities (Anh 2008; Oxfam 2009). With a lowered health condition and poor nutritional status, the regular workload (such as caring for household members, collecting water and fuel, preparing meals) becomes exceedingly overbearing and further exacerbates deteriorating health conditions (Solar 2010).

Women and children, particularly girls, are more vulnerable and prone to death or physical damage during natural disasters. For example, women accounted for 91% of the fatalities from the 1991 cyclone in Bangladesh (Neymayer & Plümper 2007). Warning information is transmitted to men by men in public spaces, but it is rarely communicated to the rest of the family (Röhr 2006). Often women and girls do not have the same access to warning systems, life-saving skills (like swimming), or have restricted mobility due to cultural norms (UNFCCC 2005). Compounding this issue, women generally lack adequate education levels to access early warning information, and usually do not have venues in which their voices and needs can be heard (Batan & Khan 2010). Additionally, social norms that regulate appropriate dress codes in accordance with the ideals of modesty can hinder women from learning how to

swim, which significantly reduces their chance of survival in flooding or storm disasters (Oxfam 2009; Parikh et al 2012). With restricted mobility and lack of access to skills or warning systems compared to men, women may be more vulnerable to death, disease, or physical harm during natural disasters.

And finally, women are more vulnerable to physical and sexual violence, particularly as household stress levels heighten, and rates of displacement, unemployment, homelessness and migration grow (Batan & Khan 2010; Brody et al 2008; Oxfam 2009; Xenarios et al 2012).

Capacity Building (Or Lack Thereof)

Despite descriptions of the ways in which women are uniquely vulnerable, based on their daily interactions and reliance on the natural resources around them, women have a unique understanding of the natural world. Often, the climate change discourse views women as either vulnerable beneficiaries or agents of change; however, women here should not be viewed as a binary, rather women fall along a continuum of unique vulnerability and capacity (Arora-Jonsson 2011; Denton 2002; Jost et al 2016; Nyong et al 2007; Skinner 2011; Terry 2009). Often, women's traditional roles are most heavily reliant on resources that are impacted by intense climate variations, such as forests and non-timber forest resources, collecting water, and small-scale subsistence agriculture. They do in fact have unique understandings of the natural world around them, yet are often excluded from public participation, decision-making, and strategy development for how to best use or adapt their use of those resources (Figueiredo & Perkins 2013). However, it is essential to underscore that women are neither entirely vulnerable nor

virtuous in the face of climate change, but rather a complex, messy combination of both, and should not be reduced to simple binaries to explain the entire picture.

Prior research suggests major factors that limit women's ability to build adaptive capacity such as the lack of access to resources or opportunities. For example, Nelson (2003), Sultana (2009) and van Aelst & Holvoet (2015) highlight the ways in which women – regardless of class – are socially and economically dependent on men. In particular, women in these studies did not have access to free mobility outside of the household, which limits their ability to conduct daily household related tasks, seek additional employment, or attend trainings or educational opportunities. Regardless of intra-household decision-making power, women's decision-making role is often excluded from the public sphere, despite their potential contributions to constructive solutions to mitigation and adaptation (Lambrou & Nelson 2010; Parikh et al 2012; Roy & Venema 2002). For example, women's participation in forest committees has shown to positively impact forest regeneration activities and reduce illegal extraction of forest products (World Bank 2011). Women's empowerment and involvement in decision-making yields positive impacts on building climate-resilience in communities (Jost et al 2016).

Summary

A justice approach to climate change (Sen 1999) that incorporates this understanding of lived experiences by a heterogeneous group of marginalized women lacking basic political and social freedoms and decision-making power, is one that finds ways to strengthen and empower women's ability to participate in the public sphere and decision-making. Adaptation strategies must not focus only on adaptation measures in response to the biophysical impacts, but also to

the social barriers for the marginalized groups of individuals who do not have the means to build adaptive capacity or contribute to solutions (Terry 2009). Women's role in response to climate change deserves attention to both their vulnerabilities to the intersectional impacts due to climate change, and also to their abilities to contribute to constructive and effective solutions based on unique knowledge, skills, and experience. A justice approach to investigating the social dimensions of climate change must take an intersectional approach from an understanding that a multitude of intervening and overlapping socially constructed factors influence the ways in which people are enabled to respond to, are vulnerable to, and participate in the fight against climate change.

Intersectionality: A Critical Praxis

Climate change does not occur in a vacuum (Smit & Skinner 2002; Terry 2009). Many other stressors and disturbances, climate-related or socially constructed, impact the way in which small-scale producers experience, adapt to, perceive, and are vulnerable to climate change (Misselhorn 2005; O'Brien et al 2004; Paavola 2008). Climate change can exacerbate these risks and vice versa; these risks can exacerbate the ways in which small-scale producers are impacted by climate change. The social construction and implications of these risks draw attention to justice and equity measures within and across communities at different scales, in addition to the power hierarchies that influence these measures that emerge (Adger 2001; Kaijser & Kronsell 2014). As the social dimensions of climate change are increasingly being acknowledged and observed, discussions of power, and intersectionality emerge as “the social causes of vulnerability [and] the capacity to adapt, which constrain individuals and social groups in their

adaptation, are highly differentiated” (Adger 2001, 922; Kaijser & Kronsell 2014; Lykke 2009; Winker & Degele 2011).

Additionally, in the same vein that the globally-scaled categories of ‘polluters’ were discussed in an earlier section in this chapter, there is an inherent danger in basing policies or strategies on the assumption that the lived experience of one group can be explained by that defining category. Certain ‘polluters’ have access to means, education, natural and social resources, and livelihoods as such that they can pollute as a byproduct of pursuing luxury or comfort; whereas some polluters do so as a means to survive because they have little to no access to necessary resources for their survival. By promoting punitive policies (such as the ‘polluters pay’ principle), it can, in fact, further marginalize an already marginalized group at the global scale. The point here is, intersectional lenses are important for all scales of analyses and consideration.

Social structures based on socially-constructed categories of identity, such as gender, socioeconomic status, ethnicity, nationality, health, sexual orientation, age and place, influence the responsibility, vulnerability, capacity, and decision-making power yielded to individuals and groups in relation to climate change (Kaijser & Kronsell 2014). Inherent power structures emerge between individuals and social groups based on socially constructed categories that impact the ways in which certain groups of people are able to respond to the unforeseen disturbances related to climate change (Lykke 2009; Winker & Degele 2011). This opens the door for social groups or individuals to be inherently marginalized at local, regional, and global scales of the climate change discussion.

The following section describes the history and application of intersectionality as a critical praxis. A deeper discussion of how intersectionality theoretically informs this research design is presented in the following chapter (chapter 3).

Intersectionality: History/ Application in International Development Context

Originating the academic scholarship in the late 1980's, intersectionality began as a theoretical and analytical tool to challenge and investigate power dynamics in relation to social identities.

Dr. Kimberlé Crenshaw coined the term in her work as a black feminist to draw attention to the erasure of women of color's experience of compounding discrimination due to the intersection of two oppressed social identities – gender and race. The literature has evolved to expand the use of intersectionality in feminist theory and practice to challenge and investigate power structures emerging between a multitude of intersecting social identities (race, gender, caste, class, sexual orientation, religion) (Andersen & Collins 2012; Collins 2015; Crenshaw 1989; Grzanka 2014).

There are limitations in using and applying intersectionality in practice, particularly in other contexts divergent from which it was originally created, such as this study for example (Carastathis 2013; Collins 2015; Goldberg 2009).

Origins of Intersectionality & Limitations of Use

In the late 1980's, law professor Kimberlé Crenshaw saw a critical void in anti-discrimination laws, anti-racism advocacy, and feminist movements to react and validate invisible victims of intersecting oppressions. Driven by the results of high-profile court cases (such as *DeGraffenreid vs. General Motors*) and the Anita Hill/Clarence Thomas sexual harassment controversy,

Crenshaw coined the concept of intersectionality as a “metaphor” to use to understand and talk about discrimination that occurs along intersecting axes of social identity (Adewunmi 2014).

The concept of intersectionality originated as a tool to investigate power, particularly for women of color and black feminists in America. It raised issues within feminism, which did not champion the experience of compounding discrimination faced by black women. Feminists could answer questions about the intersections of gender and class politics but failed to do so for gender and race (Crenshaw 1989). The conversation surrounded either an “either or” (ex: *DeGraffenreid vs. General Motors*) or a “versus” (ex: Anita Hill/Clarence Thomas controversy) when it came to race and gender. Feminist theory evolved from a white racial context, one that excluded the women of color’s experiences and reinforced it when white feminists would speak for black feminists rather than include these voices (Crenshaw 1989).

Crenshaw (1989) cites several court cases to provide evidential support to justify her claim for intersectionality. For example, the *DeGraffenreid vs. General Motors* case in 1976 is a clear example of the “either or”: GM’s hiring was segregated based on gender and race – the jobs available to people of color were strictly for men and those for women were strictly for white women. Five women of color sued GM for obvious discrimination, as they were not considered for either position; however, the courts favored GM as both people of color and women were hired –just no women of color (Crenshaw 1989). The *Moore vs. Hughes* case dismissed a woman of color’s claim of discrimination because she had only claimed discrimination as a female of color, which – according to the law – failed to represent white women. This “curious logic...revealed not only the narrow scope of antidiscrimination doctrine and its failure to embrace intersectionality, but also the centrality of white female experiences in the conceptualization of gender discrimination” (Crenshaw 1989, 144).

By very nature of the compounding discrimination of dual identification within marginalized groups, women of color experienced a unique case of subordination, which Crenshaw addressed as seriously problematic. It was one that feminism and anti-discrimination advocates failed to address. Before Crenshaw, intersectionality was not a tool to be used; there was not language to describe this intersection or how to address it. She developed intersectionality as a theoretical framework and tool with which to understand, talk about, and study the multidimensionality of systematic injustice and social inequalities in overlapping socially constructed identities (Crenshaw 2015). She argues that “because the intersectional experience is greater than the sum of racism and sexism, any analysis that does not take intersectionality into account cannot sufficiently address the particular manner in which Black women are subordinated” (Crenshaw 1989, 140).

It is a tool to think about identity and power: to illuminate the invisibility of many constituents within groups that claim them as members but fail to represent them (ex: women of color in feminism) and to draw attention to these erasures (Adewunmi 2014; Crenshaw 2015). Since its inception, the field of intersectional research has mushroomed (Collins 2015). It has become an institutionalized concept (Andersen & Collins 2012; Grzanka 2014), one that has manifested in social sciences and has attached association with several subfields (Anderson 1996; Choo & Ferree 2010; Collins 2007). However, with such rise in popularity and use, some scholars argue that intersectionality has been misappropriated and lost sight of its original intent in conjunction with black feminism (Alexander-Floyd 2012; Knapp 2005). Collins (2015) asserts that the legitimization of concepts employed by intersectionality “invites heterogeneous users to take up its ideas” (7), however, they must in ways that adhere to the originations of the concept.

Intersectionality, now perceived as a ‘buzzword’ in social and feminist research (Davis 2008), raises questions and limitations due to definition and applicability challenges. First and foremost, how does it fit into the research process? Scholars have conceptualized the term as a perspective, a concept, a type of analysis, or as a pivotal point for feminist theorizers (Knapp 2005; Lykke 2011; Nash 2008; Steinbugler et al 2006) or have identified its placement in the research process as a methodological approach, paradigm, or measurable variable (Bowleg 2008; Hancock 2007; Steinbugler et al 2006). Methodologically speaking, the literature is scant as to how to actually measure and employ intersectional methods and empirical validity, with McCall (2005) as an exception. Collins (2015) acknowledges the definitional dilemma when engaging with intersectionality and offers a solution – albeit imperfect – to understand intersectionality as an analytical strategy, “to place the earlier themes [of its origination with Crenshaw (1989)] of community organizing, identity politics, coalitional politics, interlocking oppressions and social justice in dialogue with the guiding assumptions of intersectional scholarship” (15). She offers insight to using intersectionality as a critical praxis, to utilize its fundamental understanding and investigation of interrelated and reinforcing power structures associated with identity to remedy complex social inequalities or justice issues. Often in other contexts, intersectionality is used as human rights policy methodology (Yuval-Davis 2007) to ensure that the rights of every group are protected (Center for Women’s Global Leadership 2001). However, intersectionality as a critical praxis is underdeveloped and underemphasized in academic scholarship (Collins 2015), yet is often used in human rights work and advocacy.

The same limitations described above constrain the use of intersectionality in an international context. The lack of one streamlined definition of intersectionality allows for multiple interpretative approaches and a lack of congruence across organizations and global

players (Yuval-Davis 2007). The many approaches to intersectionality at the global level and the multitude of converging definitions in some ways miss the essence of intersectionality in the first place – to account and address interrelated power structures that emerge from intersecting social identities (Yuval-Davis 2007). A rationale for using the tenets of intersectionality in this research are presented in the following chapter, which discusses the theoretical tools and concepts used to frame this research study, and further explores how intersectionality lays a conceptual groundwork upon which to study gender dynamics in response to climate change.

Chapter 3. Theoretical Framework

This chapter expands on a theoretical framework that guides this research study. Drawing from feminist theories, such as feminist political ecology (Cole 2017; Rocheleau et al 1996) and intersectionality (Kaijser & Kronsell 2014; Ravera et al 2016; Thompson-Hall et al 2016), and theories of community and social capital, this study explores how different factors influence the ways in which men and women are impacted by and able to respond to climate change. There is a limited body of knowledge around gender and smallholder agriculture in the face of climate change in Indonesia, specifically in Lampung and South Sulawesi provinces. However, as past research investigating gender dynamics within a smallholder agricultural context has demonstrated, it is essential to incorporate feminist theoretical concepts and approaches into research application (Ravera et al 2016; Thompson-Hall et al 2016). Both men's and women's perspectives, knowledge, skills, and experiences are critical to understand the way in which each engage with each other, the broader societal context, and the environment. The process, power, and context with which gender and environmental engagement emerges is critical in understanding how men and women can experience the impacts of climate change differently.

This chapter first explores the roles in which community and social ties serve as important and essential resources for small-scale producers, underlying a critical insight upon which this research was built. It then discusses feminist theory and feminist perspectives on climate change, the lens through which this research was designed and analyzed.

Exploring Social Dynamics of Climate Change

Many stressors and disturbances, climate-related or socially constructed, impact the ways in which small-scale agricultural producers experience, adapt to, perceive, and are vulnerable to climate change (Cole 2017; Misselhorn 2005; O'Brien et al 2004; Paavola 2008). Climate change can exacerbate these risks and vice versa; these risks can exacerbate the ways in which small-scale producers are impacted by climate change. People draw upon and rely on their available resources, including social relations, to build adaptive capacity. Adaptation involves the “interdependence of agents through their relationships with each other, with the institutions in which they reside, and with the resource base on which they depend” (Adger 2003, 388; Besser et al 2017; Chaudhury et al 2017).

Contributions of Community Theory

This research study draws upon community field theory to help understand how individuals interact with one another and the common locality in which they share via social fields (Wilkinson 1991; Kaufman 1959; Granovetter 1973; Bridger et al 2011). This theoretical perspective guides how individuals within a community engage with one another, rely on social supports or networks, participate in communal life and shared activities, and/or have access to opportunity. The role of community and community engagement is a critical source of resources and support, particularly for small-scale farmers who often lack autonomy in their ability to build capacity, capital, and access to resources; small-scale farmers often rely on each other and their community for external support and information and resource sharing (Boahene et al 1999; Beckford & Barker 2007; Davis et al 2004; Feder et al 1985; Lyon 2003; Feola et al 2015). Community field theory informs this research to provide theoretical foundation for how processes within a community context contribute to or constrain adaptive capacity building.

However, it is important to note that this study is ultimately one of power and how the power that emerges at the intersection of social identities within a community shapes the ways in which individuals are able to respond to external forces (climate change). For this study, community field theory provides one slice of a perspective on how the role of strong and weak ties (Granovetter 1973) within a community may facilitate capacity building within and between communities,⁵ but is limited in its conceptualization of power.

Community is a dynamic and interactional social process (Wilkinson 1991; Kaufman 1959; Granovetter 1973; Bridger et al 2011; Cross 2015; Mainzer & Luloff 2017; Matarrita-Cascante & Stocks 2013). It is rooted in a common physical place, where individuals function, live and work to fulfill daily needs (Bridger et al 2011; Kaufman 1959; Wilkinson 1991). Wilkinson (1991) adds “social interaction delineates a territory as the community locale; it provides the associations that comprise the local society; it gives structure and direction to processes of collective action; and it is the source of community identity” (111).

Individuals interact with each other and form interpersonal relationships based around mutual interests, values, and needs (Mainzer & Luloff 2017; Matarrita-Cascante & Stocks 2013). The process of interaction illuminates shared meanings between and across individuals and social groups to emerge, and these meanings enable people to act as a collective (Cross 2015; Farganis 1996; Mainzer & Luloff 2017). Bonds developed from these shared meanings become integral and foundational for individuals’ social well-being and also demonstrate where placed-based needs lie (Granovetter 1973; Matarrita-Cascante & Stocks 2013; Wilkinson 1970). Social fields develop from these interactions, and these individual social fields concern themselves with

⁵ A critique of community field theory is the absence of a critical perspective on power. This research study acknowledges this and relies on feminist theories to lay the theoretical foundation for how power emerges, influences, and constructs vulnerability and adaptive capacity based on socially constructed norms, such as gender.

singular needs, values or interests within the community (Granovetter 1973; Matarrita-Cascante & Stocks 2013; Wilkinson 1970).

The social fields have potential to generate a community field once different social fields interact with each other (Wilkinson 1972). The community field is the broader field within a common locality where various social fields exhibit and exercise agency and collective action, as they are able to mobilize and utilize resources across the social fields (Wilkinson 1970, 1991; Bridger et al 2011; Matarrita-Cascante & Stocks 2013). Interactions between individuals are foundational to building community and social fields; these interactions cannot be predicted and thus a field is the nexus of an organic and holistic interaction, unbounded and dynamic (Wilkinson 1972, 313).

Granovetter (1973) provides important discussion on the distinction between types of connections or ties between individuals or social groups within a community that build the strength of the social and community fields. These ties can be strong, weak, nonexistent, or positive or negative in direction (Granovetter 1973). The strength of these interactions depends on “a combination of the time, emotional intensity, intimacy, reciprocal services which characterize the tie,” similarity between individuals and frequency of interactions (Granovetter 1973, 1361). Therefore, individuals within a similar social field share higher levels of similarity and also increased frequency of interaction, thus their interpersonal ties will be stronger than those between individuals from different social fields (Granovetter 1973; Matarrita-Cascante & Stocks 2013). Strong ties are those of repeated frequency and intimate exchanges between individuals. Weak ties are those between social fields that bridge different individuals and groups across various social fields; they represent impersonal and transitory connections between individuals within a community and between communities. Weak ties are essential in knowledge

and information diffusion within the broader community field, as the likelihood to spread information between two points within a community field increases when there are various paths in which that information can travel (i.e. between strong and weak ties; within and across social fields) (Granovetter 1973). The inclusion of micro-level interpersonal interactions accounts for various forms of knowledge and information diffusion across and between communities. As small-scale farmers often rely on each other and those within their community for knowledge, information and resource sharing, the quantity of their strong and weak ties will help to inform their abilities to build adaptive capacities (Besser et al 2017; Thuo et al 2014).

Both weak and strong ties shape social stability and well-being within the community (Granovetter 1973; Wilkinson 1991). Weak ties bind strong ties in the larger community structure, and social fields enhance opportunity for social mobility (Besser et al 2017; Wilkinson 1991). However, as Wilkinson (1991) notes, “strong ties and intimate networks in some isolated villages give the appearance of community but lack the qualities of equity, openness, tolerance, and collective action that make community interaction a vital force in well-being” (73). Weak ties are critical within a community so as to provide opportunity for upward mobility and reducing inequalities and obstacles for achieving well-being.

This literature draws similarities to the field of social capital, which some have promoted as the ‘missing link’ as an important tool in development to understand collective action (Grootaert 1998). Developed from the work of three influential authors (Bourdieu 1986; Coleman 1988; Putnam 1993), social capital – as defined by Putnam (1993) – are networks, norms, and trust that facilitate coordination and cooperation for mutual benefits among actors within social organizations. Social capital is concerned with relations between actors within and across levels, through bonding, bridging and linking: as described by Woolcock & Sweetser

(2002, 26), “bonding social capital refers to connections to people like you [such as family, relatives...], bridging social capital refers to connections to people who are not like you in some demographic sense...linking social capital pertains to connections with people in power, whether they are in politically or financially influential positions” as well vertical connections to formal institutions. The concepts of bonding and bridging social capital are linked with Granovetter (1973)’s concept of strong and weak ties, whereas the concept of linking social capital addresses social relationships between those with power and those without.

The community field literature addresses obstacles for achieving well-being, particularly external power structures and dominant forces (Wilkinson 1991). Power imbalances such as external forces exerting control or influence in natural resource management can influence the ways in which individuals within the community can achieve well-being (Gaventa 1980; Wilkinson 1991). However, the concept of power in the community literature is underdeveloped (Brennan & Israel 2008; Domhoff 2007; Gaventa 1980; Fisher & Sonn 2007), often employed at the macro-level tied to the emergence of social movements.

An exception is Gaventa’s (1980) classic work examining power at micro-level conditions, in which he addresses reactions of quiescence and rebellion amongst powerless groups to external forces. He indicates that community power is extremely complex, resulting from a multidimensional process. A sense of powerlessness can emerge and can manifest in ways such “as extensive fatalism, self-deprecation, or undue apathy about one’s situation...and [as] greater susceptibility to the internalization of the values, beliefs, or rules of the game of the powerful as a further adaptive response” (Gaventa 1980, 17). Quiescence and non-participation are products of invisible power structures and dynamics (Brennan & Isreal 2008; Gaventa 1980). Matarrita-Cascante & Stocks (2013) highlight that many barriers tied to systematic or embedded

power structures, such as linguistic, cultural, or spatial, influence community engagement, participation, and overall individual and community well-being. Communities with migrant or marginalized populations experience embedded power structures that inhibit or deter participation in collaborative efforts, ultimately eschewing those unable to participate from the benefits of community well-being (Matarrita-Cascante & Stocks 2013). These concepts link to understandings of social locations within an intersectional framework, such that complex inequalities arise at intersecting social identities that influence the ways in which individuals are able to access, utilize, and harness potential from available resources.

However, while these examples from Gaventa (1980) and Brennan & Isreal (2008) address impacts of visible and invisible power dynamics at the community level, they do not help to inform how power relationships emerge from socially-differentiated variables between individuals within a community. Community field theory is used in this research study to inform and guide understandings for how individuals interact via strong and weak ties to form interpersonal relationships, facilitating the diffusion of knowledge and supports.

Community and community engagement are critical resources and sources of support for small-scale producers (Besser et al 2017; Chaudhury et al 2017). The social construction and implications of climate-imposed risks draw attention to power structures between individuals and within a community (Adger 2001; Kaijser & Kronsell 2014; Thompson-Hall et al 2016). Particularly for marginalized populations within a community, barriers of difference (linguistic, cultural, spatial, religious), which are often tied to visible or invisible power structures, inhibit participation and community collaboration (Chaudhury et al 2017; Matarrita-Cascante & Stocks 2013). Local connections, combining both strong and weak ties, increase individuals' ability to build adaptive capacity, as they provide venues for support, shared resources, and information

(Chaudhury et al 2017). As the complex cultural, social, and political reality of modern-day Indonesia is greatly influenced by the period of *transmigrasi*⁶ (Arndt 1983; Barter & Côté 2015), marginalized populations face a multitude of barriers to community participation, decision-making, and opportunities and resources to capacity building (Byg & Herslung 2014; Chaudhury et al 2017; Matarrita-Cascante 2013). Understanding community participation is one important component for investigating how individuals navigate complex social interactions and relationships in order to adapt to impacts of climate change.

Gender and Climate Change

The nature of how social relationships and contexts shape climate change adaptation is significantly less explored in the literature, especially understanding the intersecting social factors that influence the ways in which different groups of people or individuals are able to respond (Alston 2013; Nyantaki-Frimpong 2017; Onta & Resurreccion 2011; Thompson-Hall et al 2016). For example, only recently has the intersection of gender and social impacts of climate change been investigated, to tease out gender dynamics and the disproportionate stress placed on women due to associated impacts (Alston 2013; Kaijser & Kronsell 2014; Mainlay & Tan 2012; Thompspon-Hall et al 2016). This study aims to contribute to this growing literature on gender and climate change.

⁶*Transmigrasi* refers to a period of time during which the Indonesian government provided land and capital incentives for internal migration away from the densely populated island of Java to other less-populated islands.

Feminist Perspectives on Climate Change

Feminist theoretical perspectives are important to study gender differences and influences on the social components of climate change research. Feminist theory conceived the concept that gender is a social construction, “that masculinity and femininity are loosely defined, historically variable, and interrelated social ascriptions to persons with certain kinds of bodies” (Gardiner 2002, 35). Employing feminist theories accepts that gender is a social construct and allows for research to probe and understand the emergent power relationships from such constructions. An important tenet of feminist theories is the need for reflexivity and situated knowledge, such that awareness of researcher positionality is incorporated and reiterated throughout the data collection and analysis process.⁷ Feminist theories are concerned with the ways in which knowledge is produced and reproduced – focusing on what influences, causes, or controls – and whose perspectives – are missing from such construction (Alcoff & Potter 1992; Fraser 2010). And finally, feminist theories shed light on existing inequalities, inequities and important power relations that construct and influence the complex ways in which individuals experience, perceive, and are able to adapt to the impacts of climate change.

Feminist epistemologies allow for exploration of the mundane, everyday actions between individuals to understand power “on the ground” and how those power relationships actually influence the ways in which individuals interact with one another and the place in which they live (Bee et al 2015). The everyday is “the time-place where knowledge, action and experience come to matter” (Bee et al 2015, 6). Feminist theoretical perspectives critique the universalization and oversimplification of narratives that erase critical aspects of social and spatial differences. In terms of climate change adaptation, mitigation, and resilience – it is

⁷ A full discussion of researcher positionality and application of feminist epistemologies is presented in the following chapter.

essential to not reduce the individual or community to statistics and quantifiable measures, as that has potential to expunge the nuanced and complex interrelated social dynamics in which these individuals or communities experience their lives (Thompson-Hall et al 2016). As concisely explained by Bee et al (2015), “dominant framings of climate policy are predicated upon decontextualized subjects living in an idealized world where resources and power are evenly distributed. In other words, climate governance is disconnected from many of the ways in which it is experienced, enacted, and contested” (p. 1).

The current global discourse on climate change heavily focuses on quantifiable data, which while extremely important, it tends to reduce the complex realities and lived experiences of those disproportionality affected by its impacts. Feminist theory advocates for pluralistic politics of knowledge, to prioritize indigenous knowledge and experience, and to give voice to those not included in the narrative. The hyper-masculine climate change narrative depicts women as vulnerable – reinforcing gendered power structures and the role of the woman in the face of climate change (Terry 2009). Feminist scholarship challenges the science of discourse and policy-making at broad scales through illuminating the complicated nature of climate change at the local level by exposing complex vulnerabilities shaped by intersecting social constructs (Bee 2014; Denton 2002; Onta & Resurreccion 2011; Thompson-Hall et al 2016; Sultana 2009). However, women (and other social groups) do not fall into a binary as either vulnerable or virtuous, as neither paints an accurate or complex picture of how impacts of climate change take effect (Arora-Jonsson 2011).

Feminist approaches challenge the social construction of knowledge in ways that illuminate and investigate the power structures and hierarchies that influence the ways in which individuals view themselves in relation to one another and the world. This raises the importance

of who is involved in the knowledge production process and more importantly, who is not. Fraser's (2010) discussion of representation within the climate change narrative challenges the idea of how the narrative is created and by whom, and how that influences how those within the narrative are depicted. For example, if women were represented as individuals with skills and expertise to contribute, and had equitable means for accessing these outlets to contribute said skills and expertise, how would the narrative shift and, more importantly, how would women be incorporated into strategy development, policy, and resource building? Terry (2009) analyzes the ways in which policy discourse and mainstreaming are masculinized, and the discrepancy of a gendered perspective in climate change research is mostly due to "lack of evidence and information" (1). There needs to be continued research to fill evidence gaps, particularly on differences between men and women and their unique abilities to combat climate change – but in such a way that combines the qualitative collection of lived experiences and perceptions with the quantifiable 'hard data' to illuminate diversions and overlaps between the narratives.

To elaborate further, the feminist literature regarding climate change presents the overall theme to include those missing from the narrative into the narrative. Exclusion from the narrative allows for disproportionate views that reinforce power structures between the oppressed and the oppressor (Fraser 2010). For one example, Ransby (2006) explores how cultural rhetoric and stereotypes shaped the response for black women and children in response to Hurricane Katrina, and how despite the stereotyping– these women and children were not only resilient and self-reliant, but "creative and heroic in the face of crisis" (215). Nelson et al (2002) explore the socio-ecological impacts of climate change in conjunction with predicted biophysical impacts, and ultimately, implore for immediate inclusion and further research into gendered impacts, citing

the critical need to incorporate gender analysis into policy- and decision-making regarding mitigation and adaptation activities to climate change.

Feminist theories, particularly feminist political ecology (FPE) and intersectionality help to illuminate power dynamics between individuals within communities and social groups, and between communities and social groups, paying particular attention to the construction of power relationships and the influence those have on individuals, groups and communities (Rocheleau et al 1996; Kaijser & Kronsell 2014; Thompson-Hall et al 2016). In this study, the theoretical perspectives of feminist political ecology and intersectionality frames and informs the design, overall goals, and methodological approach by which this research achieves its objectives.

Feminist Political Ecology (FPE)

Drawing upon feminist environmentalism (Agarwal 1992), ecofeminism (Merchant 1980), socialist feminism, feminist post-structuralism, and environmentalism (Shiva 1989; King 1989), Rocheleau et al (1996) lay a conceptual groundwork for FPE, exploring the ways in which scholarship has dealt with the gendered perspectives on environmental problems, concerns, and solutions. Original feminist political ecologies were rooted in three themes regarding gender and the environment: rights and responsibilities, politics and activism, and knowledge. FPE is concerned with issues such as unequal access and control over natural resources and the environment, unequal relationships to environmental change, and the power relations that produce or transform these inequalities (Cole 2017; Rocheleau et al 1996). Rocheleau et al (1996) build upon this original framework and assert that there are “real gender differences in experiences of, responsibilities for, and interests in ‘nature’ and environments” (p. 3) derived from the social interpretation of biological and social constructs. FPE “emphasizes politics and

power at different scales but goes further in highlighting gendered power relations...making an explicit commitment towards tackling gender disadvantage and inequality” (Elmhirst 2015, 519); it explores connections between nature, gendered subject formation, and the body. The framework draws attention to gender as a crucial variable “in shaping resource access and control, interacting with class, caste, race, culture, and ethnicity, to shape the processes of ecological change, the struggle of men and women to sustain ecologically viable livelihoods, and the prospects of any community for ‘sustainable development’” (Rocheleau et al 1996, 4).

Building upon Rocheleau et al’s (1996) acknowledgement of the ‘real gender differences’ in relation to environmental engagement, Nightingale (2006) pushes this ideology, asserting that the gender-environment nexus is a contingent relationship, as gender is a process, able to be shaped by multiple interactions with the environment, society, and other people and living creatures. Gender is not a binary, rigid structure that influences how one interacts with the environment, but a fluid category seen as created and reinforced through social and ecological processes and practices. As critiqued by Mollett & Faria (2012), FPE does not totally account for heterogeneity between groups and within groups, and the power relationships that emerge as a result of those differences. Intersectionality challenges this approach of understanding the binary or categorized identities ascribed by society or the outsider (Bograd 1999; Crenshaw 1991; Ravera et al 2016; Shields 2008). As succinctly described by Cornwall & Rivas (2015), “relegating gender to a descriptive home is an attractive option for those who want to talk the gender talk in the absence of real debates about power” (p. 399): intersectionality addresses and challenges power relationships between individuals where complex, intersecting vulnerabilities emerge.

Intersectionality

Intersectionality, an applied theoretical framework, evolved within feminist theory as an analytical tool to shed light on how structures of power emerge and interact (Crenshaw 1991; Thompspon-Hall et al 2016). It can be defined as “the interaction between gender, race and other categories of difference in individual lives, social practices, institutional arrangements, and cultural ideologies and the outcomes of these interactions in terms of power” (Davis 2008, 68). There is an inherent danger in collectivizing groups of people around one singular experience they might have when conducting research, as it eliminates or overlooks the influence of the multitude of other experiences or identities that shape an individual’s position within the household, community, or society (Bowleg 2008; Mollett & Faria 2012; Purdie-Vaughns & Eibach 2008; Ravera et al 2016; Thompson-Hall et al 2016). For example, viewing the woman’s experience as similar for all women across races, socioeconomic classes, regions, castes, religions, geographic areas, and other subordinate identities reduces the understanding of the intersectional impact that each of these unique categories holds on the individual’s identity. A tenet of feminist thinking – the concept of intersectionality, defined as “the mutually constitutive relations among social identities (Shields 2008, 301) – enables these experiences and identities to be viewed, understood and incorporated into the research process. Intersectionality asks the question, “but *which* woman’s experience” (Sheilds 2008, 302); and extended, “which [*insert studied group*]’s experience?” Purdie Vaughns & Eibach (2008) hypothesize that an individual with two intersecting subordinate identities reduces that person to be “invisible” relative to an individual with only one subordinate identity, a concept they term *intersectional invisibility*.

Tuana (2008) provides a case study to illustrate these concepts; the study examined the impact that Hurricane Katrina held on marginalized groups and the intersecting roles that social

structures and non-human structures held in disproportionately impacting those groups in response to and rehabilitation after Katrina. Her study poignantly directed attention to the fact climate change does have disproportionate impacts at the local level, highlighted by intersecting factors of the social and the natural (Tuana 2008). Tuana (2008) highlights the exact theoretical aim of intersectionality – to “widen the perspective and reflect upon what factors may be relevant in a particular setting...to address the question of which social categories are represented in, but also which are absent from” the study area (Kaijser & Kronsell 2014, 422).

Kaijser & Kronsell (2014) argue for an intersectional approach when researching social dimensions of climate change, as “it provides a critique of existing power relations...and also highlights new linkages and positions that can facilitate alliances between voices that are usually marginalized in the dominant climate agenda” (419). As the social dimensions of climate change are of increasing interest for the international community, discussions of power, and intersectionality emerge as “the social causes of vulnerability [and] the capacity to adapt, which constrain individuals and social groups in their adaptation, are highly differentiated” (Adger 2001, p. 922; Kaijser & Kronsell 2014; Lykke 2009; Thomsson-Hall et al 2016).

