The role of alternative coffee production network actors in creating a climate-resilient producer community in northern Peru

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Abstract

This thesis critically examines climate change adaptation in Peru. By considering the case of the coffee-growing region of San Ignacio, northern Peru, it seeks to address the following central research question: "*In what ways does participation in alternative trading networks shape smallholder coffee farmers' ability to adapt to climate change?*" The study draws upon the Global Production Networks (GPN) analytical framework, in addition to bodies of knowledge in the arenas of climate change adaptation and voluntary certification standards, in order to evaluate the power relations, knowledge and practices through which smallholder coffee farmers in Peru are adapting to challenges associated with climate change. The methodological approach used in this research is qualitative, drawing on field diaries, ethnographic observations and farm visits. Fieldwork took place between October 2013 and March 2014 and included interviews with coffee farmers and co-operative staff members from three different co-operatives, farmer field schools, local and national government representatives and NGOs.

The thesis makes three key contributions. First, it demonstrates how the challenges of climate change are tackled by coffee producer communities in the context of power relations operating through contemporary trading networks, neoliberal private standards and civil society projects on environmental justice. Second, it places lived experiences of the coffee farmers centre stage, in order to evaluate how environmental and economic risk is, and could be, managed in this particular sector and in this specific locality. The latter has unique characteristics in terms of the terrain-, climate- and socio-political-based contexts inherent with a country which is so diverse and home to so many microclimates. Third, it argues that being embedded in an alternative trading network benefits farmers' ability to adapt to climate change through both upgrading and strategic coupling. However, power dynamics, tensions and knowledge flows within the network are inhibiting the farmers' agency and ability to reduce their vulnerability to climate change, to adopt adaptation practices effectively and ultimately to create a climate-resilient producer community. It is argued that such tensions, power dynamics and knowledge flows contributed to the coffee leaf rust crisis in 2012/13. These contributions raise important issues of interest for production network actors involved in designing climate change adaptations for – and channelling support to – smallholder coffee farmers, as well as for farmers affected by climate change in other localities.

In Memory of

Arnaldo Quispe

Arnaldo was the first person I met in the field in San Ignacio, and from that day onwards we spent every day I was in San Ignacio together, travelling through the cloud forests: me on the back of his motorbike visiting countless farmers, and getting drunk on homebrew while he kindly ate my share of the numerous fried guinea pigs offered to us by the farmers.

Arnaldo dedicated his life to helping others, including me. I would not have the data for this thesis without his support, but more than this he supported thousands of farmers in upgrading their coffee and adapting to climate change in order to provide for their families.

Dedicated to my two incredible children, Albie and Charlie

Albie, while you were in my tummy you joined me on interviews in the Peruvian cloud forest. I trekked up steep valleys to meet farmers, to find out more about their lives, and you gave me the opportunity to tell them a little more about mine. We shared our concerns about the planet which we are borrowing from the next generation: you (and now your brother) and the millions of other children around the world and we discussed our shared responsibility to preserve it. Charlie, you joined our family as I was writing up my findings, and as such you had to share me with this thesis, but we helped each other through those sleepless nights. You both helped motivate me to continue and complete this thesis, and to contribute in whatever small way I can to making the planet a healthier, more sustainable place to live, for the farmers of San Ignacio, for both of you and for all future generations.

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"We do not inherit the earth from our ancestors, we borrow it from our children" Native American Proverb

"It is not the strongest or the most intelligent who will survive, but those who can best manage change," Charles Darwin

'Adaptation' was by far the most important word in the writing of this thesis, both in terms of my research question and surviving this journey, each of which challenged and changed me in more ways than I can attempt to capture here.

I have had the great privilege of adapting to life as a PhD student after 10 years as an International Development Practitioner. Being permitted the time and financial support (thanks to the ESRC) to research something that I am passionate about has been a real gift. During this time, I have learnt a new language and adapted to living in a new culture whilst conducting my fieldwork in Peru. On a personal level, in the course of researching and writing this thesis I have had two incredible children, Albie and Charlie, and in doing so, I have had to learn to adapt to life as a new mum, including writing with extreme sleep deprivation and post-natal anxiety. I have had three surgeries, lost loved ones and supported others through significant illnesses, slowly learning that you cannot stop the waves, but you can learn to surf. As such, I would like to thank those people who taught me to 'surf', who guided me through both my academic and personal journeys.

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List of Abbreviations

APESSI	Agrarian Co-operative for ecological producers in San Ignacio
APECAFE	The Peruvian Association of Specialty Coffee
APROCASS	Agrarian Co-operative of Multiple Services in San Ignacio
ATPDEA	Andean Trade Promotion and Drug Eradication Act
ATO	Alternative Trade Organisation
CAT	Climate Action Tracker
CIAT	International Centre for Tropical
CLR	Coffee Leaf Rust
CONAM	Peruvian National Council for the Environment (Spanish acronym)
DEVIDA	National Drug Control Commission (Spanish Acronym)
DFID	Department for International Development
ENCC	Peruvian National Strategy on Climate Change (Spanish acronym)
ENSO	El Niño/Southern Oscillation
ESRC	Economic Social Research Council
EUFORIC	European Forum for International Co-operation
FAO	Food and Agriculture Organisation
FLO	Fairtrade Labelling Organisation
FOGAL	Latin American Guarantee Fund (Spanish acronym)
FTO	Fair Trade Organisation
GCC	Global Commodity Chain
GDP	Gross domestic product
GHG	Greenhouse Gases
GIZ	German Governmental Development Agency (German acronym)
GPN	Global Production Network
GVC	Global Value Chain
ICO	International Coffee Organisation
ICRAF	World Agroforestry Centre
IICA	Inter-American Institute for Co-operation on Agriculture
IPCC	Intergovernmental Panel on Climate Change
IBRD	International Bank for Reconstruction and Development
IMF	International Monetary Fund
INIE	Peruvian National Institute for statistics and information (Spanish acronym)
ITC	International Trade Centre
JNC	Peruvian National Coffee Board (Spanish acronym)
MDGs	Millennium Development Goals
MINAGRI	Peruvian Ministry of Agriculture and Irrigation (Spanish acronym)
MINAM	Peruvian Ministry of Environment (Spanish acronym)
NDC	Nationally Determined Contributions
NGO	Non-Governmental Organisation
PROMPERU	Commission for the Promotion of Peru for Exports and Tourism (Spanish acronym)
SAO	Structural Adjustment Programme
SCAN	Sustainable Coffee Assistance Network
SENSA	Peruvian National Service of Agrarian Health (Spanish acronym).
SIPA	School of International and Public Affairs
UNICAFE	Union of Ecological Coffee Producers

UK	United Kingdom
UN	United Nations
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
USA	United States of America
USAID	United States International Development Agency
WB	World Bank
WFTO	World Fair Trade Organisation
WWF	World Wildlife Fund

Chapter 1. Introduction

"When you drink a cup of coffee, you are completing the final link in a global chain of activities that made that cup of coffee possible… That simple act of sipping your coffee connects you to peasant farmers in Colombia and Indonesia, to dockworkers in São Paulo and Mombasa, New Orleans and San Francisco, and to many others in between" (Talbot, 1997, p. 1).

"This [climate change] will affect millions of producers as well as all other participants in the value chain, right up to the end-consumer and presents a major challenge to the coffee industry" (International Trade Centre, 2010, p. 2)

This thesis focuses on global coffee production in Peru and the way it is influenced by climate change. It specifically investigates the role of alternative trading networks in intermediating these effects from the perspective of the smallholder coffee farmer, and it responds to the overarching research question: "*In what ways does participation in alternative trading networks increase smallholder coffee farmers' ability to adapt to climate change?*"

1.1 Research Background

The two quotes presented above elucidate the interconnectedness of the globalised world and bring together two important transnational challenges of our time, globalisation and climate change. As the first quote by Talbot (1997) shows, when we drink a cup of coffee we are connecting with a range of people from across the globe, from smallholder coffee farmers (henceforth farmers) and large-scale commercial farmers to dockworkers, roasters and baristas, all of whom contribute to making possible this simple act of drinking a cup of coffee. The second quote is from a technical paper from the International Trade Centre (ITC) and focuses on the effects of climate change on global coffee production. It highlights the centrality of the natural environment, and in this case climate change within a global coffee production network, drawing particular attention to the vulnerability of farmers. The two quotes combined highlight challenges with global and local dimensions.

Coffee is one of the most valuable commodities traded globally (Mussatto et al., 2011). Through the process of cultivating, processing, transporting, roasting and selling, it provides a livelihood for some 125 million people throughout the world. Approximately 25 million farmers produce 80% of the world's coffee (International Coffee Organisation (ICO), 2018), thus illustrating the socio- economic scale of the industry and the number of lives that have been – and continue to be – affected, potentially catastrophically, by climate change.

World coffee production and consumption continues to rise, with 154.7 million bags[1] being produced in 2016/17, a rise of 3.4% from the previous year (ICO, 2018). Despite this growth, many farmers are experiencing food and livelihood insecurity (Bacon et al., 2008; Bacon et al., 2014). This insecurity can be attributed to a range of factors, including the volatility of a global market where there are regular significant fluctuations in coffee prices, the rise in input costs (e.g. fertilisers), increased labour costs, the diminishing availability of cultivatable land due to increasing population, coffee diseases such as coffee leaf rust (CLR) and climate change.

Global challenges such as price risk and climate change pose significant threats to economic and social well-being. Rather than being a set of separate issues, climate change and globalisation reflect interrelated stresses and tensions, many of which are refracted through the history of colonialism. Inequalities in power and influence have meant that decisions made in one locality often favour one set of actors whilst hindering the development of others within the network, thereby widening the gap between rich and poor, both economically and socially.

Climate change in particular is receiving attention from state, commercial and civil society actors in coffee production networks and is cited as affecting producing countries' ability to keep up with increasing demand and sustain the livelihoods of coffee farmers (International Trade Centre, 2010). Farmers for their part are reporting rising temperatures, unpredictable seasons, less predictable rainfall and new, emerging threats from pests and diseases, all of which are leading to poorer quality coffee, lower yields and equally lower selling prices, which often do not cover the cost of production.

[1] Defined by the International Coffee Organization (ICO), a bag equates to 60 kg, or 132.276 pounds, of coffee. Some exporting members use bags of 70 kg or other weights for their exports. http://www.ico.org/glossary.asp

1.2 The Challenges of Climate Change in the Peruvian Coffee Sector

Peru provides an ideal case study through which to explore the challenges associated with coffee production and climate change. The coffee industry's influence in Peru is significant and accounts for 27% of the country's total exports (Nolte, 2018), generating an estimated US$ 750 million in export revenue from sales to over 50 countries (United Nations Development Programme, 2018). Furthermore, coffee production provides a livelihood for 855,000 farmers in rural areas of Peru, where alternative livelihood options are sparse and poverty levels high (Nolte, 2018). The crop also has an important role to play in maintaining the stability and security of coffee-growing regions in the country. Peru stood as the leading global producer of coca in the mid-1990s; however, a programme run by the national drug control commission (DEVIDA), previously known as CONTRADROGAS, promoted coffee production as an alternative livelihood, leading to a shift from coca to coffee and stabilising many regions.

Peru, one of the top three producers of Fairtrade coffee globally, is the country third most affected by climate change (Natural Resources Institute, 2010), and almost the entire agricultural sector is suffering from increasing water stress, due to melting glaciers and changing precipitation patterns. As early as 1981, there were concerns that the water crisis in the Andes was a significant component of the peasant farmer crisis. Particularly, it threatens the productivity of small-scale agricultural production systems, placing farmers' livelihoods at risk. And coffee is particularly susceptible to climate change, as exemplified by a report written by the Panhuysen and Pierrot (2014), which predicted that the amount of land cultivatable for coffee production would decrease substantially by 2020 (Panhuysen and Pierrot, 2014). Climate change is already having an impact on coffee production in Peru, and it is cited as one of the driving forces behind the Coffee Leaf Rust (CLR) crisis in 2012/13, which continues to pose an ongoing threat to farmers' livelihoods.

1.3 Why Research Alternative Trading Networks?

In response to the challenges within conventional trade highlighted above, alternative trading networks emerged, such as Fairtrade and organic (Hughes, 2005). Actors within these networks are motivated by both profit and improving the lives of the farmers who produce the goods. For example Fairtrade connects with their producers from both a trading perspective and social and political perspective, referred to by Goodman (2004) as a 'transnational moral economy' (p. 891) and organic connects trade with the natural processes involved in production (Raynolds, 2004).

Trade liberalisation, state retreat and the collapse of the International Coffee Agreement (ICA), which ended the quota system, cumulatively resulted in the increased vulnerability of farmers, as prices paid to them often did not cover the cost of production (Naegele, 2019). The economic structures embedded within coffee production networks articulated unequal power, with coffee growers holding limited authority and agency, "reflecting broader geopolitical, ethnic, and gender power structures" (Levy, 2008, p. 3). Private standards and codes of conduct, prompted by such imbalances of power and inequalities, filled this regulatory gap, with Fairtrade, for example, promoting the well-being of farmers and encouraging environmental sustainability.

Voluntary certification agencies, such as Fairtrade and organic, were established by buyers in order to stabilise the price of coffee and to address the social inequalities prevailing within global production networks. These groups can be characterised as forms of non-state, market-driven governance, where non-state actors such as non-governmental organisations (NGOs) and certification bodies govern the network by influencing the policy and practices of businesses (Cashore et al., 2003). Such systems "do not derive policy making ability from states' sovereign authority" (Bernstein, 2007, p. 349) and are not accountable to them. They are discrete systems of value chain governance (MacDonald, 2007), but this does not mean that the state is not important, since such systems are embedded in the socio-political climate of a specific country, region and local context, which involves a range of other actors, as will be analysed in section 5.5.

One such example is fair trade, which refers to "a critique of the historical inequalities inherent in international trade and to a belief that trade can be made more socially just" (Raynolds and Bennett, 2015, p. 3). The global fair trade movement is well documented as a powerful means of social protection for the poor, with much of this literature focusing on counteracting the negative effects of neoliberal globalisation in order to improve the lives of Latin America's rural poor (Murray et al., 2006; Fridell, 2006) and more widely throughout the global South. For the remainder of this thesis, *fair trade* (two words) will be used when referring to the movement, while *Fairtrade* (one word) will refer to the certification element of the movement, facilitated by the Fairtrade Labelling Organisation (FLO), and be used throughout the remainder of this thesis when referring to Fairtrade-certified products (FLO-Cert).

At its core, fair trade connects producers in the global South with consumers in the global North. The movement historically worked through Alternative Trading Organisations (ATOs) which embed into their business models issues relating to social justice, economic empowerment and equality.

Through a process of mainstreaming, Fairtrade has transitioned over time from:

> "[a] small niche initiative to a movement with global reach. In 2016, consumers in more than 130 countries spent an estimated €7.88 billion on Fairtrade products, almost five times more than only a decade before. This significant growth in sales now benefits more than 1.6million producers in 73 countries" (Fairtrade International, 2017, p. 1).

The movement, which guarantees a Fairtrade minimum price and ensures that this price covers the average costs of production, has played a crucial role in supporting farmers. It has operated in an extremely volatile environment where the price of coffee fluctuates significantly and where the farmers often have limited access to resources to either invest in the quality and quantity of their coffee production or to respond to financial or environment risks such as coffee prices and climate change. In addition to the minimum price, Fairtrade also provides a premium, which is an additional sum of money farmers can invest in social, economic or environmental upgrading projects, which are decided upon democratically by a co-operative or association. Examples include crop improvement programmes, education projects, health initiatives and home improvements: "In 2016, the Premium amounted to €150 million, the highest in Fairtrade's history" (Fairtrade International, 2017, p. 1).

Climate change is threatening Fairtrade farmers' survival, by posing a significant risk to socio-economic systems, livelihoods and food security, reversing years of sustainable development work and negatively influencing farmers' yields (Nelson et al., 2010). A number of studies recount how the Fairtrade Premium in Latin America has been used to finance climate change adaptation programmes and contingency funds against natural hazards (Bacon et al., 2014; Nelson, 2009; Bacon et al., 2015). Fairtrade organisations have used their premium to convert coffee to higher income-generating, diversified and more ecologically sound organic production (Bacon et al., 2014; Murray et al., 2006).

This thesis explores ATO strategies and practices for addressing climate change adaptation, more broadly, and CLR specifically, but it does not attempt to research or justify the causes of climate change, nor does it investigate climate mitigation. It is written on the premise that climate change is indeed occurring and on the understanding that future predictions are based on reliable data from the Intergovernmental Panel on Climate Change (IPCC) and as such are largely correct.

1.4 Framework for Analysis

Taking the case of the coffee-growing region of San Ignacio, northern Peru, illustrated in Figure 1.1, I critically examine power, governance and embeddedness within coffee production networks, thereby providing an empirical base from which to analyse how farmers' responses to climate change are shaped by other actors within alternative trading networks.

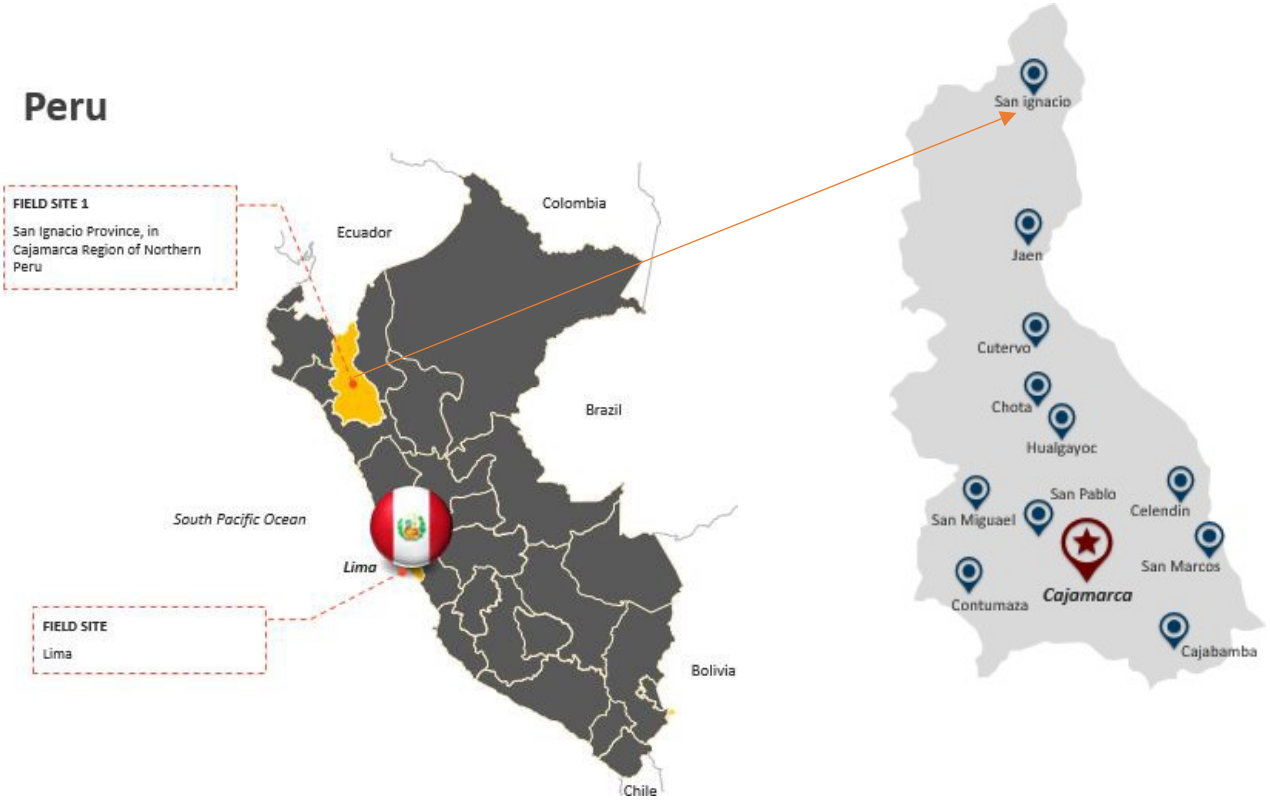

Figure 1.1 Map depicting the field site. Source: author's own

This empirical base will be considered by using the Global Production Network (GPN) framework and its key themes of embeddedness, power and value, which will provide a means of understanding coffee production networks and how climate change adaptation occurs therein. The GPN analytical framework examines interactions and relationships between all actors within a network and explores how their governance, power and values are shaped by, for example, national governments, lead firms, co-operatives and NGOs (Barrientos et al., 2011). The three conceptual categories 'value' (creation, enhancements and capture), 'power' (corporate, collective and institutional) and 'embeddedness' (territorial and network) (Henderson et al., 2002) will be utilised in order to investigate critically how being embedded in alternative trading networks influences farmers' ability to adapt to climate change.

As Coe et al. (2008) argued, the GPN literature has historically failed to "connect the processes of production, distribution and consumption to the natural environment in which they are fundamentally grounded" (Coe et al., 2008, p. 278. Also refer to Hudson, 2001; Dicken, 2007; Bridge, 2008). The situation of farmers in San Ignacio, and particularly the CLR crisis, offers an opportunity to fill this gap by bringing critical perspectives on GPNs into literature-based conversations on climate change adaptation. I highlight the complexity of the CLR challenge, shaped by wider market governance and climate change scenarios, and examine the localised responses of my particular case study ATOs in helping farmers cope with CLR and maintain their livelihoods. Particularly, I look at the value of private voluntary certifications and environmental, economic and social upgrading, and their influence on farmers' agency to adapt to climate change. In so doing, this thesis extends the GPN framework by providing a consideration of the natural environment.

1.5 Scope of the Research, and Research Questions

In order to examine the responses of farmers to climate change and CLR within a global coffee production network, and to consider the socio-political and economic landscape they inhabit, a case study site was selected. Figure 1.1 shows a map of Peru, highlighting the location of San Ignacio, where the three case study co-operatives (Apessi, Aprocassi and Unicafec) are located. The central themes discussed above form the basis of the research questions listed below, which seek to advance knowledge and understanding of how coffee production networks are governed through actors' power and embeddedness within the network, and the roles they play in influencing farmers' agency.

The farmers of San Ignacio are part of alternative trading networks which also include co-operatives, ATOs acting as buyers, farmer field schools and both national and regional government initiatives. This research aims to explore how these actors affect farmers' responses to climate change. In total, three coffee co-operatives, 45 farmers (15 from each of the three co-operatives) and one farmer field school working across the co-operatives were studied, in order to determine how farmers with support for other actors reduce their vulnerability to climate change.

This case study analysis addresses the following overarching research question: "*In what ways does participation in alternative trading networks shape smallholder coffee farmers' ability to adapt to climate change?*" as well as the following sub questions:

Research question 1: "*How do coffee production network actors exert power and influence within the network, and what are the consequences of such influence on the agency of smallholder coffee farmers looking to respond to climate change challenges?*"

This sub-question pulls into focus the role of ATOs as players within the wider global coffee production network, by considering their relationships with farmers. It is addressed in the first of three empirically-driven chapters, Chapter 5, which presents the case study coffee production network and investigates key network actors in terms of the core GPN components embeddedness, value and power, with an overarching focus on governance and their influence on farmers' agency.

Research question 2: "*What are the challenges posed by climate change for smallholder coffee farmers, and how do they adapt to such challenges in the context of power relations operating through alternative trading networks?*"

This sub-question considers climate change challenges facing farmers and the role of ATOs in mitigating their impacts. This question is addressed in Chapter 6 and examined using the critical perspectives introduced in Chapter 2, which connect GPN with the natural environment. The chapter then builds on the farmer-focused approach introduced in Chapter 2 and adopted in Chapter 5, presenting the key challenges of farmers presented through empirical data giving a voice to their lived experiences.

Research question 3: "*In what ways does participation in alternative trading networks increase smallholder coffee farmers' ability to adapt to CLR?*"

This sub-question takes CLR as an example of a particular expression of climate change, allowing for consideration of the role of ATOs in a grounded, empirical way. This sub-question is addressed in Chapter 7.

Research question 4: "*What lessons for corporations, governments and NGOs regarding knowledge transfer and empowerment can be drawn from the research and embedded into new and existing policies and projects?*"

This sub-question considers the limits of participation in ATOs as uncovered in the previous sub- questions, drawing lessons from the research to help improve the security of farmers and networks. This sub-question is addressed in Chapter 8.

1.6 Thesis Structure

The thesis comprises eight chapters in total. This introduction is followed by Chapter 2. The chapter then draws upon the ideas of ideas of climate change, development and sustainable livelihoods. I then present different frameworks developed and adopted by scholars, in order to analyse network actors' responses to such stressors, simultaneously reviewing their strengths, weaknesses and appropriateness for this study. I then argue that GPN and elements of the Global Value Chains (GVC) framework, in particular the concepts of upgrading and strategic coupling, are appropriate analytical devices to aid the exploration of the influence and practice of climate change adaptations in coffee production networks.

Chapter 3 presents the methodological design for the research, beginning with its motivation before presenting the qualitative methods used and introducing my field site, San Ignacio. It then provides a table of my case study co-operatives – Apessi, Aprocassi and Unicafec – and participants – farmers and other state and non-state actors. The chapter then reviews the ethical considerations bound up in the methods used and finally outlines the framework for analysis.

Chapter 4 illustrates the political, social and economic contexts of this research. It begins by exploring the historical power imbalances within the coffee industry, and then it moves on to country-specific conditions, including internal conflicts and political and economic instability, and the collapse of the International Coffee Agreement, which set the scene for the research. The chapter then moves on to discuss the multi-stressor environment in which Peruvian coffee farmers are embedded, investigating climate change, institutional context, the role of upgrading in relation to speciality coffee-growing in northern Peru and the role of co-operatives and private voluntary certifications such as organic and Fairtrade as vehicles of climate change adaptation.

Chapters 5–7 present the empirical findings, debates and arguments derived from nine months of field work and empirical data collection, and five months of analysis, with support from the literature review presented in Chapter 2. Chapter 5 situates the case study alternative coffee production network within the wider conventional coffee production networks in Peru. It then introduces each of the network actors, exploring power, value and embeddedness, drawing on the GPN approach, before investigating the differences an alternative trading network can make to the lives of farmers.

Chapter 6 demonstrates how the challenges of climate change are experienced by coffee producer communities in the context of power relations operating through the alternative trading networks introduced in the previous chapter. It draws upon the role of neoliberal private standards and civil society projects on environmental justice, in order to investigate interventions made by network actors. Furthermore, the chapter places the knowledge and lived experiences of farmers centre stage, in order to evaluate how environmental and economic risks could be managed in this particular sector and in this specific locality, which embodies unique characteristics in terms of its terrain, climate and socio-political context inherent with a country which is so diverse and contains so many microclimates.

Chapter 7 draws upon the key arguments made in Chapters 5 and 6, in order to analyse the 2012/13 CLR crisis. It explores the social, economic and environmental drivers of the disease and then investigates the scale of the crisis in Peru and in particular in San Ignacio, which saw over half of its coffee plantations destroyed, with livelihoods and food security threatened. The chapter then moves on to analyse the case study ATOs, co-operative, farmer field school and state responses to the crisis.

Chapter 8 summarises the research by addressing each of the four research questions, detailing the main arguments and highlighting the contribution of the thesis to knowledge. It then goes on to state the limitations of the research and presents suggestions to practitioners as to how its findings could be used to reduce the vulnerability of farmers, as well as ideas for further research in this area. The chapter also argues that by being embedded in an alternative coffee production network, the three case study co-operatives in San Ignacio are able to support their farmers to reduce their vulnerability through knowledge transfer, training, financial support and upgrading in order to adopt climate change adaptation practices and appropriate responses to the CLR epidemic. However, the success of such interventions is placed at risk due to inadequate state support and wider governance issues related to the distribution of power within the network, which, along with the volatility of pricing, are jeopardising the future of coffee farming in San Ignacio.

Chapter 2. Changing Coffee Production Networks and the Climate Change Challenge: Critical Perspectives

2.1 Brewing up a Storm: a Multi-Stressor Environment for Coffee Farmers

A perfect storm has taken place over the last two decades as the crises posed by both climate change and coffee price volatility have merged to threaten the survival of 125 million smallholder coffee farmers (henceforth 'farmers') across the globe. In coffee- growing countries, from Ethiopia to Peru, Vietnam to Brazil, people are facing severe food shortages and livelihood insecurity. Eakin, Tucker and Castellanos (2005) explored the consequences of these cumulative shocks in Mexico, Guatemala and Honduras, concluding that "while neither price volatility nor drought are unfamiliar to coffee farmers, the combination of these stressors is particularly severe in a context in which sector reforms have altered farmers' access to the institutional mechanisms to manage market volatility" (p. 305). Given the convergence of both climate change and market volatility creating a crisis within the coffee sector, this chapter will gather the tools to understand it, which will require grasping the inequalities of profit distribution and unequal risk regarding climate change, constructing an analytical framework and outlining existing responses.

The chapter is divided into two sections. Section 2.2 frames the literature by unpacking notions of climate change, development and sustainable livelihoods. The section brings together governance, climate change and development geographies literature into the discussion, in order to explore the responses to climate change and governance challenges in Chapters 5-7.

This is followed by section 2.3, which critically investigates the GCC, GVC and GPN frameworks and how they assist in conceptualising this shift in governance. In particular, I employ GPN notions of power, governance and embeddedness in my case study analysis. I also draw upon GVC concepts of upgrading, critically analysing social, economic and environmental upgrading and their ability to support farmers to become more empowered in adapting to climate change and managing market volatility. The chapter concludes with a short summary section, bringing together these areas of discussion to outline simply how they will be applied in the rest of the thesis.

2.2 Unpacking Notions of Climate Change, Development and Sustainable Livelihoods

This sub-section problematises climate change adaptation within coffee production networks in the wider context of development policy and sustainable livelihoods. Coffee has undergone numerous changes in terms of production, distribution and power over the centuries, moving "from Arab monopoly to European colonial product to the sustenance of Latin American nation states to, finally, a globally produced multinational commodity" (Topik, 2003, p. 21). Over time, power has changed hands, moving from producer to importer in the sixteenth century, importer to exporter during the nineteenth century and, more recently, exporter to roaster and national and international institutions, as the world of coffee trading has become increasingly interconnected and interdependent (Gereffi et al., 2001). Such movements of power, in a system where 90% of all coffee that is cultivated in the global South is exported for consumption in the global North (Topik, 2003), has created global inequalities and unequal exchanges arising from the structural features of trade occurring between the two hemispheres (Jaffee, 2014).

Arghiri Emmanuel (1972) coined the phrase 'unequal exchange' in order to describe the exchange that takes place between peripheral (developing) and core (developed) countries. During the exchange, peripheral countries produce goods for consumption in core countries, and core countries retain a larger share of the profits and power (Gereffi and Korzeniewicz, 1994; Austin, 2017). Such inequalities in trade are "a chief mechanism for enabling and maintaining the unfair relations between core and peripheral countries" (Austin, 2017, p. 328) and the modern legacies of colonial practice, and they can still usefully be understood using Emmanuel's 1972 model.

Due to its economic significance as the second most traded commodity in the world, coffee has become emblematic in highlighting the inequalities experienced by smallholder agricultural producers selling globally-traded commodities (Hallam, 2003). Even today, despite significant growth, the industry has become increasingly uncertain, as it faces risks that threaten to halt production, curtail market, reduce margins and threaten the entire coffee GPNS. The following sub-sections will detail the economic and environmental factors which have impacted on the lives of farmers and so which are relevant to the understanding of the uneven distribution of vulnerabilities throughout the coffee production network (Rice, 2003).

2.2.1 Climate change and the coffee community

The negative effects of climate change can now be projected with a relatively high degree of certainty, with the United Nations (UN), for instance, stating that "there is alarming evidence that important tipping points, leading to irreversible changes in major ecosystems and the planetary climate system, may have already been reached if not passed" (UN, 2019, np).

Climate change vulnerability is defined by the Intergovernmental Panel on Climate Change (IPCC) as "the degree to which a system is susceptible to, and unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate change and variation to which a system is exposed, its sensitivity, and its adaptive capacity" (McCarthy et al., 2001, p. 995), and it comprises the following:

- Adaptive capacity, which is the ability of a system to adjust and adapt via changes in practices, processes, structures and behaviours, in order to counteract or offset actual or predicted climate change. This often involves access to information, training (knowledge and skills), resources and technology;
- Sensitivity, which is the degree to which a system will positively or negatively react and respond to climate change, and, lastly;
- Exposure, which is the degree to which people, livelihoods, ecosystems, economic, social or cultural assets are adversely affected by climate change (McCarthy et al., 2001).

There is a growing body of literature documenting the impact of climate change on livelihoods throughout the globe (Field et al., 2014). Unseasonal seasons, increasing temperatures and increased rainfall are collectively predicted to cause shifting weather patterns, increasing temperatures and sea level rises which in turn are all predicted to "make poverty reduction more difficult, further erode food security and prolong and create existing new poverty traps" (Ayuk et al 2019, p62). Poverty compounds the negative effects of climate change, depriving people of the means to manage risks alone: "[W]ith few or no assets, self-insurance is impossible… and with high default risks, group insurance mechanisms are often closed off" (World Bank 2014, p. 146). This highlights the need to analyse climate change vulnerability and adaptation in the wider context of development stressors and constraints, since the livelihoods of 125 million people depend upon the successful production of coffee (Malhotra, 2003).

As a crop, coffee is highly dependent on a specific set of environmental conditions in order to grow. Robusta coffee accounts for 30% of the world's production, and the remaining 70% is comprised of Arabica coffee, which requires "a climate with an annual mean temperature of about 20°C and over 1200mm annual rainfall" (Bunn et al., 2015, p. 2). Temperatures which exceed this level for an extended period of time reduce yields and quality, and ultimately climatic conditions can lead to the area being uncultivatable for coffee production (DaMatta and Ramalho, 2006).

There is strong evidence to suggest that climate change is negatively affecting coffee farmers, due to changes in rainfall patterns, temperatures and the incidence of pests and diseases, all of which alter the yield and quality of their crops and result, in many cases, in a sharp decrease in the prices they are paid (see, for example, Gay et al., 2006; Schroth et al., 2009; Laderach et al., 2011; Bunn et al., 2015; Ovalle-Rivera et al., 2015; Bunn et al., 2018).

Governments, large coffee buyers (including Starbucks and Costa), non-governmental organisations (NGOs), governing bodies like the International Coffee Organisation (ICO), and coffee farmers are publicly acknowledging the magnitude of the threat of climate change to the entire coffee production network. Additionally, there has been an urgent call from actors within the industry for mitigating actions to reduce carbon emissions, without which the industry predicts that "the global area suitable for coffee production [will be cut] by as much as 50 per cent by 2050. By 2080, wild coffee, an important genetic resource, could become extinct" (Watts, 2016, p. 1).

2.2.2 Contested development

As touched on in the previous section, the effects of climate change interact with the financial situation of farmers. This situation can be placed within wider models of and approaches to 'development', which will be discussed here. The analysis of development captured in this section provides a grounding from which to understand and analyse notions of 'upgrading', discussed in section 2.3.2, and sustainable livelihoods, discussed in section 2.2.4 which are built upon models of development.

> "The issue of global climate change—which itself is characterized by tremendous inequality in vulnerability, responsibility, and mitigation—can therefore not be viewed, analyzed, or responded to in isolation from the larger crisis of global inequality." (Parks and Roberts, 2006, p. 14).

This thesis draws upon this point eloquently made by Roberts and Parks (2006), arguing that in our interconnected and interdependent world we cannot look in isolation at something as multi-sited as climate change. The dynamics of politics, the environment, economics and society are all interwoven in responses to climate change on global, national and local levels. Manuel-Navarrete (2010), for instance, argues that "climate change research needs to dedicate more analytical attention to social power; not only due to justice and other moral imperatives, but because power relations will determine how societies choose to respond" (p. 1).

The notion of development is highly contested both in theory and practice. Historically, development policies and practices have played a crucial role in coffee-producing countries, and with the current challenges faced by farmers, the development of both policies and actions remains an important element in securing farmers' livelihoods and food security. This section critically analyses notions of development and examines contested theories thereon, in order to highlight their influence on the climate change adaptations in Chapters 5-7.

> "Development is a multidimensional undertaking to achieve a higher quality of life for all people. Economic development, social development and environmental protection are interdependent and mutually reinforcing components of sustainable development" (UN, 1997, paragraph 1).

This understanding of development implies a 'linear' model of growth whereby a nation transitions from 'traditional' to 'modern' (Rostow and Rostow, 1990), thereby inferring path dependency as a nation transitions from a subsistence agrarian base, through several levels of industrialisation, where they capitalise on exploiting resources, increasing incomes and reducing poverty (Rostow and Rostow, 1990). The Green Revolution is a good example of this sequential development in practice. A series of policies issued by the U.S.'s President Truman were introduced to help societies from low-income countries transform into more economically advanced nations. Such polices promoted "industrialization, high degrees of urbanization and education, technification of agriculture, and widespread adoption of the values and principles of modernity, including particular forms of order, rationality and individual orientation" (Escobar, 1997, p. 497). Such changes with regards to agricultural systems were referred to as the "Green Revolution", whereby 'green' "signified verdant abundance, the 'revolution' underlined the change from extensive, subsistence agriculture to extensive, market agriculture. At the heart of the Revolution was the idealisation of a modern, industrial, capitalist society in which a small percentage of people supplied food commercially for a large, non-agricultural sector" (Shepherd, 2019, p. 1). However, there were consequences to such intensive interventions – Latin America, Asia and Africa all experienced environmental degradation and

a heavy reliance of both the state and external markets support which significantly changed the lives of the rural poor in these 'peripheral' countries. Such prescriptive top-down policies, which characterised development during the post-war era, have been heavily contested. Theorists who advocate dependency theory, such as Leys (1996), argue that 'developing countries' are not merely immature versions of 'developed countries'; rather, they are countries situated within a world system, where former colonies and their natural resources, labour and markets continue to be exploited by core nations (Leys, 1996). This exploitation creates hierarchical division between the 'central' and 'peripheral' countries, and the constructed socio- political global landscape replicates the power imbalances of the colonial era (Ferguson, 1990; Escobar, 1995; Kothari, 2006). In turn, such power imbalances and exploitation have led to countries in the global South participating in world trade from a position of disadvantage, because "whatever they undertake and whatever they produce, they always exchange a larger amount of their national labour for a smaller amount foreign labour" (Emmanuel, 1972, p. xxxi).

Historic development policies have been replaced with more targeted approaches specific to each country's needs. This, combined with the emergence of unconditional capital from newly industrialised countries such as China (which ranks as one of the largest outward investors in developing countries) (Cai, 1999), has changed the landscape of economic development. Peru, like many other countries, has actively promoted its country and resources globally in order to attract foreign investment, with the aim of achieving economic development (Gore, 2000). Peru is the fourth largest recipient of foreign direct investment (FDI) in Latin America (Kechagia, 2016), with funds coming primarily from Europe (UK and Spain) and the United States.

In the past, the International Monetary Fund (IMF) and the International Bank for Reconstruction and Development (IBRD) facilitated the flow of financial capital from developed countries to developing countries through structural adjustment programmes (SAPs), which provided loans to countries in economic crisis; however, they placed a number of conditions on these loans, insisting that countries execute specific policies in order to access new loans or reduce rates of outstanding advances. SAPs were implemented under Alberto Fujimori's government in the 1990s, and the implications for Peruvian coffee farmers in this regard are detailed in Chapter 4.

The implementation of SAPs "came to embody a 'Washington Consensus[2]' of 'neoliberal or market-led—growth strategies, to be promoted globally via both direct stipulations in loan agreements and advisory influence more generally" (Thomson et al., 2017, p. 3). Their policies, which had previously focused on import substitution industrialisation (ISI), were replaced by export-focused policies as part of the trade liberalisation process. Developingnations' climatic conditions, together with their high unemployment rates, cheap labour and limited labour regulations, provided a conducive environment for labour-intensive work such as coffee production at far lower rates than could be achieved in developed countries.

The analysis of development within this section summarises the critical research that challenges dominant ideas of development. It will be utilised within this thesis in order to analyse critically development-based interventions such as Fairtrade, which claims to develop producers' lives through upgrading, along with climate change adaptations implemented in my case study area.

2.2.3 Sustainable livelihoods

While theories and approaches to development tend to focus on the economy- or nation-scale, at the level of the farmer there is a need for economic and personal survival. Sustainable livelihoods are a way of thinking about this survival and how it is ensured.

The Brundtland Commission, in 1987, published "Our Common Future", the first report to define and promote sustainable livelihoods on the world stage, defining sustainable livelihoods as:

> "[…] development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts: the concept of 'needs', in particular the essential needs of the world's poor, to which overriding priority should be given; and the idea of limitations imposed by the state of technology and social organisation on the environment's ability to meet present and future needs" (Brundtland, 1987, p. 43).

The report formed the basis for what was later termed the 'sustainable livelihoods approach' (SLA), which drew upon many aspects of the Brundtland report, including citizen participation in decision making, self-reliance and sustainability (Brundtland, 1987) – all of which became key elements in future international development policy, such as the UN's Environmental Conference, which took place in Rio in 1992, and the World Summit for Social Development, which took place in Copenhagen in 1995.

[2] **Washington Consensus** is a set of ten economic policy prescriptions, which, combined, were considered the 'standard' reform package to promote economic growth in developing countries by the IMF, WB and other such institutions based in Washington D.C

The work of the Brundtland Commission was advanced by Chambers and Conway (1992), who, in their paper 'Sustainable rural livelihoods: practical concepts for the 21st century', define a livelihood as:

> "[comprising] the capabilities, assets (stores, resources, claims and access) and activities required for a means of living; a livelihood is sustainable which can cope with and recover from stress and shocks, maintain or enhance its capabilities and assets, and provide sustainable livelihood opportunities for the next generation; and which contributes net benefits to other livelihoods at the local and global levels and in the short and long term" (Chambers and Conway, 1992, p. 7).

Their paper provided a critical analysis of previous literature on livelihoods, determining that much of it was inadequate in capturing the complexities of rural life (Chambers and Conway, 1992). The authors went on to propose that three concepts were crucial to sustainable livelihoods: capability, equity and sustainability, thus linking back to the work of Sen (1981), Jodha (1988) and others. They then proceeded to present a framework through which to achieve development: (i) Enhancing capability, which they stated involves "being adaptable, versatile, quick to change, well-informed, and able to exploit diverse, complicating, and changing opportunities"; (ii) Improving equity, i.e. "giving priority to the capabilities, assets and access of the poorer, including minorities and women,"; and lastly (iii) increasing social sustainability, namely "reducing vulnerability by restraining external stress, minimising shocks, and providing safety nets, so that poor people do not become poorer" (Chambers and Conway, 1992, pp. 22-23).

These concepts became interwoven and embedded into various policies developed by a multitude of institutions, including the Overseas Development Institute (ODI), The International Institute for Environment and Development (IIED) and the Society for International Development (SID). In 1998, the Institute of Development Studies (IDS), in a working paper entitled 'Sustainable Rural Livelihoods a Framework for Analysis', argued that any analysis of sustainable rural livelihoods (SRLs) should ask:

> "Given a particular *context* (of policy setting, politics, history, agro ecology and socio-economic conditions), what combination of *livelihood resources* (different kinds of capital) result in the ability to follow what combination of *livelihood strategies* (agricultural intensification/extensification, livelihood diversification and migration) with what *outcomes*? Of particular interest in this framework are the *institutional processes* (embedded in a matrix of formal and informal institutions and organisations) which mediate the ability to carry out such strategies and achieve (or not) such outcomes" (Scoones, 1998, p. 3 italics in original).

Farmers have experienced changes in governance, environmental stressors and top-down development policy. The present research draws on the general principles of sustainable livelihoods in thinking about the lived experiences of coffee farmers within a global production network which will be critically examined in Chapters 6 in relation to climate change adaptations and Chapter 7, in relation to the responses to CLR.

In this context, the Brundtland Report is particularly pertinent to my research area, which observes the effects of both the Green Revolution (refer to section 2.2.3) and historic development initiatives such as SAPs, together with changes in governance (trade liberalisation) that resulted in the promotion of export-led growth and led to environmental degradation, thereby threatening future generations' ability to meet their own needs, due to historical exploitation of the land. The SLF framework and the notions of sustainable livelihoods captured in the Brundtland report are used in Chapter 6 in order to frame the analysis of climate change adaptations, and to examine in Chapter 7 responses to the coffee leaf rust crisis.

2.2.4 Summary

Section 2.2 considers climate change, historical coffee governance and the broader concepts of development, in addition to highlighting the multitude of Western policies that exacerbate the structural dilemmas facing developing countries with regards to sustainable development and poverty alleviation. Such policies include those created and implemented by the IMF, WB and other IFIs which promoted the bi-lateral conditionality accompanying SAPs, thus "limit[ing] national autonomy in setting policy, tariff escalation, agricultural protectionism, bilateral investment treaties and other 'deep integration' agreements, commodity support funds" (Roberts and Parks, 2006, p. 14).

These dramatic changes in power and governance have occurred not only in the case of coffee, but also across a range of industries, from manufacturing, to apparel and agriculture, leading scholars to search for new ways to analyse transnational trade. Furthermore, as the fragmentation of production has prompted flows of goods, resources, knowledge and money between "national and local economies, and the firms and individuals embedded in them have come into closer contact through trade and foreign direct investment, the complexity of the analytical problem has increased" (Sturgeon et al., 2008, p. 297).

The increasing power of transnational firms has rendered former state-centric forms of analysis inadequate in understanding and framing modern trading relationships and interactions. Such dramatic changes to the trading and governance landscapes have led scholars to search for ways of making sense of and analysing new governance and power dynamics within such globalised networks.

The following sub-section will therefore explore concepts under the global commodity chains (GCCs), global value chains (GVCs) and global production networks (GPNs) frameworks, arguing on the strengths and weaknesses of the frameworks. They will be utilised throughout the remainder of this thesis, in order to explore global coffee production networks and how they influence farmers' ability to adapt to climate change.

2.3 Framework for Analysis

Building on critical engagement with the notions of development and sustainability in the previous section, this section will consider three frameworks: global commodity chains (GCC), global value chains (GVCs) and global production networks (GPNs), each of which has been used in the literature to understand those problems. I will show where these frameworks help clarify my case study, and where they do not, and use them to form the analytical framework used in the rest of the thesis.

2.3.1 Global commodity chains

In light of economic globalisation, GCC was the first of a family of approaches to emerge in an attempt to provide an analytical framework to analyse this new landscape. GCC developed from world-systems theory, developed by Immanuel Wallerstein (1987), who argued that that the world-system comprises mechanisms that facilitate the redistribution of profit (surplus value) from countries on the periphery to countries in the core. It argues further that such transactions occurring through the market result in exploitative relationships between these two cohorts. Hopkins and Wallerstein (1986) sought to develop an analytical tool which would assist them in gaining a deeper understanding of time and space in the production, distribution and retailing of goods. In doing so, they were the first to define the commodity chain, which they used to present the sequence of activities and division of labour taking place in the production and processing of goods from raw products to final retail product.

The sequences of activities, named by the authors as 'nodes', are clear within the coffee GCC. The first stage of production occurs at the site of production in the global South. Here, the raw

product, ‘the cherry’, undergoes a number of processes, i.e. harvesting, drying, de-pulping and milling, in order to produce an exportable product, namely green coffee beans. These green coffee beans are then exported to the global North, where they are roasted, packaged, marketed, sold and consumed.

Gereffi (1994) made a key distinction between ‘producer-driven’ and ‘buyer-driven’ commodity chains, depending on which actor has the most influence. Producer-driven chains are characterised by barriers to entry, resulting from the need to acquire capital and technology, intensive production and economies of scale. Buyer-driven chains are characterised by lower barriers to entry, with buyers exerting their power through design and marketing functions. Recent studies in this arena argue that there has been an increase in the number of ‘buyer-driven’ agro-food chains exerting their power and influence over networks and product specifications (Gibbon, 2001; Ponte, 2002; Dolan and Humphrey, 2000). Scholars such as Flynn, Marsden and Harrison (2005) expand this view of agro-food chains by exploring both government policies and consumer movements whilst still acknowledging the buyer-driven element of the chains, arguing “in the UK at least, a retail-led form of food governance has emerged” (Flynn et al., 2005, p. ix). In addition, GVC governance (discussed in the sub-section below) enables us to determine both which actor ‘drives’ the chain and how this influences the distribution of benefits between value chain actors (Tallontire and Greenhalgh, 2005). The buyer-driven elements of GCC will be drawn upon herein when examining coffee production and changes to governance within the coffee industry. However, many of the other concepts of GCC will not be used, as they have been refined and built upon within both GVC and GPN, as illustrated in the following two sub-sections.

2.3.2 Global value chains

The GCC framework, over time, has been refined and adapted, and in the mid-1990s, Gereffi produced the GVC framework (Gereffi and Korzeniewicz, 1994; Gereffi, 1999; Gereffi, Humphrey et al., 2005). Whereas GCCs were predominately used to analyse manufacturing production chains, GVCs have been utilised to analyse agricultural commodities such as coffee (see for example Gibbon, 2001; Ponte, 2004; Daviron and Ponte, 2005). The conceptual framework provides a way to analyse the conditions of farmers within agri-food chains: “it specifies the role and position of smallholders within the intersection of global and local agrifood value chains by mapping the geographic dispersion and organizational integration of these chains” (Lee et al., 2012, p. 12326).

The GVC framework illuminated the role of value creation, value capture and value differentiation (Gereffi et al., 2005). Value chains, as highlighted by Sturgeon (2001), do not exist in vacuums but are situated instead within a wider institutional context. The liberalisation of markets and the addition of foreign investment have resulted in a sharp rise in companies and brands based in the global North sourcing food products from the global South, where labour and land are cheaper, thus adding farmers into their value chains. Along with these changes in sourcing, power dynamics within the value chain have also transformed, with large transnational companies and brands stepping in to the space left by the state, exerting their power and influence over the chain (as will be discussed in section 4.3.3 in relation to the collapse of the ICA and neoliberal development policies): "Diminished government capabilities following structural adjustment and the inflow of agrifood multinationals into producing countries have undermined the distributive power of developing country producers vis-à-vis global buyers, resulting in the declining gains of developing nations in the world agrifood trade" (Lee et al., 2012, p. 12326). Such transformations led to Gereffi's original GVC analysis expanding to include "governance and institutional structures" (Gibbon, 2001; Humphrey and Schmitz, 2002). These two additions, namely governance and institutions, allowed GVCs to fully encompass the influence of space, place and governance "represent[ing] the multi-scalar contexts that explain how economic actors are embedded within particular geographies" (Neilson and Pritchard, 2011, p. 8). These changes reflected the notion that GVCs were situated within complex and fluid environments, where power relations and levels of influence and control differed throughout the chain. They acknowledged that the processes or 'nodes' which occur through the GVC do not act in isolation but rather influence other nodes throughout the chain. Such conceptual tools enable us to "identify leverage points in agrifood chains; (i.e. those chain actors who can bring about desirable or deleterious changes for smallholders)" (Lee et al., 2012, p. 12326). Having analysed the broader GVC concepts above, it is important to analyse another valuable contribution of the GVC model of analysis, 'upgrading'. This concept will be used in Chapters 5, 6 and 7 to analyse the responses of farmers in alternative trading networks. Essentially, it "provides a framework to chart the ways that participants can alter their positions within chains" (Neilson and Pritchard, 2011, p. 42), whereby producers, often in the developing world, are able to move up the value chain by making products with added value (Gibbon 2008).

The process of upgrading involves acquiring skills and capabilities in order to access new market segments (Humphrey and Memedovic, 2003). These new skills can be gained through producers' connections to down-stream value chain actors (Neilson and Pritchard, 2011), and such interactions support the flow of knowledge and learning, thus supporting producers to

move up the value chain.

Humphrey and Schmitz (2002) made an important contribution to the literature by defining four key upgrading characteristics: (i) process upgrading, which involves the transformation of inputs into outputs in a more efficient manner, either through the use of technology or reorganisation of the production system; (ii) product upgrading, transitioning into higher-value product lines; (iii) functional upgrading, obtaining new functions or discarding old ones; and lastly (iv) inter-sectoral upgrading, utilising new knowledge and/or functions to enter into new chains in different sectors (Humphrey and Schmitz, 2002; Humphrey and Schmitz, 2004).

There has been good deal of analysis as to whether particular forms of governance help or hinder upgrading within the value chain framework. I will be adding to this analysis by applying the concept of upgrading to my field site in Chapters 5-7. Gibbon (2008) argues that Humphrey and Schmitz's (2002) classification is a useful starting point but one which makes it "difficult to distinguish product and process upgrading in the case of agricultural products (for example, the organic process generates a new category of product)" (Gibbon, 2008, p. 44). Gibbon goes on to suggest that a more useful way of analysing the relationship between governance and upgrading in GVCs is through a detailed empirical analysis of a particular chain. Exploring the role of upgrading in a coffee GVC in terms of both improving the quality and accessing the speciality segment of the market by converting to organic and Fairtrade, provides a useful lens through which to explore and analyse the process of climate change adaptation, not just from an economic upgrading viewpoint, but also in terms of social and environmental upgrading (refer to Figure 2.1). This approach to the analysis of upgrading will be adopted in Chapters 5-7 and will explore economic, social and environmental upgrading within a coffee production network.

