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Linking social protection and resilience to climate change:
A case study of the conditional cash transfer programme
Oportunidades in rural Yucatan, Mexico

By

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A thesis submitted for the degree of Doctor of Philosophy in Development Studies

University of Sussex

November 2014

I hereby declare that this thesis has not been and will not be, submitted in whole or in part to another University for the award of any other degree.

Signature:.....

UNIVERSITY OF SUSSEX

ANA EVANISI SOLORZANO SANCHEZ

DOCTOR OF PHILOSOPHY IN DEVELOPMENT STUDIES

LINKING SOCIAL PROTECTION AND RESILIENCE TO CLIMATE CHANGE: A
CASE STUDY OF THE CONDITIONAL CASH TRANSFER PROGRAMME
OPORTUNIDADES IN RURAL YUCATAN, MEXICO

SUMMARY

This thesis examines the linkages between social protection and resilience to climate change among poor rural households. To date there is a very limited understanding of the potential role of social protection programmes in contributing to an increase in resilience of the rural poor with respect to climate change. An improved understanding of these links can help to build the knowledge base that is needed to help the poorest members of the society to adapt to the impacts of climate change. This gap in understanding is addressed in this thesis through a case study of the conditional cash transfer programme Oportunidades in two rural communities in Yucatan, Mexico, a region highly exposed to hurricanes and droughts. Qualitative and quantitative data were collected by means of household surveys, life-history interviews, key informant interviews, group discussions and participant observation.

A social protection-resilience analytical framework was developed in order to guide the data collection and analysis. This framework is informed by a dynamic understanding of resilience, which integrates two resilience dimensions: the absorptive capacity (the ability to resist and recover from a shock) and the adaptive capacity (the ability to adapt to the effects of a shock). This framework is based on the proposition that social protection reduces vulnerability and, by doing so, this can also help to increase poor households resilience to climate change.

The thesis found that the main role of Oportunidades is to provide a regular and predictable safety net that protects households from short-term risk, thus increasing households' absorptive capacity. The impact on the adaptive capacity of households is indirect and differentiated according to their respective poverty profiles. Furthermore, the research shows that certain features of the theory of change of Oportunidades, and its design, reduce the potential impact of the programme, creating trade-offs between the different resilience dimensions. This is the case because resilience to climate change and social protection literatures are derived from distinctive approaches, which frame vulnerability differently. The thesis concludes by making a case for social protection to be complemented by other interventions in a systemic approach that should explicitly consider climate change, in order to increase resilience and achieve sustainable poverty reduction.

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Acronyms

- 70 y Más:** Senior Citizen Attention Programme in Rural Areas
- AR5:** Intergovernmental Panel of Climate Change Fifth Assessment Report
- ASP:** Adaptive Social Protection framework
- BERA:** British Education Research Association
- CCTs:** Conditional Cash Transfers
- CIGA:** Research Centre of Environmental Geography
- CONABIO:** Comisión Nacional para la Biodiversidad
- CONAPO:** National Population Council in Mexico
- CONEVAL:** Consejo Nacional de Evaluación de la Política Social
- CPC:** Community Development Committee
- EZLN:** Ejército Zapatista de Liberación Nacional
- Huertos Familiares:** Family Garden Programme
- ILO:** International Labour Organisation
- INEGI:** National Institute of Statistics and Geography
- IPCC:** Intergovernmental Panel of Climate Change
- NAFTA:** North American Free Trade Agreement treaty
- Oportunidades:** Programa de Desarrollo Humano Oportunidades
- PAN:** National Action Party
- PET:** Temporary Employment Programme
- PRD:** Party of the Democratic Revolution
- PRI:** Institutionalised Revolution Party
- Procampo:** Direct Support to the Country Programme
- RCPs:** Representative Concentration Pathways
- SEDUMA:** Secretaría de Desarrollo Urbano y Medio Ambiente
- Seguro Popular:** Health insurance national programme
- TSP:** Transformative Social Protection framework

Glossary

Cenote: karstic sinkholes formed in the Peninsula of Yucatan

Ejido: is the unit of the rural development in the country and of the communal identity. It was the agrarian unit of the land reform that took place during the 20th century after the Mexican revolution, and it has a mix of private and communal property. In the collective *ejido*, lands are held and worked cooperatively. In individual *ejidos*, farmers work their lands apart from other *ejidatarios*

Ejidatarios: legally recognised owners of *ejidos*

Fajinas: periodic community work without remuneration performed by community members

Fiado: informal arrangement between a local service provider, consisting of a short-term loan in exchange of the good or service, usually with no interest rate, and mainly based on trust and reciprocity

Henequeneros: peasants that worked in the sisal production industry that took place throughout the 19th century and first half of 20th century.

Hipil: highly-embroidered traditional blouses wore by indigenous women

Maalobcushta: Mayan understanding of wellbeing

Mecates: an ancient measure of length and area still used in some parts of rural Mexico for land surveying and roads. One *mecate* is equivalent to 20 metres.

Milpa: a rotational form of agriculture based on natural vegetative processes in order to restore soil fertility. The *milpa* is part of the ancient tradition of the Mayan population of sustainable management of the environment (Konrad 2003)

Vocales: Recipients' representatives in charge of monitoring that recipients comply with the conditionalities of Oportunidades

Chapter 1 Introduction

1.1 Background

Social protection is increasingly considered as having an appropriate role in reducing poverty and poor people's vulnerability to climate change. Scholars have emphasised the importance of social protection as a means of protecting the most vulnerable members of society from the impacts of climate change (Davies et al. 2008; Heltberg, Siegel and Jørgensen 2009; Jones et al. 2010; Wood 2011; Johnson and Krishnamurthy 2010; Johnson et al. 2013). Likewise, 'resilience' is becoming one of the most dominant policy narratives to deal with the impacts of climate change. The concept is being mainstreamed by governments and development organisations, and lies at the centre of different frameworks and strategies targeted at the poorest members of society (cf. Pasteur 2011; SDC and WFP 2011; World Bank 2013; World Vision UK 2013).

Several policies associated with social protection, mainly taking the form of safety net provision, have already been identified for their scope to reduce vulnerability to climate shocks (Heltberg, Siegel and Jørgensen 2009; Béné, Devereux and Sabates-Wheeler 2012; Davies et al. 2013; Coirolo et al. 2013; Panda 2013). Frameworks such as the Adaptive Social Protection framework (Davies and Leavy 2007; Davies et al. 2009; Arnall et al. 2010), and the 3P&T-3D resilience framework developed by Béné et al. (2012) have also aided an understanding of the commonalities and differences between social protection; climate change adaptation; resilience; and disaster risk reduction.

However, to date there has been little agreement on the role of conventional forms of social protection in enhancing resilience. Until recently, there has been no reliable evidence-base that explains to what extent the agenda relating to social protection is compatible with plans dealing with resilience to climate change. How can social protection increase resilience? How does social protection affect long-term resilience and interact with the different intergenerational factors and processes that contribute to risk, poverty and vulnerability? Are there any trade-offs in terms of different timescales over which the given policy interventions are operational? This also leads to additional questions about operational matters, such as: which design features of social protection programmes maximise or limit an impact on resilience? How does the theory of change that underpins social protection affect resilience? What other contextual factors favour,

or limit, the impact of social protection upon the resilience to climate change of poor households?

This gap in the understanding of the potential of social protection to support climate change resilience is addressed in this thesis. Studying the links between these two literatures is critical in order to improve our understanding about how to aid the poorest members of society, to cope with, and adapt to, a changing climate. Poor people are already struggling to deal with current climate variability, as has been well documented (cf. Stern 2006; Mitchell et al. 2012; Olsson et al. 2014). Given this, climate change will increase the current insecurities of these already vulnerable groups (Adger, Paavola and Huq 2006). This will also impose serious challenges to future generations of poor people and represent a serious concern in terms of the intergenerational transmission of vulnerability and poverty (Adger, Lorenzoni and O'Brien 2009; O'Brien et al. 2012). It is therefore fundamental to expand the knowledge base about the role of conventional forms of social protection in increasing resilience to climate change and climate variability of poor households.

1.2 Research setting

The purpose of this thesis is to enhance our understanding of the linkages between conventional forms of social protection and resilience to climate change. For this purpose, this work takes the form of a case study based on the conditional cash transfer Oportunidades programme in Mexico.

This research focuses on the case of Mexico due to the high level of vulnerability to climate shocks that poor rural people face in this country. Due to its geographical location and topography, Mexico currently encounters hydro-meteorological hazards mainly due to its distinct climate zones and to its location, which is associated with a relatively high probability of being hit by hurricanes and tropical storms (see appendix 1). Furthermore, the IPCC Fifth Assessment Report shows that it is *very likely* that the mean annual temperature has increased over the past century across most of North America, including Mexico. Observations also show increases in heavy precipitation over Mexico, between the mid-20th and the early 21st century (Romero-Lankao et al. 2014).

In addition, climate change projections of the IPCC Fifth Assessment Report show a *very likely* increase in mean annual temperature of at least 2°C in Mexico, in the mid- and late-21st-century periods, under any scenario related to carbon emissions. With this level of climate change, it is *very likely* that the country will experience more frequent extreme heat events and daily precipitation extremes; sea level rises; more intense droughts; and increased precipitation variability (Romero-Lankao et al. 2014). The IPCC also argues that there is *high confidence* that these changes will lead to increased stresses to water availability, agricultural production, economic activities, and conditions facing urban and rural settlements. This will negatively affect the rural poor, since small farmers in Mexico are considered highly vulnerable to climate change (ibid.).

Whilst Mexico is considered an upper middle-income country with a gross domestic product per capita of 10,307 USD (World Bank 2014a), income poverty in rural areas is significant. According to the latest census of the population in 2010, Mexico has 112 million people, of which 60 million people (or 51.6% of the total population) were below the wellbeing income poverty line¹. Likewise, 23.5 million people (or 20% of the population) were in extreme poverty or below the minimum wellbeing income poverty line (CONEVAL 2013). While the majority of the poor reside in urban areas (more than 60%), the proportion of income poor people is more extensive in rural areas² (Ávila 2012). There were 24.4 million people (or 23% of the total population) living in rural areas, and of these, 16.7 million people (or 61.6%) were poor in 2012, while 5.8 million people (or 21.5%) were in extreme poverty (ibid.). In the urban context, the rates for poverty and extreme poverty were 34% and 6%, respectively (CONEVAL 2013).

Furthermore, in Mexico the settlements in rural areas are highly dispersed and isolated. For instance, more than 90% of rural localities have a population of less than 500 people. In other words, more than ten million people are dispersed in more than 180 thousand localities with less than 500 inhabitants (Ávila 2012). More than half of the

1 Based on the official national poverty lines in Mexico (CONEVAL 2010): 1) The wellbeing income poverty line measures the population whose income is insufficient to cover their needs (food and no food) even if they devoted their entire income to this purpose. In rural areas this value was equivalent to 1,444 pesos (112 USD) per capita per month with price values of December 2011. 2) The minimum wellbeing income poverty line measures the population whose income is insufficient to cover their food needs, even if they devoted their entire income to this purpose. The value is equivalent to 755 pesos (59 USD) per capita.

2 Defined as the population that resides in localities of 2500 inhabitants or less.

rural localities have low to zero access to health services and 76% have no access to roads (CONEVAL 2012). This fragmentation and dispersion affects access to services and markets, the quality of public services, and increases transportation costs and dependence on subsistence farming. Rural areas suffer from almost double the rates of social deprivation when compared to urban areas with respect to lack of quality of dwellings; lack of access to social security; educational gaps; and food insecurity among the people (CONEVAL 2013).

Moreover, there is a high dependence on rain fed agriculture all over the country, which makes Mexico highly sensitive to any precipitation shifts. In the Caribbean, Gulf of Mexico, and Pacific regions more than 96% of the cultivated agricultural land is rain fed. In the northern region of the country this rate is lower but still quite significant with 68% of the cultivated land highly dependent on rain fed agriculture (Sagarpa-FAO 2012). This is particularly relevant in relation to the food security needs of subsistence and smallholder households in the country

Of particular relevance for this study is that in Mexico there is a large scale and long-term social protection programme operating in rural areas. Specifically, the conditional cash transfer programme, Oportunidades, has been in operation for more than ten years and covers more than 5.8 million households. This model of social protection has been replicated in many countries in Latin America, Asia and Africa. Given this, by analysing a conventional form of social protection, this study researches how social protection matches the resilience agenda.

The *Programa de Desarrollo Humano Oportunidades* (Oportunidades) has been internationally recognised as the main anti-poverty programme in Mexico and was a pioneer conditional cash transfer (CCT) in Latin America.³ Originally known as Progresas, it was developed in 1995 as an income transfer programme for rural households in

3 CCTs differ in the emphasis they put on their objectives. For instance, *Bolsa Família* in Brazil gives more emphasis to distributive justice as social rights recognition, whereas *Oportunidades* in Mexico focuses on long-term human capital investments (Soares et al. 2010; Handa and Davis 2006; Fiszbein and Schady 2009). They also differ on the scope, the scale, the size of the transfer, and the conditionalities: for example, *Bono de Desarrollo Humano* in Ecuador and *Familias en Acción* in Colombia are nationwide programmes with conditionalities relating to education and health, whereas the *Subsidio Condicionado a la Asistencia Escolar* in Colombia and the Punjab Education Sector Reform Programme in Pakistan are small scale with conditionalities only applying to education (Fiszbein and Schady 2009).

extreme poverty. It began as a pilot programme that provided cash benefits, and required recipients to attend health check-ups and children to attend school (Lloyd-Sherlock 2008).

Its overall objective is to "facilitate the development of education, health and nutrition capabilities of the beneficiary families in order to break the intergenerational cycle of poverty" (SEDESOL 2011:3). A detailed explanation of the design is provided in chapter 2 'Theoretical foundations: review of literature and the social protection-resilience framework', but it is important to highlight its extended coverage: currently, the programme reaches more than 5.8 million families⁴ (29 million people) across all the municipalities of the country (Presidencia de la Republica 2011). A total of 68% of these families reside in rural areas (3.4 million families), which represent almost all extremely poor rural households in Mexico (CONEVAL 2009).

Furthermore, according to the National Evaluation Council of the Social Development Policy in Mexico (CONEVAL), without any cash transfers from the government in 2008, extreme poverty in Mexico would have increased an additional 2.6 million: 2.2 million in rural areas and 0.4 million in urban areas; and further, without Oportunidades extreme poverty would have increased from 18.2% to 27.8%, reaching more than 35% of the total population in rural areas (CONEVAL 2009). Additionally, Oportunidades is the programme that delivers the biggest government cash transfer to poor rural households in Mexico (CONEVAL 2010).

A fundamental aspect of Oportunidades is that it does not aim deliberately to increase poor households' resilience to climate change. Nonetheless, in this thesis I explore if the programme design implicitly supports the interaction of the programme in relation to poor households' resilience, by reducing their vulnerability, as will be explained in chapter 2 'Theoretical foundations: review of literature and the social protection-resilience framework'.

Having explained the research context of the thesis I will now present the main research questions, the rationale of the study, the main methodology used and the general results.

⁴ In official statistics in Mexico, a family is considered to have five members.

1.3 Research questions and rationale of the thesis

The key research question of this study is: How does Oportunidades interact with resilience to climate change and variability of poor rural households?

In order to answer the main research question, two main interlinked research sub-questions are addressed:

Research sub-question 1: How does Oportunidades affect the absorptive capacity of poor households?

Research sub-question 2: How does Oportunidades affect the adaptive capacity of poor households?

This research will examine these research questions through the social protection-resilience analytical framework that I created, and that is presented in more detail in chapter 2 ‘Theoretical foundations: review of literature and the social protection-resilience framework’. The framework uses the concept of resilience in relation to two main household capacities: the ‘absorptive capacity’ (the ability to resist and recover from a shock) and the ‘adaptive capacity’ (the ability to adapt to the effects of a shock). Likewise, social protection is understood in terms of three main features: ‘protection’ (which provides relief from deprivation), ‘prevention’ (which averts deprivation), and ‘promotion’ (which enhances incomes and capabilities).

The thesis therefore explores how protective and preventive social protection affects the short-term absorptive capacity of the households that receive support through Oportunidades. It also attempts to shed light on the role of promotive social protection in the long-term and the intergenerational adaptive capacity of these households. Through this analytical framework the research thus examines which features of social protection are most supportive and over which timescale, as well as the different trade-offs that might exist between the absorptive and adaptive capacities.

These dynamics will be explored through the two research sub-questions presented above.

Furthermore, both qualitative and quantitative methods were used in this investigation in order to identify the different dynamics arising from households’ exposure to the cash

benefits of the programme. Data were collected from household surveys, life-history interviews, key informant interviews, group discussions and participant observation. Fieldwork was situated in two rural communities highly exposed to hurricanes and droughts, in the region of Yucatan, as will be explained in chapter 3 ‘Methodology’.

The empirical findings show that the impact of Oportunidades in relation to the resilience of recipient households to climate change was limited. The analysis shows that the impact of Oportunidades is mainly in the absorptive capacity of households, supporting them over a short-term time scale, through the preventive feature of the programme. Furthermore, the results also show that there is an indirect impact of the programme upon the adaptive capacity of households in the long-term, also mainly through the preventive feature of the programme, which is enhanced only in synergy with other sources of income. However, these impacts are differentiated between different poverty categories. The results show that the main potential role of conventional forms of social protection, such as Oportunidades, is to provide a robust preventive safety net that can be used by households in the short-term to cope with shocks. Furthermore, in times of prosperity social protection transfers can be accumulated, in synergy with other sources of income, to indirectly support long-term adaptation.

The research shows that certain features of the theory of change of Oportunidades, and its design, reduce the potential impact of the programme. They create trade-offs between the absorptive and adaptive capacities and between timescales of intervention. Moreover, the findings also demonstrate that Oportunidades does not tackle some power structures that underpin the lack of resilience of poor households. The thesis also shows that conventional social protection may lead to maladaptation (the actions that increase vulnerability), since social protection does not frame vulnerability as part of the wider and global process that underpin climate change. By implicitly accepting an economic development paradigm based on fossil-fuel intensive systems, it can create a positive feedback by increasing emissions of greenhouse gases, hence increasing vulnerability in the long-term. This hinders the development of an agenda embracing both ideas.

The thesis concludes by making the case for a systemic approach of social protection, to integrate development processes with climate change resilience, under a paradigm of

sustainable development. It considers the synergies between poverty reduction (promotive measures); risk reduction (preventive measures); and insurance mechanisms (protective measures); in order to increase both the absorptive and adaptive capacities.

Thus, this research offers some important insights into the compatibility of the concepts of resilience and social protection as means to support pro-poor adaptation. The thesis also considers endeavours towards the potential construction of a social protection-resilience analytical framework that integrates both development and climate change concerns. Finally, the study expands the knowledge of the Oportunidades literature which, to my knowledge, contains no study that has been conducted to examine the impact of the programme on the resilience of recipient households to climate change.

In the next section, the chapter will conclude with a description of the overall structure of the thesis.

1.4The structure of the thesis

This thesis is organised in seven chapters. Chapters 1 to 3 provide the introduction to this research. Chapters 4 to 6 integrate the empirical results. Chapter 7 integrates the main conclusions of the thesis.

Following this introduction, chapter 2 reviews the relevant literature that represents the conceptual foundations of this research, such as social protection, the Oportunidades programme, and resilience. It also reviews the main conceptual frameworks that have been developed that link social protection and resilience or adaptation, such as the Adaptive Social Protection and the 3P&T-3D analytical frameworks. The chapter also explores the main gaps in the knowledge base that justify this research. For instance, the absence of an in-depth analysis of the conceptual linkages between the two literatures; the lack of emphasis on timescales which considers the long-term and the intergenerational scale; the absence of a framework that is operational; and the lack of empirical evidence. The chapter then presents the social protection-resilience analytical framework that I developed in order to facilitate and guide the data collection and analysis of the research. Two main linkages that guided the analysis throughout the research integrate the framework: the protective and preventive social protection-absorptive capacity link; and the promotive social protection-adaptive capacity link. The chapter finishes with an explanation of these linkages.

Chapter 3 presents the methodology of the thesis, which is based on a case study approach. It describes the site selection, based on two rural communities in the Yucatan region of Mexico, a region highly exposed to climate risks. The field sites consist of the coastal community and the inland community. The chapter also explains the research design, and data collection and analysis criteria. The research was based on a mix of quantitative and qualitative data collection sources: 212 household surveys, 56 life history interviews, 6 group discussions, key informant interviews, transect walks, and participant observation. I conclude the chapter with an explanation of my positionality in the research, and the different ethical issues encountered during the fieldwork.

Chapter 4 provides the contextual setting for the following empirical chapters. For this purpose it firstly describes the social-ecological system in the coastal community and the inland community. It presents the main socio-demographic characteristics and also the main livelihoods of people. It also describes the different social protection programmes that operate in the region of study. The chapter then presents the main climate shocks that affect the region, and it also describe the sensitivity of different livelihoods to these climate shocks. The chapter concludes by exploring some contextual and governance issues in the social-ecological system in the communities.

Chapter 5 explores the linkage between Oportunidades and the absorptive capacity of households. For this purpose, it assesses the coping strategies developed by households after the impacts of climate shocks, such as hurricanes and droughts. It shows that the protective feature of the programme supports consumption smoothing strategies in the households, increasing their absorptive capacity in the short-term. The chapter then presents evidence relating to how the preventive feature of the programme supports anticipation of risk. The chapter concludes by arguing that social protection does affect the absorptive capacity of the households, but that it should not be considered as a sufficient source of resilience. Other enablers -such as access to services and markets; land property rights; rural infrastructure plus the humanitarian assistance and relief- are necessary to support the absorptive capacity of households.

Chapter 6 analyses the relation between promotive social protection and the adaptive capacity of the households. For this purpose it deals with two times scales. Firstly, it focuses on the long-term scale by analysing the link between the promotive features of the programme and the adaptive capacity of the adult recipients. Findings show that the

transfer of Oportunidades is used to invest in productive activities only to a very limited extent. This is the case because the size of the transfer is too small. Other more significant transfers such as remittances, promotive transfers from the local government, and income from farm work, are used in a synergetic way to invest in small businesses. However, the empirical results also show that Oportunidades indirectly supports livelihood diversification and innovation, by securing households' short-term needs, thus controlling downward crises. In terms of the intergenerational scale, the chapter suggests that the human capital investments in young adults translate into increasing opportunities for these otherwise excluded children. The empirical findings suggest that other factors will shape the effect of the programme. For instance, the poverty trajectory; the lack of quality and access to schools; the household demographic composition; the parents' interest in the education of the children; and the lack of jobs; will all shape different livelihood pathways for the young adults.

Chapter 7 summarises the findings from the social protection-resilience analytical framework. It also presents the main theoretical implications, which can be divided into: 1) the resilience trade-offs of social protection; 2) the main divergences between the agendas of the two literatures; and 3) the role of power in the social protection-resilience framework. The chapter also discusses some design and policy implications of a universal and systemic social protection approach, and it concludes with some ideas for future research.

Chapter 2 Theoretical foundations: review of literature and the social protection-resilience framework

The main purpose of this chapter is to present the theoretical foundations on which the study draws in order to answer the main research question of the thesis: How does Oportunidades interact with resilience to climate change and variability of poor households? In order to position this knowledge in existing literature, section 2.1 explains the most relevant debates about the role of social protection as a means to increase pro-poor adaptation. For this purpose, the section firstly gives an overview of social protection, and the origin of conditional cash transfers. A detailed description of the rationale and design of Oportunidades then follows. I will also address some of the main critiques to this approach, and some alternative thinking in social protection by reviewing the Transformative Social Protection framework (TSP) (Devereux and Sabates-Wheeler 2004). The chapter later discusses the Adaptive Social Protection framework (Davies et al. 2008). Following this line of thinking in the literature, the literature review then discusses the concept of resilience, and the pros and cons for its use in the development arena. This section then presents the 3P&T-3D analytical framework (Béné et al. 2012). I conclude this section by presenting the main gaps identified in the knowledge base that support this research.

Section 2.2 presents the social protection-resilience analytical framework that I developed in order to systematically analyse the linkages between social protection and climate change resilience. The framework also aims to guide the data collection stage of the research. For this purpose, the conceptual dimension of the framework is presented. Given this, two main linkages are described: the protective and preventive social protection- absorptive capacity link; and the promotive social protection- adaptive capacity link. This section then explains the theoretical proposition that underpins these linkages that I have developed.

2.1 Review of concepts and frameworks

2.1.1 Social protection

There are many different definitions of social protection in the development literature. Broadly, social protection can be understood as “the public actions taken in response to

levels of vulnerability, risk and deprivation which are deemed socially unacceptable within a given polity or society” (Conway, de Haan and Norton 2000:5). Differences in the design and implementation approaches to social protection still remain across different contexts (Cook and Kabeer 2009). Nonetheless, the common thread in the international development community has been a focus on “safety nets” (Devereux and McGregor 2014).

Safety nets aim “to prevent the unfortunate from falling into utter destitution, or to lift those who fell to such a level up to a minimum acceptable standard of living” (Conway and Norton 2002:533). This approach of social protection is equivalent to social assistance, understood as those interventions that have been adopted as shock-response instruments to support those not covered by formal-sector provision (McCord 2013). This approach is largely ‘residualist’ (Titmuss 1974), where “public obligation enters only when the market fails” (Esping-Andersen 2010:43). It seeks to compensate for the income loss after a crisis, and protect and strengthen households from shocks that would otherwise make them fall to a low standard of living. Tax-financed cash transfers targeted to poor and vulnerable households are the most common forms of this form of social protection (McCord 2013).

Conditional Cash Transfers (CCTs) have been given priority in the international development agenda, especially in Latin America as it has been argued that they provide an effective method to reduce poverty. These programmes have now become conventional forms of social protection that are mainstreamed by governments and donors in order to build the incomes, assets, and livelihoods of vulnerable populations (Niño-Zarazúa et al. 2012). They “are all the rage now” (Kanbur 2014:95). CCTs originated in Latin America during the 1990s after the social fall-out of the Tequila Crisis⁵ (Fiszbein and Schady 2009). They began in Mexico with Oportunidades and in Brazil with Bolsa Família as income transfer programmes for rural households in extreme poverty. In the context of structural adjustment policies and the Washington Consensus, these instruments were seen as the most cost effective way to achieve poverty reduction in rural areas (de Janvry 2010). However, these programmes have

5 The ‘Tequila crisis’ effectively became a crisis with the sudden devaluation of the Mexican peso in December 1994, after a period of hyperinflation, debt loads, and low oil prices. Its effects expanded to affect the rest of Latin America.

been criticised as they do not address the structural causes of vulnerability. This will be explained in more detail in section 2.1.1.2 Transformative Social Protection.

With the introduction of these programmes, mainstream social protection expanded its range to the broader objectives of economic growth. So they are specifically designed to achieve multiple objectives simultaneously (Lindert 2005; Samson, Niekerk and Mac Quene 2006; Britto 2008; Fiszbein and Schady 2009). For instance, cash provides emergency assistance, protecting incomes and consumption. The cash injection also contributes to sustainable poverty reduction by transforming recipients' livelihoods into activities with a higher productivity through the regularity of predictable payments. The provision of cash has a redistributive objective with the aim of creating equality among citizens. In addition, various conditionalities prevent further deprivation through access to health and education services and improvements to nutrition. CCTs aim to break the intergenerational transmission of poverty through the investments in human capital (Lindert 2005).

These CCTs have reached poor people often dependent on informal work (Leisering and Barrientos 2013). In Latin America the welfare model has a "historical division between social insurance for formal sector workers and social assistance for the rest of the population" (Lloyd-Sherlock 2008:621). This stratified system was initially modelled on the conservative/Bismarckian welfare model, influenced by the International Labour Organisation (ILO). The conservative welfare state is a meritocratic model focused on social insurance for wage-earners, based on contributory provisions and formal labour-market based social security (Esping-Andersen 2010). However, in Latin America a large proportion of the workforce is in the informal sector. Consequently, this welfare model has excluded a large extent of the population that falls outside the coverage of formal employment. It is highly regressive, and it has accentuated social differences between urban advanced sectors and the more traditional rural and urban informal sectors (Filgueira 2005). "Workers in informal employment and their dependents, a majority in the region, remained excluded from formal social protection institutions" (Barrientos 2010:11).

Some scholars argue that these large-scale social assistance programmes in the form of CCTs might help to ameliorate some of the negative effects of the stratified welfare system, and even provide a new model of social citizenship in Latin America (Leisering

and Barrientos 2013). The rapid expansion and the large-scale of these programmes during the 1990s has been described as a ‘quiet revolution’ reflecting a paradigm shift to more inclusive social policies in developing countries (Barrientos and Hulme 2008). To a certain extent these cash transfers partly fill the social welfare gap that in wealthier countries is covered by more systematic social welfare or social security policies (Devereux 2002; Cook and Kabeer 2009).

2.1.1.1 Oportunidades

There are two trains of thought that underpin the original design of Oportunidades (Escobar- Latapí 2012). The first is based on a socio-demographic approach represented by the National Population Council in Mexico (CONAPO), which emphasises education and health investments as drivers of demographic change that would help to reduce poverty. The theory of change of this approach is that higher investments in these areas would lead to lower infant and maternal mortality, lower fecundity rates, and a lower dependency ratio, and therefore a higher income per capita in the household. In the long-term, all these factors would help to reduce poverty. The second approach draws from an economic productivity rationale, which emphasises the human capital investments of poor children as a means to break the intergenerational transmission of poverty. The focus of this approach is to increase the labour income per capita of poor people, which is critically dependent on their productivity once they enter the labour market. In this approach, it is expected that once in the labour market young adults will find improved and constant wages, and will have permanent access to social security (Levy 2008). Once these two complementary approaches of social protection were combined then the expected social change should be very significant: higher labour incomes from access to higher human capital, and higher income per capita due to the lower dependency ratio (Escobar-Latapí 2012).

The operational description of the programme is explained next.

Recipients are selected through a two-stage targeting mechanism. Firstly, geographic targeting is applied to select the most marginal localities based on the deprivation index. Secondly, a socioeconomic survey is applied to all households in these localities in order to identify households in extreme poverty. Also the access to health and education

services in these localities is evaluated, in order for the families to achieve the health and education conditionalities that they are required to cover (SEDESOL 2011).

The transfers are targeted to families with children in primary, junior high and senior high school⁶. Girls and children in higher education receive larger payments. Whilst there are no clear criteria for the actual amount of the transfers, the differentiated size of transfers by age and gender is an attempt to cover the opportunity costs of children's education in terms of labour market and domestic labour alternatives. The maximum monthly sum that a household with children in primary and junior high school can receive is 1,560 pesos (121 USD)⁷, and for families with children in senior high school it is 2,520 pesos (196 USD) (SEDESOL 2011). Moreover, families also receive transfers to support their nutrition and to smooth their energy consumption costs.

In exchange for these cash transfers, mothers are required to guarantee that their children who are younger than 18 are enrolled in primary and junior high school, and that they attend classes regularly. Children below the age of 21 are required to be enrolled in high school. Furthermore, the recipient women should attend regular health checks in the local clinics, as well as attend various health education workshops. If recipients do not comply with the conditionalities, they will have a reduction in benefits or even an indefinite suspension from the programme. Empirical evidence suggests that these conditionalities appear to be linked to significant improvements in child and maternal health and physical development (cf. Rawlings and Rubio 2005; Barham 2005; Hernandez et al. 2005). In this light, the cash transfers of Oportunidades are viewed as temporary while the programme achieves its main goal of improving children's human capital, through education, nutrition, and health investments.

6 Basic compulsory education starts in primary school. It is equivalent to six years in grades 1 to 6. The student usually starts at the age of six years old. Junior high school corresponds to grades 7 to 9, equivalent to three years of education starting when the student is 12 years old. The high school is three years long, equivalent to grades 10-12, and commences when the student is 15 years old. The grant for the first and second year in primary school applies only for localities of less than 2500 inhabitants and it started only in September 2011.