Among small-scale agricultural producers, women are the most disproportionately affected by the impacts of climate change, with limited ability to build adaptive capacities or influence decision-making (Alston 2013; Arora-Jonsson 2011; Jost et al 2015; Skinner 2011; Terry 2009). However, it is essential to underscore that ‘women’ are not a binary category in relation to men, such that not all women share the same experience. Rather, complex inequalities arise between social categories (such as gender), and those that arise within social categories. While studies investigating one social variable (such as gender or economic status) can be useful in highlighting power structures in relation to climate change, they can often “fail to consider

how this base for inequality is intertwined with and even reinforced by other structures of domination” (Kaijser & Kronsell 2014, 421). For example, Dewachter et al (2018) examined the communication channels of water information within a rural Ugandan village, finding that while women categorically share and have access to less water information than men, less educated women receive significantly less information on water than better educated women or all men. This finding points to the nuanced inequalities and vulnerabilities existing within groups. Without understanding the differences in access to information among women, interventions may reinforce and potentially exacerbate inequalities between higher and lower education women in gaining access.

Intersectionality allows for the discourse surrounding the impacts of climate change to examine the interrelatedness of reinforcing power structures to hinder or enable an individual to attain adaptive capacity, particularly for small-scale agricultural producers (Cole 2017; Kaijser & Kronsell 2014; Shields 2008). This research project fundamentally considers that many forms of *structures of domination* are at play between the individuals and communities in the face of climate change, which may significantly influence their abilities to adapt.

In summary, this research study is ultimately one of power. It examines the emergent relationships of power between individuals and within a community to understand how these hierarchical structures influence ability to build adaptive capacity to external forces, such as climate change. Feminist theories, such as FPE and intersectional theoretical perspectives guide the conversation of how power structures emerge and shape the ways in which individuals may or may not be able to respond and/or adapt to external changes, particularly for marginalized groups often excluded from dominant narratives. These individuals are situated within a community structure and community field theory guides an understanding of how individuals interact with one

another to build community, which may build or inhibit capacity. Therefore, this research study draws upon feminist and community theoretical perspectives to inform its overall design and analysis.

Theoretical Application

In conclusion, community field theory informs an understanding of social processes occurring with individuals at a community level, such that individuals engage with their community and each other in response to external risks and impacts imposed by climate change (Adger 1999; 2001; 2003; Chaudhury et al 2017; Matarrita-Cascante & Stocks 2013). FPE and intersectionality informs the epistemology (Cole 2017; Nyantakyi-Frimpong 2017; Rocheleau 1995) and an understanding of micro-level social processes, such as gender (as a process), and the socially-differentiated ways in which individuals perceive and experience an event (Kaisjer & Kronsell 2014; Terry 2009; Thompson-Hall et al 2016). Both men's and women's perspectives, knowledge, skills, and experiences are critical to understand the way in which each engage with each other, the broader societal context, and the environment. The process, power, and context with which gender and environmental engagement emerges is critical in understanding how men and women can experience, perceive, and adapt to the impacts of climate change differently.

These theoretical perspectives are important in understanding these concepts in the Indonesian context. In Indonesia, the New Order's *transmigrasi* period saw state-sponsored migration of populations from densely ('Inner Islands') to sparsely populated areas ('Outer Islands'), where land and supplies were made available to migrating populations at the expense of those already settled (Arndt 1983; Barter & Côté 2015). Those from Java and other 'Inner Islands' who spread to the 'Outer Islands' brought their cultural, religious, and hierarchical

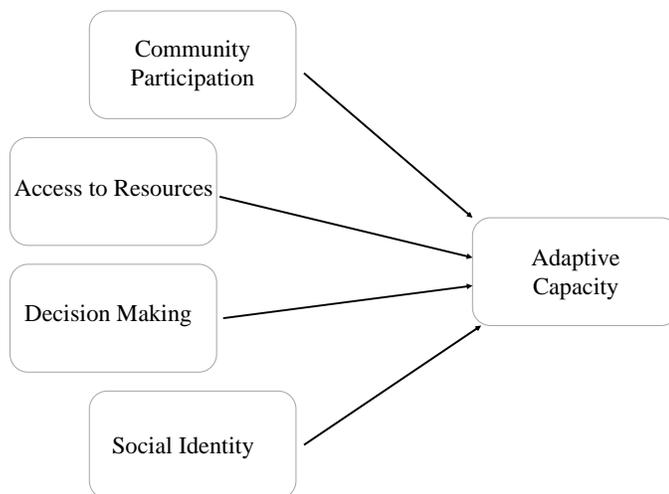
power dynamics with them (Barter & Côté 2015), reshaping the demographic, ethnical, and political compositions of Indonesia's provinces. Lampung province especially saw an increase in transmigrants from Java and other islands (Cribb 2010), reshaping the composition and power hierarchies of communities throughout, resulting in very complex social and power dynamics. FPE and intersectionality help to inform and identify these nuanced power relationships (i.e., intersections of ethnicity, religion, and gender) and how they influence the ways in which individuals can respond to and build adaptive capacity to climate change, while community field theory helps to inform barriers to community engagement (Matarrita-Cascante & Stocks 2013).

These theoretical perspectives guide this research study, logically connecting the concepts to study each research question and objective. All three research questions are interrelated, building upon one another to better understand how men and women in small-scale cacao producing households build adaptive capacity to respond to perceived impacts of climate change. Figure 3.1 shows a conceptual model linking the main concepts addressed in this study.

This research is primarily exploratory, attempting to understand social and gendered dynamics surrounding small-scale cacao producers in their ability to build adaptive capacity. To explore these dynamics, the following concepts are explored to understand their influence on an individual's ability to build adaptive capacity (or not): community participation, access to resources, decision making, and social identity. These concepts connect to build a framework from which to design and analyze the research questions and objectives. Community participation examines the role of providing social supports for individuals, the presence of strong and weak ties (Granovetter 1973) in building social networks upon which individuals can rely for information sharing, support, and capacity building. Overall, access to resources examines the differing resources available within a community and levels of access individuals

have to those resources in order to build capacity to perceived impacts of climate change. Decision making explores influence and power exhibited within the household and community levels by men and women, specifically looking at what kinds of decisions men or women have more influence or power, and how this affects their respective ability to build adaptive capacity. And finally, social identity explores the ways in which intersecting identities influence how individuals are able to build adaptive capacities (Kaisjer & Kronsell 2014).

Figure 3-0-1 Conceptual Model



The following chapter (chapter 4) details the methodology and methods employed to design, collect, and analyze this research study. Chapter 5 presents the results for all three research questions, and the respective sub-objectives.

Research question #1 explores the intra-household gender dynamics, roles, and responsibilities, as well as community participation in small-scale cacao producing households in Lampung and South Sulawesi. Influenced by feminist theoretical perspectives, this first research question provides a baseline for understanding the intra-household dynamics of households producing small-scale cacao, specifically looking at men and women’s division of labor and time allocation for productive or reproductive activities, decision-making patterns, and levels of

community participation. Research question #2 explores how men and women perceive the impacts of climate change on their daily lives, specifically examining these impacts on food security and health, agricultural activities, and concerns for the future. Based in feminist theories, this question explores these differences in perceptions of impact by men and women of intersecting identities, with an understanding that socially-constructed gender roles may influence such perceptions. Finally, question #3 draws upon feminist and community theories to understand what and how men and women employ strategies to adapt to perceived impacts.

The final chapter (chapter 6) presents discussions and implications for each research question. Based on these findings, suggestions for programming recommendations are provided, as well as areas for future research. A final conclusion summarizes this research study and its overall implications.

Chapter 4. Methodology and Methods

This chapter describes the methodological approach and methods employed to answer the research questions and objectives as outlined in Chapter 1. The research design blends quantitative and mixed qualitative methods to conduct a comparative case study analysis across two provinces in Indonesia (Creswell & Clark 2007; 2011). The methodological approach is framed by feminist methodology to quantitatively and qualitatively assess the lived realities of men and women involved in small-scale cacao production in Lampung and South Sulawesi, Indonesia. Operationalized concepts, research development and timeline, sampling selection, qualitative and quantitative designs, analytical design, and statements of researcher positionality and reliability/validity are presented. Prior to fieldwork, this research was submitted for the Pennsylvania State University's IRB review and was deemed exempt (IRB#00004701).

Development of Research Concept and Realization

To successfully conduct this research, strong partnerships were established with key collaborators around the world, and funding was strategically sourced from various grants and fellowship support. A key collaborator on this project was a senior climate change scientist at the International Center for Tropical Agriculture (CIAT) in Hanoi, Vietnam. There existed a clear gap in the literature regarding the social dynamics of climate change adaptation for small-scale cacao producers in Indonesia (as well as most of Southeast Asian producing countries) (Atker et al 2017). This research aims to contribute to the body of knowledge to fill this gap. Via collaborations with such partners at CIAT as well as subsequent partners at Swisscontact's Sustainable Cacao Production Program (SCPP) and Mondelez's CocoaLife program, this research idea became feasible to investigate. With support from the Borlaug Graduate Research

Fellowship in Food Security from Purdue University, The Marjorie Whiting Indigenous Knowledge student research grant, and the National Geographic Young Explorer’s Grant, a field stay in Vietnam (at CIAT-Asia with collaborators) and Indonesia was held for 7 months during 2017 to accomplish a wide range of research activities. Table 4.1 outlines the timeline for this research process.

Table 4-0-1 Overall Data Collection Timeline

Activity	Aug. 16	Sept. 16 - Jan. 17	Feb. 17.	Mar. 17	Apr. 17	May. 17	June. 17	July. 17	Aug. 17	Sept. 17
Scoping trip to Indonesia & Vietnam to visit field sites and collaborators										
Literature review; protocol development; completion of Ph.D. requirements										
Residency at CIAT-Hanoi										
Scoping trip to Indonesia with CIAT team										
Lampung Data Collection										
Sulawesi Data Collection										

Sampling Selection

This section describes the process and justification for selecting Indonesia, Lampung and South Sulawesi, the respective villages, and participants for this research study.

Indonesia

Indonesia was selected as the main research site based on several criteria. Considering the global cacao value chain, Indonesia is an extremely strategic source of cacao (Figure 4.1; FAOSTAT 2016). Overall, it is the third largest producer of cacao, behind Ghana and Côte d’Ivoire, but more specifically, it is the largest and most important source of unfermented, bulk cacao. These

beans are mainly used for by-products, such as butter as well as for fillers to supplement higher quality, flavorful beans to make chocolate products.

Figure 4-0-1 Total global production of cacao beans by country in 2016



Source: FAOSTAT, 2016.

Overall, Indonesia is extremely vulnerable to hazardous impacts of climate change (Yusuf & Francisco 2009), including but not limited to increased frequency and severity of natural disasters, erratic rainfall, prolonged droughts, and flooding. Observed climatic changes across the archipelago include shifts in maximum and minimum temperatures, timing of monsoon onsets, increased severity of monsoons and floods, and dramatic changes to rainfall timing and amounts (MoE 2010).

As the fourth most populous country in the world, Indonesia's population is increasingly and extremely dependent on their agricultural sector for economic growth as well as livelihood sustainability. Particularly during El Niño/a years, agricultural-dependent households increasingly struggle to meet their daily needs in direct relation to variable climatic events (Boer

et al 2016). The agricultural sector, particularly for small-scale commodity farmers (like coffee and cacao) dependent on specific climatic conditions for optimal harvests, is most vulnerable to these climatic changes (Schröth et al 2015).

Indonesia is also an incredibly complex and diverse country, with an amalgamation of over 700 spoken languages and 300 distinct ethnic groups (Cohn & Ravindranath 2014). Very limited research has explored the complexity of social dynamics in response to climate change, and almost none (if any at all) has explored this for small-scale cacao producers in Indonesia. Additionally, the literature reveals a gap in knowledge with regard to the gender dynamics of cacao production in Indonesia and specifically examining these in the context of anthropogenic climate change. This section will further detail the context of Indonesia and strategic reasoning for selecting Indonesia as the research location.

Indonesian Cacao

Cocoa production is the main source of livelihood for over 1.4 million smallholder farmers across Indonesia, representing about 93% of national production (Witjaksono & Asmin 2016). The Indonesian cacao sector has experienced tremendous growth over the past 25 years; yet, the impacts of climate change exacerbate the constraints already faced by Indonesian small-scale cacao farmers as well as the bottlenecks faced by the private sector in securing a sufficient quantity of quality cacao beans. Production is estimated to decline by up to 6% in El Niño Southern Oscillation years (Läderach et al 2010; 2013; Schröth et al 2015). For small-scale commodity production, such as cacao, farmers must maintain high or at the very least, sufficient, yields each harvest to have purchasing power in order to maintain their livelihoods (Achterbosch et al 2014). However, Indonesian cacao production and yields have recently declined due to

unpredictable weather conditions, prevalence of pests and diseases, and aging trees (Moriarty et al 2014; Witjakson & Asmin 2016).

Widespread pest infestations, particularly the cocoa pod borer (CPB) reduce cocoa bean quality across Indonesia (Panlibutan & Lusby 2006). Despite industry, NGO, and governmental efforts to increase improved production and post-harvest practices across the small-scale farmer population, adoption of these practices has been limited. As the international and local purchasing market for Indonesian cacao is fiercely competitive and does not differentiate for quality, small-scale producers have little incentive to change their production or post-harvest practices since they can generally find a market channel for their supply somewhere. Needed changes would include upgrading to or adopting more labor-intensive methods, however these changes would face barriers due to corruption, poor infrastructure, and lack of access (Personal KI Interview). In addition, increased variability, unpredictability, and severity in rainfall, temperature, drought, and disaster patterns pose inconsistently damaging effects on cacao production and smallholder farmers' ability to produce high enough yields to earn a livelihood. As such, Indonesia is a strategic place to study the impacts of climate change on small-scale cocoa producers' livelihoods and perceptions, particularly as it relates to women's contribution to the value chain.

Gender Issues Related to Cacao and Climate Change

There is a limited body of knowledge around gender and smallholder agriculture in the face of climate change in Indonesia (Atker et al 2017), specifically Sulawesi (the largest cacao producing region across the archipelago) and Lampung (a recent area of cacao production). Women are active participants in the cacao value chain across the world, as well as in all other agricultural (livestock, and fisheries) value chains. From limited available grey literature, women

are involved in the cocoa value chain in Indonesia, but to what extent is not well known (Panlibuton & Lusby 2006). Previous research examining gendered divisions of labor, decision-making, and power in the Southeast Asian (and sometimes Indonesian) context frame this research's expectations, such that women may take an active and dominant role in controlling the household's finances, participate in agricultural organizations, and yield some power in decision-making processes while still bearing burdensome workloads with limited access to credit and culturally-restricted public mobility (Atker et al 2017; Tickamyer & Kusujarti 2012; Rinaldo 2013; Mason & Smith 2003; Alkire et al 2013). This research study aims to address this gap in the literature. A full review of the existing literature on these intersections is described in Chapter 2.

Case study sites: Lampung and South Sulawesi Provinces

This research was conducted across two main study sites in Indonesia: Lampung province and South Sulawesi province (Figure 4.2). South Sulawesi province and Sulawesi island are the major production areas of cacao across Indonesia, whereas Lampung is a relatively new area to

Figure 4-0-2 Province Selection in Indonesia



cacao production (Personal KI Interview). Lampung province was purposively selected to serve as a case study site due to its recent push to intensify their cacao production as well the ethnic and religious diversity represented at the provincial and village level. South Sulawesi was selected as a comparative case study site as it is the major cocoa producing region in Indonesia.

Three districts were selected in Lampung, and one village in each district was selected in Lampung. One district was selected in South Sulawesi and one village was selected in South Sulawesi. Table 4.2 indicates the selected provinces, districts, and villages. Provinces and villages were selected based on established criteria (village selection is further discussed in below section *Selecting Villages*). Provinces were selected using the following general criteria:

- Provinces were suitable for cocoa production
- Provinces had cocoa producing villages
- Provinces hosted cocoa-focused development work (Cocoa Life in Lampung, SCPP in South Sulawesi)
- Provinces were experiencing impacts of climate change

Table 4-0-2 Site Selection

Province	District	Village
Lampung	Pesawaran	Banjar Negeri
	Pringsewu	Purwodadi
	Tanggamus	Kali Bening
South Sulawesi	Luwu Utara	Lawewe

Source: Primary fieldwork by S. Eissler

The first study site, Lampung province, is the southernmost province on Sumatra island of Indonesia. Along with Aceh, Lampung is the main province of cocoa production in Sumatra, where over 300,000 farmers rely on small-scale cocoa production to sustain their livelihoods (OLAM 2018). The Cocoa Life program, operated by Mondelez International and OLAM, has been working in Lampung since 2014 with the aim of increasing sustainability of cocoa-

producing households and communities with the overall intention to intensify their supply in this province. Cocoa production in this area has faced significant challenges to sustainable production over the recent years due to aging trees, pests and diseases, and poor management practices, not unlike the other cocoa producing regions of Indonesia. Lampung province is also a cultural melting pot, where many migrants from other areas of Indonesia settled in Lampung during the *transimigrasi* period (Elmhirst 2000). *Transimigrasi* (referred to in English as the Transmigration period) began while still under the Dutch rule, where citizens – mostly from the overpopulated island of Java – were incentivized to migrate internally throughout Indonesia. Many Javanese settled in Lampung, taking over land for small-scale agriculture production as well as non-farm work (Elmhirst 2000; Personal KI interview). Lampung's modern history is characterized by this *transimigrasi* period, which resulted in a twenty-fold population increase and major shift in the ethnic structure of the province (Elmhirst 2000). As a very ethnically diverse cocoa producing region, Lampung was selected as the first site for this research study.

The second study site, South Sulawesi, is a major province for cocoa production in Indonesia; the island of Sulawesi accounts for 90% of the national production (Lambert et al 2004). Introduced to the island in the 1960's, cocoa production had been relatively small, and spread throughout Sulawesi by the Bugis people (Ruf & Yoddang 2001). In the late 1980's, when cocoa was systematically introduced everywhere throughout the island, Sulawesi experienced a 'cocoa boom', facilitated by abundant levels of rainfall, competitive market prices, efficient rural infrastructure, access to subsidized inputs (specifically fertilizer), and relatively available forest land (Durand 1995; Ruf 2007). However, due to an onslaught of high rates of pests and diseases in the late 1990's, the Indonesian cocoa supply (particularly in Sulawesi) has deteriorated (McMahon et al 2009; Ruf & Yoddang 2001). As such, Sulawesi was selected as the

comparative case study site due to its large production of cocoa in Indonesia. South Sulawesi was the region selected as it was most secure (there are security issues in Central Sulawesi) and Swisscontact facilitated access to a village in Luwu Utara (a northern district of South Sulawesi) that has high rates of cocoa production. The village selection process is detailed in the next section.

Both sites were justifiably selected to conduct this research. In Lampung, I worked directly with the CIAT field team and field partners through the Mondelēz International Cocoa Life program, which operates across Lampung province. The Cocoa Life program aims to promote sustainable cocoa production by empowering cocoa farmers and nurturing cocoa producing communities, to ultimately ensure the sustainable supply of cocoa for the future. It focuses on four overall pillars: 1) Farming, 2) Community, 3) Youth and Livelihoods, and 4) Environment. In Indonesia, it has linked with strategic partners to facilitate these initiatives, such as OLAM and Save the Children. Mondelēz's CocoaLife had recently partnered with CIAT to conduct a cost-benefit analysis project on the uptake of climate-smart agriculture practices in the Lampung province for cocoa production. In South Sulawesi, Swisscontact enabled field access to the head villager in Lawewe, the selected study site village.

Selecting Villages

Using an established set of selection criteria, I worked with local partners to identify villages across each selected province that fit the criteria for the study sites. The quantitative data in Lampung were sampled and collected at the district level. The quantitative data in South Sulawesi were collected at the village level. These are explained further in the *quantitative data*

section. All qualitative data were collected at the village level (explained further in the *qualitative data* section).

In total, four villages were selected (one per district) (see Table 4.2 above). Villages were selected based on established criteria, inclusive of necessary considerations for access feasibility and security:

- Both male and female farmer groups were established in the village
- Cacao was a predominantly produced crop of the village
- Villages had the following ethnic makeup: a province-level minority group was the majority; a province-level majority group was the majority; and the village was mixed
- The village experienced tangible impacts of climate change

All villages selected across both provinces were cocoa-producing communities (criteria 2). In South Sulawesi, Lawewe did in fact not have an established female farmer group, rather many females engaged in cocoa production. However, they were not established nor registered as a farmer group. The first selected village was destroyed by landslides prior to fieldwork, and thus inaccessible. Lawewe was the second option, although it did not have a female farmer group established (criteria 1).

From literature reviews, discussions with key informants, and scoping trips, it was evident that there are clear social differences between ethnic groups in Indonesia, particularly as it pertains to power relationships. It was deemed imperative to the research to focus on areas with different representations of ethnic groups (Criteria 3). In Lampung province, the following villages with respective ethnic representations were selected: one village was predominately Javanese (ethnic majority in terms of power in Lampung province) [Purwodadi, Pringsewu], one village was predominately Lampung (ethnic minority in terms of power in Lampung province) [Banjar Negeri, Pesawaran], and one village was a strong mix of ethnic groups [Kali Bening,

Tanggamus]. The village selected in South Sulawesi (Lawewe) was predominately Bugis, the dominant ethnic group in the province, representing a mono-ethnic village.

Finally, all villages selected had been experiencing impacts of climate change. These impacts of climate change were pre-defined as areas prone to flooding or drought (i.e. intense variability in precipitation levels) (Morton 2007; Yusuf & Francisco 2009). In Lampung, Banjar Negeri and Kali Bening were prone to flooding; Purwodadi was prone to drought. In South Sulawesi, Lawewe was prone to flooding.

Household Sampling

The household survey was conducted with a random sampling of cocoa farmers across the three study districts in Lampung province: Pesawaran, Pringsewu, and Tanggamus. OLAM and Save the Children compiled a list of all of their cocoa farmers in each of the districts; the list was checked for duplicates. Those included in the comprehensive list represented Cocoa Life participating and non-Cocoa Life farmers in cocoa producing communities across all three districts. In each district, the CIAT team targeted a random selection of 100 households to participate in the household survey. Several households were not available or willing to participate in the survey. After cleaning the data for missing or uninterpretable responses, the total survey sample included 190 households in the three districts (Pringsewu=60; Pesawaran=66; Tanggamus=64). This sampling design was created and employed by the CIAT field team to meet their objectives for the household survey. As described later in the *quantitative data* section, the quantitative data are used in this dissertation to inform research question 1 and complement the qualitative data where comparable between the two research sites.

Operationalization of Concepts

This research process aims to answer the following three overall research questions and subsequent research objectives:

RQ1.	What are the gender roles in small-scale cacao producing households in Lampung and South Sulawesi, Indonesia?
O.1.	Assess division of labor and time allocation for activities
O.2.	Assess decision-making patterns within the household
O.3.	Assess levels of community participation
RQ2.	How do men and women within small-scale cacao producing households perceive impacts of climate change?
O.1.	Assess definitions of climate change [causes and impacts] by men and women
O.2.	Assess perceptions of fear, highest risks, and worry related to climate change and for the future by men and women
O.3.	Assess perceptions of impact on household food security and health by men and women
O.4.	Assess perceptions of impact on agricultural and income generating activities by men and women
RQ3.	What strategies do men and women within small-scale cacao producing households employ to adapt to impacts of climate change?
O.1.	Assess how men and women perceive, access, and utilize available resources to respond
O.2.	Assess which specific strategies (ie., how resources are leveraged) men and women use to adapt to impacts of climate change

To do this, Tables 4.3-4.5 indicate methodological tools used and triangulated to assess each research question.

Table 4-0-3 Assessing Research Question 1

Question	Objective	Method	Measurement Tool
Q1. What are gender roles?	1. Assess division of labor and time allocation	Participant observation	Observation notes on activities each HH member does throughout the day
		HH Survey	Q23. Time Allocation Sheet
			Q22. Division of labor table
		FGD	Activity 1: Q3
		In depth interview	Q2c. How do you contribute to the farming activities?
	Q3a-d. Who do you sell your cacao to?		
	Q6a-f. What are your daily priorities?		
	2. Assess decision making patterns	FG Workshop	Activity 1: Q2; Activity 2: Q3, 3a
		In-depth Interview	Q6d. [if wife works] Did you/your wife have to ask husband's permission [to work]?
			Q8. How are decisions made in this community? Are your needs met?
3. Assess community participation	FG Workshop	Activity 1: community resource map compared between men/women; Q1b.	
		Activity 2: Q1	
	In-depth Interview	Q8a. How does <i>musrenbang</i> work? Q8c. Why don't you participate? How and why do people participate?	

Table 4-0-4 Assessing Research Question 2

Q2. How do men and women perceive risks [understand] climate change?	1. Assess definitions of climate change [causes and impacts]	FG Workshop	Activity 1: Q1c, 4b
			Activity 4: Open Q1, Q2
			Activity 3: Seasonal calendar results for topics [rainfall, temperature, natural disaster, crop disease] including follow up questions: Q1a, Q4
		In-depth Interview	Q7a&e. Has [the weather] changed at all in the past 5, 10, 15, 20 years? How so? Have you heard the term 'climate change'? [If yes], What is it? What are your opinions about it?
	2. Assess perceptions of fear, highest risk, worry related to CC for future	FG Workshop	Activity 4: Q9
		In-depth Interview	Q9. What are the greatest challenges in your life? What are solutions? What are barriers to these solutions?
	3. Assess perceptions of impact on household food security & health by men and women	FG Workshop	Activity 3: Seasonal calendar topics including food availability, human diseases
			Activity 3: Q1, Q5a-b
		In-depth Interview	Activity 4: Q2
	4. Assess perceptions of impact on agriculture and income generating activities by men and women	FG Workshop	Q7b-d. How does the weather affect your priorities? What do you do about this? How does the weather affect your wife/husband priorities?
			Activity 3: Seasonal calendar topics including crop diseases, agricultural labor
			Activity 3: Q1
		In-depth Interview	Q1a-b. How was the harvest last year? How does the weather affect the cocoa?
			Q2a-d. Can you tell me about your farm?
	Q7b-d. How does the weather affect your priorities? What do you do about this? How does the weather affect your wife/husband priorities?		

Table 4-0-5 Assessing Research Question 3

Q3. What strategies do men and women within small-scale cacao producing households employ to adapt to impacts of climate change?	1. Assess how men and women perceive, access, and utilize available resources	FG Workshop	Activity 1: resource map; Q1, 2, 4
			Activity 2: Venn diagram, Q1, Q2, Q4
			Activity 3: seasonal calendar for topics including water availability, resources
			Activity 4: Q4, Q5, Q6, Q8
		In-depth Interview	Q2a-b. What crops do you grow? How were the harvests? What are sources of income?
			Q5. Are you part of a farmer group here?
			Q6aii. What is your water source?
	2. Assess which specific strategies men and women use to adapt to impacts of climate change	FG Workshop	Q6f. Do women in this community work? How do you feel about that?
			Q7f. Where do you get weather information? Do you trust it? Do you use the internet?
			Q9. What are the greatest challenges in your life? What are solutions? What are barriers to solutions?
		In-depth Interview	Activity 1: Q1a, 3a
			Activity 3: Q1b, Q5
			Activity 4: Q2, Q7
			Q1a. What happened? Why did this challenge happen? What are causes? How long has this happened for? Who noticed it? What did you do about this?
In-depth Interview	Q3c. How do you negotiate cocoa prices?		
	Q4. How do you determine cocoa quality?		
	Q5b. What are the benefits to participating in a farmer group?		
In-depth Interview	Q7c. What do you do about [impact of climate change]? How do you plan for next year?		

Quantitative Data

Description of Data

The quantitative analysis uses two different quantitative sources, based on the research location, to contextualize or complement the qualitative data. In Lampung province, primary quantitative data were collected at the district level. A household survey was employed by the CIAT field team, examining use and adoption of climate-smart agricultural practices in cocoa-producing households. A team of six field enumerators were trained and employed to close-question interview a random sampling of households across the three districts. They were given a tablet and recorded all answers electronically using CommCare software. This survey included

variables on: household demographic information, farm characterization, perceptions of climate change, sources of information, good agricultural practices, adaptability, perceptions of pests and diseases, access to resources, and household decision-makers on various topics. Quantitative data on time allocation and division of labor perceptions were gathered across this sample. The sampling frame was compiled by CIAT colleagues, using a randomized sample of registered CocoaLife and non-CocoaLife cocoa farmers in Purwodadi, Pesawaran, and Tanggamus, Lampung Province. Table 4.6 highlights a description of this sample.

In South Sulawesi, secondary data were used from Swisscontact's CocoaTrace database. This database is highly restricted; only variables within my geographic region (the village of Lawewe) were released. These variables included: household demographic information, farm characterization, description of good/bad farm practices, perception of climate change or environmental impacts, access to resources, adaptability, and food security. These data were collected by representatives of Swisscontact. The variables were limited in geographic scope, such that the sample included 214 cocoa-farmers in the Luwu Utara (district), Baebunta (sub-district), Lawewe (village) region. Table 4.7 highlights the description of this sample, representing cocoa farmers in Lawewe. Quantitative data on time allocation and division of labor percentages were collected using a smaller, purposive sample, representative of the qualitative sample.

These two sets of quantitative data are not directly comparable, as such, these data are used to contextualize and describe the populations. Directly comparable quantitative data are presented in the results. Additionally, preliminary analysis of the quantitative data informed the development of the in-depth interview protocols.

Data Collection Process

Once the sampling frame was complete, the trained team of enumerators were given a list of households from the sampling frame for which they were instructed to make appointments by phone and visit the household to conduct the survey. The enumerators used a tablet and CommCare software to conduct the survey and read the survey to the participants. The survey was conducted at the household level such that whoever was an adult (>18 years of age), present, available, and with knowledge of the household cocoa farming at the time of the enumerator arriving was qualified to represent that household. If the respondent wasn't home and had a scheduled appointment time, the enumerator would reschedule with the respondent. If the respondent never answered the phone to schedule an appointment, the enumerator would try to schedule an appointment in person. Reaching farmers by phone was suggested by CocoaLife and the head villager, as a majority of farmers had active mobile phones, except for a few of the much older farmers. In the case of no phone, then the enumerator would directly attempt to schedule an appointment in person. If the respondent was still unavailable or unwilling, the respondent was listed as no-response. The household surveys were conducted between April-May 2017, before the intensive harvest season began. The research team (myself and the CIAT field team) would quality check the data each day from the enumerators and would formatively evaluate them as enumerators, such that occasionally, we would go with an enumerator while they conducted their interviews to ensure questions were asked correctly and answers were recorded correctly.

Sample Characteristics

Table 4-0-6 Overall Summary Statistics for Lampung Data

	Mean (Percentage)	Min	Max
Gender			
Male	65.79%		
Female	34.21%		
Household Size	3.95	1	8
Annual Income*	2,737.96 USD	69.11 USD	18,384.06 USD
Land ownership	1.17 ha	0 ha	6 ha
Age	48.9	23	86
Ethnicity			
Javanese	65.32%		
Sundanese	16.94%		
Lampung	8.87%		
Palembang	4.84%		
Other	4.03%		
Religion			
Islam	97.37%		
Christian	1.06%		
Hindu	1.58%		
District			
Pesawaran	35.79%		
Pringsewu	32.11%		
Tanggamus	32.11%		
N		190	

*Calculated by international exchange rate of Indonesian Rupiah to United States Dollar, March 2018.

Table 4.6 highlights the descriptive statistics for the Lampung secondary data sample, collected by the CIAT team. These data were collected to inform a larger project focusing on climate-smart agricultural practices and carbon stock assessments of cocoa production in the Lampung province. As a CIAT collaborator, I informed the development of several questions and instruments used to collect data within this sample on the gendered divisions of labor and decision-making. The sampling and data collection frame were under CIAT's direction. These data reflect a small portion of the overall population and is not representative. They will, however, be used to provide context and insight where appropriate to complement the qualitative data collected within the region. The initial analysis of this data was used to identify trends in order to develop the in-depth interview protocol.

A majority of the sample is male (65.79%), Javanese (65.32%), and Muslim (97.37%). There is an even split between district representation of the three target districts (Pesawaran, Pringsewu, and Tanggamus). The average age of respondents is 48.9 years old, with a range between 23 and 86 years old. The average household size is around 4 persons, with a wide range between 1 and 8 persons. The average annual income is around \$2,700, with a wide range between 69.11 USD and 18,400 USD. The average annual income in Indonesia in 2017 was approximately \$3,488, according to the World Bank Group. In this sample, the average size of land in which the participant owned was 1.67 ha, with the minimum at 0 ha owned and the maximum at 6 ha owned.

Table 4-0-7 Summary Statistics for South Sulawesi Data

	Mean (<i>Percentage</i>)	Min	Max
Gender			
Male	97.65%		
Female	2.35%		
Marital Status			
Married	87.32%		
Single	4.69%		
Widow/er	7.98%		
Educational Status			
Primary Completed	71.36%		
Secondary Completed	21.60%		
Senior Completed	7.04%		
Age	40.11	23	71
Land ownership	1.04 ha	0 ha	3.25 ha
N	213		

Source: Swisscontact's CocoaTrace (2017)

Table 4.7 highlights the demographic sample descriptive statistics for the South Sulawesi secondary data provided by Swisscontact's CocoaTrace. This data is only for Lawewe village. An overwhelming majority of the sample are men (97.65%), are married (87.32%) and have only completed a primary level of education (71.36%). The average age is 40 years old, slightly under the average age of an Indonesian cocoa farmer participating in Swisscontact's Sustainable Cocoa

Production Program (43.4 years) (SCPP 2015). The average size of land ownership is 1.04 ha, with the minimum size of farm owned at 0 ha and the largest at 3.25 ha.

Qualitative Data

Description of Data

The mixed qualitative methods yielded significant data on which the bulk of this research was based. Semi-structured focus group discussions were held in Phase One of data collection in three villages in Lampung Province and one village in South Sulawesi province. These were held during Phase One to gather an understanding of participants' perspectives, knowledge, and opinions of the research topics. The information gathered from the focus group discussions informed the development of the in-depth interview protocol to better understand household management and gender dynamics around cacao production, as well as perceptions and adaptation strategies employed to respond to climate change.

To learn from the perspective of each sample group, three focus group discussions (FGD) (one for each sample group) were held in each village, with the exception of South Sulawesi, where no formal women's farmer group was established. Each separate FGD were held with members of a men's farmer group, a women's farmer group, and women in cocoa-producing households that weren't part of a formal farmer group (also referred to as 'household wives'). Follow up in-depth interviews occurred with selected members of the FGDs, and then using snowball sampling and purposive sampling, other members of the community were asked for an in-depth interview. Participants for the follow up in-depth interviews were selected first on their willingness to be contacted for an additional interview. Then from this pool, individuals were purposively selected based on several criteria including their ethnic and religious identity, their

leadership level (or lack thereof), role within the group and community (determined by participation in *musrenbang* and/or the farmer group, if applicable), age, and educational level. A translator was trained on how to facilitate FGDs and in-depth interviews; he conducted each of the FGDs and in-depth interviews in Bahasa Indonesia. The in-depth interviews were recorded using an audio recorder, while I took extensive notes during FGDs. The fieldwork methods are detailed below for each qualitative method.

All the data collection process occurred in the local language. I made significant steps to learn Bahasa Indonesia, including an intensive immersion course in August 2016 and a continuing online course through the University of Hawaii – Honolulu. While the majority of Indonesians speak the national language (Bahasa Indonesia), they all also speak their local or ethnic language, and often times, a dialect of that language (Cohn & Ravindranath 2014). For this reason, as well as the fact my Bahasa skills and competency were not strong enough to effectively run data collection unassisted, I hired and trained translation assistants in the field. In addition, all data collection protocols were translated into the appropriate languages, which included mainly Bahasa Indonesia, with minor revisions in Javanese, Sundanese, Lampung, and Bugis, depending on the need of the participants and ability of the translator.