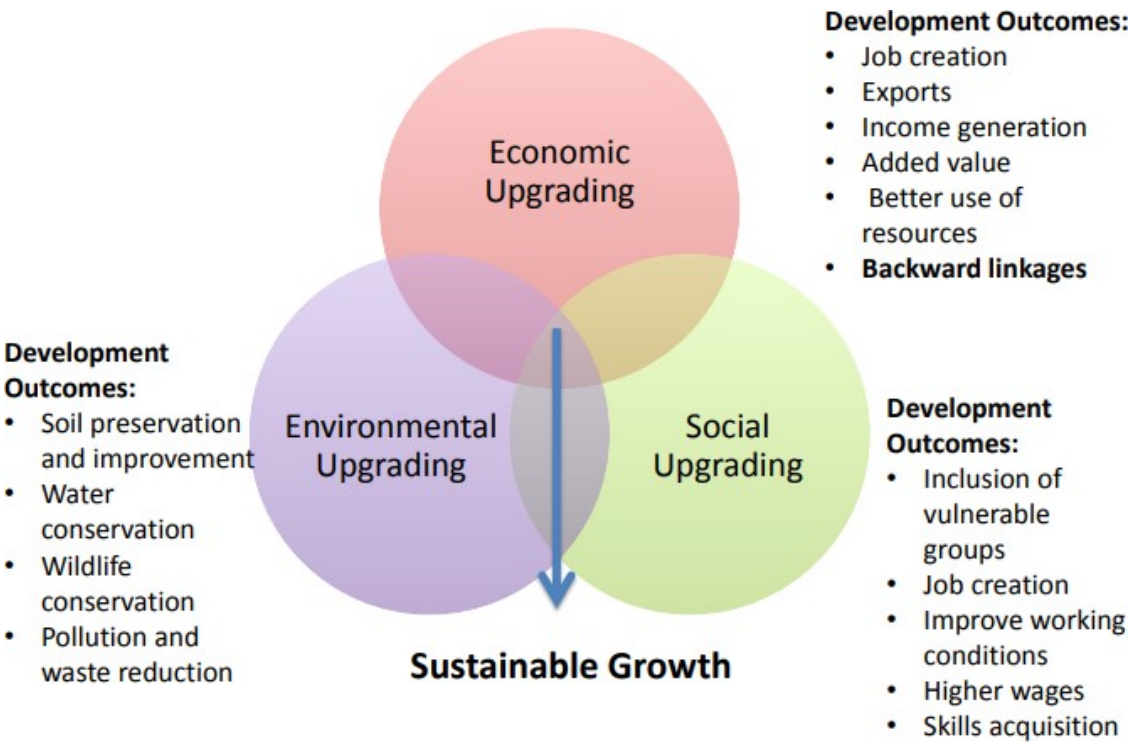

Figure 2.1 Upgrading and sustainable growth of GVCs. Source: Gereffi (2016, p. 10).

A key factor in understanding upgrading is the concept of the 'cluster', defined as "a geographic concentration of interconnected economic agents (firms and individuals), including suppliers, service providers and supporting organisations, such as local governments, non-governmental organisations (NGOs), co-operatives and business associations" (Puppim de Oliveira and de Oliveira Cerqueira Fortes, 2014, p. 367).

Within the broader models of development and sustainability critically analysed in section 2.2 above, coffee commodity clusters in the global South are often required to innovate and upgrade their products and production processes, to maximise their chances of attaining economic and social sustainability, Upgrading is one way to think about this process. The three types of upgrading are:

- Social upgrading, which involves raising the quality of employment for workers, as social actors, whilst simultaneously improving their rights and entitlements (Barrientos et al., 2011). Development outcomes for social upgrading include the inclusion of vulnerable groups, job creation, improved working conditions, higher wages and skills acquisition.
- "Economic upgrading means enabling local producers to achieve higher levels of productivity and to move into higher value-added aspects of production" (Puppim de Oliveira and de Oliveira Cerqueira Fortes, 2014, p. 368). Examples of this type of

upgrading within the coffee sector include speciality coffee, which opens up access to markets, increases farmers' value capture, as they are paid a premium for high-quality speciality coffee, and initiating communication channels between farmers and buyers (Puppim de Oliveira and de Oliveira Cerqueira Fortes, 2014, Cammett, 2006, Milberg and Winkler, 2011). Development outcomes for economic upgrading include job creation, accessing export markets, income generation, increased value addition and value capture and improved use of resources (Gereffi and Lee, 2016).

- Environmental upgrading, which occurs when a company (or co-operative in this instance) improves its environmental performance through production or processes. Jeppesen and Hansen (2004) argue that the most common form of collaboration is when a foreign firm sets environmental standards for its Third World partners. This includes, for example, "requirements to be certified according to an environmental management standard" (p. 263) such as organic. Development outcomes for environmental upgrading include soil preservation, wildlife conservation, water conservation and pollution and waste reduction (Gereffi and Lee, 2016).

All three forms of upgrading will be interwoven into the analysis of empirical data within Chapters 5-7, which examine ways in which producers' participation in alternative global value chains "may enable small producers [smallholder coffee farmers] to adopt managerial and technological innovations that protect the environment and improve the conditions of workers in developing countries" (Puppim de Oliveira and de Oliveira Cerqueira Fortes, 2014, p. 365).

Despite a significant amount of upgrading occurring in the global South, the process interacts with power dynamics in the value chain so that a high proportion of the value added occurs within consuming countries in the global North. Increasingly, the value added for all kinds of coffee ends up in consuming countries. Green coffee beans (refer to 2.3.1, which describes the coffee processing chain) are graded according to their quality, with farmers getting paid more for high-grade coffee; however, the majority of the value added remains with roasters and retailers after the coffee has been roasted (turned into brown coffee beans), ground and sold (Daviron and Ponte, 2005). These changes in power and the distribution of profits are weighted towards consuming countries, due to the changes in the governance of the coffee GPN which will be discussed in Chapter 4, section 4.3.3. These changes have contributed to what Ponte (2002, p. 19) refers to as the "latte revolution," whereby consumer options for coffee consumption have expanded through increased variation of products. Roasters and retailers capture increasingly more profit downstream, as expensive non-coffee components, such as

wages, packaging and marketing, constitute an increasing share of the total retail price (Lewin et al., 2004).

The GVC framework's major weakness is its linear model of analysis, which follows a product from producer to buyer in a vertical manner but misses the complexity of the environment in which the actors are situated. Post-colonial commodities and places, such as coffee and Peru, respectively, are complex and steeped in historical power imbalances, alongside geographical complexities surrounding the division of labour, allocation of resources, place-based politics and national and international institutions. Scholars such as Coe, Dicken, Hess and Yeung (Coe, Hess et al., 2004; Coe, Dicken et al., 2008; Coe and Yeung, 2015) argue that real-world global trading is a "highly complex network structure in which there are intricate links – horizontal, diagonal, as well as vertical – forming multi-dimensional, multi-layered lattices of economic activity" (Henderson et al., 2002, p. 442). This argument is supported by Henderson et al. (2002), Hughes (2001) and Raynolds (2004), who stress the importance of conceptualising processes in a non-linear manner.

The following section critically explores the GPN framework, in order to evaluate its abilityto respond to the overarching research question "*In what ways does participation in alternative trading networks shape smallholder coffee farmers' ability to adapt to climate change?*" Building upon the work of GCCs and GVCs, GPNs offer a deeper level of analysis, exploring not only the global value chain, but also the wider environment in which it is situated, thereby investigating the institutional settings, standards, regulations and embeddedness that are at play within a complex multi-scalar network.

2.3.3 Global production networks

Building upon the linear, uni-directional form of analysis posed by GVC, the GPN approach provides a framework from which to examine both the horizontal and vertical dimensions of governance, which is something that scholars such as Nelson and Tallontire (2014) call for in order to scrutinise the "nature of engagement of local actors in value chains and how they may shape governance structures, processes and outcomes, particularly in the context of multi-stakeholder initiatives" (Nelson and Tallontire, 2014, p. 482) such as Fairtrade.

GPN analysis "examine[s] not only the interaction between lead firms and suppliers, but also the whole range of actors that contribute to influencing and shaping global production, such as national governments, multilateral organizations, and international trade unions and non-governmental organizations" (Barrientos et al., 2011, p. 321). In addition, it places emphasis on

the interconnectedness of actors within the network and the institutional contexts in which it is situated (Henderson et al., 2002) and aligns with Castells' argument that the world has changed from a "space of places" into a "space of flows" (Castells, 2000). The GPN framework for analysis illustrates the three key conceptual categories, namely value (creation, enhancements and capture), power (corporate, collective and institutional) and embeddedness (territorial and network) (Henderson et al., 2002), and importantly, it places more importance on spatiality and economic geography (Hughes, 2005). The GPN framework has since incorporated a third dimension – societal embeddedness (Hess, 2004; Hughes et al., 2008).

Understanding spatial relationships is central to the GPN approach, in that "specific spatial configurations are an inherent element of all networks; each GPN can be mapped by 'placing' its agents and sketching their mutual connection" (Henderson et al., 2002, p. 447). This mapping exercise is utilised in Chapter 5, which illustrates a conventional GPN and the case study GPN. Another aspect of spatiality that needs to be acknowledged within GPNs is the multi-scalar nature of the networks, a factor which has often been omitted from much of the GVC literature. Blair (2005) and Gibbon and Ponte (2005) argue for an expansion of the GVC framework, in order to account for the influences of institutions and regulatory structures. This is addressed within the GPN literature, which states that the multi-scalar "networks are built- up and transformed over time by a multiplicity of agents with asymmetrical influence and power" (Henderson et al., 2002, p. 447), whereby aspects of value and power circulate between the local, regional, national and global.

The focus of both the GVC and the GPN literature is lead firm-centric (Barrientos et al., 2003; Pegler and Knorringa, 2007; Coe and Jordhus-Lier, 2011), viewing the producer, or in the case of this thesis the farmer, as peripheral in terms of influence. This thesis uses the insight that power relations within GPNs are heavily weighted towards the lead firm, but it nevertheless aims to investigate the research from a farmer-focused stance in regard to both collection and analysis of data, thereby gaining an insight into the lived experiences of farmers. It is important first to define and deconstruct the three conceptual categories value, power and embeddedness, as this will then form the basis of the qualitative analysis.

The GPN approach acknowledges different types of power and elements that influence its movements, "recognis[ing] collective power (e.g., trade unions, employers' associations, NGOs, etc.) as well as being well positioned to recognise the state as a key actor within global production" (Horner, 2017, p. 4). This move towards a broader approach is a development within the GPN literature, and it acknowledges that the state remains an important actor in

GPNs. This in turn allows for the combination of both state- and firm-centric approaches for development policy intervention (see for example Carmody et al., 2012; Mosley, 2005) and even more recently in economic geography (Gereffi and Sturgeon, 2013; Kaplinsky and Morris, 2016). This is fundamental to my research, which critically analyses the collective power of co-operatives and NGOs, in addition to the state, when responding to the challenges faced by farmers.

Acknowledging the role of the nation state has turned scholarly attention toward strategic coupling, which is a key notion within the GPN framework for analysis and is defined as "a mutually dependent and constitutive process involving shared interests and co-operation between two or more groups of actors who otherwise might not act in tandem for a common strategic objective" (Yeung, 2009, p. 332). The concept has three key characteristics. The first is that it provides a common goal for actors across different spatial scales, from local stakeholders to global actors, bringing them together to work collaboratively: "In other words, many of the key strategic decisions that that determine the nature of coupling within a particular region are taken outside its bounds by actors associated with other spatial scales (for example, national, global)" (Coe and Yeung, 2015, p. 20). The second is that strategic coupling requires continuous active participation, and the third is that it is fluid and time-space contingent, and such actors within the network may experience decoupling and recoupling as market demands and institutional conditions continuously transform (MacKinnon, 2011).

Strategic coupling is interlinked with upgrading, which was discussed in section 2.4.2, in that "strategic coupling determines the boost of upgrading at the industry level and could have a real influence on local and regional development trajectories" (Sanz-Ibáñez and Clavé, 2016, p. 3). GPN analysis provides several examples of regional development through strategic coupling, when "region-specific economies can complement the strategic needs of lead firms in global production networks" (Coe and Yeung, 2015, p. 19). Within the coffee industry, for example, place-based marketing is a widely known route to adding value (Neilson et al., 2018b), particularly within the speciality coffee market (Teuber, 2010), which is a crucial component of this research. This prompts a process of strategic coupling, during which the competitive advantages of regions match with the strategic need to lead firms in GPNs (Coe and Yeung, 2015).

However, this does not always benefit producing countries. As described by Daviron and Ponte (2005), there is currently both a coffee boom in consuming countries and a coffee crisis in producing countries occurring simultaneously, in what they call the "coffee paradox" (Daviron

and Ponte, 2005, p. 160). To add another layer of complexity, the coffee market is experiencing an over-supply of low-quality coffee and a shortage of high-quality speciality coffee. One way to understand this paradox is to explore market power within the coffee production network, which shall be done in Chapter 5.

A final concept provided by the GPN approach, which will be key to my analytical framework, is network embeddedness. Hess's (2004) understanding of network embeddedness recognises governance mechanisms throughout different layers of the production network that constitute a 'heterogeneous' GPN pattern (Hess, 2004, p. 180): "Under the notion of 'network embeddedness', trust between network agents can be 'institutionalized' in one form or another, for successful stable and reciprocal relationships" (Yang and Liao, 2010, p. 202). Network embeddedness will be utilised throughout the thesis, to provide a map of the network actors (the case study map of connectedness will be presented in Chapter 5) and a framework in which to understand the relationships between network actors and the governance mechanisms at play. From there, I shall draw upon Henderson et al. (2002) to describe network embeddedness in a GPN context, to depict the relational and structural nature of the relationships of a network of actors, be they individual (at varying scales) or organisational. While this definition is an excellent starting point, there is a need to flesh out the various nuances of network embeddedness, to systematise our understandings of the concept. Relational embeddedness primarily consists of the social content of a tie, i.e. the cohesiveness (affectual or exchange) within dyadic relations between actors in networks (Granovetter, 1985; Gulati and Gargiulo, 1999). I will explicate this relationality under network architecture, stability and durability (as suggested in Hess, 2004). Structural embeddedness refers to the broad network setting of social relationships between actors, looking more at the positional aspects (Emirbayer and Goodwin, 1994), which I explore through network structure.

2.3.4 Summary

Having considered the strengths and shortcomings of GCC, GVC and GPN, I argue for the adoption of the GPN framework, in order to analyse the global coffee production network. The GPN framework views coffee production networks as interconnected political and economic systems through which political power and environmental challenges flow. Moreover, it provides a multi-scalar and multifaceted lens through which to investigate value creation and appropriation, power dynamics and influence, acknowledging the role of geography through strategic coupling, a factor which both stabilises and creates tension in the network (Levy 2008). I also draw upon the agency of network actors specifically in relation to alternative trading

networks, in order to both mobilise and distribute resources (monetary, knowledge and materials) and form alliances and networks through inter-sectoral partnerships.

GCC made a valuable contribution in terms of the buyer-driven commodity chain, which will be incorporated into my analytical framework in order to investigate the influence and power of coffee buyers in supporting farmers to adapt to climate chain, and GVC's notions of 'upgrading' will be linked to the GPN concepts of value creation, enhancement and capture. These concepts will be utilised during the analysis, in order to identify how farmers are positioning themselves within the network and how this influences their ability to adapt to climate change.

One of the fundamental omissions from much of the GVC and GPN literature is failing to acknowledge the interdependent nature of agribusiness, whereby the processes involved in producing the raw product and through to processing, distributing and consuming are fundamentally connected with the natural environment (Hudson, 2001; Coe et al., 2008). This thesis aims to contribute to the limited GPN literature with regards to the natural environment by gaining a deeper understanding of the symbiotic nature of the former and the production of goods, especially in an agri-food industry such as coffee production. Bringing together two of the most fundamental challenges of our generation, globalisation and climate change, the thesis explores issues related to maintaining sustainable livelihoods of farmers in light of the current climate change and coffee crises.

This thesis also aims to advance the literature on GPNs by shifting the focal point of analysis away from a lead firm-centric approach which is dominant within GPN discourse, to a farmer-focused stance. A farmer-focused epistemological stance will be adopted in order to view the global coffee production network from the farmers' perspective, exploring their experiences of agency, empowerment and control in relation to climate change adaptation whilst still acknowledging that "it is the 'lead' firm that plays a dominant role in a GPN" (Coe et al., 2008, p. 277). This gives us the opportunity to explore territorial embeddedness from the view of the farmer, exploring the impact and influence their locality (place-related situatedness) has on their ability to bargain and negotiate with lead firms.

2.4 Conclusion

The challenges of climate change are situated within histories of development and models of sustainability, as critically analysed in section 2.2. Globalisation and the fragmentation of trade have resulted in leaving farmers increasingly vulnerable to climate change. Schneider (2011)

emphasises this notion, stating that "climate change poses a challenge that will test nature, human populations, as well as markets and economies" (p. 53). The interwoven strands of development and their ability to influence farmers' vulnerability to climate change create the need to consider the nuances involved in climate change adaptation. Employing a framework that considers not only solutions to immediate climate related shocks, but also the underpinning causation of vulnerability, is vital in understanding the needs of farmers. Previous studies regarding coffee adaptation have focused primarily on price volatility, but in recent years, there has been growing concern about climate change adaptations, as the impacts of increased temperatures, changes to precipitation and seasons are felt within the coffee-growing communities. Gay et al. (2006), Eakin et al. (2014) and Eakin et al. (2009) have all begun to explore the connections between coffee production, market fluctuations, price risk and climate change in relation to achieving or maintaining sustainable rural livelihoods for coffee farmers. The studies argue that climate change vulnerability is "particularly dangerous for products that have highly volatile markets and for regions where socioeconomic conditions are deficient, since the producers' vulnerability is already high and their adaptation capacity limited" (Gay et al., 2006, p. 260).

It is crucial to understand the drivers to this heightened vulnerability if successful adaptations are to be implemented. Section 2.2 did this by critically analysing the ways in which climate change, development policies and conceptions of sustainable livelihoods have contextualized farmers' vulnerability.

Section 2.3 laid out the analytical framework that will be used to analyse critically the empirical data in Chapters 5-7. Arguing that GPN is the most appropriate framework to answer the overarching research question "*to what extent does participation in alternative trading networks increase smallholder coffee farmers' ability to adapt to climate change?*" the GPN framework will be augmented with 'buyer-driven' networks, from GCC, and upgrading, from GVC.

There have been a number of responses to the challenges highlighted within this chapter. Private voluntary certifications such as Fairtrade and Organic set out to address the socioeconomic inequalities occurring in the conventional market place; however, such schemes are limited, as they are challenging the very system in which they exist. This has been further compounded by the mainstreaming of Fairtrade, which has both increased sales but heightened the complexities of existing within a mainstream market.

The framework is adopted and critically adapted by economic geographers (see Hughes et al., 2008; Tallontire et al., 2011; Neilson and Pritchard, 2011), as it provides a lens through which to view the entirety of the network, exploring the complexities that occur in relation to governance and power, all of which are pertinent to this thesis. The study adopts a GPN analytical framework whilst also utilising notions of environmental upgrading (GVC), sustainable livelihoods, strategic coupling (GPN), value creation, value capture and value enhancement (GVC), in order to explore the responses made by network actors in relation to climate change. The next chapter will introduce the methodology and methods employed herein, reflecting the adoption of the GPN approach.

Chapter 3. Methodology

3.1 Introduction

This chapter introduces the methodologies and frameworks that guided the collection and analysis of the data, in order to respond to the research questions, set out in Chapter 1 and the overarching question "*In what ways does participation in alternative trading networks increase smallholder coffee farmers' ability to adapt to climate change?*"

The methodology involves a qualitative approach, using the smallholder coffee farmer (henceforth farmer) as a point of entry through which to research the coffee production network, thereby ensuring that their voices are paramount to the analysis. The centrality of the farmer offers an alternative to the conventional lead firm approach as the gateway into the GPN (Neilson et al., 2018a; Neilson et al., 2014; Henderson et al., 2002; Gade, 2001) and a way to examine their sense of agency in adapting to climate change.

The ethnographic and case study research is complemented by a multi-scalar approach, acknowledging that coffee production networks and climate change – by their very nature – are multi-sited and engage with a diverse range of network actors. I therefore conducted interviews with actors at local (San Ignacio), regional (Jaen and Cajamarca) and national (Peru) levels, in addition to conducting interviews with coffee buyers from both the UK and USA.

Level	**Location**	**Type of actor**
Local	San Ignacio, northern Peru	Farmers, co-operatives
Regional	Jaen and Cajamarca, northern Peru	Regional government, NGOs,
National	Peru	National government, NGOs, national coffee organisations, coffee buyers, regional offices
UK/USA	London, UK and Portland, USA	Alternative trading coffee buyers

Table 3.1 Multi-scalar approach

The chapter is split into four sections. Firstly, I begin by outlining my research motivation, exploring how my educational and professional background led to my choice of research questions and aims and my collaborative partnership. Secondly, I describe both my methodology and methods, the field sites and introduce the case study co-operatives that were core to my research practice. Thirdly I reflect on my positionality and ethical issues encountered

in the field, before outlining the techniques that were employed in order to address such concerns and adhere to the university's ethical policies and practices. Finally, I explore how I analysed the data through a process of transcribing and coding the focus groups and interviews, critically assessing coffee production networks and examining the role of certification bodies through policy, literature and current procedures.

3.2 Research Motivations

This section examines the research motivations that shaped both my research focus and methodological design. A combination of my professional and academic background, in addition to my long-standing curiosity and passion to understand the impact of climate change and the adaptations coffee farmers employ in Latin America, led to this research alongside my desire to gain a deeper understanding of the role of coffee buyers and the Fairtrade certification body FLO-Cert in supporting such adaptations.

I started researching human geography, political ecology, ethical trade and climate change during my BSc (Hons) degree in Geography and Environmental Management at Northumbria University (2000–2003), which sparked an interest in ethical trade and climate change. I developed my knowledge base and research skills further when undertaking an MA in International Development at the University of Leeds (2004–2005), gaining relevant work experience through an Economic and Social Research Council (ESRC)-funded internship with the European Forum for International Co-operation (EUFORIC), based in the Netherlands. This work focused on co-operation and collaboration within the field of international development, exploring specifically the role of trade.

This academic background led to a career in international development. From 2005 to 2012, in my role as the manager of an international development charity, Shared Interest Foundation[3], I built up experience and expertise in both climate change adaptations and alternative trade and its role in empowering farmers. It is within this role that I put into practice my research skills and theoretical knowledge, leading several research and capacity-building projects across Latin America and Africa. Working with hundreds of Fairtrade producers and farmers, I carried out desk-based research together with extensive time spent in the field, and I used my findings to secure funding in order to develop and implement projects, thus supporting thousands of Fairtrade producers and farmers to tackle poverty.

[3] **Shared Interest Foundation** provides training and capacity-building in climate change adaptations, business and financial skills and market access to Fairtrade farmers and producers throughout the developing world

It is through this research and project implementation that my desire to learn more about the relationship between humans and nature, coffee farmers and climate change became firmly established. I saw first-hand the effects that climate change had on farmers and producers, as well as the devastating effects this could have on entire communities. I developed and implemented a livelihood security fund – a grant scheme to support Fairtrade co-operatives in the event of a climate-related shock or disaster, such as landslides and flooding. While managing this fund, I observed a high number of applications for funding coming predominantly from coffee farmers, and specifically those located in South America, and it was with this in mind that my research proposal developed: exploring proactive adaptations rather than merely awarding grants in order to renovate farms following a climate change event.

3.2.1 Collaborative partnership

My research is a collaborative (3+1) ESRC-funded studentship. To ensure my research was challenge-led, I developed my research questions and methodological approach in conjunction and consultation with my collaborative partner Twin[4]. This process was essential in producing a piece of research that would provide a contribution to the literature and also value to Twin. The research findings will feed into Twin's Adapt Now project, which seeks to identify critical climate change adaptation projects through integrated climate risk assessments and sharing best practice among networks of producers and businesses.

3.3 Research Methodology and Methods

Prior to introducing the methodology and the methods employed for this research, it is important to acknowledge the theoretical perspectives in which they are grounded, their ontology and epistemology, which in combination underpin the philosophical position of this study.

Whereas ontology describes the nature of being, portraying the researcher's view of the world (Guba, 1990), epistemology is concerned with our understanding of the world and how this is communicated in the form of knowledge to others, ensuring that we know what knowledge is and then ensuring our analysis guides us in shaping the scope of this knowledge (Goldman, 2004). The research adopts an interpretive approach by placing the farmer at the centre of the paradigm, thereby generating a nuanced account of their lived experiences and of the power and governance of the coffee production networks, their embeddedness and their ability to adapt to climate change and coffee leaf rust. Cook (2006) talks about the power of giving farmers a

[4] **Twin** is a pioneer and leader of the Fairtrade movement, working to build better lives for the poorest and most marginalised in the *trading* chain

voice in his paper "Geographies of food: following," in which he ponders what life would be like if, when we were in a supermarket, we could hear the people who made, grew and produced the products we were about to purchase: "I was putting things in the basket. As usual. But there were these voices in my head. Talking about the politics, poetics, economics of connection… where people's lives meet and become entangled through the complex lives of things. Bananas. Food. Anything" (Cook, 2006, p. 656). By placing the farmer at the centre of my research, therefore, I aim to give them a voice and through dissemination allow this voice to be heard.

Qualitative approaches have been attributed to enabling "the study of, and emphasized the importance of, seeing economic activity as a set of lived practices, assumptions and codes of behavior" (Crang, 2002, p. 648), which is a fundamental component of my research. Qualitative approaches enabled me to investigate the lived experiences of farmers and investigate how they "make sense of these experiences" (Johnston and VanderStoep, 2009) and use them in order to adapt to climate change. In addition, qualitative research has been credited for its political and ethical value (Hammersley and Atkinson, 2007), providing tools and approaches that enable the researcher to give a voice to some of the most marginal members of society.

3.4 Fieldwork

The data collection and analysis stages of my research comprised six phases stretching over a 17-month period. Nine months were spent in Peru (July 2013 – March 2014) conducting research, and eight months following this were used to code and analyse the data. The six stages of research are illustrated in Table 3.2. Stage one involved four months of in-country language training, during which time I received four hours of teaching per day and immersed myself in the country in which I undertook my fieldwork (Peru). During this time, I conducted preliminary research (stage two), by developing in-country networks with a range of coffee production network actors, including coffee co-operatives, farmers, buyers, ministries and NGOs. The preliminary fieldwork was followed by stage three, during which time I lived and worked with a coffee-farming family in Shipasbamba, northern Peru. I then undertook a four-month immersion living in and researching my specific field site, San Ignacio, which was also located in the north of Peru, around a three-hour drive from Shipasbamba, where I conducted the bulk of my research, using interviews, focus groups and recording ethnographic observations. I then returned to the UK and conducted interviews with two of the alternative trading coffee buyers from the case study production networks, namely Sustainable Harvest, based in Portland, USA, and Twin, based in London, UK. I then began the process of coding and analysis.

Stages of research	Actions	Dates
Language training	Four months' in-country language training	July – October 2013
Preliminary fieldwork	Developing in-country networks and establishing relationships with coffee production network actors. Visiting potential field sites	July – October 2013
Living and working on a coffee farm	Four weeks living and working as a coffee farmer. During this time, I lived with a coffee-farming family in Shipasbamba, northern Peru	October – November 2013
Fieldwork in Lima	During a four-week period, which occurred prior to, during and after my fieldwork in San Ignacio, I conducted interviews in Lima with NGOs, coffee buyers, ministries and other network actors, in order to gain a macro view of the Peruvian coffee production network	August 2013 (1 week) October 2013 (1 week) January 2014 (1 week) March 2014 (1 week)
Fieldwork in San Ignacio	Four months living in the coffee-farming community of San Ignacio, northern Peru. I carried out 45 interviews with farmers and co-operative staff members in addition to interviews with local auxiliary organisations. Two focus groups, visual research methods and ethnographic observations were recorded in my field diary	November 2013 – March 2014
Coding and analysis	Initial analysis occurred during the fieldwork phase and informed the research. This was then built upon on return to the UK through comprehensive coding and analysis. Initial results were presented at two international conferences and the results feedback to farmers via their cooperatives through an iterative process	May – September 2014 April – June 2015 *There was a break in the coding and analysis, due to taking maternity leave between September 2014 and March 2015 and sick leave March – June 2015 and maternity leave again January 2017 – September 2017.

Table 3.2 Stages of the research.

3.4.1 Preliminary fieldwork

Between July and October 2013, I gained an intermediate-level qualification in the Spanish language and carried out preliminary fieldwork. During this time, I conducted initial meetings with network actors, including farmers, international coffee buyers, NGOs and government ministries, in order to gain a macro-level view of coffee production networks and climate change adaptation in Peru. This preliminary phase of the fieldwork proved invaluable, as it enabled me to gain an insight into activities occurring in relation to coffee production and climate change adaptation, explore the potential field sites in person and employ reflexivity and mutual exchange, in addition to establishing key networks and contacts. The benefits of this preliminary process are widely accepted by the likes of Caine et al. (2009), who define it as "the formative early stages of research in the field that allow for exploration, reflexivity, creativity, mutual exchange and interaction through the establishment of research relationships with local people" (Caine et al., 2009, p. 491).

This phase was crucial in gaining cultural understanding, uncovering insights into community beliefs and establishing initial researcher-community relationships (Altman, 1995). I visited several Fairtrade and organic-certified coffee co-operatives, deciding upon three which would eventually form the basis of my final study. In addition, I established key networks and contacts from academic, governmental, NGO and business arenas as well as hosting two in-country supervisory meetings, one in Lima and the second in my field site.

Before immersing myself in my main fieldwork, I was asked to write a 'postcard from the field', which was published later in Hammett, Twyman and Graham (2014)'s work, 'Research and fieldwork in development', published by Routledge. The 'postcard' detailed my thoughts about the fieldwork process on which I was about to embark on and reflection on the preliminary fieldwork completed.

"I conducting fieldwork for over ten years in completely different circumstances to which I find myself currently. My background as a manager of an international development charity has taken me to a range of different countries, from India to Costa Rica, Ethiopia to Swaziland, looking at diverse issues. What has not changed during this time is the reason why I gathered these data and the scope I've had to do so. It was vital for me to collect high-quality baseline data in order to secure funds to run long-term projects, to involve local communities and coffee co-operatives in developing and owning project outcomes and thus determining the impact of the interventions.

What is vital for me is that my doctoral research should have value on a practical level. I want to work alongside NGOs and policymakers, co-operatives and coffee farmers, to ensure that there is dialogue throughout the entire process, from development to dissemination. This has resulted in my current research taking on a whole new meaning for me. I am collaborating directly with a Fairtrade coffee company, Twin, based in the UK, which imports Peruvian coffee. Twin is a pioneer in the field and has the power to use my research to make a real and lasting difference to the lives of coffee farmers and, as importantly, their families and community".

"Becoming a doctoral researcher has resulted in my questioning the validity of my past research. Previously, research was not my sole aim but only a small part of my job. I used to fly in somewhere to spend a few weeks in the field, conduct back-to-back interviews, focus groups and questionnaires and then fly back out again to analyse the mass of data I had just collected. This time, I am taking a different approach. I have spent the last four months learning a new language in the country in which I will conduct my fieldwork. Instead of using translators, I am slowly immersing myself into my research field site. My learning is organic and is growing naturally. I have learnt a huge amount from everyday conversations, which I have discovered give you completely different answers to those you hear when sitting with a pen, paper, Dictaphone and a tight time schedule. I am about to embark on the pilot phase of my fieldwork, where I will live and work on a coffee farm, seeing first-hand the impacts of climate change as opposed to hearing what people want me to hear.

The farmers and co-operatives, as well as my collaborative partner, will help shape the direction of my research, which I am beginning to understand is fluid and not merely about baseline data from which I can justify funding for various projects. It is about providing a more holistic reflection of the reality of the issues facing coffee farmers, co-operatives, importers and businesses posed by climate change. It concerns what people are willing to do to support long-lasting beneficial change for coffee farmers, their families and of course the natural environment" (Hammett et al., 2014, p11)."

Figure 3.1 Postcard from the field. "Looking at the effects of climate change on coffee farmers in Peru – four months in the field (seven to go!)

Figure 3.2 Last day of Spanish Language School in Arequipa.

As referred to in the 'postcard' above in Figure 3.1, I decided to take a different approach to conducting fieldwork and enrolled on a four-month intensive Spanish language school in Arequipa, Peru. This experience left me with a moderately good level of Latin American Spanish and a deeper understanding of the country and the context in which I was conducting my research. However, it did not leave me by any means fluent, because, as Gade (2001) states, language acquisition involves a significant investment of time:

> "It normally takes six months of living in a culture to attain a decent speaking ability and two years to acquire a fine-grained knowledge" (Gade, 2001, p. 377).

At the risk of misunderstanding what was being said, or misreading signals between me as the researcher and the participants, I decided to hire a translator. Oliver was a Peruvian national studying at a university located in Lima. He was originally from a coffee-growing community in the Andes, where his parents and grandparents were coffee farmers, and so he had a wealth of experience and expertise in coffee farming and was able to pick up on some of the nuances which may otherwise have been missed. He proved to be a valuable resource in decoding some technical information from interviews with the farmers, and although my Spanish language skills meant that I could conduct many of the interviews personally, Oliver would step in where needed. I recorded the interviews and he then translated them, ensuring I had understood the specific details and any technical terminology.

Figure 3.3 Coffee farmers. From left to right: Juan (coffee farmer), Oliver (translator), me and Marie (coffee farmer). Pseudonyms have been used for the coffee farmers; however, they provided consent for their photo to be used in this thesis.

3.4.2 Ethnographic enquiry

My ethnographic research used a range of qualitative techniques to ensure a breadth of perspectives and voices were included, as well as to engender depth of insight. Living in a coffee-growing community enabled me to deploy classic ethnographic techniques, based upon the recognition that cultural practices in local communities can only be understood by studying the context in which they take place. The participant-observer method was complemented with several qualitative techniques, including semi-structured interviews and focus groups. In addition, visual anthropology techniques involving key informants staging drawings of their farms at the time of the research (October 2013 – March 2014), and how they envisaged these would look in five years' time and explaining them in order to capture adaptations, current challenges and a calendar of growing seasons, were used as participatory ethnographic tools and are detailed below.

There are advantages and limitations to ‘intensive’ and ‘extensive’ research approaches, as both options are “concerned with the relationship between individual observations drawn from measurement programmes or case studies” (Clifford et al., 2016, p. 11). Whereas extensive research draws upon a large number of observations from multiple case studies, intensive research focuses on fewer or even a single case study. The ‘intensive’ approach used within this research enabled me to gain a deep understanding of one particular case study site, drawing out the nuances through in-depth descriptive data. Table 3.3 illustrates the differences between the ‘intensive’ and ‘extensive’ research approaches and highlights particularly the former of the two, which was adopted for this research.

Notes	Extensive	Intensive	Approach used
Research question	How representative is a feature, pattern or attribute of a population	How? What? Why? In a certain case example	Research question: *In what ways does participation in alternative trading networks increase smallholder coffee farmers' ability to adapt to climate change?*
Type of explanation	Representative generalisations are produced from repeated studies or large samples	Causes are elucidated through in-depth examination and interpretation	Causes of farmers' ability to adapt to climate change were investigated through in-depth examination of their lived experiences and connections with alternative trading networks
Typical methods of research	Questionnaires. Large-scale surveys	Case study. Ethnography. And qualitative analysis	A case study approach was adopted, focusing predominately on San Ignacio but also acknowledging that coffee farmers in this region are linked to multiple network actors operating at local, regional, national and international levels. Ethnographic and qualitative approaches employed
Limitations	Explanation is a generalisation – it is too difficult to relate to the individual Observation	Relationships discovered will not be 'representative' or an average generalisation	The findings are specific to the case study coffee production networks and their locality; however, they can still relate to other case study producer networks
Philosophy	Explanation based upon formal relations of similarity and the investigation of taxonomic groups	Method and explanation rely on discovering the connection between events, mechanisms and casual properties	Undertaking an investigation of a coffee production network enabled the researcher to discover connections events (climate change/ disease) and farmers response to such events

Table 3.3 Differences between 'extensive' and 'intensive' research approaches and those used within this research. Adapted from Sayer (2010, pp. 163-164).

Researching the lived experiences of a community and a specific set of actors comes with complications and complexities. The acknowledgment that "human behaviour is the product of community life" (Prus, 1996, p. 2), and as such cannot be attributed solely to individual properties, leaves social scientists with the challenge of deducing "how people become social

entities and how they attend to one another and the products of human endeavour in the course of day-to-day life" (Prus, 1996, p. 2). Researchers are challenged with the intersubjective creation of "meanings that code these everyday processes" (Herbert, 2000, p552), and so an 'intensive' approach was adopted, focusing on one specific locale (San Ignacio, northern Peru), to provide an in-depth and context-specific interpretation of the complexities of a global coffee production network.

Ethnography, with its roots in anthropology (Geertz, 1973), has been used by social scientists as a qualitative methodology to explore cultures and the lived experiences of people's daily lives and practices (Hoey, 2014). Its adoption of long-term connections with people's lives (Hörschelmann and Stenning, 2008) makes it a useful method to gain nuanced and rich empirical data.

The approach involves a range of methods and techniques, including field diaries, audio/visual recording, interviews and focus groups, and it is defined by Falzon (2016) as "an eclectic methodological choice which privileges an engaged, contextually rich and nuanced type of qualitative social research in which finely grained daily interactions constitute the lifeblood of the data produced" (Falzon, 2016, p. 1).

The main crux of this type of approach is observation, in that the researcher is expected to become immersed in a community, living alongside the participants, with continuous interaction between the researcher and those being researched. This notion aligned with my research, as I lived in San Ignacio for four months, experiencing daily interactions not only with farmers, but also with the wider coffee-growing community in which they were embedded provided me with a holistic view of their day-to-day lives.

Ethnography is both iterative and cyclical (Whitehead, 2005), and the process of living for an extended period of time in one locality allowed me to present my preliminary findings to the participants, namely farmers and the co-operatives of which they were members, in order to ensure accuracy, obtain feedback and shape the remaining fieldwork. This gave the participants a voice in the research and fitted with my desire to create a challenge-led study that would be of value. This consultation exercise resulted in rich, in-depth data with a high degree of accuracy and phenomenological validity for my initial analysis, which is a commonly cited concern of ethnography (LeCompte and Goetz, 1982; Anderson, 1989). As stated by Jenkins (1994), this methodology provides a lens through which to view a particular world, one that is governed by multiple actors and factors, including those relating to the researcher.

The research adopts the principles and practices of grounded theory, which are more attuned to qualitative methodologies focusing on theory generation, as opposed to quantitative methodologies which lean towards theory-testing (Glaser and Strauss, 1967). Charmaz (2014) states that grounded theory methods:

> "[C]onsist of systematic, yet flexible guidelines for collecting and analyzing qualitative data to construct theories from the data themselves… Grounded theory begins with inductive data, invokes iterative strategies of going back and forth between data and analysis, uses comparative methods, and keeps you interacting and involved with your data and emerging analysis" (Charmaz, 2014, p. 1).

The flexibility and iterative dimensions of the framework ensured that both the data collection and analysis were data-led, thus enabling themes and arguments to emerge from the field rather than being imposed on it (Silverman, 1985). As such, it proved a valuable basis for this research.

A field diary was kept throughout the four months in San Ignacio, recording daily observations together with my initial thoughts and feelings on, and reactions to, what I was observing. The notes stimulated questions, contradictions and uncertainties, all of which I was able to clarify whilst reflecting on them in the field. They also helped shape future research, prompt additional questions and provide a richer, more nuanced dataset. Whitehead (2005) describes this process of reflexivity as:

> "[I]mportant in overcoming what those in more positivist paradigms refer to as investigator bias. In ethnography, however, we know that emically valid representations of these others, or so called objectivity in positivist paradigms, is enhanced by moving away from the more positivist orientation of the so-called objective neutral investigator, to accepting and analyzing our own human subjectivity in this process" (Whitehead, 2005, p. 7).

This reflexivity results in knowledge based on intersubjectivity between the researcher and the participant. Since the 1990s, there has been a rise in research relating to transnational practices and the social construction of space as a result of globalisation, and this brought into question the single- sited approach to ethnography and its understanding of the ways in which we interact traditionally with – and therefore perceive – 'other cultures' (Hörschelmann and Stenning, 2008; Ortner, 1997).

New methodologies were required, hence the emergence in 1995 of multi-sited ethnography, created by George E Marcus, who argued that the study of social phenomena could not be summarised through the practice of single-sited ethnography, acknowledging the need to ground globalisation. Friedberg (2001) stressed that multi-sited ethnography "can illuminate the dynamic, geographically dispersed activities and social relations that comprise transnational

food commodity chains" (Freidberg, 2001, p. 554). A multi-sited ethnographic approach, where the focus is "to follow people, connections, associations and relationships across space (because they are substantially continuous but spatially non-contiguous)" (Falzon, 2009, p. 2), could not be more pertinent to understanding the ways in which being part of an alternative trading network influences farmers' ability to adapt to climate change. I therefore complemented my participant observations, interviews and focus groups in San Ignacio with consultations with regional and national coffee buyers, in both the UK and USA, in order to explore how multiple agents throughout the coffee production network engage in varying contexts with farmers and influence their ability to respond and adapt to the impacts of climate change. Through adopting such an approach, I was able to examine the social networks within and between the coffee production networks.

> "The movement of commodities across space is, of course, an incredibly complex entanglement of the (more-than-) capitalist space economy. If we could visualize and animate these flows, they would flicker across the landscape, interconnecting bodies, firms, markets, neighbourhoods, cities, regions and countries in ways that reflect, reproduce and transform the connectivity's of economy and their place-based imprints" (Sheppard, 2012, p. 47).

Some are sceptical about the move from single-sited to multi-sited ethnography (Candea, 2007; Hage, 2005), stating that it is an oxymoron (Clifford, 1997). Hage (2005), for instance, argues that single-sited ethnography is much more useful than the multi-sited option, believing that the researcher is unable to cover social relations at any depth at a multi-sited level. However, Friedburg (2001) disputes this proposition, stating that "a clear analytical framework helps clarify the objectives in each site, and thus helps ward off doubts about the depth of understanding possible from such a project" (Freidberg, 2001, p. 362). I therefore constructed an analytical framework, which was refined during my pilot research, prior to undertaking my multi-sited ethnographic enquiry. This technique has been adopted in several climate change and farmer participatory research studies (Roncoli, 2006; Krauss, 2016; Artur and Hilhorst 2012), and it is cited as a way of facilitating the better integration of farmers in a report published by the Panel on the Human Dimension of Seasonal to Interannual Climate Variability of the National Research Council (Stern and Easterling, 1999). This multi-sited approach enabled me to understand the cultural landscape in which climate vulnerability, adaptation, mitigation and diversification were grounded within my field site.

3.4.3 Focus groups

Focus group discussions were used during the initial stages of my field research, in order to

explore issues around a set of themes by focusing on climate change adaptation and coping strategies with Fairtrade and organic coffee farmers. This qualitative method enabled me to collect information from groups of individuals through group interaction, to test out interview questions and to explore new areas that may potentially arise during group conversations. Crang and Cook (2007) describe a focus group as "not just a way of collecting multiple individual statements, but is a means to set up a negotiation of meanings through intra and inter-personal debates" (p. 56). Throughout the three focus groups with farmers and three with co-operative staff members, I used a mix of the visual and participatory activities mentioned above.

Arnaldo, my gatekeeper, introduced me to several of the co-operatives in San Ignacio, and from these initial introductions I arranged three focus groups with co-operative staff members (engineers, co-operative managers, presidents and trainers) from the three case study co-operatives (Apessi, Arosaccisi and Unicafec introduced in section 3.7). The three co-operative staff member focus groups explored areas of adaptation, capacity-building support and links/relationships with their coffee farmers in addition to FLO (Fairtrade Labelling Organisation) and buyer organisations. Each of the three case study co-operatives then supported the organisation of one focus group per co-operative with their farmers, although neither Arnaldo nor any co-operative staff members attended or participated in the focus groups, in order to ensure anonymity and free speech. Each focus group explored issues on the ground regarding farmers' food and livelihood security relating to climatic changes and the types of adaptations they employ.

The data collected from this exercise helped inform the semi-structured interviews conducted during the four-month immersion into the coffee-growing area of San Ignacio. Using multiple methods enabled me to cross-check findings, establish whether they resonated with or contradicted those collected during the focus groups and gain a more detailed understanding of the topics in question.

3.4.4 Semi-structured interviews

Throughout the fieldwork, I conducted 70 semi-structured interviews. Forty-five of these were with farmers (detailed in Table 3.4) and a further nine were members of staff within one of the three co-operative case studies (detailed in Table 3.5), and 16 were held with auxiliary organisations, including Peruvian governmental ministries, coffee buyers and NGOs (detailed in Table 3.6).

I begin this section with a brief introduction to semi-structured interviews, before narrowing down the specificities of interviewing the less powerful – a central construct of my research which places the farmer as the point of entry into the coffee production network. I then move on to interviewing elites (those possessing power), which is pertinent to my research in UK- and USA-based alternative trading organisations, Peruvian government officials and coffee co-operative managers, all of whom have privileged access to or control of the sort of information upon which I relied throughout my research.

Throughout the fieldwork phase of my research, I was able to theorise the differences between actions, feeling and beliefs, acknowledging that there is variance and tension between what people think they are doing, what they aspire to do and what they do in practice (Harris and Brown, 2010). An effective technique in addressing this issue is to combine methods, so I employed a collection of qualitative techniques. Ethnographic enquiry and observation, as detailed earlier, helped me gain insights into what was occurring, and this was then complemented by the previously detailed 70 semi-structured interviews, 45 of which were with farmers, nine with co-operative staff and 16 with other network actors.

Interviews were adopted for several reasons as one of the main qualitative techniques for this research. The semi-structured approach provided a complementary way in which to collect both emotional and contextual content, which is often difficult to obtain through other methodologies such as stand-alone observation and questionnaires, and it therefore enabled me to gather empirical evidence from both outliers and those who were typical of the population being studied.

I prepared for my interviews by drafting a list of questions and/or themes to structure the meeting (Longhurst, 2003), which can be found in Appendix 4. This resulted in partially structured interviews, which, unlike structured interviews, left room for flexibility and allowed for the flow of natural conversation, similar to that of an unstructured interview. Nonetheless, these natural conversations, or "informal interviews" (Agar, 1996), still maintained a certain amount of control in terms of the flow and direction of the discussions.

Lindsey (1997) posits that the "interactive nature of qualitative interviewing means that interviewing is itself part of the learning process for the researcher" (Lindsey, 1997, p. 58). This flexible approach requires great skill on behalf of the interviewer, establishing a natural rapport and giving the interviewee a certain amount of freedom in terms of what they talk about and in what order, all the time keeping the conversation centred on a specific theme or purpose. This

technique enabled me to adapt questions accordingly and follow up on themes raised during the interviews which I had not previously considered.

The advantages of using semi-structured interviews are clear: they offer a flexible way of obtaining useful information and are time-efficient, and they enable the researcher to ask the 'subject' direct questions. They also help the researcher take into account non-verbal factors, which may help in gaining an insight into certain situations, either by reconfirming what has been said or, in other instances, reversing the meaning of what has been stated verbally during the interview (Robson, 1993).

There are, however, limitations to this qualitative method, all of which were taken into consideration during the development phase of my research design and, where possible, mitigated against. The degree of flexibility, although extremely useful, lacks standardisation and inevitably raises concerns about reliability (Robson, 1993). Debates taking place over the last decade have brought into question the validity and utility of qualitative methods, including semi-structured interviews (Crang, 2003; Crang, 2005), thereby promoting a move by many geographers toward something which Sayer and Morgan (1985) call "intensive methods," as outlined above, which permits the researcher to "examine the power relations and social processes constituted in geographical patterns" (Clifford et al., 2016, p. 144).

Interviews are a specific subset of the 'intensive methods'. Clifford (2016), states that such 'intensive methods' are better described as "performative." This can take many forms; Longhurst, for example, prepared food for and ate with her participants (Longhurst et al., 2008), and Cain (2011) looked through garments with her participants in order to elicit stories associated with items of clothing (Chamberlain et al., 2011). The 'performative' methods in my research are detailed below.

3.4.4.1 Researching the less powerful

> "Non-elite people around the world have great stores of local knowledge to share with those who prepare themselves to seek it" (Gade, 2001, p. 375).

Prior to conducting my fieldwork, I had not envisaged anything other than standard semi-structured interviews, sitting in either farmers' homes or co-operative offices. However, the more time I spent in San Ignacio, the more I became embedded in coffee-farming life, and so farmers often jumped up mid-conversation, finding it easier to show me what they were referring rather than solely communicating it verbally. This resulted in the majority of the

interviews I conducted being ‘walking interviews’.

There has been a surge in research regarding ‘mobile methods’ (Hein et al., 2008), a method that has a long history within anthropological fieldwork, particularly in ethnographic participant observer techniques, which often call for the researcher to observe the participant in motion, in order to make sense of everyday practices (Clark and Emmel, 2010). Jones et al. (2008) refer to challenges with regards to power relations between interviewers and participants, stating that “when interviewing socially marginalized individuals, for example, the fact that researchers are generally better educated and wealthier creates an uneven relationship, bringing the risk that the interviewees might be too intimidated by the researcher to articulate their ideas for fear of ‘sounding stupid’” (Jones et al., 2008, p. 3). Walking interviews helped alleviate some of these concerns, as moving from the coffee farmers’ homes to their land encouraged them into a space in which *they* were the experts.

As a social scientist, my aim during this research was to put myself in the shoes of my subjects and view the world through their eyes – and walking interviews helped to achieve this aim. The environment (coffee farm) was often used to elicit information or prompt further discussion and questioning (Clark and Emmel, 2010), and it served as an insightful method from which to gain an insight into the everyday lives of the participants. Many farmers stated that they knew their land better than they did their partners, in that they were not used to sitting in their homes during the day but rather being active on their farms. During the interviews, participants often incorporated visits to plant nurseries, co-operatives or drying areas, the logistics of which were often difficult and included catching lifts from a passers-by or having to postpone visits, especially in the rainy season when unpaved roads became impassable. The visits also highlighted the importance of farmers accessing such spaces (plant nurseries, co-operatives, etc.), not only for their practical value of purchasing new plants and selling coffee beans, but also because the spaces provided an opportunity for the transfer of knowledge, as farmers met at a communal point (the drying facility or co-operative, for example) where they shared information with one another. This method also proved beneficial in “placing events, stories and experiences in their spatial context” (Clark and Emmel, 2010, p. 2), supporting participants to articulate their lived experiences and allowing the researcher to visualise some of the elements in the stories recounted in the interviews.

Ingold and Vergunst (2008) state that walking interviews create a deeper sense of connection with the environment and change the dynamics of the interviews taking place. The preliminary research phase of the study involved more traditional interviews in coffee farmers’ homes, in a

similar experience to Evans et al. (2011), in that such interviews often involved participants who wanted to give the 'right' kind of answer. By comparison, the walking interviews, during which I walked around coffee farms with participants or sat outside their farm or by the roadside observing life and talking informally, produced the most interesting conversations – and richer data. Although no route was determined prior to the interviews, it was understood that they would take place in the vicinity of the farmers' homes or farmland and community. This then had the benefit of remaining in places and spaces which were relevant to the research (Jones et al., 2008; Evans and Jones, 2011).

Research methods focusing on participation are on the rise, as it is acknowledged that techniques and tools need to be tailored to the abilities and cultural contexts of the people being researched. During my time in the field, I drew upon such techniques in order to access information from coffee farmers, who are often categorised as people with 'less power' and often with low literacy levels. These techniques often break "the linear mould of conventional research; participatory research focuses on a process of sequential reflection and action, carried out with and by local people rather than on them. Local knowledge and perspectives are not only acknowledged but form the basis for research and planning" (Cornwall and Jewkes, 1995). Furthermore, the approach contributes to readdressing any power imbalance between the researcher and those being researched, empowering the latter to take an element of control over the research process.

Visual techniques I employed included creating maps with materials that were readily available, to create discussions about challenges in terms of access and climate change or to ignite discussions and affirm local knowledge. This involved drawing (mainly with a stick on the mud floor) detailed seasonal calendars and how they were changing as a result of climate change, and lastly mapping, as detailed below, acknowledging that:

> "[T]he image is a unique form of data that stores complexly layered meanings in a format that is immediately retrievable… thinking, writing and talking about images can make arguments not only more vivid but more lucid as well" (Knowles and Sweetman, 2004. p. 18).

As part of their participation in Sustainable Harvest's farmer field school, prior to my arrival, participants had drawn a map of their current farm and what they would like it to look like in five years' time. This was used by the school to prompt discussions about farm management practices, and so I built upon this, asking the farmers to talk through what their farms were like at that point in time (from their illustrations, displayed in Figure 3.4), why they were that way

and what the benefits and challenges were in relation to their current set up. I then asked them to talk through their future farms, what changes would occur, how they would occur (i.e. what resources were required and who would carry out the changes) and why. This provided a unique insight into their understanding of climate change adaptation, as well as their relationships with co-operatives, coffee buyers, the farmer field school and with each other.

Figure 3.4 Maps drawn by participants detailing their current farms and how they hoped they would look in 5 years' time. Source: author's own

3.4.5 Interviewing elites

It is essential that we acknowledge the complex modalities of power encountered in approaching or interacting with any group or individual, be they elite or non-elite, those possessing power or those who are classed as 'disempowered'. In the following section, I therefore explore the advantages and limitations, as well as the practicalities and ethical issues, of interviewing elites. A heavy emphasis on the willingness of interviewees to trust the interviewer and to talk honestly and openly. This can often be extremely challenging in the case of interviewing elites, who are defined as people who have "privileged access to, or control over, particular resources which may be mobilised in the exercise of power or influence" (Woods, 1998, p. 2108). This type of research is often referred to as "researching up," and challenges encountered are often different from those found in "researching down" (Desmond, 2004; Hughes and Cormode, 1998).

Prior to conducting interviews with governmental officials, NGOs and co-operative managers,

I conducted research regarding associated challenges, many of which were linked to power (Rice, 2010) and, if not addressed, could result in difficulties in gaining access during the initial stages and then, during the latter, acquiring trust and building rapport (Mikecz, 2012). The literature highlighted that such issues with access, trust and rapport are often exacerbated by cross-cultural issues involved in conducting interviews not only in a different country and environment, but also in a different language (Valentine, 2005). This was a concern of mine particularly, as I conducted the majority of the 70 interviews in Peru and in my second language (Spanish). I therefore ensured, wherever possible, that I mitigated against such challenges as detailed in section 3.8.