7 The cash amount of the benefits is based on the 2012 rules of management of the programme. Estimated figures using an exchange rate of 12.80 Mexican Pesos per US Dollar, February, 2012 (Banxico)

Graduation rules from the programme are as follows:

“After six years, those families above a reassessment line— equivalent to the eligibility line used for admission, plus the amount of the monthly cash transfer for food consumption—are transferred to a differentiated scheme, for six more years and then they would leave the programme. This differentiated scheme consists of the former benefits minus the cash transfer for food consumption and the primary school scholarships, which are assumed to be affordable by beneficiary families above the eligibility threshold” (Yaschine and Dávila 2008:8).

The families that started to receive the programme in 1997 are currently graduating from it. In 2011 the programme had a total budget of more than 58,700 million pesos (4,585 million USD)⁸ (including the participation of social development, health and education sectors) (CONEVAL 2012).

The programme was originally designed so that it would be complemented by other interventions that would use the same targeting mechanisms in order to plan and direct their actions in the same locations (Rodriguez and Pasillas 2008). A series of instruments have been developed during the last couple of decades, but they remain like an umbrella of isolated interventions rather than an integrated scheme to tackle the different structural causes of poverty and vulnerability. However, these programmes do create an extended safety net for a large part of the population.

2.1.1.2 Transformative social protection

Some scholars have challenged the conventional approach of social protection, which includes Oportunidades, by arguing that it carries a “hidden ontological bias” (Devereux and McGregor 2014:308), where “the causes of poverty and its solutions are located in individuals rather than in social structures” (ibid.). Scholars have criticised CCTs for their limited impact on addressing the structural factors that perpetuate poverty and social injustice. For instance, Teichman (2008) argues that CCTs can hardly address the historical factors that perpetuate vulnerability. Devereux and McGregor (2014) state that cash transfers aim to compensate for the structural conditions that cause inequality

⁸ Estimated figures using an exchange rate of 12.80 Mexican Pesos per US Dollar, February, 2012 (Banxico).

and social injustice. “A transformative agenda for social protection asserts that while poverty can be alleviated with a cash transfer, it cannot always be solved with a cash transfer. Poverty relief is not poverty reduction” (ibid.:306).

Some authors have argued that social protection should tackle causes rather than only the symptoms of poverty and vulnerability, by including social structures, institutions, politics and power (cf. Devereux and Sabates-Wheeler 2004; Lloyd-Sherlock 2008; Sabates-Wheeler and Devereux 2008; Devereux and McGregor 2014). For instance, Devereux and Sabates-Wheeler (2004) argue that effective social protection interventions must attempt to address the underlying structural inequalities, which give rise to vulnerability, insecurity and social exclusion in a given context. In this vein, the Transformative Social Protection framework (TSP) (ibid.) highlights “the potential of certain social protection measures to contribute to growth and productivity as well as to risk management and/or social equity, either through achieving both objectives simultaneously or through linkages with other interventions” (Devereux and Sabates-Wheeler 2007:33).

The TSP refers to the need “to pursue policies that relate to power imbalances in society that encourage, create and sustain vulnerabilities” (Devereux and Sabates-Wheeler 2004:9). In this approach, vulnerability and risk are embedded in the socio-political context, rather than as exogenous factors to be managed. So TSP aims to address ‘social risks’ and non-economic vulnerability, such as social exclusion and discrimination (Sabates-Wheeler and Devereux 2007).

Additionally, this approach considers the potential synergies between the economic functions of social protection (protection, prevention, promotion), and its social functions (transformation), which Devereux and Sabates-Wheeler (2004) elaborate as follows:

- “Protective measures are those that provide relief from deprivation. They are narrowly targeted safety net measures in the conventional sense – they aim to provide relief from poverty and deprivation where promotive and preventive measures have failed to do so. Protective measures include social assistance for the ‘chronically poor’, especially those who are unable to work and earn their livelihood.

- Preventive measures seek to avert deprivation. They deal directly with poverty alleviation. They include social insurance for people who have fallen or might fall into poverty, and may need support to help them manage livelihood shocks. This is similar to social safety nets.
- Promotive measures aim to enhance real incomes and capabilities, which is achieved through a range of livelihood-enhancing programmes targeted at households and individuals. The inclusion of promotive measures as a category here is open to the criticism that it takes social protection too far beyond its original conceptualisation. However, the intention of promotive measures is not to broaden the scope to include all development initiatives, but to focus on approaches and instruments that have income stabilisation at least as one objective.
- Transformative measures seek to address concerns of social equity and exclusion of the poorest and most marginalised groups. Transformative interventions include changes to the regulatory framework to protect ‘socially vulnerable groups’” (ibid.:10).

This framework takes as its point of departure the understanding that anti-poverty interventions should operate both at the economic and socio-political level, “since many underlying causes of human wellbeing failures are as much social and political as they are economic” (Devereux and McGregor 2014:306).

2.1.1.3 Oportunidades and the transformative agenda

CCTs can be seen as entitlements provided by the state as part of its ‘social contract’ with its citizens (Chapman 2006). In countries like Brazil for example, CCTs are explicitly established as a social right related to a minimum income in recognition of the social element of citizenship (Marshall 1964). From this perspective, the state’s introduction of entitlements has the redistributive potential to create equality among citizens (Cook and Kabeer 2009), which is transformative. It transforms traditional clientelistic relations between the state and the population in poverty, by an explicit recognition of social rights for the most excluded, as part of a notion of citizenship (Solórzano 2010).

Furthermore, strengthening citizenship rights and claims to security is a ‘catalyst’ to greater awareness of recipients’ claims on the political proselytism at the local level state (Cook and Kabeer 2009). The right to social security is inscribed in both the Universal Declaration of Human Rights (1948) and the International Covenant on Economic and Social Rights (1966). “While the state should respect the right to minimum livelihood under all circumstances, in other conditions in which scarcity of resources makes full immediate realisation unattainable it should seek to work towards progressive realisation of this right” (Norton, Conway and Foster 2002:542). In this light, social assistance constitutes a potential route to ensuring economic and social rights, especially among those in poverty and subject to social exclusion (Barrientos and Hinojosa-Valencia 2009). Given this, the ILO has established that cash transfers provide a ‘floor’ for many citizens (Deacon 2013).

Some scholars argue that CCTs do not build citizenship, since conditionalities erode the principle of social protection as a human right, and that people should be free to make the choices they want with no conditions attached (Samson, Niekerk and Mac Quene 2006; Freeland 2007; Jusidman 2009). Moreover, weak institutional frameworks in locations where the programmes operate undermine the extension of this citizenship, through corruption and clientelism (Jusidman 2009; Leisering and Barrientos 2013). Hevia de la Jara (2008) argues that Oportunidades still reproduces the culture of authoritarian corporatism and political proselytism at the local level, through the intermediaries that stand between the federal government and the recipients, such as the municipal liason and the *vocales*. The latter are recipients’ representatives in charge of monitoring that other recipients comply with the conditionalities. The *vocales* are recipients themselves and are granted powerful instruments of control that on occasions are used for clientelistic purposes. Hevia de la Jara (2008) points out that this is the case because the quality of the different collective actors that are outside of the programme’s realm is essential for the success of the programme.

While theoretically Oportunidades have positive features to address some of the underlying causes of chronic poverty and vulnerability such as malnutrition, the lack of access to education and health services of quality (Anderson, Geoghegan and Ayers 2009), restricts any transformative potential of Oportunidades in these areas. Moreover, Oportunidades avoids recognising the structurally disadvantaged position of the poor

worker in Mexico's dual labour market and reinforces their exclusion (Solórzano 2010). Likewise, Ulrichs and Roelen (2012) argue that Oportunidades does not deal with the social injustices that underpin the social exclusion of the indigenous populations in Mexico.

In this research I take the position that the aim of social protection should to build resilient livelihoods, protect people against impoverishing shocks and stresses, and to eradicate the social origins of vulnerability (Sabates-Wheeler and Devereux 2008). In this light, I am assuming that the overall objectives of Oportunidades are not transformative, but that, nevertheless, in certain contexts the programme reduces some of the causes of vulnerability by helping future generations to have more options about their own destiny, and creates new types, or directions, of change.

2.1.1.4 Oportunidades and climate change research

There is a large set of studies and impact evaluations focusing on the Oportunidades programme's education outcomes (Skoufias and McClafferty 2001; Rawlings and Rubio 2005), household consumption outcomes (Rawlings and Rubio 2005; Arroyo et al. 2008; Barrientos and Sabates-Wheeler 2011), health outcomes (Gertler 2004; Barham 2005; Hernández et al. 2005), among other social development goals (cf. Oportunidades 2014). However, very little literature is found that considers the role of the programme in relation to climate shocks.

De Janvry et al. (2006) analysed whether or not the conditionalities of the programme helped to protect school enrolment during income shocks, including climatic shocks. Through a dynamic model using panel data from 1997 to 2000 they found that Oportunidades helped to protect enrolment, but did not stop parents from using their children's labour in response to shocks. Hou (2010) in his study -also based on a randomised experiment using the Oportunidades panel data from 1998 to 1999- finds that Oportunidades mitigates the impact of drought on calorie intake from fruits, vegetables, and animal products. Matching household data from 2002, 2005 and 2007 to weather information based on total rainfall, Skoufias and Vinha (2012) found that when faced with certain weather-related shocks, the health of children living in households receiving Oportunidades is statistically significantly worse than the health of children not receiving the programme. The authors suggest that simply being a recipient of the

programme does not level out child health outcomes after certain weather shocks. In another thread of thought, Alix-Garcia et al. (2013) researched the links between Oportunidades and climate change mitigation. They link spatial data on deforestation to the eligibility of every community in the country. They found that Oportunidades increases the consumption of land-intensive goods, increasing deforestation rates.

Whilst these studies have broadened the research scope of Oportunidades to include climatic and environmental analysis, to my knowledge, no study that explicitly analyses the linkage between Oportunidades and climate change resilience has been undertaken. In addition, these studies are quantitative studies that do not consider the different dynamics and processes that underpin households' climate change resilience. This thesis aims to cover this empirical gap by providing evidence about the linkages between social protection and resilience to climate change.

2.1.2 Adaptive Social Protection Framework

Scholarly research about the linkages between social protection and climate change resilience is at its early stages. However, some research progress has been achieved during the last six years, mainly in the areas of social protection, climate change adaptation and disaster risk reduction. For instance, different forms of social protection programmes have been related to their capacity to mitigating climate risk, such as cash for work programmes (Béné, Devereux and Sabates-Wheeler 2012); crop insurance (Panda 2013); and safety nets (Coirolo et al. 2013). New evidence is emerging that provides a better understanding of the linking of social protection, climate change adaptation and disaster risk reduction. Davies et al. (2013) used evidence from 124 agricultural programmes in Asia to assess their degree of integration and its implications for livelihoods. The authors found that higher integration linking these areas increases the impact of interventions on the livelihoods of poor people.

Other advancements in academic research include the development of conceptual frameworks in order to explore the synergies between social protection, climate change adaptation, and disaster risk reduction, such as the Climate-Responsive Social Protection framework developed by Kuriakose et al. (2013); and the Adaptive Social Protection framework (Davies et al. 2008). Due to its relevance to this study, I will focus on the latter.

The Adaptive Social Protection framework (ASP) (Davies et al. 2008) developed at the Institute of Development Studies was the first scholarly effort to explore the linkages between disaster risk reduction, climate change adaptation and social protection approaches. The framework aims to “simultaneously tackle unsafe living conditions, counter the underlying causes of vulnerability, and promote people’s ability to adapt to a changing climate” (Arnall et al. 2010:1). The ASP framework aims to accommodate the social protection interventions that aim to support development and reduce vulnerability to climate change. A set of main features that characterises the ASP approach is identified as follows:

- “An emphasis on transforming productive livelihoods as well as protecting, and adapting to changing climate conditions rather than simply reinforcing coping mechanisms.
- Grounding in an understanding of the structural root causes of poverty for particular people, permitting more effective targeting of vulnerability to multiple shocks and stresses.
- Incorporation of a rights-based rationale for action, stressing equity and justice dimensions of chronic poverty and climate change adaptation in addition to instrumentalist rationale based primarily on economic efficiency.
- An enhanced role for research from both the natural and social sciences to inform the design and implementation of social protection policies and measures in the context of the burden of both geophysical hazards and changing climate-related hazards.
- A long-term and dynamic perspective for social protection programmes that takes into account the changing nature of shocks and stresses”. (Davies et al. 2008:111)

The ASP framework draws on the TSP framework developed by Devereux and Sabates-Wheeler (2004), where the different strands of social protection are linked to potential adaptation and disaster risk reduction benefits, based on the reduction of exposure to current and future climate shocks and building the adaptive capacity of the poor (see figure 2.1). The conceptual underpinning of this link is that social protection helps climate change adaptation to move the attention from building on coping strategies to

tackling the structural factors that permit adaptive shifts in livelihood strategies. In other words, an emphasis on social protection helps to look beyond protecting the most vulnerable and towards ‘prevent and promote’ approaches to livelihoods (Davies et al. 2009). In this light, ASP derives from the sustainable livelihoods framework since it describes the role of the different forms of assets to construct livelihoods, and in the sense that it recognises that the lack of means to cope with risk is a cause of poverty (Davies et al. 2013).

Figure 2.1 Promoting adaptation through social protection, ASP framework

SP category	SP instruments	Adaptation and DRR benefits
<i>Provision</i> (coping strategies)	<ul style="list-style-type: none"> – social service provision – basic social transfers (food/cash) – pension schemes – public works programmes 	<ul style="list-style-type: none"> – protection of those most vulnerable to climate risks, with low levels of adaptive capacity
<i>Preventive</i> (coping strategies)	<ul style="list-style-type: none"> – social transfers – livelihood diversification – weather-indexed crop insurance 	<ul style="list-style-type: none"> – prevents damaging coping strategies as a result of risks to weather-dependent livelihoods
<i>Promotive</i> (building adaptive capacity)	<ul style="list-style-type: none"> – social transfers – access to credit – asset transfers/protection – starter packs (drought/flood-resistant) – access to common property resources – public works programmes 	<ul style="list-style-type: none"> – promotes resilience through livelihood diversification and security to withstand climate related shocks – promotes opportunities arising from climate change
<i>Transformative</i> (building adaptive capacity)	<ul style="list-style-type: none"> – promotion of minority rights – anti-discrimination campaigns – social funds 	<ul style="list-style-type: none"> – transforms social relations to combat discrimination underlying social and political vulnerability

Source: Davies et al. 2009:16

Early approaches to ASP helped to map out some of the overlaps and gaps between social protection and climate change adaptation, with the purpose of mitigating risk and building resilience on livelihoods (Davies et al. 2009). They have also set the scene to address the potential of specific social protection interventions such as cash transfers in order to develop no-regrets approaches to climate change (Wood 2011).

Conceptually, ASP approaches have moved from simplified assessments about the role of social protection in increasing adaptive capacity to more structured frameworks that aim to address the dynamic relations and issues of timescale that underpin long-term

resilience. Moreover, these approaches have also moved forward from broad generalisations of social protection to the specific role of certain interventions such as cash transfers. These frameworks are still in their early stages and there are certain gaps in the understanding of what is to be expected from social protection in relation to resilience, and the links with vulnerability.

Early approaches of ASP identified the potential links between vulnerability reduction and adaptive capacity by linking the concepts with the TSP framework. The introduction of the TSP framework as a complementary tool to address the role of social protection in climate change adaptation has been fundamental. This helped to frame the importance of social protection in reducing structural barriers to adaptation and resilience through emphasising vulnerability reduction. However, it is not yet very clear how this relation takes place. These approaches also ignore the synergies between social protection measures, either formal or informal, and other factors that may result in constraints or enablers of adaptation. Instead the adaptation approach focuses on isolated and short-term impacts of social protection (cf. Davies and Leavy 2007; Davies et al. 2009).

New thinking on ASP has recently used resilience to complement the ASP framework in order to assess a more dynamic approach (Béné et al. 2012). In this light, Béné et al. (2012) developed the 3P&T-3D analytical framework which links resilience with social protection, which will be reviewed in sub-section 2.1.4.

2.1.3 Resilience

Before reviewing the 3P&T-3D analytical framework, I will firstly explain the concept of resilience. Resilience is becoming a very popular concept to integrate development with climate change adaptation (Klein, Nicholls and Thomalla 2003; Béné et al. 2014). Several authors have documented the evolution of the term ‘resilience’ and its use in different fields (cf. Brand and Jax 2007; Bahadur, Ibrahim and Tanner 2011; Martin-Breen and Anderies 2011; IFPRI 2013). In this literature review, I will focus on its evolution in climate change adaptation and development literatures. Then I will reflect on the main critiques to the concept of resilience and some limitations identified for its use in development interventions.

There is no standard definition of resilience, but the term comes from the Latin word *resilire*, which means “to rebound or recoil” (Hoddinott 2014:1). Early thinking of resilience was applied in the natural sciences including, mathematics, engineering, development psychology, and ecology (Brown 2014). In the climate change adaptation arena, resilience thinking evolved from the field of ecology (cf. Holling 1973; Berkes and Folke 1998). It has also been influenced, and has influenced, the work on global environmental change and disaster risk (Klein, Nicholls and Thomalla 2003). These early approaches to resilience emphasised a quality of persistence and resistance to disturbances (Adger 2000; Gunderson 2000).

The social-ecological systems (SES) literature challenged, and evolved from earlier conceptualisations of resilience in ecology, and emphasised the importance of human actions as sources of change. It integrated social structures and ecological systems, which are made up of many different parts that interact to form a more complex entity (Luers et al. 2003; Turner et al. 2003; Walker et al. 2006; O’Brien et al. 2007; Resilience Alliance 2010). This literature identified three main characteristics of resilience (Carpenter et al. 2001; Folke et al. 2002; Tompkins and Adger 2004; Nelson, Adger and Brown 2007): the buffering capacity, which is the degree to which the system is susceptible to change while still retaining structure and function; self-organisation, which is the capacity of the system to adjust through interactions among its components; and the adaptive and learning capacity. As the extent and scale of these capacities increase, so does the ability to adapt (Hammill et al. 2005; Reid and Huq 2005; Adger 2006; Mitchell and Tanner 2006).

The importance of this approach is that resilience is not anymore about coping with change, but also about living with it. Following a disturbance, the social-ecological system’s interactions might create feedbacks that amplify change, or that have a stabilising effect within the system (Resilience Alliance 2010). Therefore, resilience now focuses on processes of change (Adger et al. 2011; O’Brien et al. 2012). By adding the idea of multi-scale systems, social change is essential for this resilience approach. In this light, change at small scale is facilitated by adaptation, and new initiatives emerge through the interactions within and across scales.

It is in this arena that resilience started to have growing influence in development discourses (cf. Fischer and Kothari 2011; IFPRI 2013; Béné et al. 2014). In particular,

resilience “allows multiple risks, shocks and stresses and their impacts on ecosystems and vulnerable people to be considered together in the context of development programming” (Mitchell and Harris 2012:6). The term is used as a conceptual umbrella, facilitating integrated approaches that break the usual disciplinary silos (Martin-Breen and Anderies 2012). It has integrated the interactions between climate change, and other multiple sources of shocks and stresses. Furthermore, this understanding of resilience emphasises systems thinking, helping to identify the different interactions between short-term and long-term changes that affect vulnerable people (Miller et al. 2010; O’Brien et al. 2012).

Through its focus on strategies to deal with change, resilience also highlights the capacities required to deal with these shocks and risks. It also focuses on the agency of people, since it emphasises what people do to strengthen these capacities (Berkes 2007; Twigg 2007). The emphasis on social-ecological systems helps aid an understanding of the relation between climate change and rural livelihoods (Béné et al. 2014). By highlighting the relation to natural resources and social systems, resilience helps provide an understanding of the processes that underpin the vulnerability of the rural poor.

Even so, resilience has been often criticised for not being a normative concept (Janssen et al. 2006; Nelson 2009; Miller et al. 2010; Adger 2008; Pelling 2011). In other words, resilience is “neither good nor bad; or more precisely put, that it can be good but it can also be bad” (Béné et al. 2014:599). This is the case because early approaches to ecological resilience drew from a positivist epistemology, which left any normative assumptions aside. In the SES literature, the application of resilience assumed that social and ecological systems were similar, and the concept grew in isolation from social science development, excluding society and people from the focus of analysis (Cote and Nightingale 2012). Miller et al. (2010) argue that the differences in approach to social-ecological dimensions of change are caused by the distinctive origins in ecological and social theory.

From a development perspective this means that there may be trade-offs between resilience and wellbeing (Davidson 2010; Armitage et al. 2012). For instance, a system could be robust enough to cope with change, but the status quo is in a state of high marginalisation and poverty. Likewise, a system can transform into a new equilibrium,

but the new equilibrium reached is highly unequal, increasing the vulnerability of certain groups in society (Pelling 2011).

Furthermore, the resilience literature does not reflect issues of agency, politics, and power in the social-ecological system. For instance, Gaillard (2010) argues that resilience ignores the root causes of vulnerability and poverty by framing risk as an external source located in the ecological system. Miller et al. (2010) argue that in the SES literature vulnerability is approached as the physical vulnerability of ecosystems, rather than taking an integrated view that includes social dimensions of vulnerability. Cannon and Muller-Mahn (2010) indicate that resilience's avoidance of power and politics in social systems is 'dangerous'. Likewise, Béné et al. (2014) argue that resilience is not a 'pro-poor' concept, and therefore should be used with caution when trying to implement development actions. "If applied uncritically, a resilience-based approach might end up leading us towards abandoning interest in the poor (est) for the sake of strengthening community or even (eco) system-level resilience" (ibid.:616). To a large extent, this critique is the consequence of an increasing interest by developing agencies and donors in the concept of resilience, where it has become a "policy narrative" (Béné et al. 2014:606), with little or no critical awareness of the potential negative implications of the term for poverty reduction. This is illustrated in the different resilience frameworks and strategies that have been developed by some of these agencies (cf. Pasteur 2011; SDC and WFP 2011; World Bank 2013; World Vision UK 2013).

A further distinction in SES resilience literature is the difference between 'specified' and 'general' resilience (Carpenter et al. 2001). The former narrows the focus to one system level and drivers by defining the specific resilience 'of what, to what'. The latter concerns all the aspects of the system including disturbances that are novel and unforeseen (Resilience Alliance 2010). Scholars recognise the existence of trade-offs between these two types of resilience. If resilience is approached as 'general resilience' then the concept is neutral. If resilience is understood as 'specific resilience' then the concept can narrow down to what type of resilience it is referring to, and it can specify a normative view of resilience. However, it would also be missing some of the feedbacks that could be enhancing poverty and vulnerability at different scales.

Some authors argue that by complementing the concept of resilience with vulnerability, these issues will be reconciled (Adger 2006; Miller et al. 2010; Béné et al. 2014). For instance, Adger (2006) argues that vulnerability and resilience influence each other, not as opposites, but as overlapping concepts. Miller et al. (2010) suggest taking a ‘bifocal approach’, which draws from the virtues of both approaches: from the resilience thinking there can be an assessment of the long-term biophysical system drivers and from the vulnerability literature there can be an integration of the contemporary local socioeconomic realities, such as issues of social justice and power distribution (Cannon and Muller-Mahn 2010). In this light, Mitchell and Harris (2012) note that resilience “does place emphasis on individual, institutional and system wide capacities at its heart, which can help to expose concerns about an inability to address underlying causes and where weaknesses (such as lack of power) have an impact on overall functioning” (ibid 2012:5).

However, the concern in terms of development practice is that a resilience approach may lead to a focus on apolitical, and technocratic responses focused on hazards that come at the expense of social justice and social transformation (Cannon and Muller-Mahn 2010; Béné et al. 2014). This is reflected in the fact that resilience actions focus on incremental shifts rather than the transformational changes that might be necessary to tackle the underlying causes of vulnerability.

Recent approaches to resilience in relation to climate change highlight the importance of transformation, understood as a fundamental physical or qualitative change in form, structure or meaning in the system that will enable it to be better suited to thrive within the context (Berkes, Colding and Folke 2003; Folke, Chapin and Olsson 2009; Folke et al. 2010; Smith and Stirling 2010; Park et al. 2012).

In the climate change adaptation literature, transformation is related to the structural social, cultural, economic, and political causes of vulnerability (Pelling 2011).

Transformation addresses the power imbalances in society, which underpin vulnerability (Kates, Travis and Wilbanks 2012). To a certain extent, this understanding of transformation in the climate change literature reflects the same definition reviewed in the TSP framework (Bahadur and Tanner 2014).

Transformation can also be understood at the individual scale, where it involves a major change in livelihood, location or identity. In this light, agency and choice are central to how people undergo their transformation (Gunderson and Holling 2002; Osbahr et al. 2010; Marshall et al. 2012). Agency gives humans the ability to proactively direct patterns of adaptation in ways that increase resilience (Moench and Dixit 2004). It can change path-dependent strategies that are ‘maladaptive’ (Osbahr et al. 2010), understood as the actions that tend to increase vulnerability (Burton, Smith, and Lenhart 1998; Barnett and O’Neill 2010).

Even so, the meaning of transformation in the discussion of resilience remains ambiguous (Brown 2014). On the one hand, resilience expands its meaning to the inclusion of social shifts (Chapin et al. 2010; Folke et al. 2010; Smith and Stirling 2010). For instance, Folke et al. (2010) present both adaptability and transformability as key components of resilience thinking. They expand the definition of resilience from persistence or buffer to a dynamic synergy between persistence, adaptability and transformability among multiple scales and attractors. They present the idea of ‘resilience as transformation’ where social change is essential for resilience, and adaptation facilitates learning and innovation, through interactions within and across scales. Bahadur and Tanner (2014) propose not to discard one concept for the other, but they argue for “reimagining resilience as a concept that includes useful tenets from the body of knowledge on transformation” (ibid: 12).

On the other hand, resilience focuses on the persistence of the system, working against profound change (cf. Jerneck and Olsson 2008; Leach 2008; Pelling 2011; Pelling and Manuel-Navarrete 2011; Shaw 2012; Wilson et al. 2013). Given this, Pelling (2011) argues that transformation remains as a different, and opposed, concept to resilience. Leach (2008), on the development arena, establishes that resilience usage is inherently conservative, since it focuses on the persistence of a system, underplaying the endogenous and social dynamics in the system. Moser and Ekstrom (2010) indicate that transformation and resilience are different parts of an adaptation spectrum.

In the praxis, evidence shows that in the context of development action, resilience to climate change usually supports the latter, with bigger emphasis on ‘business as usual’ activity. For instance, Brown (2012) shows, in her review of policy discourses in the

arena of climate change and development, that the application of resilience emphasises the status quo, rather than more profound and structural changes.

For the purpose of this thesis the definition of resilience that I use is: “the ability to resist, recover from, or adapt to the effects of a shock or a change” (Mitchell and Harris 2012:2). It will assume that vulnerability and resilience are complementary concepts, and that transformation is a separate concept that can be related to resilience. This will be explained in more detail in section 2.2.

2.1.4 The 3P&T-3D analytical framework

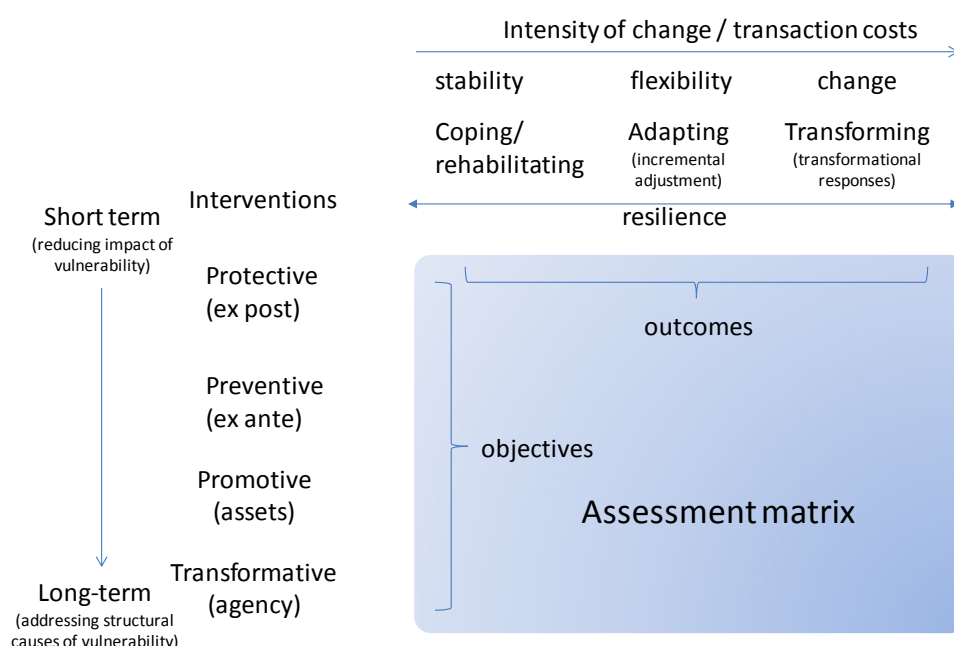
Béné et al. (2012) provide an innovative analytical framework to evaluate the extent to which social protection programmes contribute to strengthening the resilience of their recipients to climate change. The framework moves from earlier simplified approaches of ASP that linked adaptive capacity with TSP, to a more systematic framework that highlights the importance of a dynamic approach to resilience and social protection which considers time and scale issues.

The authors argue that resilience is the synergy that people can create by playing with the three dimensions of the term (which the authors frame as the 3D resilience framework): absorptive, adaptive and transformative capacity. These capacities lead to different resilience outcomes: persistence, incremental adjustment or transformational responses. The framework suggests that these different outcomes can be linked to various intensities of shock or change: the lower the intensity of the initial shock, the more likely the household will be able to absorb its impacts without consequences for its function, status or state. Likewise, the higher the intensity of the shock the higher the transaction costs to maintain the status quo, and therefore transformation will be required (Béné et al. 2012).

Furthermore, they link the 3D resilience framework with the TSP framework developed by Devereux and Sabates-Wheeler (2004), creating the 3P&T-3D analytical framework. The framework is based on an assessment matrix, which links each objective of TSP (protection, prevention, promotion and transformation) with the outcomes of these programmes but in terms of the three components of resilience (persistence or coping, adaptive or transformational responses) (see figure 2.2). In other words, the outcomes of protective social protection are linked to coping, adaptive or transformational resilience;

prevention is linked to these three resilience outcomes too; and promotive and transformative social protection are each related to coping, adaptive and transformational resilience. In their approach, social protection interventions should strengthen the three components of resilience together and at multiple levels. This means that each social protection intervention should increase the three resilience outcomes, therefore TSP interventions have 12 possible resilience outcomes.

Figure 2.2 The 3P&T-3D analytical framework



Source: Béné et al. 2012:31

One of the main conclusions of their analysis is that combined social protection measures (protective, preventive, promotive and transformative) can ensure that the three dimensions of resilience are strengthened together.

However, there are certain conceptual drawbacks and inconsistencies in the framework that require an in-depth analysis before moving forward to applying a resilience framework. For instance, the 3P&T-3D analytical framework deals with general resilience, which is the resilience of all aspects of a social-ecological system to unspecified disturbances (Resilience Alliance 2010). But general resilience is value neutral. It does not assess good or bad resilience. As explained earlier this is a common critique of resilience, and one way to deal with this limitation is by complementing the

concept with vulnerability. Béné et al. (2012) assume this and with this purpose in mind they link the 3D resilience framework to the TSP framework, which aims to tackle the underlying causes of vulnerability.

Even so, these authors only make this connection implicitly by arguing that social protection programmes reduce vulnerability, but they do not break down the analysis to assess where, and how, vulnerability is being reduced within these linkages. In their assessment matrix, the authors propose 12 possible resilience outcomes from TSP. However, they do not explain how these outcomes link to vulnerability reduction. In other words, what is the role of vulnerability in each of these linkages they are assuming? What are the conceptual linkages between TSP and resilience that are assessing vulnerability?