Mkandawire-Valhmu & Stevens (2010) also suggest dressing in clothing common and appropriate to the cultural context and to limit the use of technologies that may appear as unfamiliar to the research participants. I spent time consulting with local partners so as to dress and act appropriately in the field.

Key Informant Interviews

Key-informant (KI) interviews were held with identified persons of interest throughout the research process (Brennan & Dodd 2009; Krannich & Humphrey 1986; Schwartz et al 2001). These interviews followed a semi-structured protocol (see Appendix A) to understand different perspectives on issues plaguing rural small-scale cocoa farmers, as well as approaches to gender sensitivity in policy and programming. A total of 36 key informant interviews were held throughout the research process and served to complement and triangulate other methods of data collection (Morse 1994; Polkinghorne 1989). Table 4.8 indicates a description of those that were interviewed for a KI interview throughout the research process. These were informal in nature; the researcher took extensive notes during the interviews and relied heavily on these notes to assist in developing data collection protocols as well as provide additional perspectives.

Table 4-0-8 Key Informant Interviews, by Sector/Description for Lampung and Sulawesi

Indonesian Cacao Supply Chain	
Local cacao buyers	2
Input sellers or distributors	3
Local chocolate makers	2
NGO Representatives	16
Government / Extension	
Lawewe / South Sulawesi	8
Private Sector Representatives	5
Total	36

Source: Primary fieldwork by S. Eissler

Participant Observation

Participant observations helped to inform the context of women's and men's roles on the farm and within the household and served as a tool for reliability and validity for collected qualitative data (Yin 2009). It was used as a means to triangulate data and collect more data on lived

experiences (Yin 2009). Two participants in each community (eight in total) from the in-depth interviews were ‘observed’ by the researcher, in that we did extra activities outside of the interview together relating to the research questions. The length of time spent observing and participating in these activities varied from two to five hours per activity, depending on the availability of time by the participant and length of activity. Two were selected in each community to provide additional context to the lived experiences shared in the in-depth interviews (Kawulich 2005; DeWalt & DeWalt 2002). In each community, one man and one woman were purposely sampled via nested sampling in order to observe men’s and women’s different daily activities and to use these observations as a means of triangulation of other qualitative techniques (DeMunck & Sobo 1998; DeWalt & DeWalt 2002). These activities included farm walks, cooking and sharing a household meal, walks to the river, and tours of community cocoa nurseries. The participant observations were recorded with written field notes and photographs. This method was used to add context and reliability to the overall collected data. For each research question, insights and key observations from these activities are included.

Focus Groups

Focus groups were conducted with the aim of identifying preliminary themes and informing the development of the in-depth interview protocols (Bloor et al 2001; Rocheleau et al 1994). In each village, the head villager was first contacted for permission to hold a FGD in their village. The head villager granted permission and gave us the contact information of head farmers for a registered male and female farmer group in the village. This is the necessary appropriate protocol when engaging at the village level in Indonesia. The head farmers were contacted and requested to assist in organizing three FGDs, one with 8-12 members of the men’s farmer group, and 8-12 “household wives” (referring to women not part of a registered farmer group), and 8-12 members

of the women’s farmer group. Three groups were held in each village to ensure the participants were separated based on the sampling (i.e., men farmer group, women farmer group, household wives). The farmer groups ranged from well-established to very new (mostly the female groups). In Lawewe village (South Sulawesi), it was requested that 8-12 members be invited but more than requested had shown up the day of the focus group. Some had arrived during or towards the end of the FGD but did participate. Additional individuals were actively engaged in the FGDs, and these discussions went longer than the allotted 3-4 hours (about 5 hours each).

All discussions were hosted by a member of the community at his/her home. Lunch and a transportation stipend were provided to the participants, both of which were given at the conclusion of the FGD. Each participant was asked to fill out a sheet for basic demographic information. A total of 117 individuals participated in 11 total focus group discussions across the four village sites (Jost et al 2016). Table 4.9 shows description of participants by village for the focus group discussions.

Table 4-0-9 Focus Group Participants by Village, 2017

	Total	Banjar Negeri	Kali Bening	Purwodadi	Lawewe
Men's Farmer Group	50	12	10	10	18
Women's Farmer Group	29	10	10	9	--
Household Wives	38	5	6	10	17
Total	117	27	26	29	35

Source: Primary fieldwork by S. Eissler

The purpose of the FGDs was to initially assess general concepts regarding impacts and perceptions of, and vulnerabilities and adaptive strategies to climate change within the context of their villages, and to better understand the challenges or strengths these farmers or household

wives were facing. FGDs were used to better understand the context in which these participants were experiencing climate change and small-scale cocoa production, and then to use this information to inform the development of the in-depth interview protocols. Each FGD used an informal semi-structured protocol that covered the following topics: sentiments about the local community, institutional support, cocoa production (including division of labor, stakeholder mapping, challenges, and motivations), perceptions of weather change, and understanding of climate change. Each topic was addressed via a range of strategies: informal and open discussion, and structured activities. See Appendix B for the complete focus group protocol.

These discussions were not audio recorded, but very detailed notes were taken throughout the entire discussion. In addition to informing the development of the in-depth interview protocol, the FGD also provided additional insights to answer the research questions. The written notes from these discussions were typed and coded based on overall themes. In the results section under each research question, qualitative insights are noted when they are from FGDs or in-depth interviews.

In-Depth Interviews

Following preliminary analysis of the FGD results, the in-depth interview protocols were developed. The in-depth interviews were guided by semi-structured protocols with open-ended questions to engage with the participant and allow them to express their full view point and so as to not bias or influence their response (Creswell & Clark 2011; Crouch & McKenzie 2006; Ezzy 2002). Probing questions were included if it were needed to stimulate conversation. These probing questions were context specific. The in-depth interviews were recorded using an iPhone 6s; all participants gave verbal permission for their voices to be recorded as per IRB protocol.

Although interviews were recorded, I also took supplemental notes as appropriate. See Appendix C for the in-depth interview protocol.

Participants in the FGDs were requested to give their cell phone information if they were interested in being asked for a follow up interview. Many of the participants gave their information. Several individuals were purposively selected from the FGDs to conduct an in-depth interview. These individuals were purposively selected to fill a representation of the typology of people aimed to be included in this research study. This typology included a mixture of characteristics from the three sample groups (male farmer, female farmer, household wife): young, older, by ethnic group, by religion, village status, and role in the cocoa value chain. I then asked interview participants if there were another person in the village I should talk to (and if so why talk to them). I also asked participants to introduce me to farmers that were not part of a farmer group, as well as farmers that worked as a local cocoa bean collector. Additionally, I only spoke to one person (a household wife) whose household did not grow cocoa (her husband had recently lost the ability to grow cocoa as the owner of the land he managed changed to rice). Table 4.10 shows numbers of in-depth interview participants by village.

Table 4-0-10 Interview Participants by Village, 2017

	Total	Banjar Negeri	Kali Bening	Purwodadi	Lawewe
Men's Farmer Group	19	6	4	4	5
Women's Farmer Group	12	4	3	5	
Household Wives	18	3	3	3	9
Total	49	13	10	12	14

Source: Primary fieldwork by S. Eissler

The qualitative data were analyzed using NVivo software. All in-depth interviews were transcribed by a native Bahasa Indonesian speaker. These transcriptions were lined and then translated into English by a second native Bahasa Indonesian speaker. Both the Bahasa Indonesian (original) and the English transcriptions were kept and used for reference in the analysis.

The transcribed in-depth interviews and detailed notes from the FGDs, participant observation, and key informant interviews were then analyzed using a coding framework developed to answer the research questions (Saldaña 2009). Coding is a crucial aspect of analysis (Basit 2003), albeit it is essentially a judgment call, whereas researchers bring “our subjectivities, our personalities, our predispositions, [and] our quirks” to the process (Sipe & Ghiso 2004, 483). It is a cyclical process, whereas themes and categories are linked to the data via codes, and these codes are used to piece apart and make sense of the qualitative data (Richards & Morse 2007; Saldaña 2009). To this process, a mixture of inductive and deductive codes were developed to link the data with the “idea” (i.e. operationalized concepts), and then the idea with all of the data that supports it (Richards & Morse 2007).

The coding process was using NVivo software. Throughout the data collection process, codes were outlined and formulated to analyze the qualitative data. Using the hierarchical nodes system allowed for multiple codes to feed into broader themes, as related to the overall research questions. As discussed in the literature, the codifying process was cyclical and underwent several iterations coding the qualitative data and readjusting the codes (Saldaña 2009). I worked as a “lone ethnographer” in that I was the only person to code the qualitative data; however, I followed quality checks as recommended by Ezzy (2002).

The analysis of the qualitative data elucidated quotations to heavily describe the participants' views, experiences, and knowledge from their perception (Creswell 2007; Naples 2003). As such, the first round of thematic coding used principles of a grounded theory approach such that codes were developed from the text itself after several read-throughs (Glasser 1978; Strauss & Corbin 1990). The second round of coding incorporated these codes to link to the operationalized concepts this research study aimed to investigate using principles of an axial coding approach (Strauss & Corbin 1990). This research is informed by social theory and the operationalization of concepts guided the ways in which questions were asked, and thus, codes to be formed (Saldaña 2009). However, due to the epistemological design of this research study rooted in feminist methodologies, it is essential to code in such a way that emphasizes the participants' voices in the analysis (Creswell 2007; Saldaña 2009). Thematic and pattern coding techniques are employed to analyze the data (Saldaña 2009).

Analytical Approach

Each of the research questions is substantively addressed with qualitative data, and quantitative data measures are used to contextualize and provide robust analysis where appropriate. To optimize the information gathered through this mixed-method approach, a combination of multiple types of data is used in the analysis. This integration of data provides a more comprehensive and robust investigation of the research questions. The analysis of both the quantitative and qualitative data were done concurrently, based on the specific research question. This was done in part to create a strong relationship between the two types of data, creating a dialogue and helping to better address the research question (Creswell 2011). The research questions were divided into three main topics. These questions informed both the quantitative

and qualitative data collection: what variables to be measured, site selection, protocol development, and participant selection.

Methodological Approach and Researcher Positionality / Reflexivity

In international development work, a common approach to gender analyses is to over-sample women or present disaggregated data, seemingly used as an ‘add-on’ variable prescribed by funding requirements (Kabeer 1999; Nilsson 2013). This project challenges this approach by not only disaggregating the data, but also treating gender as a process, one that establishes power dynamics that exist in relation to each other. In addition, this project challenges the perspective that is often employed in gender research, which assumes women are one homogenous group, ignoring the fact that women across the globe “carry identities other than those of gender” and operate and live in completely different contexts, political systems, moral structures, and socio-demographic categories (Kabeer 1999, 30; Nilsson 2013). Doing so may reinforce power hierarchies and complex inequalities amongst those efforts are intended to help (i.e., marginalized groups) (Freidman et al 2018).

Methodology refers to an epistemological position, whereas a method (or technique) refers to ways of gathering data. These two distinctions are often muddled in realms of discourse – both are at different levels of analysis – yet are often used interchangeably (Bryman 1984). This research takes a feminist methodological approach, incorporating feminist methodology rooted in feminist political ecology and intersectionality to investigate the lived experiences of small-scale cocoa farmers in Lampung and Sulawesi. According to Creswell (2007), feminist methodologies aim to “establish collaborative and non-exploitative relationships to place the

researcher within the study so as to avoid objectification, and to conduct research that is transformative” (83). Realities are subjective; there are subjectivities according to the researcher, the studied, and those interpreting the study from afar (Creswell 2007). A power relationship emerges between the researcher and the researched, one reflective of imbalanced power relations similar to the Global North and the Global South (Beetham & Demetriades 2007; Naples 2003). Alcoff (1988) describes how the researcher’s positionality can be strategically used to “their positional perspective as a place from where values are interpreted and constructed rather than as a locus of an already determined set of values” (434).

Reflexivity as a Researcher: Acknowledging Power

As a female from the Global North investigating challenges facing those in rural areas of the Global South, my positionality as a researcher must focus on eliciting the voices and perspectives of those being studied with a sensitivity to an imbalanced power relation. Beetham & Demetriades (2007) emphasize the danger in further disadvantaging those in vulnerable populations (such as women, indigenous groups, or impoverished people) by interpreting collected data through a Western or Euro-centric lens, rather than one from which the data is collected. To best acknowledge this power imbalance and potential hazards in incorrectly interpreting the collected data, an intersectional approach is employed for this research process. As Walker (2003) identifies, “the attempt to understand intersectionality is, in fact, an effort to see things from the worldview of others and not simply from our own unique standpoints” (991). In addition, Naples (2003) advocates for the use of standpoint epistemologies as “tools for exploration of the micro-dynamics of the operations of power” (23). Throughout the research process, I acknowledge the emergent power structures according to Wolf (1996) between the different positionalities between the researcher and the researched, power exerted during the

research process (such as defining the design and project structure), and the power exerted during post fieldwork process. While a power dynamic between the researcher and the researched is inevitable, it is my job as the researcher to reduce this power differential between myself and the participants in gender-sensitive research. Reducing this power differential will help build rapport and trust with the research participants (Pitts & Miller Day 2007).

In addition, I recognized my role as an outside investigator during the project design and data collection process and understood that I was to face strategic challenges in securing my ability to conduct the research with the appropriate research subjects and with the inherent barriers that arise for an outsider investigator (Lofland & Lofland 2006; Naples 2003). Naples (2003) debates the role of insider/outsider positionalities of researchers – that they are “permeable social locations that are differentially experienced and expressed by community members” (49). Outsider status can be granted insider status conditionally depending on the strength and nature of reflective strategies employed and negotiated with the community in question via manifestations in “local processes that reposition gender, class and racial-ethnic relations...” (Naples 2003, 49).

Reflexivity as a Researcher: Research Design

Babbie (1986) teased out how to define truth and reality versus true and real, outside of generic tautologies. A basic definition of the relationship between truth and reality is: statements made about reality that conform with reality are considered true. While this does not address what is true or real, Babbie (1986) addresses the definition of actuality, factual, existence, and being. His work laid foundation for the very basic questions of existence and what is versus what is not, an essential part of conducting social research. Particularly important is the difference of

subjectivity and objectivity; social research and qualitative methods investigate what is via understanding inherently subjective information through an objective manner, but the role of the researchers' subjectivity influences the analysis of the collected data. Becker (2008) emphasizes the importance of perspective based in reality and facts, not created imageries within our own perceptions. I practiced reflexivity when preparing to and actually conducting the interpretative analysis process.

This research fundamentally takes a gender-sensitive methodological approach to ensure that both the realities and voices of men and women are represented throughout all of the research processes. Leduc (2009) defines gender-sensitive research methodology as an approach that “takes into account gender as a significant variable [and] pays attention to the similarities and differences between men and women’s experiences and viewpoints and gives equal value to each” (1). It goes further by treating gender as a “social and cultural phenomenon whose influence deserves to be taken seriously in research” (Rudduck & McIntyre 1998, 173). As such, women and men are considered active participants in the research process to share their knowledge, perceptions, and lived experiences (Scheyvens & Leslie 2000).

Reflexivity as a Researcher: Collecting and Analyzing Data

There is a level of emotional positionality that the researcher assumes when conducting “outsider” investigative research. Researchers must prepare for and employ “an active rather than reactive approach towards emotions to improve the quality of research” (Blix & Wettergren 2014, 688). Social researchers must – for a lack of a better term – do their research before engaging in field work and think through the different kinds of emotional situations in which

they might find themselves and be very self-reflective and honest with their ability to handle said situations.

Gaining access to and building rapport and trust with the research participants was an essential part of this methodological approach. As described by Wilson (1992), “locals remember researchers and ‘learn’ from them through their personal relationships – not their monographs” (189). This was critical to remember before and during the research process – that my time spent with the participants was not solely for my research purposes. I took time from these individuals to share their experiences and perspectives with me; I need to ensure that their time was well spent with me as well and that this was a mutually beneficial relationship, not an assertion of dominance as the researcher. Throughout the data collection process, I was extremely cognizant of the participants’ time and employed genuine respect for local people and customs, flexibility in the research design, a sense of humor, and a willingness to share my own experiences and knowledge with the participants – albeit not at the expense of biasing their views or opinions (Scheyvens & Leslie 2000).

During the data collection process, I followed suggestions from the literature and expert opinion on how to best conduct the process of collecting data as a researcher in the field. As I am a researcher with an explicit research agenda (to ask questions to inform my overall research goals), it was important to talk about the ways in which the data were collected. Becker (2008) encourages social scientists to think of society as a machine, to ask “how” rather than “why” in interviews to remove defensive positions, or potentially bias or leading questions. In addition, I maintained my role as a researcher during the data collection process to reflect that to all extents and purposes. I also trained my translators and field enumerators on these techniques, so they too employed these reflexive practices.

For example, I was careful how I chose my words when talking with the participants and asking questions. I came to this research process with an understanding of science, global politics, and a body of knowledge regarding the impacts of climate change on small-scale farmers. In addition, from the literature and my own experience, I understand that the accepted global definition of climate change may not be fully or similarly understood in developing countries, particularly remote rural areas (Alfa & Katikpo 2014; Oduniyi 2013; Tiyo et al 2015).

One goal of this project is to understand small-scale producers' perceptions of climate change, in that I am interested in understanding from their point of view what they have witnessed or felt over the past 10, 25 or 50 years (depending on age) with regards to variability or variations in the climate affecting their ability to farm or participate in daily life. I am interested in understanding these perspectives from both men and women participating in the study to better understand if there are differences between the two in how they perceive (or if they do at all) a changing climate and how those differences play out. As part of data collection, I ask open-ended questions to measure the individual's perception of climate variability in the indicated time frames. While I base my analysis on the scientifically accepted definition of climate change – “a change of climate that is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and that is in addition to natural climate variability observed over comparable time periods” (UN 1992) – I did not attempt to explain the term climate change to small-scale farmers and those with whom I spoke. Fundamental to this research project is an approach that values indigenous and local knowledge (i.e. marginalized voices)– I wanted to hear participants' unbiased opinion and perceptions regarding things they have been noticing throughout their tenure as small-scale farmers. If I attempted to explain climate change in the terms of indicator variables, it may bias or persuade an answer that would

affect the credibility of the data provided. I began interviews and focus group discussions with general “how” questions and if needed, depending on the context and the nature of the conversation, I used probing questions.

While analyzing the qualitative data, I followed suggestions from the literature and expert opinion on how to best interpret the interviews. While Churchill (2005) offers that the researcher’s mind should be considered a translational space - to “clarify what occurs between the acquisition of data and the formulation of a thesis about the data” (3) – he qualifies that this raises considerations of validity, but maintains that this process is like direct language translation: the real aim is to capture the essence of the dialect to ensure that meaning and intent are not lost in translation.

Knowledge is socially constructed; the knowledge production process is one to which this research project pays particular attention, particularly for those of the marginalized and in this project, women involved in small-scale cacao production. The methodological design is such that both quantitative and qualitative data measures were collected. The voices and knowledge of those research were collected through thorough, semi-structured key informant interviews. The analysis of the qualitative data elucidated quotations to heavily describe the participants’ views, experiences and knowledge from their perception. In conclusion, by taking a feminist methodological and method approach to this research, I am sensitive to issues of power and control in the research process and undertake a self-reflective practice (Naples 2003; Naples & Sachs 2000).

Reliability and Validity

This study utilizes a mixed-methods research design that employs qualitative and quantitative techniques to inform the research objectives, thus enhancing validity, reliability, depth, and scope of the research (Creswell & Clark 2011).

Qualitative Data

Several strategies were employed to increase the validity of the qualitative data. Combined data collection methods were used, including qualitative methods (key informant interviews, in-depth interviews and participant observation), mixed methods (quantitative and qualitative), and multiple data sources to triangulate the methods. Triangulation “in qualitative research assumes that if two or more sources of data, theoretical frameworks, types of data collected, or researchers converge on the same conclusion, then the conclusion is more credible” (Tracy 2010, 843). It assumes a single reality to be known and increases the validity of the data and the conclusions drawn.

As part of the Borlaug Fellowship funding requirements, I spent an extended time in the field with the research participants, which enabled constant engagement and observation. As suggested by Creswell (2007), this extended field experience allowed me to build familiarity and trust with the participants, learn from their culture and experiences, and check for misinformation that could stem from my positionality as an outside researcher. As part of the Ph.D. dissertation research process, I was and am able to check my project via peer review debrief. I have the benefit of working with esteemed colleagues at Penn State and the International Center for Tropical Agriculture (CIAT), who have helped inform, critique and provide feedback – most importantly for the research design, protocols and

analysis/interpretation of the data. I solicited participants' views and perceptions of my interpretation and analysis of the data, the "most critical technique for establishing credibility" (Lincoln & Guba 1985, 314). The research participants did not have access or time to further discuss results with me via Skype or other forms of telecommunication. Thus, I made efforts to conduct preliminary analyses of qualitative measures and asked for feedback from participations as to whether I was interpreting their experiences and perceptions accurately (Singleton & Straits 2005). I also made use of quotations and thick description (Creswell 2007) in the analysis so as to prioritize the participants' voice in explaining their own positions, perceptions and experiences.

During the interview process, I paid close attention to the way in which I asked questions, probed questions, and structured the interview. There are concerns of validity in the interview process with regards to how questions could potentially lead or bias a respondent's answer or description, or influence whether or not the respondent tells the full truth, partial truth or not the truth at all. The interview protocol, as well as the way in which I conducted the interviews, were informed by Weiss (1994) and my previous experience conducting interviews (particularly the way I feel comfortable troubleshooting unexpected events within an interview). I practiced the interview protocols beforehand with several Indonesian colleagues as well as my Bahasa Indonesian field translator to ensure that the questions and structure made sense, were understood, and were asked in appropriate ways. This practice also served to familiarize myself and my translator in our respective roles.

To increase reliability to my research methods, I took detailed field notes during participant observations and interviews with research participants (Neuman 2007; Singleton & Straits 2005). These took note of body language and nonverbal cues that are important to the

research concepts. For participant observation, these notes detailed the observations relevant to the concepts and complemented the interviews as well. With permission of the research participants, I used an iPhone6s voice memo audio recording device to record each interview. Each interview was transcribed and then translated into English. I read through each transcription and developed themes and codes for each theme related to the research concepts.

Quantitative Data

Several strategies were employed to increase the reliability of the quantitative data. For all quantitative secondary data sources, descriptions of data source and metadata information are provided in the “data” section of this chapter. Sometimes metadata is not readily available, and in such cases, the most information retrievable is provided.

To increase the reliability of quantitative measurements, I followed steps suggested by Neuman (2007). First, constructs to be measured are clearly defined and conceptualized. These concepts are measured by clear indicators at the most precise measurement level possible. Each indicator only measures one concept so as to omit analysis confusion about which concept is being ‘indicated’. Multiple indicators measure a concept, so as to provide analysis with a wider range of the conceptual definition. Additionally, this step helps to reduce systematic error in the event that one indicator is imperfect; multiple indicators to measure one concept allow for an analysis of different aspects of the concepts and reduces potential error. The scoping field trip with CIAT and CocoaLife in March 2017 allowed for the household survey to be ‘practiced’ with small-scale cocoa farmers in the field before the full deployment to the entire sample. This practice checked for readability and clarity with local participants. Before the household survey was deployed, the CIAT team and I held an intensive two-day training with the team of

enumerators to ensure full understanding, comprehension, and literacy for both the survey instrument as well as how to record the information.

Several steps were employed for optimal validity. First, experts reviewed the data collection protocol (household survey) and operationalization of concepts using secondary data to check for face and content validity. The scholarly theoretical and empirical literature served to inform the operationalization of the concepts to address content validity as well. Each concept was defined, and indicators were used to ensure each part of the concept was measured. Batteries of pre-existing indicators and survey questions deemed valid by empirical literature and previous studies were used. This increased criterion and concurrent validity.

In conclusion, this research was designed and conducted in a way that maximizes the reliability and validity of both the qualitative and quantitative methods employed in this project.

Chapter 5. Results

This chapter presents the results for each research question and objective. The data presented combines mixed-qualitative and quantitative methods to assess each objective outlined below, however only comparable data sources are used under each research objective (refer to the methods chapter [4] for further detail on comparable data sources). The data are presented and summarized separately for results from Lampung and South Sulawesi, respectively.⁸ After each research objective, the data and results are succinctly summarized to highlight major themes, and then comparisons are drawn between findings from Lampung and those from South Sulawesi. Synthesized discussions of the results and conclusions are presented in the following chapter [6].

5.1 **Research Question 1:** *What are the gender roles in small-scale cacao producing households in Lampung and South Sulawesi, Indonesia?*

5.1.1. Objective 1: Division of Labor and Time Allocation

Lampung

In Lampung, data were collected from 190 individuals (126 men and 64 women) on their daily time allocation. Respondents were instructed to describe what they did and for how long the previous day starting at 4 am. Activities were recorded at 5-minute intervals, consistent with prior time-use surveys (World Bank Group, 2012; Johnston et al 2015). Figures 5.1 and 5.2 show the weighted average time men and women in the sample allocated to different activities.

⁸ To note, throughout this results chapter, all names are changed to protect respondents' anonymity. Additionally, *Ibu* (or *Bu*) is the Indonesian term for Mrs. or woman; whereas *Bapak* (or *Pak*) is the Indonesian term for Mr. or man.

Figure 5-0-1 Time Allocation for Women’s Daily Activities (n=64) in Lampung

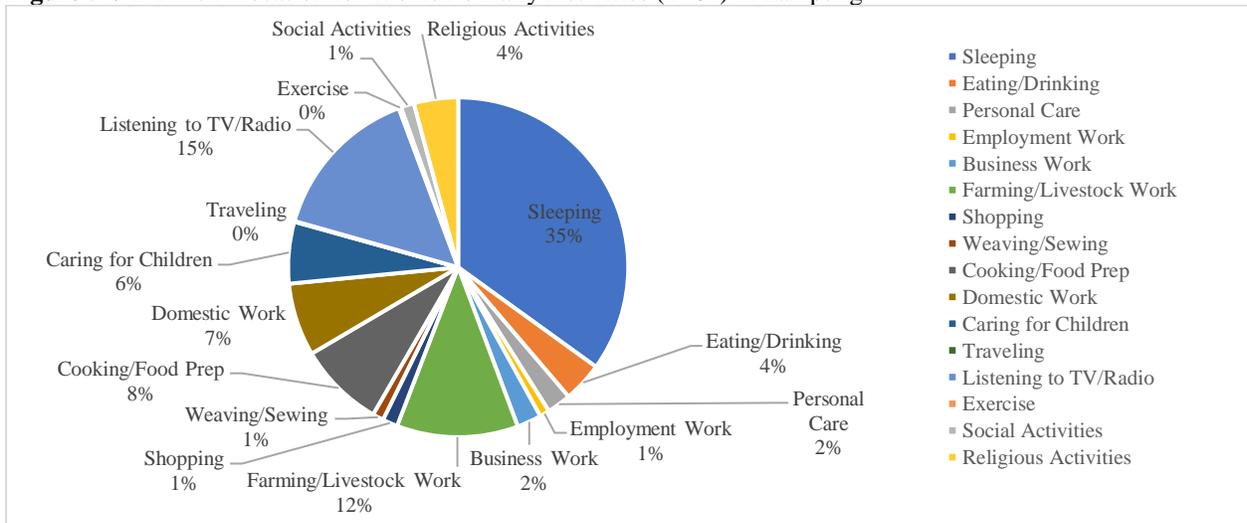
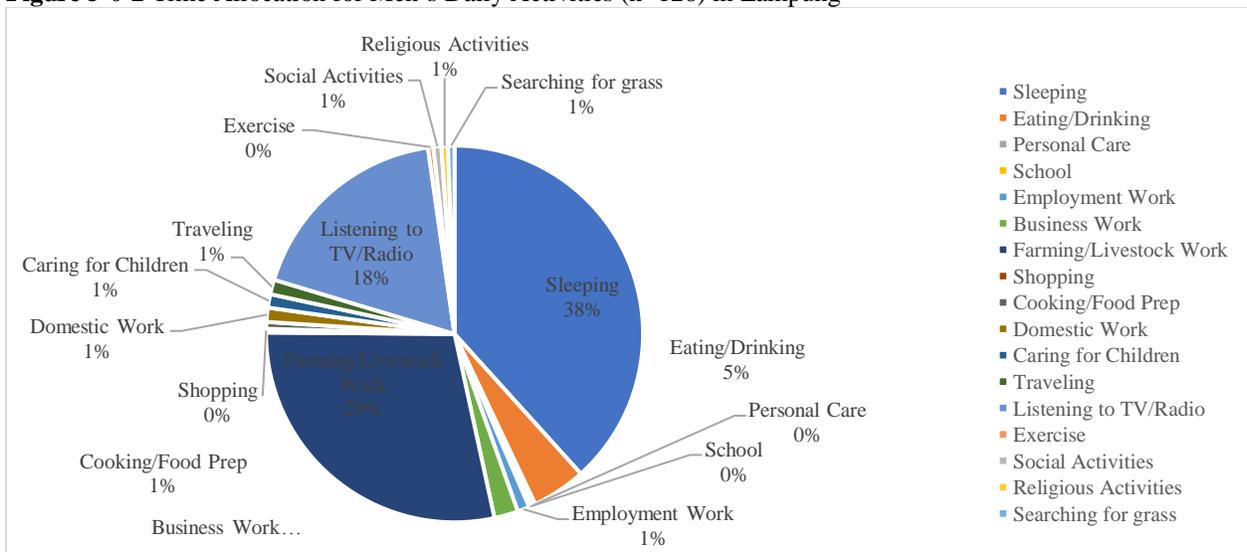


Figure 5-0-2 Time Allocation for Men’s Daily Activities (n=126) in Lampung



As expected, women on average spend more time on a diversity of tasks throughout their day, while men’s activities are primarily concentrated sleeping (38%), doing farm/livestock work (29%), and listening to the TV/radio (i.e., leisure) (18%). Next to sleeping (35.0%), women spend the second largest portion of their daily activities doing unpaid, household labor chores (caring for children, 6.0%; domestic work 7.0%; and cooking and food preparation 8.0%).

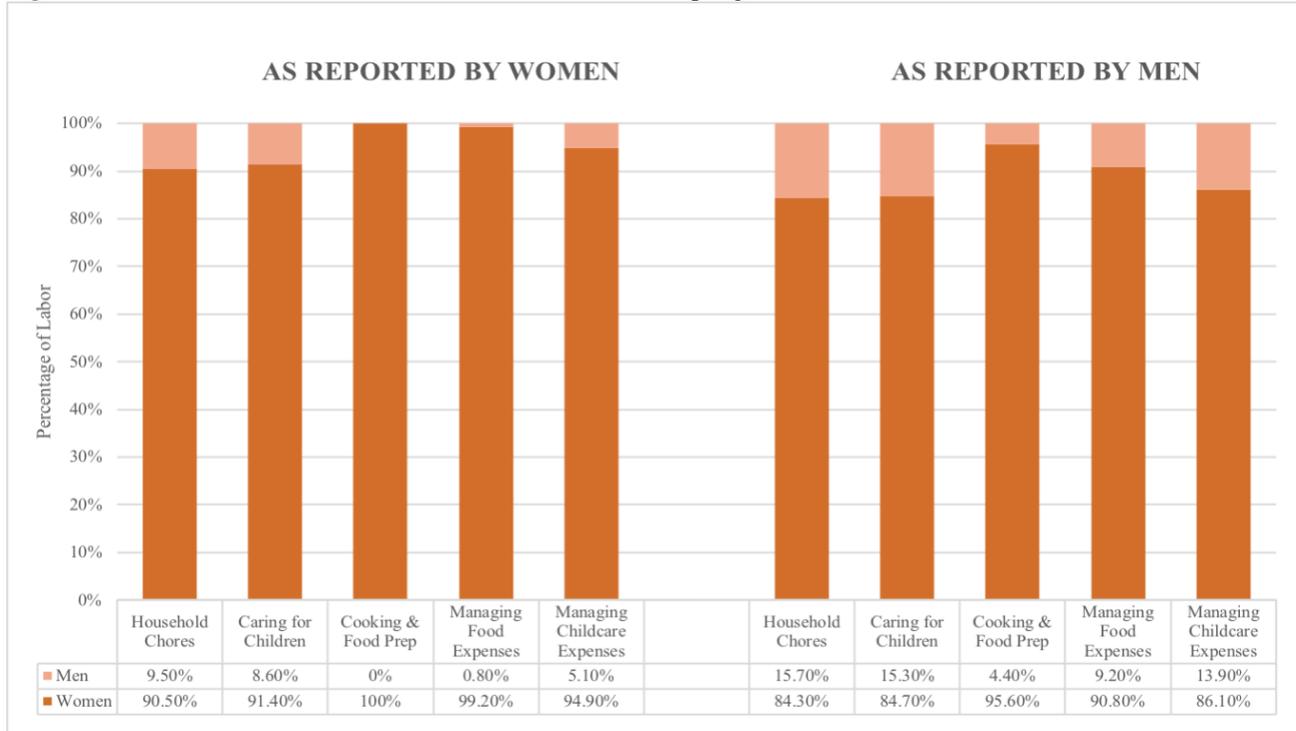
Qualitative insights from the focus group discussions (FGDs) and semi-structured in-depth interviews help to triangulate and illuminate how men and women spend their time differently. Across the Lampung sample, a typical day for a man in Lampung province was described as waking up early (5am), praying, eating breakfast, going to the farm until afternoon, eating lunch, either attending a community social event or smoking cigarettes and relaxing, eating dinner, and falling asleep. All meals are prepared by his wife as one Pak explained, “*To be a good wife you must be a good cook. Cooking is a women’s work and life*”. For Muslim men, each day is broken up by the 5 obligatory calls to prayer, twice in the morning, once in the afternoon, and twice at night.

Across the sample, a woman’s typical day began at a bit earlier than a man’s (around 4 am) when she prepared breakfast for her husband and children, then she would do household cleaning chores, prepare and take children to school, and then returned home to finish household chores. She would then visit her husband on the farm to assist him in whatever was needed that day. They would return, she would feed him lunch, and then conduct some business activities (if she was engaged in these). She then either relaxed and watched TV, socialized with neighbors, or continued household chores. She then prepared dinner for the family and watched more TV after dinner with the whole family.

Respondents were then asked to give approximate percentages for the division of labor for specific household chores and crop specific agricultural tasks. Figures 5.3 and 5.4 highlight the weighted average percentages as reported by men and women for household tasks and agricultural activities related to cocoa production within the household. Figure 5.3 compares how men and women specifically report labor divisions related to general agricultural activities (for

all crops combined). All results presented for division of labor activities are disaggregated by gender.