Ostander (1993) argues in favour of drawing attention to institutional affiliations or influential sponsors, which he claims will assist with the co-operation of interviewees in terms of both gaining access and building rapport (Ostrander, 1993). With this in mind, I drew upon the strength of my collaborative partners, as well as my own professional networks, in order to set up initial meetings and to access what would have otherwise have been closed events and then subsequently to make key contacts within the UK and set up initial meetings with Peruvian smallholder coffee networks and co-operatives (Hughes and Cormode, 1998).

Following this stage, I prepared myself for the interview process. The positionality of the researcher is fundamental in accessing interviews and in establishing bonds, as detailed in section 3.8. It was also important to consider my position on the topic being discussed, and so in this instance I drew upon Freidbrug's (2001) strategy, in which she describes herself to informants as "someone concerned about the future of the entire trade, since they share these concerns" (Freidberg, 2001, p. 363); moreover, she asserts that in adopting this strategy, most people were willing/eager to talk to her, as everyone was working towards the same aim. I transferred this approach to my research, in that all actors were interested in securing a sustainable coffee production network and thus managing the impacts of climate change.

Mikecz (2012) discusses two key elements involved in obtaining and maintaining trust and good rapport with elites. He begins by highlighting the importance of knowledgeability and positionality, i.e. knowledge of the interviewee's background, preferred means of communication and willingness to contribute to academic research are essential components in the preparation and planning process. I ensured that I had background information, where possible, on both the organisation/NGO/government department for which the interviewee worked, their affiliations with other stakeholders, as well as background information on the person themselves, in terms of where they studied and previous employment, something that

was often gained through the use of LinkedIn, which provided both details of potential participants and also allowed them to view my connections, academic and professional background and references. Mikecz (2012) then goes on to discuss the benefits of having a solid knowledge base of the topic in question, in addition to the sensitivity and awareness of cultural norms, arguing that "through preparation and research of the interviewee's background—culture, life history, and career—the researcher can significantly influence the success of interviewing elites by decreasing the status imbalance between researched and researcher" (Mikecz, 2012). This preparation, alongside readdressing the power imbalance, reduced the chance of interviewees 'closing off' from specific questions or topics and manipulating data, which can and often does occur (Rice, 2009).

3.5 Field Site: San Ignacio

San Ignacio is part of Cajamarca, itself one of a group of 11 organic coffee-growing regions in Peru (Puno, Cusco, Apurimac, Ayacucho, Junín, Pasco, Huánuco, San Martin, Amazonas, Cajamarca and Piura), as illustrated in Figure 3.5. Cajamarca, and in particular San Ignacio, which is located in the north of Cajamarca, is a highly appropriate case study site for research, as it is the centralised area of coffee growing in northern Peru and is renowned for its speciality, certified coffee. The length of time coffee has been produced in this area, and the length of time co-operatives have been active, was significant to this study, in order to research climate change and farmers' adaptations over a period of time. Additionally, it was important that co-operatives had been established for at least ten years, to illustrate the influence they had in terms of farmers' livelihood security and the role they play in climate change adaptations.

Figure 3.5 Map of Peru's organic coffee-growing region. Source: author's own

San Ignacio was an ideal location for the investigation, due to two factors. First, the economy of the district centres on coffee production, with 90% of the inhabitants relying on the crop either directly or indirectly for their livelihoods. Living in and researching this community enabled me to immerse myself into a coffee-producing region and so observe the complexity and challenges of an area which is so heavily dominated by one industry.

Second, the area is known for its focus on speciality coffee, with many of the co-operatives having both Fairtrade and organic certifications. This was particularly pertinent to my investigation, in that I wished to explore how such certifications can support the process of adapting to climate change and secure the livelihoods of farmers, thus making San Ignacio a valuable case study site.

It is important to note that there were additional reasons for the selection of San Ignacio. Due to relationships developed during the preliminary fieldwork in Lima, Peru, with Sustainable Harvest (a coffee buyer based in the USA, but with an in-country office in Lima and a regional presence in San Ignacio), I was able to gain access to a number of co-operatives in this area. Sustainable Harvest had a member of their team, Arnaldo, who was based in San Ignacio, and he became my gatekeeper and supported me with initial introductions to the co-operatives and, more generally, within the wider community.

Arnaldo, although a Peruvian national, was an outsider to the region. He had, however, embedded himself within the area over several years and was a well-respected and trusted member of the coffee-growing community. He was significantly networked, which proved immeasurably helpful in gaining access to and the trust of participants (Buchanan and Bryman, 2009; Crowhurst, 2013; Campbell et al., 2006).

Moreover, Arnaldo had a clear understanding of the aims of the research and the ethical considerations integral to the data collection phase (Buchanan and Bryman, 2009), and he had a detailed insight into the lives of the coffee farmers and the running of the co-operatives in this region, having extensive experience running farmer field schools and providing technical assistance to farmers and business advice to the co-operatives. His input proved invaluable in decoding some of the complexities and challenges faced by the coffee-growing community, bringing forth nuances and explaining processes and practices of which I would otherwise not have been aware. This information was cross-checked through interviews with both farmers and their co-operatives. I continued to stay in touch with Arnaldo after completing the fieldwork, corroborating my initial analysis with him, along with the case study co-operatives

and farmers, to ensure accuracy. However, a year after I left Peru, Arnaldo unfortunately passed away suddenly, following a short illness.

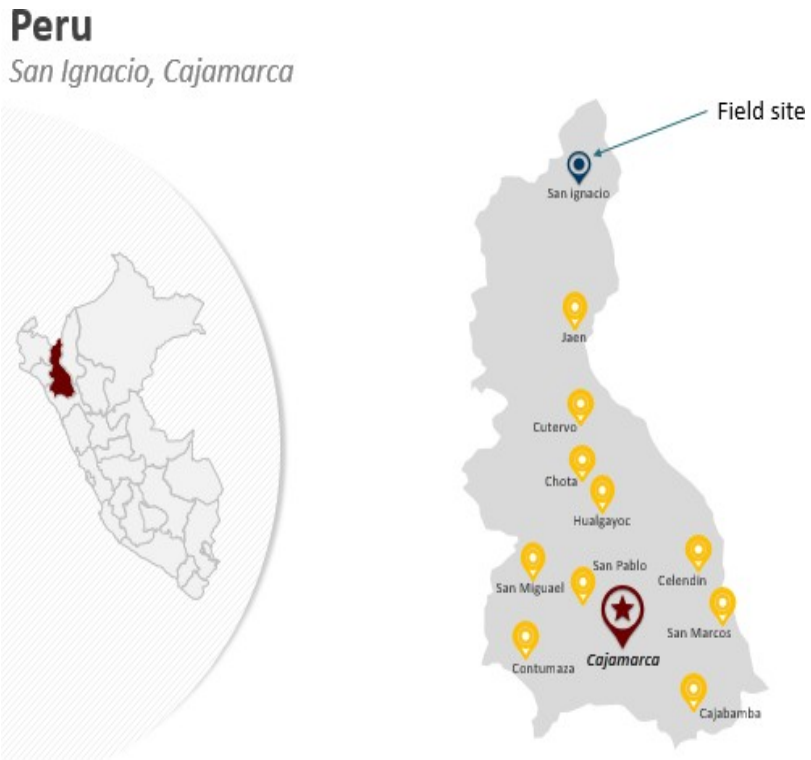

Figure 3.6 Map depicting the field site location. Source: author's own.

Located in the Cajamarca region in northern Peru (illustrated in Figure 3.6), San Ignacio province comprises seven districts. It has a population of 1,341,012 (Peruvian National Institute for statistics and information (INIE), 2017), the majority of whom inhabit rural areas. The region was once composed of cloud forest, but now the crisscrossed array of several valleys is occupied predominantly by coffee production and referred to by locals as "The Valley of Eden," due to its rich biodiversity and varied ecosystem. It is renowned for growing high-quality organic and Fairtrade-certified coffee.

Farmers in this region are predominantly smallholders, and they cultivate coffee on plots of land ranging between 1 and 3 hectares in size. The majority struggle to access credit and financial and technical assistance in order to invest in their farms and to convert from traditional to more technical and intensive agricultural practices. Rice (2008), in a comparative study between the Peruvian and Guatemalan coffee sectors, states:

> "[T]he Peruvian coffee sector has received little aid, with many grower communities essentially abandoned to fend for themselves in remote, difficult regions characterised by broken terrain, heavy rainfall, and poor infrastructure. Most growers in both countries are peasant producers with a risk-averse philosophy and admirable pluck and perseverance when it comes to producing coffee" (p. 215).

Furthermore, in a more general description of the Peruvian coffee sector, Rice (2008) accurately describes San Ignacio, which is known for its uneven mountainous terrain, as a difficult area in which to farm and where farmers can, during the rainy season, be cut off completely from nearby towns and villages, due to poor infrastructure. This lack of investment has resulted in many still farming in the traditional way and as such producing inadequate yields to sustain them and their families.

Traditionally, smallholders have made "use of an array of products from their coffee farms, validating the notion that peasant producers often make their living in a number of ways – including non-farm sources when possible" (Rice, 2008, p. 216), including fruits and vegetables that can be traded at local markets, as well as cocoa, which has the potential to be sold to international markets. However, a period of high coffee prices in the 1990s led to many farmers in San Ignacio ripping out all of their fruit and vegetable plants and planting more coffee (information received during interviews) in the hope of making more money in future years. Nonetheless, what they had not accounted for was the volatility of the coffee market, and so, as prices have fluctuated significantly over the years, there has been a recent push from co-operatives to return to a more diversified livelihood base.

It is also worth noting the role of *hoja de coca*, which is Spanish for 'coca leaf':

> "[It is] a culturally embedded crop, coca and coca leaves hold special status within rural Peru as a traditionally revered product, used in their dried form and chewed for their stimulant effect. Its use is widespread and socially accepted. Aside from this traditional use, dried leaves are also used in the processing of coca paste and, ultimately, cocaine, for both the legal and illicit markets" (Rice, 2011, p. 47).

Coca production can generate a substantial income for smallholders, and it provides between two to three harvests per year, without much in the way of cultivation or agronomic input, in comparison to the demands associated with both coffee and cocoa production, both of which require investments in both time and money: "In short, coca leaf production and sale provide Peruvian coffee growers with income that allows them to survive from one year to the next" (Rice, 2011, p. 48).

The Peruvian government actively promotes coffee production as an alternative to coca production through its National Commission for Life without Drugs (DEVIDA). The survival of the industry is a vital strategy in the country's anti-drugs policy, although many Peruvian coffee farmers benefit from both crops, which co-exist, grown under similar conditions (Rice, 2008). A growing problem, however, is that coca production is far more profitable than coffee:

"Cocaine production in Peru increased to the highest level in 25 years, rising 20 percent to 491 metric tons, while coca cultivation saw a 13 percent increase in 2017" (Whitehouse Briefing Statement, 2018, np).

As stated above, however, the main income-generating activity in the region is the production of coffee, with complementary economic activities taking place around this, including trade in goods and services, many of which are associated with or reliant upon the coffee industry. The area has a high number of co-operatives as a result of the dominance of the coffee industry. The main buyers for the high-quality crops produced by Apessi, Aprocassi and Unicafec are located in the USA, Canada and the UK, whilst low-quality coffee is sold locally. Each producer is responsible for transporting their harvest from their farm to the collection centres at their co-operatives, which poses significant challenges for farmers, especially during the rainy season (January to March), when many of the roads are impassable in a region where only 50% of them are paved.

3.6 Case Study Co-operative Profiles

This section presents a table of the three case study co-operatives that participated in this study, followed by a brief background on each of them, thereby providing an essential grounding for the three empirical chapters that follow, namely Chapters 5-7.

The farmers are grouped according to the co-operative of which they are a member, and the co-operative staff are then listed, once again according to the co-operative for which they work. Then, lastly, the other network actors are listed, along with information regarding their role, company and context. The following Table 3.4 gives and overview of the three case study co-operatives.

Cooperatives	**Buyers and financial support**	**Altitude**
APESSI (founded in 2001) The Co-operativa Agraria de Productores Ecologicos of San Ignacio To become a leader in the production of quality coffee and the diversification and transformation of organic products – improving standards of living for 360 (2014) members	**Buyers:** Sustainable Harvest, USA PROASSA-OPTCO, USA Rainforest Trading RGC **Financial Support:** Unknown	Located between 1,100 and 1,800 metres above sea level.
Aprocassi (founded 2000, registered co-operative 2010) Co-operativa de Servicios Múltiples Aprocassi Aprocassi exclusively commercialises coffee on behalf of more than 400 (2014) associated farmers, who together cultivate more than 1,500 hectares of high-quality product	**Buyers:** Wholefoods Market, UK Allegro Coffee Company Rocky Mountain Roasters, USA Ozo Coffee Company's, USA Sustainable Harvest, USA Twin Trading, UK **Financial support:** Root Capital Oikocredit GlobalPartnerships Peru Opportunity Fund Fairtrade USA	Coffee plantations located between 1,100 and 1,800 metres above sea level.
Unicafec (founded in 2001) Union de Cafetaleros Ecologicos Started with 106, now has 405 (2014)	**Buyers:** Twin Trading, UK Sustainable Harvest, USA Equal Exchange, UK Eguale Women's Rights Coffee, Sweden **Financial support:** Root Capital	Coffee plantations located between 900 and 1700m above sea level

Table 3.4 Overview of the three case study co-operatives

3.6.1 Apessi

Apessi was founded in 2001. Starting with only 15 members and a social capital of S. 2000 Peruvian Soles (which converts to approximately £460), the co-operative has grown to 360 members (2014) looking after a total of 524.88 ha of coffee production land. In 2008, the organisation launched a diversification project, funded by the Belgian Technical Co-operation (BTC), the Belgian government's implementing agency for development projects, promoting the production of honey in order to encourage farmers to have more than one income stream and to support their members when coffee prices fall. The project was successful and was still being implemented in 2014. This was followed by another project, launched in 2009, which aimed to optimise coffee production through technical and business processes associated with organic coffee and improving quality – as a result increasing the prices farmers receive for their harvests. This project was co-financed by the Institute of Agricultural Training (INCAGRO), under the auspices of the National Institute of Agricultural Training, which supported Apessi in gaining both organic and Fairtrade certification. Through this project, the co-operative increased the quality of its coffee as well as the prices it was able to receive for the green beans they exported. Prior to this intervention, and to securing both organic and Fairtrade certification, Apessi had only been able to access local markets or international markets through middlemen. Both forms of certification enabled the co-operative to access the speciality coffee market and to work directly with alternative trading organisations such as Twin and Sustainable Harvest, thereby expanding its buyer portfolio and increasing sales and the prices received for the crop. This resulted in the organisation accessing funding from Root Capital, which otherwise would not have been possible.

Apessi's main markets are located in the United States and Canada, but it is looking currently to expand into the Asian markets. A breakdown of the co-operative's sales is presented below in Tables 3.5 and 3.6.

Breakdown of Apessi sales 2010		
Buyers	**Volume (QQ)**	**Quality**
PROASA	1888	Fairtrade/Organic
Sustainable Harvest	840	Fairtrade/Organic
Rainforest Trading	413	Fairtrade/Organic
Sustainable Harvest	420	Fairtrade
RGC	825	Fairtrade
Local sales to different buyers	690	n/a local sales
Total	**5076**	

Table 3.5 Breakdown of Apessi sales 2010

Breakdown of Apessi sales 2011		
Buyers	**Volume (QQ)**	**Quality**
PROASA	2100	Fairtrade/Organic
RGC	3360	Fairtrade/Organic
Sustainable Harvest	2940	Fairtrade/Organic
PROASA	420	Fairtrade
Sustainable Harvest	420	Fairtrade
Total	**9240**	

Table 3.6 Breakdown of Apessi sales 2011

3.6.2 Aprocassi

Figure 3.7 Aprocassi Headquarters, San Ignacio. Source: author's own

Aprocassi is a co-operative comprising 400 farmers, who collectively cultivate approximately 1,500 hectares of land. The organisation was founded in 2000 with the vision of increasing the wellbeing of its members and supporting them to commercialise their coffee to both national and international markets at fair prices. Aprocassi is a member of Junta Nacional del Café[5], and as such it collaborates with other regional coffee associations. Its vision is to market international speciality coffee markets. Aprocassi has two buyer warehouses: one in Jaen (central transport links and nearest urbanisation) and the second located in San Ignacio.

Aprocassi has developed a portfolio of national and international buyers to guarantee high-quality organic products meeting Fairtrade standards, and it has obtained FLO-Cert, Naturland and IMO-Control certification. These labels provide buyers with additional assurances and ensure that farmers get a higher price for their coffee beans through the Fairtrade minimum price guarantee, explained in Chapters 2 and 4, and the premium which organic certification brings.

[5]Junta Nacional del Café (JNC) is the national coffee board that unites and represents Peruvian coffee producers. It aims to support the growth of the coffee sector in Peru and thus contribute to the socio-economic development of the nation.

Aprocassi is working currently with a number of partners, buyers and NGOs, including Sustainable Harvest, Okiocredit, Root Capital and Shared Interest, in order to grow the co-operative by 20% over the next five years. Through these partnerships, the co-operative is looking to support more young and female farmers, to increase their productivity. Aprocassi has a dedicated technical team, offering members educational training and technical assistance, and its financial arm, Aprocredit, offers farmers credit lines, which they can use, for example, to improve their plantations or finance their children's education.

3.6.3 Unicafec

Figure 3.8 Unicafec headquarters, San Ignacio. Source: author's own

Unicafec was founded in 2001, with the goal of marketing coffee directly to buyers on behalf of farmers, consequently supporting the local population of San Ignacio to lift themselves out of poverty. The co-operative started out with 106 farmers as members and had grown this number to 406 by 2014. The Organic Coffee programme was initiated in 2002, helping members convert to organic farming and in doing so access the speciality coffee market and obtain a higher price for their crop. This initiative was followed by the co-operative gaining Fairtrade certification in 2005, providing farmers with access to markets, higher prices for their coffee and a Fairtrade premium.

In 2006, co-operative members struggled with low productivity of between 8-10 quintals per hectare compared to an average of 20 quintals previously, so the co-operative decided to implement a programme of fertilisation with organic inputs, in order to fit with their

certification requirements, with the aim of increasing both output and quality.

The co-operative and its members have received support (both financial and technical input) over the years from a number of programmes implemented by the Ministry of Agriculture and Irrigation (MINAGRI), including 1). The public investment programme MINAGRI and the National Institute of Agrarian Innovation, established in 2010 with support from the World Bank. INCAGRO finances research, technical and innovation projects within the agricultural sector; 2) A support services programme to access rural markets (Spanish abbreviation PROSAMER), funded by the Peruvian government and the Inter-American Development Bank (IDB) and implemented through MINAGRI via their Rural Agricultural Productive Development Programme (AGRO RURAL), the aim of which is to improve access to markets for both goods and services; 3) The Compensation Programme for Competitiveness (AGROIDEAS), which operates through MINAGRI by implementing sustainable business training at national levels, promoting co-operatives, supporting business planning and managing the finances of co-operatives.

Due to low coffee prices, many of their members were food insecure, but the co-operative responded by initiating a joint project with Heifer Peru, the Peruvian arm of the global non-profit organisation that supports rural families with agriculture- and values-based training throughout the developing world. It was launched in 2011 in order to support Unicafec members in diversifying their livelihood base by raising guinea pigs, planting orchards and taking up beekeeping alongside their coffee production.

Unicafec's vision is to become a sustainable organisation with committed partners, as well as a leader in the production and commercialisation of high-quality speciality coffee. The organisation will position itself within the environmentally-responsible segment in the international coffee market, through its adoption of both organic and Fairtrade certifications.

Sales to the Fairtrade market have grown since 2008 and account for over 70% of their sales to the international market. The co-operative has used its Fairtrade premium to achieve the following: purchase land in order to build a head office, a cupping lab to provide feedback which helps farmers improve the quality and flavour of their coffee, a fertiliser warehouse and a drying machine fuelled sustainably by coffee husks. The drying machine enables Unicafec to control moisture levels consistently and therefore to achieve export standards during the humid drying season. This is increasingly important due to heavier and more frequent rainfall as a result of climate change. They have also implemented an electric *zaranda* (a mesh screen used

after de-pulping to separate low-quality beans) to improve the quality of parchment coffee. The co-operative offers its members a range of training opportunities, covering:

- Productive management of coffee. This includes pruning, organic fertilisation, shade management, pest management and coffee diseases
- Post-harvest storage facilities, quality control
- Participation in institutional strengthening workshops, so that they know how they can contribute to strengthening the co-operative members as a whole
- Self-esteem workshops for women
- Internships, allowing members to learn about particular functions of the co-operative

Figure 3.9 Unicafec bags of coffee beans ready for export. Source: author's own

3.7 Positionality – the Inbetweener

In-country fieldwork remains one of the most important means by which regional geographical research produces knowledge (Sundberg, 2003). This subsection discusses the power relations between researcher and participants and my positionality as a white, female researcher from the global North conducting fieldwork in the global South. Sidaway (1992) brings to light the ethical considerations of researchers from the North, often from ex-colonial countries, conducting research on the global periphery (global South) (Sidaway, 1992). In terms of examining global production networks (GPNs), this notion is of importance, as throughout this thesis I discuss the power dynamics between lead firms (coffee buyers) in the global North and

farmers in the global South. It is therefore imperative to acknowledge the influence that this may have had on my data collection. I also explore conducting research as a pregnant woman and a wife and how this changed the ways in which I was viewed. I then discuss the impact of conducting research in a field in which I was and continue to be a practitioner, and how this helped in terms of gaining access but also came with challenges in terms of the power dynamics between researcher and participant, along with the associated ethical dilemmas. Finally, I highlight the fluidity of my positionality based on the different identities highlighted above.

The social positions of women define how they are viewed as researchers; this definition comes with specific advantages and disadvantages (Sundberg, 2003). As illustrated in Figure 3.1, 'A postcard from the field', I reflected on my position as a doctoral researcher prior to my fieldwork in San Ignacio and how this differed from previous roles in which I undertook international fieldwork, when I travelled as a single, young, white female, which raised questions in cultures where my position was incongruous to the participants' cultural and societal norms.

I travelled for my PhD fieldwork with my husband, which had both advantages and disadvantages. The advantages were that participants felt more at ease with my marital status and the fact that I was not travelling alone. However, questions which previously had focused around my marital status, or lack thereof, were now directed at my lack of children. People asked if there was something medically wrong with me, why was I not producing children for my husband. In essence, I did not fit in with the cultural norms of my research site, being "old" (I was 32 at the time), married and without children.

Literature concerning being accompanied during fieldwork is surprisingly sparse, given the importance placed on the positionality and reflexivity of the researcher, and "the limited theoretical consideration and scholarly discussion on the nature of accompanied fieldwork neglects its importance and provides little material of substance which could be of use to those contemplating fieldwork with others" (Cupples and Kindon, 2003, p. 212).

The presence of my husband highlighted a number of country-specific gender norms; for instance, after only two visits (which my husband attended as an observer) to the farmers' field school, I quickly realised that his attendance was not going to be compatible with conducting research, since all of the male farmers were drawn to talking solely to him, assuming, despite my introductions, that he was the person undertaking the research. We therefore decided that he would no longer accompany me to any of the interviews, co-operatives or farmers' field

school visits. His presence in the community was less troublesome, however, as we were the only white people in San Ignacio, and so people automatically knew who he was. Conversely, his presence helped in terms of gaining approval from the community that I was at least ticking one of the boxes in terms of cultural norms, and his eventual absence from interviews proved beneficial also, as participants engaged with me as a researcher, not as the wife of a researcher.

Farmers as a rule were happy to share their experiences of coffee farming and climate change adaptation. However, they spoke to me very much as an outsider, as someone who was neither a coffee farmer nor Peruvian. There were, nevertheless, two factors which began to change these dynamics and therefore the depth of the discussions which took place during the interviews. The first was my experience of living and working on a coffee farm during the preliminary phase of my fieldwork, when my husband and I lived with a local coffee-farming family for four weeks. During this time, we ate with our host family, slept in one of their outhouses (a small brick building with a tin roof and a blow-up mattress, complete with a puncture), cooked on their traditional stove (stone and firewood, which we had to collect), shared food and worked alongside them weeding, planting and fertilising their coffee plants (refer to Figures 3.10 – 3.12. This invaluable experience gave me a unique insight into the lives of coffee farmers, the physicality of their work, the challenges of working outside in the blistering heat of the sun and high humidity, reacting to unseasonal downpours of rain and seeing first-hand the impacts these elements could have on crops. I was able to ask questions with a small insight into the coffee farmers' lives, and many respected the fact that I had lived in similar conditions to them, even if only for a short period. Immersing myself in the life of a coffee-farming family enabled me to enter spaces both on the farm and beyond its boundaries, to which I would otherwise not have had access in my position as an outsider. Furthermore, partaking in farming activities gave my host coffee-farming family an opportunity not only to tell me about their experiences, but also to show me and provide me unique access to the community in which they were embedded.

Figure 3.10 Coffee farming in Shipasbamba,

Figure 3.11 Kitchen at Shipasbmba

Figure 3.12 Bedroom Shipasbamba

The second factor that changed the dynamics of the interactions, interviews and focus groups was my role as a practitioner in ethical trade and development. The questions I asked, and the manner in which I asked them, were probing, and similar to situations experienced by Gade (2001), who stated "In the Andes, rural people applied the label of *ingeniero* (engineer) to anyone wearing boots and carrying a map" (Gade, 2001), I faced questions about my professional identity. Do you work for the co-operative? For the Government? For an NGO? The participants felt the need to situate me as more than just a researcher, and I would inform them that I used to manage a Fairtrade NGO, delivering training and capacity-building to farmers and handicraft producers to support them with business and financial skills, market access and environmental management. Once they learned of my profession, they changed the way in which they spoke to me. Farmers started to view me as someone who had a basic knowledge of their situation, whilst co-operatives, NGOs and ministries spoke to me on a slightly more equal footing, starting conversations with terms such as, "As you will already know," or "You know our situation."

Once again, this had both advantages and disadvantages. For example, farmers spoke more technically and critically than they had done previously, and once word got out, I had a long line of them sitting outside the homes of the participants I was currently interviewing, waiting to share their views with me. Gaining access was certainly not a problem. However, I had to be extremely careful to state that I was an independent researcher from Newcastle University and

that I would share anonymised data with their co-operatives and with my collaborative partner Twin, but nothing would ever be associated with them personally. I also emphasised that I had no power to provide funding or develop projects which would help them: I was merely collecting data, analysing it and sharing it, in the hope that it would feed into future programmes delivered by the case study co-operatives and their associated buyers. Nonetheless, the farmers often pleaded that I share their situation with people who could help them, and so I agreed to do so through the dissemination of my research findings.

In terms of interviews with co-operatives, NGOs and ministries, my background and professional conduct provided me with a good level of credibility. I dressed in a professional manner and had business cards made before my fieldwork, which I distributed along with the details of my project. In a way similar to what I would do as a practitioner, I researched the person I was interviewing ahead of time, read materials published by the participant and the company or organisation they represented and tailored my questions accordingly. My conduct and profession placed me in the position of a "knowledgeable outsider" (Milligan, 2016; McNess et al., 2015), and I followed up every meeting and interview with an email of thanks, summarising our discussion to ensure I had captured the conversation correctly. As a person with dyslexia, I found this extremely useful, additionally from a research perspective, since it ensured that the data I was recording were factually correct and that I was representing the participants' views accurately. I noted down any action points that the participant or I had agreed on and informed them of the next steps with regards to my research. The credibility that both my background and professional conduct gave me provided access which would not have been possible otherwise. Moreover, I made some key contacts and gained the trust and respect of leaders in the field in which I was studying, which then led to these contacts providing me with insider access to their networks.

One example of insider access was a key contact at the British Embassy in Lima, Patricia Iturregui, the Climate Security and Energy Advisor to the British Embassy, who gave her consent to be named in this thesis. During my first meeting with Patricia, we built up a rapport, based on a shared affinity for climate change adaptation and realising the potential role of trade in addressing some of the associated challenges. My background in international development meant that she saw me as professional and informed. We met on several occasions, and she invited me to her home in Lima to talk more about climate change in Peru. Patricia played a significant role in the development of Peru's first National Communication to the United Nations Framework Convention on Climate Change (UNFCCC) in 2001 and the country's

second National Communication published in 2009. She was well-networked in the climate change arena and trusted me with her contacts. As a result of this relationship, Patricia introduced me to the Climate Change Director at the Ministry of Environment and the Advisor at the Ministry of External Affairs, both of whom were also delegates of the UNFCCC and who kindly offered their time to be interviewed. I also gained access to key contacts at NGOs such as Practical Action, WWF (World Wildlife Fund) and key international governmental delegations at Deutsche Gesellschaft fur Internationale Zusammenarbeit (GIZ), the German agency for technical assistance supporting the German government, and the Department for International Development (DFID), the UK government's department which leads the nation's international development work. I acquired a wealth of 'insider' data from these meetings, which gave me an insight into the perceptions of farmers by network actors who held power, and a window through which to witness how and why decisions are made in the country's ministries. Through the above contacts, I was then introduced to key contacts at the Ministry of Agriculture who is hold responsibility for the national coffee sector and who also provided information and access to reports.

My relationships with all of the above led to me being invited to present papers on my research at two high-profile conferences in Lima, Peru. I presented a paper entitled "Security and climate change among the coffee-growing community in northern Peru" at the Climate Security Conference (2014), run by the Chamber of Commerce in Lima and hosted by the British Embassy. A second paper, "Innovation and diversification – entrepreneurial responses to climate change," which was presented at the International Forum on Climate Change and Agribusiness: Adaptive Opportunities Conference (2014) at the Universidad del Pacifico in Lima, Peru. Both events supported the dissemination of my preliminary findings and created some valuable feedback from industry leaders in the field of climate change adaptation within agribusinesses. This information was later fed back to the co-operatives and farmers via the co-operatives, in order to gain their insights into the reliability of the information presented at these conferences and to understand if the views and information matched or contradicted their lived experiences.

3.7.1 Pregnancy and positionality

I became pregnant after being in the field for five months. At the time, I was living in my field site, a small town called San Ignacio, which bordered Ecuador in northern Peru. San Ignacio was remote – a 31-hour bus ride and a two-hour taxi ride away from the capital city, Lima. Situated in the cloud forest and bordering the Amazon, it was hot and humid and a somewhat

difficult place to endure the first trimester of morning sickness. I had the added challenge of food poisoning, which had become a frequent occurrence, and travelling on unpaved, dangerous roads in unsuitable cars or on motorbikes, trying to reach remote farms located in the numerous valleys which peppered the landscape. Before becoming pregnant, I had ridden on the back of my gatekeeper Arnaldo's motorbike, holding on tightly as we weaved our way around corners and up muddy banks to reach our destination. However, after becoming pregnant, an early scan had shown internal bleeding, and I was told that I was at high risk of miscarrying and that I should refrain from travelling on unpaved roads, something which is the norm for local pregnant women. Not travelling on unpaved roads would have left me confined to conducting my research in the town centre, solely at the co-operative offices. Not having the benefit of seeing first-hand coffee farmers and their homes would have hindered my insight into their lives, so I decided to compromise and hired a car and a driver, and together with my gatekeeper we travelled to farms, taking our time, and where the roads were too bad, we got out of the car and walked.

In those early days I was not visibly pregnant, however, I chose to tell participants of my pregnancy, due to experiencing morning sickness. It is a tradition in Peru to welcome someone into your home with a drink (often local homebrew or very strong coffee) and food (often deep-fried guinea pig), and as I was unable to accept either and did not want to appear rude or dismissive of their hospitality, I thought it was wise to disclose my pregnancy and explain that I was experiencing morning sickness. I did this for purely practical reasons, to minimise my chances of getting food poisoning. However, my disclosure came with unintended advantages. Participants, whether male or female, visibly appeared more comfortable in my company; in essence, the growing baby inside me humanised me (Cassell, 1987). Furthermore, my pregnancy helped me build a rapport quickly as the farmers walked around their land with me, telling me about local plants and traditional remedies for morning sickness. The women talked about coffee-farming while they were pregnant or with small children and how they felt more connected to nature during this time. The farmers assumed that I also had a more significant connection to "Mother Earth" and told me about their lives and farming practices in more detail than they had done before I became pregnant. Gibbs (2014) discusses how an embodiment of a woman's body can open up opportunities for examining the "more-than-human world," or the "politics of belonging" (p. 208) and connections between people and the natural environment (water, plants and land) (Gibbs, 2014). My status as a pregnant woman enabled me to be more culturally accepted and helped me gain a greater insight into farmers' deep connection to the natural environment.

3.7.2 The fluidity of a researcher: insider, outsider and inbetweener

This section on positionality illustrates the various personal and professional identities that influence the positionality of a researcher, and so I therefore propose a more fluid, nuanced view, challenging the commonly used and oversimplified terms 'insider' or 'outsider'. Being an 'insider' or 'outsider' is not static but rather "has much to do with our own constantly evolving lives, academic scholarship, previous experiences and prior knowledge of the context to be researched. It has much to do with how we each perceive the world and how we interpret what we see and experience" (McNess et al., 2015, p. 311).

Hellawell (2006) and Arthur (2010) argue for a more nuanced view in the shape of the 'inbetweener' (Milligan, 2016). As illustrated above, decisions made by the researcher in terms of research design and data collection, as well as the disclosure of information, "can affect the way in which a researcher is viewed" (Milligan, 2016, p. 248). The degrees to which my decisions altered the perceptions of participants in my research differed depending on their role within the coffee production network. However, there was a distinct feeling, specifically in relation to my professional experience, that I moved from an 'outsider' to a 'knowledgeable outsider' or an 'inbetweener' to actors within the network. This insight provides a contribution to the limited literature challenging the insider-outsider perspectives (McNess et al., 2015), thus offering an alternative viewpoint from which to examine positionality and the power between researchers and participants in the field.

3.8 Ethics

> "Conducting international fieldwork involves being attentive to histories of colonialism, development, globalization and local realities, to avoid exploitative research or perpetuation of relations of domination and control" (Sultana, 2007, p. 375).

It is paramount that ethical concerns are interwoven throughout the planning, consultation, implementation, analysis and dissemination processes of the research and, where possible, planned for and mitigated against. Prior to entering the field, I sought and gained ethical approval from the university.

It is important throughout the entire research design and implementation to ensure that ethical and practical considerations are taken into account. All interviewees were given an information sheet or had it read out to them, depending on literacy levels: "The process of consenting to participate in qualitative research should be managed in a way that is enabling and respectful to the needs of the participants" (Ritchie et al., 2013, p. 97). The information sheet (refer to

Appendix 2) provided participants with information regarding the purpose of the study, a time schedule, their potential involvement, confidentiality and their right to opt out of any questions or the entire interview at any point and details about the security and confidentiality of the data collected. This information was provided in order to enable the participants to make an informed decision on their involvement.
Following consent from the participants, dependent on their preferences, the interviews were either recorded on a Dictaphone (saved on a password-protected memory stick) or hand- written notes were taken, which were later typed up and once again saved on a password-protected memory stick. In order to ensure anonymity, each participant was given a unique pseudonym. Participants were debriefed at the end of the research, in order to communicate the key findings and to acknowledge their contribution.

The research also made use of information gathered by non-participant observation. Information gathered in note form or audio-recorded, upon attending resident and group meetings within the community, informed the context of the research and supplemented information gathered during the interviews. This information was only used in the analysis if it had been obtained in a public setting (i.e. a co-operative management team meeting, farmer field school, public event), where permission was agreed verbally by those attending the event. My position as a researcher, and my interest in attending the meeting, was made clear at the start of each meeting, and if there was anything said during these encounters that was confidential, it was agreed it would not included in my research.

A number of ethical dilemmas arose that had not been anticipated, and as such they were dealt with on a reactive basis. As mentioned in section 3.8, when writing about my positionality, in my previous roles I had the power – and often the funding – to implement a development project that would have helped coffee farmers, so I felt somewhat uncomfortable in this new role as purely a researcher, especially when listening to the farmers' lived experiences of poverty, food insecurity and the risks that climate change was posing to their livelihoods, without power to do anything about it. The farmers were sharing their time, sharing what limited food and drinks they had, sharing extremely personal facts about their lives and providing me with the data to complete my PhD, but what was I offering them in return? This is a common ethical dilemma in research, where the researcher is extracting valuable raw material but offering very little by way of recompense. Boesten (2008) talked about her experiences in the field, reflecting on the pressure she felt to set up projects that would benefit the local community and which led her to develop fundraising proposals for development projects. Highlighting the complexities and

complications this issue brings to the position of a researcher, she states "I was now not only a researcher in the community, but someone with access to projects and resources – a development worker" (Boesten, 2008, p. 12). Boesten also discussed the many challenges this caused in her research, in that community members viewed her as "a relatively powerful outsider with access to the leadership of various organisations, including government representatives, as well as with potential access to funding" (Boesten, 2008, p. 15). Moreover, community members expected her to resolve conflicts, raise funds and implement projects, all of which greatly compromised her research and altered the participants' motivations for being involved in the first instance.

3.9 Analysis

Grounded theory aligned with the aims of the thesis and was believed be the most relevant analytical tool to conduct and analyse the rich dataset. The process was iterative and involved the symbiotic collection and analysis of the data, and the stages were interwoven whilst in the field. I used ethnographic observations, interviews and visual methods and kept a field diary, and at the same time, I conducted initial open coding, going back and forth between the two to ensure I had sufficient data and that the initial findings shaped the research. This was of great importance, as I could not return to my field site if I suddenly realised I had not clarified something or collected insufficient data in terms of quality and quantity, once I had returned to the UK.

Once I returned to the UK, I explored the theoretical conceptualisation of my data through further coding and analysis and progressed to axial coding, exploring the relationships between the categories established in the field. "Theoretical conceptualisation means that grounded theory researchers are interested in patterns of action and interaction between and among various types of social units (i.e. 'actors') investigating relationships between the key themes established in the analysis and "embedded in a thick context of descriptive writing" (Strauss and Corbin, 1994, p. 278). The outcome of grounded theory, according to Glaser and Strauss (1967), is to formulate a substantive theory which is "suited to its supposed uses" (p. 3). This is achieved through analysing both the data collected and past research, both of which support answering the question "*In what ways does participation in alternative trading networks shape smallholder coffee farmers' ability to adapt to climate change?*"

Interviews with coffee farmers from APESSI, APROCASSI and UNICAFE							
	Name (Pseudonym	**Age**	**Gender**	**Years coffee farming**	**No. of years as a member**	**Name of co-operative**	**Notes**
1	Alfredo	37	M	20>	6	Apessi	Day 1, interview 1
2	Fernando	53	M	40	Since its inception	Apessi	Day 1, interview 2
3	Maria	44	F	5	5	Apessi	Day 1, interview 3
4	Natalia	68	F	20	10	Apessi	Day 2, interview 1
5	Marco	72	M	26	10	Apessi	Day 2, interview 2
6	Samuel	27	M	12	10	Apessi	Day 2, interview 3
7	Mateo	70	M	25	unknown	Apessi	Day 2, interview 4
8	Sofia	62	F	40>	5	Apessi	Day 3, interview 1
9	Isabella	48	F	30>	5	Apessi	Day 3, interview 2
10	Mai	37	F	20	3	Apessi	Day 3, interview 3
11	Jose	55	M	50	14	Apessi	Day 4, interview 1
12	Antonia	52	F	30	5	Apessi	Day 4, interview 2
13	Maria	45	F	8	4	Apessi	Day 4, interview 3
14	Juan Pablo	52	M	12	10	Apessi	Day 4, interview 4
15	Pedro	38	M	20	10	Apessi	Day 5, interview 1
16	Laura	50	F	12	8	Aprocassi	Day 1, interview 1
15	Peter	28	M	10	10	Aprocassi	Day 1, interview 2
16	Juan		M	7	7	Aprocassi	Day 1, interview 3
17	Pablo	55	M	35	12	Aprocassi	Day 1, interview 4
18	Alejandro	43	M	20	7	Aprocassi	Day 2, interview 1
19	Cristopher	72	M	30>	10	Aprocassi	Day 2, interview 2
20	Daniel	40	M	15	8	Aprocassi	Day 2, interview 3
21	Karen	38	F	10	4	Aprocassi	Day 2, interview 4
22	Valerie	34	F	20	9	Aprocassi	Day 3, interview 1
23	Diego	25	M	15	5	Aprocassi	Day 3, interview 2
24	Marcos	48	M	30>	10	Aprocassi	Day 3, interview 3
25	Lucio	48	M	30>	10	Aprocassi	Day 3, interview 4
26	Aiko	45	F	30>	10	Aprocassi	Day 4, interview1
27	Fernando	64	M	30>	12	Aprocassi	Day 4, interview 2
28	Francisco	59	M	30>	12	Aprocassi	Day 4, interview 3
29	Pedro	58	M	30>	12	Aprocassi	Day 4, interview 4
30	Pablo	46	M	12	6	Aprocassi	Day 4, interview 5
31	Marie-Teresa	57	F	8	13	Unicafec	Day 1, interview 1
32	Alfred	43	M	2	2	Unicafec	Day 1, interview 2
33	Francisco	77	M	47	14	Unicafec	Day 1, interview 3
34	Pedro	42	M	30	14	Unicafec	Day 2, interview 1
35	Olivia	35	F	25	5	Unicafec	Day 2, interview 2
36	Carlos		M	10	7	Unicafec	Day 2, interview 3
37	Annabella	22	F	7	3	Unicafec	Day 2, interview 4
38	Alfred	43	M	2	2	Unicafec	Day 3, interview 1
39	Francisco	77	M	47	14	Unicafec	Day 3 Interview 2

40	Pedro	42	M	30	14	Unicafec	Day 3, interview 3
41	Olivia	35	F	25	5	Unicafec	Day 3, interview 4
42	Carlos		M	10	7	Unicafec	Day 4, interview 1
43	Annabella	22	F	7	3	Unicafec	Day 4, interview 2
44	Pablo	38	M	30	14	Unicafec	Day 4, interview 3
45	Fernando	39	M	10	7	Unicafec	Day 4, interview 4

Table 3.7 Participants' Profiles

Interviews with employees from each of the three co-operatives						
	Pseudonym	**Age**	**Years working**	**Role**	**Name of co-operative**	**Notes**
45	Charles	34	2	Manager	Apessi	Member
46	Terrassa	unknown	4	Administration manager	Apessi	Member
47	Valarie	unknown	4	Engineer	Apessi	Member
48	John	unknown	6	Logistics and accounting	Unicafec	Member
49	Julian	unknown	13	Manager	Unicafec	Founding member
50	Pascal	unknown	4	Projects manager	Unicafec	Working with JNC
51	Fernando	unknown	7	Manager	Aprocassi	Member
52	Maria	unknown	4	Administration Manager	Aprocassi	Member
53	Pablo	unknown	2	Engineer	Aprocassi	Member

Table 3.8 Interviews with Employees from each of the three cooperatives

	Interviews with auxiliary organisations			
	Name	**Organisation**	**Role**	**Notes**
54	Patricia Iturregui	British Embassy, Lima	Climate Security and Energy Advisor to the British Embassy, Peru	Negotiation of the Kyoto Protocol and its implementation in Peru, initiating the first project's access to the clean development mechanism, led the adoption of the first national climate change strategy in Peru and Latin America. Member of the negotiating team of the environment chapter (Trade Promotion Agreement with the US and Colombia)
55	Ben Rawlings	British Embassy, Lima	Head of Economic and Sustainable Development	In charge of business & commercial development (trade & investment); education, science & innovation; economic development (economic reform, trade barriers & market access); climate change and sustainable development; cultural affairs
56	Eduardo Durand	Ministry of Environment Peru	Director of Climate Change	General Director of Climate Change, Desertification and Water Resources In charge of the General Directorate, including the negotiations of the UNFCCC and the coordination of technical and financial co-operation projects on the subject
57	Eduardo Calvo	Ministry of External Affairs	Advisor to the Ministry of External Affairs	22 years as a UNFCCC delegate, works closely with Director of Climate Change
58	Philine Oft	GTZ	Local coordinator for Peru	Research into agricultural risk in Peru
59	Oscar	Ministry of Agriculture (regional)	San Ignacio representative	Implements regional intervention programmes in order to support the coffee-growing community of San Ignacio
60	Fernando	Ministry of Environment (regional)	San Ignacio representative	Works alongside the community of San Ignacio to protect the diverse ecosystem of flora and fauna in the area, which are at risk due to the threat of mining and poor agricultural practices

61	Cesear	Ministry of Tourism (regional)	San Ignacio representative	Role to develop tourism in the area and work alongside the Ministry of Agriculture and Ministry of Environment to promote the region's cultural and environmental assets
62	Arnaldo Quispe Janampa	Sustainable Harvest San Ignacio	Agricultural technician and trainer	Based in San Ignacio, Arnaldo ran the farmer field school and worked with several co-operatives in the area to support their farmers in adapting to climate change and securing their livelihoods
63	Claudia Aleman	Sustainable Harvest, Peru Office	Coffee quality manager	Involved in both checking quality for export and supporting coffee farmers to improve the quality of their coffee beans
64	Susan Aleman	Sustainable Harvest, Peru Office	Development Manager	Directly involved with producer organisations in the country, helping them to improve their productivity and the quality of production on their farms.
65	Oscar Gonzales	Sustainable Harvest (national)	Quality Specialist and Supply Manager	Supports farmers to improve the quality of their coffee and connect to international markets
66	Jose	Agrotour	Farm manager	Managed a coffee farm which not only harvested coffee, but also was open to the public as a way of educating people about how a coffee farm is run (and highlighting the challenges it faces)
67	Susana Schuller	Junta National del Café	Development Technician	The mission is to strengthen the management and negotiation capacities of Peruvian coffee organisations
68	Rebecca	Practical Action	Project Manager	In charge of climate change-related projects
69	Luis Alfaro Garfias	Sierra Exportadora	Advisor to the Executive Presidency	Public body attached to the Ministry of Agriculture and Irrigation that promotes productive economic activities in the highlands and jungle regions of Peru
70	David Griswold	Sustainable Harvest	CEO and Founder	Leading the direction of Sustainable Harvest

Table 3.9 Interview with other stakeholders

Chapter 4. The Context of Coffee Production in San Ignacio: Setting the Scene

4.1 Introduction

This chapter introduces the empirical context for my research. Exploring factors related to both Peru as the case study country and coffee, the commodity production network is analysed in subsequent chapters (5-7). The central contextual elements which emerge in this chapter include the legacies of the colonial era, specifically in relation to agricultural policies and the current influence of power within conventional coffee production networks.

The chapter is divided into three sections. The first presents societal embeddedness within a post- colonial country, Peru, exploring national contextualisation in relation to the study. The chapter then presents information on the historical and political contexts in which coffee growing emerged in Peru and the current challenges faced. This is followed by a brief history of coffee production in the country and its significance, exploring the ecological, economic, social and political importance of the crop. The second section presents climate change at both national (Peru) and local (San Ignacio) levels, exploring the key terms and implications specifically for coffee farming families. The third section presents the alternative trading models of specialised coffee production networks. Together, these three sections provide essential contextual information regarding the smallholder coffee farmers (henceforth 'farmers'), co-operatives and network actors, which will be further investigated in Chapters 5-7.

4.2 Peru

Peru is located in South America. It is bordered to the north by both Ecuador and Colombia, to the east by Brazil and to the south by both Bolivia and Chile. It is one of 12 'megadiverse' countries (World Bank, 2013) in the world, with a vast range of ecological zones, including 84 of the world's 104 living ecological regions (Escobal, 2000). The country is divided into three distinct geographical zones, highlighted in Figure 4.1: i) the arid costa (coast) to the west of the country, which experiences high temperatures and very little rainfall; ii) the sierra (highlands), which is dominated by the Andes mountain range which separates the coast from the Amazon. This area is comprised of multiple micro-climates, dependent on altitude and slope exposure, with the wet season occurring in the summer and generally drier periods over winter; and iii) the Amazon rainforest (which accounts for 60% of the country's land mass), which experiences

a hotter climate, with rainfall experienced throughout the year.

The Sierra region, which is where the case study site is located, is dominated by smallholder farmers (fewer than five hectares), many of whom have land across "a range of micro-environments that vary in terms of altitude, soil quality, water availability, and climate"(World Bank, 2017, p. 36). Smaller farm size is associated with subsistence farming, which accounts for approximately 1.5 million farmers in Peru (World Bank, 2017). This type of farming is "critical to the rural areas of Peru, where poverty is most extreme" (USAID, 2011, p. 3), and it is estimated that 70% of these subsistence-focused family farms cannot cover their basic food needs, due to lack of sufficient land, livestock and/or infrastructure (Escobal and Armas, 2015).

Traditionally, the farmers in this area practiced mixed cropping, interspersing different crops together to meet their nutritional needs. However, this is becoming increasingly problematic, due to poor soil quality, climate change and the rise of mono-cropping, leaving farmers to rely on cash crops or off-farm sources income to purchase food.

Figure 4.1 Geographical zones of Peru. Source: author's own

4.3 Territorial Embedding of Local Places in Global Spaces

Understanding the historical and geo-political background of both a country and a commodity gives meaning to the power struggles and dependent environment in which coffee farmers in Peru are embedded. This section highlights the historical background of political, social and economic change within the agricultural sector and draws attention to significant changes and transformations in power and governance, which have influenced coffee-producing areas today and which are historically linked to colonialism.

4.3.1 Power and politics

Modern Peru "can be dated from the formation of the coastal oligarchy during the mid-and late nineteenth century and its linkage with foreign capital and overseas markets" (Gonzales, 2014), which created an environment of economic and political control in which the creation of coastal sugar plantations played a significant role. The plantation workers along the coast perceived themselves as heroes who created economic prosperity and a grounding for political stability, albeit the benefits of their work were steered towards their own interests and have been cited as a period of "liberal economic theory and oligarchic democracy" (Gonzales, 2014, p. 1).

Led by General Velasco Alvarado, armed forces overthrew President Fernando Belaunde Terry's government via a coup d'état on October 3rd 1968, in an attempt to challenge the oligarchic democracy. Naming themselves the 'Revolutionary Government of the Armed Forces', the newly established government sought fundamental societal reform by giving justice to the poor (Klarén, 2000), believing that this could be achieved by increasing the role of the state in order to regenerate the country's economy. The government regained control of key sectors which had previously been under foreign control, in order to increase the independence of the nation. Furthermore, "Velasco Alvarado inherited an agricultural policy that emphasized the production of industrial cash crops and foodstuffs for urban consumption" (Painter, 1983, p36). Industrial cash crops includedcotton, sugar cane and coffee grown for the export market, and food grown for consumption included wheat, barley, yucca and potatoes.

Velasco implemented the Peruvian Agrarian Reform Law (N. 17716) in 1969. Regarded as the most radical amongst Latin American countries (Klaren, 2000), the reform aimed to rebalance power in the nation through the reallocation of land, converting large private landholdings into co-operatives and thus moving power from a minority of Peruvian elites to a larger share of the population. Co-operatives also sub-divided their land, converting to smallholder agriculture

(Korovkin, 2011). Velasco's agrarian reform is estimated to have redistributed 9 million hectares of land between 1969 and 1979; however, policies favoured coastal areas, where the terrain was even and the climate more predictable, thereby marginalising the Andean highlands with its uneven terrain and microclimates. This resulted in spatially imbalanced economic improvements (World Bank, 2017) due to which "many peasant producers [were] relegated further to the margins of the economic system" (Crabtree, 2002, p. 132).

Peru returned to civilian rule in the 1980s when Fernando Belaúnde Terry won his second presidency (1980–1985). Belaúnde implemented liberalisation policies throughout the country, reversing state control, which led to a significant national economic crisis that had devastating impacts on agricultural co-operatives. The economic crisis, combined with the after-effects of the agrarian reform, threatened the existence of the agricultural co-operative movement. During this time, the co-operative movement exerted its political strength through significant involvement in strikes and demonstrations (Korovkin, 2011).

During Alan Garcia's term in office (1985–1990), dramatic changes took place in the country. His policies led the country to distance itself from international markets, resulting in reduced investment and periods of hyperinflation that reached a high of 7,649% in 1990, and the country's foreign debt rose to $19 billion by 1989, destabilising the nation's economy. Unsurprisingly, this led to increased poverty levels throughout the country, and the "incidence of poverty quadrupled between 1985 and 86" (Glewwe and Hall, 1994). Heightened social tensions fuelled internal terrorism, perpetrated by the Communist Party of Peru (better known as Shining Path or PCP-SL) and the Tupac Amaru Revolutionary Movement, and resulted in an estimated 70,000 deaths, making it one of the most intense periods of violence in Latin American history. Shining Path "envisioned a rural movement led by the peasantry that would 'encircle the cities from the countryside'" (Weinstein, 2006, p84).

4.3.2 Trade liberalisation

Economic liberalisation during the 1990s led to significant changes in the agricultural landscape in Peru. President Alberto Fujimori (1990–2000) inherited a bankrupt country from former President Alan Garcia (de Olarte, 1993), and as a result the newly appointed president sought to stabilise the economic situation through structural adjustment, "imposing a 'super economic shock' (the now- famous *fujishock*) of such severity that inflation rocketed up to 398% in response to his price "corrections"" (de Olarte, 1993, p52). The economic structural adjustment resulted in:

> "the elimination of government intervention in pricing, marketing, and the financial system; a reduction in tariffs and trade barriers; and the maintenance of crawling peg currency devaluations in order to maximise Peru's competitiveness on foreign exchange markets" (Pastor and Wise, 1992, p2).