By asserting that social protection interventions should enhance each of the three components of resilience together (persistence or coping, adaptive or transformational responses), these issues are excluded from their assessment matrix. Likewise, the authors do not explain how the issue of timescales, which is supposed to be one of the comparative advantages of a resilience framework, is addressed. This occurs because the framework aims to work with general resilience whilst this concept is extremely difficult to operationalise. The authors recognise this limitation when they argue that “although intuitive, the concept of resilience still remains relatively complex and particularly difficult to operationalise and/or to measure” (Béné et al. 2012:45). They highlight the risk that a resilience framework might overcomplicate the analysis of the role of social protection in climate change adaptation, while at the same time an oversimplification of the framework might leave aside crucial issues that underpin vulnerability. In order to address these issues, a workable conceptual tool that draws from the broader idea of general resilience is required. By assessing ‘specific resilience’ (resilience “of what, to what”) a resilience framework would be able to address in a systematic way the different aspects of vulnerability reduction, social protection and resilience. This will be explained in section 2.3 where the ‘social protection-resilience’ framework will be presented.

Another conceptual clarification is that social protection is not exclusively aimed at reducing poverty as the authors argue, except when it is in the form of productivity enhancing safety nets. The authors assert that resilience is not a pro-poor concept, and

that supporting measures that aim to increase resilience in the context of development may constrain poverty reduction efforts. “The whole discourse about how it is important to build resilience as a tool for poverty alleviation is flawed: there is no direct and obvious way out of poverty through resilience” (Béné et al. 2012:48). The authors then conclude that this is where the 3D and 3P&T framework starts to fail, since there is not a straight relation between resilience and poverty, except that “perhaps that the poor are often presented/assumed to be more vulnerable, or less resilient, than others” (ibid:48). Even so, this issue is not about resilience not being a pro-poor concept, but about the actual nature of social protection.

There is an on-going discussion in the social protection academic community that debates the real aim of social protection: vulnerability reduction or poverty reduction. Sabates-Wheeler and Devereux (2013) argue that, rather than poverty alleviation, the main purpose of social protection should be vulnerability reduction: “it is important not to lose sight of the primary purpose of social protection, which is to provide effective safety nets or insurance against downside risk for people who are already poor or vulnerable to becoming poor(er)” (ibid:936). They argue that for social protection to reduce poverty it requires a package of complementary development interventions outside the social protection realm. It is the inclusion of the promotive measures as a category of social protection that sets off the confusion about the real aim of social protection. However, the original intension of this category “is not to broaden the scope (of social protection) to include potentially all development initiatives, but to focus on promotive measures that have income stabilisation at least as one objective. A case in point is microcredit that fulfils income stabilising and consumption smoothing functions” (Devereux and Sabates-Wheeler 2004:9). This conceptual clarification would better illuminate the link between resilience and vulnerability that Béné et al. (2012) propose.

Moreover, as explained in this chapter, not all social protection interventions are transformative. Therefore, it cannot be assumed that social protection innately will increase resilience as transformation. Again, Béné et al. (2012) fail to explain how exactly social protection can support transformation. This is only possible if one assumes that transformation is indeed a component of resilience, which is also a contested relation, as reviewed in the previous section.

In summary, the 3D and 3P&T framework lacks clarity on the mechanism for how the relation between social protection and resilience takes place. It only assumes implicitly that social protection increases resilience by reducing vulnerability but it does not explain how this relation takes place. Furthermore, it lacks an in-depth explanation of the role of social protection in enhancing resilience in the long-term and it completely excludes the intergenerational timescale, which is of high importance due to the fact that climate change represents a bigger burden for future generations. Moreover, it also excludes governance issues. Likewise, there has been little progress in terms of building the evidence base.

2.2 Proposed Analytical Framework: The social protection-resilience framework

In this research I developed the social protection-resilience framework in order to fill the gaps in the current understanding of linkages between social protection and resilience, in order to understand how Oportunidades interacts with resilience to climate change and variability of poor households. This section presents the social protection-resilience framework as a conceptual tool to better understand the conceptual linkages between these concepts. The framework seeks to guide the data collection and further analysis of the research. For this purpose, I will present the broad conceptual underpinnings which frame the research, and the operational dimension of the framework that will guide the data collection and analysis. The section will end with an explanation of the two social protection-resilience linkages that this thesis will examine: the protective and preventive social protection- absorptive capacity link, and the promotive social protection- adaptive capacity link.

2.2.1 Conceptual dimension

The social protection-resilience framework that I developed explores how conventional forms of social protection interact with the resilience to climate change and variability of poor households. The conceptual underpinnings of the framework are based mainly on the complementarity of the concepts of vulnerability reduction and resilience to climate change. It deviates from the understanding that since certain social protection interventions reduce vulnerability, then -by doing so- they could help people manage climate risks and support them as active agents in creating resilience. This assumption

does not imply that the resilience and social protection literatures are describing the same issues, but that they complement each other as established in the ‘bifocal’ approach by Miller et al. (2010) reviewed earlier in this chapter. In other words, it is through the vulnerability reduction outcomes of social protection that its interventions will increase the capacities of resilience to climate change. The research will explore how this relation takes place. This social protection approach would be equivalent to that of addressing the ‘drivers’ of vulnerability in the adaptation continuum developed by McGray et al. (2007).

McGray et al. (2007) identify a continuum of adaptation activities between development-oriented activities that targets the underlying causes of vulnerability and poverty, regardless of their relation to climate change (start-point approach); and discrete adaptation, which includes all the activities which respond to specific climate impacts (end-point approach). Under the start-point approach, namely addressing the causes of current vulnerability, activities that reduce poverty and aim to increase human capabilities that make people less vulnerable to harm, are considered as adaptation activities. It assumes that addressing vulnerability today will reduce vulnerability under future climate conditions (Burton et al., 2002; Stern 2006; Huq and Reid 2007; Mearns and Norton 2010; Tanner and Allouche 2011; IPCC 2014). However, since this approach barely takes into consideration the specifics of climate change, some climate impacts could undermine some interventions that are aimed at development gains over the longer term (McGray et al. 2007).

The social protection-resilience analytical framework draws from a pro-poor normative assumption where resilience aims to increase the wellbeing of the poor. It deals with ‘specific’ resilience to climate change, instead of ‘general’ resilience. The relationship between poverty and vulnerability is not straightforward, since non-poor people can be vulnerable to climate change or poor people might not be exposed to climate change (Eriksen and O’Brien 2007). Furthermore, the conditions and processes that create poverty may not be the same as those that create vulnerability. Nonetheless, in this thesis I assume that, first, rural people are especially vulnerable to climate change due to the combination of social and climatic factors that exacerbate their dependence on climate sensitive resources, and that, second, their limited access to resources may help them to buffer and adapt to climate shocks (Hammill et al. 2005; Reid and Huq 2005;

Mitchell and Tanner 2006; Stern 2006; Yohe et al. 2007; Agrawal and Perrin 2009; Heltberg, Siegel and Jørgensen 2009; Olsson et al. 2014). Since the framework focuses on poor households it is then assumed that they are experiencing climate change and variability in a context of high marginalisation, poverty and exclusion.

The framework also focuses on different timescales, in order to understand the different feedbacks that a social protection intervention might have in the social-ecological system. The framework is based on the understanding that poor people will have to learn how to live with change, instead of trying to avoid it, therefore resilience should also be about building options and flexibility that improve livelihoods and support adaptation for future generations.

The components of the framework were adapted to the specific characteristics of the Oportunidades programme. Given this, I suggest that Oportunidades reduces some of the causes of vulnerability, since it is related to the material dimensions of social protection: protection, prevention and promotion (Devereux and Sabates-Wheeler 2004). Whilst Oportunidades is not transformative in itself, I assume that it has the potential to help younger generations to create new directions of change, as explained earlier in this chapter. Furthermore, it has short-term, long-term and intergenerational objectives: in the short-term Oportunidades protects incomes and consumption after a shock or stress. It also provides social assistance to people living in poverty, preventing them from falling into further destitution. In the long-term the periodic delivery of cash transfers promotes the livelihoods of the poor, so they can escape poverty. The long-term human capital investments in poor children help to reduce vulnerability at the intergenerational scale, by promoting their future livelihoods, and increasing their access to certain opportunities for better wages from which they would otherwise have been excluded.

2.2.2 The social protection-resilience links

For the framework to be operational and guide the data collection these concepts need further unpacking. Firstly, from the definition of resilience that I am using in this research: “the ability to resist, to recover from, or adapt to the effects of a shock or a change” (Mitchell and Harris 2012:2).

The choice of this definition draws from its importance in integrating the main qualities of socio-ecological resilience: the capacity to cope and the capacity to live with change. This definition can be split in two main ideas: ‘the ability to resist and recover from a shock or a change’ and ‘the ability to adapt to the effects of a shock or a change’.

Given this, it will be assumed that resilience is integrated by two main dimensions:

- the absorptive or coping capacity, which in this research integrates: ‘the ability to resist and recover from a shock or a change’; and
- the adaptive capacity, understood as ‘the ability to adapt to the effects of a shock or a change’.

By focusing in these two characteristics, this definition of resilience includes short and long-term time scales. This approach to resilience is distinguished from the definition used by Béné et al. (2012) in the 3P&T-3D analytical framework because it does not include transformative capacity. This is the case because the relation between transformation and resilience is still ambiguous, as it has been explained in section 2.1.3. Given this, for the purpose of this thesis, it will be assumed that transformative capacity is a separate concept that interacts with -but does not integrate- resilience.

Secondly, I linked these capacities to the preventive, protective and promotive features of Oportunidades, leading to, as a result, two main linkages:

- the protective and preventive social protection- absorptive capacity link; and
- the promotive social protection- adaptive capacity link

The role of vulnerability is key in this framework. As it was explained earlier, vulnerability and resilience are complementary concepts. Social protection can address some of the material causes of vulnerability, by increasing access to economic assets and entitlements. This increases resilience by providing more flexibility in livelihoods, enhancing absorptive and adaptive capacities (see table 2.1).





I developed two theoretical propositions that justify and describe these linkages in more in-depth. These theoretical propositions are presented in the next sub-section.

Thirdly, these theoretical propositions also aimed to facilitate and guide the data collection and analysis of the research. For this purpose, I linked them to the research sub-questions:

- how does Oportunidades affect the absorptive capacity of poor households?; and
- how does Oportunidades affect the adaptive capacity of poor households?

It is important to highlight that in this thesis it is not expected that it will be possible to confirm or reject these theoretical propositions, but instead they are used as templates to test and modify theory based on the empirical results. This technique will be explained in more detail in chapter 3 ‘Methodology’.

Table 2.1 Conceptual linkages between social protection, vulnerability and resilience

Linkages	Social protection role		Reduction of material causes of vulnerability		Resilience benefits
Protective & preventive social protection-absorptive capacity link	Provides relief Prevents further deprivation		Provides relief Reduces the risk of poverty traps Provides minimum security		Increases absorptive capacity: Self-organisation & relief Capacity to plan for the future Livelihood adjustments
Promotive social protection-adaptive capacity link	Promotes income and capabilities		Increases productivity		Increases adaptive capacity: Stronger livelihoods Less climate-sensitive livelihoods

Source: Author

2.2.3 Theoretical proposition for the protective and preventive social protection and absorptive capacity link

I propose that theoretically, the impact of Oportunidades in the absorptive capacity of households is twofold: firstly, after a climate shock Oportunidades provides relief by supporting short-term consumption needs. This takes place due to the protective feature of the programme, which protects the households’ income. The cash also helps in the recovery of the asset base of the households after the climate shock, increasing their capacity for self-organisation. Secondly, the regularity and predictability of Oportunidades provides poor households with a level of basic security, which prevents

households from falling into deeper poverty. Poor households can start anticipating risk, which increases their absorptive capacity in the face of future shocks (Cipryk 2009; Anderson, Geoghegan and Ayers 2009; Davies et al. 2009; Jones et al. 2010). This capacity of resilience integrates the coping strategies that households use to buffer the impacts of shocks on their livelihoods and basic needs (Béné et al. 2014).

Households develop both consumption and income smoothing strategies, where the former aim to protect consumption by the “conversion of household non-food resources (income and assets) into food” (Devereux 1993:52); and the latter aim to reduce risk in the income process, often including the immediate and short-term alteration of consumption patterns (Dercon 2004).

In this light, the food security literature differentiates coping strategies in terms of their reversibility and the commitment of domestic resources (Watts 1983; Corbett 1988; Devereux 1993). The former are strategies with no serious long-term consequences, while the latter are related to extreme behaviours that jeopardise long-term prospects. As food insecurity worsens, households will employ less reversible coping strategies, which reinforce poverty and vulnerability over the long-term. This approach helps to aid our understanding of the way that poor people develop their coping strategies in a context of increased risk of falling into so-called poverty traps.

Such poverty traps occur when poor households face vicious cycles of decline in their wellbeing, until they reach a point where the recovery of wellbeing is very difficult (Wisner et al. 2004; Barrett and Swallow 2006; Eriksen and O’Brien 2007; Heltberg, Siegel and Jørgensen 2009; Osbahr et al 2010). These strategies may also erode sustainability for future generations (Davies and Leavy 2007; Tanner and Mitchell 2008; Johnson et al. 2013). Poverty traps occur because poor households often develop their coping strategies in a context where they have very few of the assets necessary for them to adapt (Barrett and Carter 2006; Ericksen 2008; Siegel and Jørgensen 2013). For this reason, safety nets that prevent households from reaching critical income thresholds in vulnerable areas are crucial (Barrett and Carter 2006).

Social protection reduces the probability of irreversible strategies by protecting the income of poor households and their short-term consumption needs. Given this, Oportunidades increases the ability of households to access cash, which is necessary for

relief and recovery after a climate shock (Davies et al. 2009; Arnall et al. 2010). This cash also helps to prevent poor households fall into deeper poverty (Bastagli 2014).

Furthermore, the regularity and predictability of Oportunidades provides poor households with a level of basic security from which they can start investing current consumption into future consumption (Anderson, Geoghegan and Ayers 2009). This means that if the cash transfers of Oportunidades are big enough, over time they can take people across an income threshold to escape the risk of poverty traps (Devereux 2002; Sabates-Wheeler and Haddad 2005; Dorward and Sabates-Wheeler 2006). In terms of resilience, preventive social protection is related to risk reduction and forward planning. Cash transfers from Oportunidades can then be accumulated as savings and as a self-insurance mechanism which can then be drawn upon and liquidated at times of crisis (Corbett 1988). In other words, Oportunidades can then support proactive strategies, understood as the “adjustments that populations take in response to current or predicted change” (Nelson, Adger and Brown 2007:397). These are actions that poor households take in anticipation of climate impacts, so as to reduce risk and to improve the level of response (ibid.). Such actions can be classified as bear losses, share losses, modify the threat, prevent effects, change use, and change location (Burton, Smith, and Lenhart 1998) (see table 2.2).

These actions are important because they can reduce the adverse effects of climate change on people’s wellbeing, as well as support people in taking advantage of new opportunities that might be available. They also show the extent into which certain livelihood adjustments are possible.

Table 2.2 Type of coping strategies

Type of coping strategy	Description
Bear losses	Do nothing. It occurs when those affected have no capacity to respond in any other ways. This provides the baseline from which other responses can be compared.
Share losses	Involves sharing the losses among a wider community
Modify the threat	Exercise a degree of control over the environmental threat itself.
Prevent effect	Involves steps to prevent the effects of climate change and variability
Change use	Where the threat of climate change makes the continuation of an economic activity impossible or extremely risky, consideration can be given to changing the use
Change location	Change the location of economic activities

Source: Burton, Smith, and Lenhart 1998: 5-4 & 5-5.

This theoretical proposition is related to the research sub-question: How does Oportunidades affect the absorptive capacity of poor households?

2.2.4 Theoretical proposition for the promotive social protection and adaptive capacity link

In a context of poverty, households usually have few means to develop more productive and less-climate sensitive livelihoods. However, arguably, Oportunidades' impact on the asset profile of poor households can help to create different livelihood options for both current and future generations. This livelihood innovation helps them to adapt to climate change. This takes place when households learn to live with change and uncertainty (Marschke and Berkes 2006). Households start innovating so that some of their livelihood strategies encompass ways to adapt to this change (Armitage 2005). Due to the characteristics of the Oportunidades programme, the promotive feature takes place in two different timescales: the long-term and the intergenerational scale.

Promotive social protection helps poor people to invest in productive assets and livelihood income-generating activities, and these make livelihoods stronger and more sustainable in the long-term (Devereux 2002; Sabates-Wheeler and Haddad 2005; Dorward and Sabates-Wheeler 2006; Sabates-Wheeler and Devereux 2013). The rationale behind this assumption is that the regular and long-term provision of cash transfers will eventually translate into productive investments (Devereux 2002; Sabates-Wheeler and Haddad 2005; Dorward and Sabates-Wheeler 2006).

In terms of resilience, this increased productivity can translate into more flexibility to engage in further adaptive strategies. This flexibility can be in the form of livelihood diversification or new livelihood options, helping households to build security against climate shocks (Davies et al. 2009; Heltberg, Siegel and Jørgensen 2009; Béné et al. 2012; Niño-Zarazúa et al. 2012). The ASP literature argues that for livelihoods to be more resilient to climate change, they need to be less dependent on climate-sensitive activities (Sabates-Wheeler, Mitchell and Ellis 2008; Davies et al. 2008; Johnson et al. 2013). Therefore, theoretically it is expected that such adaptation of livelihoods will lead to less climate-sensitive livelihoods.

Moreover, the main focus of Oportunidades is the idea that the households will invest in the human capital and wellbeing for future generations. By providing the children with skills and knowledge through the conditionalities of education and health, future generations will ideally have more skills and abilities. These investments in human capital can help future generations to have more options and choices about their own future. “Increased skills, higher levels of education, [...] offer greater possibilities of being able to create or take up a broader range of options, thus signifying an increase in adaptability” (Sabates-Wheeler, Mitchell and Ellis 2008:5). Theoretically, over time these young adults will be able to access formal semi-skilled and skilled labour, which is also more secure and less-climate sensitive.

The research sub-question for this theoretical proposition is: How does Oportunidades affect the adaptive capacity of poor households?

2.2.5 Summary

The two theoretical propositions presented above will guide data collection and analysis. It is not expected that the evidence will confirm them, but that it will help to build theory, based on these theoretical propositions. The thesis aims to understand how the different features of social protection affect the different components of resilience, and in what contexts. For this purpose, it draws from a system perspective where the different feedbacks and trade-offs between the system scales are analysed. For example, it is worth considering whether social protection supports one resilience capacity by undermining another (e.g. a social protection intervention that increases absorptive capacity by increasing dependency, thus eroding the agency to create new livelihood paths). Alternatively, it could be asked if social protection strengthens one timescale by undermining another (e.g. the intergenerational scale is supported at the expense of the long-term scale).

The framework also aims to understand the conditions that favour and impede the potential of social protection to reducing vulnerability and enhancing resilience to climate change. Social protection interacts with other informal and formal instruments that increase or decrease households' vulnerability. These ‘enablers and constraints’ (Sabates-Wheeler and Devereux 2013) interact with social protection and will influence its impact on resilience. They are part of the governance of the social-ecological system,

which influences assets, entitlements, and endowments (Davies 1997; Scoones 1998; Ellis 2000; Kepe 2008) -all of them necessary for resilience (Nelson, Adger and Brown 2007; Resilience Alliance 2010; Osbahr et al. 2010).

The theoretical propositions presented above are analysed and explored in the empirical chapters. Therefore, the protective and preventive social protection-absorptive capacity link (or research sub-question 1) is addressed in Chapter 5 ‘Oportunidades and absorptive capacity’; the promotive social protection- adaptive capacity link (or research sub-question 2) is addressed in Chapter 6 ‘Oportunidades and adaptive capacity’. The next chapter will present the methodology and research design used in this thesis.

Chapter 3 Methodology

This research used the case study approach in order to expand and generalise theories about the role of social protection in increasing resilience to climate change and variability. The case study was based on the conditional cash transfer programme Oportunidades in a coastal community and an inland community in the state of Yucatan, in southern Mexico.

To the knowledge of the author of this thesis, empirical analyses that address the relation between social protection and resilience are very limited if not non-existent. For this reason, the assessment of this relation was very challenging since there were almost no references from which this research could draw upon. Even so, using the case study approach was an innovative way to address questions relating to timescales behind resilience and social protection, as well as to understand the dynamics between social protection and climate change and variability.

Causation in case studies is usually deterministic and not probabilistic. This means that case studies are generalizable to theoretical propositions or analytical generalisations (Yin 2003). In other words, this technique is useful for both testing and generating theory (Flyvbjerg 2006). Case studies have also been identified as a good technique to cover contextual conditions, and causal links, which are “too complex for the survey or experimental strategies” (Yin 2003:15). By adopting the case study technique I aimed to explore the different dimensions that underpin social protection and resilience to climate change and variability among poor households. Qualitative studies can help to test structural changes due to social protection (Devereux et al. 2013).

The impacts of climate change are socially and spatially differentiated (Olsson 2014), therefore, research based at the local scale is crucial. The case study technique helped to illustrate that climate change is experienced in different ways. It explained how social processes are affected by and in turn shape, responses to social protection. This approach also helped in the identification of other issues related to the governance of the social-ecological system that are determining access to assets necessary for adapting to climate change and variability. Moreover, it provided an understanding of the meaning that recipients gave to the programme, and the pathways and mechanisms through which impacts occurred (Adato 2008).

The case study technique followed a systematic procedure that linked the research questions, with the data collected, in order to develop robust conclusions (Yin 2003). Given this, the research design of this thesis consisted of the following main components: 1) research questions and theoretical propositions, 2) site selection, and 3) data collection criteria and data analysis.

3.1 Research question and theoretical propositions

As presented in the Introduction the main research question of this thesis is: How does Oportunidades interact with resilience to climate change and variability of poor rural households in Mexico?

The two sub-questions of the research are:

- How does Oportunidades affect the absorptive capacity of poor households?
- How does Oportunidades affect the adaptive capacity of poor households?

The case study technique requires a previously developed theory that will be validated or modified by the empirical results. This theory can be in the form of theoretical propositions or hypotheses that are used as templates “to determine whether a theory’s prepositions are correct or whether some alternative set of explanations might be more relevant” (Yin 2003:40). In the case of social protection assessments, the theory of change behind the interventions is mapped out with their intermediate steps and alternative hypotheses in order to assess whether the predicted changes occurred as expected (White and Philips 2012).

Given this, I developed a theoretical proposition for each one of the sub-questions. These theoretical propositions aim to facilitate and guide the data collection and analysis. The rationale for these hypotheses was explained in-depth in chapter 2 ‘Literature Review and Analytical Framework’.

3.2 Site Selection

The case study was an embedded multiple-case study, where the use of two communities allowed for literal replication, where the conditions under which a particular phenomenon is likely to be found were considered to be similar (Yin 2003).

Examining two communities allowed me to investigate the different dynamics that underpin the resilience of households in different contexts. Furthermore, causal inferences from comparing different cases, such as contrasting Oportunidades recipients with non-recipients in each livelihood context would contribute to developing theoretical generalisations.

The selection of research sites was based on seeking ‘critical cases’ (Yin 2003), for testing theory, in other words, these cases would meet all of the conditions within which the propositions were believed to be true. The objective of these cases is to achieve the greatest amount of information possible relating to a given phenomenon (Flyvbjerg 2006). In this light, the field sites would need to:

- experience climate shocks, as a proxy for climate variability and change;
- contain households receiving Oportunidades as well as non-recipient poor rural households;
- have different livelihood settings: such as fishing and agriculture in order to allow a better understanding of the dynamics behind social protection in different local contexts;
- be places with less than 1000 inhabitants (coastal community 551; inland community 617), and suffer isolation, exclusion and high levels of poverty -making them a representative case of rural communities in Mexico;
- be located in Mayan municipalities, with the inland community having a stronger indigenous identity -this society has distinctive practices and traditions firmly embedded in their culture as a form of autonomous adaptation to the climate stress in the region.

The field sites were located in the state of Yucatan, on the Yucatan Peninsula, in the southeast of the country (see figure 3.1). The selection process had two main sources: 1) key informants; and 2) secondary sources such as census, government reports, and the register of Oportunidades recipients. Given this, two communities were chosen following the above criteria, based on these sources of information. The two

communities were visited prior to starting the fieldwork, in order to establish an initial contact, and assess the potential challenges and feasibility to conduct the research.

In order to protect the identities of the respondents in the research, and to comply with the ethical clearance of this research, the official name of the communities will be confidential and hence, during the discussion on the research, they will be referred to as the ‘coastal community’ and the ‘inland community’.

Figure 3.1 Field sites



Source: Author, using QGIS

3.3 Data collection criteria and data analysis

The data collection for the case study was based on a mix of quantitative and qualitative methods and sources. The purpose of this mixed data collection was to complement the methods in order to examine overlapping and different facets of the phenomenon under study, by triangulating the data (Garbarino and Holland 2009). This also allowed me to build a robust data set. The research data sources of my data set were:

- 212 household surveys
- 56 life history interviews
- 6 group discussions
- Key informant interviews
- Participant observation

- Secondary data review from previous research studies, census and surveys

The fieldwork was conducted between November 2011 and November 2012. The first two months of the fieldwork were based in the state capital city of Merida, with the aim of selecting the field sites. During this period, I conducted key informant interviews and consulted secondary data sources, in order to make the site selection. From January to June 2012 I conducted the fieldwork in the coastal community, which is mainly the dry season and the beginning of the north-wind season. In the inland community, the fieldwork was from July to October 2012, which corresponds to the rainy season. The final month of fieldwork was in Mexico City with the purpose of conducting key informant interviews.

The data collection had four main stages, and several data sources were used in order to complement the data collection (see table 3.1). Firstly, I applied the PRA tools, such as transect walks and group discussions, in order to build the vulnerability context of the community (see section 3.3.1). Secondly, the survey was applied to recipient and non-recipient households (see section 3.3.2). Group discussions and key informant interviews were used in the design of the questionnaire. This was piloted with three respondents from different households, and adapted to the local wording and understanding of the issues being studied. Once all the household surveys were collected, a preliminary analysis was developed in order to get an initial understanding of the different dynamics that the life histories would explore in more in-depth. The analysis of the coastal community took place at the Institute of Development Studies in Brighton, UK. Thirdly, the life histories were conducted to households identified in the survey (see section 3.3.3). Fourthly, at the end of data collection a workshop with community members was organised to share the preliminary results and get some initial impressions from the community members. Participant observation was developed throughout all the stages of the fieldwork, with the purpose of feeding the data collection with an in-depth understanding of the people's understanding of certain dynamics (see section 3.3.4).

Table 3.1 Data collection stages and season of the year

Data collection stage	Description	Season	
		Coastal community	Inland community
First stage	PRA tools	Dry season	Rainy season
Second stage	Survey & PRA tools	Dry season	Rainy season
Third stage	Life histories & participant observation	North-wind season	Rainy season
Fourth stage	Workshop	North-wind season	Rainy season

Source: Author

The main unit of analysis was the household. Nevertheless, in the life histories and the PRA tools the individual was used as the main unit of data collection. In this research a household is understood as a group of people who can be or not related through kinship, that shares the same dwelling and that has a common expenditure. This is the standard definition used by the Mexican National Institute of Statistics and Geography (INEGI).

The baseline year for the analysis was 2012, therefore the institutional framework that was operating in that year including the Oportunidades' rules of management -which established the terms of the programme management such as the size of the transfer, the targeting mechanisms, and the rights and obligations of the recipients (cf. SEDESOL 2011)-, is used as the reference. Currency rates in pesos and dollars were also based on this baseline year, and any other references relating to the research considered 2012 as the baseline⁹.

The surveys and interviews were conducted in Spanish. In the inland community translation services were required to conduct some of the interviews and surveys in Mayan. A key informant provided this service. She was an ex-recipient of Oportunidades. She was the only community member with an undergraduate degree. She had previous experience conducting household surveys and translating. Even so, I trained the translator both for the survey collection and life histories translation. Likewise, the translation of the life histories was simultaneous in order to address any issues related to the interpretation. The surveys had a standardised format with a drop-down menu, minimising the risk of bias or misinterpretation.

9 On September 23rd 2014 and while this thesis was being finalised, the administration of the current president of Mexico Enrique Peña Nieto (2012-2018) announced a mayor expansion on the objectives and strategy of Oportunidades. The administration also announced a change in the name of the programme to *Prospera* (Prosper) (SEDESOL 2014). The rules of the new programme will only be published in December 2014.

The criteria chosen for the data analysis are fundamental in the research design. In this light, I used the ‘pattern matching technique’ (Yin 2003), in order to examine the evidence to address the theoretical propositions presented at the beginning of this chapter. By comparing empirical patterns found in the case study with predicted patterns related to the theoretical propositions, this technique proved internal validity.

3.3.1 PRA methods

The research was based on a bottom-up approach, based on what the members of the communities themselves considered to be their main sources of resilience and of vulnerability. For this purpose, the vulnerability context was developed during the different stages of the data collection, triangulating the findings based on the information provided by the people. Participatory tools based on Participatory Rural Appraisal (PRA) were used to facilitate a dialogue and emphasise local people’s point of view (Chambers 1994; 1997). This approach allowed me to build concepts and arguments based on what people in the communities considered to be important. Tools such as key informant interviews were used at different stages of the research, in order to uncover the research context where I was working, and also to triangulate some of my preliminary findings. Usually these interviews were applied to local leaders and members of informal institutions in the communities, such as the *Ejidal* Assembly, the elderly people, the fishermen’s cooperatives, and women’s organisations. The key informant interviews were also applied to researchers, national and local public officials, and NGO and international organisation staff working in the area.

Likewise, group discussion and transect walks, provided contextual data and facilitated an understanding of both biophysical and socio-economic aspects of resilience (see photo 3.1 and 3.2) (Yohe et al. 2007). The latter provided information on the resource use and the features of the area of study, and the former was mainly in the form of six group discussions which included seasonal calendar, monitoring of different social protection interventions in the area, historical timeline of the communities, main climate shocks and coping strategies in the area, and wellbeing discussion (see appendix 2 for the list of the group discussions by topic, date, and community). These techniques provided contextual data and facilitated an understanding of the social-ecological system.

This approach also aimed to identify the climate shocks that people themselves considered as main sources of risk. In this light, in the coastal community Hurricane Isidore in 2002, was identified as a main climate shock. In the inland community, the Hurricane Isidore in 2002 and the drought experienced in 2012 were the climate shocks studied in this research. In both communities, people's perception of climate variability was also considered. These shocks will be explained in more detail in chapter 4 'Context, exposure, and livelihood sensitivity in the inland community and coastal community'. In this research, climate shocks are understood as a single category of covariate shocks, and they are used as a proxy for climate change.

Whilst high uncertainties remain about the linkages between hurricanes and droughts and climate change¹⁰, the purpose of studying these specific climate shocks is to understand the 'adaptation deficit' in the region, in other words, how households have been responding to current climate conditions, and if these responses have been adequate (IPCC 2014).

I also explored how the communities defined 'wellbeing'. In the coastal community it was defined as 'satisfactory means to live' and in the inland community the Mayan word for wellbeing was translated as *malobcushta*. The different characteristics of wellbeing identified in the group discussion are described in Table 3.2.

10 The latest Working Group I contribution to the IPCC Fifth Assessment Report shows that there is medium confidence that droughts will intensify in some seasons in Mexico by up to the year 2100 (Stocker et al. 2013). Increases in intense tropical cyclone activity have 'low confidence' for the early 21st century and 'more likely than not' in the Western North Pacific and North Atlantic.