Figure 5-0-3 Division of Labor for Household Activities in Lampung



Both women and men report that men help the most with childcare activities and help the least with food preparation or expense management. However, for each household-related activity, men report a higher estimation of their contribution to the total labor requirement compared to how women estimate men’s contribution. For example, women report they do 100.0% of the cooking and food preparation, whereas men report that on average women contribute 95.6% of the labor while men contribute the remaining 4.4%. Across the FGDs (with both men and women) as well as the in-depth interviews, an emerging theme is that cooking and food preparation are strictly the women’s responsibility. If the wife had emigrated abroad to work [such as a domestic worker in Malaysia, Qatar, or Saudi Arabia], the eldest daughter or a mother would assist the family in cooking and food preparation. Sometimes, if the wife needs

ingredients from her home garden or nearby, she may ask her husband or children to fetch those for her during food preparation. Additionally, women manage all household budgets across the entire sample. Women keep the money, but only a few women in the sample would keep records of budgets. Generally, she maintained mental notes or counted the money every day to know how much she had (which made it generally hard for them to estimate incomes and money earned from different activities). According to men and women in the sample, men did not get involved in allocating the budget, but were very much involved in the decision-making process for certain types of purchases [discussed under Objective 2].

Figure 5-0-4 Division of Labor for Agricultural Activities for All Crops in Lampung

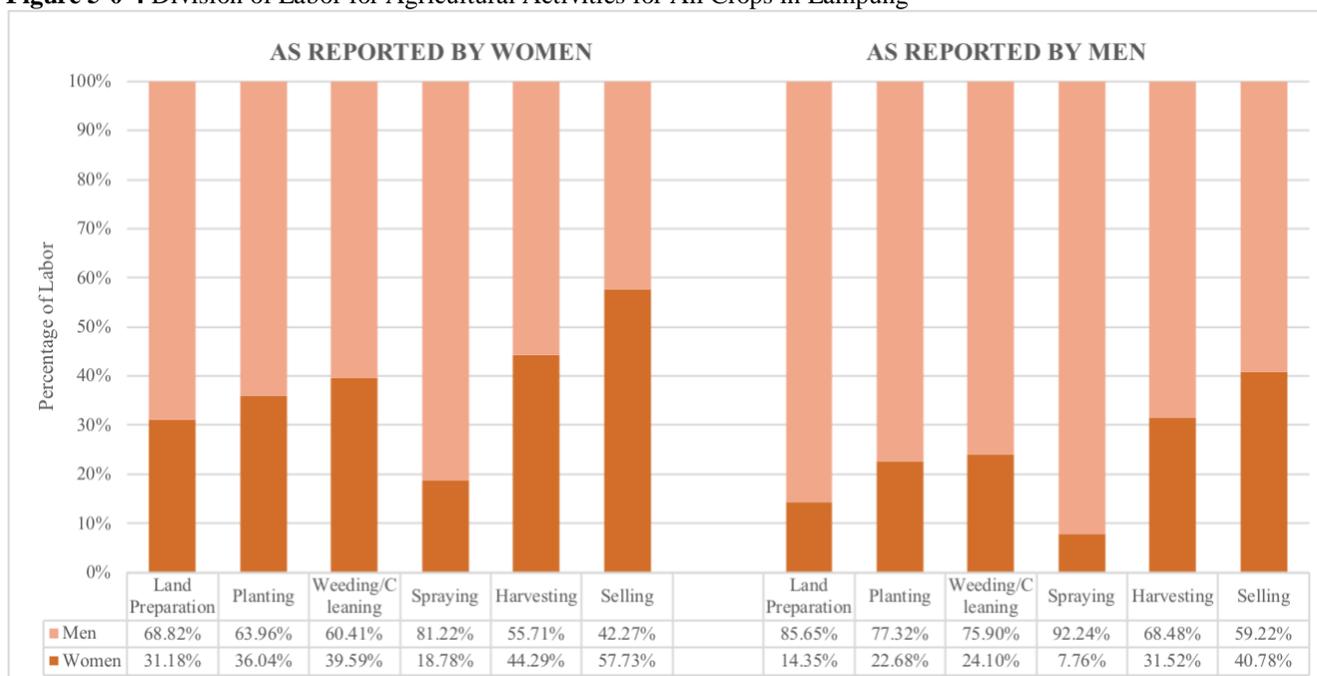


Figure 5.4 presents self-reported percentages of labor for 5 main agricultural activities aggregated across all household crops reported. A total of 20 crops were cited as the three most important crops per household across the sample in Lampung. These crops included cocoa,

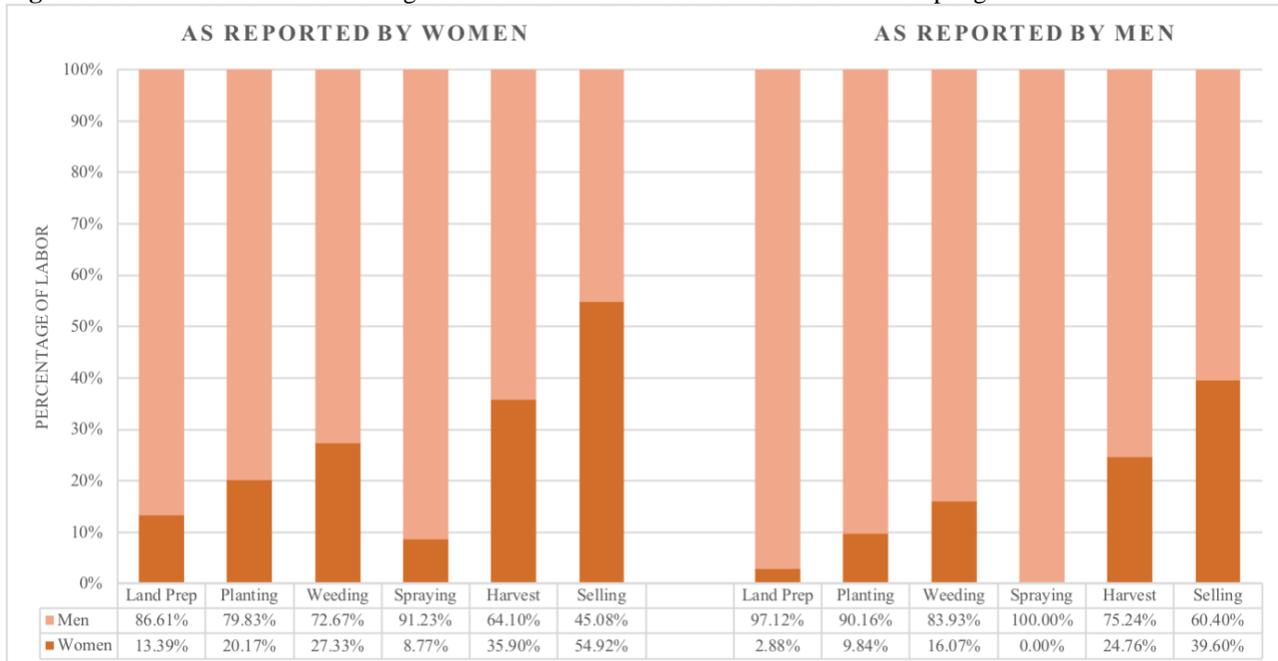
coffee, banana, coconut, rice, pepper, staples, vegetables, fruits, beans, and rubber.⁹ For overall agricultural activities for all household crops combined (Figure 5.4), both women and men report that men contribute a majority of the labor, however men and women report contributions at differing levels. Overall, men report women's contribution to agricultural labor activities lower than women report their own contribution. This is consistent for all crops combined and cocoa-related activities specifically. Additionally, men cite women contributing less than half the labor for selling crops, whereas women cite the opposite. In FGDs and in-depth interviews, both men and women explain in more depth the contribution of labor for selling crops (in general). If the crops can be purchased at the home, by a local collector usually, the women are 100% responsible for selling the crops and negotiating the price received. However, if the crop needs to be transported from the harvest point to the home or from the harvest point/home to the market, the husband will transport the crops to the selling point. However, the women are responsible for interacting with the buyer, negotiating the price, and completing the transaction¹⁰ (in general, this may vary between crops that were discussed in depth).

Finally, Figure 5.5 presents self-reported percentages of labor for the 5 main agricultural activities specific to cocoa production, disaggregated by men and women. Similar to self-reported percentages of labor contribution for men and women, both men and women report that men contribute the majority of the labor, however there are differences in how men and women report women's contribution to different cocoa production activities. For example, men report that women contribute 0% to spraying pesticides/chemicals whereas women report contributing

⁹ A selection of crops were categorized into the following groups for analysis: staples (Cassava, corn), beans (petai, nutmeg), vegetables (carrots, chili, conglah), fruit (jengkol, avocado, jackfruit, papaya, mango, durian, duku, salak). These were categorized due to the low frequency with which each are cited across the sample.

¹⁰ This dynamic is described in general across agricultural activities; however, this may depend on the specific crop sold that was not discussed in depth.

Figure 5-0-5 Division of Labor for Agriculture Activities for Cocoa Production in Lampung



8.77% of spraying. From in-depth interviews with one Ibu, she explained, “[when her husband migrates] I have to do it. Who else will? I don’t like spraying, but I do it if it means our [crops] live”. Generally spraying is not a woman’s responsibility, but if her husband is not there or cannot spray, the women within the household will. Additionally, men cite that women contribute 39.6% of the labor for selling cocoa, whereas women cite they contribute 54.92% of the labor. To better understand these discrepancies, qualitative results from focus group discussions and in-depth interviews are presented in Table 5.1 to highlight how men and women describe labor contributions to cocoa production.

Table 5-0-1 Qualitative Results of Division of Labor for Cocoa Production in Lampung

Activity	Overall Summaries of Themes from Qualitative Insights	
	Men	Women
Land preparation	Land preparation is labor intensive and only occurs when new trees or new areas need to be planted. This is primarily the men’s responsibility, however women who grow their own cocoa will prepare their own land. Additionally, household wives will sometimes help their husbands with land preparation activities, as one Pak indicated, “ <i>[My wife] comes to the farm to help me when I ask and to help, she does activities, I have to train her but she’s good. She listens and is helpful</i> ”.	This is generally not considered women’s work to prepare the land for cocoa planting and production, however wives will always support and help their husbands. Women who grow their own cocoa do prepare the land and sometime have assistance from brothers, husbands, sons, and other men laborers.
Planting	The CocoaLife program (known to the farmers simply as <i>Olam</i>) provide the men farmer groups with new seedlings grown in nurseries that the farmers can replant. Only the men farmer groups in across the sample had access to these seedlings. Like land preparation, men indicated planting was their responsibility, but their wives would help when asked.	Similar to land preparation, women indicate that planting cocoa is generally a husband’s responsibility but will help if needed. Women who grow their own cocoa work together with their husbands to plant the cocoa.
Weeding / Cleaning [Maintenance]	Maintenance activities occur throughout the cocoa growing season. Generally, when husbands spend time on the farm every morning, they are maintaining the cocoa farm, doing watering, pruning, or cleaning activities. Husbands indicate doing the bulk of this work, but their wives will sometimes help whenever she is done with her work at home. As one Pak explained, “ <i>My wife helps [with the cleaning]. I train her but she is a quick learner and helps me a lot,</i> ” whereas another Pak indicated he asks his wife to help with the maintenance activities because, “ <i>I get lonely and it’s nice to have her company.</i> ”	While this is generally the men’s responsibility, women will always assist their husbands on the farm with maintenance activities after they have completed their daily chores and responsibilities. As one Ibu explained, “ <i>When Bapak needs help, I finish [my chores] and go to the farm. He tells me what to do</i> ”. When husbands migrate for work, women in the household are left responsible for maintaining the cocoa farm, which some do, but some do not. Women who have their own plots of cocoa will maintain their own cocoa farms and sometime solicit help from a brother, son or other men laborers.
Spraying	Spraying is considered men’s work as the tool used to spray can be too heavy for the women and labor intensive. Also, exposing women to the spray is not good for their health. Women do not spray chemicals or pesticides.	Spraying [pesticides or chemicals] is largely considered men’s work, as the machine used to spray can be heavy and also dangerous to expose women to chemicals. However, while men are not at home to do spray [i.e. having temporarily migrated or seasonally migrated to the city or another province for work] women will spray. Women who maintain their own cocoa plots will ask their husbands to do the spraying, and in very limited cases, do the spraying themselves.
Harvesting	While there are peak periods of harvest throughout the year for cocoa in Lampung, harvesting ripe pods is a continuous activity. Men across the sample indicated that they will “ <i>knock the pod off the tree</i> ” and move the	Women explained that men would pick the pods off the tree, unless it was easy for the women to pick as well. Sometimes they would help pick the pods off the tree, either using their hands or a long tool. They then would spend hours at a time “ <i>cracking open</i> ”

	collection of pods to one area, since transporting pods can be a laborious task, suggesting that this task was too laborious for women.	each pod, decide the quality of the beans, and separate beans into piles based on quality and target buyer. Women were 100% responsible for managing drying the beans after they were separated, using on their front porch or on plastic mats. Women spent their time at home and could watch over the drying beans in case it rained, or someone would try to steal them. They also were able to move the beans around as well.
Selling	Men overall described selling any crops or products as generally “ <i>women’s work</i> ” since “ <i>women are too eager to get a higher price</i> ” and women keep the money to manage household budgets. Men will bring the beans to sell to Olam, but otherwise, women sell all cocoa beans to local traders or any traders that come to the house. If the household sold to a middleman (the person the local traders sold to), the husband would drive the beans to the middleman’s house and the wife would negotiate the price. As part of the CocoaLife farmer group, husbands received SMS text messages each day with the market price for cocoa beans. Sometimes the husbands would then share this information with their wives, who would use it to better negotiate the price.	Women sell the cocoa beans to the <i>tengkulak</i> (local middlemen) or <i>pengepol</i> (local collectors) who come around to their homes each day to buy cocoa beans. Women sell their lower quality beans to the <i>tengkulak</i> and negotiate prices that day to sell their beans. Women give their husbands higher quality beans to sell to Olam, if their household has the ability to sell to Olam (not all households produced high enough quality beans to qualify selling to Olam, so most still sold to local traders in their village). Her husband will take these higher quality beans to the farmer group, where he can sell to an Olam representative for a higher price. Or sometimes Olam’s <i>pengepol</i> would come house to house, and the wife would sell quality beans directly to the <i>pengepol</i> . Women learned price information from either asking the <i>tengkulak</i> , her neighbors who had sold beans that day, or if her husband was a part of CocoaLife, he would receive an SMS with the information and she would either learn it that way or through a friend who learned the price from her husband (also part of CocoaLife).

South Sulawesi

Similar data collection activities were conducted in Lawewe, South Sulawesi. Data were collected from 31 individuals (men n=15; women n=16) on how they allocate their time.

Respondents were instructed to describe what they did and how long they spent on that activity the previous day starting at 4 am. Activities were recorded at 5-minute intervals. Figures 5.6 and 5.7 indicate the weighted average time men and women in the sample allocated to different activities.

Figure 5-0-6 Time Allocation for Women’s Daily Activities (n=16) in Lawewe, South Sulawesi

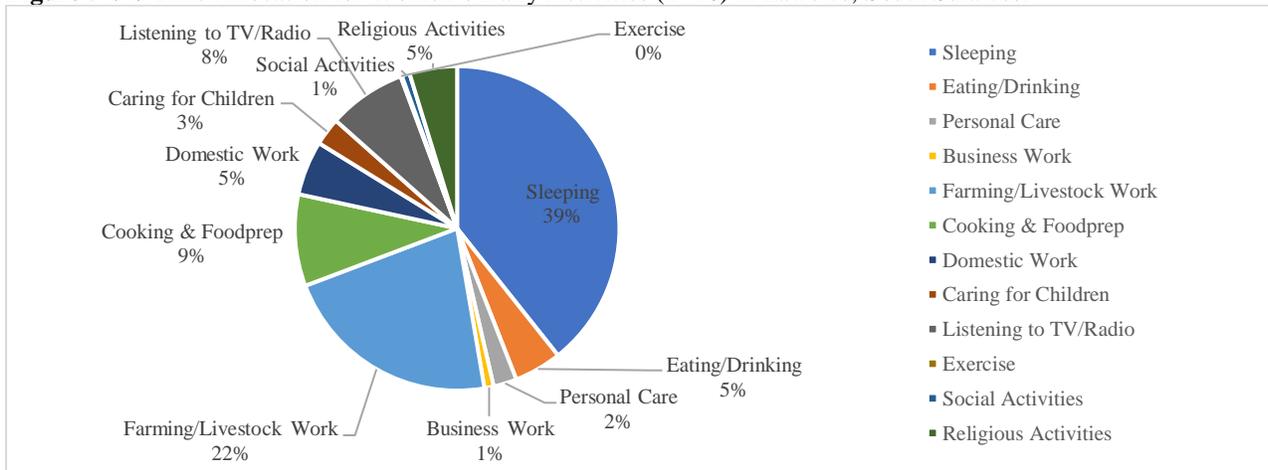
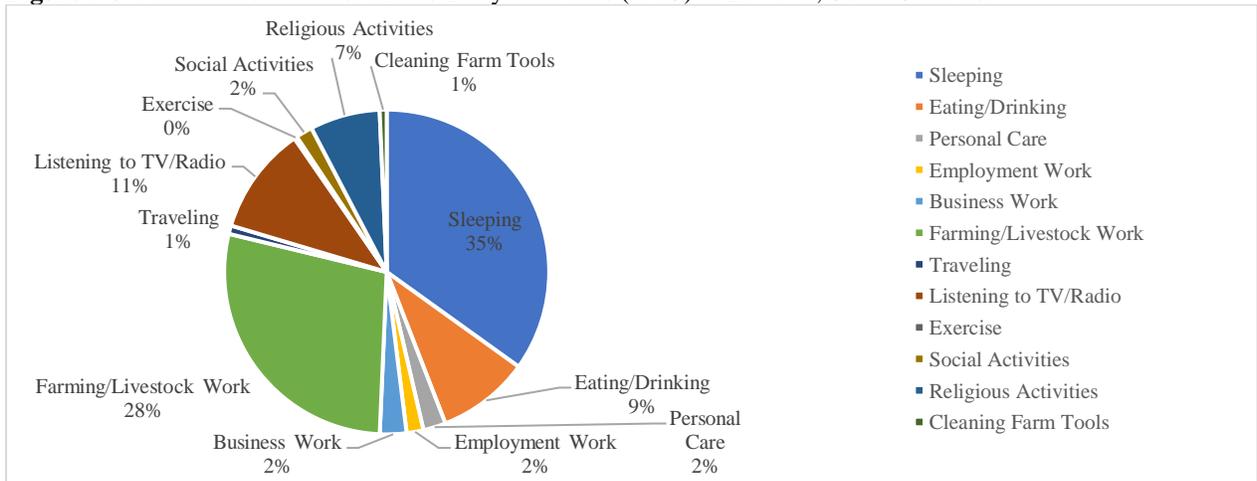


Figure 5-0-7 Time Allocation for Men’s Daily Activities (n=15) in Lawewe, South Sulawesi



Women in Lawewe report spending more time on a variety of diverse activities, whereas men’s time was primarily concentrated sleeping (35.0%), farming/livestock work (28.0%), and leisure activities (‘listening to TV/radio’) (11.0%). Men in Lawewe did not report spending any time the previous day on childcare or domestic activities, whereas these activities occupied 17.0% of women’s time the previous day (specifically: meal preparation and cooking, childcare, and domestic work). During the FGD with both men and women, when asked about general household responsibilities, both groups strongly indicated that household work (including cleaning, food preparation, caring for the children and older parents) was only women’s work.

Men were permitted to help if they so choose, but it is not required nor desired as women are “proud” to fulfill their job as a household wife. One Pak explained, “*I never ask [my wife] to work, other than managing the house. But she understands and helps [with agricultural activities] still*”. And from a woman’s perspective, summarized by one Ibu during an in-depth interview, she described:

“Bapak [her husband] works so hard and long all day in the field, I must support him to make money for our household. He is hungry in the fields, I cook for him and bring it. This is my job to support him. I clean the [cocoa beans] to help Bapak. I am a housewife, but I help [him] on the farm, he is the expert”.

In turn, the women described enjoying and wanting to help their husbands with farm maintenance, as the general sentiment shared was that this enables women to take part in earning incomes and supporting their household. One Ibu explained, “*The expert [in farming cocoa, corn] is Bapak. We don’t know anything either. We just do it. We want to help [contribute to the household income].*”

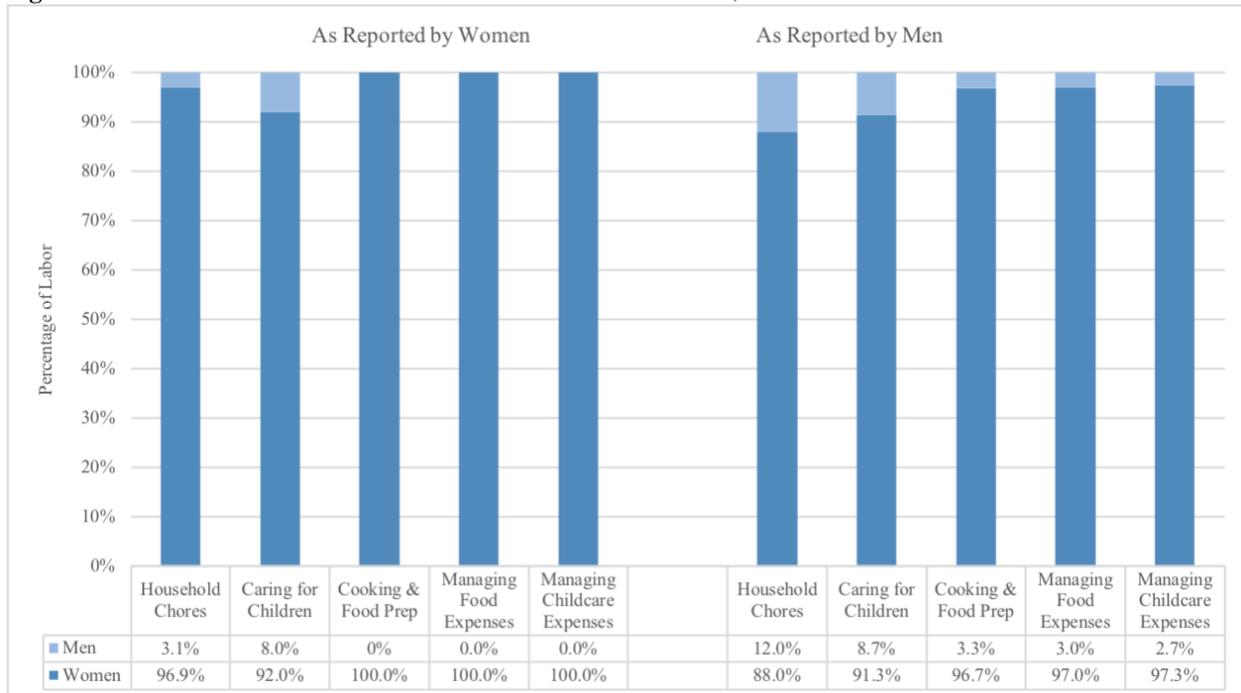
In Lawewe, women (and men) described wanting to engage in additional income generating activities to earn more incomes for their family, but there were little or no opportunities to do so in Lawewe or in surrounding villages. Women in Lawewe spent no time the previous day on employment work and only 1.0% on business work. Men spent a small portion (4.0%) of their overall time on these activities. During the in-depth interviews, several women and men explained that additional employment or income-generating activities were hard to come by in Lawewe. Only when harvest yields are low, or floods are heavy will household members actively go in search for additional employment, although both expressed a desire for more opportunities year-round. Men in Lawewe expressed support for their wives to contribute to the overall household income. One Ibu explained she will seek employment as a farmer

laborer to harvest *neem* (patchouli) in neighboring communities. However, she is limited to doing this only during the *neem* harvest season, every 3-4 months. Whereas men, as described by 4 men and 3 women during in-depth interviews, will most likely travel to Kalimantan for 6 months at a time (a different Indonesian province) for illegal mining jobs to gain supplemental income. However, these illegal mining jobs are not salaried, the men are only paid for whatever gold they find. Thus, the household wives more often than not have to send their husbands money for subsistence while in Kalimantan searching for gold, inciting the need for the wives to maintain an income through agricultural labor or harvests while their husbands migrate.

Respondents were then asked to give approximate percentages for the division of labor for specific household chores and crop specific agricultural tasks. Figures 5.8 and 5.9 highlight the weighted average percentages as reported by men and women for household tasks and general agricultural activities (aggregated by all crops reported). Figure 5.10 compares how men and women specifically report labor divisions related to agricultural activities related to cocoa production within the household. All results presented for division of labor activities are disaggregated by gender.

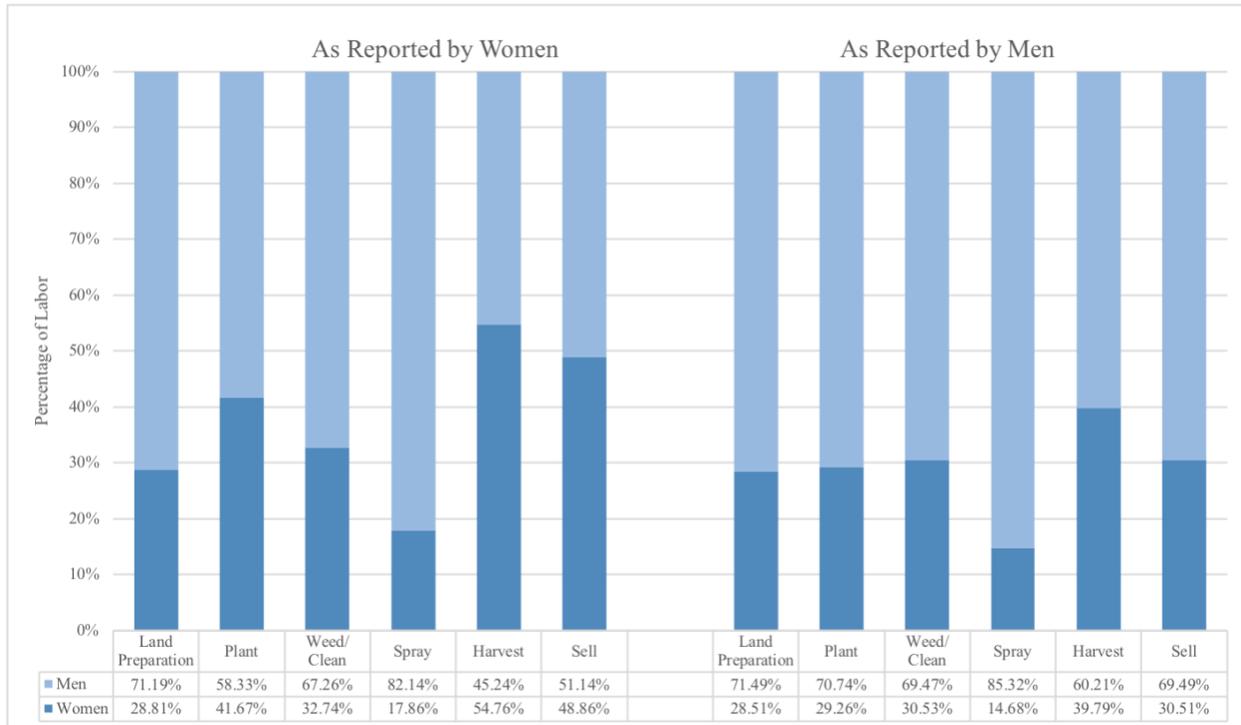
Men and women in Lawewe, South Sulawesi report women contributing the majority of labor to household chores and care activities (Figure 5.8). Men report higher percentages of their own contribution to household activities compared to women's estimation of men's contributions. For example, women report doing 100% of the labor for cooking and food preparation, managing food and childcare expenses, whereas men report contributing 3.3%, 3.0%, and 2.7% of the labor for those activities, respectively. Throughout the FGDs and in-depth

Figure 5-0-8 Division of Labor for Household Activities in Lawewe, South Sulawesi



both women and men indicated that household work is women’s work and the “*pride*” of a woman. Men do not contribute to food preparation nor do they manage household budgets. Women are responsible to hold onto all money and allocate budgets for household needs, prioritizing food and tuition fees for their children. If a husband wants to purchase cigarettes, he has to ask his wife for money. As one Ibu explained when asked about who maintains the household money, “*It’s all me. Just me. [My husband] asks for cigarette allowance and I give it, but unless we do not have enough for gasoline or food or [children’s] tuition fees*”.

Figure 5-0-9 Division of Labor for Overall Agricultural Activities for All Household Crops in Lawewe, South Sulawesi

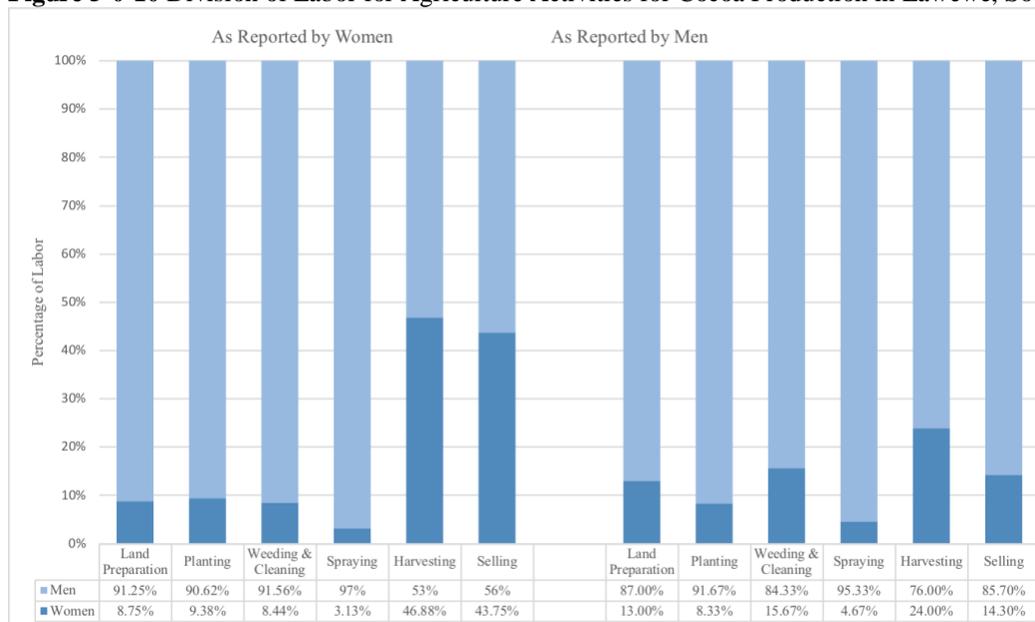


Men and women in Lawewe report that men contribute the majority of overall labor to agricultural activities. In Lawewe, the three main crops produced for income are cocoa, corn, and *neem* (patchouli). For the 5 main agricultural activities aggregated across these crops, men report women’s labor contribution lower than the percentage women report of their own contribution. For example, men report women contribute 39.8% of the labor involving in harvesting crops, whereas women report they contribute 54.8% of the labor involved in harvesting crops. The FGD and in-depth interviews illuminate that both men and women explained that activities related to land preparation, planting [for cocoa and corn], maintenance, and spraying were generally the men’s responsibility, and women would help as needed. Both indicated that women planted *neem*, as the seeds were smaller and easier for women to take greater care in planting the seeds in neat rows. *Neem* is a favorite crop, as one Pak explained,

“...because of the chocolate-nilam combination sir. Cocoa is a long-term plant, whereas nilam is a short term one. We get fast cash through nilam, which can be used for fertilizers and poisons. That is my opinion. Cocoa takes a long time.”

Both men and women indicated that although it is not ideal for women to spray chemicals, she will if her husband cannot. For harvesting crops, men indicate taking care for all labor-intensive activities, such as physically picking corn or cocoa pods off the trees and transporting these to a central location, but women are responsible for all quality control activities, and drying (for cocoa specifically). Women and children work together to harvest *neem* as it is not a very labor-intensive activity and requires “small fingers” to pluck the plants without damaging them. Both men and women explained that selling crops is “*women’s work*” as it is better for women to negotiate quality and prices for products sold, and women manage the household budgets. However, men are involved in selling products if they need to be taken to market, as women generally do not drive motorbikes in Lawewe (for fear of crashing or culturally deemed unsafe). Husbands will transport their wives to the market to sell the harvest.

Figure 5-0-10 Division of Labor for Agriculture Activities for Cocoa Production in Lawewe, South Sulawesi



Finally, Figure 5.10 presents self-reported percentages of labor for 5 main agricultural activities specific to cocoa production, disaggregated by men and women. Both men and women in Lawewe report that men contribute the majority of the labor but cite different percentages of labor for each activity. For example, men report that women contribute approximately 24.0% of the total labor to harvest cocoa, while women report they contribute approximately 46.9% of the total labor to harvest cocoa. To better understand these discrepancies, qualitative results from focus group discussions and in-depth interviews are presented in Table 5.2 to highlight how men and women describe labor contributions.

Table 5-0-2 Qualitative Results of Division of Labor for Cocoa Production, South Sulawesi

Activity	Overall Summaries from Qualitative Insights	
	Men	Women
Land preparation	Preparing the land for cocoa production and planting only happens before new trees are to be planted. This is the man's responsibility always, but sometimes women help and do as directed by their husbands.	No women in the Lawewe sample had their own cocoa plots, but they will always help their husbands with this task.
Planting	Planting is men's responsibility, which only happens when there are new trees to be planted (not every season). In Lawewe, there is only a men's farmer group that interacts with Mars, where men get their new seedlings. Men plant new seedlings and sometimes ask their wives' help.	This is not women's responsibility in Lawewe, however women will always help her husband in whatever farming tasks he needs.
Weeding / Cleaning [Maintenance]	This activity occurs regularly throughout the cocoa growing season each year. Primarily, maintaining the cocoa farm is the men's responsibility.	Women always help their husbands for general cocoa maintenance, such as cleaning fodder, picking "sick" cocoa pods, watering, or some simple pruning. But women indicate they are directed or "trained" by their husbands.
Spraying	Spraying is generally a man's responsibility. However, wives will help if the husband cannot do or finish the spraying for whichever reason (the main cited reasons were the husband was sick, the husband needed help it complete, the husband had migrated in search for work).	Men are generally responsible for spraying cocoa trees, however, as Ibu Nur indicated, " <i>if [my husband] has no time to spray the cocoa, then I would substitute him</i> ".
Harvesting	Men are responsible for picking the cocoa pods off the trees and transporting them to one singular location. Men sometimes would help their wives to crack open the pods if there were many or to help her.	Women are responsible for cracking open the cocoa pods once harvested. Women sometimes help their husbands to pick the pods off the trees but spent most of their time opening the pods and separating the beans for quality. In Lawewe, most households preferred to sell their cocoa beans wet, rather than dry. If they were to sell dry beans, it would be the lower quality beans sent to the local market.
Selling	In Lawewe, all farmers sold their cocoa beans to Mars and saved poorer quality beans to sell at the local market. The registered farmer group led by Pak Aksan worked with Mars for several seasons to improve their quality. A Mars representative would come to Pak Aksan's house, where all farmers would gather with their bags of cocoa beans. The Mars representative and Pak Aksan would record the weight of each farmers' bag and price owed. Pak Aksan and the Mars representative would then take the bags back to the local Mars storage house, and Mars would give Pak Aksan all the money owed, which then Pak Aksan would deliver to each respective home. The men of each household would transport the bags of cocoa beans to Pak Aksan's house.	While the men would transport the bag of wet cocoa beans for sale to Pak Aksan's house or the local market to sell, the women would always follow (travel either with her husband or other men relatives) to negotiate the price. Some women would wait for a few hours at Pak Aksan's house to monitor how her household's bag of cocoa beans was weighed and priced and would negotiate as needed. During this time, her husband would go home or do other activities, and return to pick her up. If she were selling cocoa beans at the local market, her and her husband would bring the bags to the market where she would negotiate the price based on the quality of beans with the local buyer.