In order to achieve economic stability, Fujimori focused on two specific goals: The first was to change the way Peru was perceived globally (following a period of conflict between the state and the Shining Path terrorist group, in addition to the significant economic crisis of the 1980s, Fujimori wanted to present a more positive image of the country) and the second focused on integrating the country into the globalised economy. In order to achieve this objective, the state-run La Comision de Promocion del Peru para la Exportacion y Turismo (PROMPERU) was created in the early 1990s with the aim of attracting foreign investment, export markets and tourism. PROMPERU was given both political and economic power to achieve these goals, which caused conflict and concern from other state institutions that had formerly held power and control over some of the areas now controlled by this new body.

The structural adjustment is seen by some as a success, as the political violence ended and the country's economy strengthened. However, despite Peru's significant economic growth, liberalisation policies directly influenced the rural poor, by undercutting the economic feasibility of farmers' livelihoods and agrarian co-operatives through trade liberalisation, the removal of food subsidies and the privatisation of technical assistance via extension workers[5], which were previously state-funded.

The three contextual drivers highlighted, namely the elimination of government intervention in pricing, marketing and the financial system, a reduction in tariffs and trade barriers and, finally, currency devaluations, led to protests and peasant movements across civil society, drawing attention to the needs of the rural population, many of whom were – and still are – living in poverty. Farmers, peasant communities and rural organisations called for support in the form of agricultural management techniques to improve the quality and quantity of their produce, in addition to support at the co-operative/association level, so that they could access new global markets and trade their way out of poverty.

The rural poor's situation was further exacerbated by the transformation of the seed and fertiliser industry, as it transitioned from being populated by small seed companies to being monopolised by a few transnational corporations (Nolte, 2010). Such corporations used their

[5] An extension worker operates between an agricultural research institution and farmers. They are agents of change, whose role is to empower farmers to identify their problems and find their own solutions

power to control the pricing of vital resources required by the farmers, resulting in increased input and trading costs and diminishing profits.

For coffee farmers, the situation was dire, as Alan Garcia's presidential term followed the collapse of the International Coffee Agreement (ICA), which will be discussed in section 4.3.3, resulting in the loss of the quota system that had previously helped support stable coffee prices, as it managed the global supply and demand of coffee. This change led to an oversupply of coffee on the global market, and this in turn led to significant reductions in the prices paid to coffee farmers. This highlights that they were very much on the receiving end of globalised neoliberalism, in that it was configured by elites in a different locality. The farmers were part of the system, but it was not set up to benefit them (Massey, 2012).

4.3.3 Possible Peru

After allegations of corruption and fraud, Fujimori, after winning his third election in 2000, decided to hold re-elections in 2001, during which time he stood down and his party subsequently lost to Alejandro Toledo (2001–2006), Peru's 63rd President and the first South American national leader of indigenous descent to be democratically elected in five hundred years.

Toledo and his political party 'Possible Peru', saw a 66% growth in GDP from 2002–2012 that generated a sudden increase in tax revenue and in turn enabled the state to invest in social programmes aimed at raising the standard of living for much of the population. The growth model was predominately based on commodity exports (Oxfam, 2015), which lifted the entire region and has been said to have been "the Latin America miracle". The most notable result was the reduction in poverty, which fell from 50% in 2004, to 23% in 2014 (INEI, 2015). However, there were significant levels of geographic disparity in this wealth distribution, which remains the case today, with Peru having one of the highest levels of national inequality on the continent (Escobal, 2000):

> "The rural population makes up about one-quarter of the total population, but it accounts for one-half of the poor and 82 percent of the extreme poor. Rural poverty is particularly concentrated in the Sierra and Selva regions. About 47 percent of the total number of poor were living in the Sierra region, which also has a high proportion of indigenous people" (World Bank, 2017, pp. 18-19).

High poverty rates and low education levels, combined with a weak agricultural sector, left the rural poor vulnerable to shocks (economic, environmental and political) and created labour

unrest, as many of them experienced a significant rise in the cost of living and wages, which many believed did not live up to the promises of Toledo's presidency campaign.

Alan Garcia's second term in office (2006–2011) saw a stabilised national economy as a result of extractive industries in Peru and the increase in global metal prices.

Policy period	**Policy**	**Impact on farmers**
Velasco Alvarado (1968–1975)	Redistribution and state control	-Transition from hacienda lands to smallholding - Growth in coffee growing
Morales (1975–1980)	Market liberalisation	-Market liberalisation
Belaunde (1980–1985)	Market liberalisation	- Market liberalisation - Emergence of co- operatives
Garcia (1985–1990)	State control and subsidies	- Government-sponsored credit incentive - Cattle Module
Fujimori (1990–1995) (1995–2001)	Economic structural adjustment	-Seed improvement - Reforestation - Creation of PROMPERU
Toledo (2001–2006)		-Agriculture mechanisation - Fish farming
Garcia (2006–2011)	Ratified the Peru-United States Trade Promotion Agreement	-Market liberalisation - Improved trading with USA due to non-tariffs
Humala (2011–2016)	Declared a state of emergency in response to the CLR crisis New climate change policies	-Continued export trade links - Climate change policies designed to reduce deforestation and Co2 emissions

Table 4.1 Presidential terms, policies and impacts upon smallholder coffee farmers. Source: author's own

4.3.4 Summary

This section highlighted the socio-economic and geo-political implications of various presidents and their political parties' policies, providing a grounding from which the following chapters (5-7) will be built. The section highlights the key role government plays, in that "Government constitutes a key institution that structures human-environmental interactions by promulgating policies intended to guide decision-making about land use" (Chavez and Perz, 2012, p. 525).

The various presidential changes detailed above illustrate the complexity of the institutional environments, which are as multifaceted and fluid as the geo-political and socio-economic system they were created to govern (Young, 2010): "[E]lections often bring regime changes that can result in new policies orientated towards different goals or interest groups" (Chavez and Perz, 2012, p. 526). Understanding and acknowledging the complex governmental environment

in which the farmers reside is paramount to understanding the challenges they face when living with and responding to climate change.

4.4 Peruvian Coffee

Depending on the variety, coffee plants take between 3 and 5 years to bear fruit, and after picking, drying, processing and exporting, the product eventually reaches your home, supermarket or coffee shop. This section begins by detailing the journey coffee goes through to reach its final destination, following which it looks at Peruvian coffee production at macro (National) and micro (San Ignacio) levels, building upon the global coffee market presented in Chapter 2 and exploring the political and economic importance of the crop to Peru.

4.4.1 Coffee production processes

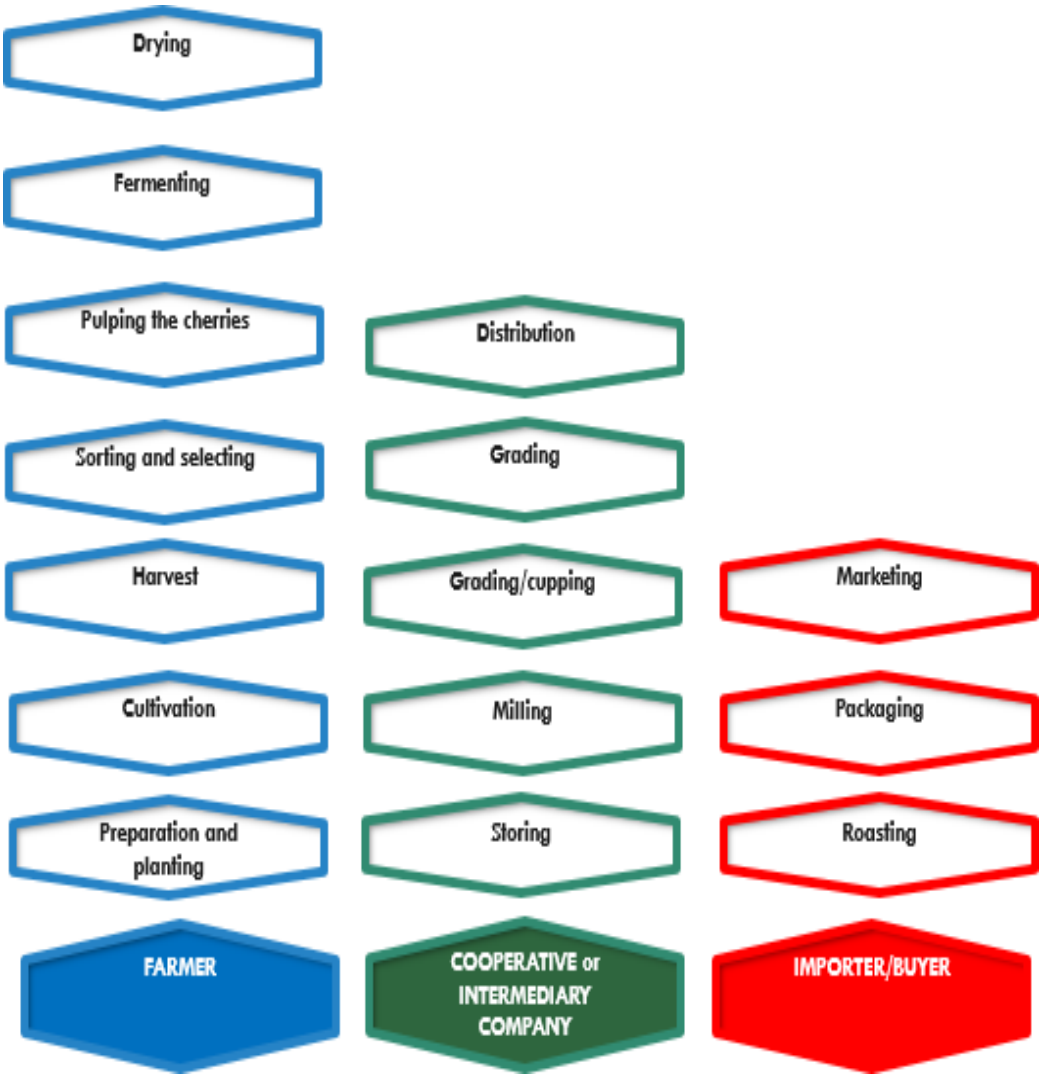

Figure 4.2 Coffee production from bean to brew. Source: author's own

4.4.2 Preparation

Coffee cultivation starts with seed selection. Coffee seeds are chosen based on their variety (C. arabica, which includes typica, bourbon, catimor and caturra among others, and Robusta) and are generally planted in large beds in shaded nurseries, protecting them from exposure to too much sunlight. They are watered regularly until they have grown enough to be permanently planted. The optimum time for planting is during the rainy season, when soils are moist enough to support the plants' roots to become firmly established.

Coffee production is a long and arduous process. Dependent on the variety, plants take between 3- 5 years to bear fruit, which is referred to as the 'coffee cherry' (due to its distinct cherry-like appearance) and turns a vibrant red when it is ripe, indicating to the farmers that it is ready to be harvested.

Figure 4.3 Coffee seedlings at a nursery, San Ignacio. Source: author's own

4.4.3 Harvest

Figure 4.4 Harvesting coffee: San Ignacio. Source: author's own

Typically, farmers will only reap one harvest from their coffee crop, but in some cases there are two flowerings throughout the year, in which case the farmers collect one main harvest and a secondary smaller harvest.

The cherries are hand-picked in a labour-intensive and sometimes difficult process. Many farmers (even smallholdings) employ seasonal labour during this time to support them with the harvest period. Coffee farmers have two ways of harvesting their coffee: 1) The first is when all coffee is stripped from the coffee plant. This is referred to as 'strip picking'; 2) Only ripe cherries are harvested (by hand). This is extremely labour-intensive, as farmers rotate among their crops every 8-10 days, selecting only the ripe cherries. This is referred to as 'selective picking' and is usually only practiced with crops that can reap higher value, such as Arabica.

On average, a labourer or farmer will collect around 150 pounds of coffee cherries per day, which in turn produces around 30 pounds of coffee beans.

4.4.4 Processing

Farmers then either process the cherries at home or transport their harvest directly to a processing plant. There are time constraints on this process, as the longer a farmer takes to process the coffee cherries, the higher the chance of spoilage, which will lead to either loss or a lower price.

There are two ways to process the coffee cherries:

Dry – this is the traditional method and is still widely used, due to the challenges of water availability in many parts of the world. Farmers lay out a large piece of material, spread out their coffee cherries and then leave them to dry in the sun. Large rakes are used to turn the cherries at regular intervals throughout the day, cover them up at night or during any unseasonal rainfall, to prevent them from getting wet or contaminated. The length of time taken in this part of the process highly variable and weather-dependent. The farmer is aiming for a specific moisture content (11%).

Figure 4.5 Drying coffee: San Ignacio. Source: author's own

Wet – a modern, resource-intensive method. Coffee cherries are passed through a pulping machine, which separates the pulp from the bean. The beans then pass through water channels, which categorise them dependent on weight, as the lighter beans float to the top of the water channel and the heavier beans sink to the bottom. The beans then pass through drums, which further categorise them based on size. Once this stage is complete, the beans are then transferred to large fermentation tanks (filled with water), where they remain for anywhere between 12 and 48 hours (dependent on the climate conditions and altitude), in order to remove the parenchyma – a slick layer of mucilage. The beans are then rinsed and ready for drying, usually on a drying table, again in order to reach a moisture level of around 11%. Another option is that the beans can be machine-dried in large tumblers. The dried beans (whether processed by wet or dry

methods) are then known as *parchment coffee.*

Figure 4.6 Washing station: San Ignacio. Source: author's own

Figure 4.7 Raised drying beds: San Ignacio. Source: author's own

Figure 4.8 Milling at APROCASSI, San Ignacio. Source: author's own

The *parchment coffee* then undergoes a further three milling processes, each of which is carried out by a machine:

- Hulling – involves the removal of the entire dried husk
- Polishing – (optional process) the removal of any silver skin which might remain on the coffee been after hulling
- Grading and sorting – coffee beans are graded based on their size by being passed through screens; they are also sorted by weight with the use of an air jet, which separates the light from the heavier beans
- Beans are rejected based on any imperfections caused by insects, weather or transportation (either by hand or machinery).
- Export – the coffee beans are now referred to as *green coffee* and are transferred into jute or sisal sacks ready for export.

Figure 4.9 APROCASSI green beans ready for export. Source: author's own

4.4.5 Cupping

Coffee is regularly tested for quality. This process is referred to as 'cupping' and usually takes place in the consuming country; however, some coffee buyers who have a presence in the country of production support coffee co-operatives to learn this process and test the quality of their own product.

Figure 4.10 Roasted coffee beans from APROCASSI. Source: author's own

4.4.6 Roasting

Roasting transforms *green coffee* into *brown beans* ready for purchase. Green coffee enters the roasting machines, which are kept at a temperature of 550 degrees Fahrenheit, and they are continuously rotated, to ensure that they are not burnt. A process called pyrolysis takes place which releases the *caffeol* (a fragrant oil inside the coffee bean) as the bean is gradually roasted, and once roasting is complete, they are cooled (by water or by air).

4.4.7 Packaging and marketing

The coffee is then packaged. This packaging will no doubt refer to the origin of the coffee, the quality and flavours. The coffee is then marketed and sold to supermarkets, cafes and individual traders.

Figure 4.11 Packaged coffee from APROCASSI

4.4.8 The importance of coffee cultivation in Peru

Coffee is an important crop in Latin America for multiple social, economic, political and environmental reasons. Coffee farms cover a significant proportion of the land, with Mexico, Central America, the Caribbean, Colombia and Peru accounting for 3.6 million hectares collectively (World Bank, 2013).

Peru is a mega-diverse country and is regarded as the most important country for biodiversity (World Bank, 2013). “Its territory contains approximately 10% of the worldwide species of flora, 2,000 species of fish; 1,736 species of birds (second ranking in the world in biodiversity); 32 species of amphibians (it ranked the third place in the world); 460 species of mammals (ranking third in the classification); and 365 species of reptiles (ranking fifth in the classification)” (World Bank, 2013, np). Land management is therefore vital in protecting this biodiversity.

The ecological balance in the coffee-growing regions of the Sierra has undergone change since the mid-1950s, as land management practices have evolved from long-rotation patterns to new settlers cultivating permanent coffee crops, thereby leading to an erosion of soil fertility and diminishing yields:

> "The principal determinant of this ecological disequilibrium has been the mono production of coffee, which in turn made those colonists who had invested heavily in this crop more vulnerable to fluctuations in commodity prices on the international market" (Brass, 1983, p. 77).

The high coffee prices experienced in the 1950s dropped significantly in the 1960s, leaving farmers highly indebted to both state banks and coffee merchants who had given them loans based on future harvests.

Peruvian coffee farmers have difficulty accessing credit for fertilisers, pesticides or herbicides or technical assistance in order to improve their crop management techniques, as so many of them employ traditional farming methods, farming without chemicals, using shade cover and inter- cropping (Brown, 2015):

> "The Peruvian coffee sector has received little aid, with many grower communities essentially abandoned to fend for themselves in remote, difficult regions characterized by broken terrain, heavy rainfall, and poor infrastructure" (Rice, 2008, p. 215).

In terms of land management, this has resulted in a diverse landscape, where multiple farming techniques are adopted ranging from traditional and ecological techniques seeking to retain biodiversity, including those practices required to gain organic certification, to more specialised modern techniques derived from the Green Revolution. The latter focused on intensified farming methods, placing efficiency and increased economic returns at the forefront of agricultural practices and resulting in deforestation and the heavy use of chemical fertilisers, pesticides and herbicides used to increase yields.

Coffee is an economically important crop for many countries in Latin America, and it is the most important export crop in Peru (Perfecto et al., 2005; Rice, 2008; Rice and Greenberg, 2000). In total, 96% of the crop is exported, accounting for 17% of the countries total agricultural export and around 1 billion US dollars in annual revenue (SIPA, 2017).

In addition to its economic importance on a national level, regionally, coffee farming generates 855,000 jobs (Nolte, 2018) and supports 220,000 families (IICA, 2016) in rural areas, where income-generating activities are limited. The majority of coffee farmers are smallholders, producing coffee on small plots of land averaging 3 hectares (Nolte, 2018) and often on steep hillsides, making it a labour-intensive process often involving entire families in order to manage seed selection, planting, farm management, harvesting and post-harvesting.

4.4.9 Governance of coffee

The International Coffee Organization (ICO) was established in the 1960s and represents 125 million people from over 60 countries worldwide by bringing together network actors to find collaborative solutions to the multitude of challenges facing the industry: "Member Governments [of the ICO] represent 97% of world coffee production and over 80% of world consumption" (ICO, 2014, p. 7). One of the key instruments created to stabilise the industry was the International Coffee Agreement (ICA), an internationally-agreed treaty which governed the ICO's framework and the parameters in which it operated. The 1962 agreement aimed to achieve three key objectives: (i) a balance between supply and demand, in order to achieve equitable prices; (ii) to ensure the alleviation of poverty caused by price volatility, occurring as a result of an oversupply of coffee on the market; and (iii) to support exporting countries gain more power within the network through stabilising prices and promoting an increase in consumption (ICO, 2014). The main governing mechanism used to achieve these goals was the quota system, which provided each exporting country with a share of the total global export quota, based on each nation's average exportable production, assessed annually. The system proved successful in regulating the production of and demand for coffee, and stabilising global coffee prices (Akiyama and Varangis, 1990; Ponte, 2002). Nevertheless, there were continuous complaints from member countries about unfair treatment concerning the allocation of quotas. Rather than renegotiating the entire ICA, complaints were dealt with on an individual basis and waivers were put in place. Such waivers enabled exporting countries to distribute more than their ICA quotas, resulting once again in an oversupply of coffee in global markets and a reduction in prices paid to coffee farmers. In 1968, a new ICA was adopted with many of the same objectives as the 1962 agreement. The new agreement, however, created a 'diversification fund' (Article 54 of the Agreement) as a way to address the ongoing challenges associated with over-supply to the market. The fund, which was financially supported by exporting countries, aimed to support coffee farmers in growing other crops, in addition to helping them 'upgrade' through improved storage and production processes.

The stability of the industry did not last, though, due to a number of factors that led to the eventual collapse of the ICA, including (i) the fragmentation of production and consumption; (ii) geopolitical shifts such as the fall of the Soviet Union, and changing relationships between the USA and Latin America; and (iii) the promotion of export-led growth and market liberalisation, during which time economic policies in the global North and global South were focused around neoclassical economics (Tucker, 2017). Such policies promoted external

investment and increasing exports, together with many governmental ministries reducing their role in governing coffee production and commercialisation. The collapse of the ICA led to the loss of the quota system, which had been responsible for stabilising coffee prices, and resulted in an imbalance between supply and demand: "The consequences of the current situation vary, but in many cases prices do not even cover the costs of production" (ICO, 2002, p. 2). The demise of the diversification fund resulted in the disappearance of all support given to both upgrading and diversification initiatives, and the number of staff employed by the ICO halved to 75 as the governing mechanism declined and the ICO reduced its function to become solely a centre which collected and shared information about the sector.

After a two-year period of negotiations, a new ICA was agreed in 1976. It had many of the components of earlier agreements, but the focus was placed more heavily on providing benefits to consumers. The collapse of the ICA in 1989, and more importantly the loss of the quota system, "was accompanied by several years of prices so low that the market situation became known as the 'coffee crisis'" (ICO, 2002, p. 14). In 2001/02, total production was estimated at 113 million bags (60kg bags) while consumption was at just over 106 million, leading to a fall in prices.

The coffee crisis continues to affect thousands of farmers and their families negatively throughout the world (Ponte, 2002; Montgomery, 2019; Fernandez and Méndez, 2019). Prior to the collapse of the ICA, coffee-producing countries received 20% of the total retail price and consuming countries around 51%; however, the balance changed as the governance of the sector transitioned more heavily into the hands of coffee roasters and retailers, resulting in the value capture for farmers falling to 13% and at the same time consuming countries' share rising to 78% (Talbot, 1997).

4.5 Multi-Stressor Environment

The first section (section 4.2) of this chapter outlined the changes in politics and power in Peru. The second section (section 4.3) provided analysis of coffee from both global and national perspectives, and this final section brings the two together to talk about the specific case study – a GPN which is subject to the double crisis – outlining the players and their responses to the multi- stressor environment. These interventions and responses are critically discussed below and will be developed further within Chapters 5-7, which draw upon the key theoretical aspects explored in this chapter in order to analyse critically the empirical and secondary data collected in relation to both my research question and the specific case study.

4.5.1 Climate change

The main focus with regards to climate change interventions is mitigation, particularly among the business community. Mitigation has an overarching aim of reducing the impact of economic activity on the environment through the reduction of greenhouse gas emissions, and the Intergovernmental Panel on Climate Change (IPCC) defines it as "technological change and substitution that reduce resource inputs and emissions per unit of output [...]. Concerning climate change, mitigation means implementing policies to reduce GHG emissions and enhance sinks" (IPCC, 2007a).

Climate change adaptation has received less attention and fewer resources when compared to mitigation, but nonetheless it plays a crucial role in how society, businesses and governments manage the effects of climate change. How adaptations are framed and managed will determine food security and livelihoods. For the purposes of this thesis, I will draw upon Adger et al.'s (2004) definition thereof:

> "as an adjustment in ecological, social or economic systems in response to observed or expected changes in climatic stimuli and their effects and impacts in order to alleviate adverse impacts of change or take advantage of new opportunities" (Adger et al., 2005, p. 78).

Adaptations occur on multi-scalar levels and are carried out by individuals, civil society, governments and global actors, all of whom have different motivations for their interventions, which can be as diverse as security, economic and social wellbeing or health-related. Network actors' motivations shape the form in which their interventions take place. Chapter 6 will examine the different ways in which interventions aimed at climate change adaptation occur, and the motivations behind them with regards to farmers' adaptations.

Peru is cited as one of the country's most vulnerable to the effects of climate change globally (Paun et al., 2018; Eckstein et al., 2017; Vázquez-Rowe et al., 2018). With the Intergovernmental Panel on Climate Change's (IPCC) Special Report on Emissions scenarios predicting that Peru will experience a temperature rise of between 0.7 and 1.8°C (dry season) by 2020 and a rise of between 1 and 4°C by 2050, the highest rise in temperature predicted globally within the report (Nakicenovic et al., 2000). Such rises in temperature pose problems in terms of water scarcity and desertification throughout the country.

Peru holds 71% of the world's tropical glaciers (Vuille et al., 2008), and during the past three decades, scientists have observed a 30% reduction in the glacial snowpack (Urrutia and Vuille, 2009), making the nation highly vulnerable to future temperature rises, glacial retreat and

glacial runoff:

> "the complex interplay of hydroclimatic and glacial runoff seasonality exacerbated by climate change impacts as well as shifting socioeconomic dynamics, pose challenges for local and regional livelihoods and sustainable water resource management" (Drenkhan et al., 2015, p. 1).

This impending issue, together with the changes which have been observed with regards to increased temperatures and subsequent flooding, will have potentially devastating impacts on farming families at lower elevations:

> "[Five] million people (around 18% of the country's population) have been affected by extreme temperatures… the occurrence of disasters showed an increasing trend over the years: flooding increased by more than 60% from the period 1970-1980 to 1990-2000, *huaycos* (mudflows) by almost 400% for the same period" (World Bank, 2009, p. 2).

This is further compounded by the effects of El Niño/Southern Oscillation (ENSO) and the multitude of microclimates which exist in Peru, which is home to 28 of the world's 32 climates (Oxford Business Group, 2015), because such a diverse range of challenges and microclimates makes the responses to both mitigation and adaptation inherently complex.

4.5.2 Institutional context

In response to the climate challenges cited above, Peru has embarked on a range of mitigation and adaptation strategies over the last three decades. The National Commission for Climate Change was established in 1993 by the Ministry of Foreign Relations (Supreme Resolution 359) and later transferred to the National Council for the Environment (CONAM, Spanish acronym), the country's environmental governing body, which was established in 1995. CONAM was the nation's designated national authority (DNA) on climate change to the UNFCCC, and it developed the National Strategy on Climate Change (ENCC – Spanish abbreviation Decree No. 011-2003) in 2003, later replaced in 2015. The strategy draws attention to the adverse effects of climate change and specific areas of concern, including glacial retreat, access to water resources and historic changes to rainfall and temperatures. In response to such concerns, the strategy sets two targets, one focusing on a reduction in greenhouse gas (GHG) emissions and another relating to adaptation, which is detailed below:

> "Prevent the adverse impacts of climate change from reducing the vulnerability of the economy and society to such impacts, raising awareness among the population and implementing adaptation actions in appropriate scale. The associated indictors are:

- Increased proportion of people who know what actions to take to manage climate change risks and adapt to the impacts
- Increased volume of private investment and increased quality of public expenditure for climate change adaptation
- Reduced human and economic losses due to the occurrence of natural disasters linked to climate change
- Increased production of scientific research and technological development as a basis and guide for climate change risk management and adaptation to climate change" (London School of Economics, 2019).

The responsibilities of CONAM were later taken over by the country's first Ministry of Environment (MINAM, Spanish acronym) which was created in 2008. MINAM has since taken the lead on matters relating to climate change; however, due to the cross-cutting nature of climate change, there are a number of other institutions and ministries with responsibility for climate- related issues, including the Ministry of Agriculture, which was established in 1943, the Ministry of Economy and Finance, established in in 1821, the Ministry of Foreign relations, established in 1821, and the more recent Ministry of Foreign Commerce and Trade, established in 2002. One of the key challenges which will be explored in more detail in Chapters 5-7 is the lack of clarity with regards to both the ownership and management of specific climate-related issues.

The country's current policies are rated as 'insufficient' by Climate Action Tracker (CAT), which provides a scientific analysis developed by three research institutes (Climate Analytics, Navigant and New Climate Institute):

> "Commitments with this rating are in the least stringent part of their fair share range and not consistent with holding warming below 2C let alone with the Paris Agreement's stronger 1.5C limit. If all government targets were in this range, warming would reach over 2C" (Climate Action Tracker, 2018).

The recent addition of the Framework Law on Climate Change (Law no. 30754), in April 2018, moved the country closer to meeting the agreed mitigation targets set in the Paris Agreement Pledge. The Law determines how public policies pertaining to both climate change mitigation and adaptation must fulfil these commitments, and it determines actions to be taken by the country's Ministry of Environment (MINAM) in relation to the nationally determined contributions (NDCs) (Law no. 30754, Article 6) were central to the Paris Agreement. The Paris Agreement (Article 4, paragraph 2) states that each country needs to develop, communicate and manage targets to achieve their NDCs to ensure global warming does not exceed 1.5°C. The articles in the Framework Law on Climate Change, which specifically relate to adaptation and as such are important to highlight for the purposes of this thesis, are listed in the table below:

Article	Theme	Requirements
2	Principles of integration	2.1: stipulates that the state designs and integrates both mitigation and adaptation measures 2.7: "principle of climate governance" which refers to the processes and policies governing climate change adaptation and mitigation at all levels of the government, requiring participation of both public and private actors
3	Approaches for the integral management of climate change	Including management based on traditional knowledge, hydrographic basins, ecosystems, the conservation of carbon stocks, territorial planning and climate risk management
4	Management of climate change	Stipulating that both adaptation and mitigation measures are integrated into policies and programs at all three levels of the government administration (national, regional and local)
7	Sectoral authorities	The ministries and organisations responsible for producing climate change publications, development activities related to climate change
8	Regional and local authorities	Through the decentralisation process, regional and local governments are required based on their competencies to implement national policies at a regional or local level, incorporate climate change mitigation and adaptation into territorial development plans, report back to MINAM, promote studies relating to vulnerability and adaptation and identify vulnerable zones and consider traditional and indigenous populations
15	Measures to adapt to climate change	Policies determined at national level are to be implemented by regional or local level governmental departments.

Table 4.2 Relevant articles in the Framework Law on Climate Change

4.5.3 Climate change in northern Peru

A study conducted by the World Agroforestry Centre (ICRAF) and the International Centre for Tropical Agriculture (CIAT) has predicted that the coffee region located in the north-east of the country, covering the Cajamarca (study site), San Martin and the Amazonas regions, will be adversely influenced by climate change affecting "all links in the crop's value chain, though primary production will be impacted most significantly" (Popescu, 2018, np). This is further compounded by the continued deforestation on the region, in that; "between 2001 and 2015, Jaén and San Ignacio lost over 3,998 and 9,289 ha of forest, respectively, on surfaces smaller than 1 ha" (Interview with the regional Ministry of Environment, 2014).

The next sub-sections will introduce responses to climate change which attempt to incorporate the two key challenges facing the coffee industry (price volatility and climate change). The theoretical aspects of each response will be critically analysed below and then drawn upon in the subsequent empirical chapters (5-7).

4.5.4 Speciality coffee and strategic coupling

High-quality coffee is often referred to as 'speciality' coffee and is responsible for a rapidly growing industry. The USA experienced a rise in sales from 7.8 billion USD in 2000 to 24.3 billion in 2014 (Speciality Coffee Association of America, 2014), providing farmers with an opportunity to benefit from the premium paid by adding value to their coffee and gaining access to a growing segment of the market through 'upgrading'. Additional benefits to participating in the speciality coffee GPN include the incentive to engage in agro-ecological farming techniques through practices such as shade-grown, organic and manual farm management systems, resulting in improved soil fertility and a reduction in the reliance on costly fertilisers.

An example of how this works in practice is the relationship coffee model (RCM), a development intervention created by Sustainable Harvest, an ethical coffee buyer based in the USA, and Bloomberg Philanthropies. The model is closely aligned to the speciality coffee market (Vicol et al., 2018). The two creator organisations (Sustainable Harvest and Bloomberg Philanthropies) have since established the Relationship Coffee Institute (RCI), which has developed the "unique model [which] disrupts opaque, commodity-driven systems to increase value throughout the supply chain" (RCI, 2019, np). The approach has four fundamental components:

(i) "traceability, by territorially embedding themselves in the country, Sustainable Harvest representatives build relationships directly with farmers and their co-operatives, thus
(ii) ensuring traceability of the product from bean to brew;
(iii) transparency, which is achieved through facilitating relationships between buyers and farmers, assisting with clear communications, negotiations and quality expectations between actors;
(iv) most valued partner programme, which connects roasters with second-level, well-managed co-operatives, facilitating additional direct trading relationships, and lastly
(v) investing in origin, Sustainable Harvest have four in-country offices in addition to experts based in the field. Through the RCI they also facilitate conferences for all network actors, in order to "invest in some of the coffee world's most pressing

challenges" (Sustainable Harvest, 2019, np).

There is limited literature surrounding the RCM. Raynolds (2009), who explores the influence of a range of buyer relationships, concludes that "mission-driven buyers," such as those who participate in the RCM, go beyond FLO requirements with regards to price, credit and their long- term commitment to the co-operatives with which they work, albeit while imposing stringent rules regarding quality.

RCM, along with the speciality coffee market, places high-quality coffee at the centre of trading relationships, aiming to provide opportunities for farmers to 'upgrade'. The model involves farmers working in close collaboration with roasters, buyers and importers to develop direct long-term relationships.

Neilson and Pritchard (2011) argue that the concept of upgrading provides a bridge that links the institutional dimension and the governance dimension of the GVC approach. Their entry point is a relational perspective that comprehends governance arrangements and institutional formations as being co-produced by internal, place-bound actors and external 'lead firm' actors. Referring to the notion of strategic coupling, Coe et al. (2004) stress that "prospects for upgrading hinge on how the multi-scalar industrial formations into which economic actors are embedded interact with new governance arrangements frequently set in train by agents remote from their immediate environment" (Neilson and Pritchard, 2011, p. 1939). Many coffee roasters have built their business model around these certifications in order to create value enhancement and capture by promoting their ethical standards.

4.5.5 Co-operatives as a vehicle for change

Co-operatives are a key actor within global coffee production networks, as they bring together farmers and act as a mechanism through which they can collectively access global markets. They are also crucial in supporting farmers to adapt to climate change.

The International Co-operative Alliance defines a co-operative as:

> "An autonomous association of persons united voluntarily to meet their common economic, social and cultural needs and aspirations through a jointly owned and democratically controlled enterprise."

The European co-operative model started to emerge in Latin America after the end of World War II, and as was the case in many colonial countries they were top-down development

initiatives, often heavily controlled by the countries' ministries of agriculture (Tallontire, 2015). The majority of co-operatives were located in marginal rural areas with the aim of pooling resources, both monetary and labour. However, despite such earnest ambitions, these co-operatives became politicised and "in many cases, rather than serving the needs of the poor, [became] political organizations and were co-opted by political parties" (Vásquez-León, 2010, p. 5). They received particularly heavy criticism during this period as they embraced the dominant capitalist system in preference to their original remit as a social movement. They received a further challenge to their survival as state support (financial and training) was withdrawn during liberalisation, resulting in significant changes to the socioeconomic environments in which they were operating.

The governance structure of Peruvian coffee co-operatives comprises two controlling bodies. The first is the governing council (*Consejo de Administracion*), whose role is to appoint the general manager, act as an advisory body on management issues pertaining to strategic planning and liaise with co-operative management on issues related to the membership. The second is the audit committee (*Consejo de Vigilancia*), the role of which is to audit the co-operative's accounts and oversee administration and management operations. All three of the case study co-operatives had two additional governing bodies, namely an education committee (*Comite de Educacion*), whose role was to educate members on the key co-operative principles, and a gender equity committee (*comite de equidad de genero*).

4.5.6 Voluntary private regulation and standards

Alternative development strategies within the coffee sector emerged in order to address some of the inequalities between buyers, retailers and roasters in the global South and farmers in the global North, and they focused on creating a solidarity-based economy which balanced both economic and social indicators. Driven by NGOs and consumer demand, private voluntary certifications and sustainability codes, including Fairtrade and Organic among others, were established to address social and environmental concerns about production and labour within global production networks (Neilson, 2008). These initiatives have been widely critiqued (Daviron and Ponte, 2005; Giovannucci and Ponte, 2005) and will be explored in Chapter 5.
The Fair Trade movement, originally called 'alternative trade', was driven by a desire to support poor people in the global South. Its origins began in the US, when an organisation called Ten Thousand Villages began importing needlework from Puerto Rico in 1946, and this was closely followed by SERRV, another alternative trading organisation (ATO), which developed links and trading relationships with these poor communities.

The world's first Fairtrade label, Max Havelaar, which was developed in 1988 with support from the Dutch development agency Solidaridad. The certification sought to distinguish conventionally traded goods from those traded to improve the living standards of smallholder farmers in developing countries. The first product which was certified and imported by the Dutch company was coffee. The collapse of the ICA, as discussed in section 4.3.3, resulted in a significant drop in coffee prices paid to smallholder coffee farmers and a knock-on rise in poverty and food insecurity. Max Havelaar (named after a fictional Dutch character who challenged the exploitation of coffee growers in Dutch colonies) sought to support Mexican farmers to ensure they received a fair price for their coffee that covered the costs of production.

Actors within the global coffee production network, including NGOs, governments and international donors, have all supported smallholder producers engaging with private voluntary certification schemes such as Fairtrade (Linton, 2012). The Fairtrade label is governed by the Fairtrade Labelling Organisation (FLO) and has been recognised as "an innovative certification and labeling initiative, which harnesses the power of the market to address social and environmental problems exacerbated by conventional global markets" (Taylor et al., 2005, p. 199). The certification adheres to key principles (see Appendix 8), of fairness, trust, transparent equality by making sure that smallholder farmers receive fair and stable prices for theirproducts.

Co-operatives, farmer associations and other marketing structures have played a significant role in how Fairtrade and organic certification have been territorially "embedded" (Rice, 2001) in local contexts across Latin America. Fairtrade, according to Gereffi et al. (2001), is a form of governance that provides a regulatory mechanism through which voluntary codes of conduct concerning production, retail and consumption take place: "Some of fair trade coffee's most important innovations, as well as some of its greatest challenges, lie in the governance arrangements it introduces into the commodity chain" (Taylor et al., 2005, p. 200). This concept will be drawn upon in Chapters 5-7 in order to investigate what this form of governance means and the role of Fairtrade as a regulatory mechanism when addressing climate change challenges.

Fairtrade-certified co-operatives are "perceived as the seeds of a fairer, more democratic and more sustainable economy through which global capitalism can be transformed to address concerns for social justice and environmental sustainability" (Vásquez-León, 2010, pp. 8-9). The principles of the sustainable livelihood approach (see section 2.2.4) will be used in order to investigate the influence of Fairtrade in supporting farmers to achieve and maintain sustainable livelihoods and the impact this has on their ability to adapt to the climate change challenges they are currently experiencing.

There are many potential benefits to certification schemes like Fairtrade. “For the millions of small- scale farmers and artisans in Latin America who produce coffee and other commodities for global markets, F[air]T[rade] and other alternative markets offer the hope of earning livable incomes and the means of improving conditions within both their households and their communities” (Sick, 2008, p. 194), balancing out some of the inequalities noted in section 2.2. Certification offers farmers the opportunity to upgrade: by following the standards required farmers and other producers can improve product quality and efficiency, and introduce new technologies and adaptations, which will draw upon the GVC notions of economic, social and environmental upgrading discussed in section 2.3.2. Fairtrade certification is demand-driven, thereby connecting it to Gereffi’s key contribution within the GCC framework, which highlights the differences between buyer-driven (which is the case for Fairtrade) and producer-driven chains, and thus one of the requirements prior to certification is that the co-operative has identified an export market. They often see a greater financial reward through minimum prices and premiums, and through improved quality, and are able to access training opportunities to improve their farming practices and build capacity.

Fairtrade works on the premise of long-term direct trading helping to build trading relationships, which means they have the potential to become empowering relationships, (see section 4.4.4 for more details) while examining the benefits of and limitations to the relationship coffee model. From a financial perspective, the reported benefits are multiple, since Fairtrade-certified co-operatives and smallholder farmers receive not only a more stable price, but also one guaranteed to cover the costs of production: “The Fairtrade minimum price defines the lowest possible price that a buyer of Fairtrade products must pay the producer. The minimum price is set based on a consultative process with Fairtrade farmers, workers and traders and guarantees that producer groups receive a price which covers what it costs them to grow theircrop. When the market price is higher than the Fairtrade minimum price, the trader must pay the market price” (Fairtrade Foundation, 2019, np). There is also the Fairtrade premium, which is an additional payment awarded to the Fairtrade-certified co-operatives, and members vote on how this money should be spent on social, environmental and economic endeavours. This is something that will be critically analysed in Chapters 5.

A number of studies recount how the Fairtrade premium in Latin America has been used to finance climate change adaptation programmes and contingency funds against natural hazards. Fairtrade organisations have used their premium to convert coffee to higher income-generating, diversified and more ecologically sound organic production (Murray et al., 2006) and to

improve their sanitation facilities.

Lastly, it opens up access to finance which would otherwise be closed off to smallholder farmers. The risks associated with growing agricultural products such as coffee, to a certain extent, decrease through Fairtrade certification. The minimum price, quality requirements and more stable market make organisations more appealing to finance organisations and more secure in the knowledge that any loans or other forms of financial support will be repaid. One of the most significant advances in this regard is that Fairtrade co-operatives have access to pre-finance from buyers, which provides them with up 60% of the value of the buyers' order ahead of delivery.

4.5.7 Climate change and Fairtrade

> "Over the past decade, Fairtrade, with its original emphasis on social development and economic empowerment, has been challenged in terms of public and political interest by the growing significance of environmental concerns, in particular those connected to climate change" (Hughes in Raynolds and Bennett, 2015, p. 301).

Such shifts in focus have resulted in stronger environmental standards and clauses being embedded into the Fairtrade standards. Retailers and producers alike are now working in a multi-certification environment, whereby Fairtrade certification is one of a range of certification bodies they engage with in order to strengthen their corporate social responsibility reporting and meet the demands of consumers for more ethical and environmentally conscious purchasing.

One of the other key challenges, as argued by Johannessen and Wilhite (2010), is that the power dynamics following the collapse of the ICA have changed, with power becoming consolidated in networks, which has negative consequences on smallholder farmers: "This power consolidation is contributing to an increasing preference within Fairtrade coffee chains for coffee produced by large, second-order co-operatives, to the detriment of smaller co-operatives and a reduction in Fairtrade benefits in the local areas where the coffee is produced" (p. 526).

It is argued that this unequal distribution of value is down to the decision to mainstream Fairtrade in 1989, in order to achieve significant growth (James, 2000). The organisation decided to utilise existing market actors and infrastructure to access the mainstream market (Renard, 1999). Consumer demand for Fairtrade products, along with the mainstreaming of the mark, has led to changes, with power becoming consolidated by networking with conventional brands; for instance, Nestlé labels a very small number of it products as Fairtrade. It is argued

that this both dilutes the brand, as Nestlé have a poor track record in terms of ethical trading, and, due to the size of conventional brands, they buy in bulk, which means they trade with second-level co-operatives with the ability to provide sufficient volumes of high-quality coffee, thereby leaving the first-level co-operatives unable to access mainstream markets (Johannessen and Wilhite, 2010; Fridell, 2007). These second-level co-operatives then bolster their position in the market by using their Fairtrade premium to improve their competitiveness. It is also worth noting that the minimum price guarantee is only of benefit when conventional coffee prices drop below the floor price (the minimum price required to cover the cost of production) (Giovannucci and Ponte, 2005; Raynolds et al., 2004).

"Guided by similar principles, Fairtrade also aims at increasing the share of organic production under their label" (Beuchelt and Zeller, 2011, p. 1317). These two certifications complement one another, and numbers of studies have illustrated that smallholder farmers with dual certification receive higher prices than those paid for conventional coffee (Bacon, 2005; Daviron and Ponte, 2005; Lewin et al., 2004). This in turn has been proven to have positive knock-on effects in improving smallholder farmers' organisational capacity (Raynolds et al., 2004), achieving higher and more stable prices (Aranda and Morales, 2002, p. 16) and investment in equipment, headquarters and warehouses (Pérezgrovas and Cervantes, 2002; p. 15). However, only a small percentage is sold through the Fairtrade and organic channels, due to limited demand, and thus the benefits are often insufficient to cover the additional costs (Bacon, 2005; Johannessen and Wilhite, 2010).

However, it is important to also acknowledge the cost implications of these farming practices and in accessing speciality markets. Scholars have conducted empirical studies which illustrate reduced yields through organic farming (Valkila, 2014), the risks associated with organic farming, which can leave smallholder farmers more vulnerable to pest and plant diseases, and the costs associated with gaining and maintaining certifications such as organic and Fairtrade (Rice, 2001), which are often a requirement for co-operatives to access speciality markets.

Understanding both the situation at present, together with future predictions with regards to the effects of climate change, is paramount to informing both adaptation and mitigation strategies. Building upon the global view and academic literature surrounding climate change, as presented in Chapter 2, this section of the contextual chapter presents the situation with regards to climate change in Peru. It begins with a national overview and then transitions to the regional (Cajamarca) and local (San Ignacio) contexts.

4.6 Conclusion

This chapter has set the scene for the three empirical chapters that follow, highlighting the importance of understanding and acknowledging the political, historical, economic and environmental contexts, by providing a historical grounding to changes in Peruvian power, governance and control, both nationally and globally.

The chapter began by presenting the national contextualisation of a Peru as a post-colonial country, exploring both the historical and political contexts shaping coffee growing in the country. The changes in political parties resulted in radically different national policies. When the rural poor have done best, there has been a significant amount of state intervention aimed at supporting them. An example of this is Alejandro Toledo presidency, which oversaw a 66% rise in GDP. This rise enabled the government to invest in state aid targeted at the most vulnerable and resulted in a reduction in poverty, from 50% in 2004, to 23% in 2014.

A further finding in this chapter relates to the power of global governance in coffee production and supply. The ICO developed the ICA that brought into play the quota system, and which ensured a stable coffee price for producers and producing countries by managing the supply and demand of coffee, leading to price stability and security for farmers. However, in 1989, the ICA collapsed and coffee farmers experienced volatile coffee prices, leading to livelihood and food insecurity. This also led to international agreements being focused on the interests of exporters and coffee roasters. An example of this is the reduction of wealth capture in coffee-producing countries, from 20% to 13% of the global retail price (Talbot, 1997). These economic and political challenges were further compounded by climate change, as presented and analysed in section 4.4. These changes to global governance, and the increasing influence of climate change, led other actors in the network to exert their power. Private voluntary certifications, co-operatives and ATOs stepped in to the void created by both the state and the ICO, in order to support farmers both adapt to climate change and deal with the challenges of price volatility through upgrading to speciality coffee, accessing niche markets through gaining Fairtrade and organic certifications and becoming members of co-operatives. The power and influence of both state and non-state actors will be critically examined in the context of the changes and challenges highlighted in this chapter, responding to the overarching research question "*In what ways does participation in alternative trading networks shape smallholder coffee farmers' ability to adapt to climate change?*"

This chapter has outlined the motivations that led to the formulation of this challenge-led research. I then introduced the stages of the research, arguing that in-country language training, together with preliminary fieldwork, enhanced my cultural awareness and language skills and thus enriched the quality and depth of the ensuing empirical material, following which introduced the field site, San Ignacio, detailing the selection criteria for deciding upon this locality. I then provided a detailed reflection of how my positionality as a wife, pregnant woman and practitioner influenced the participants and, as such, the empirical research generated. This was followed by the final section which presented both the ethical considerations of my research and tools used to analyse the data created.

Chapter 5. Peruvian coffee production network: the implications of power and governance for climate change adaptation in San Ignacio

5.1 Introduction

> **"[Coffee] provides a window through which we can view a range of relationships and social transformations"** (Lyon, 2007, p. 241).

This is the first of three empirical chapters illustrating Lyon's quote above regarding the use of coffee and its global production network as a 'window', to critically examine the ways in which participation in alternative trading networks empowers smallholder coffee farmers (henceforth 'farmers'). The relationships and transformations referred to by Lyon (2007) are exemplified through the strategic coupling between coffee co-operatives and alternative trading organisations (ATOs) aligned with upgrading undertaken by farmers to improve their ability to adapt to both market volatility and climate change and to safeguard their livelihoods and food security.

This chapter responds to research question 1, "*How do coffee production network actors exert power and influence within the network and what are the consequences of such actions on the agency of smallholder coffee farmers to make decisions about their own livelihoods?*" as presented in Chapter 1. I begin by situating my particular case study network within the Peruvian context and in doing so I explore the specificities of alternative trading networks. I then move on to investigate the network actors within my coffee production networks case study, investigating co-operatives (section 5.2.1 and 5.2.2), private voluntary certifications (section 5.3), alternative trading organisations (section 5.4) and state and non-state actors (5.5). I apply three concepts from the GPN framework – value creation, enhancement and capture, actors and network – to analyse the structures of governance and the exercise of power operating within and shaping the network. The positions and roles of each actor are examined to explore their positionality, power dynamics and degree of embeddedness within the site of production. This first empirical chapter sets out and problematises the context for the remaining two empirical chapters (Chapter 6 and Chapter 7), drawing out the influence of alternative trading network for farmers and their collective and individual agency to lift themselves out of poverty and tackle the challenges associated with climate change.

The two subsequent empirical chapters follow this model. Chapter 6 explores how the challenges of climate change are experienced by farmers and how they are subsequently tackled through state and non-state interventions in response to research question 2, namely "*What are the challenges of climate change for smallholder coffee farmers and how do they adapt to such challenges in the context of power relations operating through alternative trading networks?*" It argues that the power dynamics, tensions and knowledge flows within the production network, in which my case study farmers are embedded, influence their agency and ability to reduce their vulnerability to climate change, to adopt adaptation practices effectively and, ultimately, create a climate-resilient producer community. Chapter 7 examines the contributing factors to the coffee leaf rust crisis in 2012/13, at which time San Ignacio saw over half of its coffee plantations destroyed, and the actions taken to respond to this crisis in response to research question 3, i.e. "*In what ways does participation in alternative trading networks increase smallholder coffee farmers' ability to adapt to coffee leaf rust?*" The chapter draws together the interrelated challenges of both market and environmental volatility and critically addresses the ways in which alternative trading networks influence farmers' ability to adapt to and sustain both their livelihoods and food security.

This empirical work, which forms the basis of these three chapters, reveals the complexities of power and governance associated with trading within a global coffee production network, situated against a backdrop of changes to both global and national governance resulting from trade liberalisation, the retreat of the state and globalisation. The chapters highlight the benefits to farmers associated with trading within an alternative trading network and the complexities which arise from this and require increased coordination and co-operation, transparency and traceability throughout the network.

5.2 Coffee Production Network Case Study: Co-operatives as a Vehicle for Change

Approximately 70% of Peru's farmers are not members of a co-operative or an association, and so they operate within Ponte's (2002) general structure of the global coffee-marketing chain illustrated in Figure 5.1, also known as a 'conventional' or 'mainstream' trading network structure. Farmers selling their coffee on the conventional market account for 80% of all Peruvian coffee exports. This coffee is purchased by a small number of large multinational companies such as Sara Lee, Kraft, Nestlé and Proctor and Gamble (Levy et al., 2016). This route to market involves multiple actors (as illustrated in Figure 5.1) exerting their power and control over their suppliers (coffee farmers and co-operatives), often leaving farmers

disempowered and with limited agency to make decisions and influence their own livelihoods. Individually farmers do not produce sufficient volumes of coffee to access international markets or gain certification; thus, they are forced to sell their coffee at the farm gate for prices much lower than those received by co-operative members. These farmers do not interact directly with international buyers but rather work through intermediaries, often referred to as 'coyotes' in Peru: "The coyote is someone who buys up coffee from several small farmers and brings it to the miller. Credit is extended to each farmer in advance of the harvest, and receipt of the loan usually requires that the coyote will also purchase the farmer's coffee at harvest time at a specified, and generally low, price" (Tedeschi and Carlson, 2013, p. 458). Operating in this manner provides farmers with instant access to credit at a time when food insecurity is high and income at an all-time low; however, it also locks them into a system where they have limited agency over the prices at which they can sell their coffee, and who they sell it to, and one which gives them no access to non-financial support which would enable them to upgrade and adapt to climate change.

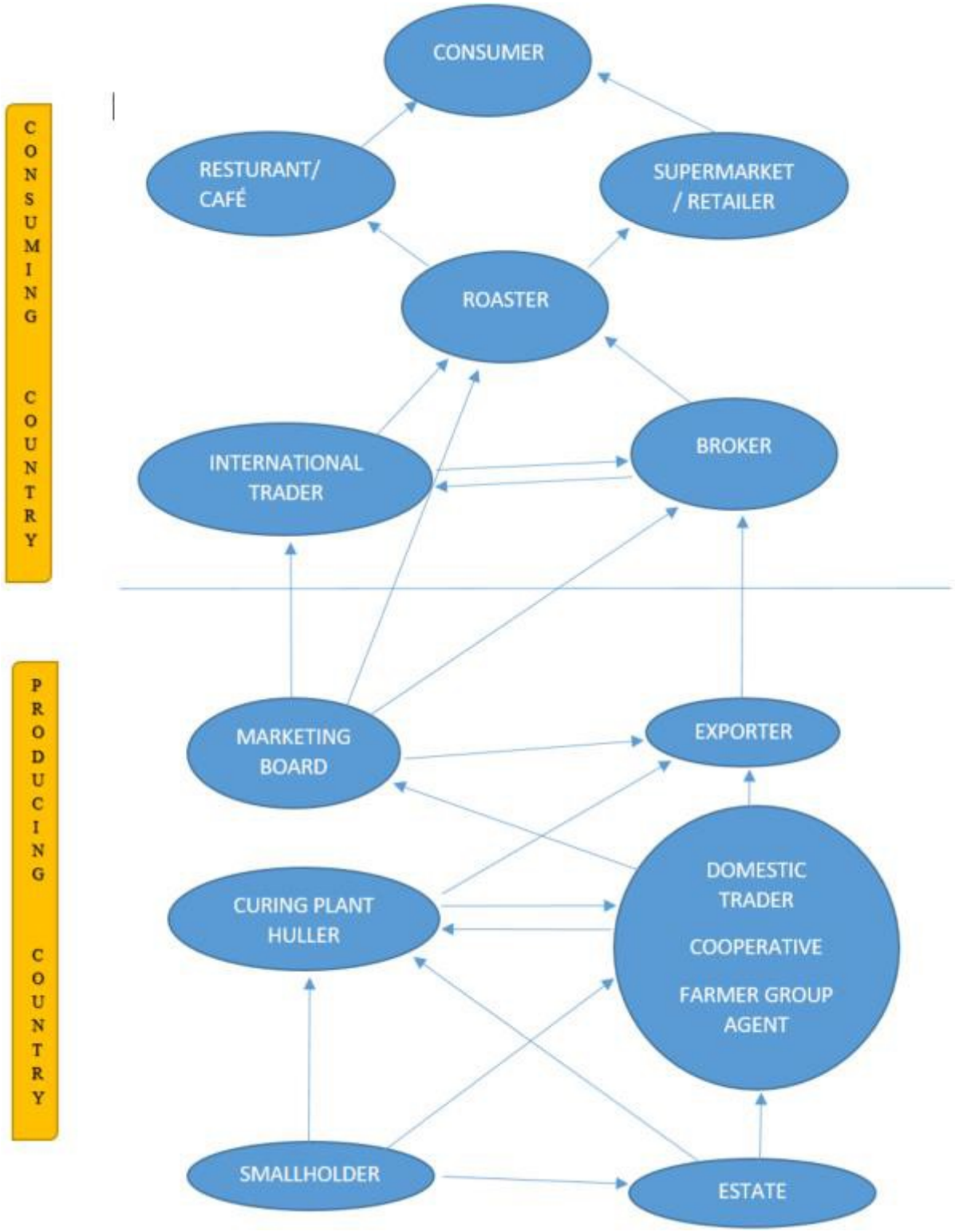

Figure 5.1 General structure of the global coffee-marketing chain (Ponte, 2002, p. 1102).