Table 3.2 Main characteristics of wellbeing identified in the group discussions in the coastal and inland community

	Coastal community	Inland community
Definition of wellbeing	<i>Satisfactory means to live</i>	<i>Malobcushta</i>
Characteristics of wellbeing identified in the group discussions	Learning different trades, having initial capital to invest in productive activity, access to credit, access to education, having a long-term vision, having a secure and safe livelihood, enthusiasm for life, decent housing, learn to administer the household expenses, being entrepreneur, have access to work and have job opportunities, support network, learning to save	To have good health, good education, good capacities for work, a stable economic life, life without illness, progress a little bit by managing to save, to have a job not only in the <i>milpa</i> , secure food for consumption, to be able to buy things, having decent dwelling, support for productive projects, that all the children who are studying are able to finish their studies

Source: Author

Photo 3.1 Group discussion, coastal community



Source: Author, July 2012, coastal community

Photo 3.2 Transect walk, inland community



Source: Author, August 2012, inland community

3.3.2 Survey

Oportunidades is recognised to be ‘iconic’ (Fiszbein and Schady 2009) due to the basal data (ENCASEH 1997) and the panel databases collected (from households and from localities) (ENCEL 1998, 1999, 2000, 2003 and 2007) and made available to the public (cf. Oportunidades 2014). However, the collection of data for these panel databases has focused on the priorities of the programme: to increase school attendance and health care among poor children. Since climate change is not a concern of the programme design, there is very little data available related to this area of study. For instance, starting from the ENCEL 1998 survey, households were asked whether they had experienced any catastrophe such as a drought, flood, frost, fire, plagues, hurricanes, or earthquakes in the past 6 months. Localities were also asked the same question starting from 1999. In the ENCEL 2003, however, this question was removed from the household questionnaire and instead was applied only in the locality survey asking whether the locality experienced a catastrophe in the last three years, and four years in the ENCEL 2007.

For this reason, I created a household survey to collect baseline information on assets, socio-demographic characteristics, livelihood activities, and actions taken before, during and after climate shocks.

The questionnaire was systematised between the two communities, but it was also adapted to the social-ecological context of each community using qualitative tools, such as group discussions with community members, informal interviews with key informants, transect walks, and a secondary data review from previous research studies, census and surveys. The systematised modules included in the survey were (see appendix 3.1 for the full questionnaire for both communities):

- Socio-demographic information
- Livelihood information and asset profile
- Social protection information
- Income and expenditure in the household
- Access to services and social infrastructure
- Exposure and impacts from climate shocks
- Exposure and impacts from non-climatic shocks
- Main coping strategies
- Main sources of resilience

The survey was applied to all households in both communities giving a total of 212 households: 117 households that received Oportunidades, and 95 that were non-recipients. From the former, 54 had received the transfer since 1998 (long-term), 42 households since 2004 (medium term), and 21 households since 2007 (short-term). From the latter, 84 households had never received the transfer, and 11 had the transfer suspended (see table 3.3).

Table 3.3 Surveyed households coastal community and inland community

		Oportunidades households			Non-Oportunidades households		Total
	Household Oportunidades profile	Long term 1998	Medium term 2004	Short term 2007	Transfer suspended	Never received	
Coastal community	Number of surveyed households	15	20	16	8	42	101
	Percentage		50.5%		49.5%		
Inland community	Number of surveyed households	39	22	5	3	42	111
	Percentage		59.5%		40.5%		
Total	Number of surveyed households		117		95		212
	Total		55%		45%		
	Percentage						
		Households registered in Health Centre	Surveyed Households	Deceased, temporary migration, considered as members of other households already interviewed or did not want to participate in survey			
Coastal community	Households	143	101	32			
Inland community	Households	142	111	31			

Source: Author

Causes for not receiving Oportunidades

The most common causes among the non-recipients in the coastal community for not receiving Oportunidades were: 19% of the 101 households declared that they had not applied for the programme either because they did not have children below 21 or because they did not need the transfer; 14% of the households said that they had applied for the programme, but had not been successful; and 8% of households had the transfer suspended after the mid-term means-testing. In the inland community the causes were: 26% of the 111 total households applied for the programme but were not successful; 9% of the households declared that they had not applied for the programme either because they did not have children below 21, or because they did not need the transfer; and 3% of households had the transfer suspended after the mid-term means-testing.

The survey analysis was mainly exploratory and descriptive. It was developed using the SPSS Statistics 18 software. It aimed to build the baseline data of the research. It was used to build the livelihood profile of each household, as well as to explore the different coping strategies implemented after a shock or stress. The exploratory analysis also aimed at finding relationships arising from households' exposure to the financial

benefits of the programme. For this reason, the analysis was stratified according to whether households were recipient of Oportunidades or not. Moreover, when data was available, the analysis also considered the poverty category and gender of the head of the household. The purpose of including this layer of analysis was to get a better understanding of the different dynamics that might constrain or enable the potential impact of Oportunidades in the resilience of households.

In an initial stage of the analysis statistical association tests were developed in order to find any relevant correlation between the programme and the resilience of households. In particular, the correlation between recipient households and the different coping strategies was tested using Fisher's Exact Test and Phi and Cramer's V Test. The analysis showed that the probability of using certain coping strategies after a climate shock increased when households received Oportunidades. For example, recipient households in the coastal community had a positive correlation with the use of savings after hurricane Isidore (see appendix 3.2). However, the absence of a control group tailored for the research limited the comparability between the recipients and the non-recipients. Households were also tested in terms of their socioeconomic and demographic characteristics using Mann-Whitney U Test. The results showed that some basic socio-demographic characteristics, such as age of the breadwinner, showed a positive correlation with Oportunidades. This meant that the non-recipients could not be used as a control group. For these reasons, this analysis was not incorporated in chapter 5 'Oportunidades and the absorptive capacity'. Moreover, due to the small size of the sample, this analysis did not aim to be statistically significant. Even so, the exploratory analysis indicated potential dynamics that the qualitative analysis could explore in more detail.

3.3.3 Life history interviews

The retrospective life history interviews were the main data collection source for the case study. Life histories allow "process tracing" (Davis 2010) which identify "the causal mechanisms in sequences of life events by drawing from the perspectives of research participants" (ibid.:6). It helped to explore the different mechanisms or mediating links around which certain events occurred, and more complex patterns such as critical thresholds relating to their wellbeing. This technique also allowed me to address the different long-term effects of social protection.

Life histories helped me to identify the different circumstances and contexts where certain events might occur, as well as how different individuals choose to respond to the events. This approach focuses on the individual agency and in the context. For instance, “qualitative life course analysis has great potential both to examine perceived intentionality of individual action (agency), and to evaluate individual experience (subjective meaning) in the context of linked lives and changing times” (Locke and Lloyd-Sherlock 2011:1141). Moreover, these tools also help to uncover the different indirect or unintended effects of social protection (Devereux, et al. 2013).

The sample for the life histories consisted of 56 individual interviews, which were clustered in two groups (see table 3.3). The selection of these groups followed the next criteria:

- The first cluster was integrated with 28 respondents. These were selected from the vulnerability profile created with the household surveys. The criteria were to find long-term or medium-term recipient households, in order to assess the long-term effect of the programme, and an equivalent number of non-recipient households with a similar household profile.
- The second cluster was integrated with 28 respondents. These life history interviews were conducted with the children of the interviewees in the first cluster, in order to have a sample with the young adults who were sponsored by the Oportunidades scholarship and had already graduated, or were about to graduate from school, along with their peers who were not recipients of the grant. When it was not possible to interview the children from cluster one (either because they were not available or because they did not want to participate), then the ‘snowball sampling’ technique (Mack et al. 2005) was implemented. In this method, participants with whom I had already made contact used their social networks to refer me to other young adults who could potentially participate in the life histories.

Table 3.3 Life history interviews, adults and young adults

		Recipients	Non-recipients	Total	
Adults	Coastal community	7	7	14	28
	Inland community	7	7	14	
Young adults	Coastal community	7	6	13	28
	Inland community	8	7	15	
				Total	56

Source: Author

The interviews were ‘thematically focused’ (Locke and Lloyd-Sherlock 2011) with the aim of exploring the causal mechanisms that underpin resilience and social protection, giving special emphasis to the agency of the respondents. This included the perceived changes in their access to livelihood assets, livelihood strategies, and coping strategies. The analysis also explored the role that the life cycle played in the household dynamics and the wider socio-ecological context that framed certain resilience strategies.

Using retrospective descriptions of life histories was an innovative tool to address the timescales behind resilience and social protection. For instance, the main objective of the first cluster of interviews was to have an in-depth understanding of the capacity and key factors that surrounded households’ long-term resilience and wellbeing. They were based on the work of Davis (2010). The patterns of life trajectories were essentially based on people’s perception of their own life conditions that change over time in a context of constant climate stress. They also helped to identify the different sources of stress and vulnerability that accumulate over time. Tipping points on a life trajectory, where it increases or worsens, were given special attention.

The second cluster of interviews aimed to identify the livelihood opportunities that young adults had, and the different factors that surrounded the access to different labour opportunities in a context of incremental climatic change. This analysis was based on Davis (2011). The analysis also helped to compare the different drivers and constraints to the intergenerational mobility of these young adults, compared to their parents.

The life history interviews were recorded with digital voice recorders, with the explicit consent of the interviewees. More than 62 hours of interviews were recorded (3,746 minutes). The recordings were later used for checking back the write-up during the interview. The main language for the life history interviews was Spanish, my native

language. When the participants did not speak Spanish, translation services from Mayan to Spanish were required during the interview also with the permission of the research participants. All the interviews were written down in Spanish and for later analysis I translated them into English. In the final transcripts, all the interviewees' identities were anonymous and confidential. I attach a list in appendix 4 with the date and duration of each life history interview and the gender, age, and poverty category of each respondent. Drawing on Davis (2010), I used historical markers during the life-history interviews such as the hurricanes and droughts that impacted upon the region in recent years. These historical markers were identified in the group discussions that took place at the beginning of the fieldwork. As I have used information that might be sensitive, I have chosen to make the interviews anonymous.

I coded and analysed the content of the 56 life-history transcripts using Dedoose software, an online qualitative analysis software. I focused on the themes that relate to resilience, and to the use and impact of social protection. I looked at the frequency of these events and the contextual information that surrounded these events. Moreover, the analysis gave special attention to the different timescales of social protection, and the resilience strategies with benefits both in the present, in the long-term future, and on the intergenerational scale. When data was available, these findings were triangulated with the 212 household surveys collected in both communities.

I developed a poverty typology that worked as a heuristic device to systematically analyse the life histories based on the life conditions described by the respondents. Adapted from the poverty category system developed by Hulme, Moore and Shepherd (2001), I distinguished three main categories of poverty based on the level of assets during the life trajectories.¹¹ I assessed poverty in terms of four asset benchmarks: 1) household is destitute, 2) household has basic assets to perform daily activities, 3) household is able to save, and 4) household is able to invest in productive activity. In order to identify these benchmarks, I frequently asked the respondents to refer to their level of assets in the different periods of their life trajectories. Using the perceived level of assets as a measure of poverty was an efficient way to assess long-term poverty, since people could recall more easily this subjective measure of wellbeing rather than a

¹¹ Hulme, Moore and Shepherd (2001) categorisation of poverty is derived from panel data based on mean expenditures in relation to the poverty line.

numeric and static measure such as the level of income. The long- term poverty categories were (see table 3.4):

- Chronic poor: the general life conditions of the respondent along his or her life history were of destitution. The respondent has few episodes where the household increased their level of assets and was even able to save.
- Churning poor: the overall trend in the life history is that the respondent has the basic assets to perform daily activities, and has had some episodes where she or he was able to save and invest in productive activities. The life history also shows some episodes of destitution.
- Occasionally poor: the trend in the life history is that the respondent was able to save and to invest in productive activities, but had few episodes in her or his life history where the level of assets diminished.

In a further stage, I identified the main causes of risk identified by the respondents and the main sources of resilience. Based on Davis (2006), each participant was asked at the end of each life history interview to identify the two or three most important causes for an improvement and decline in their wellbeing throughout their lives. The former are considered as sources of resilience and the latter as sources of risk.

Wellbeing has been used as a proxy of resilience in previous research (cf. Armitage et al. 2012; Goulden et al. 2013). In this thesis, I understood wellbeing in terms of what the communities themselves defined: the ‘satisfactory means to live’ and the *malobcushta*, explained earlier in the PRA methods section. Therefore, when asking the respondents about their wellbeing I used the expression ‘satisfactory means to live’ in the coastal community or *malobcushta* in the inland community, instead of *bienestar*, which is the exact Spanish translation for ‘wellbeing’. Using this subjective assessment of wellbeing in my analysis helped me to integrate a social dimension to resilience that was also pro-poor and bottom-up.

I complemented the analysis with an assessment of the trajectory patterns based on the different episodes of crises that respondents had described as having impacted negatively on their livelihoods, as well as the episodes of recovery and improvement in their wellbeing. These allowed me to identify secondary sources of resilience and risk

that may have been underestimated by the respondents. The sources of risk are mainly in the form of stresses to the households and rapid and slow onset shocks. The sources of resilience are mainly in three forms: protective, preventive and promotive drivers. The appendix presents the frequencies of these main sources and restrictions for livelihood change/progression (see appendix 5).

The analysis also explored the different processes and dynamics, which allowed the promotion of livelihoods of young adults, and the role of social protection in those dynamics, including the governance challenges faced by young adults that received Oportunidades during their school years. Given this, the analysis gives special attention to the dynamics behind human capital transmission since it is where Oportunidades aims to affect the intergenerational transmission of poverty. For this purpose, the analysis compared the school achievements and livelihood progression of the recipients to that of their peers who did not receive the transfer, as well as comparing it with their parents (see appendix 6). It should be noted that, even when the intergenerational changes are due to several structural factors in Mexico that go beyond Oportunidades' objectives, the analysis developed in this section is crucial to understanding the different contexts in which conventional forms of social protection could increase resilience, as well as identifying where there are challenges and limits to those forms.

Table 3.4 Poverty trajectories adults and young adults

	Usually poor	Churning poor	Occasionally poor	Total
Adults	11	12	5	28
Young adults	12	10	6	28
Total	23	22	11	56

Source: Author

3.3.4 Participant observation

This ethnographic method was used as a tool that allowed me to be immersed in the social life of the research sites, understanding the meaning people gave to certain events and dynamics. This method “emphasises the legitimacy of a researcher’s interpretation of observed cultural phenomena from their participation and immersion in this phenomena” (Brockington and Sullivan 2003:65).

Participant observation took place on normal days in everyday activities, in order to capture relevant information related to how people relate to the climate, how they

develop and organise their livelihood activities, including how domestic work is organised, among other issues. This method also helped me to understand certain cultural factors to take into consideration when applying the other research methods, such as the life histories or the household surveys. For instance, I learnt that it is considered improper for a woman to be seen alone, even in public spaces, with a man to whom she is not engaged or married. For this reason, as a female researcher I decided to conduct the life history interviews and surveys mainly with women. To a certain extent the awareness about gender relations and socialisation in the communities limited my observation to the activities developed only by the women, but I could counteract this by engaging in informal discussions with the husbands, once when they came back into their homes after their daily activities. In some cases, the husbands joined the life history interviews. With the young adults, gender was not a main concern, and I could apply the interviews to both young women and men. Informal conversations were conducted regularly in order to explore sensitive issues that were difficult to explore in formal interviews. Even so, on a few occasions I was able to join the men in their livelihood activities, such as fishing, apiculture or agriculture. Likewise, the group discussions with the peasants and the fishermen helped me to have more insights into their perceptions. They were also used to triangulate the information that I had obtained from other sources.

3.4 Positionality and the ethics of data collection

Ethical issues were considered in terms of the ethical guidelines of the University of Sussex and the British Education Research Association (BERA). The research operated within an “ethic of respect and freedom from prejudice regardless of age, gender, sexuality, race, ethnicity, class, nationality, cultural identity, partnership status, faith, disability, political belief or any other significant difference” (BERA 2011:5).

It was ensured that all participants in the research understood the process in which they engaged, including why their participation was necessary, how it was to be used and how and to whom it would be reported (BERA 2011). Further, voluntary informed consent was requested, when possible, in written form, or orally. Participants were also informed of their right to withdraw from the research for any, or no, reason and at any time. Anonymity was applied to all participants.

No participant withdrew from the research but in some cases potential respondents did not agree to participate in the research. Moreover, in two cases the interviewees did not give their permission for recordings of the life history interviews with the digital recorder.

Spanish language and culture shock were not barriers, since the fieldwork location was in my home country. Furthermore, prior experience researching chronic poor rural communities and post-disaster localities in Mexico helped me to understand the risks and challenges that the work might present. However, I do not speak the Mayan language, and I had to rely on translation services when the respondent did not know, or did not want, to speak in Spanish.

In Mexico the use of participatory methods has a political connotation, due to the context in which they have been used and applied (Moya and Way 2003). Accordingly, the researcher was very clear on how to avoid certain biases that villagers might have towards these tools. Yucatan is a state with high NGO presence and many development practitioners, due to its high level of poverty and the indigenous population. Therefore, communities were somewhat sceptical about outsiders. “In some places, communities have become suspicious of PRA, either because they never see the final product, or because they do not feel satisfied with the outcomes of the workshops” (ibid.:23). This situation is reinforced by a generalised feeling that outsiders want to extract something from them (ibid.).

Furthermore, paternalistic practices in Mexico are seen as an obstacle to the success of PRA, “since rural communities still expect outsiders to bring them money and resources” (ibid.:15). Thus, the way in which I approached the communities was crucial to determining the type of relation that I established. For instance, in all the data collection activities that I applied I was very clear about my role and aim as a researcher, and explicit on my use of an ethics code to avoid any misunderstanding relating to the communities’ expectations. Therefore, the aims and interests of all those involved in the data collection were clarified at the beginning in order to create mutual confidence. However, I was also aware that in helping me with my research respondents faced an opportunity cost in terms of time. In this light, I offered, and undertook, work in some community activities as a way of compensating for their time. This also helped me to build mutual trust.

My main contact to the region was through the social anthropologist Dr Genner Llanes Ortiz. Through him I managed to contact some of the organisations working in the region, such as the regional representation of the United Nations Development Programme; researchers from the Instituto Nacional de Antropología e Historia and the Universidad de Chapingo; and government officials from local and federal environmental agencies such as the Secretaría de Desarrollo Urbano y Medio Ambiente (SEDUMA); and the Comisión Nacional para la Biodiversidad (CONABIO). These contacts were crucial for my first encounter with the communities.

Once in Yucatan, I firstly approached the communities through the formal local institutions in each community, acknowledging the importance of these institutions and norms, and ensuring that the whole community was informed about my presence as a researcher. Informal practices of participation and decision-making such as the family groups, peasants associations, and sports teams were also approached.

As a means to avoid an extractive behaviour with the communities, at the end of the fieldwork I shared in a group discussion my preliminary results. I also participated in a radio programme transmitted in Mayan in all Yucatan through the radio station XEPET, where I shared some of my research insights. Moreover, once my PhD is concluded I plan to develop a follow-up radio session based on my final results, tailored to the needs in the region. Likewise, I have also planned with some researchers from the Instituto Nacional de Antropología e Historia in Yucatan to develop a workshop with the communities, also based on my findings.

This chapter has presented the methodology and the research design that underpins this study. It has shown a robust and systematic approach based on the case study technique to assess resilience and social protection. I explained the quantitative and qualitative data collection tools that enabled me to build my data set. The use of participatory methods focused on a bottom-up approach, in order to explore the contextual vulnerability in the field sites. Moreover, using retrospective life history interviews with household surveys showed an original research design for exploring the timescales associated with resilience.

The first three chapters presented in this thesis represent the introduction to the research. Chapter 1 presented the aims of the research and explained the research

setting. Chapter 2 reviewed the relevant literature for this research and it also presented the social protection-resilience analytical framework that I developed. The current chapter introduced the methodology. In the following chapters the results of the thesis will be presented. The next chapter presents the relevant background and contextual information about the coastal community and the inland community.

Chapter 4 Context, exposure, and livelihood sensitivity in the inland community and coastal community

This chapter aims to provide a critical background for subsequent empirical chapters that explore the linkages between resilience and social protection in the two fieldwork sites. For this purpose, section 4.1 firstly describes the social-ecological system in each community. It presents the overall ecological characteristics of the two communities and the key socio-demographic and economic characteristics of the households. Section 4.2 introduces the different livelihood activities developed in these communities. Section 4.3 presents the entitlements to social protection programmes from which households benefit. Section 4.4 explains the main climate shocks that households in both communities have been exposed to: Hurricane Isidore, drought and climate variability. Overall the chapter considers the structural context and governance issues in the social-ecological system. This context provides a better understanding of the different dynamics and processes that affect the potential impact of social protection in the resilience of households.

4.1 Socio-ecological system in the coastal community and inland communities

4.1.1 Coastal community

The coastal community is located on the central coast of Yucatan in the Gulf of Mexico. The climate is classified as semi-arid with an annual precipitation of 600 mm. Annual evaporation is around 1800 mm per year and the annual mean temperature is 26 degrees Celsius. The dry season takes place during February, March and April. The rainy season takes place during July and August. The north-wind season is between June and November (Batllori-Sampedro, Canto-Polanco, and Febles-Patron 2006). The coastal community has a surface area of 1,472 hectares, of which more than 60% consists of wetlands (Batllori- Sampedro 2002a). The environmental landscape consists of coconut plantations, mangrove swamps (which includes red, white and buttonwood mangrove), 45 sinkholes, hypersaline waters and low deciduous forests (ibid.) (see figure 4.1). These resources provide several ecological services to the population. Nonetheless, in the past 35 years, hydro- meteorological phenomena have changed the social-ecological relations in the coastal community (Batllori-Sampedro and Febles-Patron 2009).

Hurricane Gilbert in 1988, classified as major hurricane reaching category 5 in the Saffir–Simpson Hurricane Scale and Hurricane Isidore, which reached category 3, had severe impacts on the vegetation and social infrastructure of the community. They accelerated the erosion process on the coastline, and they changed the coastal configuration in the watershed by breaching the sand bar, leading to changes in the composition of the wetland from a hypersaline-palustrine system to an estuarine- marine one (ibid.) (see photo 4.1).

The coastal community has also suffered from environmental degradation in the form of deforestation due to natural processes, as explained above, but also to anthropogenic activity such as residential development and population growth that began in the late 1970s (Batllori-Sampedro, Canto-Polanco, and Febles-Patron 2006). Between 1975 and 1998 the population grew almost four fold from 150 to 554 people (Batllori-Sampedro 2002b). This population growth not only resulted in an overexploitation of the natural assets in the community, but also led to a growing exposure of a larger population to an area affected by extreme events. Likewise, the reduction of the main marine resources, particularly related to octopus and grouper, highlights the overexploitation due to unsustainable fishing that has been taking place in the community.

Figure 4.1 Coastal community



Source: Author using QGIS

Photo 4.1 Coastal erosion after Hurricane Isidore, coastal community



Source: Author, taken on January 2012

Community members argued that Hurricane Isidore reshaped the beach dunes, reducing the coastal line approximately 70 metres. They also argue that every year during the north-wind season the sea level rises, increasing the coastal line erosion.

The average number of family members in the coastal community is four family members living in the same dwelling and sharing the household's food expenditure, but some households have up to seven family members. Moreover, 40% of the 101 households have at least one family member that speaks Mayan, the most important indigenous ethnicity in the region.

More than 70% of the households have basic services at home, including drainage service, electricity, and water faucet. However, over 57% of the households have at least one of the following characteristics in their dwellings which render them vulnerable to hurricane and flood risk: a dirt floor with the roof and/or walls made of cardboard or asbestos sheets; waste; mud or daub and wattle; or palm tree.

The community has a health clinic, which emerged from public demands by the inhabitants more than 15 years ago (Castillo, Viga and Dickinson 2008). The clinic offers tier 1 primary care health services. The community also has a public school giving them access to basic education through junior school, a primary school, and a tele-junior high school—a system that is quite a common way in rural areas for delivering teaching through satellite television. The community is well connected by a

coastal highway, where public transportation is available to reach other coastal villages and the capital city.

According to the survey, 1.7 people per household work on average to earn an income in the coastal community¹². In other words, in 42% of the households only one person works for an income, while in 38% of the households two people work. In 18% of the households more than three people work. The average age of breadwinners is 41 years old. Female-headed households are considerably younger than male-headed households. For instance, the average age of the former is 36 years old, while the latter is 53 years old. For this reason, the dependency ratio is also lower in female-headed households (see table 4.1). On average, in female-headed households 19% of the household members are below 14 years old and/or above 65 years old and cannot formally earn an income. For male-headed households this ratio increases to 45% (see table 4.1).

When this data is stratified by poverty category, it is quite significant that difference between extreme poor households and those households above the wellbeing line. For instance, the former have a dependency ratio of 40%, while the latter only of 15% (see table 4.2).

The analysis did not find any significant differences between recipient and non-recipient households.

12 People of 12 years old and over who worked, had jobs but did not work or; sought work in the reference week.

Table 4.1 Socio-economic descriptive statistics by head of the household, coastal community

		House- hold size	Age of head of the househol d	Depende ncy ratio	Monthly labour income per househol d	Monthly labour income and Oportunida des	Monthly value of Oportuni dades	Oportu- nidades/ Consum- ption
Woman	N	13	12	13	13	13	13	13
	Mean	3.38	36.67	.19	3092.31	3319	453.85	.05
	Min.	1	25	0	1000	1000	0	0
	Max.	6	50	1	6300	6300	2500	.25
	Std. Dev.	1.56	8.61	.23	1591.88	1571	906.10	.09
Man	N	12	12	12	10	11	12	11
	Mean	3	52.92	.45	2530	2729	771.67	.18
	Min.	1	30	0	800	800	0	.00
	Max.	6	70	1	5000	5000	1900	.51
	Std. Dev.	1.7	12.69	.35	1533.37	326.94	653.89	.18
Both	N	74	74	74	71	74	74	74
	Mean	4.30	40.27	.32	3202.82	3802	1022.97	.17
	Min.	2	20	0	500	1210	0	0
	Max.	7	80	1	8600	9480	4240	1.34
	Std. Dev.	1.33	11.1	.24	1673.40	1749	1150.517	.25
Total	N	99	98	99	94	98	99	98
	Mean	4.02	41.38	.32	3115.96	3617	917.78	.16
	Min.	1	20	0	500	800	0	0
	Max.	7	80	1	8600	9480	4240	1.34
	Std. Dev.	1.48	11.81	.26	1644.7	1738	1083.54	.23

Source: Author based on household survey

Table 4.2 Socio-economic descriptive statistics by poverty category, coastal community

	Poverty after all transfers	House- hold size	Age of head of the househol d	Depen- dency ratio	Monthly labour income per household	Monthly labour income and Oportunida des	Monthly value of Oportunid ades	Oportu- nidades/ Consum- ption
Extreme poverty	N	34	34	34	34	34	34	34
	Mean	4.65	38.68	.40	2085.29	342.5	685	.12
	Min.	2	20	0	500	0	0	0
	Max.	7	65	1	4000	1550	3100	.51
	Std. Dev.	1.35	10.89	.20	972.38	441.9	883.8	.17
Minimum wellbeing	N	49	48	49	45	49	49	48
	Mean	4.04	42.29	.33	3373.3	611.32	1222.65	.21
	Min.	1	20	0	800	0	0	0
	Max.	7	80	1	8600	1800	3600	1.34
	Std. Dev.	1.38	12.54	.28	1637.1	549.9	1099.8	.27
Wellbeing	N	18	18	18	17	18	18	18
	Mean	2.83	43.89	.15	4552.9	235	470	.0694
	Min.	1	20	0	1800	0	0	0
	Max.	5	60	1	8000	2120	4240	.42
	Std. Dev.	1.29	0.92	.20	1624.	569.74	1139.5	.14
Total	N	101	100	101	96	101	101	100
	Mean	4.03	41.35	.32	3126	453.76	907.52	.15
	Min.	1	20	0	500	0	0	0
	Max.	7	80	1	8600	2120	4240	1.34
	Std. Dev.	1.48	11.78	.26	1671.8	538.29	1076.59	.22

Source: Author based on household survey

Table 4.3 Socio-economic descriptive statistics, Oportunidades recipients and non-recipients, coastal community

		Household size	Age of head of the household	Dependency Ratio	Monthly labour income per household	Monthly labour income and Oportunidades	Monthly value of Oportunidades	Oportunidades/Consumption
Recipient households	N	51	50	51	50	51	51	50
	Mean	4.33	42	0.35	2912	3755	898	0.31
	Min.	1	20	0	500	900	450	0.05
	Max.	7	75	1	8600	9480	2120	1.34
	Std. Dev.	1.438	11.384	0.261	1690.62	1828	414	0.2366
Non-recipient households	N	50	50	50	49	49	--	--
	Mean	3.72	40	0.29	3482	3482	--	--
	Min.	1	20	0	800	800	--	--
	Max.	7	80	1	8000	8000	--	--
	Std. Dev.	1.471	12.248	0.257	1707	1707	--	--
Total	N	101	100	101	99	100	--	--
	Mean	4.03	41	0.32	3126.04	3621	--	--
	Min.	1	20	0	500	800	--	--
	Max.	7	80	1	8600	9480	--	--
	Std. Dev.	1.480	11.782	0.259	1671.88	1766	--	--

Source: Author based on household survey

4.1.2 Inland community

The inland community is located in the south of Yucatan. The weather in the region is classified as a dry tropical climate (As). The mean annual temperature is 26.3 degrees Celsius. It has a mean annual precipitation of 68.2 mm. The rainy season takes place during the summer and the dry season during the winter.

The environmental landscape includes medium sub-deciduous forest (see figure 4.2). The community has 10 hectares that constitute a protected natural reserve. There are no surface rivers. The ground is quite flat and is composed of soft limestone bedrock. This property makes the land very permeable and porous. Rainwater infiltrates through the calcareous ground, preventing the formation of surface water streams. In its place, underground rivers and karstic sinkholes known as *cenotes* are formed. These underground rivers and pools form the main hydrological basin in Yucatan, and are the main source of potable water of rural communities.

Figure 4.2 Inland community



Source: Author using QGIS

Photo 4.2 Typical dwelling in the inland community



Source: Author, taken August 2012.

76% of the households in the inland community have poor quality housing, making them vulnerable to hurricane and flood risk.

As in the coastal community, the inland community has infrastructure for basic education through a public school, which includes a junior school, primary school and a tele-junior high school.

Less than ten years ago a highway was constructed to connect the inland community with the main part of the municipality. However, there is no public transportation from the inland community. People have to organise transportation for themselves to the centre of the municipality, located 6km away. From there, access to public transportation to the capital city and minor cities is accessible. This geographic isolation limits the access to major public services and markets.

Furthermore, 93% of the 111 households are considered as deprived of basic services in their dwellings because they use wood or coal with no chimney inside the dwelling, while some households lack access to a water faucet in their dwellings. Nonetheless, electricity and drainage are available in all dwellings. However, 76% of the households have no access to dwellings of quality, because they have a dirt floor; the roof is made of cardboard sheets or waste; and/or the walls are made of mud or daub and wattle; reed, bamboo or palm tree; cardboard, metal or asbestos sheets; or waste (see photo 4.2).

The average household size is five family members. The range of family member ranges from one to 12 family members living in the same dwelling and sharing the household's food expenditure. The community belongs to a Mayan municipality. According to the survey, all households have at least one family member that speaks Mayan. Accordingly, 58% are bilingual with at least one family member speaking both Mayan and Spanish.

On average two people per household work on farm and off-farm labour. Female-headed households are older than male-headed households, with an average age of 46 years old in the former and 40 years old in the latter. Given this, the dependency ratio is also higher in female-headed households with 41% of the household members below 14 years old and/or above 65 years old and cannot formally earn an income. In contrast, male-headed households the dependency ratio drops to 35% (see table 4.4).

Breadwinners in recipient households are slightly older than non-recipients: the former are 45 years old, while the latter are 32 years old. The dependency ratio is slightly lower

for recipient households: on average, 34% of the recipient household members are below 14 years old and/or above 65 years old and cannot formally earn an income, while for non-recipient households the ratio increases to 44% (see table 4.5).