Summary, Comparison, and Intersections

In summary, similarly in Lampung and South Sulawesi, the data suggests that women spend their time on a diversity of unpaid and sometimes paid labor tasks, contributing considerable labor to household cocoa and other crop production while also maintaining their responsibility to household labor, managing home gardens, and childcare chores. Men spend the majority of their time on agricultural labor tasks, followed by leisure activities and sleep. Specific to cocoa, although the farm is generally considered under the men's domain (except in cases across Lampung when women managed the cocoa farm and the husbands were employed in other labor activities), women contribute a considerable amount of labor to household cocoa production activities, while also maintaining the aforementioned diversity of unpaid and sometimes paid labor tasks. While women contribute to all aspects of cocoa production in the form of labor, women are uniquely in charge of separating the beans, determining quality of each bean (separating which ones should be sold to the local market and which to Olam/Mars), drying the beans (if dried in Lampung, but not in South Sulawesi), and negotiating selling prices. They work with their husbands, whom they consider the '*expert*' on the cocoa farm and express interest in wanting to contribute more to the household income and learn more about cocoa techniques.

We see differences in how women spend their time between Lampung and South Sulawesi due to available resources and opportunities. Lawewe is more remote and less accessible to the nearest markets than the sample villages in Lampung, thus there are less income-generating opportunities available for women as well as lower access to markets to sell or buy goods or vegetables. Only a few women in Lawewe maintain household gardens, as recently taught by Mars' livelihood program, however accessing seeds and inputs were

challenging for the women to sustain the household gardens, as well as the increasingly inconsistent threat of severe flooding, which destroyed these gardens. A majority of women across Lampung maintained a household garden, and those in flood-prone areas adapted these gardens into raised poly-bag gardens.

Additionally, we see differences in how women engage in income-generating activities between Lawewe, South Sulawesi and Lampung. In Lawewe, the only income-generating opportunity for which women can engage was as an agricultural laborer on *neem* farms, which is time-restricted as it's only available during the harvest season (every 3-4 months). Lawewe is a 100% Muslim village, whereas across the Lampung villages, there is a majority of Muslim, with Christian and Hindu in the minority. The men in Lawewe were more supportive and encouraging of their wives working to gain additional income to support their household needs than those in Lampung, whose approval of women working was dependent on the level of conservative values the husband held (often tied to religion) as well as the household's socioeconomic status. For example, one farmer in Pesawaran explained that although his cocoa harvest was much lower than in prior years and he had to engage in construction work to feed the household, he absolutely refused to let his wife work, although she explained that she was "*bored*" at home. To him, his wife working signaled that he could not take care of his own family, suggesting a threat to his masculinity. In addition, he held very conservative Muslim values such that allowing his wife to engage in the public sphere opened he and his wife to sin and immoral acts, as he explained. Thus, this farmer prioritized his conservative religious values over socioeconomic status. Whereas another farmer in Tanggamus explained that while he was deeply religious and held conservative Muslim values, he was forced to let his wife work because he could not meet the household needs by himself since the harvests were so low in recent years. This farmer

prioritized his socioeconomic status over his conservative values. However, across the Muslim households, there existed tiers for where a woman could engage in income-generating activities – if allowed at all – such that she could engage if she stayed within the household, at an approved neighbor’s household, within the community close to her house, within the community far from her house, outside the village, and finally, outside of Indonesia. And whereas all Muslim women indicated that if they were allowed to work, they always had to have permission from their husband to engage in the public sphere and were not allowed to leave the village unaccompanied (by a male relative), Christian women explained that their working was a discussion between her and her husband and she could leave the village, but always informed her husband before doing so for “*safety reasons*”. The intersecting dynamics between religious and socioeconomic households observed in this research study raise more questions for further investigation to better understand how households make decisions regarding women’s capacity to engage in the public sphere and impact on their empowerment.

5.1.2. Objective 2: Decision-Making Patterns within the Household

Qualitative data were collected in both Lampung and South Sulawesi to understand the gender dynamics of decision-making within small-scale cocoa producing households.¹¹ From FGD and in-depth interview data, decision-making patterns were identified and explored under three major emergent categories: those related to agricultural activities, household activities, and general

¹¹ Given the availability of comparable data across both sites (Lampung and South Sulawesi), only qualitative data is presented.

livelihood activities. A discussion of a summary, comparisons between Lampung and South Sulawesi, and intersections is presented at the end of this objective.

Lampung

Qualitative insights into intra-household decision making patterns related to general agriculture, cocoa-specific, household, and livelihood activity decisions are presented in Table 5.3. These decision-making patterns emerged across the qualitative sample in Lampung and reflect general patterns for a traditional household structure (one husband and one wife with children) as represented across the sample.

Table 5-0-3 Decision-Making Patterns for Lampung

Decision	Who Decides?	Description
General Agricultural Decisions		
Investments	Men decide	The husband must ask his wife for money to make the investment, to which she must (or will) always say yes unless there is not enough money for the investment after paying for food and school fees (<i>“food and money for tuition, those are our priorities”</i> as described by women in an FGD when asked about budgeting prioritization). However, the husband does not ask his wife nor do they discuss if he can make an investment or what kind of investment to make for an agricultural purpose. As described by one housewife, <i>“Bapak does [agricultural decisions], he is the expert, he does not need to discuss with me. Sometimes he will tell me, ‘oh I did this for the [cocoa] farm’ but not always. Just like that.”</i>
Agricultural Practice [i.e., changing types of fertilizer, or how to prune]	Men decide, sometime discuss with women	The men may sometime share the new practice with their wives, but do not need to discuss or ask permission from their wives to change a practice. The general sentiment from household wives is summarized by one woman from Pringsewu, <i>“[My husband] is the one on the farm, he goes to trainings, he knows better. What more could I add, I am a household wife? He does not ask me, I do not know anything”</i> whereas women who participate in a farmer group generally express that their husbands will discuss with them, but ultimately it will be their husbands’ decision. From in-depth interviews, five men indicated they discuss agricultural practice decisions with their wives who also participate in a farmer group because sometimes their wives have <i>“made research or know from other trainings,”</i> but ultimately, it is their decision
Cocoa-Specific Agricultural Decisions		
Investments	Men decide; woman cocoa farmer discusses with her husband	Similar to general agricultural decisions, cocoa is considered a man’s crop and he will make the decisions for what is needed to invest in the crop. However, since his wife holds the household money and makes the budget, he has to ask her for money and explain what he wants to do with the money. But she will never disagree because he is the <i>“expert”</i> for cocoa, unless there is not enough money for necessities. Even when the husband must migrate, as one farmer

		explained, “ <i>The farm is our priority, side jobs is for free time...I do more side jobs now but I still control the farm though.</i> ” However, a woman cocoa farmer must discuss with her husband if she wants to invest in her cocoa plot. In cases like this, they decide together how to invest in their cocoa plot, both bringing “ <i>research and ideas for what is best</i> ”, as explained by one woman cocoa farmer.
New practices	Men decide for his farm; women decide for her farm	Men decide which new practices to employ on the cocoa farm and rarely discuss with their wives, unless just to share for sharing’s sake. A woman cocoa farmer also does practices without discussing with her husband, unless he also is involved in cocoa production, then they will discuss.
Where to sell	Women decide, but discuss	Women decide to which seller beans are sold as they are largely responsible for separating the beans (based on quality), drying the beans, and are home when local collectors come around to buy the beans. Women decide whether to sell to <i>tengkulak</i> (local middlemen that came house to house), <i>pengepol</i> , (collectors that work for Chinese-Indonesian cocoa buying companies at the local market), directly to the local market, or to Olam, if their beans are of high enough quality. Women will discuss with their husbands should there be a change, but everyday decisions on price and buyer women make.
Household Decision Making		
Small purchases	Women decide	For everyday small purchases, such as children’s allowances or food purchases, women do not discuss these with their husbands. He must ask her for money for cigarettes, to which she will always give him the money unless there is not enough for more prioritized items (like school fees, food, and gasoline). However, if she wants to buy new clothes for herself or cosmetics, she must discuss these purchases with her husband.
Large purchases	Together, men have final decision	For large household purchases, like a new motorbike, television or rice cooker, women will discuss this decision with her husband, who always has the final say in a disagreement. However, as many men repeated during in-depth interviews (summarized by one Pak), “ <i>She brings me the idea and budget, and she always has good research. I have to listen because sometimes she has better ideas and research than me. Most of the time I agree with her</i> ” for making large purchases for the household.
Children	Women decide, sometimes discusses	Women always make decisions regarding their children. Sometimes she will discuss these with her husband if it’s a big decision and he will weigh in his opinion. Usually, the husband agrees with the wife because again, “[<i>she</i>] <i>brings research and knows the children’s needs very closely</i> ”. However, as with all other decisions, if her husband disagrees with her, his decision is final.
Food	Women	Women make the decisions surrounding household food consumption, specifically what to eat, how to prepare the food, and where to source the food. Men only contribute to this decision if the husband specifically asks for a certain meal.
Livelihood Activity Decisions		
Men migration	Together, but men decide	Sometimes the wife might explain to her husband that they need more money because the harvest was too low or prices are too low, and the husband will go in search for work outside of the community, either as a construction laborer, driver, agricultural laborer, or another activity. But this decision is not always directly discussed, as the husband looks for side jobs to fill his time.
Women migration	Depends	This decision-making process largely depends on the religion of the household. For example, one Christian husband indicated that his wife expressed wanting

		to go abroad to work and earn an income to support the household. ¹² However, this Pak explained that he told his wife that they were not “ <i>needing so much extra [money]</i> ” right now and she should wait, but it was very much a discussion and decision made together. On the other hand, one Muslim wife explained being “ <i>bored at home. I want to work and contribute to our income because the [cocoa] harvest is doing so poor, I beg Bapak every day to let me go but he won’t let me</i> ”. A Muslim man explained it is the husband’s role to entirely support his wife and family, and that if she must work, that signifies he is not doing his job as a man. Muslim women must secure her husband’s (or another male guardian’s) permission before traveling outside the village.
Women working	Depends	Similar to the decision for a woman to travel abroad for work, the decision regarding women working within the community, province, or country is dependent. One Christian Ibu explained that if she wants to work, she tells her husband what she is doing that day and when she’ll be back but does not need his permission. However, they always discuss. Whereas this decision proved more complicated within Muslim households across the qualitative sample. A Muslim woman must always receive her husband’s permission to work or go outside of her household. Across interviews with the Muslim men regarding this subject, several factors seemed to influence this decision: the husband’s level of conservative beliefs (very conservative husbands would not permit their wives to work regardless of their economic situation), the household’s economic situations (one husband explained, “ <i>I do not want [my wife] to work. She asks and asks. But the [cocoa] price is so bad and harvest so low, what choice? I have to say yes.</i> ”), or type of work proposed by the wife or available in the community (for example, women were generally permitted to work on the farm, or doing small business-like activities like sewing or making snacks, because these enabled the women to stay at home and not have to travel outside of the community. Generally, women were not allowed to work outside of the village nor were allowed to be outside her household at night, because that would draw ‘suspicions’ about what she is doing and with whom she is doing it).

South Sulawesi

Qualitative insights into intra-household decision making patterns related to general agriculture, cocoa-specific, household, and livelihood activity decisions are presented in Table 5.4. These decision-making patterns emerged across the qualitative sample in Lawewe, South Sulawesi and reflect general patterns for a traditional household structure (one husband and one wife with

¹² There are companies in Indonesia that facilitate Indonesian women to apply for working visas abroad and secure a position as a domestic helper in countries such as Malaysia, Hong Kong, Qatar, UAE, and Saudi Arabia. Women cited working abroad often for years at a time to send money home to support their families. This was highly stigmatized depending on the village and who was expressing their views.

children) as represented across the sample. A discussion of a summary, comparisons between Lampung and South Sulawesi, and intersections is presented at the end of this objective.

Table 5-0-4 Decision Making Patterns for Lawewe, South Sulawesi

Decision	Who Decides?	Description
General Agricultural Decisions		
Investments	Men decide	The husband asks his wife for money to make the investment, to which she will always say yes unless there is not enough money for the investment after paying for food and school fees. However, the husband does not ask his wife nor do they discuss if he can make an investment or what kind of investment to make for an agricultural purpose. Similar to Lampung, household wives describe their husbands' as the "expert" on farming, so their opinion is not considered for agricultural investments, only for how household budgets are allocated.
Agricultural Practice	Men decide, sometime discuss with wives	The men may sometime share the new practice with their wives, but do not need to discuss or ask permission from their wives to change a practice.
Cocoa-Specific Agricultural Decisions		
Investments	Men decide, but discuss budget together	Similar Lampung, cocoa is considered the husband's crop in Lawewe and he will make the decisions for what is needed to invest into the crop. However, as his wife manages the budget for the household, they must discuss the budget for the investment together. The wife usually will not disagree because he is the "expert" for cocoa, unless there is not enough money for necessities.
New practices	Men decide	Men decide which new practices to employ on the cocoa farm and rarely discuss with their wives, unless just to share for sharing's sake.
Where to sell	Women decide	Women decide to which seller beans are sold as they are largely responsible for separating the beans (based on quality) and drying the beans. However, there are only two options in Lawewe: sell to Mars (higher quality beans) or to the local market (lower quality beans). There is rarely ever a disagreement about where to sell because the quality of beans is always easy to identify, as explained by the women in the FGD.
Household Decision Making		
Small purchases	Women decide	Women make the decision for everyday small purchases, such as children's allowances or food purchases. They do not need to discuss these decisions with her husband. He must ask her for money for cigarettes, to which she will always give him the money unless there is not enough for more prioritized items (like school fees, food, and gasoline). However, if she wants to buy new clothes for herself or cosmetics, she must discuss these purchases with her husband.

Large purchases	Together, men have final decision	For large household purchases, like a new motorbike, television or rice cooker, women will discuss this decision with her husband, who always has the final say in a disagreement. But wives usually have “ <i>good proposals</i> ,” one Pak explained.
Children	Women decide, sometimes discusses	Women always make decisions regarding their children. Sometimes she will discuss these with her husband if it’s a big decision or just to share the decision. However, with all other decisions, if her husband disagrees with her, his decision is final.
Food	Women	Women make the decisions surrounding household food consumption, specific to what to eat, how to prepare the food, and where to buy the food. Men only contribute to this decision if the husband specifically asks for a certain meal.
Livelihood Activity Decisions		
Men migration	Discuss together	In Lawewe, both men and women described during FGDs that they will discuss together whether the husband should migrate in search of labor and additional income. This discussion always happens when the harvest is too low or there are unexpected floods or intense rainfall, which they predict will ruin the harvest.
Women migration	Together, but husband has final say	Women and men in Lawewe described that even though women shouldn’t work, it is better for women to help support the income for the household. However, no women in Lawewe had emigrated abroad for a domestic laborer job but expressed wanting to find work wherever. All households in the qualitative sample in Lawewe were Muslim.
Women working	Together, but husband has final say	Both men and women across the FGDs and in-depth interviews expressed support for women working and helping to supplement the household income, however that opportunities for work were limited, if not nonexistent in their area. Some women described traveling to a nearby village to work as a <i>neem</i> harvester for larger farms during the harvest season (every 3-4 months). The women would ask their husbands for permission to go and he always gave permission. One woman cited in an in-depth interview that there was a woman in the village who sold credits (for cellphones) and snacks, and that her husband would have had to give her permission to do so.

Summary, Comparison, and Intersections

In summary, in both Lampung and South Sulawesi, women make the everyday decisions for where to sell cocoa beans, based on her knowledge of the quality of the beans and the fact that she is responsible for actually selling the cocoa beans, as well as everyday decisions regarding small household purchases (such as food items), the children, or food (meal) preparation. However, as these decisions fall under women’s primary labor responsibilities, she does not need to discuss these with her husband every day before deciding, however should she want to change her decision-pattern (such as buy new types of clothing for the children or a new

type of food), she will discuss these changes with her husband. When a woman had to discuss a decision with her husband, the husband generally has the final say. However, in both study sites, women employ a suite of negotiation techniques¹³ to influence her husband's decision making, as men repeatedly indicate that their wives come to decisions with convincing arguments for how they should decide. While their husbands still held the ultimate decision-making power, these negotiating and influencing strategies should be further explored in future studies to best understand decision-making influence within households.

We see differences in decision-making patterns between the Lampung and South Sulawesi samples. For one example, men and women are more likely to discuss a decision together regarding cocoa production when the wife has attended cocoa trainings or was part of a women's farmer group. Since there exists no women's farmer group in South Sulawesi, none of the men indicated that they would discuss with their wives regarding cocoa-related decisions, and women indicated that they need not be involved with this decision as they "know nothing" related to cocoa. These responses suggest that women who have attended formal trainings have higher levels of confidence in the material and to share an opinion about the material. None of the women who had attended a cocoa training or were part of a formal farmer's group indicated that she knew nothing about cocoa, whereas most of the women considered 'household wives' had indicated that their husband was the expert and she knows nothing (despite having just explained a plethora of information regarding cocoa production, harvest, quality, and pests and diseases).

¹³ These techniques are referred to throughout the data presentation as the women's *research*. However, these techniques and strategies were not fully explored in this research study but should be investigated with further research studies to learn how women influence decision making in less overt ways and better understand true decision-making influence.

Decision-making patterns also fluctuate in households depending on religious affiliation. For example, one Christian woman indicated that if she wanted to work, she would tell her husband, so he would know, but she was clear to indicate that she did not need his permission to do so. Within Muslim households, women and men across the qualitative sample indicated that it was paramount for women to have their husbands' permission before leaving the household or to engage in any activity outside the household. These nuanced intra-household decision-making dynamics should be further explored in future studies.

5.1.3. Objective 3: Community Participation

Data were collected from FGDs and in-depth interviews to understand how men and women from small-scale cocoa producing households participated in their community. Tables 5.5 and 5.6 present the list of the most important community groups in which men and women participated. Several additional groups were identified but not included here as they were not described as the most important nor attended by a majority of the qualitative samples. In both case studies, men and women report participating in community life via various formal and informal organizations and indicate that community interaction is essential to their daily lives. A discussion of a summary, comparisons between Lampung and South Sulawesi, and intersections is presented at the end of this objective.

Lampung

A similar sentiment expressed across the FGDs in all three villages in Lampung was that community life was the same, “*we help each other and work together in harmony*” but that there were now “*more people here than before*”.

Table 5-0-5 Descriptions of Most Important Community Groups

Group	Description
Prayer / Religious group	For both men and women, regardless of religion, religious groups were the most important form of community participation. Men and women’s religious groups were separate. Men meet regularly to pray and read passages, either from the Bible if Christian or from the Quran if Muslim.
Farmer group	Farmer groups are officially organized groups with established leadership and are registered with the government. Each community has at least one farmer group for men, but women farmer groups are less popular, although increasing.
Men Farmer Group	<p>Men farmer groups were established and registered with the government before CocoaLife, but CocoaLife help establish cocoa specific farmer groups across Lampung province. In order to have access to government trainings and subsidized inputs (like fertilizer), farmers must be a part of a registered farmer group. Men farmers that do not participate in a farmer group cannot access fertilizers as stores can only sell to those part of a registered farmer group. Farmers not part of a group indicate that they either simply do not use fertilizer or will buy fertilizer from their neighbor, if available. Many farmers do not use fertilizer. As part of CocoaLife, the men farmer groups engage with Olam and CocoaLife trainers for training on different best agricultural practices (like pruning, planting, grafting) and other cocoa-related topics, receive price information everyday by SMS, and have guidance for improving cocoa quality to sell to Olam instead of local collectors (who purchase any kind of quality). The farmers also have access to new seeds through the farmer group.</p> <p>Usually, there is a maximum number of men that can participate in a farmer group (around 25-30), otherwise the groups can become corrupt and inefficient, as explained by one farmer during an in-depth interview. One farmer group in Pringsewu (which had upwards of 50-60 members) had recently disbanded and re-established into three different groups because the leaders of the group became corrupt, stole money from the members, and the group was neither effective nor beneficial. Within the hierarchy of a men’s farmer group, the head farmer has a majority of the responsibility and power. For example, Olam (via CocoaLife) coordinates with the head farmer to establish trainings, run a nursery, disseminate information and technology, and negotiate prices. It is then the head farmers’ responsibility to recruit or invite other farmers to join the farmer group or to attend the trainings. Across the in-depth interviews, several farmers had not participated in a farmer group due to “<i>personal politics [that] inhibited [their] ability to join</i>”. The farmer group dynamics are important and have implications for who gets access to what trainings, and also how these important sources of information regarding best agricultural practices for cocoa are disseminated.</p>
Women Farmer Group	In Tanggamus, the women farmer group was recently established but not yet registered, whereas there were well established women farmer groups in Purwodadi and Pringsewu. Save the Children, under CocoaLife, helped establish and facilitate the women farmer groups to conduct livelihood trainings (such as sewing, making snacks, candles, or soaps), introduce, implement and maintain home gardens, conduct trainings for best agricultural practices (like making compost or fertilizers), and give some cocoa or coffee-related trainings, if requested. Across FGDs, women farmers (those part of a registered farmer group) repeatedly indicated that they wanted more information on pests and diseases for cocoa and how to properly identify and treat these as they arose. In addition, all women indicated wanting trainings on value-addition for cocoa and marketing/business skills to increase their profitable contribution to their households’ cocoa production. In KIIs with The Save the Children coordinators, they explained that the trainings are flexible and responsive to the needs of the women farmer group, such that they can request trainings on certain topics and the training facilitator will organize them.
<i>Arisan</i>	While not all women participate in a farmer group, all women across the qualitative sample participate in <i>arisan</i> , a traditional Indonesian rotating collective savings group. This is an essential and important component of women’s daily lives, as they know they have safety and security with their neighbors, particularly in times of stress or need. The women meet regularly at a community members’ home; they contribute monthly to the pot of savings, and each month 3 women can apply to access the savings to do business-related activities or in times of need. The group will decide

	which 3 women’s applications would be accepted based on need and ideas. For example, a woman can apply for a loan to support opening a small shop, or to buy materials to open a sewing business. Or a woman could apply for a loan to purchase food products for her family (particularly during times of low harvest). Once the application is accepted, the women receive the loan and then have to pay the group back over time by submitting an additional fee to the monthly fee. As one woman explained during an in-depth interview, “[<i>Arisan</i>] is a priority for us.”
<i>Musrenbang</i>	<i>Musrenbang</i> is held among village leaders and selected community members to make decisions and proposals for the community across a wide variety of topics. The Indonesian government mandated that <i>musrenbang</i> and other representative groups should include at least a 30% representative of women (the ‘ <i>quota</i> ’ as referred by several participants across the qualitative sample), however this was not always the case in rural villages where quota enforcement was lacking. The village leader of Pesawaran described “his” <i>musrenbang</i> that met the 30% women quota and proudly exclaimed his support for “ <i>emansipasi perempuan</i> ” [women’s emancipation].
<i>PKK (Pembinaan Kesejahteraan Keluarga)</i>	The PKK is a government sponsored women’s group generally translated as the Family Welfare Movement. Many women cited that this was a group in which they participated but was not the most important nor did all women participate.

Both men and women in Lampung indicated that religious groups were the most important group in which they participate, however men and women’s religious groups are gender separate. Men and women meet weekly to pray together and read the Quran. As a point of observation, prayer times were strictly held across Lampung for both men and women Muslim participants. Men indicated that the cocoa farmer group was their second most important community group, as it provided them with a venue to share ideas, expertise, and resources amongst community farmers as well as receive necessary supports (trainings, inputs, market options) to improve their cocoa crop. Where established, the women’s farmer group was indicated as the second most important group for women (in Tanggamus, the second most important group was the *arisan*), as it served to teach women new livelihood skills in which they could support their families, as well as socialize and learn new information. The *arisan* was described as extremely important to everyday life to most women across the qualitative sample, serving as an important social safety net and source of informal credit for women.

South Sulawesi

During an in-depth interview, one household wife summarized the role of community life and informal participation in Lawewe:

“Exactly, help each other. If you don’t, how can you live? We here live a very rural life...Even though we are the ones cooking, [sic] if we see our neighbors lacking, we will share ours. No one [in this community] can imagine how we go [on] without caring [for] each other.

Table 5-0-6 Descriptions of Most Important Community Groups, South Sulawesi

Group	Description
Religious groups	Religious groups were considered the most important to both men and women across the qualitative sample in Lawewe. Men would meet regularly at the mosque to pray together and would attend Friday prayer together. They joined together whenever there was a wedding, funeral, or burial to participate as the local religious group. For example, during data collection, a member of the community had passed that morning. The Pak we were scheduled to interview had to delay the interview [which he normally would never had done unless it was for this exact circumstance] to dig the grave for the community member along with the rest of his religious group and spend time with the now widow. This ceremony lasted until 4pm (we arrived at 7am), and then we began the interview.
Farmer Group	<p>In Lawewe, only men farmer groups were established and registered with the government. The cocoa farmer group was facilitated and supported by Mars, who gave trainings on how to improve cocoa quality and quantity, and new seedlings to replace aging trees. Through participation with Mars via the farmer group, households were then able to sell their high-quality cocoa beans to Mars for a higher price than to their original buyers at the market. If husbands were not available to attend trainings, then they would send their wives in their place because “<i>someone needed to get the knowledge</i>” as explained by the women in the FGD.</p> <p>Although there were no established farmer groups for women in Lawewe, Mars also conducted trainings specific for women on how to grow vegetables and “<i>small plants</i>” around the household, in home gardens. Some women in the qualitative sample had participated in these trainings and found them to be very important for their lives and families. Other women either did not have time or were skeptical to join the trainings. Although all women in the qualitative sample said they would be interested in joining a women’s farmer group if it were to be established.</p>
<i>Keluarga harapan</i> (Family Hope Group)	Women in Lawewe participate in a government sponsored group, <i>Keluarga harapan</i> , that operates as a rotational money savings group. There is no <i>arisan</i> in Lawewe, but the women describe their participation in KH as similar to an <i>arisan</i> , saying it is “ <i>their arisan</i> ”.
<i>Musrenbang</i>	As with all other Indonesian villages, <i>musrenbang</i> existed but only one participant in the qualitative sample was part of the local <i>musrenbang</i> . He was one of the older members of the community. The other members say they know about it but do not want to participate as they do not have the time, between visiting family, farm work, and household chores.

Both men and women in Lawewe indicated that religious groups are the most important community groups in which they participate, however men and women’s religious groups are

separated. Men and women meet weekly to pray together and read the Quran. Men indicated that the cocoa farmer group was their second most important community group, as it provided them with a venue to share ideas, expertise, and resources amongst community farmers as well as receive necessary supports (trainings, inputs, market options) to improve their cocoa crop. While there was no established women's farmer group (although the women expressed interest and desire to join should one begin), women would attend cocoa trainings in lieu of their husbands should he not be able to attend as well as vegetable specific trainings for home gardens. For women, the second most important community group was the *Keluarga haraban*, a government sponsored rotational savings group in which the women considered as their village's version of the traditional *arisan*. Women expressed that this group provided critical resources and supports, especially during times of stress as they openly share ideas and resources with one another and can take small loans.

Summary Comparisons and Intersections

In summary, participation in community life across Lampung and South Sulawesi is integral for both men and women, however separated. Religious activities and groups are most important to village life in Lampung and Lawewe. Men in both villages list the farmer group as the second most important community group in which they participate. Men rely on the skills, information, and trainings received at the established farmer group (Olam in Lampung or Mars in South Sulawesi) to maintain the quality and viability of their cocoa crops. Women in both groups list the *arisan* (Lampung) or KH (South Sulawesi) as second most important, except for women farmers in Lampung, who list the farmer group second most important for similar reasons to the men. In general, women prioritize their ability to socialize via community groups,

learn new skills to support their households, and rely on social networks and activities established through these groups as resources and support.

We do see observational differences in community life and participation between Lampung and South Sulawesi. In Lampung, religious protocols were followed much more strictly than in Lawewe during data collection. For example, my translator, the enumerators, and all participants who practiced Islam stopped whatever activity we were doing (even in the middle of an interview or FGD) to answer the call to prayer (signaled by every mosque in the area). Women wore a *jilbab* whenever myself and my translator entered her house (with the exception of a few). Whereas in South Sulawesi, the participants would not stop the interviews or FGD activities to adhere to the call to prayer. As one Pak explained, “*We have visitors here, we can prayer later after you leave or before you arrive. Allah knows and understands, it’s OK for special occasions*”. It was also observed throughout the data collection that women did not always wear their *jilbab* inside or outside when we (and other community members) were present, did not cover their arms, and some openly breastfed during interviews. These observational differences suggest that religious values dictate behavioral and cultural norms more in Lampung than so in Lawewe, which may have implications for how women may participate in and navigate the community and public sphere.

5.2 **Research Question 2:** *How do men and women within small-scale cacao producing households perceive impacts of climate change?*

5.2.1. Objective 1: Definitions of Climate Change

This objective presents results for how participants in Lampung and South Sulawesi understand, perceive, and define *climate change*. A discussion of a summary, comparisons between Lampung and South Sulawesi, and intersections is presented at the end of this objective.

Lampung

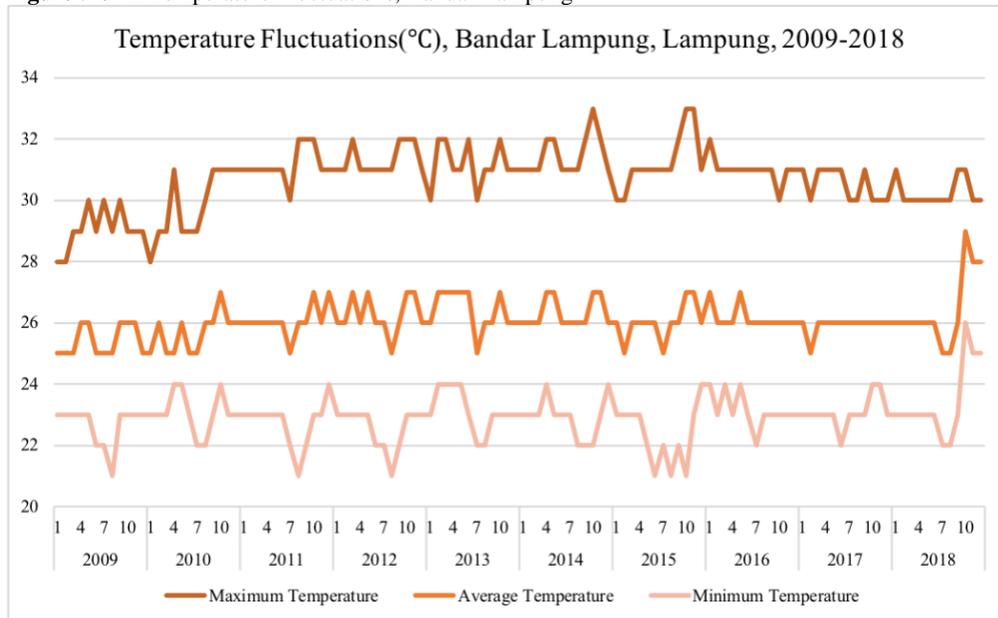
When asked to describe any unusual weather or climate changes that have been experienced since a reference period [15-30 years], participants across the sample describe changes related to fluctuating rainfall timing or patterns. Across the entire sample, both men and women identify issues of *climate change* and refer to impacts in terms of rainfall, not temperature fluctuations. Most cited are discussions of increased frequency or severity of floods or droughts, depending on the topography and biophysical vulnerability of the respective village. For example, in Pringsewu, both men and women indicated an increase in the frequency and longevity of droughts since a reference period of the 1970's.¹⁴ However, both men and women in Pesawaran, a village located along a river, described impacts relating to the increase in frequency and severity of flooding in the village. A few months before data collection, an unexpected flood swept through portions of the village and destroyed household belongings. A women FGD described how the flood swept into their homes while their husbands were in the field, and they had to race with their children and expensive belongings (a rice cooker or TV, for example) to the "*higher homes*" (traditional Lampung homes are built one story off the ground). Their husbands would come back home to help if they heard about the flood, but some of their

¹⁴ A reference period used was a historic drought that occurred in this area in the 1970's (exact year unknown).

agricultural plots are far away and unaffected by floods, so maybe their husband would not know to come back home to help until after his work in the fields was completed.

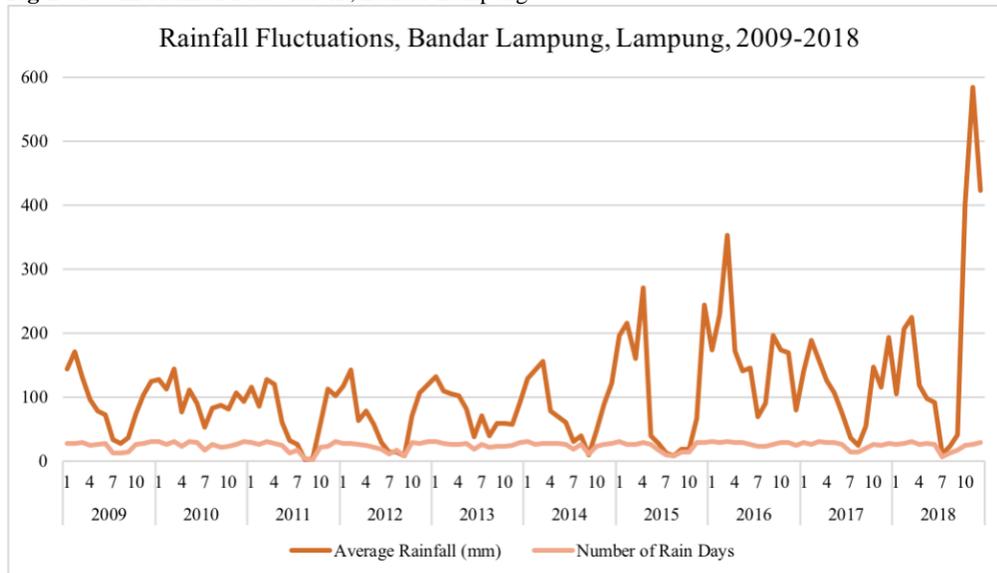
These perceptions are compared to weather data for the past 10 years in Bandar Lampung, a proxy for this region. Figure 5-11 demonstrates maximum, average, and minimum temperatures (Celsius) recorded each month since 2009, and Figure 5-12 demonstrates the average amount of rainfall (in mm) and number of rainy days per month since 2009. The rainfall levels in Bandar Lampung have been increasing in volume (particularly starting in the 2014-2015 rainy season) as well as the fluctuation in amount of rainfall throughout the year since 2009. While participants across the qualitative sample did not indicate increases in temperature as a concerning environmental change, the highest temperature recorded each month has slightly risen, from around 28-30°C in 2009 to 31-33°C in 2014.