There are, however, alternatives to this conventional GPN. This section aims to analyse critically the three case study co-operatives (Apessi, Aprocassi and Unicafec) introduced in Chapter 3, section 3.7 and which are all embedded within the alternative trading production networks illustrated in Figures 5.2 and 5.3.

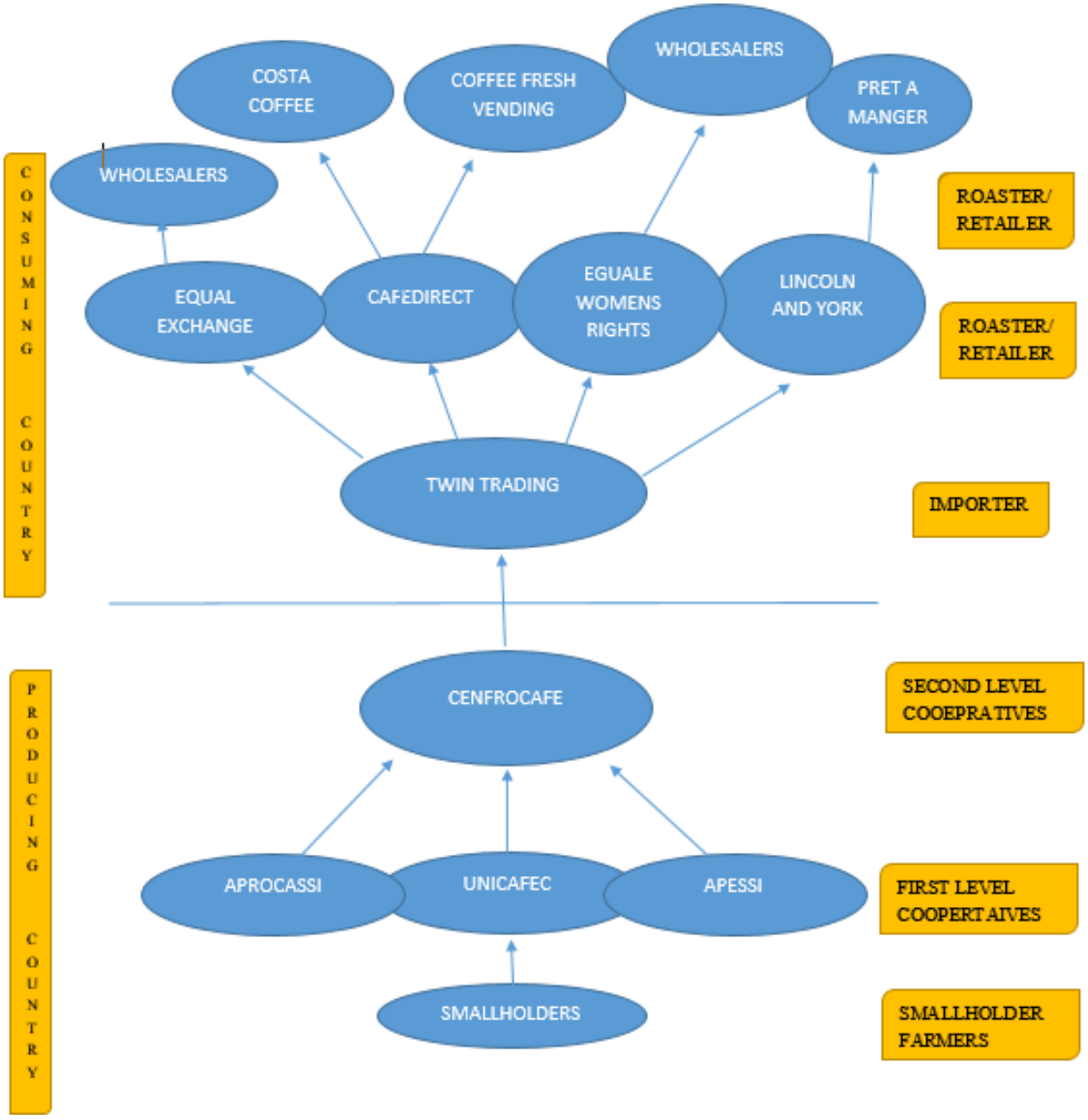

Figure 5.2 Twin's trading coffee value chain. Source: author's own

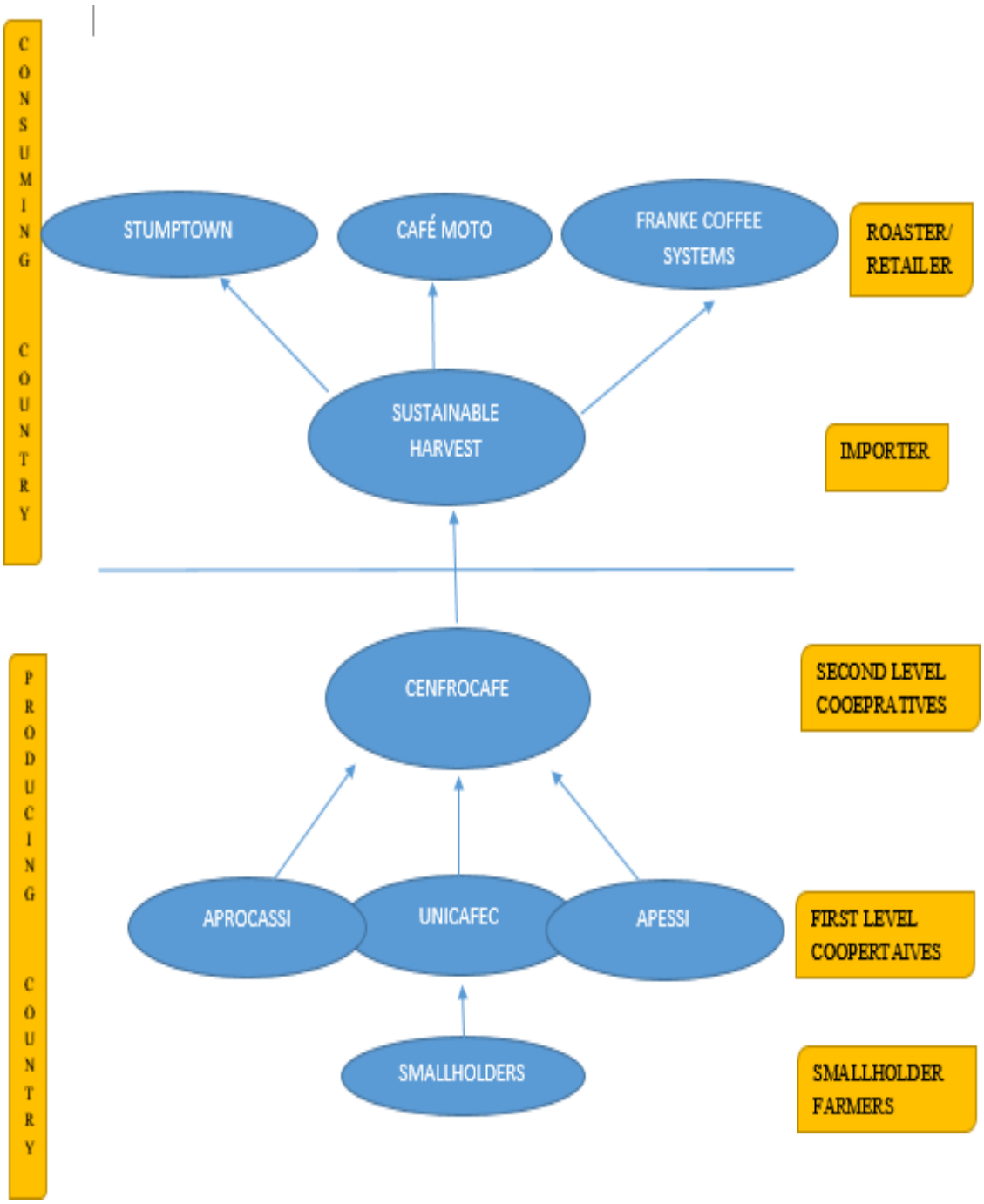

Figure 5.3 Sustainable Harvest's coffee value chain. Source: Authors own, data retrieved from interviews with alternative trading organisations and coffee co-operatives.

Figures 5.2 and 5.3 illustrate two alternative production networks in which the three case study co- operatives are embedded, and they highlight the key role the two ATOs, Sustainable Harvest and Twin, play in these buyer-driven networks. The influence of these two significant ATOs, along within the other network actors, will be critically analysed in this chapter, in order to

examine their influence on smallholder coffee farmers' agency to make decisions about their own livelihoods.

5.3 Agrarian marketing co-operatives and the power of co-operation

Co-operatives are highlighted in the literature as an empowering mechanism through which farmers can access and participate in new markets (Bacon, 2005; Wollni and Zeller, 2007). They are a central player within the GPN, acting as a vector through which other influences flow. From a GPN perspective, agrarian marketing co-operatives provide a connection between consumers and producers, and they enable farmers, who would not as individuals have the capacity to access alternative network markets, to participate in speciality markets (Varangis, Siegel et al., 2003; Bacon, 2005; Wollni and Zeller, 2007).

One of the aims of agrarian co-operatives is to counterbalance the market power of those network actors further down the value chain, with the intention of creating a more equitable market. The co-operatives within this study (Unicafec, Aprocassi and Apessi) use their countervailing power to help farmers make larger profits than what could be achieved by the individual farmer selling at the farm gate. This is achieved through collective bargaining, access to information, access to markets via voluntary certification schemes and empowerment through the structure of co- operatives (one member, one vote), which allows members to both own and control their co- operatives. Members of the three case study co-operatives reported a sense of empowerment through working within this governing system, stating that they felt as if they were facing together common challenges such as price risk and quality improvement. Within the study group there was a distinct feeling that farmers who were members of a co-operative were "all in it together" and had developed a collective sense of identity. In total, 80% of the participants interviewed noted the significance of training, shared knowledge and peer support gained through their membership of their respective co-operative, as illustrated in the two quotes below:

> "Being a member of a co-operative brings with it many benefits. We can work together and share knowledge and attend trainings," Maria, Apessi co-operative, San Ignacio (2014).

> "[A] benefit of being associated [in a co-operative] is that we are a family we know each other, but if you are not associated, you never meet together," Fernando, Apessi co-operative, San Ignacio (2014).

Drawing upon the GPN notion of collective power, which Henderson (2002) describes as "actions of collective agents who seek to influence companies at particular locations in GPNs"

(p. 451), the overall goal of these co-operatives is to empower farmers through collective action. Furthermore, "'Empowerment' refers to the ability of individuals and groups to act on their own to achieve their self-defined goals" (Bacon, 2010, p. 53), giving them a sense of agency. Bacon (2010) refers to the work of Rowlands (1997), who divides empowerment into three categories: personal (the ability to meet basic material and nonmaterial needs), relational (the ability to shape and influence relationships and avoid exploitation) and collective (the ability to participate in collective action and reflection). This taxonomy helps to contextualise the organisational influences and power relations through which climate change adaptation is practised, which will be investigated in Chapter 6.

In pooling a large membership base, co-operatives are able to exploit economies of scale and scope (Schroeder, 1992), and so the more stages of the network that are controlled by the farmers themselves, the more value they can capture (see section 4.3.3). Although farmers plant, grow and harvest their coffee individually on their smallholdings, the centralised nature of co-operatives enables them to jointly process, store, market and sell their coffee. Consequently, such "horizontal coordination brings together individuals' assets and dilutes costs and risks" (Mitchell and Coles, 2011, p. 146). Additionally, working together collaboratively improves farmers' access to information (relating to climate change adaptation, price risk, environmental sustainability and improved quality) and enables them to participate in voluntary certification schemes such as Fairtrade and organic (analysed in section 5.3), which to some extent can limit the volatility of the international coffee market, provide access to finance and enable them to reap the benefits of pooled financial and labour capital (Markelova et al., 2009). Such benefits associated with economies of scale are evident for a range of inputs required to practice good farm management, including the application of fertiliser:

> "When we [farmers] either make or purchase our organic fertiliser, it is significantly cheaper to do this collectively, as we buy the fertiliser or ingredients for the fertiliser in bulk, getting a better price" Fernando, Apessi Co-operative, San Ignacio (2014).

> "The warehouse we have here at the co-operative [Aprocassi], provides us with a space to store our coffee in a more hygienic, cheaper and safer way than the makeshift individual storage facilities we have used in the past. This helps our coffee maintain its quality and therefore helps us receive a better price for our coffee beans," Lucio, Aprocassi Co-operative, San Ignacio (2014).

Such economies of scale will be considered again in Chapters 6 and 7, when critically analysing co-operatives' influence and power in supporting farmers to adapt to climate change and respond to the coffee leaf rust crisis. Several co-operatives, including Aprocassi, Apessi and

Unicafec, were set up in order to support and empower smallholder coffee farmers after the collapse of the ICA. The elevation and ecology found in San Ignacio is highly compatible with the conditions required to grow speciality coffee, something which has been recognised and acted upon by ATOs and the state, who have supported farmers in upgrading to a quality that would meet speciality coffee standards and to obtain Fairtrade and organic certification to access niche markets. Coe and Yeung (2015) describe this mutually beneficial relationship between farmers and their co-operatives, who need to access a market, and lead firms, who require high-quality coffee produced in this locale, as "strategic coupling." The authors argue that where "a complementary effect exists between regions and global production networks; a developmental process of *strategic coupling* will take place through which the advantages of regions interact positively with the strategic needs of actors in these global production networks" (p. 19).

Strategic coupling occurs between the region's actors, farmers in San Ignacio and what Coe and Yeung (2015) describe as "powerful global production network actors" (p. 20), in this instance the case study alternative trading organisations analysed in section 5.4. These organisations take intentional action by forming and building relationships with co-operatives and then facilitating access to speciality coffee markets, by supporting co-operatives and their farmers to upgrade their coffee in order to meet the grade required and to secure official certification, which is also often a requirement of the market.

These relationships, and as such strategic coupling, are not static but evolve based predominantly on these specific niche market demands. Such coupling "transcends territorial boundaries as actors from different spatial scales interact" (Coe and Yeung, 2015, p. 19). The power within this relationship often lies with coffee buyers such as Twin and Sustainable Harvest, who are located outside of the regional site of production but still influence it, as critically analysed in section 5.4.

5.3.1 Second-level co-operatives

First-level co-operatives are often members of their second-level counterparts. Apessi, Aprocassi and Unicafec, for instance, are all members of Cenfrocafe (Central Fronteriza del Norte de Cafetaleros), a second-level co-operative based in Jaen that has created an alliance with 86 primary- level organisations representing over 2,000 farmers in the Cajamarca region of northern Peru (Co- op Coffees, 2019). It provides a unified response to challenges affecting farmers in the region, ranging from marketing services to technical training, and this collective action has enabled all parties to increase their revenues. Cenfrocafe gained Fairtrade

certification in 2007, allowing them access to value-added markets.

As illustrated in Figures 5.2 and 5.3, the co-operative acts as a point of contact and as marketing mechanism through which to export the three case study co-operatives' coffee to importers such as Twin and Sustainable Harvest. Cenfrocafe is a key supplier to Twin and has been since 2009. However, due to the organisational values of Twin, Cenfrocafe is more than merely a supplier – it is a partner with shared values and a vision for the future of coffee growing in San Ignacio.

5.4 Voluntary Certification Agencies

This section examines how private voluntary certifications, in this instance Fairtrade and organic, exert power and influence within the network and how their actions affect farmers' ability to achieve and maintain livelihood security. Chapter 4 looked at the challenges of an uncertain and volatile market following the collapse of the ICA, where prices often no longer cover the cost of production (Naegele, 2019). Voluntary certification agencies, such as Fairtrade and organic, were established by buyers in order to stabilise the price of coffee and to address social inequalities within global production networks. They can be characterised as forms of non-state, market-driven governance, where non-state actors such as NGOs and certification bodies govern the network by influencing the policies and practices of businesses (Cashore et al., 2003). Such systems "do not derive policymaking ability from states' sovereign authority" (Bernstein, 2007, p. 349) and are not accountable to them; instead, they are discrete systems of value chain governance. This does not, however, mean that the state is not important, since such systems are embedded in the socio-political climate of a specific country, region and local context, which involves a range of other actors, as discussed in section 5.5.

Peru is the world's leading producer of organic coffee and one of the top five Fairtrade producers. Current certification schemes in the country include:

- Fairtrade: accounts for 14% of the global speciality coffee market and is certified by Fairtrade Labelling Organisations International (FLO)
- Organic: accounts for 71% of the speciality coffee market and is certified by several agencies, including USDA's National Organic Programme (NOP), Natureland and the Organic Crop Improvement Association (OICA)
- Sustainable Coffee: accounts for 11% of the speciality market and is certified by the Rainforest Alliance
- Café Practice: certified by Starbucks, among other corporations, and accounts for the remaining 4% (Junta National de Café).

Multi-certification as a means of accessing market opportunities is on the rise, with the specific pairing of Fairtrade and organic becoming increasingly more common (Raynolds et al., 2007, Blackman and Rivera, 2011). All three of the case study co-operatives had this dual complementary certification (Fairtrade and organic), and as such those two certifications will be analysed in order to examine the influence of private voluntary certifications, and to highlight the problems associated with them.

5.4.1 Fairtrade

The case study farmers, their co-operatives and the alternative trading organisation work under Fairtrade principles of transparency, participation and democracy. The lived experiences and understanding of Fairtrade in this sub-section are drawn from the three case study co-operatives (both staff and members), providing a basis on which to compare and contrast the theoretical expectations of Fairtrade presented in Chapter 4, together with the realities on the ground from the empirical data collected in San Ignacio. This will provide a grounding from which to analyse the influence of Fairtrade in supporting farmers to adapt to climate change (in Chapter 6) and respond to the coffee leaf rust crisis (in Chapter 7).

Fairtrade is well documented as a powerful means of social protection for the poor (Raynolds, 2002; Tallontire, 2002; Renard, 2003). Both the fair trade movement and the Fairtrade mark (detailed in Chapter 4) aim to reduce inequality and unevenness through increased participation, democracy and transparency between network actors:

> "Fairtrade is one of the few sustainability initiatives addressing fairness in trade. Its supply chain interventions do – to some extent, and upstream in the supply chain – positively influence capacity to trade and the awareness of good trading practices, increased transparency and safeguards for suppliers. Influence on downstream trading practices is limited" (Aidenvironment et al., 2016, p. 5).

This is facilitated through the payment of Fairtrade social premiums (FSPs), which are governed by co-operatives' Fairtrade premium committees (FPC) together with the Fairtrade standards which govern working conditions and "the 'fair producer price', [given] by the maximum between the Fairtrade minimum price of $1.40 per lb and the market price, given for Arabica by the 'C' contract on the New York Stock Exchange" (Naegele, 2019, pp. 4-5). The 'fair producer price' not only raises the price paid to farmers, but it also helps to stabilise coffee prices, thus allowing farmers and their co-operatives to plan for the future. Figure 5.4 illustrates the difference between the price for C-grade coffee futures (the market price of coffee), the Fairtrade floor price and the Fairtrade actual price. The graph demonstrates the financial

difference between payments received by farmers selling non-certified conventional coffee and those selling Fairtrade-certified. The period for this study, 2012–2014 (highlighted in grey in Figure 5.4), features some of the most significant differences between the prices received, thereby illustrating the importance of the certification when coffee prices reach extreme lows. This governing mechanism provides both a safety net and stability in times of extreme volatility within the coffee sector.

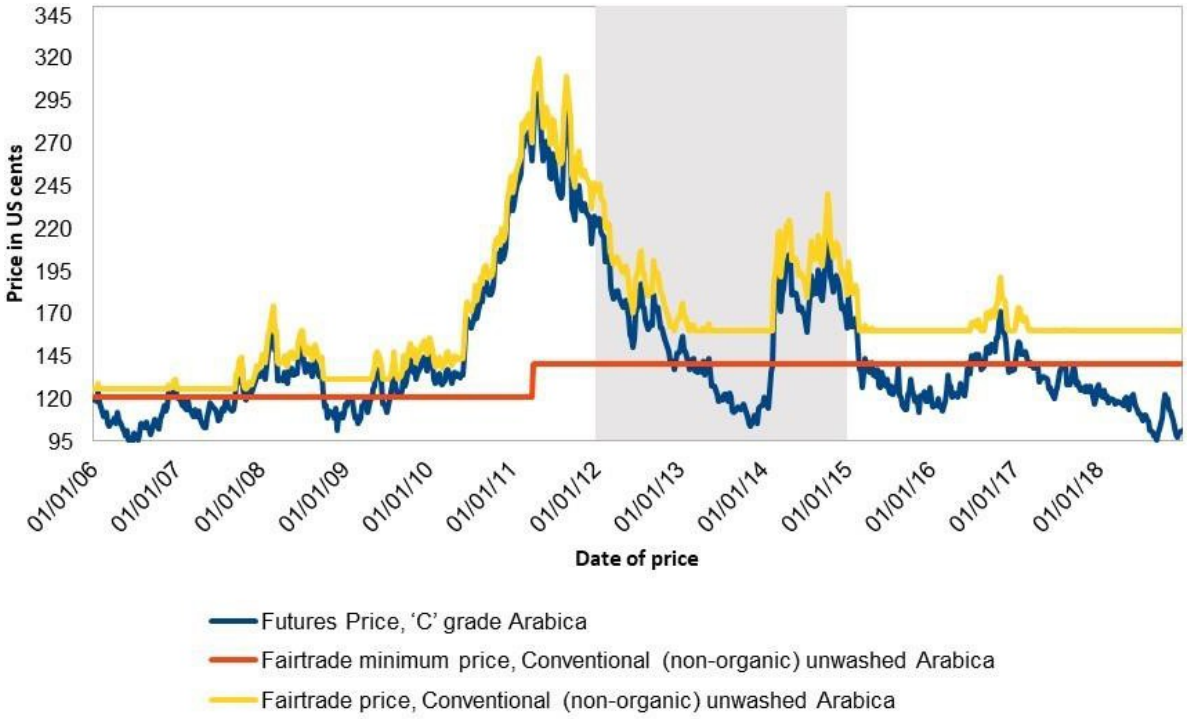

Figure 5.4 Prices of conventional and Fairtrade-certified Arabica coffee. Source: Matt Jenkins, after Naegele 2019, 'C' coffee futures data from investing.com [accessed 01 August 2019], Fairtrade data from www.fairtrade.net [accessed 16 August 2019] (2019)

Fairtrade is neither a universal nor a complete solution to the fundamental flaws in the global governance of coffee, and indeed there are questions asked of it. By bringing these questions to the forefront, I aim to problematise Fairtrade whilst still highlighting the financial and non-financial benefits to farmers.

While around half of the respondents reported the positive benefits of Fairtrade, stating that the price premium had secured their livelihoods, others were surprised to learn that there were certain advantages derived from being members of certification schemes:

> "Without Fairtrade, we would not be eating. It helps us to continue farming. I know others who are not members [of co-operatives] and do not make enough money to cover the costs of production. They are drowning [not surviving] and are not hopeful about their futures," Marcos, Apessi Co-operative (2014).
>
> "I have heard of Fairtrade, but until we spoke yesterday [the participant was referring to a focus group that they had participated in with me and other co- operative members], I did not know what the word meant. I would like to know where this extra money goes and what happens to the pre-finance," Eduardo, who asked that the name of his co-operative be omitted from this thesis. San Ignacio (2014).

This difference can be accounted for by analysing one of the fundamental flaws in the system, namely that farmers are not guaranteed to sell all of their Fairtrade-certified coffee under the label. The supply of Fairtrade coffee often exceeds demand, meaning that farmers 'despite being certified' are unable to sell their coffee and therefore receive the market price rather than the Fairtrade price. Authors such as De Janvry, McIntosh et al. (2015) and Smith et al. (2010), highlight these challenges, stating that there is a 'disequilibrium', as Fairtrade fixes prices but the quantities are decided by the market (Naegele, 2019). This means that the percentage and quantity of Fairtrade coffee sold by farmers is more important than simply being registered as a certified farmer. Since 2004, farmers and their co-operatives have been required to pay auditing and licencing fees in order to receive certification (De Janvry et al., 2015). These fees are based on the size of the co-operatives and not the quantity of Fairtrade coffee sold. On average, Fairtrade farmers sell 22% of their coffee under the label (De Janvry et al., 2015), which will be touched upon in Chapters 6 and 7, which examine the influence of Fairtrade on climate change adaptation and responding to the coffee leaf rust crisis.

A number of studies recount how the Fairtrade Premium[6] in Latin America has been used to finance upgrading, the process of converting coffee to higher-income-generating, diversified and more ecologically sound organic production (Murray et al., 2003). Unicafec, for example, have invested their Fairtrade premium in building their headquarters, which in turn has provided a base from which the co-operative can process and store coffee, maintain a fertiliser warehouse to give its members access to high-quality organic fertiliser and house the organisation's drying machine (also funded through their Fairtrade premium), which uses a coffee waste product (coffee husks) to power the machine: "The drying machine enables Unicafec to consistently

[6] The Fairtrade Premium is a sum of money paid on top of the agreed Fairtrade price for investment in social, environmental or economic development projects, decided upon democratically by producers within the farmers' organisation or by workers on a plantation. http://www.fairtrade.org.uk/what_is_fairtrade/fairtrade_certification_and_the_fairtrade_mark/the_fairtrade_premium.aspx

control moisture levels to achieve export standards during the humid drying season" (Twin, 2018 a). Unicafec now also has a purpose-built cupping lab, paid for by their Fairtrade premium, which helps farmers analyse their own coffee and heightens their understanding of consumer and importer requirements.

One of the major challenges for farmers is "access to credit on reasonable terms" (Coe, 2006, p. 2092). Alongside the contested benefits of higher prices, Fairtrade certification supports farmers who are members of a co-operative to access finance. The Fairtrade principles state that Fairtrade buyers must provide pre-finance, which is credit based on the predicted harvest. This enables farmers to pay for additional labour and other costs associated with harvesting and transporting their coffee to the co-operative. Once the coffee arrives at the co-operative, farmers are paid an additional payment on delivery of their parchment coffee, which is then ready to be processed at the co-operative. The final payment is made when the coffee has been exported and all payments have been received from the buyers. Being Fairtrade-certified opens up fair finance options that are not available to other non-certified co-operatives or individual farmers. Buyers providing such pre-finance to my case study co-operatives include Shared Interest, a co-operative based in the UK which provides pre-finance and term loans to Fairtrade-certified concerns (Shared Interest, 2019), Root Capital, an American-based lending organisation which supports agricultural businesses with the capital they need to sustain, grow and protect their businesses in the global South (Root Capital, 2019), and Okicredit, a co-operative based in the Netherlands that promotes sustainable development through loans, investments and training within the agricultural sector in the global South. Oikocredit's work is "guided by the principle of empowering people to improve their livelihoods" (Oikocredit, 2019, np). The implications of access to such finance will be examined in Chapters 6 and 7, in order to establish the influence this has on farmers' ability to adapt to climate change and respond to the coffee leaf rust crisis.

As argued in Chapter 4, the rules of trade are predominately determined by the market and public policy. Oversupply, caused by the demise of the quota system with the collapse of the ICA, and competition on price have contributed to the coffee crisis witnessed today. From the empirical analysis above, it is evident that Fairtrade is positively influencing farmers, albeit the degree of which is determined by the amount of coffee they can sell under the Fairtrade mark, highlighting that "Fairtrade on its own has insufficient leverage to influence these dynamics" (Aidenvironment et al., 2016, p. 6) or to address the multi-stressor environment alone.

5.4.2 Organic

It is argued that organic farming that is focused around the improvement and sustainability of soils, ecosystems and people can "under the right conditions, contribute to environmental benefits and improve livelihoods among resource-poor, smallholder farmers" (Qiao et al., 2016, p. 247). As such, it has increased in prominence as a development intervention for farmers in the global South over the last decade. The section below explores in detail the complexity of organic certification, highlighted by both the case study co-operatives and their members, and examines how their context and position in the network influence the economic and environmental benefits of organic farming.

When asked if there were any benefits to organic certification, and therefore organic farming, farmers stated that i) there is a price premium accruing to organic coffee; ii) it decreases financial outlay, as they no longer purchase synthetic inputs; iii) it enables them to take care of their environment and protect water sources; and iv) it is safer for them and their families, as they are no longer using or breathing in chemical fertilisers. The section below provides some examples of which emerged in the empirical findings and draws out the complexities and contestations which surround organic coffee growing.

The costs and benefits of organic coffee farming are complex. Organic certification supports farmers in accessing speciality markets and gaining a higher price for their product (Valkila, 2009; Bacon, 2005), as highlighted in my empirical data, in which farmers cited the benefits of organic certification:

> "Yes, because organic is a better price than the conventional price. The organic coffee prices go to 320 or 330 per quintal, whereas the conventional prices stand at between 280 and 300 per quintal, so we have 30 soles more," Francisco, Aprocassi Co-operative, San Ignacio (2014).

> "As all of the companies are looking for organic coffee growers and good quality, if you have this you can earn money and support your children, but I hope that the price goes up next year," Mai, Apessi Co-operative, San Ignacio (2014).

However, such benefits are complex and were contested by both the farmers themselves and within the growing body of literature in this arena (Qiao et al., 2016). However, the benefits of this price differential are questionable. My empirical evidence aligns with the work of Bacon (2005) and Valkila (2009), arguing that the conversion to organic coffee farming does indeed bring with it price premiums. However, the cost versus benefit ratio is questionable, as over

half of the farmers interviewed stated that despite the price premium they receive from their co-operative for being organic, they still receive a lower net return when compared to non-organic farmers in San Ignacio. Reasons for this included the increase in inputs and labour, along with a reduction in yields (Van der Vossen 2005). Responding to a question about how much money they make, organic farmers stated:

> "Not too much, because the difference is just a little, and organic production earns more than conventional. However, this does not always cover the costs associated with being organic. We must invest in being organic, we invest money and time to improve the quality, so in the end the difference is not that much," Fernando, Unicafec Co-operative, San Ignacio (2014).

> "We are into specialist coffee, we mainly sell abroad. So obviously to sell to them we need to be organic, and that's why we have the certification. They used to tell us to use only organic compost, but now we need to do more in order to keep our organic certification. There are many regulations from the North Americans. Farmers have to use the additional money [premium] not on our families but to conserve the lands," Maria B, Apessi Co-operative, San Ignacio (2014).

This quote speaks of buying power in the global North, the influence of consumer preferences and the centrality of organic certification in relation to those market drivers. The economic returns associated with organic farming are complex:

> "In general, the gap between the price paid for organic coffee and conventional coffee grows larger when overall coffee prices drop, and has narrowed to as little as 5% when coffee prices have gone way up. When the premium for organic coffee goes down, as it always will, farmers are less likely to undertake the transition" (Bray, Sanchez et al., 2002, p. 439).

As is the case for Fairtrade coffee, because the amount sold as organic is more important than the price premium in creating significant financial net returns (Barham and Weber, 2012), farmers cited only being able to sell a percentage of their harvest as organic, despite all of it grown in these conditions, due to an over-supply of organic coffee on the global market (Méndez et al., 2010). In this market-driven environment, farmers are faced with a sometimes impossible dilemma. On the one hand, organic agriculture offers access to market, a price premium and low input costs, but on the other hand, the stringent standards the farmers have to adhere to often inhibit their ability to increase their incomes rather than promote them (Valkila, 2009). The tensions acknowledged by Valkila in Nicaragua in 2009 still remain today, illustrating that such issues are a long-term feature of the network. My research in Peru aligns with and strengthens the work of both Valkila (2009) and Mendez (2010), adding evidence from a new context. Participants in this research stated that although they knew that organic agriculture was better for the environment, they have to contribute vastly more human resources

to manage their farms and receive lower productivity and yields than those who use commercial farming practices. This results in farmers either getting poorer or remaining in the poverty cycle (Valkila, 2009; Barham and Weber, 2012):

> "It is more work, it's a radical change, we have to take good care of the plot of land, not use chemicals, but people that use chemicals get double the production. But overseas they don't want chemicals, they want just organic. We sell them a good thing, but give us enough money to do this and keep our livelihoods," Jose, Apessi co-operative, San Ignacio (2014).

It is therefore believed from a purely economic perspective that organic farming is not a viable mechanism for helping farmers lift themselves out of poverty. What is required are methods to promote increased productivity (Tallroth, 2010). Tallroth also believes that organic is not necessarily good for the environment either, as these production methods require a larger land mass in order to be profitable, thus contributing to deforestation. This aligns with the concerns raised by the co-operative leaders, who stated that they had seen a significant reduction in the coverage of cloud forest in the area.

Participants were explicit in the fact that that they were "forced" to comply with certain standards or, as the farmers stated, "rules," in order to maintain their organic and Fairtrade status and meet market demands, many of which, certainly in the case of organic, focused on how they managed their environment:

> "If we want to sell our coffee, we have to follow the rules of organic coffee growing. They are very strict about what is and is not organic. We can no longer apply pesticides, which means we have to do a lot of weeding and extra farm management. It takes a lot of work and money to make sure that we meet these standards. But if we do not do this, we do not have anywhere to sell our coffee," Natalia, Apessi co-operative, San Ignacio (2014).

While both certifications offer higher prices, the analysis in this chapter shows that they have unintended consequences and limitations. These include raised costs of production, including for coffee not sold under the certification and the intensification of pressure on local environments, and lower yields. These limitations will be analysed in Chapters 6 and 7 in relation to their influence on farmers' vulnerability to both climate change and CLR.

5.5 Alternative Traders

As stated to in 5.2, ATOs hold a significant amount of power within the case study GPNs. They act as intermediaries between farmers and their co-operatives and roasters, retailers and consumers, as illustrated in Figures 5.2 and 5.3. Moreover, they are the gatekeepers of vital information, resources and access to funds which are required by farmers to sustain their

livelihoods. This section therefore examines the key ATOs and their networks, in order to determine their influence through upgrading, value creation, capture and enhancement and strategic coupling in line with answering research question 1 i.e. "*How do coffee production network actors exert power and influence within the network, and what are the consequences of such actions on the agency of smallholder coffee farmers making decisions about their own livelihoods?*" It also provides a basis for research question 2, "*What are the challenges posed by climate change for smallholder coffee farmers, and how do they adapt to such challenges in the context of power relations operating through alternative trading networks?*", which will be answered in Chapter 6, and research question 3 "*In what ways does participation in alternative trading networks increase smallholder coffee farmers' ability to adapt to CLR?*" which will be answered in Chapter 7.

5.5.1 Twin Trading and Cafédirect

The first part of this section on ATOs considers in detail one of the case study ATOs, Twin, a non- profit organisation that owns a trading company, Cafédirect. I highlight Twin's pivotal role in the Fairtrade movement, the power and influence they have in their networks and the influence they have in empowering farmers who are embedded in their networks through transparency, long-term relationships and value addition.

Twin's ethos is to create meaningful, global partnerships throughout their production networks. Due to the setup of the organisation, they purchase coffee through their trading company and provide training and support to the farmer co-operatives, which they provide through their non-profit arm. As illustrated in Figure 5.2, Twin is a key buyer for the three case study co-operatives, providing access to additional markets such as:

- Cafédirect, as detailed below.
- Equal Exchange, which is a UK-based worker co-operative founded in 1979, promoting both Fairtrade and organic coffee and dedicated to providing a fair deal for both farmers and the environment. They work together with coffee farmer co-operatives to establish creative long-term partnerships based on fairness and transparency, in order to achieve economic justice and environmental sustainability. These partnerships ensure that the organisation is "uniquely positioned to bolster the organizational capacity of coffee producer co-operatives and to support democratic relations within, as well as between, supplier and buyer enterprises" (Raynolds, 2009, p. 1087). The networking and distribution of Equal Exchange, as with many other Fairtrade companies (Cafédirect for example) is often done

through wholesalers and distribution specialists: "Equal Exchange distributes almost entirely through wholesalers. Even the products they distribute through mail order are delivered to the company headquarters by wholesaler Green City" (Davies, 2009, p. 115).

- Egual Women's Rights Coffee, which is a brand of the Swedish roaster Sakues. The company believes in equality and justice, acknowledging that there are a number of women working within the coffee industry, the vast majority of whom are out in the fields, tending to their farms, weeding, fertilising and harvesting. The organisation works alongside Unicafec to support women farmers to work together, own land, feel empowered to make decisions about running their households and play an active part in their societies (Eguale, 2019). This approach, they state, "gives women better self- esteem and decision-making ability and raises awareness of the role of women within the coffee industry and the need for gender equality" (Eguale, 2019, np). The organisation requires that their coffee is dual-certified with both organic and Fairtrade certifications and only purchases coffee from female members of Unicafec, who account for around a quarter of their 405 members. As with Sustainable Harvest above, Eguale Women's Rights Coffee prides itself on transparency and traceability. This means ensuring that all coffee sold can be traced back to the female farmers, who are paid a premium that can be invested in women's development programmes, including gender equality in the workplace.
- Other roasters such as Lincoln and York, a UK-based coffee roaster. These ATOs then go on to sell to wholesalers, coffee shops such as Costa Coffee and Pret a Manger and Coffee Fresh Vending, a UK-based coffee vending machine company. Twin have played a pivotal role in bringing Fairtrade-certified produce to the UK. Following the collapse of the ICA and the fall in coffee prices detailed in Chapter 4 Twin began to work with coffee co-operatives, importing their first container in 1989 and setting up their first coffee organisation, Cafédirect, in 1991, in partnership with Equal Exchange, Traidcraft and Oxfam. Cafédirect was the UK's first and largest Fairtrade hot drinks brand and had an innovative ownership structure whereby farmers had influence over products and the direction of the organisation. Many were shareholders, and some were board members actively participating in the governance of the organisation (Twin, 2017), resulting in improved agency for farmers in terms of shaping and controlling the network in which they were embedded. Twin was very much involved in Cafédirect and "act[ed] as an importer and supply chain manager for most of Cafédirect's coffee" (Davies, 2009, p. 114) and supported its producer partnership programme. Furthermore, Cafédirect had "a partnership with Coffee Fresh vending machines distributions and had an agreement with Costa Coffee

to ensure distribution in the burgeoning market for coffee shops" (Davies, 2009, p. 115).

The success of Cafédirect led to Twin setting up two additional companies, Divine and Liberation Foods. Divine is the world's only 100% Fairtrade-certified chocolate company. Its innovative governance structure empowers Kuapa Kokoo Co-operative's cocoa farmers to own and manage 45% of the company (Anderson, 2015). Liberation is the UK's only Fairtrade farmer-owned nut company (farmers own 49% share in the company). Through their innovative work and by setting up three Fairtrade brands, Twin has certainly facilitated the development and mainstreaming of Fairtrade (Anderson, 2015).

Twin aims to create co-operative global production networks built around long-term relationships with the coffee co-operatives from which they purchase, "giving more business to fewer suppliers [coffee co-operatives] and forg[ing] closer relationships with a core strategic group that they hope to align to their own goals" (Whitford, 2005, p. 17). In addition, "Twin Trading have supported producer-led efforts to build effective organizations and connect to certified markets" (Bacon, 2010, p. 51). The two organisations have a long-term working relationship and work closely together to achieve their common goal of producing and selling high-quality coffee. Twin supports Unicafec's board "in developing long-term business plans and provid[ing] training on Price Risk Management" (Twin, 2018 a).

During interviews with Unicafec staff members, it was acknowledged that coupling with Twin, based on a shared ideology (Lyon, 2010) which seeks to achieve quality and the adherence to social (Fairtrade) and environment (organic) standards, is fundamental to the success of both the co- operatives and their buyers:

> "It is important that our customers know that we produce high-quality coffee, but we are not just selling the coffee, we are selling our story and the story of our members. We are informing our customers that when they buy our coffee they are supporting very poor farmers [a cause]," Olivia, Unicafec, San Ignacio (2014).

However, this story creates value that does not fully accrue to the farmer. Daviron and Ponte (2005) argue that a lot of the value capture occurs at the site of consumption, where "symbolic quality" (p. 34) and "immaterial" (p. 43) parts of the network create value addition and capture. They argue that this has contributed to the coffee paradox discussed in Chapter 2, making it increasingly difficult for farmers to trade their way out of poverty. Easson (2000) also notes that roaster and retailers' success is based in selling 'coffee with a conscience', using certifications such as Fairtrade and organic marketing tools.

Twin, in their 'Smallholders and speciality' report (2018), acknowledge the scale and complexities of the challenges associated within supporting farmers to upgrade their coffee when they face "multiple contextual challenges – such as limited power and knowledge of the market, being in a remote location, climate change, political instability and limited access to finance" (Twin, 2018 b, p. 1).

Twin, through this report, identify four specific themes that are paramount to achieving value addition and strong long-term relationships with farmers. The first is strengthened co-operative member engagement, ownership and empowerment. Twin only work with co-operatives, ensuring strong buy-in to the organisation by its members, and they state that this is not only vital to the success of the organisation, but it can also have wider positive implications for the community in which the organisation is situated. The second key element is knowledge. Twin states that farmers must understand quality requirements in terms of meeting the agreed standards to access the speciality coffee market – as set by speciality Coffee Association. This knowledge in turn provides the farmers with greater power and influence within the GPN, since "sharing information along the value chain (with buyers making regular visits to origin) helps farmers and their organisation understand how important their role is in the delivery of speciality coffee" (Twin, 2018 b, p. 1).

This knowledge regarding quality and the market turns into power, as the farmers and their co-operatives are then much better placed to negotiate with potential and current buyers. The third element is supporting farmers to think in the longer term. They often focus on this year's harvest, as many are living hand to mouth, often due to the length of time it takes for coffee plants to bear fruit (3-5 years), so it is vital that they are supported in aligning themselves to the long-term vision of the co-operative. Fourth, long-term strategies can only be achieved with financial support, access to which is often cited by co-operatives and their members as one of the major barriers to success. Dalinda Castillo, who is the president of the Women's Committee of Aprocassi, stressed the importance of pre-finance (analysed in section 5.3.1), stating that:

> "Pre-finance is one of the key benefits of being Fairtrade-certified. The co-operative receives 40% of the value of the order up front [before they have shipped the order to the buyer], which in turn enables us to pass this on to our members. It provides them with the working capital to fund additional farm labour during the intense period of harvesting, for example," Dalinda, Aprocassi Co-operative, San Ignacio, January (2014).

5.5.2 Sustainable Harvest

I now turn to Sustainable Harvest, in order to introduce this key network actor. Sustainable Harvest is a US-based coffee importer, working in 15 countries and buying speciality-grade coffee from across the globe. Established in 1997, they have over 20 years' experience in creating transparent relationships and sustainability with coffee co-operatives. As illustrated in Figure 5.3, Sustainable Harvest is a key buyer for the three case study co-operatives, providing access to additional markets such as:

i) Café Moto, a San Diego-based coffee roaster and wholesaler
ii) Stump Town, a Portland-based coffee roaster
iii) Franke Coffee Systems, a US-based coffee machine company

The company, through its desire to go beyond the monetary benefits of premiums and pre-finance, pioneered the "relationship coffee model" to empower farmers through both upgrading and creating positive long-term relationships with farmers, co-operatives and other local firms (Rappole al., 2003; Raynolds, 2009; Hernandez-Aguilera, Gómez et al., 2018). The company aims to transform the traditional linear supply chain model, in order to create an engine for transparency, collaboration and shared success. The coffee they import can be found in supermarkets and cafés throughout North America, refer to Figure 5.3.

The relationship coffee model is built around 'embeddedness' in Sustainable Harvest's host region, namely:

> "[...] offices in five countries (Mexico, Nicaragua, Colombia, Peru and Rwanda), which are staffed by coffee professionals who understand the local cultural context of their respective regions. This means that Sustainable Harvest is on hand to support smallholder farmers with any challenges they might be facing with regards to meeting quality standards, adapting to climate change or responding to disease and pest outbreak and in" (David Griswold, Sustainable Harvest Founder and CEO Interview, (2019).

In addition to their presence in San Ignacio, Sustainable Harvest have an office in Lima, in order to manage their exports and to embed themselves in discussions and debates surrounding coffee on a national level in Peru, but they are also embedded at a regional level through their farmer field schools, where they work alongside farmers to support their practices. Such national and regional embeddedness strategies, and the overarching strategy of alternative trading companies, are of particular importance when investigating the power and influence exerted in the case study GPNs, as this territorial embeddedness supports the process of upgrading and value creation, capture and enhancement, thus influencing the farmers' agency to determine their own futures.

The farmer field school, the first of its type to be implemented in San Ignacio, was the main vehicle used to achieve good agricultural practices and aiming to "build farmer capacity to analyse their production systems, identity problems, test possible solutions and eventually adapt the practices most suitable to their farming system" (Braun et al., 2006, p. 1). The school (*Escuelas de Campo* in Spanish) was run in collaboration with the Peru Opportunity Fund, an investment fund providing loans to institutions such as Sustainable Harvest, who work with value chains in the rural agricultural sector in Peru, Franke, an American-based coffee machine company, and Café Moto, an America-based coffee roaster and retailer. It was designed to be interactive, by using demonstration plots and utilising years of traditional knowledge in adapting farming techniques. It heavily promoted co-operation and collaboration in line with the values of both the co-operatives of which the farmers were members, and the values of Sustainable Harvest.

The field schools worked in four regions of San Ignacio: Barrio Nuevo, Bajo Potrerillo, San Juan de Pacay and Puerto San Antonio training 90 farmers, 8 of whom (2 from each region) were selected to become 'promoters' and were assigned tasks to cascade the teaching they learnt at the farmer field school to other farmers in their respective communities. During the 3 year project, the farmer field schools aimed to empower farmers to become "their own technical experts, adapting potentially applicable technologies to their particular conditions" (Helmsing and Vellema, 2012, p. 258), the included topics such as quality control, marketing, integrated management of pests and diseases, pruning and shade management and production of organic insecticides. It also aimed to i) to increase their productivity both in relation to quality and quantity, which in turn would increase their incomes and strengthen their livelihoods; and ii) meet demand for speciality coffee within the consumption market, particularly for a certified product (organic and Fairtrade), in line with the international standards set for the speciality coffee market. Such certification claims to ensure that the product is both high quality and safe for consumption, but it also benefits farmers and their environment. The project was so successful that Sustainable Harvest funded farmer field schools in an additional 4 regions of San Ignacio, training an extra 70 farmers who were peer mentored by the 'promoters' from the original farmer field school. Alongside the field schools, Sustainable Harvest established a cupping lab in San Ignacio, to help farmers improve the quality of their beans and capture more value from them:

> "I know the process, from planting the coffee seed, harvesting the fruits and processing the coffee into green coffee beans, but the thing we were lacking was the knowledge of what

> happens to it after that. We only get a small percentage of the value of our coffee; we are told that most of it stays with the roasters, so we wanted to know why, what they do. The coffee cupping lab has enabled us to smell and taste what the coffee we have grown is like, and from there we can understand what our buyers are looking for and if we are very lucky maybe we can do more activities here to keep a higher percentage of the profit," Pablo, Apessi Co-operative, San Ignacio (2014).

I was able to visit the cupping laboratory and see first-hand the process that takes place and the benefits that this has had with regards to empowering farmers to produce high-quality speciality coffee. Farmers using the laboratory had picked several different cherries from their plants. These included, those picked too early (still green), those which were ripe, those which were overripe, which had been left to dry on the tree, those which had been eaten by insects or left to go mouldy, those not processed at the optimum time and those which floated in water. In tasting these coffees side by side, the farmers were able to see the difference their farming practices had on the quality of the drink, thus gaining a deeper understanding of the requirements of coffee buyers. Another activity that took place in the laboratory was tasting the cupping samples. Coffee is graded on qualities including flavour, aftertaste, acidity and mouthfeel. The Speciality Coffee Association provides protocols for cupping which ensure consistency, these ensure that the process is repeatable i.e. the same results should be obtained by every person throughout the GPN no matter of their role, location or reason for cupping. This is empowering for farmers as once trained in this technique it means that everyone in the GPN speaks the same language and is working towards the same goals. It enables farmers to take make informed decisions regarding the quality of their coffee which in turn enables them to make informed decisions about their livelihoods. An example of this is illustrated below.

Coffee buyers are sent samples, which they either approve or reject before their coffee is exported. The farmers were able to sample coffee that had been accepted by their buyers and one that had been rejected. They noted:

> "Before this training, I was blind. We were told if a sample was rejected, but we did not know why. Now it is like someone has given me glasses. I can see, taste and feel the difference between these two coffees. I know what is expected from our buyers, and this, together with the training, means that we can now ensure we deliver," Jose, Apessi Co-operative, San Ignacio (2014).

From Sustainable Harvest's perspective, territorial embeddedness in terms of "anchoring" (Henderson et al., 2002, p. 452) within a region, as in the case of San Ignacio, supports their relationship coffee model (RCM) in three key ways. First, it supports the organisation in achieving transparency and traceability throughout the production network, second, their

presence in both San Ignacio and Lima increases farmers' ability to manage their farms in a sustainable manner, through improved GAPs, and to capture increased value through the production of higher quality coffee, and third, Sustainable Harvest ensures they have access to high-quality speciality coffee. Farmer field schools and cupping laboratories are a key interventions in San Ignacio, and Sustainable Harvest as a governing organisation are able to shape the behaviours of actors by giving them the skills and knowledge to upgrade the value of their product, adhere to organic and Fairtrade principles and produce high-quality speciality coffee.

Figure 5.5 Farmer field school, San Ignacio (2014). Source: author's own

Figure 5.6 Farmer field school graduation (2014). Source: author's own

In addition to the farmer field school and cupping labs based in San Ignacio, the organisation carries out annual training at their 'Let's Talk Coffee' regional events. In May 2015, this event took place in Lima, Peru, bringing together 30 Peruvian coffee co-operatives and 80 other network actors, including buyers, roasters, retailers, NGOs and state and non-state actors within Sustainable Harvest's global production networks.

Sustainable Harvest also carries out training on price risk management and facilitates direct dialogue between buyers and farmers and their co-operatives. The organisation acknowledges the significant volatility and shortcomings of the C market price (as reviewed in section 5.3.1) and encourages dialogue about price, not only using this price as an indicator, but also ensuring that profit and the costs of production are considered. Sustainable Harvest also acknowledges the need for collaboration and commitment throughout their global coffee production networks, if they are to address some of the challenges associated with the volatility of the C market price and the negative impacts that this has on farmers.

The same project that developed both the farmer field school and the Centre for Excellence in San Ignacio also initiated a food security programme in response to concerns raised by farmers and their co-operatives, and it has received recent attention in the literature (Chambo, 2009; Caswell et al., 2012; Morris et al., 2013).

Farmers are often unable to either produce or be able to afford sufficient food throughout the whole year to meet both their own and their family's basic nutritional needs. This food insecurity is at its worst in the last 3-4 months prior to the next harvest, when financial resources are low and basic crop prices are high (Devereux et al., 2008). The project focused on teaching farmers and their families how to establish and grow their own food gardens and raise small animals. This multi-cropping and rearing of small animals had previously been common practice in San Ignacio; however, when the price of coffee rose in 1997, many coffee farmers removed all other products and replaced them with the more profitable crop. I interviewed farmers about their participation in these 'food security forums', to determine what impact, if any, they had on their food security:

> "We are now more self-sufficient. Before these trainings, we often had to travel to the nearest market places in order to purchase food and staples. This was difficult, as we had to find the money for transport and often the prices of food went up at the time when we needed to purchase them, making them expensive. We often had to borrow money to buy enough food to feed our families. Now we are able to grow what we need to survive, and if we are lucky we grow more and are able to sell the surplus or exchange them for other foods," Valerie, farmer, Aprocassi Co-operative, San Ignacio (2014).

This food security programme draws upon Amartya Sen's capabilities approach (Sen 1981, Adger 2006), which informs the sustainable livelihoods approach discussed in Chapter 2, and focuses on how farmers access food rather than on the aggregate food availability. It is discussed in more detail in Chapter 6, which explores farmer adaptations to climate change.

Lack of traceability is a challenge for coffee co-operatives (World Bank 2012), something that Sustainable Harvest has tried to address through implementing technologically driven interventions. The organisation implemented two systems to help coffee co-operatives improve their transparency and efficiency, the first of which was the relationship information tracking system (RITS), used by farmers in northern Peru. RITS was funded by USAID and enabled coffee co-operatives to follow their coffee throughout the global production network: "using a cloud-based application, the coffee co-op manager is able to record individual coffee farmer deliveries, track certification status of each delivery, process farmer payment, record quality-related information, bulk coffee deliveries according to quality, and generate reports on farm productivity, payments and samples" (Sustainable Harvest 2011, p. 1).