Table 4.4 Socio-economic descriptive statistics by head of the household, inland community

		House- hold size	Age of head of the house- hold	Depende ncy ratio	Monthly labour income per household	Monthly labour income and Oportunida des	Monthly value of Oportunid ades	Oportu- nidades/ Consum -ption
Woman	N	9	9	9	9	9	9	5
	Mean	4.22	46.11	.41	1395.56	2362	966	.89
	Min.	1	20	.00	0	100	0	.31
	Max.	7	70	.75	6600	9280	2680	1.39
	Std. Dev.	1.922	16.54	.26	2223.12	2801	1131	.44
Man	N	11	11	11	11	11	11	8
	Mean	5.00	40.45	.35	2036.36	2739	703	.62
	Min.	3	25	.00	400	400	0	.19
	Max.	12	55	.60	6000	7550	1550	.94
	Std. Dev.	2.490	11.28	.24	2062.42	2501	556	.30
Both	N	80	80	80	80	80	80	47
	Mean	4.84	38.38	.37	1697.25	2307	610	1.07
	Min.	2	20	0	0	0	0	.15
	Max.	10	85	1.00	7360	8770	2580	11.07
	Std. Dev.	1.74	13.14	.22	1504	1718	646	2.11
Total	N	100	100	100	100	100	100	60
	Mean	4.80	39.30	.38	1707	2360	652	1
	Min.	1	20	0	0	0	0	.15
	Max.	12	85	1.00	7360	9280	2680	11
	Std.Dev.	1.84	13.33	.23	1630	1908	692	1.88

Source: Author based on household survey

Table 4.5 Socio-economic descriptive statistics, Oportunidades recipients and non-recipients, inland community

		Household size	Age of head of the household	Dependency ratio	Monthly labour income per household	Monthly labour income and Oportunidades	Monthly value of Oportunidades	Oportunidades/Consumption
Recipient households	N	66	66	66	66	66	66	66
	Mean	5.38	44.47	0.3382	1783.94	2842.20	1080	0.95
	Min.	2	20	0.00	0	405	450	0.15
	Max.	12	85	1.00	7360	9280	2680	11.07
	Std. Dev.	1.959	12.283	0.21868	1824.01	2064.90	559	1.80
Non-recipient households	N	45	45	45	45	45	--	--
	Mean	4.04	32.11	0.4407	1530.67	1530.67	--	--
	Min.	1	20	0.00	0	0	--	--
	Max.	6	65	1.00	4400	4400	--	--
	Std. Dev.	1.381	11.103	0.24107	1143.02	1143.02	--	--
Total	N	111	111	111	111	111	--	--
	Mean	4.84	39.46	0.3798	0.3164	2310.50	--	--
	Min.	1	20	0.00	0.00		--	--
	Max.	12	85	1.00	1.00	9280	--	--
	Std. Dev.	1.861	13.252	0.2325	0.27879	1860.20	--	--

Source: Author based on household survey

Table 4.6 Socio-economic descriptive statistics by poverty category, inland community

		House hold size	Age of head of the household	Depende ncy ratio	Monthly labour income per household	Monthly labour income and Oportunida des	Monthly value of Oportuni dades	Oportu- nidades/ Consum- ption
Extreme Poverty	N	79	79	79	79	79	79	45
	Mean	4.99	39.05	.37	1203	1737	534	.86
	Min.	1	20	0	0	0	0	.15
	Max.	10	65	.75	4000	5405	1985	11.07
	Std. Dev.	1.68	11.96	.21	1004	1202	578	1.60
Minimum Wellbeing	N	26	26	26	26	26	26	18
	Mean	4.65	41.15	.46	2595	3477	881	1.24
	Min.	2	20	0	0	405	0	.19
	Max.	12	85	1	7200	8770	1580	10.19
	Std. Dev.	2.30	17.33	.25	1953	2132	800	2.38
Wellbeing	N	6	6	6	6	6	6	3
	Mean	3.67	37.50	.14	4020	4800	780	.56
	Min.	2	25	0	1600	1600	0	.20
	Max.	6	50	.50	7360	9280	2680	.77
	Std. Dev.	1.97	10.37	.19	2402	3338	1063	.31
Total	N	111	111	111	111	111	111	66
	Mean	4.84	39.46	.3798	1681	2310	629	.95
	Min.	1	20	0	0	0	0	.15
	Max.	12	85	1	7360	9280	2680	11.07
	Std. Dev.	1.86	13.25	.23	1582	1860	676	1.80

Source: Author based on household survey

4.2 Livelihoods in the coastal and inland communities

Livelihoods in rural Yucatan are quite complex and are based on several small-scale livelihood activities (see table 4.7). In this section I describe the different types of livelihood activities practiced in both communities, the extent of households practicing these activities and the income received per activity.

In the coastal community the main activities can be divided into the following categories:

1. Artisanal offshore fishing: all surveyed households practice this activity. It is the base of the households' subsistence and it is practiced on a regular basis with the catch used both for consumption in the households and for commercial purposes. This is the case for households across all poverty categories. Traditionally fishing is considered a 'masculine' activity, therefore female participation is quite restricted, and it remains an activity exclusive to men.

In the community, fishing is mainly small scale. The main marine catch is octopus during the north-wind season and grouper, which is caught almost all year round. Fishermen are usually organised in cooperatives in the marina, which manage the fishermen of both the coastal community and the neighbouring community of Chabihau. These institutions mainly work as intermediaries between the fisherfolks and the market. Those households with the possibility of purchasing a boat work as ‘free’ fishermen. On an average fishing day, households earn around 200 pesos per day (16 USD)¹³ for this activity plus the in-kind earning for consumption in the household. Free fishermen will keep all the catch, while fishermen in cooperatives have to pay a fee.

Fishermen are not required any particular training to perform this activity. For instance, the fishermen do not know how to swim. Some practice the lung diving, which is extremely risky. Usually these communities remain excluded from any governmental effort to increase the capacities of fisherfolks. Furthermore, this activity is highly volatile, due to the high climate variability in the region, but also to the overexploitation of the resources. Fishermen now are exposed to lower volumes of catch, higher prices in gasoline and oil, larger distances to find fish, price speculation by big intermediaries, and complex legal constraints and surveillance measures that restrict the activity. The increasing scarcity of the resource is notorious in the increase of illegal fishing in the region. 2. Livestock production is in the form of small-scale poultry and pork: this activity is practiced by 45% of the households and it is mainly to provide for consumption in the household. It is accessible to households in all poverty categories, but extreme poor households practise it more with almost half the households producing mainly small-scale poultry.

3. Agriculture: only 23% of the households practice crop farming, mainly to yield food for their own consumption. It is in the form of coconut plantations, backyard agriculture and small-scale rearing of coconut seedlings. This activity is quite limited in the community due to the constrained access to fertile land and lack of irrigation. After the Hurricanes Gilbert in 1988 and Isidore in 2002, land became more saline and new plagues appeared (Batllori-Sampedro and Febles-Patron 2009). This required additional investments in pesticides, and other agricultural inputs that de-motivated agricultural activity in the community. Informal interviews and group discussions showed that

¹³ Estimated figures using an exchange rate of 12.80 Mexican Pesos per US Dollar, February, 2012 (Banxico).

households were not motivated to farm after Hurricanes Gilbert and Isidore, which destroyed most of their backyard crops. It is mainly the households in the minimum wellbeing category that practise this activity. When people work as agricultural labourers in the community, or in neighbouring communities, they earn 60 pesos (4.7 USD) per day.

4. Tourism: this includes handicrafts production; ecotourism in the sinkhole; and maintenance of beach houses. These activities are seasonal, except for the maintenance of beach houses, and are practiced by 27% of the households. These activities are not accessible to all the households since they depend on the social networks of each household, which will provide them with access to certain resources. Given this, the activity is mainly practised by households in the minimum wellbeing category. Households earn around 400 pesos (31 USD) per month for these activities.

5. Services: this covers sewing and dressmaking; cooking; carriage services; carpentry and building. These activities are pursued by 30% of the households across all poverty strata, and are temporary.

6. Small family business: this consists of restaurants; convenience stores; market stalls; car and bicycle workshops. These activities are mainly permanent activities of the household and involve 18% of the households. Both men and women participate in these activities. The lack of access to financial services that provide the necessary investment to develop these activities make them quite limited and exclusive to the households above the minimum wellbeing line.

Households in the coastal community combine these activities, creating a complex livelihood portfolio. As it will be explained further, this diversification of livelihoods is a strategy that responds to a context of increased risk.

In the inland community, livelihood activities range between traditional livelihoods that depend on natural resources, and market-oriented activities, usually practiced in the cities. The former activities not only provide in-kind production and, to some extent, income, but they also represent the basis for everyday life and ceremonial life (Rosales 2003). The latter activities provide the necessary income that modern life requires. The activities are divided into the following categories:

1. Agriculture: traditional activities are based on the *milpa* or swidden agriculture, a rotational form of subsistence agriculture based on natural vegetative processes in order to restore soil fertility. The *milpa* is part of the ancient tradition of the Mayan population of sustainable management of the environment (Konrad 2003). Around 84% of the households work the *milpa*. Farmers mainly cultivate maize, and some still practice ancient intercropping strategies mixing maize with beans, pumpkins, sweet potatoes and lima beans. Men mainly practice this activity, but some women engage in the *milpa* too. Backyard agriculture, horticulture, weeding, and apiculture are also practiced in the inland community. Households also cut firewood every three days and sell it for 50 pesos (3.90 USD). Agriculture is rarely practiced as an exclusive livelihood activity. Households usually diversify their activities between agriculture and temporary migration to the city, off-farm activities, services or small business. This is the case because the *milpa* provides mainly for consumption in the household, but no surplus is available to sell and get some income from the agricultural production. There are some households that do not produce enough even for the subsistence of the household. However, even if the household manages to sell some surplus of the production, the difficulty to access a fair market price will hardly translate in income returns. Given this, households have to engage in diverse income generating activities in order for them to cope with the households' expenses associated to the nutrition of the household and all other activities. For instance, some peasants eventually work as agricultural labourers in other people's *milpas*. They are paid 60 pesos (4.70 USD) per day.

In general terms, subsistence agriculture is decreasing in the community (Rosales 2012). Whilst the *milpa* is still practised, the extensions and yields are decreasing. With the increased access to high school, young adults are less interested in this activity, and they usually search for job opportunities outside the communities, leaving the *milpa* to the older generation.

2. Livestock production, mainly small-scale poultry (this involves 95% of the households) and pork (45% of the households). Survey data shows that households in all poverty strata produce small-scale poultry mainly for the consumption of the households, while raising pork is mainly for commercial purposes as well as to achieve better nutrition.

3. Temporary migration to the city: 48% of the households have at least one family member migrating to the city in Merida or in the Riviera Maya in Quintana Roo state. Men usually stay for one week and work as builders. On average, a helper of a builder earns 300 pesos (23 USD) per week while a chief builder earns 600 pesos (47 USD) for the same period. Young women migrate to the city for periods of approximately one year to work as domestic workers. They earn around 700 pesos (55 USD) per week. This activity is very important for households in extreme poverty, since they complement the agricultural activity in the *milpa* with temporary migration to the city. Access to work in the city gives these households the possibility of generating some income necessary for the household's expenses. The lack of economic opportunities in the community makes temporary migration crucial for the survival of the households in extreme poverty.

4. Off-farm work in the community in the form of hammock weaving also brings some financial liquidity to the household. This activity is developed by 80% of the households, and it has become a secure source of income. An intermediary from a shop in the capital city comes on a weekly basis to collect hammocks and sell them. Households usually produce between one and two hammocks per week, earning between 70 pesos and 90 pesos (5 USD and 7 USD) for each hammock. This activity is of high importance to all households across all poverty categories, since it is very accessible and does not require a lot of training-all household members, including children, women and men, practice making these items-. Furthermore, it does not require an initial financial investment and there are no transaction costs associated to transportation or buying the inputs, since the intermediary will deliver all the material necessary for sewing.

5. Services: these include cooking and carriage services. These are temporary activities that are undertaken by less than 10% of the households, mainly in extreme poverty (for the cooking) and non poor households (for the carriage services). These activities are upon demand. They provide an extra income for the households, but they are not practised in a regular basis due to the limited demand.

6. Family business: these activities include: 1) mills to prepare the *tortilla*; 2) small convenience stores -households establish a small shop in their own houses where they sell a small range of groceries and industrialised foods; and 3) sewing *hipiles*,

highly-embroidered traditional blouses wore by indigenous women. The initial financial investment required to open a business makes these activities quite limited in the inland community. Less than 13% of the households have small business, and the majority are above the minimum wellbeing poverty category, but some extreme poor households have established small family business. Women mainly develop these activities, while men work in the *milpa* and/or in the construction industry in the city. Families earn 30 pesos (2 USD) per day from the mill. From the small convenience stores households earn around 400 pesos (30 USD) per week. In the case of the *hipiles*, each piece is sold outside the community for 350 pesos (27 USD) and it takes two weeks to sew. Despite the diversity of these livelihood activities in the inland community and products obtained, these activities are quite low in productivity, a family budget deficit, unfavourable market insertion, and consequently extended poverty.

Table 4.7 Livelihood activities in the coastal and inland communities

Type of livelihood activity	Households in the coastal community practicing this activity	Income received per activity	Households in the inland community practicing this activity	Income received per activity
Fishing	100%	Artisanal off-shore fishing: 200 pesos per day, plus consumption for the household	--	--
Agriculture	23%	Agricultural worker: 60 pesos per day Coconut plantation, backyard agriculture, small-scale rearing of coconut seedlings: mainly for the consumption for the household	84%	Timbering: 40 pesos per day. Agricultural worker: 60 pesos per day <i>Milpa</i> , backyard agriculture, subsistence production
Livestock production	45%	Small-scale poultry and pork for the consumption of the household	95%	Small-scale poultry and pork for the consumption of the household
Off-farm work	--	--	80%	Hammock weaving: 70 pesos and 90 pesos per week
Work in the city	--	--	48%	Helper of builder: 300 pesos per week Chief builder: 600 pesos per week Domestic worker: 700 pesos per week
Tourism	27%	Ecotourism in the sinkhole: 80 pesos per trip Maintenance of beach houses: 400 per month	--	--
Services	30%	Sewing and dressmaking: 200 pesos per complete piece Cooking: 30 pesos per meal Carriage services: n.a. Carpentry and builder: 400 per week	10%	Cooking: 20 pesos per meal Carriage services: 500 pesos per week
Small family business	18%	Restaurants: n.a. Convenience stores: 750 pesos per week Market stalls: 500 per week Car and bicycle workshop: n.a.	10%	Mills: 200 pesos per week Small convenience stores: 400 pesos per week Sewing <i>hipiles</i> : 350 pesos per two weeks

Source: Author

4.2.1 A tale of two Yucatans

There is a big asymmetry between the capital city of Merida and the rural areas of Yucatan. Given this, the variation in livelihoods in Yucatan is comparable to the gap between Switzerland and Morocco (OECD 2007). Merida concentrates the political and economic power in the metropolitan region, while the rural localities are usually highly dispersed and isolated, affecting the access and quality of services and markets. As a consequence there is a high inequality in terms of employment opportunities, income distribution and human development. For instance, the Gini coefficient for Yucatan, which measures the distribution of income in a given region, is highly unequal, with a coefficient of 0.60 (ibid.).

Furthermore, Merida is the primary destination of both permanent and temporary migration of tens of thousands of rural inhabitants of Yucatan -about 80% of all indirect job creation takes place within Mérida- (OECD 2007). The neighbouring state of Quintana Roo is also recipient of tens of thousands of Yucatecan migrants, mainly in the touristic destinations of Cancun and Cozumel. International migration mainly to the United States also takes place. These migrants are looking for economic, education and employment opportunities. This process has been taking place since the 1970s after the collapse of the sisal industry. For 150 years the state's economy was sustained in the agricultural sector, and in the last stage of this period, it was predominantly in the monoculture of sisal or henequen fiber. However, in the 1980s the sisal production collapsed. Despite several efforts to activate the economy in rural areas, attempts to consolidate the diversification of economic activities failed and peasants mainly rely in the temporary or permanent migration in tourist centres in the peninsula.

The emerging fishing activity was also magnet of the *ex-henequeneros*, for whom training courses were designed by the government. However, this fishing bonanza lasted less than 30 years, and in the late 1990s fishing stagnated, due to more competition of the resources, affecting mainly artisanal fisher folks (Fraga et al. 2008). Nowadays, the fishing industry faces a more difficult situation, with more fishermen migrating to the construction industry in the city, and a faint hope for a tourism activity that produce little economic welfare.

The tourism industry in the Yucatán Peninsula has focused exclusively in the big cities. This has led to the concentration of tourist investment in the already wealthy municipalities of Merida and Cancun, with little or no spill-over effects in the rural areas. This is the case despite the fact that some of these areas do offer diverse tourist attractions, such as the *cenotes* or sink holes and the archaeological sites. Likewise, the increasing importance of these touristic areas has led to the immigration from the United States and Europe. Some of these immigrants are in search of investment opportunities in the area, and others are retired middle class people seeking relaxed and pleasant weather. This ‘ex pat’ immigration has led to an increasing demand of lands, which have implied a subtle process of land grabbing. In the context of structural poverty and debt, rural households are willing to sell their *ejidal* lands in exchange of some flow of cash, while the expats and rich Mexican families accumulate lands paying a very cheap price. Paradoxically, the rural population essentially end up landless and working for this new group of big landowners.

4.2.2 The ejido

Land tenure has also shaped power relations in the social-ecological system in rural Yucatan. The *ejido* is the unit of the rural development in the country and of the communal identity. It was the agrarian unit of the land reform that took place during the 20th century after the Mexican revolution, and it has a mix of private and communal property. In the collective *ejido*, lands are held and worked cooperatively. In individual *ejidos*, farmers work their lands apart from other *ejidatarios*. In its original conceptualisation, the *ejido* was an instrument of liberation and support to farmers. These parcels of land were supposed to complement farmers’ wages, instead of being the basis for national agricultural production, as it was later conceived to be (Meyer 1991).

The *ejido* is also an organisation that can deal with problems common to all of the individual landholders (DeWalt 1979). This collective organisation increases the collective management of natural resources. It also mediates the relation between the social and the ecological components in a social-ecological system (Barnes 2009). The *ejido* structure has also been recognised as a source of resilience as it has shown an ability to maintain its structure despite strong changes to the land tenancy policies or macroeconomic shocks (Eakin 2006; Barnes 2009).

Nonetheless, peasants have incomplete land property rights. The land reforms established in 1992 aimed to individualise the *ejido* sector in order to facilitate the use of the land as collateral. While these changes aimed to bring certainty to the legal situation of the land-holders, the reforms also affected the resource use and social organisation in the communities and *ejidos*. For instance, in the coastal community land property is mainly in the form of smallholders. However, 30 people earned their property rights as *ejidatarios* in approximately 1,400 hectares that cover the mangrove and the swamps. This has represented an unequal access to community resources that has translated into a social tension between the *ejidatarios* and the rest of the members of the community (Pech 2010). In the inland community 67% of the population have *ejidal* rights, equivalent to 72 *ejidatarios*. This process has contributed to an unequal access to the natural resources in the social-ecological system, leading to an increase of the contextual vulnerability of the non *ejidatarios*.

Furthermore, land fragmentation has led to unproductive smallholding: the *minifundio*, “a farm whose production does not meet the basic needs of the unit that works and manages it, thus off-farm activities are essential to survive” (Warman 2001:35). In the inland community, 80% of the *ejidatarios* own less than two hectares of land. Further, based on the national agricultural censuses for 1950, 1960, and 1970, Liverman (1999) showed that *ejidos* are more vulnerable to droughts than private landowners with more than five hectares, as they have shown higher crop losses. Farmers, therefore, have poor agro-ecological endowments, limiting the adoption of strong risk-management strategies in the face of climate change.

Parallel to this process of impoverishment in the rural areas, the communities are subject of discrimination against the ‘Maya’. Although practices and ways of Mayan-Yucatecan culture organization are kept, the communities are subject to a strong influence of the ‘modern’ capitalist culture with contents of discrimination against the Maya (Rosales 2012). For instance, the exogenous and top-down model of education is completely disjointed from the local traditions and needs, imposing a stigma towards traditional knowledge. In the words of Faust (2001): ‘schools, while preparing youth for life in the modern world, also generally result in a denigration of the oral knowledge of the elders’ (Faust 2001:163). The influence of the mass media has risen, leaving little appreciation for the local culture, especially among the young adults and children. This

has led to a ‘crisis’ of the Mayan identity (Rosales and Moya 1999, as quoted in Rosales 2012), which is reflected on the weakening of community and communal instances of organization, lack of participation in collective decision-making spaces, and a growing differentiation and internal political divisions. This crisis of traditional systems contributes to the loss of primary vegetation and biodiversity, due to the loss of local knowledge and traditional practices that are sustainable.

In the inland community sustainable farming practices that have helped to protect the forests are being lost. The reduction of primary vegetation and the increasing deforestation in the Yucatan region increases the vulnerability of farmers (Rosales 2012). Given this, traditional activities such as the *milpa* are sustainable practices that have helped to conserve the forests and the natural resources. However, according to Moya et al. (2003) the sustainability of the *milpa* in Yucatan is threatened by six main drivers: 1) the reduction of the fallowing period; 2) reduction of polyculture; 3) erratic rainfall patterns; 4) low maize prices due to the trade liberalisation; 5) top-down agricultural policies that aim to homogenise agricultural practices; and 6) the individualisation of the land, which weakens the *ejido*. These drivers are all present in the inland community. When the *milpa* is practiced without the traditional techniques, the necessary fallowing periods, and the necessary diversity and appropriate crops, then it becomes a predatory activity since it cannot guarantee that the biodiversity and the soil’s nutrients will be regenerated (Ramírez 2010).

4.3 Access to social protection

Households receive other social protection programmes that can be federal, local or temporary programmes, which work in synergy with Oportunidades (see table 4.8). In particular:

1. Senior Citizen Attention Programme in Rural Areas (70 y Más) provides monthly cash support of 500 pesos (41 USD) to all senior citizens over 70 years that inhabit the target localities. Its relevance lies in aiming to tackle the greater senior citizen dependence ratio in the localities of smaller size (10.4 rural vs. 7 urban), and in addressing the limited coverage of the pensions systems. It currently covers 1.6 million senior citizens in localities of up to 20 thousand inhabitants (CONEVAL 2010).

2. Direct Support to the Country Programme (Procampo), which is the most important agricultural subsidy in the country in terms of its coverage and budget: it covers more than half the country's cultivable surface, and it targets 2.4 million producers through a transfer per hectare grown in the base period. It pays 1000 pesos (78 USD) per hectare, and up to 100 hectares per farmer every agricultural cycle. It is highly regressive, 10% of the producers receive 45% of the resources, since it does not aim to reduce poverty, but to support the transition of agricultural producers to the free market (CONEVAL 2010).
3. Most households also receive a health insurance national programme, the Seguro Popular, which provides coverage for catastrophic health expenditures. This programme aims to compensate the lack of access to formal social security mechanisms. Potential recipients are classified through a socioeconomic assessment in order to assign them to the relevant contributory bracket. Poorer households are exempted from these contributions. Around 95% of the households in the coastal community and 79% in the inland community are affiliated to this programme, without any contributory obligation.
4. Family Garden Programme (Huertos Familiares) is a local cash transfer programme that aims to improve the nutrition of poor families by supporting investments in garden agriculture. It provides 1400 pesos (109 USD) every month during one year. It only supports 28 families in the inland community.
5. Education grants: SEP grant provides 300 pesos (23 USD) for families with children in primary school. The Bécals programme provides 900 pesos (70 USD) to senior high students. It lasts 10 months during the academic year. The Pronabes programme provides a grant for higher education. It provides support for four years with bigger grants as the students are progressing in their studies. It starts with 750 pesos (59 USD) and ends with a 1000 pesos (78 USD) monthly support.

In certain contexts, friends and families also provide transfers that function as informal safety nets.

Table 4.8 Social protection interventions in the coastal and inland communities

	Objective	Financing source	Monthly payment (in pesos)	Recipients in the coastal community		Recipients in the inland community	
				Total number	%	Total number	%
Oportunidades	Protective, Preventive and Promotive	Federal government	400- 2,600 per month	51	51%	66	59%
70 y más	Preventive	Federal government	500 per month	12	12%	10	9%
Procampo	Promotive	Federal government	1,000 per hectare	--	--	72	65%
Huertos familiares	Promotive	Local government	1,400 per month	--	--	28	25%
Education grants (Pronabes, SEP, and Béalos)	Promotive	Federal government, local government, and private sector	300 to 1,000 per month	10	10%	15	15%
Informal social protection	Protective and Preventive	Family and friends	100- 3,000 one period	24	24%	4	4%
None (cash transfer programmes)	--	--	--	17	17%	21	19%
Seguro Popular	Protective and Preventive	Federal government	Access to tier 1 medical services	96	95%	87	79%
Social security	Protective and Preventive	Federal government (IMSS; ISSSTE)	Access to tier 1 medical services	12	12%	4	3.6%

Source: Author based on household survey

The programmes that cover more extreme poor households in both communities are: the Seguro Popular, the Programa Empleo Temporal (in the coastal community), Procampo (in the inland community) and Oportunidades (see table 4.9 and 4.10).

Table 4.9 Social protection by poverty category, coastal community

	Extreme poverty		Minimum Wellbeing		Wellbeing	
	Total number	%	Total number	%	Total number	%
Oportunidades	15	40%	31	70%	4	27%
70 y más	2	0.5%	9	20%	1	6%
PET	25	67%	30	68%	10	67%
Education grants (Pronabes, SEP, and Bécals)	0	0	5	11%	5	33%
Informal social protection	8	23.5%	11	23%	5	28%
None (cash transfer programmes)	4	10%	7	11%	6	40%
Seguro Popular	32	94%	47	96%	17	94%
Social Security	3	9%	6	12.5%	3	17%

Source: Author based on household survey

Table 4.10 Social protection by poverty category, inland community

	Extreme poverty		Minimum Wellbeing		Wellbeing	
	Total number	%	Total number	%	Total number	%
Oportunidades	45	57%	18	70%	3	50%
70 y más	4	10%	5	28%	1	16.7% ¹⁴
Procampo	53	67%	15	58%	4	67%
Huertos familiares	12	15%	6	23%	4	67%
Education grants (Pronabes, SEP, and Bécals)	5	10%	6	23%	4	67%
Informal social protection	1	1%	2	1%	1	16.7%
None (cash transfer programmes)	17	21%	0	0	2	33%
Seguro Popular	64	81%	19	73%	4	67%
Social Security	2	2.6%	1	3.8%	1	16.7%

Source: Author based on household survey

The household survey also shows that in the coastal community the average monthly self-reported farm and non-farm income of recipient households is 2,912 pesos (227 USD¹⁴). Non-recipient households have a monthly labour income of 3,482 pesos (272 USD), approximately 20% higher compared to recipient households. However, with Oportunidades the average monthly income increases by 30% to 3,755 pesos (293 USD). The monthly mean value of Oportunidades is 898 pesos (70 USD), and some

¹⁴ Estimated figures using an exchange rate of 12.80 Mexican Pesos per US Dollar, February, 2012 (Banxico).

households receive up to 2,120 pesos (165 USD) per month. The transfer is equivalent to an average of 31% of households' consumption. On average, households where both the women and the men share the responsibilities are usually wealthier than female-headed households and male-headed households. In the inland community, the average monthly self-reported farm and non-farm income of recipient households is 1,783 pesos (139 USD). Non-recipient households have a monthly labour income of 1,530 pesos (119.3 USD) approximately 10% lower when compared to recipient households. With Oportunidades the average monthly income increases to 2,842 pesos (221 USD), which means that the transfer represents half the households' monthly income. The monthly average value of the transfer is 1,080 pesos (84 USD), and some households receive up to 2,680 pesos (209 USD) per month. The cash transfer is equivalent to an average of 95% of a households' consumption, but the data shows a high dispersion with a standard deviation of 1.8. In other words, for one out of three households the transfer represents up to 40% of their monthly consumption, for another third of the households it represents from 41% to 76% of its monthly consumption and for rest of the households it represents more than 77% of its consumption every month.

In contrast to the coastal community, male-headed households are usually wealthier than female-headed households and those households that share responsibilities between the women and men (see table 4.1).

Moreover, the survey analysis is indicative of the fact that the synergies between different social protection transfers translate into increased returns to households' income. I calculated that without any social protection support 58% of the 101 households in the coastal community would be extremely poor^{15 16}. However, after all transfers, including informal social protection, the incidence of extreme poverty is reduced to 35%. Without any transfers, 29% of the 101 households in the coastal

15 Data was calculated by adding up the monthly self-reported farm and non-farm income from all household members, and subtracting the total monthly value of all transfers and Oportunidades.

16 Based on the official national poverty lines in Mexico established by the National Evaluation Council of the Social Development Policy in Mexico (CONEVAL): 1) The wellbeing income poverty line measures the population whose income is insufficient to cover their needs (food and no food) even if they devoted their entire income to this purpose. In rural areas this value was equivalent to 1,444 pesos (112 USD) per capita per month with price values as of December 2011. 2) The minimum wellbeing income poverty line measures the population whose income is insufficient to cover their food needs, even if they devoted their entire income to this purpose. The value is equivalent to 755 pesos (59 USD) per capita (CONEVAL No Date).

community would have a minimum wellbeing, while after all transfers 47% of all the households in the community reach the minimum wellbeing level (see table 4.11).

In the inland community, with the synergies between Oportunidades and other governmental transfers, extreme poverty is reduced from 87% to 71% of all 111 households; and households in the minimum wellbeing category increase from 12% to 23% households in the community (see table 4.12). However, the extent of extreme poverty among households in the inland agriculture community remains quite broad even after transfers from Oportunidades.

Table 4.11 Poverty in recipient and non-recipients households in the coastal community

	Poverty after labour income			Poverty after labour income and Op			Poverty after labour income and all transfers		
<i>Num of households</i>	<i>Recipient</i>	<i>Non-recipient</i>	<i>Total %</i>	<i>Recipient</i>	<i>Non-recipient</i>	<i>Total %</i>	<i>Recipient</i>	<i>Non-recipient</i>	<i>Total %</i>
Extreme poverty	34	22	58%	17	22	41%	15	22	35%
Minimum Wellbeing	15	13	29%	29	13	44%	31	13	47%
Wellbeing	1	11	13%	4	11	15%	4	11	18%
Total			100%			100%			100%

Source: Author based on household survey

Table 4.12 Poverty in recipient and non-recipients households in the inland community

	Poverty after labour income			Poverty after labour income and Op			Poverty after labour income and all transfers		
<i>Num of households</i>	<i>Recipient</i>	<i>Non-recipient</i>	<i>Total %</i>	<i>Recipient</i>	<i>Non-recipient</i>	<i>Total %</i>	<i>Recipient</i>	<i>Non-recipient</i>	<i>Total %</i>
Extreme poverty	60	37	87%	53	37	81%	45	34	71%
Minimum Wellbeing	6	7	12%	12	7	17%	18	8	23%
Wellbeing	0	1	1%	1	1	2%	3	3	5%
Total			100%			100%			100%

Source: Author based on household survey

Even so, of particular concern is the prevalence of food insecure households in both communities given that the Oportunidades programme has three specific monetary components¹⁷ that support recipient families “to improve the quantity, quality and

¹⁷ The *Apoyo Alimentario* consists of a monthly transfer of 225 pesos (17.50 USD), while the *Apoyo Alimentario Vivir Mejor* of 120 pesos (9.30 USD) aims to compensate the families from the effect of the international rise of food prices and the *Apoyo Infantil Vivir Mejor* offers 105 pesos (8 USD) to support the nutrition of children below 9 years old. Moreover, a benefit of 60 pesos (4.60 USD) to smooth energy consumption expenditure is also paid to poor households.

diversity of food, in order to raise the nutrition of the families” (SEDESOL 2011:7). In this light, 47% of the recipient households in the coastal community, and 68% of the recipient households in the inland community reported suffering from food shortages (staple food, vegetables/fruit, vegetable proteins and/or animal proteins) in the previous year. This statement was confirmed by the group discussions in the two communities.