Figure 5-0-11 Temperature Fluctuations, Bandar Lampung



Source: World Weather Data (2019)

Figure 5-0-12 Rainfall Fluctuations, Bandar Lampung



Source: World Weather Data (2019)

Several causes of these systematic environmental changes were cited across the men and women’s FGDs; however, the overwhelming majority and final consensus was these changes were “*up to god*”. According to participants, humans could not change the weather nor stop the floods (or droughts) from happening, but rather participants speculated to the extent humans could behave better so that god would stop “*punishing [them] with the bad [environmental] changes*”. Another thought that these environmental changes were “*just a phase – this [was his] traditional Javanese belief – this is just a phase, it comes and goes*”. During the discussion with the men’s FGD in Pringsewu, one man (the oldest of the group) stood up and exclaimed, “*Is there someone that causes this? If there was someone that causes these droughts and makes the rain arrive for different times, tell me. If there was someone that causes this, I would be protesting him since [the 1970’s drought]*”.

While one of the women’s FGD in Pesawaran agreed that these changes were divine intervention, they nevertheless described their mobilization to reduce pollution and soil erosion in their ever-flooding river. The women identified that “*too much trash and soil clog the river,*”

causing the river bed to rise and the river gets “*swollen much quicker,*” resulting in worse and worse floods. They also cite that those cutting down the forests for palm oil or rubber farms help the river “*swell quicker*” since there are less trees to “*block the trash and soil*”. The women’s group in the village wrote a proposal to the local Disaster and Relief Assistance government department for the funding to buy seedlings of trees that they could plant along the river bank to reduce soil erosion, a necessary first step – in their view – to try and stop the flooding from getting worse.

At the end of each FGD, participants were asked if they had ever heard the term *climate change* and if so, to best define it. Across the men and women FGDs, all participants with the exception of one, indicated that they had heard of *climate change* and it referred to as when the weather changes quickly, “*going from hot to cold to hot to cold;*” or “*from rainy to dry to rainy to dry.*” The one participant who believed otherwise was a young, male farmer (18 years old). He explained he learned the term in geography class to mean the “*long-term changing of an areas’ climate caused by pollution and gases*”.

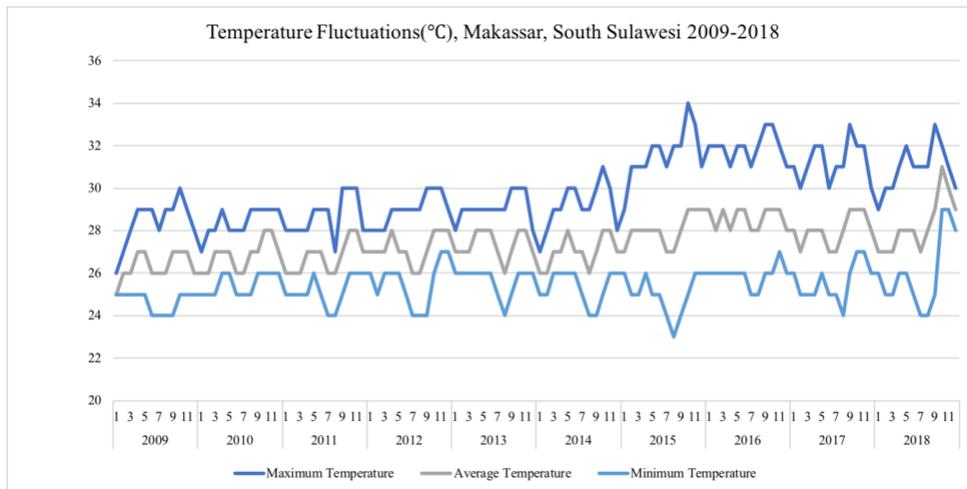
South Sulawesi

Participants in Lawewe describe impacts of climate change in terms of rainfall, specifically flooding. No participants mentioned temperature fluctuations. Both men and women cite the increasing number and severity of floods affecting their village more and more since a reference point in the 1990’s (when a major 6-month flood happened). As the men discussed during an FGD, while floods have always occurred in Lawewe with fluctuating intensity, they have never had “*tsunami floods*” since the last few years. Normally, floods can be predicted, and the households have time to prepare to move all of their belongings to the higher level of their home

(usually a small nook built on stilts to place valuables and for the family to stay while the floods occur). When the sky is dark and thundering, then the next day/night it rains heavily, they can expect a flood the following day. According to the women and men, these floods were manageable because they had time to prepare. However, the “*tsunami floods*” are recent, when neither predictions signs occur, and the participants can hear a rush of water far off, and soon the flood reaches their homes, arriving “*like a tsunami*”. These floods have been more frequent and more dangerous in recent years.

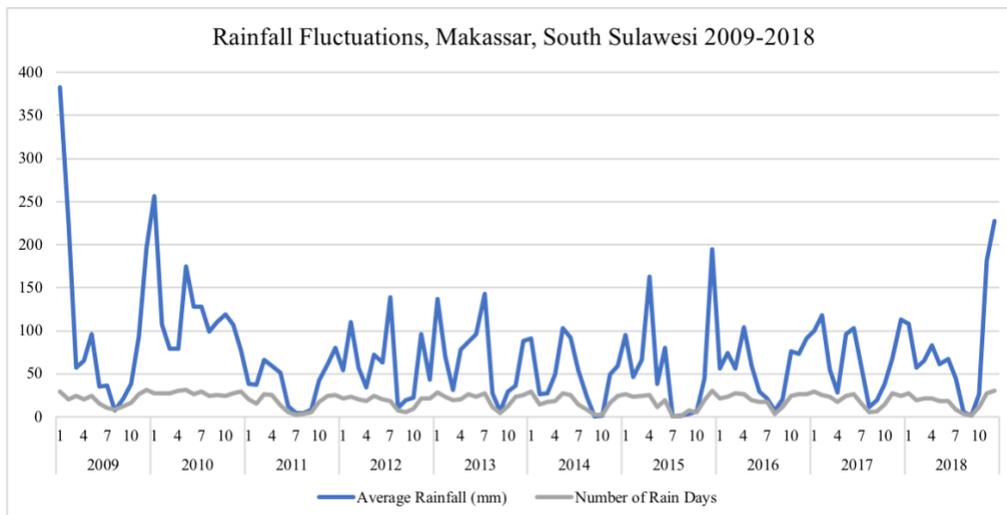
These perceptions are compared to weather data for the past 10 years in Makassar, a proxy city for this region. Figure 5-13 demonstrates maximum, average, and minimum temperatures (Celsius) recorded each month since 2009, and Figure 5-14 demonstrates the average amount of rainfall (in mm) and number of rainy days per month since 2009. The rainfall levels in Makassar have been erratic since 2008, with a fairly consistent dry season (around months 7-8) but inconsistent levels of rainfall during the rainy season. While participants across the qualitative sample did not indicate increases in temperature as a concerning environmental change, the highest temperature recorded each month has risen, from around 26-30°C in 2009 to 28-34°C in 2015. We see a continue since 2014 of increasingly hotter maximum temperatures.

Figure 5-0-13 Temperature Fluctuations, Makassar



Source: World Weather Data (2019)

Figure 5-14 Rainfall Fluctuations, Makassar



Source: World Weather Data (2019)

When asked what causes these changes, both men and women cite different issues with the *Rongkong River*, the river near Lawewe. Men indicate that the river bed is clogged with too much dirt and trash, and the “wall” is broken. In the early 1990’s, local villages put money together to build a wall around the banks of the *Rongkong River* to prevent intense flooding. However, both men and women participants say that now there are cracks in the wall and despite their best lobbying attempts, the government has not assisted with repairing these cracks. The

women participants explain further that despite the wall, there has been increased rainfall in the mountain areas around Lawewe and the surrounding villages, causing the *Rongkong* to “swell” even more and explains the lack of warning for the “*tsunami floods*” in Lawewe. However, in conclusion, both the men and women in Lawewe indicate that environmental or weather changes are part of “*mystical thinking*” that they cannot possibly know, and that these changes are “*god’s decision*”.

At the end of both FGDs conducted in Lawewe, participants were asked if they had heard of the term *climate change* and if so, to best define it. A majority of participants from the men’s FGD, with the exception of one, had not heard the term before. No participants in the women’s FGD had heard the term before, nor knew what it could possibly mean. One male participant who had heard of the term before indicated it meant that the “*seasons change, like the rainy season is January to July one year but the next it is a different time...all of the roads are broken when [the seasons] change like this and the cocoa trees die because of new diseases.*”

Summary, Comparisons, and Intersections

In summary, the technical term *climate change* was not understood or well-known amongst the qualitative sample in both sites. However, participants described noticeable and verifiable patterns of systematic environmental changes in the past few decades (or longer in respective cases). These environmental changes were described in terms of rainfall patterns and subsequent effects, such as flooding or drought. Only one of the younger farmers had indicated a close definition to the accepted term *climate change*, which he learned in high school geography class. Even though both men and women participants regularly watch television and listen to the

radio, they were not able to define *climate change*, raising the question of where this kind of information would be best disseminated. Further research is required to better understand the most effective modalities in disseminating climate-related information to both men and women engaged in agricultural and non-agricultural sectors.

While several speculative causes of these environmental changes were proposed, ultimately participants believed these changes were *up to god* and divine intervention, out of their control. Across both sites, there existed this tension between lack of capacity to change the weather (i.e, *up to god*), and groups mobilizing to mitigate and adapt to these environmental changes. The most action was undertaken by women’s groups, who were repeatedly concerned with how erosion and pollution factored into increased flooding in both Lampung and South Sulawesi. Only in South Sulawesi were the men concerned with “*clogging of the river*” and were taking actionable steps to rebuild the wall that protected the villages from the river. While the rainfall and temperature data show an increase in severity and number of rainfall days as noticed by participants, it also indicates higher overall temperatures and number of hot days per month, which was not mentioned by participants. Further research would be required to better understand why participants did not notice increases in temperature.

5.2.2. Objective 2: Perceptions of highest risks and worry related to climate change and the future

Table 5.7 and 5.8 highlight the overall perceptions of highest risks and worry related to climate change expressed by both men and women in Lampung and South Sulawesi, respectively. A discussion of a summary, comparisons between Lampung and South Sulawesi, and intersections is presented at the end of this objective.

Lampung

Table 5-0-7 Summary of Perceptions of Risk and Worry related to Climate Change, Lampung

Men	Women
<ul style="list-style-type: none"> • Droughts to worsen / floods to worsen [with frequency and severity] • Cocoa pests and diseases to become more and more and ruin cocoa • Cocoa price goes down because of poor quality due to diseases • Problems [i.e., diseases, floods, poor yields, low prices] with other crops, such as coffee and coconut 	<ul style="list-style-type: none"> • Droughts to worsen / floods to get worse [with frequency and severity] • If the cocoa price drops more, that they cannot pay their children's school fees, and their children won't finish their education • Problems with coffee cherries dropping early and not knowing how to deal with this problem, and future problems with other important crops • <i>Paceklik</i> – directly translates to <i>famine</i> but describes as the time when incomes are little, savings are little, but the household has to spend a lot of money [always during the holidays, such as Eid; weddings, circumcision parties, other social parties]

In Lampung, both men and women were concerned about the increase in frequency and severity of droughts or floods in their respective villages. The men's concerns were crop-focused, such that the increase in floods or droughts would negatively affect the harvest, yields, and price received due to the influx of pests and diseases. While the women's concerns also focused on negative effects to crops (such as coffee), they expressed concern of how these lower crop yields and subsequent incomes would affect their children's future educational opportunities as well as household food security.

South Sulawesi

Table 5-0-8 Summary of Perceptions of Risk and Worry related to Climate Change, South Sulawesi

Men	Women
<ul style="list-style-type: none"> • River 'wall' to break and floods to never stop happening [or increasing with severity and frequency] • Cocoa pests and diseases to get worse and then the cocoa will die 	<ul style="list-style-type: none"> • Children to find work and finish their education • The floods to get worse and worse [with frequency and severity] • The floods ruining their vegetable gardens, forcing them to buy food at the local market, which is expensive to access

In South Sulawesi, while both men and women were concerned about the increased severity and frequency of floods, men were more concerned about its impact on the cocoa farms, whereas women were more worried about the indirect impact these changes would have on their children's future education and employment opportunities as well as the households' ability to sustain their food sources.

Summary, Comparisons, and Intersections

Across both Lampung and South Sulawesi sites, men and women articulated their concerns of climate change impacts differently, such that men were worried of flood, drought, or erratic rainfall affecting their harvests whereas women expressed worry of these impacts on their household wellbeing and children's future. Perceptions of worry tied to different impacts were place-specific, such that the areas prone to drought were more concerned with the potential effect of a longer drought than that of unexpected flooding during the rainy season.

Women in Lampung were concerned of these second-order effects of *peceklik*, when the households would have to budget to afford cultural ceremonies. The women in South Sulawesi did not similarly express this worry, highlighting a difference in how households prioritize their budgets in times of scarcity or shock. However, in South Sulawesi, the household vegetable gardens were not adapted to withstand shock from flooding, particularly unexpected and severe flooding, whereas the polybag gardens in Lampung have a stronger resilience to flooding. The women in South Sulawesi with home gardens were concerned about the future viability of these gardens with increased flooding, indicating a vulnerability to their household food security.

5.2.3. Objective 3: Perceptions of impact on household food security and health

Tables 5.9 – 5.12 present qualitative results for the perceptions of impact of climate change on household food security and health, for Lampung and South Sulawesi, respectively. A discussion of a summary, comparisons between Lampung and South Sulawesi, and intersections is presented at the end of this objective.

Lampung

Table 5-0-9 Perceptions of Impact of Climate Change on Food Security, Lampung

Men	Women
<ul style="list-style-type: none"> • During periods of intense rainfall, flooding or drought, the cocoa trees will always be negatively affected. When more pods are diseased and lower yields, farmers receive overall lower total net incomes from cocoa, which reduces how much money they have to buy food for their households. • Men discuss a loss of livestock during times of intense flooding [animals will be killed or washed away; participants indicate when this happens they have to “<i>give them up to god</i>” indicating these losses are out of their control]. 	<ul style="list-style-type: none"> • For those affected by floods, the women explain that floods destroy home gardens since they wipe away the “<i>small plants</i>”. To counter this, the women grow their home garden plants in large polybags, but this is not always effective in saving the home garden plants. • For those affected by droughts, the home gardens suffer from not enough water or from too much sun, which ruins the plants, as explained by women during the FGDs. • When the floods or increased rains bring more diseases to other crops, like cocoa, coffee or chili, for example, the harvests suffer. If they do not receive the same quality or price for their harvests, they lose money that they would otherwise need to spend on food products at the local market. • The women in Lampung did not have many barriers to reaching the local markets to purchase food if they needed to. The markets are not far away nor is there a cost other than for motorbike fuel to travel to the market. However, they do also rely on neighbors to share food items or support [via transport to the market] to make up for money or plants lost during floods.

Table 5-0-10 Perceptions of Impact of Climate Change on Human Health, Lampung

Men	Women
<ul style="list-style-type: none"> • All men participants cited that it was common to get sick during the periods throughout the year when the weather changes [i.e., when rainy season turns to dry and then back to rainy]. • In areas affected by drought (Pringsewu), men reported no changes in human health patterns of disease due to environmental changes. • In areas affected by floods, men participants cited an increase in diarrheal and flu-like diseases during times of increased flooding. 	<ul style="list-style-type: none"> • All women described it was common to get sick [coughing, nausea, headaches] when the weather changes throughout the year. • Women in areas affected by drought cited no changes in human disease patterns due to environmental changes. • Women in areas affected by drought did indicate an increase in flu-like sicknesses, especially among children, when the rains lasted too long and particularly during times after floods. • The floods can be dangerous for children as well.

South Sulawesi

Table 5-0-11 Perceptions of Impact of Climate Change on Food Security, South Sulawesi

Men	Women
<ul style="list-style-type: none"> • The floods destroy crops, lowering harvests, quality, and overall income to pay for necessary food items. Examples follow: • The increase in floods bring bugs [pests] and diseases to the cocoa farm, which reduces their quality and overall harvest, lowering their price. Although the men cite not having to worry about the household budget to pay for food, they worry that reducing cocoa money reduces the types of food they can eat. • The floods destroy the “perfume” plant (<i>neem</i>) because it is a small plant. The entire harvest is lost and they have to wait to plant again until next season. This is “<i>bad</i>” because this plant is easy for women to manage and brings a steady income. • During the <i>tsunami</i> floods, sometimes the women – if they are by themselves or the flood comes too quickly – cannot move the rice storage to a higher place quick enough, reducing their stored food. 	<ul style="list-style-type: none"> • The increase in floods [particularly the <i>tsunami</i> floods] wipe away vegetables grown in the home garden. These vegetables and food plants are managed by women and are considered ‘free food’ by women in the community. Women rely on these vegetables to supplement their daily diets, food preparation, and to barter with neighbors for other items [for example: one Ibu explained that when she has excess chili, she likes to trade chili for palm sugar with her neighbor that makes palm sugar at home.] • The floods “<i>wipe away neem</i> (patchouli), <i>totally it is gone</i>” which is a major source of income for the households in Lawewe. The floods, according to women, ruin corn crops too, but larger crops (like cocoa or banana) are affected but not destroyed. Patchouli money covers everyday needs like salt, oil, or gas money. • When home gardens are wiped out, women are forced to buy food products (mostly vegetables like chili, eggplant, peppers, etc.) at the market in <i>Lamasi</i>. To travel to <i>Lamasi</i>, one needs to go by motorbike (thus women must have their husbands take them) and pay the bridge toll each way (costing 25,000 IDR). Then they must buy the products at the market, spend half a day food shopping, and they can only carry so much to return. This travel is exhausting and expensive. Thus, women must be strategic for when and how to get to <i>Lamasi</i>, and what kinds of food to prioritize.

Table 5-0-12 Perceptions of Impact of Climate Change on Human Health, South Sulawesi

Men	Women
<ul style="list-style-type: none"> • Floods are increasingly dangerous, as some people who wash their motorcycles outside during floods have gotten caught in the rushing water and were ‘<i>washed away</i>’. • Increased in diarrheal, flu-like, and coughing diseases when the rains are too long or severe. 	<ul style="list-style-type: none"> • Women expressed an increase in diarrheal and flu-like diseases, especially among children, during times of increased flooding or rainfall. • Coughing sicknesses are common here and not associated with environmental changes. Mosquito-borne diseases are not found here [ex.: malaria, dengue, Japanese encephalitis, zika]. • Indirectly, women discussed when the floods are severe, and the harvests are lost or reduced, they have to cut down on the types of food they can eat. Sometimes, they only eat rice and maybe fish if they are lucky enough to catch fish. They notice that they, their husbands, and their children are the very tired during these periods because they do not have enough “<i>energy to do work and move about. We are bored at home and tired.</i>”

Summary, Comparisons, and Intersections

In both Lampung and South Sulawesi, men’s perceptions of impact of climate change on food security focuses on issues of lost harvest or livestock or physical danger, while women’s perceptions of impact of climate change on food security focused on issues related to loss or destruction of home gardens and incomes from lost harvest to purchase food and other necessary household items. During times when the home garden is destroyed, whether due to drought or flood, women would work collectively with other women in their social networks to share available food items or travel together to the market to purchase necessary items.

Both men and women expressed it is common to get sick throughout the year during periods of weather change (change of seasons), but systemic changes in health patterns were noticed. In response to drought, however, both men and women in Lampung perceived no changes in health patterns. In response to flooding and erratic rainfall patterns, men and women in Lampung and South Sulawesi both perceived an increase in diarrheal and flu-like diseases;

women described this further indicating that these were most common among children. Women in South Sulawesi highlight in times of environmental stress, they must restrict the household's quantity and quality of diet, inducing lethargy amongst household members. In Lampung, women also noted that floods were dangerous to young children's physical health whereas men noted that floods were dangerous to the physical health of other men and women in Lawewe.

We notice some differences in how participants in Lawewe versus Lampung describe the impacts of climate changes on health and food security. The intersections of socioeconomic class, physical geographic placement (of agricultural land and homestead), and climate help to understand these differences in health and food security vulnerability to climate change. In Lawewe specifically, men and women alike perceive changes in food security due to lower incomes due to pests and diseases and crop losses, and thus purchasing power. Men also note that *tsunami floods* result in the loss of food storage, exacerbating a household's food insecurity. In Lawewe, women are engaged in the agricultural sector and work on *neem* harvests, which produce essential sources of purchasing power. Since Lawewe households only diversify with essentially three major crops, unlike Lampung where a variety of crops are grown for sale, the loss of one crop is particularly devastating to households in Lawewe. Floods can destroy *neem* harvests, which eliminates women's only source of income-generating activity, as well as reduce a household's purchasing power if their own harvest is destroyed. The location of a *neem* farm is an essential predictor of its vulnerability, such that those at lower ground are particularly vulnerable to flooding. Additionally, Lawewe is further removed from the nearest market than are the village sites in Lampung. The added financial and time costs for women to travel to the market to purchase necessary food items when harvests and home gardens are destroyed is

sometimes unfeasible, requires strategic and collaborative planning, and exacerbates burdens and already reduced household purchasing powers.

5.2.4. Objective 4: Perceptions of impact on agricultural and income generating and labor activities

Tables 5.13 – 5.16 highlight the overall perceptions of climate change’s impact on agricultural and income generating activities across the qualitative samples in both Lampung and South Sulawesi, respectively. A discussion of a summary, comparisons between Lampung and South Sulawesi, and intersections is presented at the end of this objective.

Lampung

Table 5-0-13 Perceptions of impact of climate change on agricultural activities, Lampung

Men	Women
<ul style="list-style-type: none"> • Specific to cocoa, men cited the risk of increased rainfall and floods for damaging their harvests. The increased rainfall, specifically intense nightly rainfall, brings an influx of pests and diseases. And prolonged rainy seasons mean the cocoa trees do not receive enough sunlight, causing the pods to ‘rot’. • During periods of intensive flooding or intensive rainfall, the men could not travel to their farm to do daily maintenance tasks. If these periods lasted longer than a few days, the husbands would then attempt to travel to the farm to check on their trees, however this was not always feasible, and the plots would go unmaintained until the rainfall subsided. • Specific to coffee (a major secondary crop for this sample), the increased rainfall forced the coffee cherries to ‘drop early’ (meaning the cherries would fall from the bush before they were ripe). This was a major source of yield loss. • During floods, there is an increase in loss of livestock. But whatever is lost, the men describe this is “<i>up to god</i>” and thus out of their control. 	<ul style="list-style-type: none"> • Increased flooding washes away or ruins home gardens, ruining women’s crops and sources of food for the household. • Droughts make it harder to access water for the home garden, as women tend to source water during droughts from neighbors’ wells. • During periods of increased rainfall or flooding, women do not travel to the farm because it is dangerous, and they become bored at home. • Increased rainfall and floods bring pests and diseases to cocoa, coffee, and other crops. This reduces the volume of ‘high quality’ beans versus low quality beans that women can sell, affecting the price point of the beans. • Due to erratic rainfall, women are switching to sell wet cocoa beans for a lower price over dry cocoa beans because of the risk that the beans will become rotten if it rains while they are drying.

Table 5-0-14 Perceptions of impact of climate change on income-generating and labor activities, Lampung

Men	Women
<ul style="list-style-type: none"> • As harvests are negatively impacted, men are increasingly leaving their community to secure additional wage laborer jobs, mostly as construction workers in Bandar Lampung. • During periods of prolonged droughts, men cannot find work as an agricultural laborer, which used to be a common source of additional income that enabled them to stay close to home to maintain their own field. Now, they must always travel to the provincial city (Bandar Lampung) in search of construction labor. 	<ul style="list-style-type: none"> • As incomes are reduced during periods of intense rainfall, flooding, or prolonged droughts (i.e., lower and lesser quality harvests and reduced prices), women are increasingly migrating in search of additional income. This choice was greatly limited and variable across the qualitative sample as not all women were allowed to migrate or to work, regardless of the household’s economic situation (discussed in earlier section). However, all participants describe that more and more women from the villages are leaving in search of labor to other countries for several years at a time. • As described above, men are increasingly migrating away from the village, shifting household and agricultural labor divisions to women. The husband must ‘train’ his wife for how to take care of the different crops while he is away. • Domestic chores, such as drying clothes, take longer under periods of increased rainfall, increasing women’s time burden. • Women’s mobility is increasingly restricted under periods of intense rainfall or floods. They do not go to the farm to help their husbands, are restricted at home, and can participate in limited social activities, which is “<i>boring</i>”. • Women’s income activities, such as making candles or snacks, are already confined to the household. Women continue to partake in these activities, however getting their products to market can be a challenge during periods of floods as roads can be destroyed.

Table 5-0-15 Perceptions of impact of climate change on agricultural activities, South Sulawesi

Men	Women
<ul style="list-style-type: none"> • The increased rainfall and flooding bring pests and diseases to the cocoa farm, which kills the cocoa pods and trees. As explained by 5 men farmers on a cocoa farm, the rain disrupts the pests living in their homes and carries these pests to the cocoa trees, where then the pests find a new home in the tree and then transmit diseases or death onto the cocoa tree. For this reason, the farmers do not know how to stop the pests from choosing the cocoa tree, or how to prevent the rain from carrying the pests to the tree. This is their major concern with erratic and increased rainfall on agricultural activities. • During periods of intense flooding, the men farmers stay at home because they cannot travel to the farm. • When the flood is very high and occurs for a long period, the men will get in handmade boats (or directly from their house) to fish for household consumption. • When the rainfall and floods have reduced the harvest and incomes are low, the men go to the local river or streams with their sons to fish for household consumption. • The floods and heavy rains destroy patchouli and corn crops, but this is something that is “<i>up to god</i>” and they do not feel they can control this or prevent this. • During periods of heavy floods, the Mars buyer cannot drive on the [heavily damaged] roads to Lawewe to purchase the cocoa, so if farmers want to sell their cocoa during these periods, they have to drive by motorbike to the Mars collector about 1-hour motorbike drive away with their cocoa bags. • Men increasingly are hunting wild animals, like boars, for consumption or sale. Muslim men will sometimes share hunted pigs with Christian neighbors. They can sell boars at the local market for income. 	<ul style="list-style-type: none"> • During periods of increased flooding, women cite the worst impact is that home gardens are washed away and there is ‘<i>no way to stop this</i>’. • Any small livestock that women raise can be washed away in floods, especially the <i>tsunami floods</i>, because the women do not have enough time to find the animals and put them at the higher space within the household. • Women cannot go to the fields during times of flooding, so they are left “<i>bored</i>” at home with nothing to do. • When floods occur, the patchouli farms are destroyed for the entire season, leaving women with no patchouli to maintain or work on these farms for additional income. • Women in Lawewe indicate only selling wet cocoa beans, as opposed to dry beans, because “<i>with [the rain] and we never know when it starts or stops or could start again sometimes, it’s smarter to sell wet beans. That way, we don’t wait for them to be ruined and we get money quicker,</i>” as summarized by one Ibu during an in-depth interview.

Table 5-16 Perceptions of impact of climate change on income-generating and labor activities, South Sulawesi

Men	Women
<ul style="list-style-type: none"> • Men have to spend more time taking their wives to the market after their home gardens are destroyed so they can purchase household food products. • When harvests are affected by the intense and erratic rainfall and floods, the men indicate they must leave the community in search of other incomes. While not all men in the qualitative sample left, they all agreed that more men leave to search for income-generating jobs, either in the nearest cities (Belopa, Massamba, or Palopo) for construction or laborer work, or to Kalimantan for 6 months on illegal gold mining work. • Flooding from the <i>Rongkong</i> river brings an influx of “<i>paddy snakes</i>” and pythons. Men will kill the paddy snakes to eat at home, but they will capture the pythons in large polybags and sell them alive at the local market. The better condition the python skin is in, the higher the price they will receive for the python. This has been an increasingly larger source of income for households in Lawewe in the past 10 years. 	<ul style="list-style-type: none"> • When floods destroy patchouli farms in neighboring villages, women lose their only source of additional income-generating activities (other than selling SIM cards). • As the number of floods increase, women spend more and more time moving valuable items (like the television or rice cooker) to higher places in the household. • When home gardens are washed away, women spend more and more time traveling to the market to purchase food items. • Regular domestic chores, such as washing and drying clothes, take longer to complete when it is raining heavier and for longer periods. • Women lose their mobility during periods of floods or intense rainfall and are confined to their home, as it is dangerous for women to travel when it is raining or flooded. Women indicate they stay at home and ‘<i>make babies</i>’ when it is flooded since there is nothing else for them to do.

Summary, Comparisons, and Intersections

In summary, both in Lampung and South Sulawesi, men perceive impacts of climate change on agricultural activities in terms of the influx of pests and diseases the erratic and increased rainfall brings, for cocoa and other important crops, as well as the barriers to mobility to visit the farms. However, in South Sulawesi, increased flooding changes the ways in which men can engage with the Mars buyers, shifting selling responsibility from the women to the men, who have to drive cocoa bags for sell to the buyer one hour away via motorbike. Men also hunt wild animals for additional sources of consumption, income, or community building.

In both Lampung and South Sulawesi, women discuss impacts on agricultural activities in terms of erratic rainfall as well as prolonged droughts (in Lampung), citing impacts on mobility, loss of yield quality, and loss of incomes. In South Sulawesi specifically, women highlight the negative impacts of *tsunami flooding* on home gardens, *neem* crops, and other

agricultural activities as well. The *neem* crops in South Sulawesi are particularly important for purchasing power and women's contribution to household income, leaving these households particularly vulnerable to impacts of flooding. In Lampung, women still sell cocoa beans dry but are increasingly choosing to sell the beans wet to withstand from potential losses due to erratic rainfall patterns. Whereas in South Sulawesi, women are already selling their cocoa beans wet because although they receive lower prices, it reduces the risk of losing the drying beans and subsequent income.

With regard to income-generating activities, men in Lampung and South Sulawesi describe these impacts in terms of shifting responsibilities. As harvests decline, men seek alternative labor activities, such as wage laborer jobs in nearby towns (Bandar Lampung for those in Lampung, Belopa, Masamba or Palopo for those in Lawewe) or in other provinces. Prior to drought-induced harvest declines in Lampung, men used to easily find work as an agricultural laborer in nearby villages; however, with the prolonged drought seasons, men in Purwodadi cite agricultural laborer jobs very hard to find and must travel the several hours to Bandar Lampung in search of laborer jobs, shifting agricultural responsibilities to women or younger men within the household. Men in South Sulawesi are increasingly migrating to Kalimantan for 6 months for illegal mining work, shifting all household and labor tasks to the women in their household.

Women describe these impacts in terms of shifting mobility, such that while some women are leaving Indonesia in search of domestic labor jobs, others are further restricted (and "bored") within their household. Women in Lawewe increasingly lose their source of income-generating activities tied to the *neem* harvest and since they are too far from local markets, they struggle to find alternative methods of income generation. Whereas in Lampung, women have

increasingly sought and developed alternative income-generating activities within these bounds of restricted mobility, such as creating sewing businesses or making snacks.

5.3 Research Question 3: *What strategies do men and women within small-scale producing households employ to adapt to impact of climate change?*

5.3.1. Objective 1: Perceptions, accessibility, and utilization of available resources

Qualitative data were collected in Lampung and South Sulawesi to understand how men and women utilize accessible resources to adapt to impacts of climate change. Tables 5.17 and 5.18 present the overall emergent themes for men and women, respectively, with regard to what resources they relied on to adapt. Across the qualitative samples, men and women have different access to various resources available to them. This research objective highlights the different resources available to men and women, and the following research objective describes how men and women utilize these resources to employ adaptive strategies. A discussion of a summary, comparisons between Lampung and South Sulawesi, and intersections is presented at the end of this objective.

Lampung

Table 5-0-17 Perceptions, accessibility, and utilization of available resources, Lampung

Men	Women
<ul style="list-style-type: none"> • Mobility • Farmer group • CocoaLife • Education • Credit • Access to weather information via television or radio 	<ul style="list-style-type: none"> • Restricted mobility • Social networks and community groups • Budget Management • Women’s farmer group [if part of] • (Lack of) education • Access to weather information via television or radio

Men and women have different mobility access in the public sphere. Men operate in the public sphere and do not have restrictions to engage in public activities, such as searching for labor outside of the community. Muslim women have restricted mobilities, such that to leave their household they need their husbands' permission, and culturally they are not able to leave the community without being accompanied by their husbands. Christian women do not have the same religious restrictions to their mobility but are still tied to their household and reproductive labor tasks. Some women broke gender norms to leave Indonesia in search for labor opportunities, however this was highly stigmatized.

Men and women both relied on established farmer groups to access information, experimentation, inputs, and trainings. Men were able to join established farmer groups, where they receive fertilizers, information on pests and diseases, price information, and engage with each other to learn from one another's experience. Men had access to trainings from CocoaLife on cocoa production. Not all men participated in farmer groups as some indicated not seeing the benefit or suggested political reasons against their participation. These dynamics would require further research to better understand the politics of participation. Women's farmer groups were newly established and were not as prevalent compared to men's farmer groups. Women who did participate in the farmer group had access to livelihood trainings from CocoaLife and Save the Children, such as building home gardens in polybags and learning candle-making.

Both men and women indicated that they did not feel comfortable asking questions about issues related to other crops (banana, coconut, coffee, chili, etc) to the CocoaLife extension agents during their trainings, as they felt they could only ask questions about cocoa. However, intercropping is an important and encouraged climate-smart agriculture practice to support successful and sustainable cocoa growth. Farmers indicated that they had no one to ask about

issues relating to these other crops, and if there was a problem, they would either ask their neighbor (maybe), try to solve it themselves (usually just by spraying a pesticide), or let it die. There should be a mechanism established that farmers can ask questions about these other crops as their success translates into success for cocoa and household wellbeing as well. For example, intercropping not only improves cocoa production, but can provide additional sources of income and resource diversification, and if households can generate additional incomes from intercrops, they have more money to reinvest in cocoa production via inputs, labor, tools, and others.

Women heavily relied on built informal social networks for information sharing and support. Women received price information for any crops sold from neighbors or the buyers themselves. For one example, a group of women shared during an FGD that,

“[we] see each other or visit when we are outside and we ask ‘What did the tengkulak tell you today? What is the price?’ and then we see their cocoa beans if they are healthy and we can know that way the price”.

One Ibu explained that when she sees problems with her chili plants or does not know what to do about certain diseases on other plants, she will ask her neighbors if they have the same problem and *“what their experimentation was [to fix the problem]. If [their experimentation] worked, we will follow. Listening to neighbors is better because they are here and they have same problems”*. Women rely on social networks to share price information, share strategies they learn from trainings or their husbands (such as growing certain vegetables together in a home garden), and to gossip or talk about happenings within the community. Women also rely on their social networks and community groups to support each other. *Arisan* provides an opportunity for the women to gather, share food and ideas, and also participate in a rotational savings group. Women across the qualitative sample cite this as extremely important source of credit upon

which they can rely in times of stress (when their food storage ran out and they need to purchase foods), or for them to start a small business. Across the qualitative sample, men do not cite relying on similar social networks for support, except for the farmer group, as described above. Men can receive formal loans at a bank, but often do not because they do not have enough collateral to leverage. Instead, men acquire informal loans from other male family members or neighbors.