Sustainable Harvest were selling to Allegro Coffee, in addition to numerous other roasters and

retailers[7] (including the Whole Foods coffee brand), who collectively worked together to implement the RITS. The company included a QR code on the back of their packaging, which enabled the quality control manager at Allegro to scan a bag of coffee and instantly see all the actors who had been involved in the growing and processing of the product they held in their hands. They were able to see all of the coffee roasters, the coffee co-operatives and farmers, providing both transparency and traceability in a system renowned for being an opaque trading network.

The system was replaced by 'Growerspace', which addressed some of the difficulties with privacy protocols experienced in the earlier RITS platform. Growerspace provides all of the same services as RITS, with additions such as a performance management system that incorporates key performance indicators from supplier to roaster. This provides participating coffee co-operatives with information so that they can make informed decisions. They now have real-time data, so that they can make decisions on when to start milling, when to collect coffee and when the price changes:

> "The information required to receive Fairtrade and organic certification is often complicated and extremely time-consuming and costly. This system saves us 60-70% of our time. We can now collect and analyse data in one month, which would have taken 3-4 months in the past," Aprocassi Co-operative, Manager, San Ignacio (2014).

One of the most unique and powerful impact tools devised as part of the RCM has been the most valued producer (MVP) programme, which connects co-operative leaders to buyers in a targeted way. An example of this is that Sustainable Harvest took top leaders from Peru, including a representative from Aprocassi, to the exclusive Swiss Coffee Trade Association dinner, thus facilitating high-level connections. Strauss (the sixth biggest coffee company in the world), Nespresso and Keurig were all part of the visit, and they had private audiences with the buyers from these companies in Switzerland and then participated in the exclusive conference and gala dinner at Sustainable Harvest's MVP awardee table. Sustainable Harvest were recently recognised as a top-quality performance supplier by Keurig Dr Pepper (KDP), all as a direct result of the interventions they made using the RCM and the MVP programmes in tandem. This means that they were best not only among all coffee importers supplying KDP, but also among all soda and bottling and global vendors supplying KDP. These interventions will be analysed in further detail in Chapter 6, in order to investigate the influence, they have on

[7] A USA-based coffee company which aims to source high-quality, environmentally-friendly coffee. The company's main roaster is based in Denver, and it has six small-batch shops throughout the USA (Chicago, California, Colorado and two in New York). Their ethos is "where your coffee comes from matters."

farmers' ability to adapt to climate change.

Activity/content	Purpose / number of people	Content	Frequency	Knowledge produced
Farmer field school	**Numbers:** Total number of farmers trained – 400. 160 people trained (90 in year 1 and 70 in year 2). This resulted in 8 community trainers in year 1 and 8 in year 2 who went on to train 30 farmers each (400 people trained) in a period from 2013 – 2016. **Purpose:** to empower farmers, reignite local knowledge and support farmers to adapt to climate change, meet quality and environmental standards (set by cooperatives, Fairtrade and Organic certification bodies) and protect their crops for pests and diseases and to promote peer mentoring.	- Quality control - Marketing - Integrated management of pests and diseases - Pruning - Shade management - production of organic insecticides	Monthly for a period of 3 years	Building the capacity of farmers so they could replicate the training with members of their own community—a "train the trainers" approach that helps spread best practices exponentially.
Cupping laboratory	**Numbers:** Exact numbers are not available for this, however every cooperative member technically has the opportunity to be trained. **Purpose:** Train cuppers and farmers throughout the region on how to analyse the quality of their coffee and how harvest and post-harvest techniques on the farm affect the quality of their coffee in the cup	-Quality control -Understanding standards (Fairtrade/organic/SCA)	Ad hoc training	Empowering farmers
Let's Talk Coffee Conference	**Numbers:** Let's Talk Coffee® Regional event in Peru brought together more than 110 people from over 30	CLR Price Risk GPN Quality Food security	Annual	Informative educational platform for the Sustainable Harvest supply chain.

	Peruvian producer organisations for two days. **Purpose:** The training intended to help strengthen the Sustainable Harvest® supply chain			Producers measured their performance and defined a clear set of goals for the upcoming harvest. Sustainable Harvest also took the opportunity to sit with each organization and review areas of improvement, ensuring that specific advancements will be made in the ensuing months.
Food Security Programme	**Numbers:** 70 women and technicians across the three case study cooperatives who were then cascading the learning to all of their members **Purpose:** the project, which targets women community leaders, focuses on teaching coffee producers and their families how to build their own food gardens and raise their own animals, in turn providing them access to healthy food and income diversification.	How to grow a food garden Use upon local knowledge Diversification Food security	Monthly for 1 year	Diversification Improved food security
Growerspace	**Numbers:** all of Sustainable Harvests farmers, roasters, buys. **Purpose:** to provide transparency and traceability throughout the GPN. Providing information for all actors to make informed decisions.	Transparency and traceability	On-going	Provides real time data so that decisions can be made on when to start milling, when to collect coffee and when the price changes.
Training on price risk management	**Numbers:** training for three case study cooperatives. **Purpose:** to support farmers to manage the risk of growing and selling a globally trade commodity	Price risk management	On-going	

Table 5.1 Sustainable Harvests activities in Peru

5.5.3 Domestic sales

Domestic sales account for a small percentage of the total market share for Peruvian coffee farmers; for example, the forecast for 2019/20 is 4.5 million bags of coffee (60 kg per bag), and Peru is predicted to export 4.3 million of these bags of coffee to North America, Europe and Asia (Nolte, 2018). The remaining 0.2 million bags contain coffee that did not make the grade for export to the global North, leaving locals, despite their close proximity to coffee-growing areas, with a poorer-quality product.

Not all of the 4.3 million bags ready for export go directly via buyers such as those listed above. Apessi, the financially smaller of the three case study co-operatives, sells a small percentage of its coffee to intermediaries such as PROASSA-OPTCO and Rainforest Trading, who are both based in Lima, Peru, and export certified coffee to the USA. PROASSA-OPTCO purchases coffee from 3,694 farmers belonging to 54 different associations and co-operatives, which prevents the co- operatives having direct trading relationships and reduces both their agency and ability to capture value within the global production network. The relationship the case study co-operatives have with domestic buyers is purely transactional with no long-term relationship building, no support to upgrade or capture value and no premiums that support these processes or help farmers adapt to climate change, all of which will be further analysed in Chapter 6.

5.5.4 Alliances between alternative trading companies

All of the three case study co-operatives' main buyers listed above build relationships and conduct information-sharing with their 'partner' co-operatives. There is a constant flow of information between the coffee co-operatives and their buyers, sharing data based on estimated harvests and quality, in addition to sharing any potential barriers which may inhibit both the farmers and their co-operatives meeting the orders placed by their buyers. The buyers in turn share market information, such as the demands of the market and potential solutions to any challenges raised by the co-operatives, and work in a collaborative way to resolve them. They thereby work together to develop value creation and value enhancement.

The strength and importance of inter-organisational alliances between these alternative trading organisations (ATOs) is vital in creating and strengthening markets for sustainable certified commodities in both the UK and USA (Davies, 2009). Such networks have been "embedded in the fair trade industry since its modern foundations" (Davies, 2009, p. 109).

The global coffee production networks provide a space to not only trade goods, but also to share information for the sustainability certification/ethical coffee movement as a whole, in order to gain competitive advantage (Davies, 2009). This is illustrated through the collaborative venture undertaken by both Twin Trading and Equal Exchange, who together formed Cafédirect. Twin is Equal Exchange's biggest supplier of coffee, and so they have a mutually beneficial relationship in which "the sharing of information has provided both organisations with valuable intellectual capital, especially in locating supply chains" (Davies, 2009, p. 116).

Specific forums and conferences act as focal points through which ATOs can build and strengthen partnerships, and share information and intellectual capital. For the case study GPNs and the ATOs, this includes Cafédirect's producer conference, which "provides an opportunity for Cafédirect employees, Twin Trading (the importer) employees and the growers (the supplier) to meet to 'develop collective strategies in the market'" (Davies, 2009, p. 117). Sustainable Harvest's 'Let's Talk Coffee' events, which also bring together network actors, enable farmers to be actively involved in important discussions regarding the future of the speciality coffee industry. The event provides a platform for farmers to have their voices heard, to share the challenges they are experiencing and to work with network actors to find collaborative solutions. These knowledge exchanges will be critically analysed in Chapters 6 and 7, in order to assess what they provide in terms of strategies to adapt to climate change and the coffee leaf rust crisis.

Organisations such as Twin Trading and Sustainable Harvest have been key players in supporting other fair trade ventures. It is common, for example, in the UK for organisations such as Twin, which has created subsidiary companies (Cafédirect, Divine and Liberation foods), to provide them with initial support to get started within the industry but then empower the new organisations to become independent: "Through the creation of companies and continual enclaving, fair trade has formed an interconnected network… pursuing similar goals in relation to improving living conditions in the developing world" (Davies, 2009, p. 118).

Twin, Sustainable Harvest and the other international buyers discussed in this section focus on long-term relationships, private voluntary certifications (Fairtrade and organic), transparency and traceability, meaning their "strategic response to cost [and environmental] pressures and financial discipline is likely to be different from those mainstream market economies, which are more dominated by financial consideration in economic transactions" (Coe and Yeung, 2015, p. 127). Ultimately, they put into action firm-specific practices in order to mitigate the volatile market in which they are situated.

The alternative trading organisations discussed in this section provide ongoing support through their embeddedness in sites of production, training, financial support and long-term relationship- building. Joint working brings about synergies that contribute to "increase[ing] the resilience and robustness of their global production networks, and can thereby mitigate the economic and environmental risks associated with production disruptions and natural disasters" (Coe and Yeung, 2015, p. 128). This is particularly evident in relation to increasing farmers' resiliency and robustness to deal with the risks associated with climate change, as discussed in Chapter 6.

5.6 State Actors: Governance, Policies and Actions

The creation of trade, infrastructure and fiscal policies all directly or indirectly affect coffee production at its site of production, in this case San Ignacio. This section will therefore discuss relevant national and international policies and their impacts, in addition to state actors and their influence on Peruvian coffee production, in the case study production network and more generally within Peru. I will explore the state actors that are present within the sector and their influence on empowering farmers, in addition to exploring the impact that the lack of an overarching coffee authority has had on the Peruvian coffee industry. Table 5.2 summarises the main extra-firm actors in Peru.

Extra-firm actors within the coffee sector in Peru		
Network Actor	**Type**	**Role**
Ministry of Agriculture and Irrigation (MINAGRI)	State	Carries out activities in support of organised and non-organised producers, through the National Plan for the renovation of Coffee Farms, as a programme of the Directorate-General for Agribusiness.
Ministerio de Comercio Exterior y Turismo (MINCETUR):	State	The Ministry of Foreign Trade and Tourism responsible for setting, directing, implementing, coordinating and supervising foreign trade, including national development plans and programmes
National Coffee Council, housed by The Ministry of Agriculture and Irrigation	State	Advisory board to the coffee sector
Ministry of Production	State	Promotes technological innovation, supports the establishment of the Center for Technological Research (CITE)
The Commission for the Promotion of Peru's Exports and Tourism (PROPERU)	State	A state institution created to attract foreign investment, attract export markets and tourism
Servicio Nacional de Sanidad Agraria (SENSA)	State	The National Agrarian Health Service, the national authority for agricultural health, seeds and organic farming. Carries out specific activities in support of producers, especially non-organised producers
National Institute of Agrarian Innovation (INIA)	State	Conducts research on genetics aimed at breeding coffee varieties not currently grown in the country
National Council of Science, Technology and Technological Innovation (CONCYTEC)	State	Supports research on post-harvest practices and processing of green coffee through roasting and grinding processes, to develop appropriate technologies
Agrobanco	State	Second-tier bank for the agriculture sector
Regional governments	State	Under Act 27867, article 9, regional governments promote agriculture, agro-industrial and tourism
Local governments	State	Promote economic activities in their local areas
Sustainable Commodity Assistance Network (SCAN)	Non-state	A global network and national platform to support farmers through direct technical assistance in both business management and sustainability

Asociación Peruana de Cafés Especiales (APECAFE): The Peruvian Association of speciality Coffee	Non-state	An organisation created to promote the production and commercialisation of special coffees under the auspices of PROMPEX, the export promotion agency of Peru
Organised producers	Non-state	Coffee co-operatives and associations that are legally registered, of which there an estimated 120 organisations representing 30% of coffee producers nationally

Table 5.2 Extra-firm actors within the coffee sector in Peru. Source: author's own

As Table 5.2 shows, the governance of the Peruvian coffee industry lacks an overarching national institution or strategy which in turn weakens the power of the state to contribute positively to the economic, environmental and social development of the country. This has led to multiple network actors filling this governance void and implementing their own – often competing and conflicting strategies, thus resulting in poor sector leadership, reduced access to credit within the sector and inadequate technical assistance (Global Coffee Platform, 2017).

Several other coffee-growing countries in the region benefit from national institutions that coordinate and lead their coffee industries, bringing together both public and private sector actors. Examples include Comite Nacional de Cafeteros and the Federación Nacional de Cafeteros, established in Colombia in 1927, Instituto del Café de Costa Rica, established in Costa Rica in 1933, Asociacion Nacional del Café, established in Guatemala in 1960, Instituto Hondureno del Café, established in Honduras in 1970, Consejo Salvadoreno del Café, established in El Salvador in 1989, Consejo Nacional del Café, established in Nicaragua in 2001, and the Asociacion Mexicana de la Cadena Productiva del Café and the Comite Nacional Sistema Producto Café, established in Mexico in 2004.

Colombia is regarded as an exemplary case of the embeddedness of the state within a national coffee production network. The country, through its Federación Nacional de Cafeteros, brings together over 500,000 coffee farmers, governmental departments and other coffee production network actors. The Federation is a united force collaboratively developing national policies that directly affect the development of the national coffee sector. They also have a dedicated team of 1,600 members of staff who provide training and quality control throughout the nation.

The lack of any form of unified governance in Peru's coffee sector has been acknowledged as a shortcoming and was brought to the forefront of network actors' attention during the CLR crisis in 2012/13, something which will be discussed in further detail in Chapter 7.
Instead, there are a number of state actors with responsibility for different parts of the coffee

production network. Junta Nacional Del Café (JNC), Peru's national coffee board, plays a coordinating role with co-operatives throughout the country. The institution was established in 1993 and unites 56 coffee-growing organisations, associations and co-operatives consisting of 70,000 member families. The institution's main aim is to support the growth of the coffee sector, both nationally and globally. This consolidation of organisations provides a more united front, freeing up farmers who have been subjected to exploitative trading practices. According to JNC, an estimated 15-25% of Peru's 100,000 farmers are now members of co-operatives.

The National Coffee Council (CNC, Spanish acronym) was created in 2002 (Resolucion Suprema N° 005-2002-AG) by Junta Nacional del Café. The Peruvian Chamber of Coffee and Cocoa was established in 1991, bringing together actors ranging from producers, exporters and processors within both the coffee and cocoa production networks. Lastly, there is MINAGRI, the Ministry for Agriculture and Irrigation, which chairs the CNC. The ministry is responsible for supporting the economic and environmental development of agricultural producers through agriculture, but despite being the country's main national institute, it is extremely limited in its role, and so with no budget or resources, it acts solely as an advisory body (SIPA, 2017).

The sheer numbers of network actors presented in Table 5.1, together with the increasing challenges faced by the sector (climate change, price volatility, pests and disease), illustrate the need for a national coffee institution to take full control of the sector and address these very pressing issues. However, in the absence of an all-embracing coffee institution, farmers have had to look to other state and non-state actors to provide support and protection against external market forces, highlighting that the existence of alternative trading networks in Peru is shaped by the particular Peruvian state situation. This is an area of critical importance in terms of growing problems related to climate change, pests and disease, along with the ongoing challenges associated with price volatility, and as such it will be interwoven throughout the remaining two empirical chapters.

5.7 Conclusion

This chapter has addressed research 1 question presented in Chapter 1, namely "*How do coffee production network actors exert power and influence within the network, and what are the consequences of such influence on the agency of smallholder coffee farmers looking to respond to climate change challenges?*" It has also examined the complexities and challenges existing within conventional global coffee production networks, and the attempts made by alternative trading networks to redress the balance of power and influence within the network.

The chapter highlights the benefits and challenges inherent in trading in these alternative networks. Several network actors discussed in this chapter have shown great motivation to support farmers and their co-operatives, but their influence and agency over a global system fraught with uncertainty (over-supply, price volatility and competition) is somewhat limited. Since the collapse of the ICA, as discussed in Chapter 4 the market has been buyer-driven, demanding that farmers obtain sometimes costly certifications, change their farming practices and alter ways of working. Farmers are trading in a global system, which leaves them with little agency or autonomy over their own livelihoods; for instance, the price of their green coffee beans is determined on the New York Stock Exchange. In theory, the C price (discussed in section 5.3.1) is determined on a supply and demand basis. However, not all countries influence global supply equally, as demonstrated by Brazil and Vietnam's significant increase in production. Coffee prices, as illustrated in Figure 5.4, are extremely volatile and have shown a downward trend for several consecutive years, leaving farmers in a precarious position, and consequently, these market forces are threatening Peru's already economically exposed coffee sector. These contextual factors, along with the political and economic contextual factors presented in Chapter 4, illustrate the importance of political and social embeddedness in facilitating or inhibiting the operation of alternative trading networks. The lack of an overarching national institute, for example, has inhibited Peruvian coffee farmers' potential to gain from value capture and market exploitation.

Co-operatives at both the primary (Apessi, Aprocassi and Unicafec) and secondary (Cenfrocafe) levels have gone some way to filling this void for farmers who are members of such associations. This is done by providing their members with technical training and access to speciality markets, helping their farmers gain both Fairtrade and organic certification, access to credit, pooled resources and bargaining power, thereby positively influencing collective and individual agency to lift themselves out of poverty. However, the extent of this empowerment is limited and often constrained by factors such as markets and policies outside of both the co-operatives' and their members' control.

Private voluntary certification (organic and Fairtrade) has also entered the market in an attempt to address the inequalities in value capture and distribution within the network. This has been achieved to some extent through the Fairtrade floor price, the Fairtrade premium and increased profitability; however, as argued in section 5.3.1, this is not always a straightforward matter and is dependent on the amount of coffee sold under the label, which, as the market currently has an oversupply of Fairtrade coffee, can be limited. Some of the non-financial benefits, however,

were deemed clearer to analyse. Longer-term relationships and contracts enabled farmers and their co- operatives to plan and to access market- and climate-related information (which will be further analysed in Chapter 6), which provided them with increased agency to make informed decisions about their own livelihoods and training. This in turn gave them the practical tools to make some of the changes needed to achieve value creation, capture and enhancement to upgrade their production and secure a higher price for their coffee. These benefits were closely linked with those brought by buyers such as Sustainable Harvest and Twin, who, through their territorial embeddedness and strategic coupling, helped co-operatives and their members to upgrade through skills taught within the farmer field school. This provided results for both the ATO and the farmer, as they both benefited from this training and long-term relationship-building. The ATOs had a ready supply of speciality coffee that was certified, enabling them to meet their consumer demands, whereas the farmers had the skills and support to produce high-quality coffee to access these markets, gaining security from long-term contracts and higher prices. Fairtrade certification also opened up access to financial organisations which would otherwise have been closed.

Bringing these themes together with the constraints of the market and the contextual factors presented in Chapter 4 (retreat of the state, liberalisation and globalisation), the next chapter analyses the challenges of climate change and how network actors are influencing farmers' ability to adapt through empowerment and increased agency to reduce their vulnerability to, and increase their resilience against, the consequences of climate change.

Chapter 6. Peruvian smallholder coffee farmers and the lived experience of climate change challenges and adaptation

"Climate change adaptation is a governance project directed at 'the problem of the future'. It is shaped by how we conceive of, envisage and relate to the future under climate change, and our beliefs about human agency" (Rickards, 2010, p. 2)

6.1 Introduction

The previous two chapter situated the actors within the case study coffee production networks and the landscape of governance and power of which they are part. Furthermore, this landscape has transformed from being predominately state-led to being governed by transnational steering mechanisms and world orders, where sovereign states are but one of a vast array of network actors who now govern the environment (Auld, 2010).

The actors within the coffee sector over recent years have become increasingly aware of the threat climate change poses to the business as a whole, and so the challenge has become increasingly important to the network. Governments, buyers, roasters and NGOs have all therefore begun to explore climate change adaptation with the aim of reducing vulnerability and increasing the resilience of smallholder coffee farmers.

Despite the growing body of knowledge regarding climate change adaptation, research regarding the influence of these network actors and their associated power in relation to climate change adaptation is somewhat lacking (Vogel et al., 2007; Rickards, 2010). This chapter contributes to filling this gap in the literature, paying particular attention to the smallholder coffee farmer as the most exposed agent to climate change within the coffee production network. The first section of this chapter provides an insight into smallholder coffee farmers' lived experiences in relation to the climate change challenges they are currently facing. Narratives of these experiences speak of their vulnerability as actors who are often excluded from both the creation and dissemination of climate change adaptation knowledge and policy development, both of which directly affect their ability to maintain their livelihoods. In addition, they hold little power in the coffee production network and are often viewed as recipients of development interventions, rather than agents of change in their own right. The challenges of climate change viewed through the lives of this cohort provides an opportunity to explore not only their

vulnerabilities in the coffee production network, but also the ways in which they can benefit from influential actors who can help shape their adaptation strategies.

Section 6.2 will present the lived experiences of coffee farmers in relation to particular climate change challenges. Section 6.3 will document and explain how the influences on their responses have largely shifted from the state to powerful buyers and civil society organisations in a context of neoliberalism. Section 6.4 outlines key examples of interventions made through ATOs and co- operatives. Finally, Section 6.5 notes an interesting shift back to state influence that was prompted by the coffee leaf rust crisis of 2013, which forms the focus of Chapter 7.

6.2 Lived Experiences of Coffee Farmers in relation to Climate Change

Climate change trends in Peru include unseasonal seasons and shifts in precipitation and temperature (USAID, 2011), and such changes have the potential to increase the vulnerability of those involved in resource-dependent and rain-fed agriculture such as coffee-growing. Moreover, they affect both the quality and quantity of agricultural production, farm income and food security (Fischer et al., 2002; Battisti and Naylor, 2009; Laderach et al., 2011) and place farmers and their families in a vulnerable position, as they are heavily reliant on agriculture in order to secure their livelihoods.

It is paramount when investigating adaptation interventions to understand local perceptions and lived experiences regarding climate change (Vedwan and Rhoades, 2001) and some of their impacts, in order to assess the appropriateness of the interventions. For instance, "Local knowledge has come to be seen as the key to sustainable living in a 'bottom-up' development perspective" (Stobart and Howard, 2002, p. 3). Sillitoe (1998) discusses the new focus on indigenous/local knowledge, which often relates directly to the environment and local observations of climatic change, including changes in temperature and precipitation patterns, thus providing an insight into the impacts of climate change.

6.2.1 Unseasonal seasons

Farmers rely on their seasonal calendar to plan agrarian activities and make decisions as to when to plant, harvest and cultivate, all of which are determined by the time of year. The timing of these seasons ultimately affects whether crops such as coffee thrive or fail (Jennings and Magrath, 2009) and therefore whether or not a farmer has a livelihood and food security.

The farmers interviewed herein stated that up until 5-10 years beforehand they had been able to plan their activities around predictable seasons. In northern Peru, the rainy season would begin in December and end in June. Farmers worked in harmony with their environment, reading the signs of poor soil, changing weather patterns and potential deficiencies with their plants, in order to employ the correct farm management techniques. This was captured in the interviews, with quotes such as Jose's being commonly cited:

> "We knew our farms, our soil and our plants better than our wives; we spent more time on our farms with our plants than in our homes with our families," Daniel, Aprocassi Co-operative, San Ignacio (2014).

Such sentiments were expressed in the past tense, as farming life, according to the farmers, had changed dramatically over the last decade. They mentioned that they had witnessed a change in the climate, and there was great concern regarding the unpredictability of seasons, reported by both practising farmers and science-based academics conducting research in this area. All 60 farmers interviewed stated that these climatic changes, which included increased temperature, increased precipitation, intensity and changing seasons, were happening more frequently and with higher intensities, often resulting in devastating effects on their harvests, income, livelihoods and food security. They also stated that they were unable to forecast when the rains would arrive or leave, with one farmer noting:

> "Before, it rained from March, April to December, and now it rains just sometimes; for example, December here, it should be all rain, but now December is summer" Laura, Apessi Co-operative, San Ignacio (2014).

Coffee production requires a specific sequence of rainfall, dry periods and sun (Fischersworring et al., 2015) to occur at particular times. The plant requires a period of prolonged dry conditions in order to flower. Following this, it needs a rainy season, which supports the growth of the fruit, in addition to optimal temperature ranges. However, the coffee farmers felt that they were no longer able to predict when one season begins and another ends, making it increasingly difficult to farm their land. Planning was one of their key concerns with regards to the production of their coffee:

> "We try to plan, but how can you do this without knowing the seasons? We no longer know when to plant or harvest," Alfred, Unicafec, San Ignacio (2014).

Others informed me that the uncertainty of the seasons was threatening their livelihood and their future in coffee farming:

> "We can no longer rely on the weather to support us with our farming, it is unpredictable and is making life difficult. I don't know if I will make or lose money on this harvest, and this is my sole income. How can my family keep living like this?" Peter, Apessi, San Ignacio (2014).

Unpredictable seasons heighten the risk for farmers engaged in coffee production, as they are unable to rely upon traditional knowledge, past experience or their agrarian calendar to know when to plant, harvest and cultivate their land.

6.2.2 Changes in precipitation

Precipitation is a crucial element of coffee growing, with changes to annual precipitation, i.e. either too much or too little rain, resulting in devastating effects on coffee farmers' production. Fifty of the 60 farmers interviewed stated that the changes they were experiencing in terms of precipitation were negatively affecting their livelihoods. They also stated that they were unable to predict rainy seasons and that rainfall amounts and intensity had increased over the last 10 years. Extremes in precipitation can cause significant harm to human health, infrastructure and agriculture (Gosling et al., 2011), either directly in terms of droughts and floods or indirectly through the loss of crops, increased incidences of plant diseases (such as the devastating coffee leaf rust crisis addressed in Chapter 7) and the loss of fruits/berries as a result of intense rainfall.

Although the participants noted a change in annual rainfall, many placed more emphasis on its distribution and intensity. Farmers, extension workers and co-operative staff alike raised concerns and noted a marked difference in the type of rainfall that they were now experiencing. These differences included too little rain, resulting in droughts, too much rain, resulting in floods, unpredictable rainfall, rain occurring outside of normal precipitation patterns and increased intensity and heavy rain which damages crops/causes flooding. Almost all farmers raised the same concerns as Maria:

> "It's not like before, [10 years ago] the climate has changed, it has varied; for example, now it rains once a week or for a week, but the next week it's sunny, but before when it rained before, it rained for a whole month or two, and you didn't have hope for sun – I think this has caused the diseases that affect us," Antonia, Apessi Co-operative, San Ignacio (2014).

This perception of climatic change and unpredictable seasons could also be felt within the community. Figure 6.1 illustrates that the feelings of the town in December were 'tense' and "anxious'. It was technically the rainy season, but the area was hot, humid and dry. The community, 95% of whom either directly or indirectly depend on the coffee industry for their livelihoods, were concerned. The previous year's (2012/13) harvest had been badly affected by

both coffee leaf rust and low coffee prices, and without rain they were concerned that 2014's harvest could be even worse:

> It's December, technically the rainy season, and there is not a drop of water. The sun is so hot it feels like it is burning through your skin, the climate is hot and humid and the atmosphere in the town is tense; people are visibly anxious. Their entire life, livelihood and families' wellbeing rests on these rains arriving. But no one can predict if or when they will arrive. A few more weeks and farmers tell me that it will be too late, their plants will have died and they will have lost this year's harvest.

Figure 6.1 Field diary extract 05/12/13 – The lack of water

The majority of farmers had borrowed money (pre-finance) based on 2014's harvest, which left them in the increasingly difficult position of falling deeper and deeper into the poverty cycle. One participant explained:

> "I borrowed money from my co-operative last year in order to renovate my land, pay school fees for my children and buy food, as the coffee price was too low and I did not make a profit. I hoped that this year would be better, that I could pay back the loan and make money to cover this year's expenses, but up to now the rains have not arrived. How can I pay back that money, how can I live?" Fernando, Aprocassi Co-operative, San Ignacio (2014).

Then, in late January, when the rains finally arrived, the field diary recordings changed to reflect feelings of "joy", "celebration" and, more importantly, "relief", which were expressed within the community, as cited in the field diary extract below:

> The whole community appears to be visibly happier since the rains have arrived. People are smiling as they walk down the streets, there are more conversations happening on street corners, more people in shops buying essential items. There is a feeling of huge relief, joy and celebration. The weight of whether or not the rains were going to arrive has been lifted. Farmers are now saying that they have hope – hope that this harvest will be better, that all is not lost.

Figure 6.2 Field diary extract 12/01/2014 – The rains

The rains had given the community hope that they might be able to pay back their loans, feed their families for a few months and survive for a little longer:

> "We are relieved. Now that the rains have arrived there is a chance that the farmers' coffee crops will be ok and that we can meet our orders. The day the rain arrived there was such a feeling of relief in our co-operative. People smiled and we started to think about the future again," Alberto, Co-operative Manager Unicafec Co-operative, San Ignacio (2014).

> "Look, they [the rains] have arrived! I am no longer sad, I can start to farm again, start to work. Before I was sitting looking at the sky, hoping, praying, but now I can actually work my land and turn it into coffee – and my coffee into money. The rains have changed everything. They have given us so much more than water, they have given us hope and our livelihoods back. The rains will send my children to school again this year," Francisco, Unicafec Co-operative, San Ignacio (2014).

6.2.3 Changes in temperature

Peru's Second National Communication (SNC) to the UNFCCC reported a temperature increase of 0.2°C per decade since the 1960s (Twin, 2016). This rise in temperature is set to increase, with predictions that "temperatures may increase by 1.6°C and minimum temperatures may increase by 1.4°C by 2030 and 2°C by 2050," with the greatest increases predicted in the north and central highlands (Twin, 2016). This increase, according to the IPCC Fifth Assessment Report, may result in reductions in traditional coffee-growing areas by 2050 (IPCC, 2014):

Temperature, like rainfall, appears to be a great concern. Too much heat and the coffee plants are no longer viable, too little and they fail to grow. Managing the weather is practically impossible, but it's essential if you are going to create and sustain a livelihood from coffee-growing.

Figure 6.3 Field Diary Extract, December 2013

This poses a significant challenge to the coffee-growing areas in the north of Peru, where some of the greatest temperature rises are predicted to occur. Arabica coffee, which is the dominant crop in San Ignacio (70% of which is typical, 20% caturra and the remaining 10% a mixture of other types of coffee plants), is particularly sensitive to temperature increases during the blossoming and fructification stages (Haggar and Schepp, 2012).

Participants in the study areas all commented on the change in temperatures they had been experiencing, noting both an increase in temperature and a decrease in minimum temperatures:

> "The heat is much stronger now than before, as now you can get temperatures of 32," Isabella, Apessi Co-operative, San Ignacio (2014).

> "Before, it was normal, but now when the sun burns, it burns really hard. You can't handle that hotness, it is like you are going to burn, and when it is cold it's also really cold. It's too much is like the mountain was with ice, before it wasn't like that" Olivia, Unicafec Co-operative, San Ignacio (2014).

The effects of these changes were predominately reported negatively, with farmers at low

elevations noting a decrease in coffee yields or an inability to cultivate the crop in what was historically prime coffee-growing land (600m and above), due to temperatures outside of the optimal range. Those at higher elevations (1,200m and above) noted an increase in coffee cultivation on areas of land where historically conditions would not have been favourable to such crops:

> "The temperatures are changing, it is getting warmer and we are able to grow coffee in places that we could not do so in the past. I can now grow coffee at the top of my land, for example," Carlos, Unicafec, San Ignacio (2014).

This land-use conversion at higher altitudes from previously uncultivated land to coffee cultivation is creating conflict between coffee growers and existing forestry-based land users (Haggar and Schepp, 2012). Local government officials from the Ministry of Agriculture highlighted temperature changes as causing significant problems with regards to both land use conflicts and lowering yields. There is less land available at higher altitudes, resulting in an increase in cloud forest deforestation, and this has knock-on effects on farm management and creates climate-related challenges. Cloud forests play a vital role in ecosystem management, regulating rivers, absorbing moisture during increased rainfall and releasing water during dry spells, but they also provide an essential habitat to many endangered flora and fauna.

In addition to the direct effects of increased temperature on the coffee plants, there are also a number of indirect effects; for instance, there is evidence to suggest a correlation between increased temperatures and increases in pests and diseases. Jaramillo (2011) researched the impacts of climate change on the coffee berry borer, the most significant pest affecting this crop. Arabica is typically grown between 1,400 and 1,600m, and the study found that, historically, there were no reports of the coffee berry borer attacking plants above 1,500m. However, temperatures have risen in coffee-growing regions such as San Ignacio, and as such the insect has been found recently at higher altitudes, resulting in "losses exceeding US $500 million annually, and worldwide affect[ing] many of the more than 25 million rural households involved in coffee production" (Jaramillo et al., 2011, p. 2). Once again, this provides more vital context for the development of coffee leaf rust, examined in depth in the next chapter.

Farmers discussed not only a general rise in temperature, as examined above, but also the challenges that they face in terms of radically changing temperatures and weather throughout a single day. They highlighted days that had blistering heat, to the point that it was unbearable to be outside one minute, and then cloud cover, which would make it cold. These incidences were

felt more often at higher altitudes:

> "The change that we notice is, for example, when it is raining. After an hour, the sun comes out really hot, and sometimes a dry mist comes when it doesn't rain and we then have frost and that frost burns the plants," Daniel, Apessi Co-operative, San Ignacio (2014).

The farmers noted that this made planning almost impossible, and they went as far as stating that they felt like they were no longer able to manage their farms effectively via traditional farming practices, as they could no longer depend on the weather. This was the case for both temperature extremes:

> "Coldness, in this case frost, sometimes burns the coffee and destroys the land, because if it comes when the beans are not hard enough, the coffee is lost, the coffee doesn't endure," Jose, Apessi Co-operative, San Ignacio (2014).

This section has investigated the lived experiences of farmers in San Ignacio with regard to particular climate change challenges. It is evident from the narratives that they are experiencing significant changes, which are challenging their previous farm management techniques and placing their livelihoods at risk. Such vulnerabilities act as a driver for climate change adaptation responses and management (Adger et al., 2003), and there are multiple levels of climate change adaptation: some driven by individuals, others by institutions or civil society. Adaptations are predominately in response to shocks or long-term climate trends, such as those mentioned above, rather than being proactive in preparing for anticipated change. The section below will examine how network actors have responded to the vulnerabilities of farmers, exploring the drivers to their responses and limitations.

6.3 Shifting Governance Structures Shifting Responsibilities for Climate Change Adaptation?

It is important to note that farmers' climate change adaptations are set in the context of deregulation, neoliberalism and the dismantling of marketing boards. The collapse of the ICA and market liberalisation discussed in Chapters 4 and 5 resulted in an increase in coffee production, and this coincided in Peru with the promotion of coffee growing as an alternative to coca production. The supply of coffee far exceeded the demand, leading to a shift in power to roasters, buyers and retailers (Talbot, 1997), and lowering the price received by farmers for their produce.

The impacts and risks associated with climate change are not spread evenly throughout the

coffee production network. Whilst farmers are struggling to maintain their livelihoods, suffering from seasonal food insecurity and increased risk associated with climate change, many commercial coffee buyers are increasing their profits and diversifying their supply base, in order to balance out lower yields from coffee producers and increasing demands from consumers. Coffee buyers, as network agents holding a high degree of power, it can be argued, also hold some of the responsibility for creating a climate-resilient coffee production network.

Coffee buyers have the power to play a fundamental role in creating a more climate-resilient coffee production network, by supporting farmers to adapt to climate change. The section below explores the range of coffee production network actors presented in Chapter 5 and their roles and responsibilities in relation to the challenges of climate change faced by farmers presented in section 6.2, responding to the second part of research question 2 "*how do coffee farmers adapt to such challenges in the context of power relations operating through alternative trading networks?*"

6.3.1 The state and its role in climate change adaptation: fragmented strategies and political limits

There has been a shift in the GPN literature, which traditionally focused on the role of lead firms, to one which increasingly recognises the indispensable role of the state (Smith, 2015, Horner, 2017). The state acts as a facilitator (Horner, 2017) through which global knowledge on climate change is funnelled and acts as the basis from which national policies and interventions are developed. In addition, the state represents farmers at global climate change conferences with global governing actors such as the United Nations Framework Convention on Climate Change (UNFCCC) and the Intergovernmental Panel on Climate Change (IPCC).

The governance landscape in Peru with regards to climate change is diverse, with multiple government institutions and ministries holding responsibility, to greater or lesser extents, to address the country's climate-related issues. They include, but are not limited, to the Ministry of Environment (MINAM), Ministry of Economy and Finance, Ministry of Agriculture and Irrigation (MINAGRI) and the Ministry of Energy and Mines. The sectoral approach to such a cross-cutting challenge has proven somewhat problematic. At the time of this fieldwork, running from July 2013 to April 2014, there was confusion as to who was responsible for particular components of climate change adaptation, with many of the ministries and institutions working independently to their own individual agendas. This was highlighted during an interview with

the Director of Climate Change, who stated:

> "The problem we have is sectorialism, which is very strong. They [the ministries] always try to reach the remotest places, but sector by sector. So you can find in a very small place, health, agriculture, education, mining, but they are run directly from the centre [national government]. The regions try to rebel against that. They want us to decentralise, but this is not a decision the centre makes – never. It is to conquer. They [central government] have to conquer [said with a laugh]," Eduardo Durand, Director of Climate Change, MINAM, (2014).

Another area which was highlighted both in this quote and within the wider discussions during the interview was the centralised nature of policymaking and the development of interventions. The Director of Climate Change stated that the nation has a one-size-fits-all plan for climate change mitigation and adaptation. However, he also acknowledged that the country is one of the most biodiverse in the world, as it is home to 23 of the world's 31 recognised climates: "Regionalisation of climate change mitigation and adaptation is a critical issue in the Peruvian context" (Vázquez- et al., 2018, p. 251). It is vital, therefore, that the government draws on the knowledge, lived experiences and expertise within its regions to develop regional adaptation plans tailored to the specific needs of different segments of the population.

These challenges also have an impact at regional levels. Local institutions play a pivotal role in the climate change adaptation process (Agrawal et al., 2008). Agrawal (2008), for example, states that "institutions affect how households are affected by climate impacts, they also shape how they respond to climate impacts and pursue different adaptation practices, and mediate the flow of external interventions in the context of adaptation" (p. 16). Farmers' access to the regional MINAM and MINAGRI greatly influences their ability to access funding, resources and knowledge in order to adapt to climate change.

At a regional level, the MINAGRI was the most prominent governmental actor with regards to farmers adapting to climate change despite the MINAM having a presence in San Ignacio. Interviews with regional MINAM officers concluded that they did not have a remit to work with coffee farmers in the region and were solely involved in protecting the local national park.

MINAGRI was actively involved in working with farmers in terms of conducting their own training, which did not coordinate with the work of the farmer field school, an analysis of which will be covered below. They provided training at a local centre and explored ways in which coffee farmers could adapt to climate change. Other ways in which they offered support was through information, albeit local farmers had to visit the office in San Ignacio and request

information before it was shared with them.

One of the key mechanisms through which the regional MINAGRI does support farmers is through its weather station; however, all of my interviewees believed that it station was no longer operational. Conversely, though, a representative from MINAGRI confirmed that the weather station was indeed working, and the interviewee proceeded to show me data recorded which included 10 years' worth of historical data on precipitation patterns and temperature, which, if shared, could support farmers to adapt more effectively to climate change. The representative (who wishes to remain anonymous), when questioned about why this information was no longer available to farmers, stated:

> "It is! If they come into my office and ask me about rainfall in a particular month or temperatures for this time last year, I will share this with them. But I do not give it out readily. If I did so, what purpose would my role have? I have to withhold the information and use it only to improve my work," Representative from MINAGRI, San Ignacio (2014).

Local meteorological information could help farmers make informed management and adaptation decisions, thus reducing their vulnerability and increasing their resilience. Additionally, it could greatly support other network actors such as co-operatives and ATOs who are working to assist the region's farmers in adapting to climate change. As a result, the only information on weather forecasting to which the farmers have access is available through the radio via the National Service of Meteorology and Hydrology. However, many did not have access to a radio and those who did so had very little faith in the information that was shared.

The shortcomings and complexities of the state's response to climate change with regards to supporting farmers are evident. In addition to farmers not being consulted during the decision making process, there are significant institutional constraints such as access to fertilisers which influence crop losses (Simelton et al., 2013). Climate change is a cross-cutting issue, affecting each of the governmental ministries, and yet there is no joined up thinking, consultation or co-operation. Instead, each ministry develops its plans independently, resulting in a lack of clarity with regards to responsibilities.

6.3.2 Influencing climate change adaptation via alternative trading organisations: private standards, civil society and support for co-operative farming communities

The actions and inactions of the state have therefore shaped the responses of other groups of network actors in terms of their roles in climate change adaptation in a context of neo-

liberalisation. With actors such as ATOs, NGOs and co-operatives stepping in to fill the regulatory gap left by state retreat/weakness, responsibility for climate change adaptation becomes rather more dispersed in practice, as it travels through private standards and NGOs often working to support smallholder co-operatives. This results in uneven levels of support available to coffee farmers across Peru that appear to be based on i) whether or not farmers are members of a co-operative; ii) whether or not their co-operative is embedded in an alternative trading network; and iii) whether or not the co- operative has organic or Fairtrade certification. Each of these elements is critically analysed below, in order to assess the influence they have on farmers' ability to adapt to climate change.

Sustainability has become a prominent area for coffee buyers over the last decade, and "by 2013, all major coffee firms had adopted sustainability standards" (Levy et al., 2016, p. 364). This was prompted by customers requesting greater assurances about the environmental and labour conditions in which their products were grown. Such standards have resulted in an "extended model of governance" (Scherer and Palazzo, 2011, p. 901). The two case study ATOs, i.e. Twin Trading and Sustainable Harvest, are examples of buyers contributing to and, in some cases, taking the lead on creating a more equitable, climate-resilient production network.

Twin Trading, as noted in Chapter 5, is an ethical coffee-buying business and NGO. The organisation focuses on empowerment and the sustainable development of farmers. In order to achieve this aim, they have adopted a partnership approach, working collaboratively with farmers in order to meet a number of collective needs. In addition to working directly with farmers, Twin conduct their own research. In 2015–2016, this focused on the various climate change projects taking place across the globe. Four case studies were documented, in order to evaluate the lessons learnt in those projects and to make subsequent recommendations for practitioners, businesses and funders (Twin, 2016). The findings highlight the complexity of coffee production networks, however all actors in the network would like to create a climate-resilient production network. The report notes that many of the climate adaptation projects tend to focus solely on farmers, rather than strengthening the network as a whole. One key finding is that "even if a coffee farmer is able to produce coffee in a climate-resilient way, it may still not be profitable to do so" (Twin, 2016).

Sustainable Harvest coffee was the most active organisation within the case study networks

(refer to Figures 5.2 and 5.3) in terms of supporting farmers to adapt to climate change. Their key mechanism to achieve this was through their local farmer field school, highlighting the importance of their 'territorial embeddedness' in GPN terms. The school focused on various elements of farming, all of which could be classified as climate change adaptation.

Farmers appeared to be anxious and disempowered about their lack of understanding of the seasons and were requesting further training sessions and support. Those who had participated in farmer field schools and training sessions were appreciative of the knowledge they gained and reported seeing results from the changes they had made, including increased yield and quality, and a reduction in output costs due to the acquisition of skills and knowledge to collectively make their own organic fertilisers and to read the soil and their plants for deficiencies. However, there appeared to be a heavy reliance on outside support. If funding is withdrawn from buyers such as Sustainable Harvest, who at the time of the field study were running the farmer field schools, farmers could potentially be left more vulnerable to climate shifts.

In terms of the influence of organic certification on climate change adaptation, certified farmers are prohibited from applying chemical fertiliser, and as such they have to either purchase or make organic alternatives, which can prove costly. They were taught by the Sustainable Harvests school how to make their own organic fertiliser, working collaboratively to reduce the cost of inputs.

Adaptations employed to deal with increased rainfall and changes in rainfall patterns were a key element of the Sustainable Harvests farmer field school training provided to members of the three case study co-operatives and embedded in their alternative trading networks. Ten out of the 60 farmers interviewed believed that additional rainfall could result in higher yields if they could manage the flow of water correctly, ensuring they used specific farming techniques such a terraces, to reduce incidences of landslides, and effective drainage systems. Jose, who had attended the school, stated:

> "Because of the rains, I now think this year's production will be good, as the rains make the plants strong and produce many beans," Pedro, Aprocassi Co-operative, San Ignacio (2014).

All of the 10 farmers who stated that they thought changes to rainfall levels could help them had received training from the farmer field school in specific farm management techniques that would help them adapt to the changing climate, use the increased rainfall to their advantage

when it occurs, redirecting it to ensure their plants are not damaged by flooding, protect their plants through terracing and, where possible, store excessive water to ensure that they have enough for irrigation when the rains are late or arrive but are less than required to meet their farming needs. The other thing that these farmers had in common was that they had the funds available, either in the form of personal savings, support from family or access to credit via their co-operatives, to support them with such initiatives, i.e. to afford the equipment needed to build terraces, intercrop and provide shade coverage with banana trees, and to redirect water and purchase water containers.

All three of the case study co-operatives had Fairtrade certifications, which meant that they benefited from both the Fairtrade floor price and the Fairtrade premium detailed in Chapter 5. All three of the case study co-operatives invested part of their Fairtrade premium in reforestation projects and introducing multi-cropping and shade-grown coffee, both of which are critically analysed in section 6.4, which details the co-operatives' interventions. Along with organic farming, Fairtrade also prohibits the use of harmful agro chemicals and encourages a reduction in the application of pesticides which, when combined with the application of organic fertiliser, maintains nutrient-rich soils (Fairtrade Foundation, 2018).

In terms of the pivotal role of co-operatives, they act as liaisons and negotiators between their members and buyers certified as organic or Fairtrade, for example "bridging the otherwise firm boundary between small-scale farmers and the international organic coffee market" (Frank et al., 2011, p. 73). Co-operatives crucially, therefore, channel information, funding and the provision of training to farmers, arguing that agrarian co-operatives are effective actors in promoting and managing local responses to climate change.

The interviews with farmers, co-operative leaders and extension workers all stated that co-operatives provided their members with market information, which included prices, standards and predictions, all information received from their buyers, in this instance ATOs such as Sustainable Harvest and Twin Trading. Co-operatives supported their members to transition to organic farming, through the provision of information, regarding standards, and technical training, in order to learn new farm management techniques. Although many of these interventions or support strategies can be viewed as climate change adaptations, they were not classified as such by the farmers.

The farmers cited strategies and interventions such as the co-operative's way of supporting

them to adhere to market standards, stating the rules associated with Fairtrade, organic and in accessing speciality coffee markets:

> "The co-operative does not give us information on the climate, but they help us connect with our buyers and understand what they need from us and our coffee," Pablo, Apessi Co-operative, San Ignacio (2014).

Climate change is "paradoxically both a familiar and foreign topic to farmers: as an integral part of their experience as producers and rural residents, it is thus within the domain of their 'in-group' knowledge" (Frank et al., 2011, p. 74). Farmers perceived their co-operatives as being part of their 'in-group', stating that it was an extension of their family and a place where they got together with their neighbours, family members and other farmers in the local area to discuss common problems and find collective solutions:

> "Climate change is affecting all of us [referring to other members of the co-operative], as I have told you about the rains and changing seasons we are suffering. We need help; however, no one knows our climate here better than us. So, we come together to try and get joint solutions to our joint problems," Alfred, Unicafec Co-operative, San Ignacio (2014).

This highlights the important role that co-operatives play in increasing their members' agency to make decisions over their own livelihoods, as well as the paradox in farmers' experiences with climate change. On the one hand, they have decades' worth of experience and knowledge through living with constant climate change, and on the other, they informed me that they no longer knew how to farm their lands, as the changes they were experiencing to their climate were so extreme that they no longer knew how to adapt:

> "We are used to adapting, as we live in a country that experiences changes to our climate. However, this [referring to the delay of the rainy seasons], we do not know how to work with this. I mean, when will the rains arrive? How long will they last? We do not have this information anymore," Karen, Apessi, San Ignacio (2014).

Many of the farmers wanted their knowledge of the climate in San Ignacio to be included in the development of adaptation strategies, to ensure that they were tailored to their specific needs and not a national one-size-fits-all policy.

Furthermore, in acknowledging the significant changes to the climate and the struggles they were experiencing under such uncertain conditions, they were turning to extension workers, co-operatives, buyers and NGOs to provide assistance, with 22 of the 60 interviewees mentioning the importance of co-operatives and farmer field schools in supporting them during these uncertain times:

> "The extension workers, they give us a calendar so we know when to do our activities, when to harvest, weed and fertilise. This has helped, as we cannot trust the skies anymore or our own judgement," Coffee farmer, San Ignacio.

The need for external support was stated by all of the interviewed farmers, something they were provided in the form of *ingenieros*, or engineers, who taught them about some of the more technical aspects of farming. Most of this technical training was set up to help their members adhere to environmental standards through alternative production practices such as organic and Fairtrade, both of which give them a higher price for their coffee.

6.4 Co-operatives' Intervention Strategies for Climate Change Adaptation

The co-operatives were implementing three key interventions in order to help their members adapt to climate change: diversification, reforestation and transitioning to organic farming, which will be examined below.

Crop diversification is a common measure in response to climate change (Altieri and Koohafkan, 2008; Kissinger et al., 2013; Lakhran et al., 2017) and something which is encouraged by both Fairtrade and organic certifications (Fairtrade Foundation, 2018). The findings from my empirical research strengthen Vernooy's (2015) study, which found that crop diversification leads to i) knowledge generation; ii) improved farming systems; iii) improved nutrition; iv) integration of new technologies (e.g. soil and water conservation); and v) additional income generation, which could be used to implement climate change adaptations. All three co-operatives were encouraging farmers via the provision of training to engage in this diversification, and so many were starting to grow cocoa, which could be grown at lower altitudes where coffee-growing was becoming increasingly difficult:

> "Coffee can only be harvested once a year, but cocoa is constantly producing. It is like a chicken laying eggs," Fernando, Unicafec Co-operative, San Ignacio (2014).

Other diversification interventions promoted through the co-operatives included beekeeping, rearing small animals and producing stevia, in order to reduce vulnerability coffee market volatility and as a form of climate change adaptation. The farmers cited differing levels of food insecurity, but those engaging in diversification enjoyed better levels of food security. Those who grew their own fruits and vegetables, and who kept small animals such as guinea pigs and chickens, were in a less vulnerable position than those who solely relied on coffee. The two quotes below highlight these differences:

> "Of course, it's a huge difference, because I always remember the words of my dad that is, raising your animals, planting your products in a familiar area: the day that you are the poorest, you eat meat. But if we just dedicate ourselves to one specific plant [coffee], if it is at a good price we have something to eat, but in days like this imagine how we are going to eat; we can't eat anything," Pablo, Aprocassi Co-operative, San Ignacio (2014).

> "Normally, when we have money, we can go to the city to buy food or eat, but when we don't have money, we just have to eat what we produce locally. We grow other foods on my farm, which we can eat (yucca and bananas), but the choices are limited," Annabella, Unicafec Co-operative, San Ignacio (2014).

Those farmers who were less vulnerable and had more secure livelihoods often mentioned having several different sources of income in addition to what they derived from coffee growing, which serves as an important element in building resilience and in securing sustainable livelihoods.

Many farmers, who were part of a programme to restore forest cover in their area, had received training on environmental management, which included the importance of reducing or prohibiting deforestation. The training, organised through the co-operative, identified one of the key components farmers recognised as a cause of climate change and utilised this as an area which they themselves could address and respond to. One farmer stated:

> "According to the talks that we have, they say that it is because of the deforestation that it [climate change] is happening, because the sun is hotter and the plants don't resist the sun, the fruits go yellow," Alejandro, Apessi, San Ignacio (2014).

Farmers who not only had a good understanding of one of the factors contributing to their changing climate, but through the work of their co-operative were able to be part of something to restore, adapt and change the situation, were looking after the wider environment as well as their smallholdings.

The increased temperatures resulted in some farmers no longer being able to farm at certain elevations. Some farmers stressed that they were either not able or unwilling to diversify despite support from their co-operatives, as they felt they had no other option but to continue to try to grow coffee, even in difficult and sometimes impossible situations:

> "We are farmers… we don't have other options to work on, it's just coffee," Fernando, Apessi Co-operative, San Ignacio (2014).

> "You can't earn money from anything else. As I told you, here is only coffee, and sometimes we have to get loans for these months, when there is no harvest and when we need to

> cultivate, because you have to always be on the land maintaining it, because if not, you can see the difference and it doesn't produce the same," Francisco, Unicafec, San Ignacio (2014).

Farmers have therefore started acknowledging that lower elevations are no longer suitable for coffee growing (Ovalle-Rivera et al., 2015) and they are therefore being forced to move to higher, if they wish to continue growing the crop; however, in doing so, they are reducing the cloud forest coverage (Haggar and Schepp, 2012). This is a complex issue in the region, as securing livelihoods is of paramount importance to coffee farmers, but conversely the further uphill you go, the more cloud forest you find, and in order to farm this land, it has to be cleared.