According to the doctors of the Health Centres in both communities, health problems in the communities are related to chronic degenerative diseases like diabetes, obesity and hypertension, linked to an unbalanced diet and sedentary habits. Furthermore, it is estimated that climate change will further increase the risk of food insecurity of households (HLPE 2012; Romero-Lankao et al. 2014). Even so, the Oportunidades’ health education workshops barely considered any nutrition counselling in terms of the deficiencies and excesses in the diet. When revising the Guide for Capacity Building for Recipient Women (SEDESOL 2010), which guided the bimonthly meetings with the recipients, only one of the six bimonthly modules included a section on nutrition counselling.

Scholars in the social protection literature have argued that the choice between food or cash transfers should be linked to the context where the social protection intervention will operate. This context includes the access to regional food markets, and the different dynamics between producers, prices and traders (Gentilini 2007; Barrett and Maxwell 2005; Barrett et al. 2009). The ethnographic data in the communities showed several restrictions to accessing a balanced diet, mainly related to food shortages, in combination with increased access to convenience stores that tended to supply food of little nutritional value. Household members in the coastal community argued that it was easier and cheaper to substitute vegetables and fruits, with pre-packed processed food. This is particularly relevant since Mexico is already ranked in first place for adult obesity in the world (FAO 2013). In this light, Hou (2010) found that rural households in Mexico usually smooth their consumption after a climate shock by consuming cheap calories such as those from grains and stop consuming expensive calories from vegetables, fruits or animal products. The cash injection of Oportunidades - in a context of reduced access to food markets, restricted information, and lack of nutritional

The nutritional component of *Oportunidades* includes the provision of nutritional complements to pregnant and lactating women (Nutrivida) and to children between six months and two years as well as to children between two and four years old (Nutrisano) if signs of malnourishment are detected.

education - may reinforce unhealthy habits in the communities, leading to an exacerbation of households' vulnerability.

Furthermore, Ibararán, Brenkert and Malone (2008) show that low resilience in Mexico is determined mainly by factors such as low food security; education; health; and economic capacity. Drawing on Blaikie et al. (2004), García Acosta (2005) argues that social vulnerabilities -such as poverty; social exclusion; lack of land planning; and corruption - have caused risk, and enhance the social construction of disaster in Mexico¹⁸. Vera Cortés (2005) argues that poverty and the lack of political participation increases vulnerability to climatic risks.

4.3.1 Clientelistic background of state-society relations

Clientelism in rural areas has been a tool that has shaped the relationship between the state and the peasantry in Mexico. The patron- client relationship is based on informal and personal exchanges of resources between actors at different levels of status. The goal for each stakeholder is to provide the resources that each one controls or has access to, in exchange of the resources that are not in control of. According to Powell (1970) the main characteristics that differentiate clientelism of other power relations are: first, that the relationship is between two parties with different status, wealth and influence; second, the origin of the relationship and continuity depend on reciprocity in the exchange of goods and services that are not necessarily comparable between each other; and third, the personal contact between the parties maintains and develops the patron-client relationship.

Grindle (1977) indicates that in Mexico the patronage matches and reinforces existing formal hierarchical levels in the social structure, since the authorities are potential employers that have a relative control over the resources. Given this, scholars have argued that the Mexican paternalism is a form of patronage given the inheritance of submission to authority, reproducing the submission- colonial relationship. This relationship has changed according to the political and economic context.

¹⁸ It has been estimated that, across the country, the majority (68%) of the population that has been affected by climate related disasters are poor (Giugale, Lafourcade and Nguyen 2001). Given this, de la Fuente and Olivera (2013) estimate that by 2030 climate change will increase poverty from 15% to 17.7%, representing 2.9 million people in poverty as a result of climate change.

After the Mexican Revolution in 1920s, the emergent political system was based on the 'organic state', which differentiated the main sectors in the Mexican society into diverse interest groups (Stepan 1978). This led to the corporatism of the peasants into the national party, the Institutionalised Revolution Party (PRI), building the bases for the clientelistic relation between them. This relation was based on an authoritarian paternalism. For 70 years during the party dictatorship of the PRI, peasants were subjects of coercion, where certain benefits to the rural sector would be suspended in the case that they did not support the PRI, and buying of votes, which could be the explicit offering of money, a post in the government, a policy programme, or a handout. To a certain extent, this strengthened the role of political intermediaries such as the cacique and the caudillo (cf. de la Peña 1986).

During the 1990s Mexico went through several structural reforms that affected the rural sector. These reforms were part of the North American Free Trade Agreement treaty (NAFTA) with the United States and with Canada. The neoliberal reforms privatised farm services agencies, deregulated agricultural markets, and withdrew protectionist policies to focus on the macro fundamentals and to promote the role of market forces (Eakin 2005). With the aim of supporting farmers with commercial potential, these reforms negatively affected smallholders and subsistence farmers, which were considered 'unviable' (ibid.). In 1992 the agrarian reform that had been redistributing lands to peasants since the aftermath of the Mexican Revolution in the beginning of the 20th century, was officially terminated. With this set of reforms, post-revolutionary agrarian politics in the country ended. By 1995, the economic crisis, the low prices, the budgetary cuts to direct supports and subsidies to the rural population, taken together, all intensified the deterioration of the rural sector (Warman 2002).

The Ejército Zapatista de Liberación Nacional (EZLN), a peasant-led rebellion in the south of the country, had started social mobilisations against the federal government, attacking the government's failed policies for the peasants. Several social programmes were implemented by the federal government, as a means to buffer the negative impacts upon those groups that were negatively affected by the neoliberal reforms, as well as to contain potential conflicts with these groups (Warman 2002; Solórzano 2006; Barnes 2009).

After the democratic transition in Mexico in 2000 there has been a reduction on the coercion of the vote and a persistence of buying votes, where votes are exchanged for social policy programmes (Hevia de la Jara 2008). Given this, the different interest groups negotiated their place in the new political agenda. Peasant organisations traditionally related to the PRI party mobilised their political resources, in order to re-shape their relation with the state, and the new party in place: the National Action Party (PAN) (Solórzano 2006). After months of mass protests and rallies, the National Agreement for the Rural Sector reflects the guidelines for the participation of these organisations, as well as their demands in the areas of international business, economic development and social development. These demands were canalised in the form of social programmes, such as the Procampo programme.

Peasant organizations have historically represented a pillar in the collective action of Mexican peasants. The struggle for land has been virtually the main demand of post-revolutionary peasant organizations. They have served as intermediaries between the institutional system and the peasants they represent. As a result of their creation in the organic state, they are mainly affiliated to the PRI. However, because of the corporatist origin of these organisations, there are perverse incentives to control and manipulate peasant demands, and mobilize their constituents to develop personal agendas. Even those organisations that are related to the National Action Party or the Party of the Democratic Revolution (PRD) operate with the same patron-client logic. This illustrates how the role of political intermediaries is central to explain how the instances that allow the use of social patronage programmes operate.

Designers of Oportunidades aimed to avoid the potential clientelistic use of the programme. For this purpose, it established some control mechanisms, to foster transparency in targeting, and an information policy and electoral armour, such as the publication of the records of recipients. It also aimed at eliminating the intermediaries between the recipients and the government. For instance, the possibility that a municipality or an organization requested 'quotas' for its members was removed. Even so, Hevia de la Jara (2008) argues that due to management constraints, the programme had to create their own institutional intermediaries. The purpose of these intermediaries was to transmit information between the government and the recipients, since these usually live in remote areas with no mailing addresses, postal services, or banking network. Given this, the programme created the figure of the 'vocal' whose

responsibility was to transmit information and ensure that the recipients comply with the conditionalities. The position of these new intermediaries gave them great advantage among the recipients and the possibility of abusive power practise, reinforcing the association of collective action with political clientelism, without any real possibility of denouncing such practices. Hevia de la Jara establishes that the programme's structure gives place to authoritarian practices, because it does not consider a capable agency for oversight, that takes into consideration collective action and that allows for an adequate representation of interests.

4.4 Main climate shocks and perceived climate variability in the coastal community and inland communities

In this section I will analyse the main climate shocks that affected the communities identified during the group discussions: Hurricane Isidore in 2002, the drought in 2012, and perceived climate variability. As explained in chapter 3 'Methodology', these climate shocks and stressors are used as a proxy of climate change.

4.4.1 Hurricane Isidore

Yucatan is highly exposed to hydro-meteorological phenomena. For instance, between 1970 and 2009, 21 hurricanes affected the Yucatan Peninsula (see table 4.13), and increases in the occurrence of high intensity hurricanes in the Gulf of Mexico and the Caribbean Sea have already been identified as Dominguez, quoted in INECC-SEMARNAT (2013), shows. Moreover, hurricanes are considered one of the most devastating of the climate shocks. They cause loss of life, destroy and damage physical, natural and financial assets. In this research I studied the impacts of Hurricane Isidore in 2002 on the livelihoods of the people in the coastal and inland communities, since people in the communities themselves identified this as a highly significant point of reference in their lives.

Photo 4.3 Community church destroyed after Hurricane Isidore, coastal community



Source: Author, January 2012, coastal community

Community members clearing up the remains of the community church. 10 years after Hurricane Isidore, the landscape still shows the devastation that the hurricane caused.

Table 4.13 Hurricanes that affected Yucatan during 1970- 2008

Year	Name	Cate-gory*	Wind speed (km/h)	Place on inland impact	Affected states	Period
1970	Ella	TD(H3)	55 (195)	Akumal, Quintana Roo	Quintana Roo, Yucatan, Tamaulipas, Nuevo Leon	8-13 Sep
1970	Greta	TD	55 (45)	Telchac Pto, Yucatan	Yucatan, Campeche, Tamaulipas, San Luis Potosi, Nuevo Leon	26 Sep-5 Oct
1972	Agnes	TD	45	Tekax, Yucatan	Yucatan, Quintana Roo	14-23 Jun
1973	Brenda	TD(H1)	148 (93)	Cancun, Quintana Roo	Quintana Roo, Yucatan, Campeche, Chiapas	18-22 Aug
1974	Carmen	H4	222	Punta Herradura, Quintana Roo	Quintana Roo, Campeche, Yucatan	29 Aug-10 Sep
1975	Eloise	TS	85	Puerto Morelos, Quintana Roo	Quintana Roo, Yucatan	13-24 Sep
1988	Gilbert	H5 (H4)	287 (215)	Puerto Morelos, Quintana Roo	Quintana Roo, Yucatan, Tamaulipas, Nuevo Leon, Coahuila	8-20 Sep
1990	Diana	TS (H2)	110 (158)	Chetumal, Quintana Roo	Quintana Roo, Yucatan, Campeche, Veracruz, Hidalgo, San Luis Potosi, Queretaro, Guanajuato, Jalisco, Nayarit	4-8 Aug

1995	Opal	TD	55	B. Espiritu Santo, Quintana Roo	Campeche, Yucatan, Quintana Roo, Tabasco	27 Sep-2 Oct
1995	Roxanne	H3 (TD)	185 (45)	Tulum, Quintana Roo	Quintana Roo, Yucatan, Campeche, Tabasco, Veracruz	8-20 Oct
1996	Dolly	H1(H1)	110 (130)	F.C. Puerto, Quintana Roo	Quintana Roo, Yucatan, Campeche, Veracruz, Tamaulipas, San Luis Potosi, Zacatecas	19-24 Aug
1998	Mitch	TD (TS)	45 (65)	Cd. Hidalgo, Chiapas	Chiapas, Tabasco, Campeche, Yucatan	21 Oct-5 Nov
1999	Katrina	TD	45	Chetumal, Quintana Roo	Quintana Roo, Campeche, Yucatan	28 Oct-1 Nov
2000	Gordon	TD	55	Tulum, Quintana Roo	Quintana Roo, Yucatan	14-18 Sep
2002	Isidore	H3	205	Telchac Puerto, Yucatan	Quintana Roo, Yucatan, Campeche	14-26 Sep
2003	Claudette	TS (TD)	90 (55)	Cancun, Quintana Roo	Quintana Roo, Tamaulipas, Nuevo Leon, Coahuila, Yucatan	8-15 Jul
2005	Cindy	TD	55	Felipe Carrillo Puerto, Quintana Roo	Quintana Roo, Yucatan	3-6 Jul
2005	Emily	H4 [H3]	215 [205]	Tulum, Quintana Roo	Quintana Roo, Yucatan, Tamaulipas, Nuevo Leon	10-21 Jul
2005	Stan	TS (H1)	75 [130]	Felipe Carrillo Puerto, Quintana Roo	Quintana Roo, Yucatan, Veracruz; Oaxaca, Campeche, Chiapas	
2005	Wilma	H4	230	Cozumel, Playa Del Carmen, Quintana Roo	Quintana Roo, Yucatan	15-25 Oct
2008	Dolly	TS [TS]	85 [65]	Nichupte, Quintana Roo	Quintana Roo, Yucatan, Tamaulipas, Nuevo Leon, Coahuila, Chihuahua	20-25 Jul

Source: SMN

*Based on Saffir–Simpson Hurricane Scale: TD: tropical depression; TS: tropical storm; H1: Hurricane Category 1; H2: Hurricane Category 2; H3: Hurricane Category 3; H4: Hurricane Category 4; H5: Hurricane Category 5

In 2002 Hurricane Isidore reached category 3 and had an inland impact 9 km away from the coastal community. It destroyed mangrove swamps, coconut plantations, roads, dwellings and facilities (Batllori-Sampedro and Febles-Patron 2009). Households in the coastal community suffered several impacts, which meant a severe decline in their wellbeing. According to the household survey more than half of these households had their dwelling completely destroyed, and 86% of the households lost their main livelihood activity. Moreover, plagues such as yellow fly appeared, threatening agricultural production.

In the inland community, 90% of the households lost all their crops, 82% partially lost their livestock or beehives, and 80% of the households suffered severe impacts to their

dwellings. According to Rosales (2003), 95% or 356 hectares of sowed land in the inland community were affected by the hurricane. This is equivalent to an estimated figure of 417 tons of maize, a volume that would be enough to guarantee the annual consumption of the majority of the households, including their livestock. Apart from the impact on the consumption of the households, the loss of the agricultural production also represented a huge economic impact for the households. Shortly after the hurricane, Rosales calculated an estimated economic loss of 673,255 pesos (52,598 USD¹⁹) for the total maize production, or 1,870 pesos (146 USD) per hectare. If the production of beans, pumpkins, sweet potatoes and the lima beans is included, then the value per hectare rises from 1,870 pesos towards 5,000 pesos (390.6 USD) (ibid.).

4.4.2 Drought 2012

Drought has played a significant role in the human history of the Yucatan Peninsula. It has been argued that drought may have played a role in the collapse of the Mayan civilisation during the 9th century (Liverman 1999). Drought is common and it is experienced as soil moisture drought (also known as agricultural drought), which refers to a deficit of soil moisture (IPCC 2012) (see table 4.14). In the Yucatan Peninsula the rainy season usually takes place in the summer. However, the region is exposed to the weather phenomenon of summer drought, where a relative decrease of the rains is observed during the rainy period, originated by regional atmospheric processes. Figure 4.3 shows the summer drought base scenario for the period 1961 to 1990. It illustrates how this phenomenon is present in almost all the peninsula (Orellana et al. 2009).

As explained earlier in this chapter, the land in Yucatan is very permeable and porous, making soil-moisture quite low. Agriculture is therefore quite dependent on a good distribution of rainfall. There is no irrigation system on the inland community, therefore any delay or decrease in rain implies a severe shock for poor rural households that depend on subsistence production. Summer drought is associated with water and food scarcity, crop failure and increases in the price of basic commodities (Mendoza, Villanueva and Adem 1997). It mainly affects the *milpa*, horticulture, beekeeping and livestock production. While the survey was being conducted, the country was experiencing a spell of summer drought, which also affected the region of Yucatan. The

¹⁹ Estimated figures using an exchange rate of 12.80 Mexican Pesos per US Dollar, February, 2012 (Banxico).

2012 drought was considered one of the most intense droughts in the country during the last fifty years (INECC-SEMARNAT 2013). This was quite severe mainly in the North of the country. The Yucatan Peninsula was also affected but in a lesser extent. In the coastal community droughts do not have a major impact since the livelihoods of people mainly depend on fishing activity.

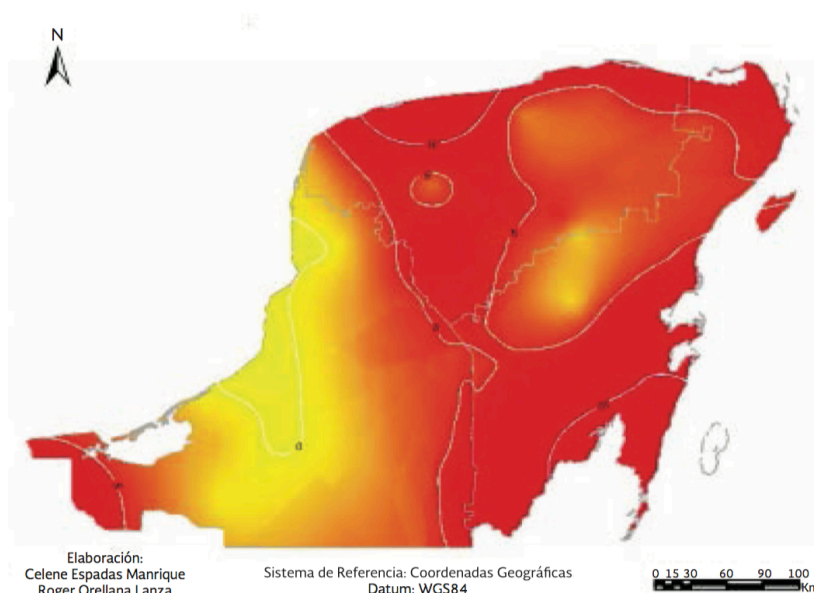
Given this, according to the household survey 85% of the households in the inland community reported impacts upon their agricultural production, and 71% of these households said they had lost all their production due to the drought. Moreover, 37% of the households reported experiencing at least two spells of drought in the last five years. Key informant interviews with peasants also showed that the droughts that took place in 2008, 2009 and 2010 seriously affected the production in the *milpa*.

Table 4.14 Years that were affected with droughts in Yucatan during 1970-2012

1970	1973	1977	1983	1984	1988	1992	1994	1995	1998	2000	2002	2005	2006	2008	2009	2010	2012
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Source: Universidad Autonoma de Yucatan (no date)

Figure 4.3 Summer drought base scenario for the period 1961-1990, Yucatan Peninsula



Source: Orellana et al. 2009

Photo 4.4 Lost crop due to drought, inland community

Source: Author. August 2012, inland community

4.4.3 Perceived climate variability

Based on the analysis developed by the Research Centre of Environmental Geography (CIGA) for the Special Climate Change Programme for Yucatan, climate change projections for Yucatan show an increase on the mean annual temperature between 0.5 and 0.8 Celsius degree for the period 2010 to 2039, depending on the emission scenario. It is also expected a substantial increase on extreme hot days. Moreover, a decrease in the mean annual volume of precipitation is also expected. This reduction ranges between 15.3 and 1% by the end of the century (CIGA et al. 2013) (see table 4.15).

Table 4.15 Climate change projections for Yucatan

	Actual mean values	Horizon		
		2010-2039	2040-2069	2070-2099
Increase of mean annual temperature	25.9C	0.5-0.8	0.5-1.8	0.6-2.8
Variation of annual precipitation	1,091.5mm	Range from reduction of 14.9% to a rise in 1%		
Increase extreme hot days per year	36.5 days per year	7-12	9-51	10-78

Source: CIGA et al. 2013

In the coastal community, the climate is perceived as changing, generally in terms of more extreme seasons (dry, rainy and north-winds). Based on data of the closest weather station of Telchac, the coastal community is already experiencing a tendency of climate variability mainly in the form of increasing monthly maximum temperatures (CIGA et al. 2013). The months with a stronger increase of maximum temperature are June, July, September and October.

Moreover, during the winter the north-winds have increased the mean sea level (Batllori-Sampedro 2002a). The salt intrusion in the soil, due to the sea level rise has already affected agriculture and horticulture in the community, by decreasing the access to fertile land. Climate variability mainly affects offshore fishing, the main livelihood in the community, by impeding fishermen's ability to go to sea. Households have had to remain on land for up to three days without being able to go fishing in the face of more intense and prolonged north-winds. This also affected tourism activities. The impacts on households of this limited fishing activity are two-fold: households will face a nutritional impact with a lack of fish consumption due to the limited fishing activity, and an economic impact by not having the income they earn by selling the surplus from fishing production. The following quotations illustrate these impacts:

“The weather has changed a lot during the last 10 years. Before, in July, the winds were calmer but nowadays they are more abrupt. Before you knew when the winds would come; now they come without notice. This affects the fishing activity. Before you had to go only 3 fathoms [5 metres] to fish, now you have to go to at least 12 fathoms [21 metres]. Before one fisherman brought 50 kg per fishing day, now you are happy if you manage to bring 4 kgs”. Male, coastal community. Age and other categories not provided. Group discussion with fishermen.

“Fishing is not as abundant as it used to be. The resources [fisheries] were overexploited and now it is very scarce. Beforehand in the four months of the octopus season [from August to December] you had a continuous fishing activity. Nowadays these are months of uncertainty”. Male, coastal community. Age and other categories not provided. Group discussion with fishermen.

In the inland community households reported having more hot spells during the day-time, more erratic rainfall and changes at the start and end of seasons. Based on the closest weather station of Tixmehuac, climate change scenarios project an increase in

the number of days of erratic rainfall in the inland community, and a decrease in rainy days (CIGA et al. 2013).

Almost 90% of the households in the inland community reported that climate variability affected their agricultural production, including apiculture and horticulture production. Indirectly, it also affects livestock production, since households feed livestock from the production of the *milpa*. These impacts have serious consequences on the food security of the households, but also on their income security, since households require extra cash to compensate for the production losses to buy food. This is particularly relevant for chronic poor rural households since they depend on subsistence agriculture²⁰. The following quotes from the group discussions illustrate this:

“The weather is changing. There is less rain. Rain is life. Without rain there is nothing because we live from the *milpa*”. Male, inland community. Age and other categories not provided. Group discussion with peasants.

“It has been 20 years since there is no security from the *milpa*. Nowadays we only have droughts”. Male, inland community. Age and other categories not provided. Group discussion with peasants.

The limited access to social infrastructure and quality of services increases the health risks associated with climate change. For instance, diseases related to climate change such as acute diarrhoea, dengue fever and respiratory diseases, could increase 5% by 2030 (Buenfil 2009).

Climate shocks in the region mainly affect traditional livelihoods, such as agriculture, horticulture, apiculture, and offshore fishing²¹ (see table 4.16). These livelihoods represent the main livelihoods in the communities. Morton (2007) argues that climate change will affect smallholder and subsistence agriculture in three main different ways:

²⁰ Several studies on Mexico show that climate change will severely affect seasonal agriculture, livestock and forestry, due to shorter growing seasons (Gay 2003; Boyd and Ibarrarán 2008; Sagarpa-FAO 2012). For instance, the National Institution of Climate Change in Mexico (INECC) has calculated that by 2030, the value of agriculture production for Mexico as a whole will reduce approximately by 11%, livestock by 10% and the forestry sector by 15% (INECC-SEMARNAT 2013). Ibarrarán (2011) estimated a 20% reduction on corn yields by 2050 and 34% by 2100 as compared to 2008 production.

²¹ Climate change in Mexico will also have an impact on fisheries, with implications for their productivity and distribution, causing severe socioeconomic impacts for fishery-dependent communities (Vázquez 2008). These impacts will be due to several processes taking place in the country such as ocean acidification, shifts in the frequency of tropical storms, sea level rise, and the disturbance to freshwater availability and precipitation. These communities will also be exposed to impacts upon their infrastructure due to sea level rise and tropical storms (Daw, Adger and Brown 2009).

the biological processes affecting crops and animals; environmental and physical processes affecting production; and the impacts on human health and on non-agricultural livelihoods. These effects can be extended to fisheries, livestock production, and forestry activities.

Moreover, declines in both food and non-food crops will severely affect the economies of the rural poor, as well as the impacts associated with food security, human health, loss of biodiversity and human settlements (IUCN et al. 2004; Parry et al. 2007; Romero-Lankao et al. 2014). These effects are socially differentiated based on the stage of the life cycle of the person; the ethnicity; gender; the location; and other social dimensions which underpin societies' structural multidimensional vulnerabilities (Tanner and Mitchell 2008). In the daily life of the poor, these effects translate into increasing uncertainty about the context in which people try to develop their livelihood strategies (Cannon and Mueller-Mahn 2010).

These findings show the high vulnerability that households in the coastal community and inland community are already experiencing in relation to current climate conditions, and it illustrates the big resilience challenges that these households will have to face in the following decades.

Table 4.16 Main climate stressors and associated impacts on livelihoods

Climate stressors	Negative effects from climate shocks	Vulnerable livelihoods	Impacts on wellbeing
Climate variability and change	<i>Coastal community:</i> Extreme seasons: dry, rainy and north-winds. Salt intrusion, flooding, erosion of coastal line	Offshore fishing, tourism agriculture, horticulture	Food insecurity, income insecurity, impacts on infrastructure, settlements and facilities, impacts on natural assets
	<i>Inland community:</i> Erratic rainfall, changes in the start and end of seasons, and hotter days	Agriculture, horticulture, livestock production, apiculture	Food insecurity, income insecurity
Hurricane Isidore 2002	<i>Coastal community:</i> Flooding, extreme wind, storm-surge	Offshore fishing, agriculture, livestock production, tourism, services, family business	Food insecurity, income insecurity, destruction of physical, natural and financial assets, unemployment, plagues, gastro-intestinal and respiratory diseases
	<i>Inland community:</i> Flooding, extreme wind	Agriculture, horticulture, apiculture, livestock production	Food insecurity, income insecurity, destruction of physical, natural and financial assets, plagues, gastro-intestinal and respiratory diseases
Drought 2012	Soil-moisture and hydrological droughts	Agriculture, horticulture, livestock production, apiculture	Food insecurity, income insecurity, plagues, gastro-intestinal diseases

Source: Author

4.5 Discussion and Conclusion

This chapter provided a context to understand the potential linkages between social protection and climate change. For this purpose, it described the socio-demographic and economic characteristics of the households in the two field sites. The chapter also described the different livelihoods, and the endowments that underpin these activities. It also presented the different social protection programmes that have been implemented in the communities. The data shows that social protection helps households to cross an income threshold out of extreme poverty, suggesting a reduction in their risk of falling into poverty traps. Throughout the chapter, a detailed discussion of different issues that relate to the politics and power that underpin the vulnerability of households was also developed.

Climate shocks in the region were also described, and their different impacts on the livelihoods and wellbeing of the households. The data showed that traditional livelihoods are particularly vulnerable to climate shocks. Households mainly experience food insecurity and income insecurity during and after climate shocks.

The next chapter will analyse the different coping strategies developed by the households during and after these climate shocks, and the anticipation of risk behaviour developed by households. The chapter will also analyse the role of social protection in increasing the absorptive capacity of the households.

Chapter 5 Oportunidades and the absorptive capacity

This chapter explores the linkage between Oportunidades and the absorptive capacity presented in the social protection-resilience framework explained in chapter 2

‘Theoretical foundations: review of literature and the social protection-resilience framework’. The sub-question related to this chapter is: How does Oportunidades affect the absorptive capacity of poor households? The rationale that underpins this linkage is that the protective features of Oportunidades help recipient households to cope, and recover from climate shocks, by reducing their vulnerability. It also assumes that the preventive features of the programme will help poor households to plan and anticipate climate risk. The chapter draws on primary data from the survey conducted across the totality of households in the coastal community and the inland community. The analysis draws, in addition, from 28 life-history interviews with adult recipients and non-recipients in both communities, and from group discussions with community members.

Section 5.1 analyses the strategies developed by households to cope with the main climate shocks that had an impact on the communities. It explores the role of social protection in those strategies, and the main drivers that underpin consumption smoothing strategies and income smoothing strategies. The role of Oportunidades varies within the type of shock and community, but mainly it supports consumption smoothing strategies. Section 5.2 explores the dynamics between preventive social protection and households’ anticipation of risk. The results show that, indirectly, Oportunidades works as a preventive driver that -in synergy with other sources of resilience- increases households’ anticipation of risk behaviour. In section 5.3, I conclude by arguing that Oportunidades increased the absorptive capacity of households mainly by protecting their consumption. I also argue that the programme cannot address the restrictions and limitations that underpin asset endowments and entitlements, which are necessary for resilience.

5.1 Protective social protection and consumption smoothing

Climate shocks in the communities mainly affect households’ access to food. For this reason, households mainly pursued strategies to protect both their consumption and the income generating process. However, poor households often acted in a context limited by the fact that they only have access to a very low level of assets that would be necessary for them to adapt (Ericksen 2008; Siegel and Jørgensen 2013). Therefore,

households usually faced trade-offs when choosing these strategies since resilience sources in the form of assets were scarce.

The differentiated nature of the shocks also frames the different coping strategies. For instance, rapid on-set shocks such as hurricanes are considered as ‘asset shocks’, since the changes to the households’ asset profile are exogenous in nature (Carter et al. 2008). This means that households lose assets during the impact period of the shock, and therefore they cannot draw down their assets to cope with the shock. Moreover, households have to cope with the loss of work and income during and after, for example, a hurricane. In contrast, a prolonged slow shock, like a drought, is considered to be an ‘income shock’, whereby the asset changes are endogenous as they form part of the coping strategies of the households (ibid). Households have to cope with the lack of income and food, but not from the lack of work or assets.

Some of the most common coping strategies in the communities studied consisted of selling livestock, selling consumable durables, asking for loans, using savings, pawning goods and asking for help, and intensifying or diversifying their income generating activities. The analysis developed in this chapter shows that the role of Oportunidades in the households was to protect their consumption. Oportunidades was a source of resilience by providing a certain immediate liquidity that helped poor households to protect their short-term consumption during and after climate shocks.

5.1.1 Hurricane Isidore

As explained in chapter 4 ‘Context, exposure, and livelihood sensitivity in the inland community and coastal community’, Hurricane Isidore caused a lot of devastation in the communities. Households suffered several impacts, including the destruction of their dwellings, losing their main livelihoods, crops, and livestock.

By the time Hurricane Isidore hit the region, about 34% of households in the inland community, and 14% in the coastal community, were receiving Oportunidades. Two out of every three of these households declared that the transfer was particularly helpful to them recovering their wellbeing following the impacts of the hurricane. The federal government brought the date of delivery of the transfer forward, and this helped in the post-shock recovery of the households.

The transfers also worked in synergy with the other protective programmes that were implemented, helping households to self-organise after the shock. For instance, the Fonden programme (National Disaster Fund) was implemented to restore or rebuild shattered dwellings of 70% of the households in the coastal fishing community and 73% in the inland agriculture community that reported suffering from damage to, or loss of, their dwellings. The private sector and organised civil society also supported the communities -mainly in the form of in-kind transfers. The cash for work programme PET (Temporary Employment Programme) was a local programme that paid a weekly cash transfer of 200 pesos (15.50 USD) plus in-kind support for six weeks. People mainly worked in the reconstruction of the social infrastructure in the communities. In the inland community, the local government also distributed 500 kgs of maize per sowed hectare (in kind and in cash) (Rosales 2003). These strategies formed part of the 'share the losses' category (Burton, Smith, and Lenhart 1998).

The most common coping strategies in the inland community were the diversification of economic activities and the temporary migration of the breadwinner (32% of the households) (see table 5.1). Usually these activities were in the construction industry in the capital city of Merida or on the coast in the state of Quintana Roo. Additionally, in two households, the breadwinner temporarily migrated to the United States. This temporary 'change location' strategy (Burton, Smith, and Lenhart 1998) is considered a more extreme response. Participants in the group discussions explained that the hammock weaving activity was suspended for almost two years, and therefore households barely had access to income generating activities in the community. These strategies reflect the importance of the access to labour markets and income generating activities after a rapid on-set shock. In this light, in the coastal community, migration does not take place as a common livelihood activity mainly due to the fact that households have more access to alternative income generating activities within the community or in the surroundings. In fact, 32% of the households in the coastal community sought alternative labour activities in the community such as working as agricultural day labourers on other people's land, and only 10% had temporary migration. No interaction with Oportunidades could be found to play a role in these latter strategies.