Across the qualitative samples, the theme of education, and specifically the ability to learn, was frequently cited. For example, men frequently explained that grafting was a new learned technique from CocoaLife trainings to improve their cocoa farms. The technique requires basic knowledge and no unique tools other than grafting tape to accomplish. However, women repeatedly explained that grafting was “*too technical*” for them. One Ibu explained that “*grafting is too technical, it is men’s knowledge. Pak went to school longer, he is better with technical and tells me what to do, but not grafting, that’s for him*”. This highlights perceptions of knowledge and ability to learn, which women perceive having less of than men. However, a few women who are part of the women farmer group explained during the FGD in Pringsewu that the CocoaLife trainings are so important because they mimic formal education.

As women manage the household budget – all incomes generated by men and women – they rely on strategic decision-making for how to best allocate the total budget. As described under Research Question 1, although women do not have full autonomy with decision-making within the household should her husband have an opinion, she does make the daily decisions about budget and food provisioning. Therefore, women rely on these strategic decisions as part of a suite of techniques to respond to impacts due to climate change and other environmental stressors.

Both men and women across Lampung rely on weather information from the television or radio. Men and women would watch TV together in the late afternoon and evening, when telecasters present the forecast for the next day. Here, both men and women had the same source and access to weather information, however this was dependent on if the household had a functioning television or radio. If they did not, they relied on traditional knowledge or information from their neighbors. Older couples represented this latter group across the qualitative sample. As one Pak explained, weather information is,

“more important to [men] because [men] go to the farm and the farm relies on weather for the crops to grow, so weather is important for us to know for each day. I go to bed after I hear the weather for tomorrow. Women, they stay at home so if it rains or does not, women can be in shelter, but I think [my wife] likes to know the weather too”.

This quote summarizes how men generally describe the importance of weather information. But women indicated weather information was also very important for them to understand because they have to dry the cocoa beans, dry clothing, and care for their children.

South Sulawesi

Table 5-0-18 Perceptions, accessibility, and utilization of available resources, South Sulawesi

Men	Women
<ul style="list-style-type: none"> • Mobility • Alternative livelihood activities • Mars’ farmer group training and supports • Access to weather information from television • Credit 	<ul style="list-style-type: none"> • Reliance on community and social networks (sharing) • Mobility • Credit • Mars trainings • Access to weather information from television

Men in Lawewe rely on their mobility to migrate to Kalimantan in search of illegal mining work to supplement their income during times of low or poor harvest. If they owned a

motorbike and smart-phone, men also would sometimes work as a Go-Jek driver. Women in Lawewe do not migrate to other countries in search of domestic labor. They will travel to other villages to work as agricultural laborers on *neem* farms during the season (every 3-4 months). However sometimes this opportunity is not always available if floods destroy the neighboring *neem* farms, or floods restrict women's ability to leave the village. During times of intense flooding – both husbands and wife stay at home all day with “*nothing to do*”. They live off of their stored food and stay in the higher space in their house (if they have one, or they stay at their neighbors' house if it is elevated) while they wait for the water to recede.

During times if the food storage is ruined, or if home gardens are destroyed, women rely on their social networks to share food and necessary items. Social supports are essential in Lawewe, as one Ibu explained,

“we have to share, we are poor, [the whole community] is poor but we are happy, because we help each other. If I lose all my rice, my neighbor sends me a pot of rice. Later when I have chili for sambal and she does not have any, I send her a pot of rice and chilis. It's like that here...to survive”.

Women also participate in *KH* group (“their *arisan*”), which also operates like a rotational savings group. Through the *KH*, they have access to small lines of credit to purchase necessary food or household items, or as a small investment to start a small shop. Employment opportunities are minimal for women in Lawewe; only a few women sold SIM/data cards for mobile phones as a source of additional income. Men in Lawewe do not usually access credit, however if they need to access credit to invest in a large purchase (repair the motorbike or buy new tools for the farm), they generally request informal loans from neighbors or family.

There is no farmer group for women in Lawewe, however, as described by one Ibu, “*I would definitely join if a farmer group happened here, we need trainings*”. Women were encouraged and invited to attend the Mars’ cocoa trainings for the men’s farmer group if they were available. Often, women would only go to the training if her husband could not attend. Mars did conduct several trainings for how to grow vegetables in home gardens, which women cited as extremely important for their household and wellbeing. The home gardens “*saves money, time, and has food right there. I don’t have to go all the way to Lamasi [market] for chilis when I can tell my son to pick them out front for me,*” as explained by one Ibu.

Men rely heavily on the information, supports, and inputs received from the men’s farmer group and associated trainings from Mars. Through the farmer group, they have access to government subsidized fertilizer and other inputs, can share information and help each other growing cocoa, learn new maintenance and propagation techniques through trainings, receive price information, have access to seedlings and cuttings, and new market options.

In response to impacts due to climate change, men in Lawewe indicated spending more time on diversified livelihood activities and opportunities that arose with these changes. For one example, as floods increased with length and severity, men started fashioning small boats that they store at their homestead. During the flood, men would go out on boats and fish for household consumption. Alternatively, when the floods recede, an influx of pythons and black paddy snacks are found, which can be exploited for additional sources of food and incomes.

Both men and women in Lawewe rely on weather information from the television or radio. Men and women would watch TV together in the late afternoon and evening, when telecasters present the forecast for the next day. Both men and women had the same source and access to weather information, however this was dependent on if the household had a functioning

television or radio. If they did not, they relied on traditional knowledge or information from their neighbors. Both men and women indicate it is important to know what the weather will be like for the next day as it affects their respective activities.

Summary, Comparisons, and Intersections

In summary, men and women in both Lampung and South Sulawesi have access and ability to access different resources to rely on to build adaptive strategies, however, overall compared to Lampung, those in Lawewe had limited opportunities and resources to leverage. In both Lampung and South Sulawesi, men and women garnered weather forecast information from either the television or radio, and if neither of these were accessible, they would rely on traditional knowledge. It is important to note that these farmers relied on immediate, next-day forecasts to know how to prepare for the following day's activities and relied on traditional knowledge for long-term forecasting. In Lampung, men indicated that while both men and women learn the weather information, it is really only important for men as they occupy their time in the field and the weather doesn't affect the women's responsibilities. Women disagree with this sentiment indicating that the weather predicts the time it will take to finish certain activities and determines whether or not they can do other activities, like go to the farm. In this case, households in higher socioeconomic classes (to be able to afford assets such as a functioning television or radio) have an advantage to predicting the following day's forecast and can make risk-reducing decisions around this forecast.

Education (or the lack thereof) is an important resource upon which men and women in Lampung rely. However, education was not a prominent resource or hindrance mentioned

amongst the qualitative sample in Lawewe. This education is translated both into formal education at school as well as informal education on cocoa or crop production, as suggested by the many women who indicated that they could not do what their husbands did on the cocoa farm because they did not attend trainings. However, the example of grafting as a technical practice highlights a lack of confidence and self-doubt in women's own capabilities, particularly as several women explained that this practice was beyond their intellectual capacities. Informal field trainings, on cocoa and other crops or livelihood activities, can serve as a proxy to formal education and improve women's confidence in their own capabilities.

Farmer groups are a key source of access to very important resources for improving cocoa production as well as household wellbeing. Men in both Lawewe and Lampung have access to a registered farmer's group, however this is only available to some women (albeit growing) in Lampung and none in Lawewe. In addition to women lacking access to this important resource, further research is required to better understand the politics of participation in farmer groups and particularly, the politics of non-participation.

To this point, while many women do not engage in established farmer groups, they all rely on informal social networks as an extremely important source of access to resources in both Lampung and Lawewe. The informal network centered around *arisan* (Lampung) and KH (Lawewe) serve to enable women to engage with one another socially, share information, and rely on one another as a source of credit or small loans via the rotational savings. In Lawewe, given the remoteness of the village, women relied on their informal community network to barter and share important resources with one another. As one woman highlighted, if she had excess chilis, she could trade chilis with her neighbor for salt (or any other needed and available item) and could return the favor with interest. These informal networks are critical for household food

security and wellbeing. The results from this research study suggest that they operate gender segregated, but further research is required to better understand how these social networks operate.

In both areas, mobility and alternative livelihood activities are critical resources upon which both men and women rely, albeit to differing degrees and capacities. Muslim women in Lampung are more restricted in their mobility and ability to engage in alternative livelihood activities due to religious and social norms. Whereas Muslim women in Lawewe are not restricted in the same way, as they would be able to leave the household to engage in income-generating activities but have restricted access to opportunity due to geographic limitations.

5.3.2. Objective 2: Specific strategies used to adapt to impacts of climate change

Men and women employed different strategies to adapt to impacts of climate change. These are summarized in Tables 5.19 and 5.20 for Lampung and South Sulawesi, respectively. A discussion of a summary, comparisons between Lampung and South Sulawesi, and intersections is presented at the end of this objective.

Lampung

Table 5-0-19 Adaptation Strategies Employed, Lampung

Men	Women
<ul style="list-style-type: none"> • Increase income and diversify sources • Improved agricultural techniques • Agricultural conversion • Up to God 	<ul style="list-style-type: none"> • Increase income and diversify sources • Improved agricultural techniques • Agricultural conversion • Prevention activities • Reliance on neighbors • Up to God

Several strategies for adapting to perceived impacts of climate change were reported across the qualitative sample in Lampung. Men and women employed different strategies based on their access to resources.

Increasing and diversifying sources of income was a common strategy employed by both men and women in the Lampung qualitative sample. However, the ways in which men and women responded were different given restrictions on mobility. Men would increasingly migrate in search of construction, agricultural laborer, or off-farm labor activities when harvests and incomes would decline. Men migrated to the provincial city (Bandar Lampung) or other towns in search of off-farm and agricultural labor opportunities. For men who owned a motorbike and a smart-phone, it was common to become a Go-Jek [similar to Uber] driver in the nearby towns to earn additional incomes. Women either increasingly participated in income-generating activities within the household (making snacks, candles, or soaps) or emigrated abroad for domestic work. Although fairly stigmatized due to cultural and religious ideations for an ideal woman, an increasing number of women are emigrating to Malaysia, Middle East (Saudi Arabia, Qatar, UAE) or China to work as a domestic care taker for months or years at a time. This earns the household a lot of money, and leaves domestic care work to the husbands, or more likely, the daughters within the household. Further research is required to understand how migration impacts empowerment and time burden indicators for those left within the household.

Across Lampung, women's migration is highly stigmatized, as several participants referred to households where the wife migrated, and categorically spoke poorly of the husbands. For example, one Ibu referred to her male neighbor whose wife emigrated, saying he "*can't provide enough for his family...what kind of man can allow that...shame*". One male participant said he forbade his wife to go abroad to work even though she begged him to go to earn income;

another male participant's wife was in Qatar working at the time of the interview, and he said he was really reluctant to let her go because he was concerned what people would say about them, but she insisted and "*she's sending back a lot of money for us here, she is keeping our household alive*".

Another strategy employed by both men and women was overall crop conversion. Both men and women explained they were changing their cocoa farm to other crops, such as chili and rubber, where they would see higher incomes and easier labor, as the cocoa harvests continue to decline. In Lampung, several men participants indicated it was too much work to keep up the cocoa field for not enough pay-off as the labor needed was intense, whereas women indicated that they wanted to switch because the money has decreased so significantly. All cocoa farmers across the Lampung qualitative sample reflected back to the 'cocoa golden years' when the production was "*booming*" without much additional inputs. Many farmers indicated that cocoa yields built their houses, put their kids through college, paid for new motorbikes, and provided them a comfortable life. The current cocoa harvests were not meeting expectations.

Other farmers who did not intend to convert their farm relied on learned practices to improve their cocoa production. They recognized the need to replant their farms due to the age of their current trees. Men used new techniques (such as grafting) to improve their cocoa farm, as well as prioritized investing in fertilizers, pesticides (*obats*), new trees, and improved varieties. Many women indicated they learned how to make compost to improve their household garden soil and expressed interest in learning other techniques to make different kinds of fertilizers that would be useful to cocoa and other crop production.

Specifically, for cocoa, women in Lampung cited several strategies employed to prevent damage or harvest loss due to erratic rainfall. Women are responsible for drying the beans once

they separate the beans for quality control. Erratic rainfall makes it increasingly unpredictable to leave the beans out to dry, so as one Ibu indicated, *“if there are a lot of beans to dry, I won’t leave them outside to dry in fear that they will lose all of them if it starts raining”*. However, if it is a small amount of beans, women will more likely dry these outside if they are staying home all day. Women have to stay closer to home for the beans when they are drying because they cannot *“trust the rainfall anymore”*. Further, women indicated that they much prefer to sell the beans wet for a much less price because it reduces the risk of losing all the beans. They indicate that it is easier to sell to the middle man/neighbor buyer and *“let him deal with the rainfall”* [to dry the beans]. The middle man/neighbor buyer (*tengkulak*) prefers to buy wet beans because he gets a better deal, since he can sell the beans for a much higher price once they’re dried and he will dry beans in bulk. Selling wet beans yields a significantly less price than dried beans, and wet beans are more subjective to different weighing measurements and thus, overall price. Although many women described that wet beans are better because they’re heavier than dried beans, so they get a higher price; however, when speaking with a local collector, he preferred wet beans because he can *“use my own scale and pay by my scale”*. Selling wet beans reduces risk of losing all beans due to rainfall but is not necessarily a more effective leverage for negotiation.

Both women and men rely on their social networks for support and resources during periods of stress. For example, all households either have a well or have a neighbor with a well. In Pringsewu, the participants cited having no issues in accessing water for household or agricultural needs during periods of drought because they can rely on their neighbors to access their wells for water and would allow their neighbors to use their wells if needed. Women engaged in community prevention strategies as well. For example, in Pesawaran, the women’s farmer group organized other women in the community to procure seedlings from the local

government and plant trees along the river to prevent soil erosion and reduce long term flooding impacts.

Finally, the most common theme that environmental changes were ‘*up to god*’, and thus there was little or nothing to do. As one woman explained, “*We can’t change anything because god causes these. Maybe we can pray more.*”

South Sulawesi

Table 5-0-20 Adaptation Strategies Employed, South Sulawesi

Men	Women
<ul style="list-style-type: none"> • Increase income and diversify sources • Improved agricultural techniques • Prevention activities • Up to God 	<ul style="list-style-type: none"> • Increase income and diversify sources • Prevention activities • Reliance on neighbors • Up to God

Men in Lawewe would increase and diversify their income sources by taking illegal mining jobs in Kalimantan to supplement the household income, specifically because the cocoa income was drastically decreasing or becoming unreliable due to floods, increased pests and diseases, and old age. The husband leaves for at least 6 months and departs after the cocoa harvest season, which leaves women to tend and care for the entire cocoa field until the next harvest. Usually, women do not have a supplemental income to hire labor to care for the cocoa farm. If the cocoa farm is far from the house, women will leave the cocoa farm unattended while their husband is gone. Women cannot drive motorbikes because it is ‘*unsafe*’ and cannot travel too far without her husband, so the distance of the cocoa farm to the house is a determining factor for how the farm is maintained. Two women in the qualitative sample would not visit the cocoa farm and noticed that the cocoa field continued to decrease in quality and health after their husbands had returned.

Men engaged in other income generating activities, such as driving Go-Jek or localized off-farm labor opportunities. Women would travel to neighboring villages to work as a *neem* harvester for additional incomes. The influx of pythons and paddy snakes provide men in Lawewe a new income opportunity. Men usually kill the paddy snakes because they are dangerous but will capture the pythons in large polybags and sell them at the *Lamasi* market for a high price. Several men in the qualitative sample explained that they are receiving higher proportions of their incomes from selling pythons than before because of the floods. Additionally, men increasingly hunt wild boar and other animals to keep them from grazing their crops as well as an additional food source for non-Muslim households.

While participants in Lawewe engaged in improved agricultural techniques, they did not indicate a desire to convert their cocoa farms. Despite challenges, their cocoa farms were improving, according to participants. Men learned different agricultural techniques, like pruning, grafting, and relying on compost to maintain the quality of their farms. There was little information on cocoa pests and diseases, which the men desired more training for how to identify and prevent the diseases from spreading. Women cite only selling wet cocoa beans despite the lower prices because it is too risky with the rainfall and floods, that “*it is better for us to always know we get a small income every week from cocoa, rather than maybe a little higher because they are dry*” as explained by one Ibu during the FGD.

Women engage in prevention activities to reduce the impact of flooding on their household assets and food storage. For example, depending if the flood is expected or unexpected and if the husbands are in field, it is the women’s responsibility to move all valuables into the higher space to avoid destruction from the flood. If traditional knowledge predicts a

flood, men and women will work together to move the items higher; however, the *tsunami floods* leave this responsibility to the women at home.

During times of stress, in their role as budget managers, women employ strategic decision-making to conserve finances to ensure households meet their daily needs. The most important items to save for are food (rice, vegetables), children's school fees, and fuel for the motorbike. Depending on how dire the situation is, women will not give their husbands budgets to purchase cigarettes or agricultural investments. Food allocation changes as well; although quantities of food never change, the type of food consumed does such that women will stop buying 'luxury items' such as oil, salt, and sugar to conserve money for the essential foods (rice, vegetables). Women employ strategic decision making with regard to budget conservation and food allocation during times of environmental stress.

Finally, the most common theme that environmental changes were '*up to god*', and thus there was little or nothing to do other than wait and pray. When the floods happened, both women and men indicate they have nothing to do other than "*stay at home, be bored, talk, make babies, sleep... what else can you do?*".

Summary, Comparisons, and Intersections

In summary, both men and women in Lampung and Lawewe leverage different resources to employ adaptation strategies in response to systematic environmental changes. An overarching theme veiling all strategies is a consistent express of a lack of agency. A participant, male or female, would explain different strategies or ways to adapt to these changing environmental conditions, but when they fail to adapt or at the end of their explanation, the caveat of "but it's

up to god” is always included. Both men and women couch their view of how they can make small changes, but ultimately, they do not have agency over total adaptation or prevention of loss (income, crop, livestock, etc) due to these environmental changes.

However, in both Lampung and South Sulawesi, different adaptation strategies are employed to respond to these environmental shocks. Women in both Lampung and Lawewe indicate changes in decision-making patterns related to household budget management, although these strategies were more employed in Lawewe, where the socioeconomic status of households on average is lower than that in Lampung. To this extent, women in both Lampung and Lawewe indicate a heavy reliance on neighbors, but this is more salient in Lawewe, where informal social networks and bartering were essential to maintaining household food security particularly during times of stress.

Diversifying and increasing income-generating activities is another strategy employed by men and women, however to restrictions as described above. In Lawewe, men typically adapt by engaging in fishing, hunting, or seasonal migration activities, whereas Muslim women in Lampung might start a small business from their household, enabling them to both earn a small income while staying within the household (mobility restriction).

Finally, we see that in Lampung, men and women are adapting their cocoa crops entirely to convert this labor-intensive crop to less labor-intensive and more profitable crops, such as rubber. However, men were focused on the labor inputs whereas women were focused on the economic outputs to inform their decision to convert their farms. In South Sulawesi, cocoa farms were faring well compared to their other crops and farmers weighed the factor of Mars’ support in wanting to maintain their cocoa farms. Lawewe cocoa farmers adapted to improve their cocoa farms by alterative practices, but not conversion.

Chapter 6. Discussions, Recommendations, and Conclusion

This research study was designed to explore the gender dynamics of small-scale cocoa production in the face of anthropogenic climate change across two provinces in Indonesia, Lampung and South Sulawesi. A mix of multi-qualitative and quantitative methods are presented to inform the context in which men and women in small-scale cocoa producing households divide labor activities, as well as perceive and respond to impacts of climate change.

This chapter presents findings and implications for the three respective research questions, discussing the overall results and major findings from each. This section highlights major differences between the Lampung and South Sulawesi research sites as well. Policy and programming recommendations are then presented, based on the findings of this research study. Suggestions for research questions requiring further inquiry stemming from this study are then presented. And the final section presents a conclusion to this research study.

Findings and Implications for Understanding Gender Roles in Small-Scale Cocoa Producing Households

Gender roles and relations in Indonesia are closely bound to ethnic and religious norms (Tickaymer & Kusujarti 2012). Consistent with literature (Atker et al 2017; Huang 2017; Mishra et al 2017), the time allocation and division of labor results indicate that women spend their average daily time on a diversity of unpaid labor tasks, such as childcare, household chores, food preparation, and managing home gardens, while engaging in agricultural labor activities and occasionally income-generating tasks. In Lampung, where a majority of households are Javanese, women ascribe to their divinely inspired gender norms, whereas these norms are not as strictly binding in Lawewe, a primarily Bugis community. Muslim women in Lampung have

more restrictions in securing income-generating activities in Lampung due to these social and gender norms compared to Christian women, which dictate that women must obtain her husband's permission to leave the household or engage in the public sphere. The masculine identity of a Muslim man is closely tied to his ability to provide for and protect his wife and family, therefore a woman working or operating in the public sphere creates a threat to this identity. He also has ownership of his wife, unlike in Christian households. However, with increased negative impacts of climate change and environmental stress on households' wellbeing, some men and women are renegotiating these gender norms to allow women to engage in the public sphere to earn additional incomes for their households. Whereas others are not renegotiating these norms, and women stay at home "*bored*" while the men must find additional sources of income to support their households.

However, we see that Muslim women in South Sulawesi were not primarily restricted in engaging in income-generating activities due to social and gender norms, but rather due to geographic isolation and lack of opportunity. Increasing impacts of climate change – primarily flooding – further exacerbated women in Lawewe's lack of available opportunity to secure additional income by destroying patchouli farms. Social and gender norms restrict women's mobility in Lawewe, however, in that women cannot drive motorbikes and are thus limited to opportunities within the village or surrounding area.

Men spend the majority of their time on agricultural labor, and occasionally engaging in additional off-farm labor activities. Both men and women expressed that the women's role is to maintain the household, while supporting their husbands; however, women consistently expressed their desire to support their husbands by contributing to the household income,

whereas men expressed their support via help with agricultural activities or staying within the household.

In both Lampung and South Sulawesi, although the cocoa farm is considered under the man's domain (except in cases across Lampung when women managed the cocoa farm and the husbands were employed in other labor activities), women contribute a considerable amount of labor to household cocoa production. While women contribute to all aspects of cocoa production in the form of unpaid labor, women are uniquely in charge of separating the beans, determining quality of each bean (separating which ones should be sold to local markets and which to the higher quality buyers – either CocoaLife/OLAM or Mars), drying the beans (if dried), and negotiating prices. As harvests continue to decline and husbands increasingly migrate in search of occasional or seasonal labor opportunities, women assume additional responsibilities particular to the maintenance and care of agricultural resources on top of her daily household tasks and income-generating activities. This places an excess burden on women's time (ABD 2017), and potentially can shift domestic responsibilities onto others within the household, primarily older girl children. We see only in Lampung that women are increasingly migrating abroad in search of labor activities, increasing the responsibilities of the man left at home, which often these domestic tasks are shifted to the eldest daughter or mother-in-law. We do not see women in South Sulawesi migrating abroad in search of domestic labor.

In both Lampung and South Sulawesi, women interviewed would indicate that they themselves were not farmers nor experts, reflecting a lack of confidence in their knowledge and expertise on the cocoa farm. This usually was shared after a one to two-hour long interview where these women would demonstrate their knowledge about cocoa production, quality control, and disease identification in detail. This consistent theme suggested a lack of confidence in their

own expertise in cocoa production and activities outside of the household and ascribed gender norms. However, several (but not all) women who were part of a farmer's group did indicate that they themselves were also knowledgeable about cocoa and other crop production and would contribute to household decision making around these agricultural activities. This finding suggests that trainings and farmer group participation may increase women's self-confidence and self-reported knowledge of agricultural activities (Vijayalakshmi et al 2010).

Consistent with literature (Atker et al 2017; Booth 2016; Mason & Agan 2015; Mishra et al 2017), this research finds that women in both samples manage the household budgets and participate in budget decision-making. While the final decision is generally the man's, women leverage negotiation power to influence these decisions. For example, men explained that they made the decision, but their wives always brought convincing "*research*" to her argument for her choice, with which the husbands said they agree occasionally. To understand the full extent to which women employ overt or covert negotiation strategies to influence household decision making, further research is required. However, this research overall suggests that women do participate in household decision making, particularly with regard to allocating the household budget making sure all necessary expenses are met. Additionally, women have a strong influence in deciding where to sell the cocoa harvest based on quality as is her role to separate beans based on quality and negotiate the prices with each respective seller.

As discussed in the prior chapter, household decision making patterns are dependent on religious and cultural influences. While this research presents exploratory qualitative insights into these differences, further research integrating an intersectional approach is required to understand how different patterns of decision-making manifest across religious or ethnic

identities, and how these patterns influence gender equality and empowerment indicators in general, and in the face of climate change.

Community participation and social networks are critical resources upon which men and women in both study sites rely, however community groups and social networks are gender segregated. Religious activities and groups are most important to village life in Lampung and South Sulawesi, where men and women are able to build strong and weak ties with others (of the same sex) throughout the village (Granovetter 1973). Men and women utilize their social networks for different purposes, such that women prioritize their networks to take informal small loans, share important information related to the community, neighbors, and livelihood and cocoa (and agricultural) activities, childcare, share resources, and barter to withstand environmental and economic shocks. Men prioritize their social networks to share information and experiment results for agricultural purposes, share important resources such as modes of transport and tools, learn new information, and assist in community decision-making and activities. The women farmer group in Lampung is an important additional resource and venue in which women can gain skills, learn from one another, socialize, and build their network. Women in Lampung rely on *arisan* as an important source of credit available to them, whereas women in South Sulawesi rely on KH, a similar group to *arisan*. As Lawewe is much more remote than the villages in Lampung, the women in Lawewe rely on their informal social networks to barter and leverage resources during time of environmental and economic stress. Men in Lampung and South Sulawesi rely on the skills, information, inputs, and trainings received at the established farmer group to maintain the quality and viability of their cocoa crops. Further research is required to understand how those who do not participate in established farmer groups accommodate this important resource.

Results from Research Question 1 indicate that women contribute a considerable amount of physical labor to small-scale cocoa production, while maintaining responsibilities for a wide diversity of unpaid and paid labor activities. Women's mobility and household decision-making influence is varied and dependent on religious and ethnic norms that shape the ways in which different women can leverage resources and build capacities to respond to increasing episodes of environmental and economic stress. Further intersectional research is required to explore these patterns more in-depth.

Findings and Implications for Understanding Men and Women Small Scale Cocoa Farmers' Perceptions of Causes and Impacts of Climate Change

In summary, these results suggest that while the technical term *climate change* is not well understood across the qualitative samples in both Lampung and South Sulawesi, systematic environmental changes were noticed, described, and felt across both samples. In Lampung, these changes are described in terms of changing rainfall patterns and subsequent effects, such as drought or flooding, whereas in South Sulawesi these changes were described primarily in terms of increased incidence, severity, and type of flooding. While participants across both qualitative samples speculated as to potential causes of these environmental changes, ultimately the most consistent and agreed upon theme from both sites were that these changes were *up to god* and thus, outside the confines of human's ability to influence or change. There existed a tension between this expressed lack of agency yet direct mobilization to effect change to mitigate and adapt to these changing environmental conditions. Community groups were lobbying the local government to plant trees to combat river bank erosion, while others were wanting to depollute the river beds.

Men expressed concern about these environmental changes in terms of impact on agricultural production, such that they worried the changing rainfall patterns (and subsequent droughts or floods) would cause an influx of pests and diseases, lowering their cocoa (and other crop) yields and prices. While women also expressed concern over negative impacts to crops, their focus remained on the decline in incomes or destroyed home gardens and the subsequent effects, such as not enough money for their children's school fees or the ability afford or acquire necessary household needs, such as food or fuel.

In Lampung, described impacts of climate change on human health and food security differed between men and women, such that while men and women both identified systematic changes in disease patterns during periods of erratic rainfall, women described these changes in terms of children's health whereas men focused on overall health. Women describe impacts on food security mainly focused on destroyed home gardens and the accessible food source they provide, as well as lost harvest incomes to purchase necessary food items, whereas men focus on lost harvests incomes for purchasing power and lost livestock during floods. In South Sulawesi, both men and women identify a change in disease patterns in response to increased rainfall and flooding. Men describe impacts on food security focused on loss of purchasing power and food storage, whereas women also focus on loss of purchasing power but loss of readily available vegetables and food items from home gardens as well, highlighting the addition burden of securing food when readily available sources are destroyed. Women attribute to this loss of home gardens to the resulting lethargy for all household members during times of severe flooding, as restrictive food choices must be made.

Finally, participants describe the impacts of climate change on agricultural and income generating and labor activities. Across both sites in Lampung and South Sulawesi, participants

primarily describe impacts on agricultural activities in terms of erratic rainfall or increased flooding. Only the women Purwodadi, Lampung described that searching for water to maintain their household garden was increasingly difficult during times of prolonged drought. In Purwodadi, and other Lampung villages, many households either had their own or access to a well to use during times of prolonged drought, which mitigated or buffered impacts of drought.

Impacts due to climate change shifted women's responsibility of agricultural activities, reducing labor on their own crops but increasing that for their husbands' crops. For example, in South Sulawesi, floods destroyed *neem* plants and home gardens, both of which women maintain, but reduce cocoa harvests and thus incomes, forcing men to seek seasonal labor jobs, leaving men's responsibilities on the cocoa farm to their wives while they are away. These shifting labor responsibilities have important implications for the associated tradeoffs, begging the question who uptakes the women's domestic responsibilities when she is on the farm? How are budget and purchasing decisions altered when incomes are further reduced, and food sources are not as readily available? What are the implications for household food and nutritional security, and who within the household is most vulnerable? Do these dynamics differ between households, and how?

Men in Lampung and South Sulawesi cite impacts of climate change on income generating and labor activities in terms of shifting migration patterns in search of additional income sources. Men in Lampung increasingly travel to the provincial capital, often several hours away, in search of wage or construction labor jobs, whereas men in South Sulawesi migrate for six months or more to Kalimantan in search of illegal mining jobs. Women in Lampung and South Sulawesi describe a variety of impacts of climate change on income-generating and labor activities. In Lampung, women describe that an increasing number of

women are migrating out of Lampung, Indonesia in search of domestic labor jobs, while other women experience further restriction within their households due to increased flooding and rainfall. Women restricted within the households either engage in income-generating activities within the household or express '*boredom*' in their restriction. Similarly, women in South Sulawesi expressed '*boredom*' with restricted mobility and lost opportunity, as the floods destroy *neem* farms and home gardens. Unlike in Lampung, women in South Sulawesi could not engage in other income generating activities due to lack of opportunity associated with geographic distance from the nearest markets, whereas women in Lampung were closer to the markets to sell their goods. Access to infrastructure, such as roads, mobility, and markets are critical for increasing available opportunities for women to engage in income-generating activities (Sultana 2012). The women's farmer group in Lampung run by Save the Children taught additional livelihood skills at various training, suggesting the importance and benefits these types of trainings may have for women.

Results from Research Question 2 suggest that participants across South Sulawesi and Lampung notice systematic trends in environmental changes, and men and women describe these impacts differently according to their roles within the household. Women describe impacts in regard to the effect on their children and household food security, whereas men's descriptions are more focused on the effect on crops and off-farm labor activities. Mobility is an important factor for both men and women in how they perceive the impact of climate change on their own lives. However, access to mobility for women is shaped by social gender norms and differ for women within Lampung as well as within Lawewe. Overall, impacts are described across both sites in terms of fluctuating rainfall patterns, droughts, and flooding, and no mention of temperature fluctuations were reported (Yusuf & Francisco 2009; MoE 2010).

Findings and Implications for Understanding Strategies Employed by Men and Women Small-scale Cocoa Farmers to Adapt to Impacts of Climate Change

In summary, these results suggested that men and women in Lampung and South Sulawesi rely on various and different resources to adapt to climate change and employ strategies based on available resources. Between men and women, woman had less access to available resources to leverage in building adaptive capacity (Brody et al 2008; Mainlay & Tay 2009). However, women (and men) fall along a continuum of unique vulnerabilities and capacities to leverage resources and adapt (Arora-Jonsson 2011; Terry 2009). Strategies to adapt were generally bounded within gendered norms, however these were sometimes renegotiated or broken in response to impacts due to climate change.

Mobility was cited as a critical resource upon which men and women relied to adapt to impacts of climate change, however women's mobility was more restricted than men's, and in the case of Muslim women, it was controlled by men. Via mobility restrictions, men imparted power over women to dictate how and when women might be able to renegotiate their gender roles to mobilize and participate in the public sphere to gain an income. Power dynamics between men and women within and between households influence the ways in which women can access mobility or work around this restriction (van Aelst & Holvoet 2015). For example, in Lampung, women adapted within their gendered roles highlighted by their lack of mobility in the public space. Within the bounds of this restriction, women engaged in various income-generating activities such as sewing, making and packaging snacks for local sellers, or making candles or soaps; these activities were supported by social linkages, skills and training learned from women's farmer group trainings. Women cited *arisan* as a critical support to engage in income-

generating activities, as they could access credit to start these businesses. Attending *arisan* is traditionally part of a woman's role, so she is able to leverage this resource without needing to violate a gender norm. However, these strategies were not employed by women in Lawewe, who did not have a farmer group available to them nor had readily available access to the nearest market. Women in Lawewe were limited due to geographic isolation as well as inability to drive a motorbike (if owned) due to restrictive gender norms. These women were left at home "bored" and relied on social supports to withstand impact due to environmental shock. Too, in Lawewe, geographic isolation and severe inundation also physically restricted men to the household as well, where they would adapt by fishing in the floods to feed their families or share resources with neighbors. This example highlights how men too are along a continuum of vulnerabilities and capacity, given that those in Lawewe have less access to resources and capacity building than those in Lampung given their geographic isolation and limited access the market, underlying (Kaijser & Kronsell 2014).

Migration was another strategy employed by both men and women. Men in Lampung migrated within the province in search of seasonal jobs whereas men in Lawewe migrated outside of the province for half a year at a time. When men migrated, women assumed responsibilities for men's agricultural maintenance activities in addition to their own domestic activities. In Lampung, women broke gender norms and migrated outside of Indonesia to be hired as a domestic maid. However, this choice was that of the men to allow their wives to migrate in search of labor, depending on his 'open mindedness', conservativeness, or economic status, and then the women were then able to adapt within that permissive mobility. Women also relied on their responsibility to manage the household budget to reduce spending in order to conserve money to buy necessary food items for the household during times of stress. Women

relied heavily on social networks as safety nets to secure additional money, food, or necessary household items during times of environmental-induced stress. Men relied on supports from established farmer groups and advice given from the CocoaLife or Mars programs.

Men and women employ different adaptation strategies to respond to impacts of climate change that are rooted in their different access to resources. Some women, such as Muslim women compared to Christian women in Lampung, have different accesses and power to access available resources, shaped by sociocultural norms (Arora-Jonsson 2011; Mollet & Faria 2013). As impacts of climate change continue to exacerbate already deteriorating cocoa harvests in Lampung, it is essential to understand how men and women are able respond to these impacts and how sociocultural norms are renegotiated or violated to adapt. As men will increasingly migrate in search of additional labor opportunities (and with women), divisions of labor and responsibilities will shift within the household, altering time burdens and workloads, particularly for women. It is essential to understand how limited resources and mobility hinder women and men's ability to respond to direct and second-order impacts of climate change.