Co-operative staff connected changes to the climate with the loss of cloud forest in San Ignacio. Standing on the roof of the Apessi headquarters, their manager pointed out areas which had lost substantial amounts of forest coverage over the last decade:

> "Look around you, can you see any trees? They have all gone. This area used to be dominated by cloud forest, its presence is importance in maintaining a stable climate. However, as coffee farming has increased in the area, the cloud forest has decreased. But now we are starting to realise that we need it. We need to work together with nature, not against it," Apessi Co-operative manager, San Ignacio (2014).

The Apessi Co-operative manager's observations align with scientific knowledge illustrating that forests in close proximity to coffee farms can improve the local climate and have the potential to reduce climate extremes by conserving soil moisture (Seneviratne et al., 2010; Verburg et al., 2019).

The state has set a goal of achieving zero deforestation by 2021, in line with climate actions agreed upon in the Copenhagen Accord (Gobierno del Peru, 2015) placing restrictions on deforestation, especially in areas that are rich in biodiversity, such as the Andean cloud forests in Peru. The three co-operatives had been guided by national policies and were encouraging farmers to diversify rather than move further up the hills. In addition, they were involving their farmers in reforestation projects. The co-operative acknowledged that "reduced deforestation, forest landscape restoration and forest preservation strategies offer essential ingredients for adaptation, mitigation and sustainable development" (Ellison et al., 2017, p. 52). However, despite this concerted effort, "the deforested land area has continued at a relatively constant pace of over 150,000 ha/year in the period 2013-2016, still far from the target set for 2021" (Vázquez-Rowe et al., 2018, p. 250). The Peruvian government states that this is due to a failure to engage with regions, lack of sector coordination and the need to coordinate activities with other stakeholders (Gobierno del Peru, 2015) – something highlighted as a significant factor in

weakening climate change adaptation interventions.

As part of the upgrading discussed in Chapter 5, the three case study co-operatives also helped their members' transition to organic farming. The Food and Agriculture Organisation (FAO) argues that the farm management practices required in organic farming can play an important role in climate change adaptation and mitigation (Borron, 2006).

Changes to the climate analysed in section 6.2, such as increased rainfall and higher temperatures, can significantly affect soils (Borron, 2006), and while conventional farming relies on external inputs such as chemical fertilisers, organic farming, through "abstaining from synthetic input use[…] cannot but adapt to local environmental conditions" (Scialabba and Müller-Lindenlauf, 2010, p. 160). The use of organic matter applied at specific cycles in the growing and harvesting seasons "capture[s] and store[s] more water than soils under conventional cultivation" (Müller, 2009, p. 3), thus supporting the retention of nutrients in the soil and reducing the incidences of landslides and drought.

Organic farming also promotes intercropping, which was discussed under the diversification interventions implemented by the three co-operatives. This tends to promote productivity and acts as a barrier to pests and diseases, as many farmers "design their planting to attract pollinators and pest predators" (Borron, 2006, p. 15)

6.5 Conclusion

This chapter has highlighted the lived experiences of farmers in San Ignacio, who are seeing significant changes to their environments as a result of changes to seasonal rhythms, precipitation and temperatures, all of which inhibit their ability to maintain both their livelihoods and food security.

In terms of the responses to the lived experiences of farmers, I argue that as climate change evolves and transforms over time, so too does climate change adaptation. It is a dynamic process, the success of which is based on the interdependence of network actors, their relationships and their ability to act collectively (Adger et al., 2003; Adger, 2010). The chapter addressed the different roles and influences of key actors within the coffee production network with regard to climate change adaptation. In particular, it documented a relatively weak state influence, which has formed the backdrop for interventions via private voluntary standards. The interventions made through ATOs, and by the farmer field school and co-operative linked into

them, provide evidence in this regard.

Despite this picture of climate change adaptation being predominantly shaped by neoliberal solutions and civil society influence, more recently there has been a significant political shift. A National Coffee Action Plan, launched in October 2018, has meant that the role of the Peruvian state is changing. The plan aims to address social, economic and environmental challenges within the coffee sector, in order to improve the lives of smallholder coffee farmers, mitigate and adapt to the effects of climate change and protect the wider environment and ecosystems. The catalyst for this change was the coffee leaf rust crisis of 2013, which coincided with the timing of my fieldwork in Peru. It is to the dynamics of, and the responses to, that crisis that my thesis now turns.

Chapter 7. Adapting to the coffee leaf rust crisis

7.1 Introduction

This is the last of three empirical chapters which collectively explore the economic and environmental challenges faced by farmers, including market volatility, climate change and disease outbreaks. The three empirical chapters collectively answer the overarching research question for this thesis, namely "*in what ways does participation in alternative trading networks increase smallholder coffee farmers' ability to adapt to climate change?*"

The chapter utilises the key arguments from Chapters 5 and 6, and the contextual setting discussed in Chapter 4, in order to acknowledge the drivers of, and responses to, the coffee leaf rust crisis in 2012/13. Chapter 5 critically analysed the significance of farmers being embedded in alternative trading networks and argued that alternative trading organisations' (ATOs') territorial embeddedness in the site of production, in addition to their strategic coupling with farmers, plays a key role in helping secure livelihoods and to upgrade to high quality speciality coffee, thus ensuring higher coffee prices. Chapter 5 also discussed the nuances of private voluntary certifications in relation to social, environmental and economic upgrading, highlighting the complexities and challenges relating to the financial aspects of the certifications and arguing the importance of the non-financial benefits and the subsequent links to empowerment and increased agency to making decisions about their own livelihoods. I also draw upon Chapter 6, which critically examined both the lived experiences of farmers and interventions made by network actors in relation to climate change. Chapter 6 looked at these experiences in relation to climate change, noting their experiences related to increased precipitation, increased temperatures and unseasonal seasons, and the impact these were having on the farmers' ability to maintain their livelihoods. The chapter then turned to the influence of sets of actors within the case study alternative trading networks, exploring the ways in which they help and/or inhibit farmers' ability to adapt to these changes. The chapter argued for a shift in the GPN literature to focus on the role of the state, and it called into question the centrality of policymaking and the sectoral approach to the implementation of policies in relation to such a cross-cutting issue as climate change. It argued that the failure of the state shaped the actions of other sets of actors who stepped in to fill the void, and the central role which both co-operatives and ATOs made through upgrading processes and diversification in order to help

farmers to adapt to climate change. The arguments from Chapters 5 and 6 will be called upon in order to answer research question 3, "*In what ways does participation in alternative trading networks increase smallholder coffee farmers' ability to adapt to CLR?*"

The convergence of climate change, coffee cultivation and disease outbreaks such as CLR is having a devastating effect on coffee-growing communities, resulting in farmers' already perilous livelihoods being threatened and food insecurity being exacerbated. Despite there being some literature on this topic (see, for example, Coakley et al., 1999; Garrett et al., 2006; Avelino et al., 2015; Baker, 2014), there is a call for more empirical data from which to develop appropriate adaptation strategies (Ghini et al., 2011).

Published research on CLR (Avelino et al., 2015; Baker, 2014; Toniutti et al., 2017; Ehrenbergerová et al., 2018) and economic and environmental 'upgrading' (Poulsen et al., 2018; Jeppesen and Hansen, 2004; Fromm and Dubon, 2006; Barrientos et al., 2011) provides the grounding to examine the strength and shortcomings of interventions and the role that power and embeddedness play in reducing, exacerbating or maintaining farmers' vulnerability with regards to CLR.

The first section of this chapter (section 7.2) presents the contextual information regarding the CLR crisis – what it is, the causes of outbreaks and the scale of its impact globally, along with the lived experiences of farmers, arguing that the effects of CLR are negatively influencing the livelihoods of the of farmers. Section 7.3 acknowledges the drivers of CLR, drawing on elements from Chapter 6 regarding the impact of climate change on coffee growing, in addition to analysing critically the socio-economic drivers of the disease. The section draws out the nuances of these drivers in relation to a disease that has threatened the livelihoods of farmers globally, which provides a basis from which to analyse the responses to the CLR crisis. Literature on upgrading is used to structure the analysis of the interventions in section 7.4, as the key fields of environmental risk management effectively align with three of the core dimensions involved in economic upgrading – product- based, production-based and inter-sectoral diversification. Interventions employed to address the problems presented by CLR are therefore grouped in my evaluation into these three broad categories: the first concerns interventions regarding the coffee plant analysed in section 7.4.1, the second involves interventions in the production process and the inputs discussed in section 7.4.2, and the third broadens out to cover responses involving economic diversification and the improvement of livelihoods by farmers moving into other sectors, as analysed in section 7.4.3. The chapter concludes in Section 7.5 by highlighting the complexities of the CLR crisis and responses to it, drawing particular attention to the significant

impact of coffee prices and concluding that supply network actors such as ATO co-operatives and the state play a significant role in responses to CLR. However, in the context of low coffee prices, this ability to influence farmers' ability to manage CLR is limited. This is then followed with section 7.6 which details steps taken by the government to create a more unified coffee sector which was motivated to some extent by the CLR crisis 2012/13.

7.2 Coffee Leaf Rust

CLR is caused by the parasitic fungus *hemileia vastarix*, which attacks the living leaves of coffee plants, the most vulnerable of which is *C. Arabica*, the most commonly grown coffee plant in Peru and which is in high demand in the speciality coffee market. The first signs of the disease are observed on the upper surfaces of leaves in the form of spots which gradually increase in diameter. These yellow spots grow and turn an orange, rusty colour, as illustrated in Figure 7.1 below. The infection spreads upwards to leaves higher up in the coffee tree, and all infected leaves drop prematurely, resulting in heavy crop losses.

Figure 7.1 Photo of a coffee plant diseased by coffee leaf rust. Source: Apessi Co-operative (2013)

The history of the disease is important background to this research, provides an insight into the 2012/13 crisis and explains the slow response from the Peruvian government in terms of

appropriate and timely interventions. The disease originated in Sri Lanka (at the time known as 'Ceylon') in 1869. As commercial coffee plantations had eliminated shade trees and windbreaks, there were very few physical obstacles to the diffusion of coffee diseases (McCook, 2006, p. 182), and so CLR spread rapidly due to prevailing winds into neighbouring countries and was so intense in Sri Lanka that it resulted in the region's total abandonment of the crop (McCook, 2006). Once the disease reached Brazil, there was significant concern regarding its transmission north throughout South America, including Peru and Ecuador. Different responses were adopted during this time, from bringing in coffee experts, to quarantining zones affected by the disease, to replacing Arabica coffee (which brought in higher prices from global coffee markets) to robusta, which at the time appeared to be more resistant to CLR. Nowadays, CLR is experienced in almost every coffee-growing region throughout the world (Arneson, 2000).

7.3 Drivers of the Disease

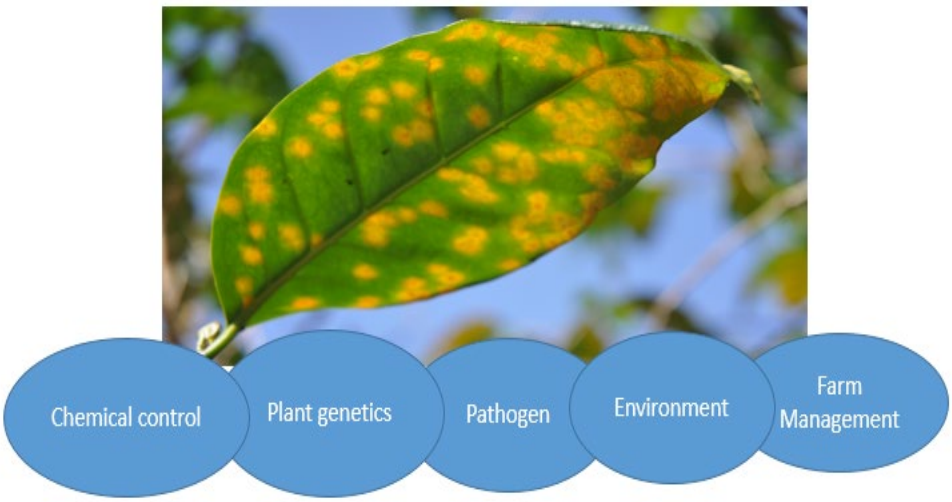

Figure 7.2 Influences on CLR. Source: author's own

There is much debate surrounding the cause of the 2012/13 CLR crisis in Central and Latin America. There are arguments to support the fact that CLR outbreaks are not just natural events caused by climate change, occurring outside of society and economics, but rather one which is shaped, and in some ways created, by social, environmental and economic factors. Avelino (2015), for example, argues that "the main drivers of these epidemics are economic and meteorological" (p. 303), whilst McCook and Vandermeer (2015) suggest that the latest outbreak "was caused by historically specific conjuncture of natural and social processes that made Latin America's coffee landscapes vulnerable to such an event" (p. 1165). To develop a natural and meteorological understanding of CLR, I will first examine the environmental factors associated with its spread, before explaining the social and economic factors that contribute to

its impacts in my case study in section 7.3.2. Throughout, I will consider the impact of CLR from the point of view of farmers and their lived experience.

7.3.1 Climate change and coffee leaf rust

The development and intensity of CLR has been strongly linked to weather and climate change, both of which influence every element of the host's and pathogen's life cycles, with the 2012/13 epidemic said to have been "enhanced by weather consistent with climate change" (Avelino et al., 2015, p. 303). Whether or not plant diseases thrive depends on five interacting elements, namely plant genetics (resistance to disease), farm management (shade, use of fertilisers), chemical control (fungicides), the environment (including climate) and, lastly, the pathogen itself. A change to any one element, or a combination thereof, influences the incidences and severity of the disease. Climate change represents a change to one of those elements, interacting with the other four elements to create conditions in which CLR can thrive: "Meteorological anomalies caused by the ongoing climate change are considered to be one of the main factors contributing to the emergence of the rust epidemic in 2012–2013" (Toniutti et al., 2017, p. 2). This section will build on the discussions in Chapter 6, which cited climate change as having a significant and predominantly negative impact on coffee farmers' lives, examining the role that it plays with regards to the development (strength and speed) of the CLR epidemic. This, together with the socio-economic drivers, will provide in section 7.4 a grounding from which to examine interventions which have taken place in an attempt to manage CLR.

Outbreaks of CLR usually occur following occurrences of increased precipitation (Avelino et al., 1991). The incidence of disease in Colombia, for example, "seems to have been triggered by unusually high rainfalls, while the outbreaks in Central America may have been the result of irregular rainfall patterns" (McCook and Vandermeer, 2015, p. 1165). Farmers alluded to experiencing both increased rainfall and unseasonal rainfall in section 6.2.2, and some even connected this to the outbreak of CLR in San Ignacio:

> "Some [other farmers] say that the rust [CLR] was brought by the heavy rains we experienced earlier in the year. Yes, it is the rains that have caused this crisis," Alejandro, Apessi Co-operative, San Ignacio (2014).

These empirical data from my fieldwork strengthen McCook and Vandermeer's argument by acknowledging the correlation between rainfall and CLR, and they illustrate that there is not purely the statistical relationship stressed by McCook and Vandermeer (2015) and Avelino (2015); through my qualitative data creation I posit that there is also an experiential relationship

highlighting the importance of researching climate change and using meteorological data as a tool to predict future outbreaks.

Changes in temperatures were also noted in Chapter 6 as being experienced by farmers in San Ignacio, although no link was made between changing temperatures and CLR outbreaks:

> "The climate is changing here in San Ignacio. The sun is at times so hot that it burns you and your plants, and yet it is also colder than before. We have this year [referring to the agricultural year] seen frost. That is something new – we have never seen this in San Ignacio before," Aiko, Aprocassi Co-operative, San Ignacio (2014).

It is known that temperature greatly affects the growth of CLR, as below 15°C the spores will not germinate due to it being excessively cold, thus slowing down the rate of growth. Similarly, if the temperature is too hot, at above 35°C, then the growth of the spores will be inhibited. The optimum temperature for the growth of CLR is believed to be between 21 and 25°C (Nutman et al., 1960; Kushalappa et al., 1983).

One of the more significant observations that arose when analysing my empirical data was the difference in incidences of outbreaks of the disease at different altitudes. Previously, CLR had not been found at altitudes above 800 metres, meaning that its effects were not evenly distributed, with those at lower altitudes being more vulnerable:

> "If your farm was over 800 metres, you were safe from such things as CLR, but now we are being forced to move further and further up the mountain. Now you are only safe if your farm is above 1,200 metres or even higher," Pablo, Unicafec, San Ignacio (2014).

This particular outbreak of CLR is unusual and outside of the normal experience of farmers, resulting in those working at specific altitudes becoming vulnerable to CLR in ways which they were not previously. Farms at higher altitudes noted a significantly lower incidence of the disease or no effects at all, as the quote below illustrates:

> "The lowlands near the river were affected by CLR. It damaged the plants and the farmers there were sad. I live in the higher zone, and coffee plants here were affected but not as much. What has been difficult for us here is the low price of coffee. We are trying to survive, but it is hard when the payment for our coffee does not cover the cost of production. We hope that the price this year is going to be good," Maria, Apessi Co-operative, San Ignacio (2014).

Farmers believed that the changes to temperatures experienced by farmers in San Ignacio, as analysed in section 6.2.3 could have contributed to the frequencies of CLR being experienced at higher altitudes than had previously been recorded (Avelino et al., 2015).

At the same time, those farmers who had farm land located at lower altitudes reported experiencing more severe effects of the disease. Empirical evidence in this regard is reflected in the following quotes:

> "In 2012, we were affected by the yellow CLR, that's what we call it, and we were affected a lot. We could say that 80% was affected, and we had low production of coffee," Fernando, Unicafec Co-operative, San Ignacio (2014).

> "Last year, I didn't send a single grain of coffee to the co-operative, I didn't give anything because of the CLR," Juan, Apessi Co-operative, San Ignacio (2014).

These quotes illustrate a pattern in farmers' experiences and observations regarding the relationships between temperature, altitude and CLR outbreaks (Avelino et al., 2006; Avelino et al., 1991), whereby farmers who grow coffee at higher altitudes experience cooler temperatures and therefore their incidence of CLR is lower, compared to farmers who farm at lower altitudes, where temperatures are higher. However, as temperatures rise, so does the prevalence of CLR outbreaks.

At the time of my fieldwork (July 2013-April 2014), incidents of CLR were being experienced at altitudes which had previously been safe, demonstrating that climate change is a significant factor and a driving force behind the CLR outbreaks in San Ignacio. In areas at lower altitudes (400–800 metres) and higher temperatures, CLR had been a challenge previously. However, now farmers who were in the middle range of where coffee is grown (800 metres-1,200 metres) were starting to see both an increase in temperature (refer to Section 6.2.3) and rainfall (refer to Section 6.2.2), and consequently these areas are now also susceptible to CLR.

7.3.2 Socio-political and economic drivers of the disease

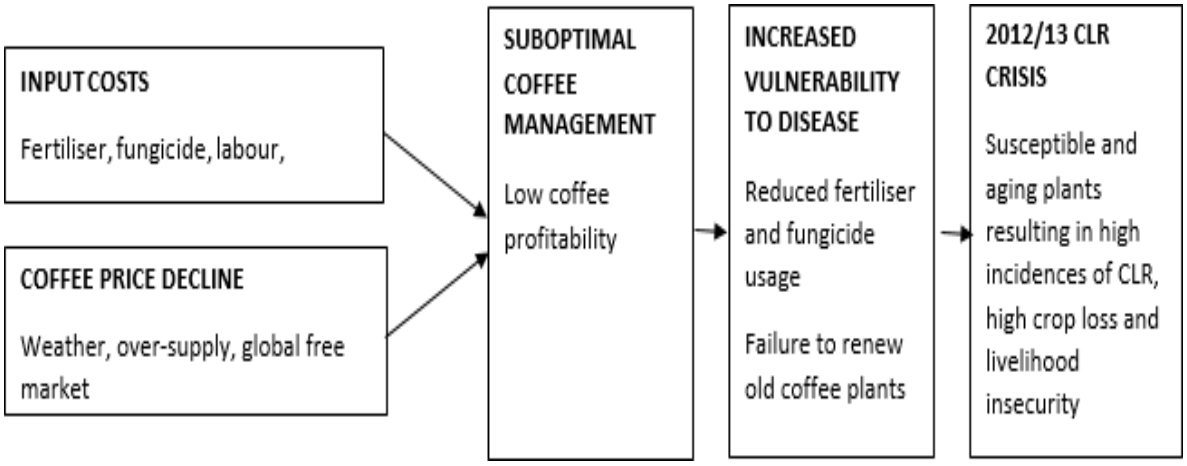

Figure 7.3 Consequences of coffee price declines on susceptibility to disease. Source: author's own.

Having outlined in section 7.3.1 the ecological factors driving CLR, the chapter now turns to the social, political and economic factors that contribute to the spread and effects of the disease in my case study area. Drawing on the literature in Chapter 2, and the contextual information discussed in Chapter 4, I argue that the factors contributing to the CLR crisis are complex and often involve a multitude of reasons, with economics playing a crucial role.

Coffee farmers, as discussed in Chapter 2, are highly vulnerable to export price fluctuations, a factor which has been completely beyond their control since the collapse of the ICA (discussed in Chapter 4), the return to the free market and the loss of the quota system in 1989. In the time period since I collected my data in Peru (2013/14), Avelino et al. (2015) have presented data explaining an area I had highlighted during my fieldwork. The data I present in this chapter support Avelino's claim that outbreaks of CLR in Colombia (1987-88), Costa Rica (1989-90), Nicaragua (1995-96) and El Salvador (2002-03) were all "concurrent with coffee price decreases" (p. 305), with the correlations being particularly pertinent in terms of the relationships between the Costa Rican outbreak and the collapse of the ICA in 1989 and the El Salvador outbreak of CLR, which coincided with the height of oversupply and resulted in some of the lowest coffee prices recorded in the early 2000s.

Coffee prices between 2011-13 fell by half (refer to Figure 5.4). This coincided with a rise in the cost of inputs such as fertilisers and fungicides (McCook and Vandermeer, 2015, p. 1164). These two factors led to the decline in coffee prices, together with an increase in input costs such as fertilisers and fungicides, and it eventually led to suboptimal coffee management as illustrated in Figure 7.3 (Taugourdeau et al., 2014), as farmers could no longer afford fertiliser and fungicide or renew their older coffee plants which ultimately led to vulnerability to diseases such as CLR. These sequential effects that come with a decline in coffee price were highlighted during interviews with the farmers in San Ignacio:

> "If we don't have enough money to eat, where do we get money from to invest in our farms? If I don't invest in my farm, where does next year's money come from? We are trapped. I know that these trees [said whilst pointing to older coffee trees on his plot of land] are not good. They were old, they didn't produce good quality coffee and needed renewing. But now after the crisis [CLR] they are dead, they will not produce anything," Juan Pablo, Apessi Co-operative, San Ignacio (2014).

Farmers were, by their own admission, stuck in a cycle of poverty, trapped by the system (the free market), and at the time they could see no way out. Even if they had the money to renew the coffee plants lost to CLR, they would have to wait 3-5 years on those plants producing any coffee:

> "The situation we are in is desperate. I can see no way out and think we will have to walk away from coffee farming, even though we don't know anything else. But what choice do we have? The co-operative said that we could borrow money to renew our dead plants, but how would we pay this money back? Also, the returns would take years, as our new plants would need to mature to provide us with coffee," Jose, Apessi Co-operative, San Ignacio, 2013.

Acknowledgement of the links between CLR outbreaks and low coffee prices highlights that a deeper analysis is required to understand the full story. Historically, the outbreaks occurred on a country-by-country basis (Colombia 1987-88, Costa Rica 1989-90, Nicaragua 1995-96 and El Salvador 2002-03), and even in the most recent outbreak that affected large parts of Central America and Peru and Colombia, there were significant differences in the incidence of the disease and as such the scale of the crisis on a national basis. Nonetheless, low coffee prices are universal and are experienced by all coffee farmers, highlighting the need to investigate the context nationally and locally.

Peru did not have the benefit of coordinated, pre-emptive help and actions such as experienced in Colombia, and neither did the farmers receive a timely or adequate response from their government (refer to Figure 7.4's field diary extract below). By contrast, both the Brazilian and Colombian governments poured prompt and substantial investment into their countries' coffee industries in response to CLR. Both nations supported their farmers with CLR mitigation through the application of fertilisers and fungicides and replanting new rust-resistant trees in a timely manner (i.e. whilst the coffee plants still had a chance at survival). This timely intervention resulted in a relatively short recovery period: "Colombia seems now to have recovered from its own rust problem, owing to a massive programme of replanting with resistant varieties which were available thanks to decades of sustained investment in research by their Coffee Federation" (Baker, 2014). Other affected nations also responded to the outbreak. Costa Rica, for example, declared a state of emergency in January 2013, five months prior to Peru, which enabled them to access funds and distribute 3.7 million USD worth of fungicides to smallholder coffee farmers. Honduras mobilised funds from its national coffee institute (*Instituto Hondureno del Café*), in order to provide credit to farmers, enabling them to access finance to aid their recovery through purchasing both fungicides and new coffee plants (Avelino et al., 2015).

The CLR crisis affected over half of the land cultivating coffee (290,436 ha). In Peru, around a quarter of the overall coffee-growing land, at 90,00 hectares, was severely affected (Junta Nacional del Café, 2014), threatening the livelihoods and food security of the 223,882 families depending on the crop for their survival. Despite this, Peru was much slower to respond to the

crisis, as illustrated in Figure 7.3.

> "I have been in Peru for one month now, and although I came to research climate change, I can see from following the national media that there are more pressing issues that the coffee farmers are experiencing. There has been a large-scale, four- day protest by coffee farmers in Selva Central in Central Peru (21/08/13). The protesters are all smallholder coffee farmers, who were adversely affected by coffee leaf rust outbreak and which appears to be spreading across the region. Farmers have lost much of their crops, and the crisis is putting their livelihoods and food security at risk. What appears to have increased the vulnerability of the farmers who were protesting (who were not part of this study) is the fact that they are not part of a co-operative and, as such, do not have the additional support (financial and social) that co-operatives provide. News of the protests reports that the farmers blocked parts of the Carretera Central highway, which connects the commercial centre of the Andes to the coast and Lima, demanding help from the government to tackle the problem, a problem so big that it resulted in the government declaring a state of emergency in the coffee sector in May 2013, and yet very little – if anything – appears to have changed for the farmers as a result of this."

Figure 7.4 Field Dairy Extract, August 2013

I later found out during interviews with the Ministry of Environment and the British Embassy that the protesters were in debt, as many had borrowed money on the back of a future year's production, which in 2012/13 was extremely low. In addition, they needed credit to enable them to renew their plantations, replacing the dead coffee plants with strains more resistant to CLR, such as catimora. Following four days of protests and numerous talks between the agricultural minister, Milton von Hesse and Junta Nacional Del Café, the government issued a statement, committing to provide 100 million soles (£22 million) to their fertilisation programme. The statement in the *Peruvian Times* newspaper stated that the Ministry of Agriculture promised to work with commercial banks to soften the terms and conditions of existing smallholder coffee farmer debt.

There was some criticism of populist policies in response to this move; however, Von Hesse, in defence, stated that coffee created $1 billion of export income for the country and allowed Peru to win in the battle against drug trafficking.

The money provided by the government in response to the CLR crisis was claimed to have been dispersed through regional government, in order to help coffee farmers with fertilisers and fungicides. However, all of the farmers interviewed stated that this help had not reached them:

> "Yes, the government pledged to help us in 2013, but as yet we are yet to receive this help," Pedro, Apessi Co-operative, San Ignacio (2014).

The state is "deemed to [have played] a basic role in shaping the wider policy context within which GVCs/GPNs function" (Alford and Phillips, 2018, p. 99) in much of the GVC and GPN literature, which has adopted a firm-centric approach in an era of largely deregulated markets and neo-liberalisation. There has, however, been a recent shift by some GPN scholars to acknowledging the state as a crucial actor in the network (Alford and Phillips, 2018; Horner, 2017). My research aligns with the work of both Horner (2017) and Alford and Phillips (2018), as I argue that the state's role in the CLR crisis was crucial in managing the scale and severity of the disease. If we compare the state response in Peru, for example, to that of Colombia, this notion is relatively self-evident.

In Colombia, the Colombian Growers Federation *(La Federacion Nacional d Cafeteros de Colombia*), a national federation of coffee growers, responded quickly and effectively during their outbreak in 2009, lowering incidence and severity by conducting a country-wide renovation programme developing CLR-resistant varieties of coffee plants and supporting farmers to implement farm management techniques to manage the disease, all of which resulted in disease frequency dropping from 60% in 2009 to 3% in 2012/13.

Conversely, Peru was extremely slow to respond to the crisis, so much so that farmers had yet to receive help 12 months after it was pledged by the government. In addition, the type of support in terms of providing fertiliser well after the damage had been caused was highly inadequate. Both the delay in responding, and the inadequacy thereof, led to other network actors filling the void in order to help farmers in their time of crisis. These interventions highlight the value of farmers being embedded in alternative trading networks.

7.4 Interventions

Sections 7.2 and 7.3 explored the scale of the CLR crisis and the drivers of the disease, demonstrating that the outbreak was a result of multiple environmental, social and economic stressors, including climate change and market volatility, and was heavily influenced by state responses. The severity of the 2012/13 CLR crisis and the failure of the state to respond in a timely manner led to debate and subsequent actions by the actors presented in Chapter 5. These included international organisations, research institutes and industry professions, all working towards securing high-quality coffee production. The interventions by these networks actors will be critically analysed below.

7.4.1 Plant-based interventions

> "We can't control the evolution of diseases or environmental factors like weather, and therefore efforts must focus on plant genetics (e.g. varieties), farm agronomy and chemical control" (Global Coffee Report, 2018, p. 1).

There has been and continues to be great emphasis placed on interventions that can be made at the plant level, with a particular surge in "coffee improvement programmes to select for resistance to these diseases, as the main part of an integrated global production approach" (Silva et al., 2006, p. 120). The coffee production process begins with the coffee seed itself, and as such it is where a great deal of the research and interventions have been taking place with regards to CLR, with the global research institution World Coffee Research stating that the "plant is the most important technology in the coffee supply chain" (Global Coffee Report, 2018, p. 1).

The Colombian Growers Federation *(La Federacion Nacional d Cafeteros de Colombia*), established in 1927, has led the way in terms of coffee breeding programmes through one of its subsidiary institutions, the National Coffee Research Centre (Cenicafe). It conducts research into CLR-resistant varieties of coffee plants, in addition to developing strains of high-quality speciality coffee. Such breeding programmes are thought to be the best long-term intervention in the management of CLR (McCook and Vandermeer, 2015; Silva et al., 2018; Avelino et al., 2015; Ehrenbergerová et al., 2018) and have resulted in hybrid varieties of catimor, which is a breed believed to be more resistant to CLR than other varieties typically planted (Kushalappa and Eskes, 1989). This work has resulted in 60% the country's crops being replaced with newer, hardier varieties (Alvarado and Moreno, 2005; Avelino et al., 2015). Such historical investment significantly reduced the Colombian farmers' vulnerability and susceptibility to the 2012/13 outbreak of CLR, so much so that the incidence of the disease in the country dropped to only 3% in 2013 compared to the 40% outbreak in 2009 (Avelino et al., 2015).

Following the CLR crisis in 2013, Apessi, Aprocassi and Unicafec supported some of their farmers (those who had the means to pay back the loans) through loans to renovate their farms with CLR- resistant breeds of coffee plants. In the case of the two financially stronger co-operatives (Aprocassi and Unicafec), the funds were provided from both their standard credit facilities and in part bythe financial organisations detailed in Chapter 5, such as Oikocredit and Root Capital. However, renovating with new breeds is not a quick fix, due to the lag time between planting and harvesting being between three and five years. Other constraints include a limited investment from the government and low coffee prices, resulting in low profitability.

Nationally, 95% of coffee farms in Peru do not have such resilient varieties planted, they therefore and remain vulnerable to CLR (JNC, 2014) as a result of lack of finance or access to new breeds:

> "We have heard that in Colombia they are using a variety of coffee which is resistant to the rust. We want to renovate our farms with this variety; however, we do not have the funds to do so at the moment. We need the help of our government," Diego, Aprocassi co- operative, San Ignacio (2014).

Many farmers had received information from their co-operatives about Colombia and their large- scale renovation programme to replace plants, and over 80% of this cohort stated that they too wanted to do this with help from their co-operatives. At the time my research was conducted, it was estimated that only 5% of coffee plants nationally had been replaced with resistant varieties, whilst the estimated number for the case study farmers embedded in alternative trading networks and members of co-operatives was estimated by the co-operatives (Apessi, Aprocassi and Unicafec) at 10% in 2012/13, with a target of 50% by 2014/15.

An area to which the government committed support to farmers was fertilisation, following the coffee protests in August 2013 in response to the CLR crisis. Coffee plants require particular nutrients in order to produce a high quality and quantity of coffee. Such nutrients are also important in increasing the plants' barriers to infection, and so adequate levels of calcium, magnesium and potassium are vital in the defence against CLR (Sustainable Harvest, 2016a):

> "If coffee plants are not well nourished, they will have a lower resistance to the disease. That means that the number of farms which have CLR will be higher and the strength of the disease much stronger. If this happens, the recovery will be much more difficult," Arnaldo, farmer field school manager, Sustainable Harvest, San Ignacio (2014).

The Peruvian government's response to the national CLR crisis was to implement a programme of fertilisation. However, despite fertilisers and fungicides being acknowledged as appropriate responses to CLR, as illustrated in Figure 7.3, the timing of this intervention is crucial, and in this instance it came too late:

> "After protesting and much campaigning, the government said that they would help us, but their help is no good. They have committed to a programme of fertilisation, but you cannot fertilise a dead plant," Jose, Apessi Co-operative, San Ignacio (2013).

Sustainable Harvest provided a three-year training programme in San Ignacio, which aimed to help farmers upgrade, adapt to climate change and respond to the CLR crisis. A selection of farmers from Apessi, Aprocassi and Unicafec participated in practical training in fertilisation prior to the crisis occurring, learning through lectures, demonstration plots and practical lessons

how to both make and apply organic fertiliser. The application of organic fertiliser at the correct time contributed to strengthening the coffee plants' resistance to the disease, and this had the result of either staving off the disease entirely or reducing its severity. This highlights the benefits of the strategic coupling between Sustainable Harvest and the three case study co-operatives in terms of farmers who were part of the alternative trading network and who actively participated in the training programme being at a distinct advantage of reducing their vulnerability to CLR. Sustainable Harvest, through their territorial and network embeddedness, were able to respond quickly and with the benefit of global research on the crisis, both supporting the farmers and securing their supply of speciality coffee:

Figure 7.5 Arnaldo, manager of the farmer field school, training farmers how to make their own organic fertiliser. Source: author's own (2014).

However, only 30 farmers from each of the three co-operatives were chosen to attend the training sessions, and they in turn were expected to cascade the learning to other coffee farmers in their respective communities. This meant that the benefits of being embedded in an alternative trading network, and one which provides a farmer field school, was not distributed evenly. Nonetheless, those farmers who did attend stated that they were implementing much of what they had learnt and felt more empowered as a result:

> "Our coffee plants are like us humans, they get sick. But that does not mean that theyhave to die. If we look after them, provide the right conditions for them and give them the right medicine (fertiliser), we can take care of the plant and bring it back to health, and the plant will take care of us and give us life," Fernando, Apessi Co-operative, San Ignacio (2014).

They were more positive about the future but were yet to see the benefits in terms of reducing their vulnerability to CLR, while those who had not attended the training were much more pessimistic about their futures:

> "I pray that my children do not grow up to become coffee farmers, as it is not a good way to make a living. We are constantly worrying about the quality of our coffee, diseases like CLR and how much we will receive for our coffee. At the moment, we do not even cover the cost of production," Marcos, Apessi Co-operative, San Ignacio (2014).

Attending the training supported farmers to take more control of their farms and to acquire both the knowledge and the tools to adapt to climate change and reduce their vulnerability to CLR.

Traditionally, the application of agrochemical fungicides on specific dates within the farming calendar has been cited as an effective way to control CLR (Avelino et al., 2006; Luaces et al., 2010); however, such fungicides pollute the environment and are known to reduce the quality of coffee, and they are therefore prohibited in organic farming:

> "The people who are not organic, they can use chemicals, which means the rust [CLR]has not been so bad for them. But for those of us who are prohibited from using such chemicals, we are suffering very badly," Francisco, Apessi Co-operative, San Ignacio (2014).

This leaves organic coffee farmers more vulnerable to diseases such as CLR, and those who are members of the three case study co-operatives have to rely on a range of other farm management techniques, including weeding, reacting to extreme heat by cultivating shade-grown coffee and regular and timely applications of fertilisers, to build up their defences to diseases such as CLR.

7.4.2 Inputs and production processes

'Process upgrading' refers to the transformation of "inputs into outputs more effectively by reorganising the production system or introduction superior technology" (Humphrey and Schmitz, 2002, p. 1020). In order to achieve this objective, farmers have received help from ATOs, Sustainable Harvest's farmer field school and co-operatives to upgrade their farm management techniques and build barriers against CLR in response to the crisis. These include plant density, plant placement, nutrition, shade, fertilisation and weed control, all of which are believed to play a role in the response to CLR and other diseases (López-Bravo et al., 2012; Bigirimana et al., 2012).

Historically, it was believed that removing all shade from coffee farms would reduce the incidence of CLR, as it would dry out the plants, but there has since been extensive research into the role of shade-grown coffee in responding to the CLR crisis, with some believing that "proper shade management creates a micro-climate that fights diseases that can affect the coffee crop" (Sustainable Harvest, 2016b, p. 19). Farmers who attended the training stated:

> "Previously, we pulled out all of our other plants and trees in order to grow more coffee, but we have learnt through this training [referring to the farmer field school] the importance of shade on our farms and how to add other crops to diversify our incomes," Fernando, Apessi Co-operative, San Ignacio (2014).

> "The addition of shade on your coffee farms will help to regulate the plants' exposure to the sun. It will also affect the temperature and humidity on your farms. These are all aspects we need to consider as farmers when managing our land," Arnaldo, farmer field school manager, Sustainable Harvest (2014).

In terms of planting patterns, there is evidence to suggest that CLR outbreaks are more severe when the coffee yield is higher (Avelino et al., 2004; Avelino et al., 2006; Ehrenbergerová et al., 2018). This can be a result of plant density (number of coffee trees per hectare of land) or the use of high- density-producing coffee plants. A high number of coffee plants alters the microclimate of a piece of land, creating a humid environment with raised temperatures, ideal conditions for CLR to flourish (Kushalappa and Eskes, 1989). Farmer field schools and the Ministry of Agriculture have provided guidance with regards to plant density and planting patterns, which has supported farmers by reducing their vulnerability to CLR:

> "They [referring to the farmer field school and the Ministry of Agriculture] tell us exactly how to farm now. We must plant our coffee plants in a certain order and in a certain way and at a certain time. Since climate change and coffee leaf rust came along, we can no longer farm alone; we need the engineers to tell us how to farm," Laura, Aprocassi Co- operative, San Ignacio (2014)

Farmers who attended the farmer field school had a good understanding of the issues surrounding plant density. They were encouraged to draw a map of their current farms and then an illustration of how it could look in five years' time, by lowering plant density and using inter-cropping techniques. However, crucially, what was not discussed during the training was the economic feasibility of this initiative. Lower plant densities often lead to lower yields and lower incomes associated with coffee farming.

Figure 7.6 A farmer's diagram of his farm of the future, illustrating the knowledge learnt regarding spacing and shade from the farmer field school. Source: author's own, San Ignacio (2014).

7.4.3 Diversification and livelihoods

Moving on to the next set of interventions, strategies of diversification have been utilised by farmers and their co-operatives and have been included in training delivered by the farmer field school. They are acknowledged as a form of economic upgrading and include i) on-farm activities, such as growing fruits and vegetables to sell at local markets; ii) bee-keeping for the production of honey; iii) producing stevia; iv) keeping small animals in addition to their crops; and v) crafts and the production of household items, all of which were highlighted as ways of generating an income which was not dependent on coffee and which in turn increased farmers' livelihood resilience.

Figure 7.7 Handicraft items some farmers sell locally. Source: author's own, San Ignacio (2014)

Figure 7.8 Growing and selling fruits. Source: author's own, San Ignacio (2014).

Furthermore, participants emphasised the significance of off-farm income in the form of second jobs that either they or a family member had taken on to supplement their income from coffee. These ranged from road building to taxi driving (moto taxis). However, many jobs that were based in the locality were also vulnerable to the coffee market, due to the fact that 95% of the community relied upon coffee for their primary income:

> "I am a coffee farmer, but I also have a mototaxi and transport people and produce to local markets and into the town centre; however, when the coffee price is low, people do not have the money to afford my mototaxi, so it means both of my options to make money are negatively impacted by the price we receive for our coffee here in San Ignacio," Pablo, Unicafec Co-operative, San Ignacio (2014).

If coffee prices or production were low, the local population did not have the spare income to spend on taxis, home improvements or additional food items. Instead, they stayed on their farms and tried to survive on what they grew in their food gardens. As a consequence, many farmers have a family member or members who have been forced to migrate to other areas or even another country, such as Ecuador, to find work and send money home.

In response to the risks that went hand in hand with higher plant density, co-operatives were also providing training regarding the importance of multiple-cropping, i.e. growing two or more crops on the same piece of land. In San Ignacio this included cocoa, bananas (Siles et al., 2011), avocado and papaya, the benefits of which were two-fold. First, the farmers reduced their coffee yield and increased shading, thus making them less vulnerable to CLR, and second, it provided them with a diversified crop base in terms of sales and increased food security, with many farmers stating:

> "If you look here [pointing to fruit trees], we have planted other trees. These do two things for us – they provide shade for our coffee plants and they also provide us with additional food," Alfred, Unicafec Co-operative, San Ignacio (2014)

As noted above, in terms of reducing coffee plant density, coffee farmers cited a loss of income alongside multi-cropping.

This section on specific interventions in managing CLR risks has highlighted those focused on the coffee plant itself, as well as interventions in the production process and agricultural inputs and strategies focused on inter-sectoral diversification. Throughout the discussion, it is apparent that the farmer field school, which is only available to co-operative members, plays a central role in empowering farmers to respond to CLR. However, what is also evident are the limitations of such interventions, the number of farmers able to attend the training due to capacity and funding constraints and the extreme price volatility of the free market, which makes funding any interventions problematic. Farmers may have all of the knowledge needed to protect their farms against CLR, and therefore their livelihoods, but not the financial or physical means to implement such knowledge.

7.5 Conclusion

The severity of the 2012/13 crisis brought to the forefront of the coffee production network the need to gain a deeper understanding of CLR, which is an additional risk that smallholder farmers, governments, experts, NGOs and farmer field schools need to learn to manage.

The chapter began by introducing CLR and acknowledging that the drivers thereof are more than merely environmental but also a result of social and economic factors. This led me on to addressing research question 3: "*In what ways does participation in alternative trading networks increase smallholder coffee farmers' ability to adapt to CLR?*"

The government was slow to respond to the CLR 2012/13 crisis, which reflects its weakened position in the context of liberalisation of the coffee sector, the return to the free market and the collapse of the ICA. This meant that other GPN actors stepped in to fill the place of the government. Significant network actors included ATOs and in particular Sustainable Harvest, who through their strategic coupling with San Ignacio and the three case study co-operatives in particular were aware straightaway of the situation with regards to the crisis and as such were able to respond in a swift and appropriate manner. Through their farmer field school, Sustainable Harvest provided a small number of farmers (lead farmers) with inputs and production techniques, in this case farm management skills, to respond to the disease, which placed those who were able to attend the training case study at a comparative advantage over their peers who were not part of this network. These farmers had up-to-date information regarding CLR and the tools with which to both respond to the current crisis and lower their vulnerability to any future outbreaks. However, at the time of my fieldwork (July 2013 to April 2014), it was unknown whether Sustainable Harvest's plan for the lead farmers who attended the training to cascade their learning to their communities would have any impact on reducing the vulnerability of other farmers within those communities.

What is often underplayed in CLR crisis is the role of economics and geopolitics (Avelino et al., 2015). Coffee is highly susceptible to price risk volatility, resulting in significant economic difficulties for farmers, who are often already living very close to or on the poverty line. This economic vulnerability has a knock-on effect on their ability to make well-informed crop management decisions, as often they do not have the time or financial means to make any that are in the best interests of the crop. This ultimately leads to increased vulnerability to diseases such as CLR – and therefore insecure livelihoods and food security.

Coffee production network actors such as ATOs (Sustainable Harvest), co-operatives (Apessi, Aprocassi and Unicafec) and the government (Ministry of Agriculture), to some degree, are striving to develop innovative and creative interventions in order to control CLR. Such interventions are required to be both ecologically and economically sound, in order to provide viable and sustainable solutions for smallholder coffee farmers seeking to maintain their livelihoods and food security. Such solutions need to be developed within a challenging environment, in which diseases are evolving and climate change is a growing concern in the context of a deregulated coffee industry (McCook and Vandermeer, 2015). The 2012/2013 CLR crisis, and the subsequent responses examined within this chapter, highlighted significant shortfalls with regard to the interventions implemented at plant, process and diversification levels. Coffee farmers who were not part of co- operatives, which effectively privately regulated CLR in the government's absence, were forced to protest in order to mobilise help from the government, and even then this support was inadequate, due to the length of time it took to put in place.

7.6 Steps to a more Unified National Coffee Sector

Some significant steps have been taken since the completion of my fieldwork. The severity of the CLR crisis prompted the government, along with support from the United Nations Development Programme (UNDP), to start to address the lack of a central coffee authority or a national coffee action plan. The UNDP Green Commodities Programme highlighted that "a key challenge faced by the sector has been the lack of a national agenda to guide it towards sustainable coffee production. Managed sustainably, the coffee sector could be a powerful engine for human development in Peru, helping the country to reach its Sustainable Development Goals" (UNDP(a) 2019, p. 2).

Chapter 8. Scholarly and policy contributions: climate change, coffee production and the ways in which alternative trading organisations support adaptations

This thesis has advanced the literature on global production networks (GPNs) by responding to the limited GPN literature surrounding the natural environment and agribusiness, whilst also adapting the focal point of analysis from the traditional lead firm-centric approach to one which held the farmer at the heart of its research. The farmer-focused stance adopted herein both acknowledges the dominant role of lead firms (Coe et al., 2008), in this case alternative trading organisations (ATOs) (Sustainable Harvest and Twin) and has enabled me to view global coffee production networks from the perspective of the farmer. This thesis has contributed to the limited GPN literature in this area by critically investigating the challenges associated with climate change and the interventions employed to respond to such challenges through a GPN lens. This final chapter provides a summary of its key findings and conclusions, by revisiting the over- arching research question and the four sub-questions to illustrate how they have been addressed. In so doing, I outline the contributions made to academic scholarship and policy discussion.

8.1 The Challenges of Climate Change for Smallholder Farmers in the Context of Changing Power and Governance within the Network

It is vital to acknowledge and understand the contextual setting of smallholder coffee farmers (henceforth 'farmers') in San Ignacio, in order to gain a more in-depth insight into the multi-stressor environment they are experiencing today. As discussed in Chapter 1, coffee is a significant crop in Peru, generating US$ 750 million in export revenue (UNDP, 2018) and accounting for over a quarter of the country's total exports (Nolte, 2018). The crop plays a fundamental role in the country's rural development, as it provides a livelihood for 855,000 farmers in areas with limited options for income- generating activities and where poverty remains a key concern (Nolte, 2018).

However, shifts in the governance and power of the coffee sector have played a significant part in increasing farmers' vulnerability and reducing their livelihood security. Trade liberalisation and the retreat of the state have meant power has transitioned to the hands of buyers. In addition, geopolitical actions led to the collapse of the International Coffee Agreement (ICA) and the loss

of the quota system which had governed and regulated supply and demand, thus keeping coffee prices relatively stable. The collapse of the ICA resulted in decades of price volatility and instability for the coffee farmer, and thereby insecure livelihoods.

The vulnerability brought about by such dramatic shifts in global governance and power has been further compounded by the challenges of climate change. Peru is regarded as one of the country's most vulnerable to the effects of climate change globally (Paun et al., 2018; Eckstein et al., 2017; Vázquez-Rowe et al., 2018), and yet despite this finding, state responsibility for climate change mitigation and adaptation lacks clarity. Responsibility currently resides with the Ministry of Environment, established in 2008, but the cross-cutting nature of climate change means that it cross-links agriculture, trade and health and requires a great deal of collaboration and coordination in responding to the challenges currently occurring. This is an important context for the three empirical chapters, as the setting influences the impact of climate change and coffee leaf rust (CLR) interventions and their success rates.

8.2 Coffee Production Network Actors exerting Power and Influence within the Network

In response to the challenges summarised above, the thesis has sought to investigate critically how coffee production network actors exert power and influence within the network, as well as what the consequences of such actions are on the agency of smallholder coffee farmers wishing to make decisions about their own livelihoods.

Analytically, Chapter 5 showed that ATOs such as Twin and Sustainable Harvest supported farmers to access speciality markets, achieving a higher price for their coffee. They did this through economic, social and environmental upgrading, which allowed farmers to gain organic and Fairtrade certification. The impact of this is increased livelihood security in terms of price stability through the Fairtrade floor price and increased income through price premiums associated with both certifications and through producing speciality grade coffee. However, power over access to the speciality coffee market remains far beyond the reach of the farmers. Furthermore, upgrading is

supporting their livelihood security but does so through their compliance with private voluntary certification rules.

These findings reveal that the process of upgrading is dynamic and complex, and it is modified by the actions of other actors, such as the state and co-operatives. Peru has several public and

private actors working within the coffee sector, but due to the lack of an overarching governing institution, these actors often pursue different goals. This disjointed approach to the sector makes it difficult to coordinate economic, social and environmental support for the country's coffee growers. This weak institutional framework has resulted in organisations involved in the coffee sector lacking clarity or ownership over their responsibilities, or the financial means to effectively help the sector. This has led to a lack of both financial and non-financial services, which have "hinder[ed] efforts to improve the production, harvesting, post-harvest, handling and processing of coffee. This works to the detriment of output, productivity and quality of Peruvian Coffee" (IICA, 2016, p. 48).

As a result of the weak institutional framework, other actors have risen to fill the space. Co-operatives, for example, provide a vector through which buyers, ATOs and the state can channel support. Without this scaffolding the co-operatives provide, farmers are unable to access help via upgrading, access to markets and knowledge development. However, what is evident from the empirical material is that such benefits are not accessed equally by all members; instead, the benefits of being a member of a co- operative are determined by the degree of involvement of the farmer in related activities.

Strategic coupling was explored in order to examine the importance of lead firm territorial embeddedness and its impact on farmers. San Ignacio had the environmental conditions required to produce speciality coffee and therefore complement the needs of ATOs such as Twin and Sustainable Harvest (Coe and Yeung, 2015, p. 19). Through this strategic coupling relationship, significant amounts of resources (monetary, knowledge and materials) were mobilised to respond to the farmers' needs. In addition, networks and alliances were established which provided access to fair finance through organisations such as Shared Interest, Oikocredit and Root Capital, and strategic partnerships were formed with high street coffee shops such as Pret a Manger, resulting in increased access to markets and sales. All of these interventions had positive impacts on farmers' agency to make decisions about their own livelihoods.

8.3 Climate Change Challenges and Adaptations

In connecting the natural environment with GPN, and building on the farmer-focused stance, I was able to create and analyse data regarding of their lived experiences in San Ignacio, responding to the first part of research question 2, which explored the challenges of climate change, thus highlighting the increased uncertainty they are facing in this regard. The farmers mentioned experiencing increased rainfall, disturbed rainfall distribution, increased

temperatures and unseasonal conditions, all of which were having significant impacts on their ability to farm coffee. This resulted in their livelihoods being insecure and them requiring external help to learn new ways in which to farm, based on their new environmental conditions.

Through critically analysing interventions such as spacing, multi-cropping and diversification implemented in San Ignacio, Chapter 6 investigated how farmers adapt to such challenges in the context of power relations operating through alternative networks, i.e. the second half of research question 2.

Co-operatives were acknowledged as the key vector through which help from ATOs, farmer field schools, the state and financial organisations was channelled, and from where climate change adaptation interventions were launched. Due to Peru's lack of an overarching coffee institution and a disjointed coffee network, farmers who were not coordinated, as members of either a co-operative or an association, received little or no support at all, thereby highlighting the fundamental role co-operatives play in reducing farmers' vulnerability to climate change.

Key interventions came primarily from ATOs and their respective NGOs. Of the actors in the case study alternative networks, Sustainable Harvest were the most active in providing help. The chapter argued that strategic coupling between Sustainable Harvest and the three case study co-operatives played a fundamental role in increasing farmers' resilience to climate change. The fact that Sustainable Harvest was territorially embedded in both San Ignacio and Lima meant that they were able to respond both quickly and appropriately to these challenges, the benefits of which were two-fold. First, their presence in the region meant that they were able to conduct in-depth and long-term vulnerability assessments with regards to farmers' vulnerability to climate change, and second, as highlighted in Chapters 4 and 6, Peru has a multitude of micro-climates, making a one-size-fits all national response greatly inadequate. Sustainable Harvest were able to tailor a training programme through their farmer field school to respond to the specific needs of farmers in San Ignacio. This encompassed a range of farm management techniques, from teaching farmers to make their own organic fertilisers and practicing spacing techniques to ensure the correct distance to space their coffee plants, in order for the plant to receive sufficient nutrients and not be competing with one another for vital resources, through to the importance of shade to help regulate temperature humidity and provide diversity. In addition to support in terms of plants and processes, Sustainable Harvest also provided guidance to the three case study co-operatives on implementing many other projects, including diversification schemes, which helped them consider other forms of both on-farm and off-farm farm income generation. This helped to restore the farmers' food gardens, thus strengthening

their food security and providing a safety net for when coffee prices were low or when the quality or quantity of coffee was sub-standard and thus reduced their incomes. Due to these adaptations, they had additional income streams on which to fall back, thus securing their livelihoods.