In the coastal community, the most common coping strategy was drawing down their savings, which were mainly in microfinance services (50% of the households).

Households also asked for a loan in order to satisfy their consumption needs (28% of the households). These strategies reflect the ‘prevent effect’ behaviour (Burton, Smith, and Lenhart 1998), where households aim to avoid some of the effects of climate shocks. This also highlights the importance of access to financial services that can guarantee households an immediate access to cash, especially in a context where other consumption smoothing strategies are limited due to the devastation of the shock.

Households in the coastal community hardly sold consumer durables or livestock since these were destroyed by the impacts of the hurricane- and Oportunidades was mainly used to support these types of strategies.

For instance, in the case of the inland community, where financial services are more restricted, few households used their savings or asked for a loan as a coping strategy. However, recipients of Oportunidades used their savings more than non-recipients (15% and 3% correspondingly) (see figure 5.2). To a certain extent this is related to the fact that Oportunidades compensated for the lack of financial services, by bringing some liquidity to the households, which was necessary to cope with immediate consumption needs.

The regularity of the payment of Oportunidades, in bimonthly instalments, also helped households to eventually recover their wellbeing after the shock. Most of these households in both communities declared that it took them up to two years to recover the asset profile they had had before the hurricane. Given this, some households (40% in the inland community and 33% in the coastal community) that started receiving the transfer in 2004, two years after Hurricane Isidore, declared that the transfer helped them to rebuild their asset base after the hurricane.

This protective feature of the programme is especially relevant when households lose their main livelihood activity due to the climate shock. The following statements illustrate this idea:

“After Hurricane Isidore Oportunidades was crucial since the work on the hammock weaving was suspended for almost two years”. Male, inland community. Age and other categories not provided. Group discussion with peasants.

“The programme helped us to recover after Hurricane Isidore”. 49 year-old recipient woman, chronic poor, inland community. Life-history interview.

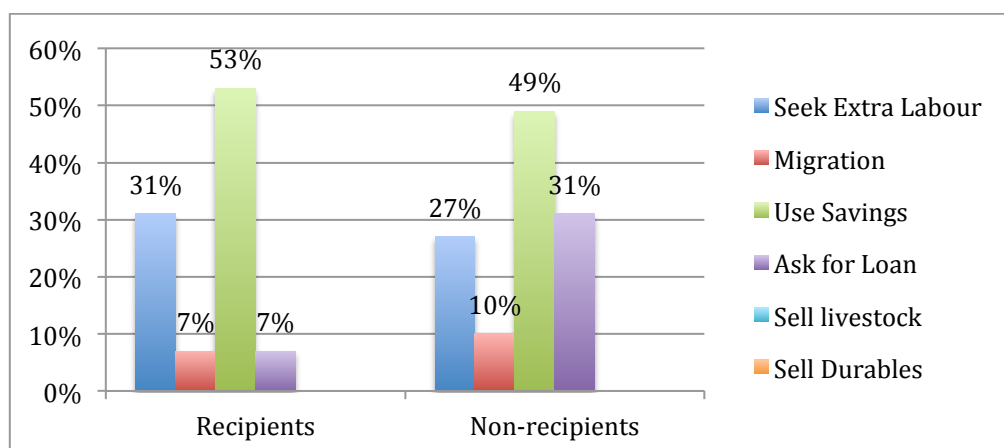
Even so, according to the life histories it was typically the eventual recovery of their main livelihood activity that helped them the most in their recovery.

Table 5.1 Coping strategies after Hurricane Isidore, inland and coastal community, percentage of households

Coastal community		Inland community	
Used savings	50%	Temporary migration	32%
Diversified economic activities	31%	Diversified economic activities	32%
Asked for a loan	28%	Asked for help	14%
Temporary migration	10%	Sold livestock	13%
		Asked for loan	9%
		Use savings	7%
		Sold durables	5%

Source: Author based on household survey

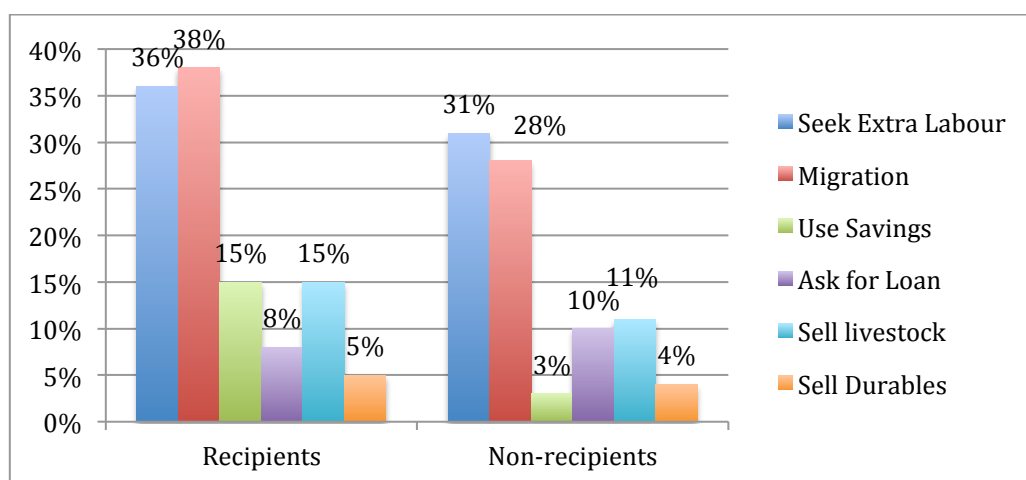
Figure 5.1 Coping strategies related to Hurricane Isidore in the coastal community, recipients and non-recipients, percentage of households



Source: Author

1 Only long-term recipients since these were the only households that were receiving the cash transfer when Isidore hit the community.

Figure 5.2 Coping strategies Hurricane Isidore inland community, recipients and non-recipients, percentage of households



Source: Author based on household survey

1 Only long-term recipients since these were the only households that were receiving the cash transfer when Isidore hit the community.

5.1.2 Drought

As explained in chapter 4 ‘Context, exposure, and livelihood sensitivity in the inland community and coastal community’, the drought in 2012 mainly affected the inland community. When households lose their subsistence production, they are in need of liquidity to buy maize for the household consumption, to feed their livestock, and to sow again. Therefore, households developed consumption smoothing strategies in order

to minimise the risk of hunger. Households experience scarcity and rises in the price of goods. For instance, during the 2012 drought, the commercial price for maize was 6 pesos per kilo, while the regular price was 5 pesos. Whilst a fair-price shop (CONASUPO) has been established in the community, with the purpose of increasing the access to basic goods at accessible prices, the salespeople explained that they were only supplied with 250 kilos of maize every week. This quantity was not enough to provide maize to all households in the community.

As with Hurricane Isidore, the most common coping strategy reported by the households was to work in the construction industry in the city (43% of the households) (see table 5.2). People also worked as agricultural day labourers on other people's land (21% of the households), and off-farm work in the inland community was intensified due to the urgency of liquidity, such as the hammock weaving activity (14%). These type of strategies are equivalent to 'diversification of income sources', identified in the climate change literature (Agrawal 2010). These strategies are reversible in the sense that households do not commit their domestic resources (Watts 1983; Corbett 1988; Devereux 1993). Respondents emphasised the importance of the hammock weaving in times of droughts, since it becomes a secure source of income. The analysis did not show any relation between Oportunidades and these coping strategies.

A few households also drew down some of their assets in order to protect their consumption. These strategies were different between recipient and non-recipient households. For instance, only the non-recipients pawned some of their consumer durables to cope with the drought (7% of the households), while only the Oportunidades households used their savings to cope with the shock (8% of the households) (see figure 5.3). Likewise, the life history interviews showed that during the drought Oportunidades households used the transfer to buy maize. For instance:

“We used the money we were able to save from the cash transfer of the children [Oportunidades] to cope with the drought and buy maize. We usually need money for the household expenses, but now with the drought we need it to buy maize”.
39 year-old recipient woman, churning poor, inland community. Life-history interview.

This evidence is indicative that Oportunidades protected households from more irreversible strategies, such as pawning, by providing short-term liquidity necessary during times of crisis. This statement also illustrates how the preventive feature of the

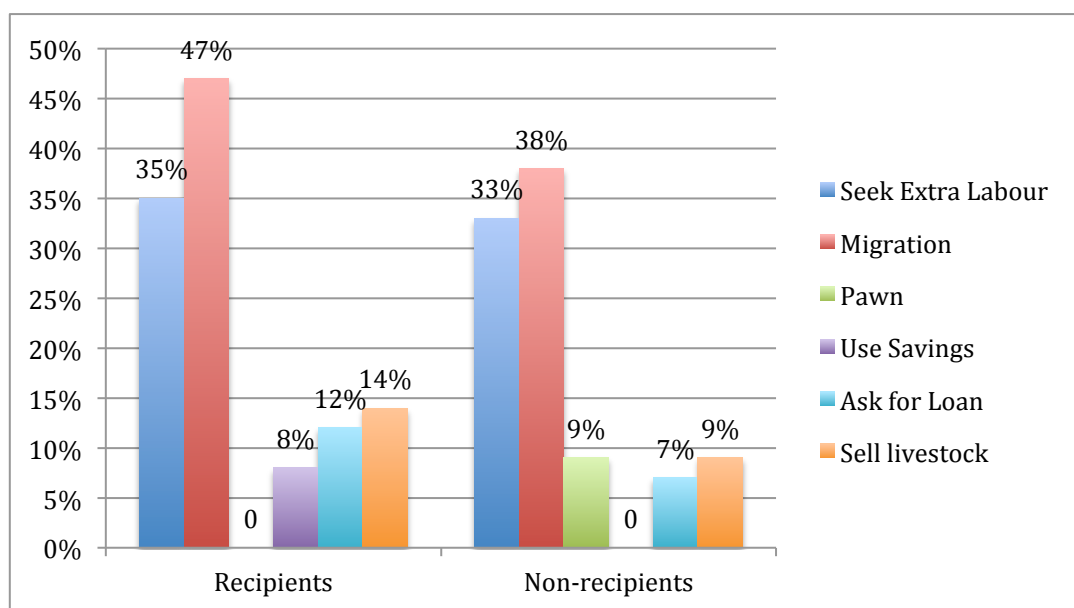
programme helped to increase savings that would be used as self-insurance. As seen with Hurricane Isidore, Oportunidades supports ‘prevent effects’ strategies, and this is especially important in contexts with restricted access to financial services. As explained in chapter 1 ‘Introduction’, in rural Mexico the access to credit, price supports, and input subsidies of agricultural products for smallholders was restricted after the neoliberal agricultural reforms that took place in the early 1990s in the aftermath of the NAFTA treaty. These strategies will be explained in more detail in the section 5.2.

Table 5.2 Coping strategies during the drought of 2012, inland community, percentage of households

Inland community	
Intensified work in construction	43%
Diversification	21%
Intensified non farm work in the community	14%
Sold livestock	12%
Asked for a loan	10%
Used savings	5%
Asked for help	5%
Pawned	4%

Source: Author based on household survey

Figure 5.3 Coping strategies during the drought of 2012, inland community, recipients and non-recipients, percentage of households



Source: Author based on household survey

5.1.3 Perceived climate variability

As explained in chapter 4 ‘Context, exposure, and livelihood sensitivity in the inland community and coastal community’, in the coastal community, climate variability is generally perceived in terms of there being more extreme seasons. In the inland community, households reported having more hot spells during the day, more erratic rainfall, and changes at the start and end of the seasons.

These climate stressors mainly affected the income generating activities of the households. For instance, almost 90% of the households in both communities reported that climate variability affected their productive activities. Therefore, the most common coping strategy for households in both communities, aimed at smoothing the income process, was based on ‘livelihood diversification’ strategies (Agrawal 2010), and the ‘change use’ and ‘change location’ strategies (Burton, Smith and Lenhart 1998).

In the coastal community, the survey results show that the most common coping strategy was seeking alternative income generating activities, in order to deal with the limited fishing activity (39% of the households) (see table 5.3). Usually these activities were in the form of diversification in the secondary livelihoods that they had already developed such as tourism activities, growing coconut seedlings or informal work in the

ejido as electricians, plumbers or masons. Therefore, access to the *ejidal* lands was fundamental. The next quote illustrates this fact:

“Currently there is less fishing than before, but we make more or less the same money from working on the sink hole. We earn 80 pesos [6.25USD]²² from each trip to the *cenote*. The *cenote* is less unstable work than fishing. If there is bad weather we cannot go fishing, but we can still receive tourists, since they [the tourists] don’t get scared by the bad weather”. 40 year-old recipient woman, churning poor, coastal community. Life-history interview.

As explained in chapter 4 ‘Context, exposure, and livelihood sensitivity in the inland community and coastal community’, there is unequal access to the community resources due to different land property rights among the members of the community. Hence, in the case of the coastal community 30 *ejidatarios* had property rights, which amounted in total to 1,400 hectares. In the group discussions, participants highlighted an unequal access to the off-farm activities in the community, which mainly depend on the *ejido*:

“The jobs that the *ejido* provides are not enough for everyone. Not all of us can be electricians, plumbers and masons.” Male, coastal community. Age and other categories not provided. Group discussion with fishermen.

When analysing the data by poverty category, the results showed that the majority of non-poor households (80% of households above the wellbeing poverty line) developed this coping strategy, while less than a quarter of the extreme poor (24% of the households below the extreme poverty line) diversified their livelihoods as a response to climate variability (see figure 5.5). These dynamics highlight how unequal governance arrangements affect the absorptive capacity of households, by influencing the access to key assets.

Furthermore, participants in the group discussions identified the investment in a small business as an activity that makes them less vulnerable to climate variability. However, the fishermen highlighted the difficulty of obtaining credit for this investment. This was why they relied on tourism activities, which are extremely vulnerable to the weather. The following quote illustrates this issue:

“Nowadays it is very difficult to get a credit. Not anyone can get it since they investigate you and they require you to have a guarantor”. Male, coastal

²² Estimated figures using an exchange rate of 12.80 Mexican Pesos per US Dollar, February, 2012 (Banxico).

community. Age and other categories not provided. Group discussion with fishermen.

Other income raising strategies consisted of the intensification of fishing (22% of the households). Households explained that when they were able to go fishing, they would work more hours than usual. This activity is the most common coping strategy of extreme poor households. This is related to the fact that fishing is perceived as an 'open access' activity where households do not face major restrictions or requirements to access its resources. Given this, fishing is perceived as a 'safety valve' that provides welfare for the poor (Béné 2003).

A small percentage of households, mainly non-poor, migrated temporarily into larger coastal cities where they could engage in large-scale fishing. This might be related to the high power-resource position of these households that gives them access to social networks that enable them to access different livelihood options. In the survey analysis and the life-history analysis no relation with Oportunidades could be found (see figure 5.4).

Households combined these strategies with consumption smoothing activities such as using savings (26% of the households) or asking for a loan (12% of the households), in order to cope with the lack of income and lack of food from fishing activity. These trends are relatively similar among extreme poor, minimum wellbeing and non-poor households. Even so, the survey analysis showed that recipients do the former to a greater extent, while non-recipients do the latter. This might be due to the fact that recipient households have more access to liquidity due to the cash transfer. These results are indicative of the idea that the programme supports short-term consumption needs of households, as happened during the drought and Hurricane Isidore.

The survey analysis also showed that households were more reluctant to draw down on their consumer durables. This might be due to the fact that households acknowledge this climate variability not as a one-time stress but as a repeated stress. Therefore they apply a 'change use' strategy, where the use of economic activities changes (Burton, Smith, and Lenhart 1998), rather than a less reversible strategy such as using their consumer durables or assets.

In the inland community climate variability mainly affects agricultural activity. Farming households usually develop strategies within the *milpa* in order to cope with the erratic rainfall, increased hot spells during the day, and changes at the start and end of season (see table 5.3). Households aim to maximise the probability of having successful production in the future, and this is usually reflected in their risk averse behaviour, making small adjustments rather than dramatic changes to their agricultural production. These strategies are equally important to households across all poverty categories (see figure 5.7). The most common strategy for households is to change the time of sowing (46% of the households). Some households delay the time of sowing, while others advance it compared to the usual agricultural calendar. These strategies are related to ‘prevent effects’ behaviour (Burton, Smith, and Lenhart 1998).

Households have also reduced the hours they spend on the *milpa* to avoid the hottest hours during the day (37% of households). Respondents explained that 15 years ago they could stay in the cornfield all day long from very early in the morning to late evening. However, nowadays they have to make a pause before noon since the sun becomes very strong, making it very hard for them to work under those conditions. For instance:

“Nowadays, the heat is unbearable. You get headaches and heatstrokes. We go to the *milpa* from 5am to 11.30am, and then we make a pause until 4pm, when we return and work until 7pm. Before we used to go from 5am to 3pm without a pause”. Male, inland community. Age and other categories not provided. Group discussion with peasants.

Some households (19% of the households) are intensifying their production. They only sow maize, whilst traditionally households have practiced polyculture. This strategy is more common for non-poor households (33% of households), but extreme poor households also develop this strategy (23% of households). In informal interviews, farmers declared they had become demotivated to sow other crops since usually these fail and they are only able to harvest maize. This reflects a ‘change use’ strategy (Burton, Smith and Lenhart 1998).

Farmers also diversified their livelihoods by intensifying the work in the construction in the city and the hammock weaving in the community (13% of the households). This strategy is more common for non-poor households (33% of households above the wellbeing poverty line). This might be the case since extreme poor households are

already maximising this livelihood strategy as part of the diversification of income sources, while for the wealthy households this diversification is temporal.

Even so, a small proportion of households (3%), all of them *ejidatarios*, continued practicing polyculture. *Ejidatarios* also manage to sow in different areas of the community land since they have access to the *ejidal* lands. This reflects the ‘change location’ strategy (Burton, Smith and Lenhart 1998), supported by the different entitlements to land that *ejidatarios* have. A small number of households (4%) declared they had stopped sowing as a consequence of the erratic rainfalls and changes at the start and end of seasons. Households in the minimum wellbeing line mainly develop this coping strategy (23%). The analysis did not show any relation between Oportunidades and income-smoothing strategies in the form of livelihood diversification, ‘change location’ and ‘change use’ (see figure 5.6).

Unequal use of natural resources due to different agro-ecological endowments was also found. For instance, households across all poverty categories but with *ejidal* lands have different endowments, which allow them to develop different coping strategies to deal with climate variability. Some of these activities involve changing the sowing area, and also the use of Procampo to invest in the productivity of the land. Even so, a large number of farmers live in marginal areas of very low productive potential mainly due to bad agricultural practices, as explained in chapter 4 ‘Context, exposure, and livelihood sensitivity in the inland community and coastal community’. Accordingly:

“Nowadays, even when it rains well, the plantations are not growing to the same extent as they used to. Nowadays, even with good land and good rain the crops are not growing. Possibly the land has already lost its capacity.” Male, inland community. Age and other categories not provided. Group discussion with peasants.

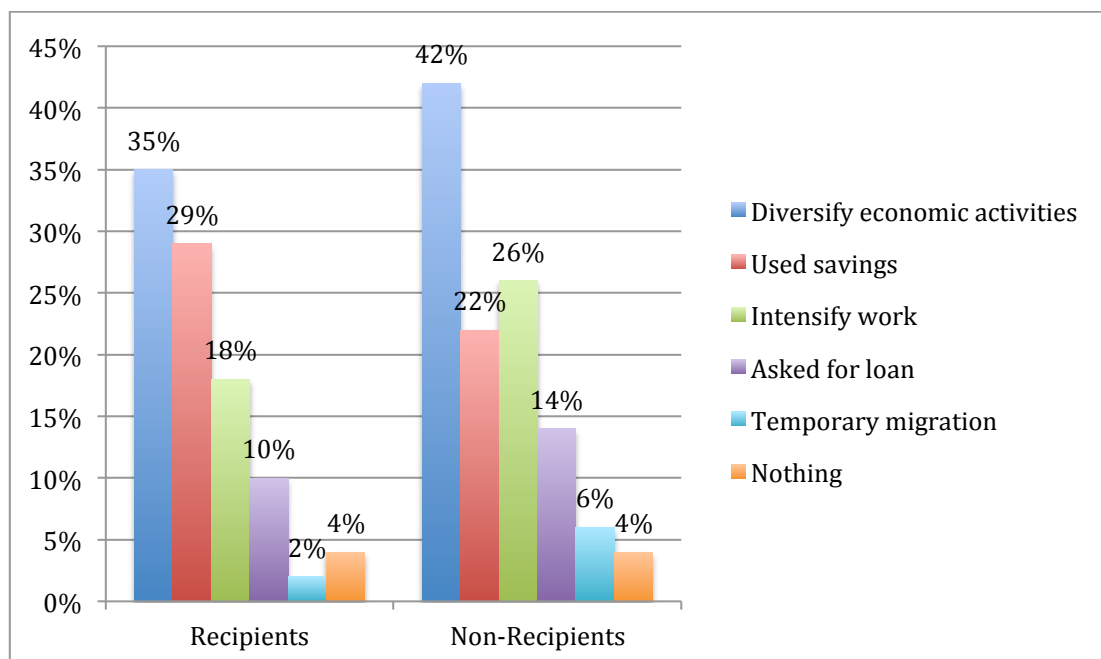
This diminishment of productivity and the discrimination in the labour market, plus the associated low incomes does not allow them to satisfy their consumption needs. In this situation, people are in debt and therefore the cash transfers are used to pay debts or are used for consumption needs. This affects the future productivity of the land since they are not investing in pesticides or organic fertilisers.

Table 5.3 Coping strategies, perceived climate variability, inland and coastal community, percentage of households

Coastal community		Inland community	
Diversify economic activities	39%	Changes timing of sowing	46%
Used savings	26%	Changes daily schedule to go to <i>milpa</i>	37%
Intensify work	22%	Crop intensification	19%
Asked for loan	12%	Intensifies construction work	13%
Temporary migration	4%	Sow in different areas of the <i>ejido</i>	12%
Nothing	4%	Nothing	5%
		Stopped sowing	4%
		Sows more	3%
		Crop diversification	3%

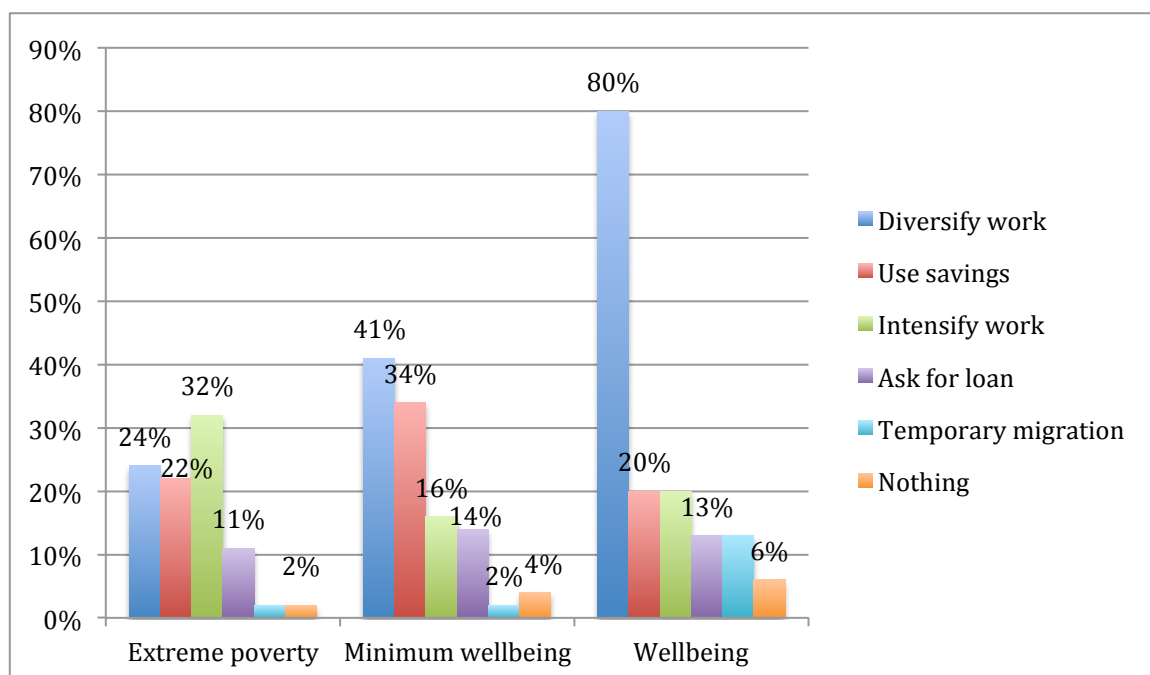
Source: Author based on household survey

Figure 5.4 Coping strategies, perceived climate variability, recipients and non-recipients, percentage of households in the coastal community



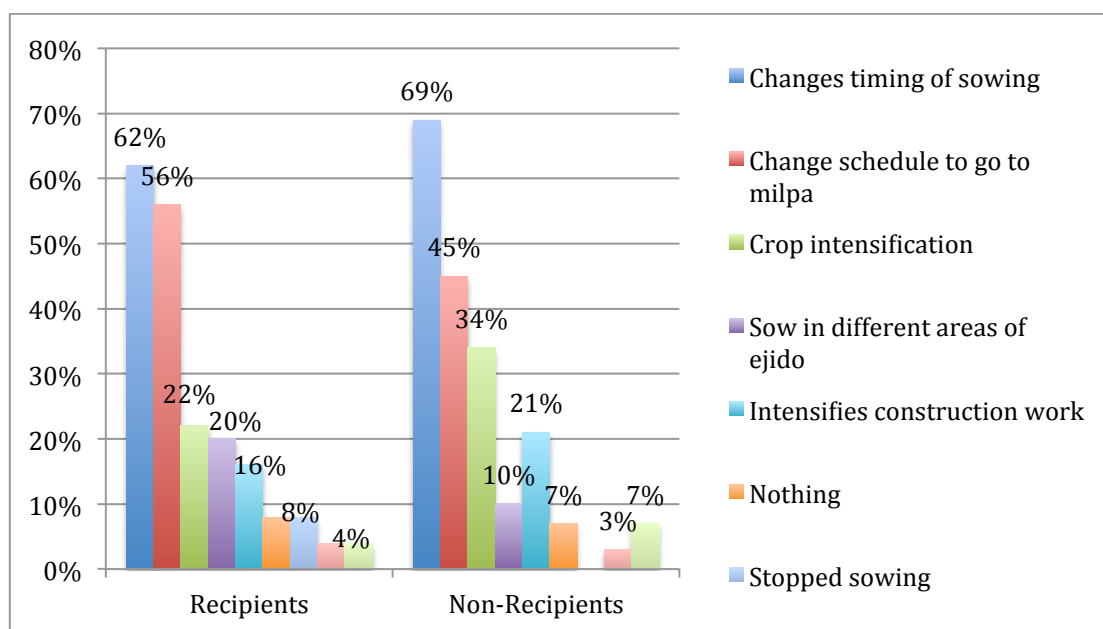
Source: Author based on household survey

Figure 5.5 Coping strategies, perceived climate variability, by poverty category, percentage of households in the coastal community



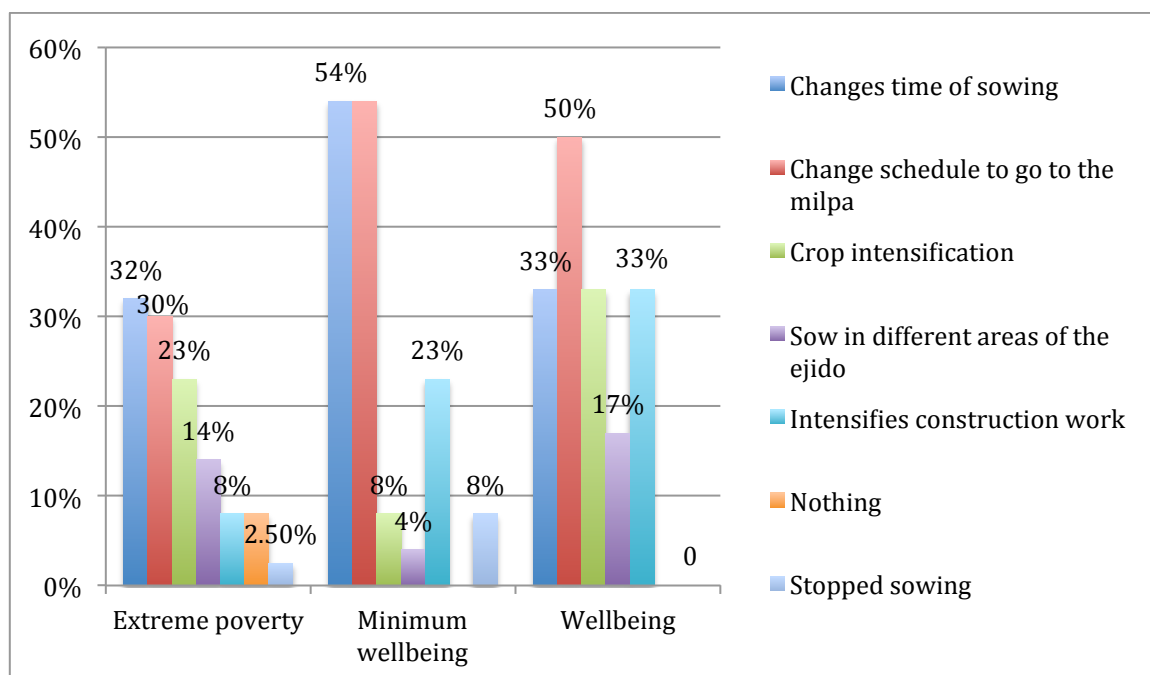
Source: Author based on household survey

Figure 5.6 Coping strategies, perceived climate variability, recipients and non-recipients, percentage of households in the inland community



Source: Author based on household survey

Figure 5.7 Coping strategies, perceived climate variability, by poverty category, percentage of households in the inland community



Source: Author based on household survey

5.1.4 Idiosyncratic shocks

Households in both communities experienced idiosyncratic shocks related to the life cycle of the households, such as sickness, pregnancy expenses, unemployment and death. The impact of these shocks was two-fold: 1) the unexpected expense which is needed to cover medical treatment –which is needed because of the lack of health insurance (the Seguro Popular only started in 2006), plus the transportation expenses to go to hospital due to the lack of access to health facilities in the communities; and 2) the loss of income when a working household member falls sick and/or is incapable of working.

According to the household survey, 36% of households in the inland community and 38% of households in the coastal community experienced a non-climatic crisis during the last 12 months. Almost all the former households also suffered from droughts in the same time period. These dynamics show how climate risk is embedded in a broader context of vulnerability, affecting absorptive capacity and resilience to climate change.

Households mainly developed consumption smoothing strategies to cope with the non-climatic crises. In the coastal community, households mainly borrowed against future earnings (25% of the households) and drew down their savings (13% of the households). In the inland community, 37% of the households implemented one type of asset degrading strategy such as: asking for a loan; pawning; selling livestock; or/and selling consumer durables. In both communities households also tried to diversify their income generating activities (11% of the households in the inland community and 6% in the coastal community followed this strategy). The survey analysis did not show any dynamic link with Oportunidades and these coping strategies. However, both informal and formal social protection approaches played crucial roles in coping with these shocks.

When triangulating the data with the life histories, the analysis showed several episodes during the life of the recipients, which demonstrated this accumulation of non-climatic shocks occurring alongside hurricanes or droughts (see table 5.5). For instance, if they had to stop their productive activity as a consequence of a shock, they would have their resilience sources for future shocks immediately reduced. This accumulation of risk can lead to a magnified effect when a further event occurs which threatens the household's livelihood. This issue was identified in half of the life histories especially after pregnancy, illness or climatic shocks. The following quote illustrates this:

“My husband stopped going to Cancun after an accident he had there where he lost money. When Cancun stopped being an option we had a worse situation because then it was only about getting the money today to eat today”. 35 year-old non-recipient woman, chronic poor, inland community. Life-history interview.