Programming and Policy Recommendations

Programming Recommendations

The results and insights concluded from this research study yield several recommendations and suggestions for overall programming in the cocoa sector in Indonesia. This research study had the benefit of working across two provinces in which separate corporate sustainability programs operated, Mondelez' CocoaLife in Lampung and Mars' Cocoa for Generations in South Sulawesi. While this dissertation topic received approval from these respective operating programs to access some of their farmers (through collaborations with established partners at

CIAT and Swisscontact), it was not an evaluative study of these programs nor sponsored research. Rather this study examined how participants navigated complex decisions and utilized available resources to respond to environmental changes, to which these corporate-funded programs were essential means of support. Targeted and gender-sensitive programming policies and strategies have the capacity to provide better support and improved capacity-building opportunities for men and women participants across these sites; thus, several recommendations towards livelihood programs are presented.

In general, when working with small-scale farmers, it is imperative to understand the intra-household dynamics for production activities, reproductive activities, and decision-making patterns, specific to the crop of focus but other livelihood activities as well. The tools used in this research study (found in Appendices A-E) for Research Question 1 can be used to assess division of labor percentages and descriptions, decision-making patterns, and time allocation for daily activities disaggregated by gender at the household level. Particularly, tools found in Appendices D and E can be used to collect information related to perceptions of division of labor for separate activities, and daily time use by gender. It would be important to also collect information on the participants' religious affiliation, ethnic identity, age, household size, socioeconomic status, and other socially-identifying variables, to best explore differences amongst women and men. Understanding gender roles within and across communities enables the programming to appropriately target their audience and provide the necessary supports to those needing it the most.

- For example, evidence from this research study suggested that these gender disaggregated patterns were not well known nor incorporated into programming targets for Lampung (specifically), as men received the daily price information via SMS, while women were

responsible for quality control, negotiating, and selling the beans with traders. Men did not always share this information with their wives daily, and women relied on other sources (mainly neighbors or the traders themselves) for price information.

- Women actively contribute to cocoa (and other agricultural crop) production activities, although their labor contributions are overlooked by current programming (as evidence by not inviting or holding trainings for women to attend). Programming efforts should target women for training or information supports for activities in which they are actively engaged such as (quality control, drying, selling, and directly receiving price information). In light of increased seasonal migration by men, women are increasingly responsible for cocoa and other agricultural-related activities. Trainings and support should account for these seasonal changes in labor responsibilities.
- In Lampung specifically, Muslim and Christian women have different social restrictions to their mobility and access in engaging in productive activities. Attention should be given to these social differences to account for ways in which Muslim women may benefit from a livelihood program compared to the ways in which Christian women may benefit. For example, suggesting a livelihood activity to women in Muslim households that requires travel outside of the house or village would restrict many women in this sample, but might not restrict women in Christian households, who do not share the same social restrictions. Integrating men into gender awareness and sensitization trainings would also be important to engage men in supporting women for their empowerment.

Crop- or commodity-specific programming should account for the fact that small-scale farmers more often than not engage in a variety of livelihood or agricultural activities to sustain their household food security, incomes, and well-being. Evidence from this study suggests that

while participants in both research sites found crucial support and capacity-building opportunities through the respective cocoa programs (CocoaLife and Cocoa for Generations), these supports did not extend to other important crops.

- For example, participants across this qualitative study indicated not having an outlet to ask questions about diseases or best practices on crops outside of cocoa¹⁵, such as banana, coffee, coconut, corn, patchouli, and others. As an extension of a livelihood approach, these programs should provide a venue for farmers to feel comfortable seeking supports about these alternative crops. These additional crops support cocoa growth as a means of agrobiodiversity and intercropping, they supplement household incomes to reinvest into cocoa production, and finally, they support livelihoods for households to sustain diversified income streams, and overall household health and nutrition.
- Certain intercrops were under women's domain, such as chili (in Lampung) and patchouli (in South Sulawesi). For all crops sold, women are the sellers and price negotiators. Therefore, any market-oriented training should be targeted towards women.

Both women and men should be encouraged and invited to attend trainings and workshops; and barriers (invisible and visible) to women's participation should be addressed.

- For example, across the Lampung sample, women frequently indicated that they received cocoa information only sometimes from their husbands, who were prioritized to receive trainings and support. It was evident that husbands were supposed to or suggested to disseminate training information to their wives, but not all husbands did. Some women, who did receive information about cocoa production from their husbands would then

¹⁵ The only exceptions to this are several male participants in Tanggamus, Lampung who participated in a coffee-specific farmer group run by Nestlé, as well as the cocoa-specific farmer group run by Mondelez' CocoaLife.

disseminate this information to other women within the community. However, it was evident that this information was not at the same quality of the information given at the trainings and incurred additional time lags in disseminating the information. The option and choice should be available for women to access trainings to glean relevant information; programs should work to address cultural barriers to women's participation. A first step would be to directly invite women to the trainings and then take necessary steps (described below) to reduce barriers to non-participation.

- Trainings should be held at times convenient for women around their domestic duties and mobility restrictions. Women are responsible for childcare and meal preparation – thus they cannot travel too far from their homes and cannot leave while meals need to be prepared. Additionally, married women across the Lampung and South Sulawesi cannot drive motorbikes, citing danger as a restriction. Therefore, trainings should be held in areas convenient and accessible for women within the community to attend. Attention should be given to additional barriers to participation, particularly in Muslim households where a woman must secure her husband's permission to attend a training or leave the household. Offering childcare options at trainings has been a successful approach to reduce barriers to women's participation (FAO, 2016).

Importantly, programming efforts and training should include gender-sensitive activities with both men and women to focus on indicators of empowerment and equality, such that the roles, desires, and needs of women and men are understood and accepted in the household and community levels.

- For one example, group discussions specifically with men on the role of women and breaking down barriers for women's engagement in income generating activities

(whether in agricultural or others) to support her own well-being, goals, and desires can be an effective tool to addressing issues of inequality.

- Group discussions with men and women focused on addressing roles and time demands for daily activities can help illuminate burdens on women's time engaged in domestic or unpaid labor. These discussions can include culturally-appropriate activities to identify ways in which men can assist in reducing these time burdens, as an effective tool to addressing issues of inequality.

The use of specific terminology should be carefully assessed when conducting trainings or livelihood supports in rural, small-scale agricultural areas. While participants may understand the meaning of a certain term (climate change, for example), they may not attach these meanings to the scientifically accepted terminology, and information delivery may be ineffective. Therefore, it is recommended to first hold qualitative and participatory exercises with participants to understand their perceptions and knowledge related to the specific topic of a training so that the information delivery is targeted to how the participants understand the issue for maximum knowledge uptake and higher chances of adoption.

- For example, in this study, both men and women farmers understood, could explain, and felt the impacts of different climatic changes within their own communities. They could describe these changes and their second order effects over the course of past decades and had thoughtful discussions and solutions to combatting or mitigating these changes. However, when asked about the term *climate change*, these participants could not define it. It would be less effective to initiate a training on climate-smart agriculture or climate-resilient agriculture with the underlying purpose to strengthen agricultural systems to climate change, if the participants cannot attach meaning to the purpose.

These recommendations and suggestions for program improvement aim to overall better support women and men small-scale farmers. While these are specific to cocoa livelihood programs in Indonesia, these can be adapted to other contexts, crops, and program foci aimed at improving rural agricultural livelihoods as well.

Policy Recommendations

The motivation behind this study was couched in an approach to gather data to meet different Sustainable Development Goals and to establish the need (and a pathway to) of accounting for gender differences in meeting these goals. This research study occurred in areas where corporate programs, non-governmental organizations, and the local governments were working together to improve rural agricultural communities through building cocoa production capacity and community resilience. In addition to meet programming goals, global actors are also aiming to progress towards achieving the Sustainable Development Goals as well. However, the guidance for implementation of policies and practices to achieving these goals is vague, and thus has posed a challenge on the global stage (Koehler 2016). Presented here are several policy recommendations that can help guide global actors aiming to achieve programming goals as well as progress towards the SDGs.

- Programming efforts should collect baseline data on nuanced intra-household gender dynamics related to decision-making influence, access (or lack thereof) to mobility, time use, division of labor, access to resources, and levels of community participation. The tools used to assess objectives in Research Question 1 (found in Appendices A-E) of this

study are examples of how to collect necessary information to understand nuanced household gender dynamics to inform broader research and programming efforts.

Relevant demographic information (age, religious, sex, education, socioeconomic status, ethnic group, other social identifiers or important variables) should be collected in tandem to understand nuanced differences between and within social groups.

- Time use is an extremely important indicator for understanding (dis)empowerment, as well as barriers and opportunities for capacity building. Too often, well-intentioned programs aiming to increase women's empowerment unintentionally exacerbate women's time burden. It is essential for any program to understand how women (and men, and youth) spend their time within the household across important seasons to understand time distributions, as well as account for potential tradeoffs with new opportunities. For example, if an intervention such as CocoaLife aims to have women come to more cocoa-related trainings, what activity would not happen in lieu of attending those trainings and what is that effect? Understanding time use of households across social strata also enables programmers to consider time as a barrier to participation, and perhaps more equal delegation of activities across household members will enable time burdened household members more ability to participate. Using time use surveys (Appendix E) or participatory activities such as seasonal calendars are practical tools to assess time use amongst household members.
- Monitoring and evaluation strategies should be gender-sensitive and socially inclusive such that methods and tools are designed to specifically understand the effect of the intervention across varying social groups (gender, religion, socioeconomic status, sexual orientation, ethnic groups, etc). To achieve this, sampling of participants across social

groups must be purposive to understand dynamics across and between groups. Data collection tools must be designed with flexibility to account for gender (and other social group) specific questions. And data analysis, particularly qualitative analysis, must be done to account for gender (or social group) specific differences in responses to account for and illuminate possibly different world views and perspectives.

- Monitoring and evaluation strategies should assess the effect of interventions on women's and men's empowerment, particularly amongst these groups (i.e., across other social strata). There exist comprehensive survey and qualitative data collection tools specifically to evaluate effect of the interventions on empowerment, particularly the aforementioned pro-WEAI tool developed by researchers at IFPRI.

Future Research

As an exploratory study, this research project points to several areas and questions needing deeper or further investigation. This research study aimed to comprehensively address and investigate the gender dynamics of small-scale cocoa producers in Indonesia. While these findings contribute to gaps in the literature and advance our knowledge of context-specific social and gendered dynamics of climate change adaptation, they spark additional questions.

Stemming from findings related to intra-household decision making patterns and their implications for women's empowerment, further research could examine the different, sometimes nuanced strategies that women employ to influence her husband's final decision on different items. Across the results, men frequently indicated that their wives had '*good research*' when proposing an idea that helped influence his decision whether to agree or not; these further research questions could examine how exactly women utilize these '*research*' to intentionally (or unintentionally) influence her husband's decision making, and how (or if) these strategies have

evolved in response to impacts of climate change. This would be a particularly salient point to further investigate as it will help to illuminate the overt and covert ways in which influence and power are yielded in household decision-making. It would be important to understand these dynamics across socially different households (i.e., religion, socio-economic class, ethnic group). For example, a woman in a Muslim household may need to more covertly express her influence in decision-making compared to a woman in a Christian household as the culturally defined roles for women within the household may be different.

Second, it was evident across the data in both Lampung and South Sulawesi that home vegetable gardens play a critical role in household food security and women's empowerment. Further research questions can explore specifically how home gardens affect household nutrition and nutritional diversity, women's empowerment and influence in decision-making within the household, and if and how these differ by ethnic or religious group. Particularly as impacts of climate change are increasingly affecting households' access to food security, home gardens play a vital role in ensuring access to nutritious vegetables and food sources. In Lawewe, specifically, home gardens were important sources of community bargaining tools, as women would trade vegetables from their home gardens in exchange for spices, cooking oil, or labor from neighbors. However, home gardens were particularly vulnerable to flooding and households located in flood prone areas had either lost their home garden recently at time of data collection or avoided investing in one due to this vulnerability.

To the latter point, a third, and important, further research question should deeper explore the differences between ethnic and religious identities across the data in relation to important topics such as women's empowerment, gender equality, access to resources, strategies employed to adapt to climate change, and overall adaptive capacity. Qualitative insights from this study

suggest that there are descriptive differences in how men and women from differing identities approach these issues. For one example, some Muslim husbands would not allow their wives to work under any circumstances, no matter how dire their economic situation was, whereas others preferred their wives to remain within the household but reluctantly gave permission to work because the harvests were doing so poor. While insights such as these are informative and illuminating, they are not conclusive nor generalizable. Comprehensive quantitative data that purposively integrates an intersectional approach into the sampling design would enable a researcher to ask how these different topics vary between men and women from different, intersecting identities to further illuminate these important and complex social dynamics.

A fourth important research question that can further be explored is the role of social networks and community supports in climate change adaptation across small-scale cocoa producing communities in Indonesia. Findings from this study suggest that formal and informal social networks (i.e., established farmer groups, prayer groups, rotational savings groups) serve as critical resources from which men and women rely to adapt to negative impacts of climate change. Further research can conduct social network analyses to better understand how these interactions work to provide supports, how those who do not participate accommodate this potential resource, and if and how these networks and supports may differ between or across gender, ethnic groups, or religious identities. And to the point above regarding the importance of home gardens, this research can explore the ways in which men and women leverage available resources (i.e., vegetables in home gardens for example) to barter and exchange in an informal network.

Future research should also examine the different sources of information on which men and women small-scale producers rely to make (or not make) adaptive decisions relating to

cocoa production as well as overall household wellbeing. Although this study provided descriptive evidence of the different sources of information utilized by men and women, it did not explore in depth the most reliant sources. For example, some women would heavily rely on their women neighbors for price information before selling their cocoa beans on a daily basis to the local collectors, while other women would rely on price information received from her husband (via CocoaLife). For another example, participants shared a mixed reliance on traditional methods as well as listening to radio or television for daily forecasts or daily and seasonal climate information. However, further research should explore how accurate these different sources are as well as to what extent they influence how men and women make decisions related to adaptive strategies (if at all). It would be important to understand if there are differences in the ways in which men and women access sources of information and utilize this information to adapt, as well as if there are differences between men and between women (i.e., socioeconomic class, education, religion, ethnic group). Potential inequalities may exist at intersecting social identities, and future research should be attentive to illuminate these so as to not inadvertently reinforce them.

Finally, while this research study took place in areas where corporate social responsibility programs operated, it was not an evaluative study of these programs. Yet, these programs, Mondelēz' CocoaLife and Mars' Cocoa for Generations, were extremely influential forces in both respective areas. Future research should largely answer the question of how these types of large corporate-funded livelihood programs actually impact women's empowerment, household wellbeing and livelihoods, cocoa productivity, and strategies employed by men and women to adapt to climate change and other variable external forces. Tools such as the project level Women's Empowerment in Agriculture Index (pro-WEAI) developed by researchers at the

International Food Policy Research Institute are useful for evaluating impact of interventions on women's empowerment. Evaluations should examine indicators in areas where corporate programs operate compared to where there are no programs to understand the effect of these interventions and supports on cocoa producing households' overall wellbeing, as well as to identify best programming practices. As corporations and sourcing companies are increasingly investing in communities producing raw materials (as well as the rise of corporate social responsibility programs outside of agriculture), this is an essential future research question that applies beyond just the cocoa value chain (Pollack 2017).

Conclusion

This exploratory research study aimed to understand the gender dynamics of small-scale cocoa production in Indonesia in the face of climate change. The findings in this study introduce new evidence of the intra-household gender divisions of labor in small-scale cocoa producing households in Indonesia, as well as support existing theories regarding the gender dynamics of small-scale producers' perceptions and adaptations to climate change. This research study underlined the necessity to incorporate intersectional approaches in understanding how small-scale producers are vulnerable to and able to adapt to localized impacts of climate change (Kaisjer & Kronsell 2014).

This study highlights women's roles as the caretakers and managers of household wellbeing and food security (Atker et al 2017). Women contribute a significant amount of labor to small-scale cocoa production in Indonesia, as well as maintain their domestic labor duties. In some cases, dependent on an availability of opportunities combined with levels of ascribed social and gender norms and or restrictions, women may also engage in off-farm labor activities as well. Restrictions and opportunities for women to engage in productive labor tasks are tied to

place- and religious-based social and gender norms, underlining the need to account for intersecting variables between and within social groups, as impacts of climate change and ability to adapt vary (Kaisjer & Krosnell 2014; Sultana 2012). Yet with impacts of climate change, we see men shifting their labor increasingly off-farm and women either taking on portions of men's agricultural responsibilities and or increasingly violating gender norms to engage in the public sphere. These social changes of climate change are important as they shape how women and men navigate their identities and social norms to adapt to increasingly severe and unpredictable environmental stressors.

The human dimensions of climate change and small-scale agricultural production are extremely complex and dynamic, and under explored (although growing) in the literature (Kelly & Adger 2000; McCarthy, Lipper & Branca 2011; Morton 2007). This research study contributes to this growing body of literature, exploring how impacts of climate change are increasingly causing men and women in rural Indonesia to renegotiate their own masculine and feminine identities as an adaptation strategy to build capacity against these environmental shocks and stresses. While both men and women perceive similar impacts of climate change, they interpret and discuss these impacts in terms of how they affect their respective responsibilities. As men focus more on impacts related to agricultural activities, women address the impacts related to agricultural activities in terms of income changes, household food security and children's education. With shifting labor responsibilities, these perceptions may change.

Some men must renegotiate their own masculinity by allowing their wives to work in the public sphere – albeit reluctantly – due to lower incomes from harvests. Some women are breaking social norms by emigrating abroad in search for domestic labor or spraying pesticides on their family cocoa farm when their husbands have migrated in search of off-farm labor. Those

further away from the markets have less restrictive social norms binding them to domestic work, but lack opportunity to engage in income generating activities due to increasingly severe impacts of climate change. Men and women employ different strategies to adapt to these environmental changes and must increasingly renegotiate or violate existing social and gender norms to build capacity to respond.

The gender dynamics amongst small-scale Indonesian cocoa producing households are heavily influenced by ethnic and religious tradition, and complex community structures. This exploratory research study attempted to investigate a sliver of these complex social dynamics and how these intersecting identities influence the ways in which men and women can negotiate their social roles to best adapt to impacts of anthropogenic climatic change. This research relied on deep, descriptive qualitative insights to explain these nuanced relationships and dynamics, upon which further research can build to better understand how they unfold to influence and curate adaptive strategies to climate change. While recommendations and programming suggestions are outlined for livelihood programming in Indonesia, findings from this research help to address contextual gaps in the literature and expand the knowledge regarding gender dynamics in adaptation to climate change.

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Appendices

Appendix A. Key Informant Interview Guiding Questions

1. Can you describe the cacao sector in [Indonesia, Lampung, Sulawesi, your district, your village]?
2. What are major challenges to the cacao sector in...[respective area]?
3. How is climate change impacting the sector? Buyers? Sellers? Producers?
4. What areas in the sector do you see are the most vulnerable or weakest to respond to challenges?
5. What are important resources for small-scale producers of cacao?
6. What is the role of government, private sector, local government in aiding cacao producing communities?
7. Who has the greatest influence or power to build resilience to local communities?
8. What needs to be improved in the sector?
9. What is the role of women in cacao?
10. Who might be left out of important decision-making? Opportunities? Access to resources? Training/education?

Appendix B. Focus Group Discussion Protocol

Focus Group # and Code:

Date:

1. Participant ID Code	7. Age:
3. District:	8. Religion:
4. Sub-district:	9. CocoaLife household: Yes No
5. Village:	10. Participate in <i>musrenbang</i>: Yes No
6. Ethnic group	

Activity 1: Community Resources Map

On a large sheet of paper (or white/black board, depending on available supplies), please work together to draw a map of your community. Include all aspects within your community that are important to you, that you utilize or interact with, or areas you know about. Draw your perception of your community.

Pick a central location in the community as a reference point. Co-create symbols to represent different aspects within the community, and guide participants with ideas such as: infrastructure, water sites/sources, agricultural lands, housing areas, community gathering centers/schools, agro-eco zones, forest, grazing areas, shops/markets, health centers, religious centers, waste sites, special use places. Guide these with probing questions, for example: “Where do you get your water/fuel”.

Take notes on group dynamics and discussions while creating the map. List a dictionary of all symbols used and take pictures of the map once it is created. Once the map is complete, ask participants to describe their community and why they included what they included.

Follow up questions:

1. Which resources are in ample supply? Which are in shortage? What do you need more of? Which ones are degrading/improving?
 - a. How do you cope [if supplies are in shortage]?

- b. Which ones are used primarily by men? By women? [why?]
 - c. Why are they degrading/improving?

2. Are there common land or resources in village? Who manages them? Who makes decisions about them? Are there ever any conflicts about how to use these resources? How are they resolved?

3. Who collects water/fuel? Where is that collected?
 - a. During times of drought, where is water collected?

4. Can you indicate some things on the map that you'd wish to see in your village but aren't currently there? What major changes to the village do you see from this map that weren't there when you were a child?

5. Is the village growing or shrinking? Why or why not?
 - a. How many ethnic groups/classes/religions are represented in this community? Where do they live? Is there an area where landless or poor people are concentrated? Where richer people are concentrated?

Activity 2: Venn Diagram

Ask the participants to name the various institutions, formal and informal, local and external, that provide services related to household support [including support for cocoa production]. We will create the list on the blackboard/whiteboard or large sheet of paper, depending on resources available. Then collectively, the group will decide if each listed institution deserves a small, medium, or large circle (to represent its relative importance). Then, ask participants what organizations/institutions works together or have overlapping memberships. The following description should guide how the circles are placed:

- Separate circle = no contact
- Touching circles = information passes between institutions
- Small overlap = some co-operation in decision making, planning, or implementation
- Large overlap = a lot of co-operation in decision making, planning, or implementation.

Discuss with participants why they ranked each organization the way they did.

Follow up questions:

1. Which organizations do you participate in?
2. Are there institutions that are specifically for men? For women? If so, which ones?
3. Do women have decision-making roles in local institutions?
 - a. If so, how do men react to it? What decisions do women make that men don't?
4. What sources of information exist for farming related practices? For weather-related?

Activity 3: Stakeholder Mapping

This activity aims to understand how each participant interacts with different stakeholders in the cocoa value chain. Materials needed for this activity are (preferably colored) index cards or small sheets, pens or markers for all participants, and a large white poster board paper. Draw a figure of a farmer in the middle of the paper.

Pass out a bunch of index cards to each of the participants (maybe 6-10). Make sure each participant has a writing utensil. Instruct each participant to answer based on their own experiences.

If the participants are farmers, ask the participants to write on each sheet each stakeholder that they interact with for cocoa production and selling. At first try, don't explain stakeholders. If the participants don't understand stakeholders, you can explain that stakeholders are people that are necessary to deal with to produce cocoa. You can give some examples such as: who do you sell your cocoa to? Where do you buy inputs? Hopefully this gets the farmers to think of other ideas of who they interact with. Instruct the farmer to list *each* stakeholder (i.e. if they sell to 3 different people throughout the year, please have them write down all three on three separate sheets of paper).

Have the farmers then place on the poster board sheet each stakeholder that they interact with corresponding to how often they interact with them. For example, if they sell to the local collector everyday but they sell to an established chocolate buying company (such as OLAM or Mars) only once a week, the card indicating the local collector will be closer to the farmer in the middle of the poster board than the chocolate buying company.

Remove duplicate cards for same purpose (such as selling cocoa to local collector). However, if they indicate they sell to the local collector but also receive price information from the local collector, then there should be two cards for the local collector on the poster board.

Activity 4: Seasonal Calendar

Explain that this activity is to gauge what happens – in their perception – for each activity or event throughout the months of the year. The amount of dots is to represent level of intensity for that activity or event for that month.

On the white board/black board, or another large sheet of paper (depending on available resources), draw a line at the top to indicate the months to total a year. List the following activities, one by one, and have the group work together to indicate level of intensity.

Activities to list: rainfall, temperature, crop disease (associated with cocoa), agricultural labor [time spent doing agricultural activities], off-farm labor [time spent doing daily activities off the farm], food availability, water availability, household expenditure, extreme events (like floods

and droughts), income sources, resources [information, requesting loans, human labor], and human diseases [when household members are sick].

For example, the calendar would look something like this:

	Jan	February	March	April	May
Rainfall	**	*****	***	**	*
Temperature	*	*	*	**	***
Off-farm labor	***	***	***	*****	*****

This would indicate that rainfall is most intense in February. The temperature is hottest in May. The group agrees that time spent doing off-farm labor is most intense during April and May.

Follow up questions:

1. Are the overall livelihood systems fairly stable or with great seasonal variations?
 - a. You say time spent doing off-farm labor is most intense in April, describe that. What are you doing? Why is it more intense in April as opposed to March? [repeat this for different activities listed].
 - b. When [food availability ... event/activity] is lowest, how do you cope?
2. What times are busiest for women? For men? Why?
3. For each activity – is this the same for women? For men? Why/why not?
4. Have these calendars changed over time? [Ex: has it always rained this much in June? Always been this hot in September? Experience droughts this often?]
5. Specific to food availability: how much of your food comes from home garden or purchase? What are your different sources of food? If your crops fail, where does your food come from?
 - a. [depending on calendar for food availability] in this period where food is less available, what do you eat? Can you characterize the amount of food your family ate during this period? Characterize the amount of food you ate during this period?
 - b. Has the amount of food available during the years changed over the past five or ten years? Why's that, do you think?

Activity 4: Facilitated Discussion and Capacity and Vulnerability Matrix

The final ‘activity’ will operate as a facilitated open-group discussion. It will begin with two open questions for discussion and based on how that discussion carries [i.e. which aspects of climate change participants respond to], the discussion will then be guided by the Capacity and Vulnerability Matrix (CVM) activity.

Explain to participants this final activity is an open group discussion to understand everyone’s perceptions or understandings of the following terms. There’s no right or wrong answer, just a general discussion.

Question 1: What is climate change?

Question 2: What causes climate change?

I will be taking notes of group dynamics as well as participants’ answers to these questions, what topics arise, and which do not. This is meant as a general, informal discussion to gauge perceptions.

Based on how this discussion continues, I will guide the following conversation using the CVM (below). The FG workshop with men will ask the men their perceptions of capacities and vulnerabilities for both men *and* women in the village. Same with the FG workshops with the women. For this activity, capacities include what people can do, who they rely on, available resources for them, and vulnerabilities include what people lack or need.

After the discussion on climate change (Questions 1 and 2 above), I will ask the participants to now describe how they view men and women are able to respond to these changes. Using the following guiding questions, I (the facilitator) will fill in these blocks in the CVM.

	Capacities		Vulnerabilities	
	Men	Women	Men	Women
Physical materials and resources				
Social organizations and institutions				
Motivation and attitude				

Guiding Questions:

1. Who is affected when there is [insert specific climate-related event defined by the group]?
2. How are you affected? What kind of adjustments do you have to make in your daily life to respond to this? [including household responsibilities, or on farm/off farm events – limit schooling, education, less employment opportunities, health status, food security]
3. How are other members of your household affected?
4. Is there anyone you rely on or that helps you during this time? (person or organization)
5. What do you not have that could really help you during this time?
6. Have you ever learned techniques to respond to this from other people, in your village or another village?
7. Do you think you can cope with this change? For how long? To what extent?
8. Do you have access to adequate information? What would help better prepare you for this type of change/event?
9. Looking to the future, what is your biggest fear/concern when it comes to climate change? Why?

Appendix C. In-depth Interview Protocol

The development of the in-depth interview questions followed collection and brief analysis of household survey data, key informant interviews, participant observation, and focus group discussions in the Lampung and South Sulawesi provinces. This is a comprehensive list of questions asked during each in-depth interview; however, as the natural flow of conversation unfolds, not every question was asked to each participant. Additionally, not every question would have been appropriate or useful to ask each participant (for example: asking the household wife of a farmer who had lost his cocoa field ‘how was the harvest this year?’ would not have been appropriate as they had no harvest this year). As with the other primary data collection, a translator fluent in Bahasa Indonesia, Javanese (Lampung) or Bugis (South Sulawesi), and English accompanied me to each participants’ home. Each interview was translated into English.

1. Do you have a cocoa farm? How was the harvest this year?
 - a. [Depending on what the interviewee says], can you explain in more detail? Why did this happen? What are causes? How long as this happened? Who noticed this? What did you do about this?
 - b. How does the weather affect the cocoa?

2. Can you tell me about your farm?
 - a. What crops do you grow? How were those harvests?
 - b. What are your sources of income, from agricultural and non-agricultural activities?
 - c. How do you contribute to the farming activities?
 - d. How is cocoa important to your income? Daily needs? Activities? What does it represent to you?

3. Who do you sell your cacao to?
 - a. Who sells to which collector? How do you negotiate the price?
 - b. Why does [whoever sells the cocoa] sell the cocoa?
 - c. What are the prices differences? Can you explain the price for each collector today and how you choose which collector/price to sell for?
 - d. How long do have you sold wet beans? Dry beans? Why sell one/the other? When do you sell one/the other?

4. How do you determine ‘good quality’ of your cocoa beans?
 - a. Can you describe what is good quality? What is bad quality? Why?
 - b. Have you heard of fermentation? What is it? How does it work? What are benefits to doing it/downsides to doing it?

5. Are you a part of a farmer group here?
 - a. Why do you join the farmer group? / Why don’t you join a farmer group?

- b. What are benefits to participating in the group?
 - c. What do you wish you received in the group that you do not?
 - d. Why do you think some point don't join the farmer group?
6. What are your daily priorities?
- a. What do you spend your time doing? What is your most important priority?
 - i. If 'household chores' – please ask to explain exactly what are HH chores?
 - ii. What is your water source? [If have livestock] Where do you collect grass? How much further must you go to get it during drought?
 - b. What is your role in cocoa? What are your husband's/wife's role?
 - c. What are your husband's/wife's priorities?
 - d. [if wife works] Did you/your wife have to ask husband's permission? How does your husband/you (if husband) feels about your wife working? How long have you worked?
 - e. [if wife doesn't work] How come you/your wife doesn't work? What would enable you to find work? What kind of work would you like to find/do?
 - f. Do many women in this community work? How do you feel about that?
7. Can you describe the weather here?
- a. Has it changed at all in the past 5, 10, 15, 20 years? How so?
 - b. How does the weather affect your priorities? [if vague, ask about outlined priorities above]
 - c. What do you do about this? How do you plan for next year?
 - d. How does the weather affect your wife's/husband's priorities?
 - e. Have you heard the term 'climate change'? [If yes] What is it? What are your opinions about it?
 - f. Where do you get weather information? Do you trust it? Do you use the internet?
8. How are decisions made in this community? Are your needs met in this community?
- a. How does *musrenbang* work?
 - b. [if participates] Is your voice heard? Are the men's voices heard? Are the women's voices heard? What do men ask for? What do women ask for?
 - c. [if doesn't participate] Why don't you participate? How and why do people participate?
9. What are the greatest challenges in your life?
- a. What are solutions? What are barriers to these solutions?

Appendix D. Division of Labor Survey Tool

	Crop Activities	Crop 1:		Crop 2:		Crop 3:		Home Garden	
		Male labor (%)	Female labor (%)	Male labor (%)	Female labor (%)	Male labor (%)	Female labor (%)	Male labor (%)	Female labor (%)
1	Land preparation								
2	Planting								
3	Weeding / cleaning								
4	Spraying pesticide								
5	Harvesting								
6	Selling crop								
7	Other:								
	Other Agricultural Activities	Male Labor (%)				Female Labor (%)			
8	Fishing or fishpond culture								
9	Livestock								
10	Selling livestock								
11	Selling fishing or fishpond								
	Household Activities								
12	Chores, collecting water and fuel								
13	Take care of children								
14	Cooking and food preparation								
15	Food expense management								
16	Children expense management								

Appendix E. Time Use Survey Tool

		Morning				Day											Evening				Night			Total		
	Activity	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	1	2	3	
1	Sleeping and resting																									
2	eating and drinking																									
3	personal care																									
4	school																									
5	work as employed																									
6	own business work																									
7	farming/livestock/fishing																									
8	shopping or getting services																									
9	weaving, sewing, textile care																									
10	cooking and food preparation																									
11	domestic work (fetching wood & water)																									
12	care for children/elderly																									
13	traveling or commuting																									
14	watching TV/listening to radio																									
15	exercising																									
16	social activities or hobbies																									
17	religious activities																									
18	Other...specify																									

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Education

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2019 Ph.D. Rural Sociology

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2015 M.S. Rural Sociology

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2013 B.S. Biology | B.A. English, Honors

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Selected Research and Project Experience

2017-19 **Women in Agriculture Network Cambodia: Gender and Ecologically Sensitive Agriculture Project | Research Assistant at Penn State University**

- Conducted comprehensive literature reviews on nexus of nutrition, gender, and small-scale agricultural production in Cambodia
- Designed qualitative data collection protocols (KII, in-depth, and FGD) and collected data during 3-week field stay in Battambang and Siem Reap provinces on gender dynamics of household management of wild food plants and wild gardens
- Conducted qualitative data analysis and prepared findings into peer-reviewed manuscripts and international presentations [citations below]

2015 **InnovATE Lab at Virginia Tech Youth in Agriculture Project Lead**

- Conducted literature review of barriers and opportunities for youth engagement in agriculture
- Developed findings into a published report and policy brief [citation below]

Selected Publications

- **Eissler, S.**, Thiede, B. & Strube, J. 2019. Climatic Variability and Changing Reproductive Goals in Sub-Saharan Africa. *Global Environmental Change*, <https://doi.org/10.1016/j.gloenvcha.2019.03.011>.
- **Eissler, S.** & Brennan, M. Review of Research and Practice for Youth Engagement in Agricultural Education and Training Systems. Feed the Future innovATE lab, Virginia Tech University. Accessible: <http://www.oired.vt.edu/innovate/wp-content/uploads/2015/09/EisslerBrennanYouth-EngagementFINAL.pdf>

Selected Presentations

- **Eissler, S.**, Ader, D., Huot, S., Brown, S., Bates, R., Gill, T., Jensen, L., Tickamyer, A. & Sachs, C. Gender and sustainable intensification: the case of wild gardens in northwest Cambodia. Poster. Seeds of Change: Gender Equality through Agricultural Research for Development Conference. University of Canberra, Canberra, Australia. April 2019.
- **Eissler, S.** "I'm not a chocolate farmer, I'm just a housewife": Gendered divisions of labor for small-scale cacao production in Lampung, Indonesia. Seeds of Change: Gender Equality through Agricultural Research for Development Conference. University of Canberra, Canberra, Australia. April 2019.
- **Eissler, S.**, Kusujarti, S., Tickamyer, A., Angeningsih, L. & Brown, R. Perceptions of Post-Disaster Recovery and Relief Efforts: Evidence from Male and Females Survivors of the 2010 Mount Merapi Eruption. Rural Sociological Society (RSS). Portland, OR. August 2018.
- Kusujarti, S., **Eissler, S.**, Tickamyer, A., Angeningsih, L. & Brown, R. Civic Engagement and Household Resilience: Evidence from female survivors of the 2010 Mount Merapi Eruption. Rural Sociological Society (RSS). Portland, OR. August 2018.