Access to financial help is an ongoing challenge for farmers in Peru. In total, 805 of the country's farmers do not have the title deeds to the land they farm (IICA, 2016), and financial support is only available to the case study farmers as they are members of co-operatives, and in some instances Shared Interest, because the co-operatives have Fairtrade certification. Without membership of a co-operative, many farmers would have to turn to state-run banks, which were cited as failing to meet their needs. State-run banks require collateral, which, in the case of farmers, often comes in the form of land. Consequently, 80% of Peru's coffee farmers do not hold the deeds to the land they farm (IICA, 2016) and as such they cannot access funds. In addition, farmers are often seen as unreliable lending prospects, due to the volatile nature of coffee prices, and if they can indeed access funding, they often have extremely high repayment charges with which to contend.

Finance organisations such as Root Capital, Shared Interest and Okiocredit provided financial help to farmers via their co-operatives, which helped fund some of the interventions listed above in terms of purchasing supplementary crops (fruits and vegetables), ingredients to make or purchase organic fertilisers and fungicides and to replant trees to practice shade-grown farm management techniques. Pre-finance was also an essential component of the financial support paid to farmers and a prerequisite of Fairtrade accreditation, as Fairtrade states that buyers must provide farmers with up to 40% of the value of their order ahead of delivery. Farmers cited using this money to fund climate change adaptations in the form of farm labour, in order to harvest ahead of the rains, or for education and food costs.

The state conducted many of its interventions not through the Ministry of Environment, which holds responsibility for climate change adaptations and mitigation, but through the Ministry of Agriculture and Irrigation (MINAGRI). MINAGRI has a presence in San Ignacio, and part of its remit was to share climate change knowledge with farmers in the region. Several challenges arose from the creation and analysis of data. First, much of the information shared at the level of the region was based on centralised policies and programmes developed in Lima. This is problematic in a country as diverse as Peru, with 28 of the world's 32 climates (Oxford Business Group, 2015), as this scale of diversity makes one national policy obsolete when responding to climate change adaptations that are inherently complex. In addition, significant barriers existed

to information that was available. Members of MINAGRI staff based in San Ignacio were consciously withholding information which had the potential to play a vital role in supporting farmers adapt to climate change. One such example was metrological data collected from a weather station situated in San Ignacio. All of the farmers interviewed believed that the weather station was no longer working; however, an interview with the regional MINAGRI office showed that it was still working and producing data. The issue was that a key member of staff had decided to withhold this data, stating that his role would be redundant if he shared it. These data could have acted as a critical component of farmers' climate change adaptation plans by feeding into their farming activities and reducing their vulnerability to climate change and plant diseases, and by giving them agency in making informed decisions about their own livelihoods.

The thesis argues that farmers who participated in this study are in a stronger position to adapt to climate change as a result of being embedded in alternative trading networks and from being members of co-operatives. The co-operatives act as a vector through which support can – and does – travel. However, despite the farmers in this study being in a position of relative advantage compared to those who are not part of an alternative trading network or a member of a co-operative, the lived experiences of farmers analysed in the first half of Chapter 6 illustrated that they are still struggling to maintain their livelihoods. The thesis contends that the limited state support hinders all farmers' ability to adapt to the climate. The centralised response, directed through MINAGRI as opposed to the Ministry of Environment (MINAM), where the responsibilities for climate change lie, illustrates the lack of clarity in the government's response to the challenges associated with climate change. This is further compounded by barriers to knowledge at the regional level, in addition to the lack of an overarching institutional body to represent the sector as a whole in Peru.

8.4 Alternative Trading Networks' Responses to Coffee Leaf Rust

The CLR crisis in 2012/13 had devastating effects for Peru as a nation, with coffee farmers losing on average 40% of their crops. This was compounded by the low coffee prices experienced during this time, which meant that many were unable to cover costs of production and as such failed to earn sufficient money to meet their basic needs, pushing them further into poverty. Chapter 7 explored the ways in which participation in alternative trading networks increased smallholder coffee farmers' ability to adapt to CLR, which is considered a particular expression of climate change.

Literature regarding the social, economic and environmental drivers of CLR brought to light

the significant roles played by power and governance in influencing farmers' susceptibility to coffee plant diseases. Authors such as Avelino (2015) and McCook and Vandermeer (2015) highlight the correlations between low coffee prices brought about by the collapse of the International Coffee Agreement, over-supply and disease outbreaks. Their worked aligns with my findings and provided the basis from which I mobilised the upgrading concept in order to analyse how sets of network actors engage and promote particular interventions at the level of plant, process and diversification.

The analysis of empirical data illustrated that the interventions made by network actors, such as ATOs and voluntary certification bodies, were shaped by the actions or inactions of other state and non-state actors. The slow response of the state in declaring a state of emergency reflected its weakened position in the context of liberalising the coffee sector and the collapse of the ICA. Moreover, even after declaring a state of emergency, the government did not deliver on its promises until large-scale protests erupted in the central highlands. During this time, farmers who were not members of co-operatives – and as such did not have access to financial help, up-to-date information or training – demanded help, as the promises following the declaration of the state of emergency had failed to emerge. Through analysis of such interventions, Chapter 7 investigated how key network actors such as co-operatives and ATOs engage in interventions to fill the void left by government inaction.

The government agreed to provide debt relief and facilitate access to credit in order to improve the economic aspects of farmers' vulnerability to CLR. During the crisis, farmers on average lost around 40% of their crops and more than half of their income, as the crisis coincided with a significant drop in coffee prices. The interventions should have enabled farmers to purchase disease-resistant strains of coffee plants, to apply fertilisers and claim compensation for at least part of the money lost through the crisis. However, this help did not materialise in San Ignacio, and the only help they were given by the state, if any, was in the provision of fertiliser – an event that came to too late to help.

As a result, other network actors stepped in to help farmers who were embedded in their networks. Sustainable Harvest and their farmer field school, for instance, were able to assess promptly the severity of the crisis and respond in a timely and appropriate manner as a result of their territorial embeddedness and strategic coupling. The organisation employed several interventions such as prompt organic fertiliser and fungicide application and replanting severely damaged coffee plants with resistant strains, in order to help the farmers and their co- operatives respond to the disease, in addition to reducing the vulnerability of their own supply of specialty

coffee. These interventions placed farmers who were members of the three case study co-operatives at a comparative advantage over those who were not part of this network. This brought to light significant shortfalls concerning the interventions implemented at plant, process and diversification levels. In total, 75% of the nation's coffee farmers who were not part of a co-operative (Nolte, 2016), which effectively performed private regulation of CLR in the government's absence, were forced to protest in order to mobilise help from the government, and even then the help was inadequate due to the length of time it took to put in place. Those who were members of co-operatives would have had an increased chance of help, and those who were members of alternative trading networks gained the most in terms of a response to CLR in Peru.

Even those who were fortunate enough to be embedded in alternative trading networks such as those involving Sustainable Harvest experienced different degrees of support. For example, those attending the farmer field school received the most benefits in terms of accessing up-to-date information regarding the crisis, farm management techniques to manage it and interventions which could reduce their vulnerability in the future. However, there were many affiliates of all three co-operatives who were members only because they sold their harvest to the co-operative, and they did not engage in decision making or any of the additional non-monetary benefits which the co-operative provided; consequently, these farmers failed to benefit from training and up-to-date information regarding CLR, and they failed to access financial help channelled through their respective co-operatives.

8.5 Lessons learnt, and recommendations for network actors

There are five key lessons for corporations, governments and NGOs regarding knowledge transfer and empowerment to help improve the livelihoods of farmers and their networks, and these can be drawn from the research and embedded into existing policies and projects. The section below draws upon specific challenges which have been highlighted within the thesis and then makes subsequent recommendations.

First, the significant changes to governance brought about by market liberalisation, the collapse of the ICA and the changing role of the ICO have had significant impacts on farmers' vulnerabilities. Chapters 6 and 7 highlighted correlations between coffee price and vulnerability in terms of both climate change and CLR. Lower coffee prices sometimes combined with high input costs, leading to poor farm management practices being employed. Furthermore, farmers were often forced to migrate to find alternative income-generating activities or to diversify, both

of which led to less time available to farm their crops, whilst low coffee prices meant that they had limited funds to invest in their farms. As such, older coffee plants were not renewed, and fertilisers and fungicides were either not applied or applied sporadically, leaving plants more vulnerable to the effects of climate change and more susceptible to CLR.

In relation to these challenges, therefore the first recommendation of this thesis is for Peru to re-engage with the ICO and rally for a global agreement such as the ICA to be re-instated, in order to stabilise the price of coffee.

This recommendation is supported by Peru's decision to re-enter the ICO in 2016, under the ICA 2007, after more than 20 years' operating outside of it. This decision will influence the ways in which Peruvian coffee farmers grow, market and sell their coffee, highlighting that the role of the state remains a fundamental component of successful GPNs (Horner, 2017) through its role as a facilitator and a regulator. Since becoming an ICO exporting member country, Peru has participated in several global meetings, including the most recent four sessions of the International Coffee Council, 116th, which took place in Addis Ababa in 2016, and the 177th, 118th and 119th, which took place in London, ensuring Peruvian coffee farmers are represented at a global level.

Second, the thesis highlighted the challenges associated with the lack of an overarching body in charge of supporting coffee production in Peru, which was brought to the fore for farmers and the state during the CLR crisis. The response of the Peruvian state was slow, and this had significant negative impacts on the nation's farmers, in particular those who were not members of co-operatives, resulting in widespread unrest, protests and many struggling to maintain their livelihood and food security. Let us compare this situation to the response in Colombia, which has a well-established and overarching coffee institution, the Colombian Growers Federation *(La Federacion Nacional d Cafeteros de Colombia*). The body has supported the country in promptly and efficiently responding to both climate change challenges and the CLR crisis. In the case of CLR, it implemented a renovation programme, which saw 60% of its existing plants replaced with a strain resistant to the disease (Alvarado and Moreno, 2005; Avelino et al., 2015), resulting in Colombia's incidence rate decreasing from approximately 40% during the 2009 outbreak to only 3% during the 2012/13 crisis (Avelino et al., 2015). As such, a key recommendation is to create a more unified national coffee sector in Peru.

It should be recognised that some significant steps have been taken since the completion of my fieldwork. The severity of the CLR crisis prompted the government, with support from the United Nations Development Programme (UNDP), to start to address the lack of a central coffee

authority or a national coffee action plan. The UNDP Green Commodities Programme highlighted that "a key challenge faced by the sector has been the lack of a national agenda to guide it towards sustainable coffee production. Managed sustainably, the coffee sector could be a powerful engine for human development in Peru, helping the country to reach its Sustainable Development Goals" (UNDP(a) 2019, p. 2).

In 2017, the UNDP Green Commodities Programme committed to supporting MINAGRI and the National Coffee Council to create a National Action Plan (NAP), aiming to both promote the sector and address structural barriers faced in the production of sustainable coffee. This would help the sector improve quality through state-coordinated upgrading, manage plant diseases and pests and provide adequate financial services:

> "This process has created greater trust and understanding between stakeholders, and, for the first time, the sector now has an agenda built through the active participation of key stakeholders" (UNDP(b), 2019).

The NAP launched in 2018 was the cumulative effort of collaboration and co-operation between 1,000 private and public sector coffee production network actors:

> "Today, thanks to the efforts deployed by the different actors, the coffee sector has a shared vision… The National Coffee Action Plan shows us that it is possible to generate consensus and work together in order to improve the livelihoods of producer families, increase incomes, strengthen technical capacities for enhancing productivity and reduce deforestation and climate change risks," Maria del Carmen Sacasa, UNDP Resident Representative Peru (UNDPb, 2019, np).

Peru's coffee NAP will run up to 2030 and prioritise sector-level goals and actions aiming at strengthening the coffee sector's global competitiveness while maintaining Peru's position as the world's second-largest organic and Fairtrade producing country, thus ensuring both social and environmental sustainability. The multi-stakeholder dialogue has involved the private sector, the public sector, civil society and partners for development and seeks to "create consensus on the need to build a new coffee governance model in Peru. One that is capable of leading change, with differentiated and clear roles for each institution. UNDP is supporting the development of such a model" (UNDP(b) 2019). Actors include the Peruvian National Coffee Board (JNC), of which all three co-operatives (Apessi, Aprocassi and Unicafec) are members. Moreover, Sustainable Harvest, due to their territorial embeddedness, as also had the opportunity to participate in the discussions and actions that have gone into developing the NAP, as well as representatives of Fairtrade and organic certifications.

The coffee NAP has four key pillars. The first is to incorporate the plan into law through a ministerial resolution, ensuring that MINAGRI has the power, influence and financial ability to

implement the plan. The second is acknowledgement of the need to 'build a new coffee governance model in Peru', addressing the need to delegate specific roles and responsibilities for each institution. The third is to provide direct help to smallholder coffee farmers through a MINAGRI 'technical assistance programme', which will promote sustainable farming practices in addition to developing a farmer finance system. The fourth is to promote Peruvian coffee consumption on a national level through marketing and awareness strategies.

Third, liberalisation and the retreat of the state have led a good deal of the GPN literature to focus on non-sate actors within the network. Much of this scholarly work has focused on the lead firm (Neilson et al., 2018; Coe and Yeung, 2015) and more recently the role of labour (Barrientos et al., 2011). However, as illustrated in this thesis, the state remains a key actor in the success of coffee production networks and farmers' ability to adapt to climate change and CLR, and so I therefore call for a more unified Peruvian coffee sector through the development of a national coffee institute that will help coffee farmers respond to challenges such as CLR and climate change.

Neoliberalism has and continues to promote the withdrawal of the state and, in its place, the increasing involvement and participation of the private sector. However, this thesis argues that the state remains a fundamental actor within the coffee sector. My argument aligns with the shifting focus in the GPN literature regarding the role of the gap in "theoretical frameworks on the state in GPNs" (Smith, 2015, p. 290). Building on this renewed interest, the thesis makes a call for scholarly literature on the governance of the coffee sector and the functions of the state. I contend that the state plays not only the facilitative role I call for within GPNs (Horner, 2017), but also a regulatory and distributive role (Alford and Phillips, 2018). This, however, requires further investigative work on how all state initiatives that apply to the coffee sector influence and are influenced by their power and position within the coffee production network.

Fourth, Chapter 6 illuminated analytically through the lived experiences of farmers that they have a wealth of expertise and knowledge with regards to climate change adaptations in the region in which they are situated. The centralised nature of the Peruvian government, along with some of the deeply embedded notions of development, has meant that this valuable knowledge gained through decades of adaptation, which could greatly help the success of adaptation interventions, often fails to feed into climate change adaptation interventions implemented by divergent GPN actors. One exception to this appeared to be Sustainable Harvest, which, through their territorial embeddedness, worked closely with the farmers to co-produce knowledge and solutions to the challenges they were experiencing with regards to both

climate change and CLR.

Fifth, the thesis contributes to the development literature by acknowledging that 'knowledge' is vital capital in responding to the challenges of climate change and CLR. For instance, farmers must have access to up-to-date metrological data in responding to climate change. The recommendation is therefore that other state and non-state actors learn from their relationships, acknowledge the value of local knowledge and then incorporate this knowledge into policy and practice interventions, specifically in the context of a diverse country such as Peru.

8.6 Conceptual contribution to academic questions and contributions of the thesis to developing the GPN framework.

One of the significant omissions from much of the GVC and GPN literature is the failure to acknowledge the importance of the natural environment within production networks. Nature plays a role in all GPNS but its inclusion in agribusiness GPN research is particularly pertinent, especially when researching climate change and GPNS. Bringing together two of the most fundamental challenges of our generation, globalisation and climate change, this thesis provides a conceptual contribution to GPN literature by connecting strategic coupling and upgrading to the environment.

Much of the discussion on strategic coupling and upgrading is focused on technological upgrading while neglecting other paths such as environmental and social. From a GPN perspective the thesis highlights the benefits of territorial embeddedness, strategic coupling and upgrading and their impact on the environment and farmers ability to adapt to climate change and respond to disease outbreaks such as Coffee Leaf Rust (CLR). Sustainable Harvest 'territorial embeddedness' in both Lima and San Ignacio was beneficial for several reasons. Economically it ensured the farmers in the network produced higher quality coffee that was certified as both Fairtrade and Organic. This supported Sustainable Harvest to maintain the right quality and quantity of coffee to sell on their customers. Sustainable Harvests 'territorial embeddedness' also had a significant impact on farmers' ability to adapt to climate change and disease something which has limited coverage in GPN research. Sustainable Harvest used their position in the network to gather knowledge on best practice in terms of farming with a changing climate, and combined this with knowledge of national policies gained from being 'plugged in' or 'embedded' into national networks in Lima and local knowledge from being 'plugged in' or 'embedded' into San Ignacio, the three case study cooperatives as well as being aware of what was happening 'on the ground' with regards to local governmental ministries such as the Ministry of Agriculture and the Ministry of Environment.

Sustainable Harvest used this knowledge to access funding to implement their farmer field school which utilised global, national and local knowledge to share best practise farming techniques, empowering farmers to farm with a changing climate. Their 'embeddedness' enables the organisation to see the entirety of the network illuminating challenges throughout the network which may have otherwise gone unnoticed. The farmer field school for example, supported economic upgrading integrating climate change adaptation techniques into the training. These included soil preservation and improvement, water conservation, wildlife conservation and pollution and waste reduction (refer to figure 2.1 for further details on environmental upgrading). This on the ground training, had a multitude of benefits, it enabled the trainer, a Sustainable Harvest employee to integrate local knowledge both in terms of historic farming techniques and observed climatic lived experiences into the training, which had also been informed by national policies, and international and intergovernmental data ad best practise. It also provided Sustainable Harvest with real time, on the ground information regarding the challenges faced by farmers. Many of these were related to their environment, climate change and food insecurity. The farming community faced significant challenges with seasonal hunger, being on the ground and being able to see these struggles first-hand prompted Sustainable Harvest to launch their food security programme, supporting farmers to grow food gardens, ensuring that they were not solely reliant on the price they are paid for their coffee, which is inherently volatile, for their nutritional needs.

The most significant challenge during the period researched was the Coffee Leaf Rust crisis discussed in chapter 7. Sustainable Harvest was one of the first actors within the coffee arena to respond to the crisis as they had both on the ground knowledge and the benefit of learning from their other strategic coupling they had in central America, being 'plugged in' to national and international policy and practice debates. This resulted in Sustainable Harvest adapting their training within their farmer field schools. They set up a fertilisation programme to empower farmers to strengthen their coffee plants, a detection process to help farmers identify which plants were infected and to remove them before they spread to their entire crops. This approach was vital, especially for organic farmers who are unable to use chemical pesticides or fertilisers. It was too early to determine the impact of this quick response from sustainable harvest, and there were of course limitations. The number of farmers who received this training were limited to those who were currently attending the farmer field school, so a relatively small portion of those enrolled in the cooperatives. Future research could revisit this field site to explore the difference in incidence and strength of CLR for farmers who were part of the farmer field school and those who were not.

One other key finding is the strong connection between economic, environmental and social upgrading. As argued in chapter 7, there appears to be a connection between the amount a farmer is paid for their coffee and disease outbreaks. CLR outbreaks in Colombia (1987-88), Costa Rica (1989-90), Nicaragua (1995-96), and El Salvador (2002-03) all occurred following a period of low coffee prices (Avelino et al. 2015). Economic upgrading through the adoption of both organic and Fairtrade certification in addition to general upgrading in term of quality (i.e. accessing the speciality coffee market), ensures coffee farmers a higher price for their coffee, in theory enabling the farmers to reinvest in their farms (replace older coffee plants) and employ good farm management practices, thus reducing their vulnerability to pests and diseases. This would prove another interesting piece of future research, interconnectedness between the three areas of upgrading (social, economic and environmental) contributing to a currently under researched area.

The last key contribution and suggestion for future research is the change in epistemological stance from the tradition lead-firm focused employed within GPN research to one which holds the farmer at the heart of the research. The thesis provided rich empirical data on the lived experiences of farmers, an actor who is often undervalued within GPNs. In applying a GPN lens to the challenges of climate change, CLR and price volatility, the thesis provided an insight into the lived experiences of farmers and their responses to such challenges. It illuminated blocks and shortfalls within the network, for example the limited and late support from the state regarding the CLR crisis and the actors who are attempting to fill those gaps, resulting in a unbalanced national response, which left farmers who were not members of cooperatives or GPNs in dire positions unable to feed their families, resulting in large scale protests to prompt government intervention to support the sector. Once again, another crucial piece of future research would be to contribute to the recent re-interest in the role of the state within GPNs and the impact that their intervention in the case of Colombia and lack of intervention in Peru has had on the lives and livelihoods of farmers.

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Appendices

Appendix 1 Debriefing handout

Climate Change and Fairtrade Agriculture – Securing Livelihoods Purpose of the project:

The overall objective of the research is to advance knowledge about the impact of climate change on the livelihoods and food security of Peruvian Fairtrade farmers', exploring contrasting ecosystems and the role of local and indigenous knowledge in their ability to employ adaptations to handle risk and shocks effectively. The specific objectives are:

1. Investigate how climate change impacts on key elements of Fairtrade famers' poverty reduction strategies.
2. Examine understandings of the impacts of climate change on Fairtrade farmers' livelihoods and food security in Peru at different scales (National, e.g. Government and Regional, e.g. Secondary level coffee cooperatives).
3. Examine how Fairtrade farmers themselves, as a representative of the climate vulnerable poor, have understood and adapted to climate change in relation to their own livelihoods and food security.

How and when will the results be available:

All participants will be able to access my final thesis (online and a paper copy will be distributed to the case study cooperatives)

Estimated time of completion – April 2019

All participants will be given a paper copy of the executive summary of my final thesis, which will be translated into Spanish.

Estimated time of completion – June 2019

A debriefing workshop/meeting will take place at the end of the research period at each of the field sites and a further two will take place, one in Lima and the other in Cusco in order to disseminate initial findings.

Estimated timeframe – March 2014

If deemed appropriate I will meet with individuals to discuss findings in person and answer any questions they may have over the telephone or Skype

Estimated timeframe – June – August 2019

Disseminated of results:

The results will be in several forms (full thesis, executive summary, presentations) and will be shared with all key stakeholders.

Safety of the information provided:

All audio recordings will be transcribed by myself and both the original recordings and transcript will be password protected on my personal computer and backed up on a password protected hard drive. Any digital photographs taken will be uploaded solely to my computer and stored in a password protected file. They will then be deleted from the camera.

Both digital photographs and audio files would be backed up on a removable memory storage, which would also be password protected and remain with myself.

On completion of my thesis, all of the audio recordings will be deleted and all other information will continue to be password protected.

Other relevant information:

If you would like further information regarding all of the above, please contact Andrea Wilkinson at a.wilkinson2@ncl.ac.uk

Appendix 2 Research Participant Information Sheet

Research into the effects of climate change on coffee farmers in the San Ignacio region of

Information for participants.

Background to the study

I am a PhD student at the School of Social Sciences, Newcastle University, and my research is looking back at the effects of climate change on coffee farmers in the San Ignacio region of Peru.

Purpose/aims of the research: The overall objective of the research is to advance knowledge about the impact of climate change on the livelihoods and food security of Peruvian Fairtrade farmers', exploring the role of local and indigenous knowledge, cooperatives and companies in their ability to employ adaptations to handle risk and shocks effectively. The specific objectives are:

1. Investigate how climate change impacts on key elements of Fairtrade famers' poverty reduction strategies.
2. Examine understandings of the impacts of climate change on Fairtrade farmers' livelihoods and food security in Peru at different scales (National, e.g. Government and Regional, e.g. Secondary level coffee cooperatives).
3. Examine how Fairtrade farmers themselves, as a representative of the climate vulnerable poor, have understood and adapted to climate change in relation to their own livelihoods and food security.

What is involved in participating?

Time required: between 1-2 hours for an interview, focus group or visual anthropology exercise, this should be a one off occurrence, however you are free to be involved in one or more of the options listed above.

Exclusion criteria: all participants are required to give either written or verbal consent, without this they will be usable to take part in the research.

Confidentiality: Interviews will be recorded and fully transcribed. The recordings will be stored in a secure location and only the researcher and her two supervisors will have access. People's names will not be included in reports (unless otherwise requested), but participants should be aware that they may be identifiable through comments that they make.

We hope you will be able to help with this important area of research. If you agree to take part please complete the consent form. You are still free to withdraw at any time and without giving a reason.

How will the results be used?

The data from this research will be used for:

PhD thesis

1. Academic research papers and presentations
2. A summary report to be circulated to all interested participants or participating organisations.

Please indicate on the consent form if you would like to receive a summary of the results.
Please get in touch if you would like further information:
Andrea Wilkinson
Mobile number - 958721085;
Email - a.wilkinson2@newcastle.ac.uk
Thank you.

Appendix 3 Informed Consent Form

Informed Consent Form

Climate Change and Fairtrade Agriculture – Securing Livelihoods

I, the undersigned, confirm that (please tick box as appropriate):

1.	I have read and understood the information about the project, as provided in the information sheet	
2.	I have been given the opportunity to ask questions about the project and my participation	
3.	I voluntarily agree to participate in the project	
4.	I understand I can withdraw at any time without giving reasons and that I will not be penalized for withdrawing nor will I be questioned on why I have withdrawn	
5.	The procedures regarding confidentiality have been clearly explained (e.g. use of names, pseudonyms, anonymization of data) to me	
6.	If applicable, separate terms of consent for interview, audio, video or other forms of data collection have been explained or provided to me	
7.	The use of data in the research, publications, sharing and archiving has been explained to me	
8.	I understand that other researchers will have access to this data only if they agree to preserve the confidentiality of the data and if they agree to the terms I have specified in this form	
9.	Select only one of the following: - I would like my name used and understand what I have said or written as part of this study will be used in reports, publications and other research outputs so that anything I have contributed to this project can be recognized - I do not want my name used in this project	
10.	I, along with the researcher, agree to sign and date this informed consent form.	

Participant:

Name: _____ Signature: _____ Date: _____

Researcher:

Name: _____ Signature: _____ Date: _____

Appendix 4 Interview prompts

BUYERS – RESEARCH QUESTION 3

Government (national, regional, local), supply chains, NGO's and others

1. History of the coffee in Peru – why it started
2. History of coffee growing (organic) in the region – related to security, income generation?
3. How long have you been in this role? Does this role exist in every region? Why here?
4. What is your job description?
5. What changes have you seen since you started in your role
6. What is the 3/5 year goals of your role or this department?
7. Do you work in collaboration with cooperatives, buyers, NGO's and other governments?
8. What is the biggest challenge of coffee farmers?
9. How do you assist the farmers with this challenge?
10. Do you receive any support from outside other government departments, NGO's, businesses?
11. Sharing of knowledge – how do you share you knowledge with others in the area, other NGO's, buyers?
12. Record of events, key learnings, impact of any social work you do
13. Do you think that certifications are important, what (if any) are the benefits and pitfalls of these certifications?
14. (If applicable) How has the coffee sector changed since you first started working in it?

Points to consider:

- Is knowledge being mobilised through supply chains and if so how does this support small holder coffee farmers reduce their vulnerability and risk through climate change adaptation?
- What adaptation/ mitigation/ diversification strategies are currently being adopted to support farmers in becoming more resilient to climate variability/events?
- If there are effective adaptations for farmers what are the costs of these adaptations to them both in terms of the financial cost and time spent on implementation
- What if any impact does this have on their return in relation to their profits?

COOPERATIVES – RESEARCH QUESTION 4

To what degree if any, do cooperatives support issues associated with climate variation and associated adaptations by small holders?

Prompt on gender, food security and livelihoods

1. History of the cooperative (any documents we could copy, business plans historical data etc.?)
2. What are the main benefits to being part of a cooperative?
3. Main markets (percentages sold locally, nationally and internationally)
4. Do you receive any support from your buyers? If so what sort?
5. Profits, shareholders governance
6. Sharing of knowledge - hand over process for the president? Trickle down to farmers
7. Record of events, key learnings, impact of any social work you do
8. What certifications do you have, what (if any) are the benefits and pitfalls of these certifications?
9. What have you done with your FT premium, how is it decided upon?
10. What are the main issues affecting coffee farmers at the moment?
11. Are you as a cooperative helping address these problems? If so how?
12. How has the coffee sector changed since you first started working in it?

Points to consider:

- Do cooperatives currently support small holder coffee farmers reduce their vulnerability and risk through climate change adaptation and if so how?
- To what extent does/can cooperatives facilitate a flow of fair finance and/or livelihood security funds
- How do (if at all) cooperatives use their collective power to mobilise resources for business development and climate adaptation programmes?
- How is knowledge passed on and retained within cooperatives?
- Currently what methods if any are employed by cooperatives in supporting small holder coffee farmers to secure their livelihoods and food security?

BUYERS – RESEARCH QUESTION 3

Government (national, regional, local), supply chains, NGO's and others

1. History of the coffee in Peru – why it started
2. History of coffee growing (organic) in the region – related to security, income generation?
3. How long have you been in this role? Does this role exist in every region? Why here?
4. What is your job description?
5. What changes have you seen since you started in your role
6. What is the 3/5-year goals of your role or this department?
7. Do you work in collaboration with cooperatives, buyers, NGO's and other governments?
8. What is the biggest challenge of coffee farmers?
9. How do you assist the farmers with this challenge?
10. Do you receive any support from outside other government departments, NGO's, businesses?
11. Sharing of knowledge – how do you share your knowledge with others in the area, other NGO's, buyers?
12. Record of events, key learnings, impact of any social work you do
13. Do you think that certifications are important, what (if any) are the benefits and pitfalls of these certifications?
14. (If applicable) How has the coffee sector changed since you first started working in it?

Points to consider:

- Is knowledge being mobilised through supply chains and if so how does this support small holder coffee farmers reduce their vulnerability and risk through climate change adaptation?
- What adaptation/ mitigation/ diversification strategies are currently being adopted to support farmers in becoming more resilient to climate variability/events?
- If there are effective adaptations for farmers what are the costs of these adaptations to them both in terms of the financial cost and time spent on implementation
- What if any impact does this have on their return in relation to their profits?

Appendix 5 Overview of key research questions and associated outputs (explanatory and evaluative)

Question	Output 1	Output 2	Output 3	Output 4
1.Are there any impacts and consequences relating to various weather patterns on agricultural productivity/coffee farmer income?	**Visual:** Ethnographic observations 1. Observation of differences in coffee plants 2. Observation on coffee farms/cooperatives 3. Visual representations 4. Working behaviour	**Coffee farmer views:** 1. Interviews 2. Focusgroup discussions 3. Visual representations 4. Working behaviour 5. Review of plans for the future and potential	**Government/NGO/companies views:** 1. Interview with government/policy makers 2. Interview with key coffee companies 3. Working behaviour 4. Actions and reactions of all of the above, including coffee rust summits, conferences and training events	**Policy intentions:** 1. Document analysis 2. Log of implementation 3. Commentary by media, government, companies and NGOs 4. Systematic review of the literature
2.To what degree if any do cooperatives support both food and livelihood security encompassing issues associated with climate variation adaptation of small holders	**Visual:** 1.Observation of the working practices of cooperatives 2. Observation of the difference between coffee farmers who are members of cooperatives and those who are not 3. Observation on coffee farms/cooperatives	**Coffee farmer/cooperative views:** Interviews 1. Focus group discussions 2. Working behaviour at the cooperative Document analysis – cooperative charter, busines plan, financial plan	**Government/NGO/companies/cooperative college views:** 1. Interviews with heads of cooperatives 2. Interview with key coffee companies 3. Interview with the cooperative college 4. Interview with the Ministry of Trade and Agriculture (or people in charge of cooperatives)	**Policy intentions:** 1. Document analysis 2. Log of implementation 3. Commentary by media, government, companies and NGOs 4. Systematic review of the literature

3. Are there links between climate change, coffee and security, if so what are they and what are the impacts on small holder coffee farms and their communities	**Visual:** 1.Observation of the working practices of cooperatives 2. Observation ofthe difference between coffee farmers who are members of cooperatives and those who are not 3. Observation on coffee farms/cooperatives	**Reality on in coffee growing regions and views of coffee farmers:** 1.Interviews 2.Focus groups 2.General feeling in the area 4.Document analysis	**British Embassy, National Government, British Government, companies, NGO's views** 1. Interviews 2. Document analysis 3.Future plans ahead of the UNFCC conference, Lima 2014	**Media coverage and review of policies** 1. Review of local, national and international media 2. Review of local, national and international policies 3.Systematic review of the literature
4. Will there be an impact on climate change policy following the upcoming UNFCC conference in Peru?	**National views:** 1. Interviews 2. Attendance at key climate change meetings where possible working behaviour	**International views:** 1. Interviews with companies, government representatives and NGOs 2. Review of their literature, current policies, plans for the future	**Who is feeding into the process, what is included?** 1. record of attendance at key meetings 2. Any documented evidence after meetings of the content 3. Where possible attend meetings	**Media coverage and review of policies** 1. Review of local, national, and international media 2. Review of local, national, and international policies 3. Systematic review of the literature

Appendix 6 Sample of semi-structured interview questions

Interview questions - Are there any impacts and consequences relating to various weather patterns on agricultural productivity/coffee farmer income as well as potentially on their livelihoods and food security?

The questions below are merely draft prompts as I plan to run semi structured interviews and hope that the answers to these questions will arise in general conversation**.**

Sub questions	Prompts	Prompts
What are impacts of diseases such as coffee rust on production, quality and livelihoods?	**Coffee farmer views:** 1. What diseases have the coffee plants been affected by in the past? 2. What diseases are the coffee plants currently affected by? 3. What do you believe the differences are between now and 5 – 10 years ago in relation to diseases affecting coffee plants? 4. What do you believe are the causes of the diseases? 5. What difference if any have you observed in production (yields) and quality over the last 10 years? 6. What impact do you believe this has had on your or other coffee farmer's lives?	**Government/NGO/companies views:** 1. What diseases have the coffee plants been affected by in the past? 2. What diseases are the coffee plants currently affected by? 3. What do you believe the differences are between now and 5 – 10 years ago in relation to diseases affecting coffee plants? 4. What do you believe are the causes of the diseases? 5. What difference if any have you observed in production (yields) and quality over the last 10 years? 6. What impact do you believe this has had on your or other coffee farmer's lives?
Have there been any changes in the types or number of incidences of diseases over the past 10-15 years?	**Coffee farmer views:** What adaptation/mitigation/diversification strategies are currently being adopted to combat diseases and reduce vulnerability on your farm?	**Government/NGO/companies views:** What adaptation/mitigation/diversification strategies are currently being adopted to combat diseases and reduce vulnerability on coffee farms you are working with or that you know about?

If so, what are the potential causes of the changes?	**Coffee farmer views:** What adaptation/ mitigation/ diversification strategies are currently being adopted to combat other effects of climate change and reduce vulnerability on your farm/within your cooperative	**Government/NGO/companies views:** What adaptation/ mitigation/ diversification strategies are currently being adopted to combat other effects of climate change and reduce vulnerability on coffee farms you are working with or that you know about?
If there are changes, how do these changes directly/in directly impact farming methods?	**Coffee farmer views:** What are the impacts on the above on quality and productivity?	**Government/NGO/companies views:** What are the impacts on the above on quality and productivity?

Data collection - The degree to which certification can support both development and climate change adaptation

Sub questions	Output 2	Output 3
What knowledges are mobilised through FT/organic/Rainforest Alliance certification and how can they support small holder coffee farmers reduce their vulnerability and risk through climate change adaptation?	Coffee farmer views: 1. How do you pass on/transfer information regarding climate change to certification bodies to feed into their projects/certifications? 2. How can this support you/your cooperative members to reduce your risk and vulnerability to climate change? 3. Do certifying bodies that you work with take traditional knowledge seriously, if so how?	Certification bodies views: 1. How do small holder coffee farmers pass on/transfer information regarding climate change to you as a certification body to feed into their projects/certifications? 2. How does this support small holder coffee farmers, and does it impact your projects ability to reduce their risk and vulnerability to climate change? 3. In your opinion do certifying bodies (yours and others) take traditional knowledge seriously, if so how do they/you demonstrate this? 4. What plans do you have to develop your standards and certification scheme in the future and do you currently have or have plans to develop a certification or standard directly related to climate change
To what extent does/can certification facilitate a flow of fair finance and/or livelihood security funds	Coffee farmer views: 1. Where do you currently finance activities, such as training, plant nurseries, demonstration plots etc.? 2. Do you struggle to raise funds for such activities? 3. Do you currently use/receive any funds from certification bodies	Certification bodies views: 1. In what way do you financially support coffee farmers to secure their livelihoods and adapt to climate change 2. Do you think that there needs to be more in the way of financial support for coffee farmers? If so, how would you suggest they access/raise funds for this type of work?
How can certification use its market position to leverage partnerships and resources?	Coffee farmer views: How can certification use its market position to leverage partnerships/ resources?	Certification bodies views: How can certification use its market position to leverage partnerships and resources?
What are the current limitations of certification (coffee price) and why do they need to up their game?	Coffee farmer views: What are the current limitations of certification (coffee price for example) and why do they need to up their game?	Certification bodies views: Are there any limitations of certification (coffee price) and what could be done to improve the certification?
How effective are these strategies in securing livelihood and food security?	Coffee farmer views: How effective are these strategies in securing livelihood and food security?	Certification bodies views: How effective are these strategies in securing livelihood and food security?

Data collection - The degree to which supply chains can support climate change adaptation of small holders

Sub questions	Output 2	Output 3
What knowledges are mobilised through supply chains and how can they support small holder coffee farmers reduce their vulnerability and risk through climate change adaptation?	Coffee farmer views:	Certification bodies views:
To what extent does/can traditional/indigenous knowledge feed into climate change adaptation projects	Coffee farmer/cooperatives views:	Certification bodies views:
What are the motivating factors for buyers in creating sustainable and climate friendly (need to check exact term) supply chains	Coffee farmer views:	Government/NGO/companies views:

Data collection - The degree to which cooperatives can support both development and climate change adaptation of small holders

Sub questions	Output 2	Output 3
What knowledges are mobilised through FT/organic/Rainforest Alliance certification and how can they support small holder coffee farmers reduce their vulnerability and risk through climate change adaptation?	Coffee farmer views:	Certification bodies views:
To what extent does/can certification facilitate a flow of fair finance and/or livelihood security funds	Coffee farmer/cooperatives views:	Certification bodies views:
How can certification use its market position to leverage partnerships and resources	Coffee farmer views:	Government/NGO/companies views:
What are the current limitations of certification (coffee price) and why do they need to up their game?	Coffee farmer views:	Government/NGO/companies views:
How effective are these strategies in securing livelihood and food security?	Coffee farmer views:	Government/NGO/companies views:

Data collection - What are the links between climate change, coffee and security

Sub questions	Output 2	Output 3
How are governmental and NGO policies shaped by concerns about links between coffee production and stability within a region?	Coffee farmer views:	Governmental and NGO views:
To what extent does access to funding for climate change adaptation programmes depend upon how the area has been classified in terms of climate security?	Coffee farmer/cooperatives views:	Funding bodies, the government and NGO's views:
What are the past and current links between coffee farming, coca production and climate security?	Coffee farmer views:	Government/NGO/companies views:
To what extent do findings from all of the above sub questions impact coffee farmers in San Ignacio?	Coffee farmer views:	Government/NGO/companies views:

Appendix 7 List of participants

3.11 Participants' Profiles

Interviews with coffee farmers from APESSI, APROCASSI and UNICAFE							
	Name (Pseudonym	Age	Gender	Years coffee farming	No. of years as a member	Name of co-operative	Notes
1	Alfredo	37	M	20>	6	Apessi	Day 1, interview 1
2	Fernando	53	M	40	Since its inception	Apessi	Day 1, interview 2
3	Maria	44	F	5	5	Apessi	Day 1, interview 3
4	Natalia	68	F	20	10	Apessi	Day 2, interview 1
5	Marco	72	M	26	10	Apessi	Day 2, interview 2
6	Samuel	27	M	12	10	Apessi	Day 2, interview 3
7	Mateo	70	M	25		Apessi	Day 2, interview 4
8	Sofia	62	F	40>	5	Apessi	Day 3, interview 1
9	Isabella	48	F	30>	5	Apessi	Day 3, interview 2
10	Mai	37	F	20	3	Apessi	Day 3, interview 3
11	Jose	55	M	50	14	Apessi	Day 4, interview 1
12	Antonia	52	F	30	5	Apessi	Day 4, interview 2
13	Maria	45	F	8	4	Apessi	Day 4, interview 3
14	Juan Pablo	52	M	12	10	Apessi	Day 4, interview 4
15	Pedro	38	M	20	10	Apessi	Day 5, interview 1
16	Laura	50	F	12	8	Aprocassi	Day 1, interview 1
17	Peter	28	M	10	10	Aprocassi	Day 1, interview 2
18	Juan		M	7	7	Aprocassi	Day 1, interview 3
19	Pablo	55	M	35	12	Aprocassi	Day 1, interview 4
20	Alejandro	43	M	20	7	Aprocassi	Day 2, interview 1
21	Christopher	72	M	30>	10	Aprocassi	Day 2, interview 2
22	Daniel	40	M	15	8	Aprocassi	Day 2, interview 3
23	Karen	38	F	10	4	Aprocassi	Day 2, interview 4
24	Valerie	34	F	20	9	Aprocassi	Day 3, interview 1
25	Diego	25	M	15	5	Aprocassi	Day 3, interview 2
26	Marcos	48	M	30>	10	Aprocassi	Day 3, interview 3
27	Lucio	48	M	30>	10	Aprocassi	Day 3, interview 4
28	Aiko	45	F	30>	10	Aprocassi	Day 4, interview 1
29	Fernando	64	M	30>	12	Aprocassi	Day 4, interview 2
30	Francisco	59	M	30>	12	Aprocassi	Day 4, interview 3
31	Pedro	58	M	30>	12	Aprocassi	Day 4, interview 4
32	Pablo	46	M	12	6	Aprocassi	Day 4, interview 5
33	Marie-Teresa	57	F	8	13	Unicafec	Day 1, interview 1
34	Alfred	43	M	2.5years	2.5 years	Unicafec	Day 1, interview 2
35	Francisco	77	M	47	14	Unicafec	Day 1, interview 3
36	Pedro	42	M	30	14	Unicafec	Day 2, interview 1

37	Olivia	35	F	25	5	Unicafec	Day 2, interview 2
38	Carlos		M	10	7	Unicafec	Day 2, interview 3
39	Annabella	22	F	7	3	Unicafec	Day 2, interview 4
40	Alfred	43	M	2.5years	2.5 years	Unicafec	Day 3, interview 1
41	Francisco	77	M	47	14	Unicafec	Day 3 Interview 2
42	Pedro	42	M	30	14	Unicafec	Day 3, interview 3
43	Olivia	35	F	25	5	Unicafec	Day 3, interview 4
44	Carlos		M	10	7	Unicafec	Day 4, interview 1
45	Annabella	22	F	7	3	Unicafec	Day 4, interview 2
46	Pablo	38	M	30	14	Unicafec	Day 4, interview 3
47	Fernando	39	M	10	7	Unicafec	Day 4, interview 4

Table 3.7 Interviews with coffee farmers from APESSI, APROCASSI and UNICAFE

Interviews with employees from each of the three co-operatives						
	Pseudonym	**Age**	**Years working**	**Role**	**Name of co - operative**	**Notes**
48	Charles	34	2	Manager	Apessi	Member
49	Terrassa	unknown	4	Administration manager	Apessi	Member
50	Valarie	unknown	4	Engineer	Apessi	Member
51	John	unknown	6	Logistics and accounting	Unicafec	Member
52	Julian	unknown	13	Manager	Unicafec	Founding member
53	Pascal	unknown	4	Project manager	Unicafec	Working with JNC
54	Fernando	unknown	7	Manager	Aprocassi	Member
55	Maria	unknown	4	Administration Manager	Aprocassi	Member
56	Pablo	unknown	2	Engineer	Aprocassi	Member

	Interviews with auxiliary organisations			
	Name	**Organisation**	**Role**	**Notes**
57	Patricia Iturregui	British Embassy, Lima	Climate Security and Energy Advisor to the British Embassy, Peru	Negotiation of the Kyoto Protocol and its implementation in Peru, initiating the first project's access to the clean development mechanism, led the adoption of the first national climate change strategy in Peru and Latin America. Member of the negotiating team of the environment chapter (Trade Promotion Agreement with the US and Colombia).
58	Ben Rawlings	British Embassy, Lima	Head of Economic and Sustainable Development	In charge of business & commercial development (trade & investment); education, science & innovation; economic development (economic reform, trade barriers & market access); climate change and sustainable development; cultural Affairs.
59	Eduardo Durand	Ministry of Environment Peru	Director of Climate Change	General Director of Climate Change, Desertification and Water Resources. In charge of the General Directorate, including the negotiations of the UNFCCC and the coordination of technical and financial co-operation projects on the subject.
60	Eduardo Calvo	Ministry of External Affairs	Advisor to the Ministry of External Affairs	22 years as a UNFCCC delegate, works closely with Director of Climate Change.
61	Philine Oft	GTZ	Local coordinator for Peru	Research into agricultural risk in Peru.
62	Oscar	Ministry of Agriculture (regional)	San Ignacio representative	Implements regional intervention programmes in order to support the coffee-growing community of San Ignacio.
63	Fernando	Ministry of Environment (regional)	San Ignacio representative	Works alongside the community of San Ignacio to protect the diverse ecosystem of flora and fauna in the area, which are at risk due to the threat of mining and poor agricultural practices.

64	Cesear	Ministry of Tourism (regional)	San Ignacio representative	Role to develop tourism in the area and work alongside the Ministry of Agriculture and Ministry of Environment to promote the region's cultural and environmental assets.
65	Arnaldo Quispe Janampa	Sustainable Harvest San Ignacio	Agricultural technician and trainer	Based in San Ignacio, Arnaldo ran the farmer field school and worked with several co-operatives in the area to support their farmers in adapting to climate change and securing their livelihoods.
66	Claudia Aleman	Sustainable Harvest, Peru Office	Coffee quality manager	Involved in both checking quality for export and supporting coffee farmers to improve the quality of their coffee beans.
67	Susan Aleman	Sustainable Harvest, Peru Office	Development Manager	Directly involved with producer organisations in the country, helping them to improve their productivity and the quality of production on their farms. Supports organisations seeking to connect with international markets and improve their technical and administrative capacity
68	Oscar Gonzales	Sustainable Harvest (national)	Quality Specialist/Supply Manager	Supports farmers to improve the quality of their coffee and connect to international markets.
69	Jose	Agrotour	Farm manager	Managed a coffee farm which not only harvested coffee, but also was open to the public as a way of educating people about how a coffee farm is run (and highlighting the challenges it faces).
70	Susana Schuller	Junta National del Café	Development Technician	The mission is to strengthen the management and negotiation capacities of Peruvian coffee Organisations.
71	Rebecca	Practical Action	Project Manager	Manages climate change projects.
72	Luis Alfaro Garfias	Sierra Exportadora	Advisor to the Executive Presidency	Public body attached to the Ministry of Agriculture and Irrigation that promotes productive economic activities in the highlands and jungle regions of Peru.
73	David Griswold	Sustainable Harvest	CEO and Founder	Leading the direction of Sustainable Harvest

Table 3.8 Interviews with employees from each of the three co-operatives

Appendix 8 WFTO Principles

10 Key Principles:

WFTO prescribes 10 Principles that Fair Trade Organizations must follow in their day-to-day work and carries out monitoring to ensure these principles are upheld:

Principle One: Creating Opportunities for Economically Disadvantaged Producers

Poverty reduction through trade forms a key part of the organization's aims. The organization supports marginalized small producers, whether these are independent family businesses, or grouped in associations or co-operatives. It seeks to enable them to move from income insecurity and poverty to economic self-sufficiency and ownership. The organization has a plan of action to carry this out.

Principle Two: Transparency and Accountability

The organization is transparent in its management and commercial relations. It is accountable to all its stakeholders and respects the sensitivity and confidentiality of commercial information supplied. The organization finds appropriate, participatory ways to involve employees, members and producers in its decision-making processes. It ensures that relevant information is provided to all its trading partners. The communication channels are good and open at all levels of the supply chain.

Principle Three: Fair Trading Practices

The organization trades with concern for the social, economic and environmental well-being of marginalized small producers and does not maximize profit at their expense. It is responsible and professional in meeting its commitments in a timely manner. Suppliers respect contracts and deliver products on time and to the desired quality and specifications.

Fair Trade buyers, recognizing the financial disadvantages producers and suppliers face, ensure orders are paid on receipt of documents and according to the attached guidelines. An interest free pre-payment of at least 50% is made if requested.

Where southern Fair Trade suppliers receive a pre-payment from buyers, they ensure that this payment is passed on to the producers or farmers who make or grow their Fair Trade products.

Buyers consult with suppliers before cancelling or rejecting orders. Where orders are cancelled

through no fault of producers or suppliers, adequate compensation is guaranteed for work already done. Suppliers and producers consult with buyers if there is a problem with delivery, and ensure compensation is provided when delivered quantities and qualities do not match those invoiced.

The organization maintains long term relationships based on solidarity, trust and mutual respect that contribute to the promotion and growth of Fair Trade. It maintains effective communication with its trading partners. Parties involved in a trading relationship seek to increase the volume of the trade between them and the value and diversity of their product offer as a means of growing Fair Trade for the producers in order to increase their incomes. The organization works cooperatively with the other Fair Trade Organizations in country and avoids unfair competition. It avoids duplicating the designs of patterns of other organizations without permission.

Fair Trade recognizes, promotes and protects the cultural identity and traditional skills of small producers as reflected in their craft designs, food products and other related services.

Principle Four: Payment of a Fair Price

A fair price is one that has been mutually agreed by all through dialogue and participation, which provides fair pay to the producers and can also be sustained by the market. Where Fair Trade pricing structures exist, these are used as a minimum. Fair pay means provision of socially acceptable remuneration (in the local context) considered by producers themselves to be fair and which takes into account the principle of equal pay for equal work by women and men. Fair Trade marketing and importing organizations support capacity building as required to producers, to enable them to set a fair price.

Principle Five: Ensuring no Child Labor and Forced Labor

The organization adheres to the UN Convention on the Rights of the Child, and national / local law on the employment of children. The organization ensures that there is no forced labor in its workforce and / or members or homeworkers.

Organizations who buy Fair Trade products from producer groups either directly or through intermediaries ensure that no forced labor is used in production and the producer

complies with the UN Convention on the Rights of the Child, and national / local law on the employment of children. Any involvement of children in the production of Fair Trade products (including learning a traditional art or craft) is always disclosed and monitored and does not adversely affect the children's well-being, security, educational requirements and need for play.

Principle Six: Commitment to Non Discrimination, Gender Equity and Freedom of Association

The organization does not discriminate in hiring, remuneration, access to training, promotion, termination or retirement based on race, caste, national origin, religion, disability, gender, sexual orientation, union membership, political affiliation, HIV/Aids status or age. The organization provides opportunities for women and men to develop their skills and actively promotes applications from women for job vacancies and for leadership positions in the organization. The organization takes into account the special health and safety needs of pregnant women and breast-feeding mothers. Women fully participate in decisions concerning the use of benefits accruing from the production process.

The organization respects the right of all employees to form and join trade unions of their choice and to bargain collectively. Where the right to join trade unions and bargain collectively are restricted by law and/or political environment, the organization will enable means of independent and free association and bargaining for employees. The organization ensures that representatives of employees are not subject to discrimination in the workplace.

Organizations working directly with producers ensure that women are always paid for their contribution to the production process, and when women do the same work as men they are paid at the same rates as men. Organizations also seek to ensure that in production situations where women's work is valued less highly than men's work, women's work is re- valued to equalize pay rates and women are allowed to undertake work according to their capacities.

Principle Seven: Ensuring Good Working Conditions

The organization provides a safe and healthy working environment for employees and / or members. It complies, at a minimum, with national and local laws and ILO conventions on health and safety.

Working hours and conditions for employees and / or members (and any homeworkers) comply with conditions established by national and local laws and ILO conventions.

Fair Trade Organizations are aware of the health and safety conditions in the producer groups they buy from. They seek, on an ongoing basis, to raise awareness of health and safety issues and improve health and safety practices in producer groups.

Principle Eight: Providing Capacity Building

The organization seeks to increase positive developmental impacts for small, marginalized producers through Fair Trade.

The organization develops the skills and capabilities of its own employees or members. Organizations working directly with small producers develop specific activities to help these producers improve their management skills, production capabilities and access to markets - local / regional / international / Fair Trade and mainstream as appropriate. Organizations which buy Fair Trade products through Fair Trade intermediaries in the South assist these organizations to develop their capacity to support the marginalized producer groups that they work with.

Principle Nine: Promoting Fair Trade

The organization raises awareness of the aim of Fair Trade and of the need for greater justice in world trade through Fair Trade. It advocates for the objectives and activities of Fair Trade according to the scope of the organization. The organization provides its customers with information about itself, the products it markets, and the producer organizations or members that make or harvest the products. Honest advertising and marketing techniques are always used.

Principle Ten: Respect for the Environment

Organizations which produce Fair Trade products maximize the use of raw materials from sustainably managed sources in their ranges, buying locally when possible. They use production technologies that seek to reduce energy consumption and where possible use renewable energy technologies that minimize greenhouse gas emissions. They seek to minimize the impact of their waste stream on the environment. Fair Trade agricultural commodity producers minimize their environmental impacts, by using organic or low pesticide use production methods wherever possible.

Buyers and importers of Fair-Trade products give priority to buying products made from raw materials that originate from sustainably managed sources, and have the least overall impact on the environment.

All organizations use recycled or easily biodegradable materials for packing to the extent possible, and goods are dispatched by sea wherever possible.