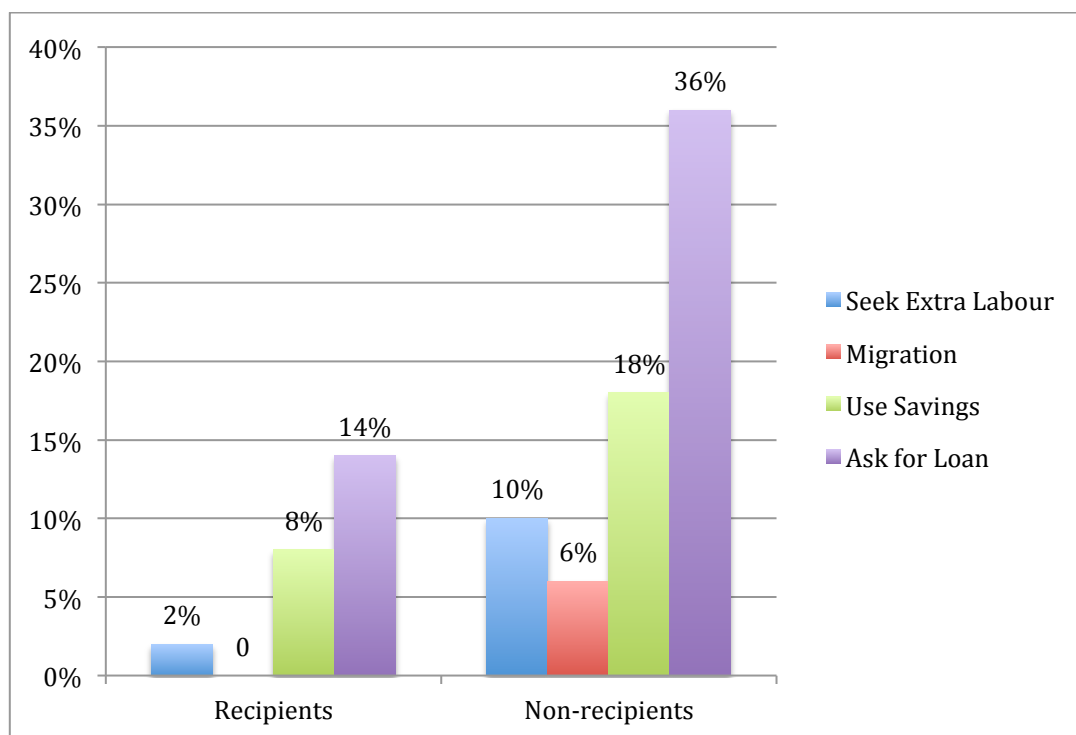
Informal social protection such as the help from family and friends, and reciprocal activities with the community members were the main sources of resilience. This ‘share the losses’ strategy is more common in idiosyncratic shocks, since the family can afford to transfer assets to the households in need. Other forms of social protection such as the Seguro Popular and humanitarian aid were also of most importance for households to cope with this accumulation of shocks. The life histories also showed episodes where Oportunidades was used to cope with these shocks. These results highlight the importance of safety nets that can protect households from multiple shocks.

Table 5.4 Coping strategies, idiosyncratic shocks, inland and coastal community, percentage of households

Inland community		Coastal community	
Diversified economic activities	11%	Asked for loan	25%
Asked for loan	11%	Used savings	13%
Pawned	10%	Diversified economic activities	6%
Sold livestock	8%	Sold consumable durables	4%
Sold consumable durables	4%	Temporary migration	3%
Asked for help	4%		
Used savings	3%		
Work in the city	2%		

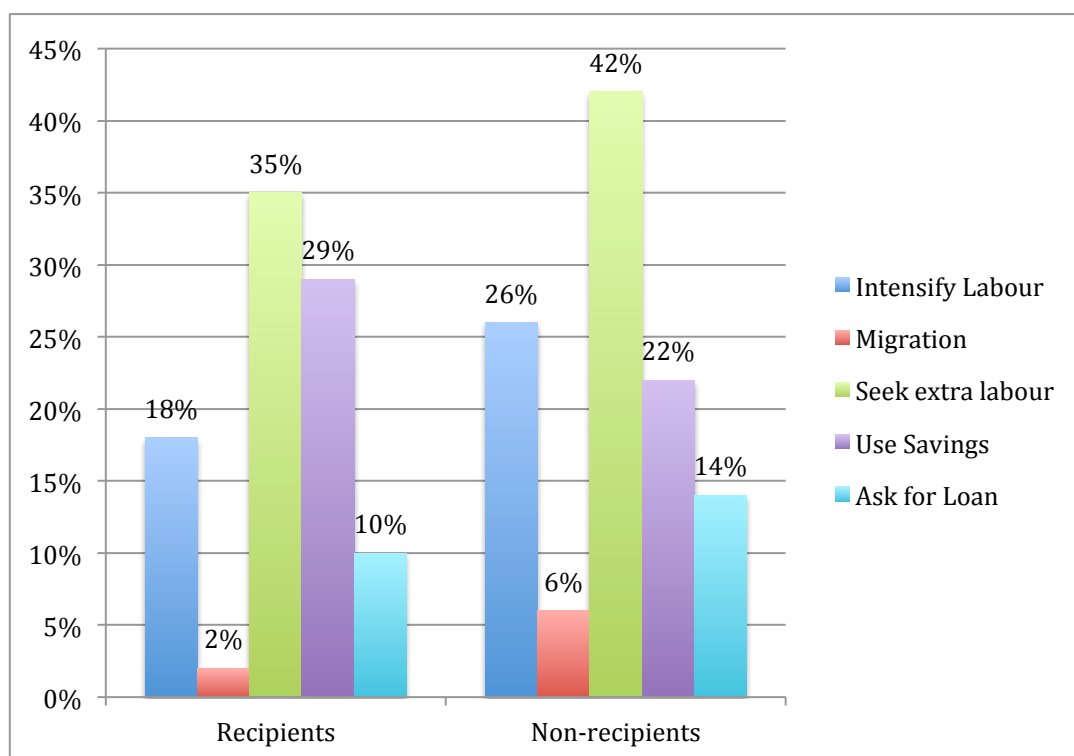
Source: Author based on household survey

Figure 5.8 Coping strategies, non-climatic crises, recipients and non-recipients, percentage of households in the coastal community



Source: Author based on household survey

Figure 5.9 Coping strategies, non-climatic crises, recipients and non-recipients, percentage of households in the inland community



Source: Author based on household survey

Table 5.5 Climate and non-climate shocks in the life histories

Shocks	Resilience sources	Oportu- nidades	Age	Type of community	Poverty trajectory
Pregnancy and hurricane	Help from family and friends, social capital/ reciprocity	Yes	40	Coastal fishing	Churning poor
Illness and drought	Seguro Popular, reduce consumption, humanitarian aid	No	67	In-land agriculture	Chronic poor
Illness and hurricane	Social security; help from family and friends	Yes	50	Coastal fishing	Occasionally poor
Pregnancy and hurricane	Humanitarian aid, help from friends and family	Yes	38	Coastal fishing	Churning poor
Pregnancy and hurricane	Social capital/ reciprocity, Savings	Yes	40	Coastal fishing	Churning poor
Pregnancy and hurricane	Humanitarian aid, Help from family and friends, loans	Yes	54	Coastal fishing	Occasionally poor

Source: Author based on household survey

The analysis of coping strategies shows that the main sources of resilience of the households were based on the reallocation of labour in order to earn additional income. Households mainly rely on farm work, off-farm work in the community, and temporary migration to the city. These are reversible strategies because when households get enough income from these activities they will not need to draw down their assets, therefore reducing the risk of poverty traps. These activities are based on the regular livelihood diversification practiced in the region. To a certain extent, these are income smoothing strategies but also income-raising strategies. Usually Oportunidades does not interact with these types of strategies, or does so only indirectly by protecting economic assets and by smoothing consumption in the households.

The analysis in this section showed that Oportunidades has been used as a self-insurance mechanism that helped households to cope and recover after both a slow and rapid on-set shock. The transfer was used to buy food. Indirectly it helped households to avoid further impoverishment by protecting their assets. The next section presents a more detailed analysis in relation to social protection and households' capacity to anticipate risk.

5.2. Preventive social protection and anticipation or risk

This section analyses the dynamics between preventive social protection and households' capacity to plan and anticipate risk. The analysis shows that households develop different strategies that aim to anticipate risk. In this light, life trajectories presented episodes with strategies that anticipated risk mainly in the form of savings or investments in livestock. For instance:

“We only saved during the octopus season in the summer to be able to cover the expenses during the seasons when the fishing was low. It was my mother-in-law who taught us to save for the bad times.” 40 year-old recipient woman, churning poor, coastal community. Life-history interview.

“There are some men that go to work as builders before the droughts. You have to move forward, think about the future. You do not know that the drought will come but you are already prepared.” Male, inland community. Age and other categories not provided. Group discussion with peasants.

However, this capacity to plan for the future is not exclusive to dealing with climate risk. Households develop preventive strategies to ‘deal with the bad times’ no matter what is the nature of the crisis. These strategies are mainly to cope with future

hurricanes and droughts; seasonality such as the north-wind season; future expected expenses such as pregnancy; unexpected household expenses such as sickness; or as buffers to deal with emergencies (see table 5.6). This is due to the fact that climate risk is perceived as the main cause of ill-being but to a lesser extent than illness and lack of job opportunities (see appendix 5). This reinforces the idea that for poor households climate change is embedded in a broader context of risk, with different factors reinforcing one another and increasing their contextual vulnerability (O'Brien and Leichenko 2000; 2006; O'Brien et al. 2004; Eriksen, O'Brien and Rosentrater 2008; Leichenko and O'Brien 2013; Olsson et al. 2014).

5.2.1 Savings and working culture

Respondents described a savings and working culture learned throughout their lives where people constantly tried to build an asset portfolio to buffer against shocks. These strategies showed how households have developed a learning capacity from previous crises, and that they developed strategies to cope with uncertainty and future shocks. For instance, group discussions in the coastal community showed that Hurricane Isidore was a benchmark in terms of their awareness about the importance of preparing for these climate risks. Participants in the group discussions said that after Hurricane Isidore people began to prepare more for these eventualities. Usually these activities were based on emergency preparation such as the organisation of routes for evacuation, keeping valuables safe, and identifying local authorities' signalling in relation to the degree of emergency. This is related to the 'educate, inform, and encourage behavioural change' strategy, where behavioural change is achieved through education and public information campaigns, (Burton, Smith and Lenhart 1998).

5.2.2 Education from parents

In other cases, this anticipation of risk was part of the education received by their parents or parents-in-law. To some extent, these social systems have meant that people learned to live with change and uncertainty and that they counted upon some resilience sources in the form of: "the best information about their own specific situation and risks they face [...], the existing indigenous knowledge and skills from dealing with past and current climate variability, [...] and the strong incentives to act to protect and sustain their livelihoods" (Vernon 2008:34). In this light, Morton (2007) argues that smallholder and subsistence systems that are exposed to climatic risks or stresses

develop autonomous adaptation aimed at increasing resilience to these risks. Scholars that have worked on the Yucatan Peninsula argue that Mayan people have developed sustainable strategies adapted to their ecological and social environment, since they have a long history of co-existence with hurricanes as well as the threats of droughts and rains (cf. Liverman 1999; Konrad 2003; Alayón-Gamboa and Ku-Vera 2011).

The table 5.6 shows some examples of these strategies and the main resilience sources that underpin them. Households rely on their income-generating activities, mainly farm work, to develop these strategies. Whilst Oportunidades is not directly related to these strategies, the analysis showed that the programme multiplied these capacities by stabilising households' short-term consumption. For instance, the regularity and predictability of the payments of Oportunidades helped households to manage change. It established a floor from where households could further engage in savings. In terms of a coping strategies typology, Oportunidades supports 'prevent effects' behaviour (Burton, Smith and Lenhart 1998).

Table 5.6 Anticipation of risk episodes found in the life histories

Cause	Resilience sources	Oportu- nidades	Age	Type of Community	Poverty trajectory
Pregnancy	Farm work to invest in livestock	Yes	65	Inland agriculture	Chronic poor
Pregnancy	Farm work to invest in livestock	No	38	Inland agriculture	Chronic poor
For emergencies	Farm work	Yes	53	Inland agriculture	Chronic poor
Seasonality	Farm work to invest in livestock	No	38	Coastal fishing	Occasionally poor
Pregnancy	Farm work to invest in livestock	No	40	Coastal fishing	Churning poor
Seasonality	Farm work	Yes	40	Coastal fishing	Churning poor

Source: Author

5.2.3 Predictability of Oportunidades

The literature on climate change argues that buffers for absorptive capacity are built during episodes of stability (Folke, Colding and Berkes 2008; Béné et al. 2014). In this light, the life history analysis showed that in the absence of shocks, Oportunidades provided a bimonthly income that households mainly used to deal with household

expenses, such as groceries and school expenses. The predictability of the cash transfer helped recipients to plan certain strategies in order to stabilise their consumption. Moreover, Oportunidades was considered a main cause of wellbeing in all recipient households (see appendix 5). These strategies helped to build future buffers in case of need. While analysing the life trajectories, I observed that all recipient respondents explained that they used the transfer mainly for this purpose:

“With the transfer we manage to buy more food than only for ‘today’. We manage to buy sugar, milk, beans, soap and cocoa.” 63 year-old recipient woman, chronic poor, inland community. Life-history interview.

“For me the programme means a peace of mind. It is a support to buy food and sometimes clothing.” 54 year-old recipient woman, occasionally poor, inland community. Life-history interview.

“In 1998 I started to receive Oportunidades which is quite helpful for the school expenses, uniforms and food for my girl. Thanks to the programme I have not had a difficult situation. My husband has barely known anything about the school expenses.” 40 year-old recipient woman, churning poor, coastal community.

Oportunidades contributed to stabilise the recipients’ consumption, and therefore indirectly helped households to redirect their farm income to save it ‘for the bad times’, instead of spending it on present consumption needs of the household.

Moreover, the predictability of the transfers also helped the worse-off households to increase their consumption and ask for *fiado*, an informal arrangement between a local service provider –usually a convenience store or market holder –and the consumer, –which consists of a short-term loan in exchange for the goods or service, usually with no interest rate, and mainly based on trust and reciprocity. To a certain extent Oportunidades increased recipients’ credit worthiness among local traders and service providers, by signalling increased liquidity. The next two quotes illustrate this dynamic:

“Two of my children that received Oportunidades were studying junior high in the municipality, but it was more expensive since they required more money. I used all the money from Oportunidades and if we couldn’t afford to buy household groceries then I would ask for *fiado*, and then I would pay it as soon as I received the bimonthly transfer. The children also helped by doing some hammock weaving.” 49 year-old recipient woman, chronic poor, inland community. Life-history interview.

“It [Oportunidades] was particularly useful to pay the transportation costs. The driver lent us money in the form of *fiado* and he came to collect his money on the same day we received the payment of Oportunidades [...] When the transfer was

cancelled we had to diminish our overall consumption to compensate for the money we were not receiving.” 43 year-old non-recipient woman, churning poor, coastal community. Life-history interview.

This relation between the preventive feature of Oportunidades and the anticipation of risk was supported by the findings from the household survey analysis. The survey results showed that whilst few households save in both communities, recipient households tend to save more than non-recipients. The most common purpose of saving reported in the surveys was to be prepared ‘for the bad times’, mainly in microfinance banking, which showed the use of ‘precautionary savings’. Food, healthcare and school expenses are the second causes for savings, according to the household survey (see tables 5.7- 5.10).

The survey results also showed that households smooth their consumption by borrowing against future earnings without further asset depletion. In the coastal community, more than half of households have asked for a loan or credit in the last six months, mainly from microfinance banks. As explained in the previous section, in the inland community, the access to financial services is still quite restricted. Given this, only one out of three households have asked for a loan or credit in the last six months, mainly from microfinance banks and pawnshops. In the group discussions, participants in the inland community highlighted the difficulty of getting credit. Therefore, as an alternative to the exclusion from these services, households in the inland community would raise livestock as a self-insurance strategy.

Survey data showed that non-recipients raised livestock to have an economic buffer, whereas Oportunidades households raised livestock both to achieve better nutrition and as an economic buffer. Pawning is another alternative in the community that helps people to bring liquidity to the household. In the context of climate change, where people will experience repeated and more extreme climate risks, asset-degrading strategies such as pawning or selling livestock are not sustainable in the long-term since assets will be exhausted rapidly, increasing the risk of poverty traps.

Table 5.7 Households savings and loan status, in the inland community

	Currently have savings				Asked for a loan in the last six months			
	Yes	%	No	%	Yes	%	No	%
Recipients	10	16%	51	84%	23	38%	39	62%
Non-recipients	2	5%	40	95%	11	26%	31	74%

Source: Author

Table 5.8 Main uses of savings and loans, in the inland community

	Main uses of savings		Main uses of loan	
	Households	%	Households	%
For the bad times	7	58%	5	7%
Food, healthcare and school	3	24%	44	59%
Productive activity	2	16%	5	7%
Dwelling	-	-	8	11%
Pay debts and pawn	-	-	8	11%
Transportation	-	-	3	4%
Clothing	-	-	1	1%

Source: Author

Table 5.9 Households savings and loan status, in the coastal community

	Currently have savings				Asked for a loan in the last six months			
	Yes	%	No	%	Yes	%	No	%
Recipients	17	34%	33	66%	29	57%	22	43%
Non-recipients	10	20%	40	80%	27	54%	23	46%

Source: Author

Table 5.10 Main uses of savings and loans, in the coastal community

	Main uses of savings		Main uses of credit	
	Households	%	Households	%
For the bad times	14	45%	1	2%
Food, healthcare and school	9	29%	15	32%
Productive activity	4	13%	11	23%
Dwelling, dress, transport	4	13%	10	21%

Source: Author

5.2.4 Rigidities of Oportunidades

Respondents argued that some recipient households have not developed this preventive culture because, instead, they expect the bimonthly payment from Oportunidades. The next quote illustrates this idea:

“A lot of people do not prepare for these eventualities [hurricanes and north-wind season]. They don’t save. They spend more money and they have to ask for loans. They are expecting the payment of Oportunidades [to pay the loans] and then they forget the rest.” 42 year-old non-recipient woman, occasionally poor, coastal community. Life-history interview.

“It [Oportunidades] helps a lot to those people that understand the programme, but not all people understand it.” 40 year-old recipient woman, churning poor, coastal community. Life-history interview.

Whilst episodes that showed the anticipation of risk were identified in both recipient and non-recipient life histories, certain behaviour that reduced resilience was found due to some rigidity in the design of the programme. For instance:

“There were some threats that they were going to remove the cash transfer if your economic situation improved, if they saw assets or characteristics in your dwelling that are considered as ‘decent housing’; therefore, people started to hide their belongings for them not to be expelled from the programme.” 32 year-old recipient woman, coastal community. Life-history interview.

“In 2007 I got sick for 6 months and I couldn’t go to the meetings of Oportunidades. I showed them the papers from the doctor but still I got expelled from the programme. I managed to deal with the health expenses with the Seguro Popular and with some savings from my son who wanted to buy a car and my husband who was working in a gas station in Cancun [...] We couldn’t save, everything was for the expenses for my health and for the children.” 38 year-old non-recipient woman, chronic poor, inland community. Life-history interview.

The first case illustrates the ‘graduation avoidance behaviour’ common in programmes that use means testing, where the recipients strategically avoid being expelled from the programme in case some marginal improvements in their socio-economic situation were discovered. The way this negatively affects resilience is that people had a disincentive to invest in a more appropriate and decent dwelling.

The second argument shows how the conditionalities restrict some coping strategies in the face of shocks. This is related to the fact that the main objective of Oportunidades is to change intergenerational – but not current – livelihoods. Therefore, there is a trade-off in terms of current recipient adults’ wellbeing and their children’s. Overall the

particularities of CCTs that emphasise long-term human capital investment are: strong conditionalities and monitoring, the emphasis on efficient targeting, and verified means testing. Hence, short-term income poverty relief is secondary. This issue will be discussed in more detail in chapter 6 ‘Oportunidades and the adaptive capacity’. Nonetheless, the management rules of the programme explicitly limit the savings of transfers: “The cash transfers will be indefinitely suspended when the beneficiary receives the programme’s bank deposit and does not make any movement on the bank account for two or more consecutive bi-monthly periods.” (SEDESOL 2011:13). This disincentive to save also limits the preventive feature of social protection by restricting saving services that help as buffers in times of stress.

5.3 Discussion and conclusion

The aim of this chapter was to answer the research sub-question: How does Oportunidades affect the absorptive capacity of poor households? For this purpose, I analysed the link between the protective and preventive features of social protection with the absorptive capacity of households before, during, and after climate shocks.

The data presented in the chapter shows that households developed different strategies to cope with climate risks (see table 5.11). The main coping strategies identified in the analysis were: share losses, change location, prevent effect, diversification of income sources, change use, and encourage behavioural change. The type of strategy used depends on several factors such as the type of shock (income or asset shock), impacts during and after the shocks, and the resilience sources available. Given this, Oportunidades mainly supported prevent effects strategies.

Social protection increases resilience by helping households to protect their assets in the aftermath of shocks. Likewise, the data also showed that the transfer indirectly helped households to protect their consumption against both asset shocks - such as hurricanes- and income shocks -such as droughts- thus increasing their resilience in the short-term. The analysis presented also found that households developed strategies to anticipate risk. These strategies were mainly due to a risk management education inherited from parents and parents-in-law who, over time, learned to live in a risky context. However, social protection did help to increase this behaviour. It provided a level of basic security that helped households to plan for the future and anticipate risk. For example, the data showed how households that had savings from the Oportunidades transfers for the

purpose of spending them on their children's education were used to buying maize for consumption in the household during times of drought.

Table 5.11 Type of coping strategies found in the coastal and inland communities and role of Oportunidades

Type of coping strategy	Description	Example	Role of Oportunidades	Type of shock
Share losses¹	Involves sharing the losses among a wider community	Relief support: in-kind transfers, Seguro Popular, PET programme, help from family and friends, reciprocity	--	Hurricane, non-climatic shocks
Change location¹	Change the location of economic activities	Temporary migration to the city, sow in different areas of community land	--	Hurricane, drought & climate variability
Prevent effect¹	Involves steps to prevent the effects of climate change and variability	Use savings, ask for loans, change sowing patterns and crop management	Supports these strategies	Hurricane, drought & climate variability
Diversification of income sources²	Income generating activities are diversified	Diversification with off-farm work	--	Drought & climate variability
Change use¹	Where the threat of climate change makes the continuation of an economic activity impossible or extremely risky, consideration can be given to changing the use	Crop intensification	--	Climate variability
Educate, inform, and encourage behavioural change¹	Behavioural change is achieved through education and public information campaigns	Emergency preparation, keeping valuables safe, organisation of routes of evacuation	--	Hurricane

¹ Source: Burton, Smith and Lenhart 1998

² Source: Agrawal 2010

Nevertheless, the empirical findings also show that the 'protection' and 'prevention' features of Oportunidades are not sufficient to enhance households' absorptive capacity. Coping with climate variability and change requires *inter alia* increased access to credit; land property rights; rural infrastructure such as irrigation systems in the communities; improved access to non-farm employment; access to food markets; and to the inputs necessary for agricultural activity.

Likewise, humanitarian assistance and other protective and preventive programmes such as the cash for work programme, Programa Empleo Temporal (PET), or the health

insurance, Seguro Popular, are very important to enhance the absorptive capacity of households. In this light, Oportunidades should not be seen as sufficient to enhance the absorptive capacity of poor households, but more as “one potential tool in a wider process of assistance” (Harvey and Bailey 2011:8).

Broader recognition of the political and economic structures underpinning the absorptive capacity of households is fundamental. For instance, power relations in the communities have affected the access to the different socio-ecological entitlements, ultimately affecting the absorptive capacity of households. Results in this chapter show how the poverty category of households explains the access to certain resources that are crucial to develop certain coping strategies. Furthermore, the historical economic exclusion of these rural communities has also hindered the availability of livelihood options that could help households cope with climate change. This social exclusion is also reflected on the limited provision of services, access to roads and markets and in the distribution of public resources. These are all aspects that increase vulnerability and reduce absorptive capacity. Wider development strategies should consider ways of tackling the accumulation of disadvantage of these households, in order to potentiate the resilience strengthening functions of Oportunidades.

The next chapter examines the relation between Oportunidades and the adaptive capacity of the households.

Chapter 6 Oportunidades and the adaptive capacity

This chapter analyses the linkage between Oportunidades and the adaptive capacity as presented in chapter 2 ‘Theoretical foundations: review of literature and the social protection-resilience framework’. The research sub-question that this chapter aims to answer is: How does Oportunidades affect the adaptive capacity of poor households in rural Yucatan? The rationale that underpins this linkage is that Oportunidades increases adaptive capacity in the long-term by providing regular injections of cash that can eventually be invested in productive activities, increasing innovation and livelihood diversification. Likewise, the human capital investments in children supported by the programme can translate into increased access to more secure livelihoods on the intergenerational scale. The analysis is mainly based on the 56 life-history interviews with adult recipients and non-recipients in both communities, and their children. It also draws from group discussions with community members.

The chapter is structured as follows. Section 6.1 explores the relation of promotive social protection, and the livelihood innovation on the long-term scale. The analysis shows that Oportunidades supports adaptation on this scale, but only through the interaction with other resilience sources. The analysis also shows that this impact is differentiated between different poverty profiles. Section 6.2 analyses the link between promotion and innovation, but on the intergenerational scale. It explores the different processes and dynamics that allow (or restrict) the progression into less climate-sensitive livelihoods of young adults, and the role of social protection plays in those dynamics. Section 6.3 concludes the chapter by arguing that social protection supports only specific livelihood progression pathways.

6.1 *Livelihood diversification and innovation, long-term impact of Oportunidades*

According to the survey analysis, livelihood diversification takes place in both communities. It is usually based on several small-scale and low-productivity livelihoods. For instance, in the coastal community households diversified, on average, into four livelihood activities, but some households had up to ten different livelihood activities. In the inland community, on average, households diversified into five different livelihood activities, but some households had up to 11 different livelihood

activities (see table 6.1). In terms of livelihood diversification typology these strategies corresponded to ‘concurrent diversification’, where households do “several activities at any one time to spread risk or increase income” (Goulden et al. 2013:907). To a certain extent, this complex livelihood portfolio represents an adaptive strategy to the changing seasons in the region (Batllori-Sampedro and Febles-Patron 2009).

Nonetheless, as explained in chapter 4 ‘Context, exposure, and livelihood sensitivity in the inland community and coastal community’, more than two thirds of the households in both communities rely on climate sensitive activities. Both recipients and non-recipients in the coastal community continue practicing offshore fishing as their main livelihood activity, and *milpa* in the inland community. To a certain extent, this livelihood analysis suggests that the income returns of Oportunidades do not lead to a major and more evident livelihood progression into sustainable, less climate-sensitive livelihoods. In a context of climate change these livelihoods are very vulnerable to changes in the weather patterns, which represent serious challenges to their subsistence. This is due to the fact that households experience severe constraints to accessing more productive activities, leaving only low-return activities available to the poor, as will be explained. Even so, the majority of the households in the inland community in particular combined these traditional livelihoods based on natural resources, with other less climate-sensitive livelihoods based on the market economy.

The analysis developed in chapter 5 ‘Oportunidades and the absorptive capacity’ showed that households were developing some strategies to cope with the erratic rain fall and changes to the start and end of seasons. Households were not developing new livelihood options to deal with these changes, but they relied on the same livelihood activities, mainly in the form of ‘temporal livelihood diversification’, whereby households “change from doing one activity to another” (Goulden et al. 2013:908), and apply the ‘change use’ and ‘change location’ strategies (Burton, Smith and Lenhart 1998). To a certain extent this reflects the way that households were already maximising their livelihood options. Climate variability and change make livelihood strategies more uncertain and therefore those activities that are intensified during times of stress may not be enough to produce a buffer against shocks.

Table 6.1 Livelihood diversification inland and coastal communities, percentage of households

		Number of livelihoods			Percentage of households by type of livelihoods		
		Min	Max	Mean	Climate sensitive	Non-climate sensitive	Mixed
Coastal community	Recipient	1	9	5	66%	2%	32%
	Non-recipient	0	10	4	62%	8%	30%
	Total				64%	5%	31%
Inland community	Recipient	0	9	5	6%	12%	82%
	Non-recipient	2	11	5	16%	18%	67%
	Total				10%	14%	76%

Source: Author based on household survey

A more in-depth analysis based on the retrospective life history interviews showed that some households developed certain adjustments to their livelihood strategies, in the form of productive investments. Whilst these strategies are not recognised as direct adaptations to climate change, respondents emphasised that they aimed to have more secure livelihoods, in contrast with their main livelihoods that were more volatile. As explained in chapter 2 ‘Theoretical foundations: review of literature and the social protection-resilience framework’, the adaptive capacity is also related to innovation. The empirical results show that innovation does take place in certain households. Table 6.4 shows the different investments of the households and their main sources of income as found in the retrospective life history interviews.

The analysis showed that these households had a strong power position in the community, which helped them to access more significant transfers, such as remittances from family members, and promotive projects from the local government. These transfers were used to invest in productive activities that would lead them to more secure and less climate-sensitive livelihoods. To some extent, these strategies reinforced their ‘concurrent diversification’ strategies.

Oportunidades only helped them to stabilise their consumption. The case of respondent number 8 in table 6.2 illustrates these strategies. This respondent explained that the

main livelihood in the household was fishing, but they wanted to develop a secure source of income that was not affected by the weather. Therefore, the husband and older son applied for the *Fomento Agropecuario* programme, a transfer from the local government that supports new productive investments. They aimed to invest this transfer in a car and bicycle repair workshop. The husband was friends with the municipal president and eventually got the transfer, equivalent of 6,500 pesos (508 USD)²³. The household was receiving Oportunidades, which was mainly used to cover daily household expenses and the education of the younger son.

23 Estimated figures using an exchange rate of 12.80 Mexican Pesos per US Dollar, February, 2012 (Banxico).

Table 6.2 Livelihood innovation, coastal and inland communities

Resp on- dent	Productive investment	Synergies/ resilience sources	Oportuni dades recipient	Age	Community	Poverty trajectory
1	Diconsa store	Remittances, promotive social protection, farm work	No	42	Coastal community	Occasional ly poor
2	Transportati on services	Remittances, work in the city	Yes	54	Inland agriculture	Occasional ly poor
3	Convenience store	Waged job	No	38	Coastal community	Chronic poor
4	Cooperative of women handcrafters	<i>Fomento Agropecuario</i> (government transfer for productive projects)	No	38	Coastal community	Occasional ly poor
5	Cooking and selling food	Gift from father	Yes	54	Coastal community	Occasional ly poor
6	Small convenience store	Farm work	No	67	Inland agriculture	Chronic poor
7	Cooking and selling food; mill	Remittances	Yes	45	Inland agriculture	Churning poor
8	Bicycle workshop	<i>Fomento Agropecuario</i> (government transfer for productive projects)	Yes	47	Coastal community	Churning poor
9	Liquor shop	Inheritance	Yes	50	Coastal community	Occasional ly poor
10	Builder workshop	Farm work	No	40	Coastal community	Churning poor

Source: Author based on life history interviews

These households had an entrepreneurial background, which motivated them to find different ways of promoting, and innovating upon, their livelihood strategies. They described this as a ‘personal motivation to progress in life’, and identified it as a main cause of their wellbeing (see appendix 5). Respondents reported to have learned this attitude from their parents or parents-in-law. They also explained that this motivation came from a will to improve for their children. Accordingly:

“Teachings from my father about work, to progress in life, to seek solutions for problems.” 40-year old non-recipient woman, churning poor, coastal community. Life-history interview.

“Motivation and effort to progress for my children.” 40-year old non-recipient woman, churning poor, coastal community. Life-history interview.

The life history analysis showed that very few households used the transfer of Oportunidades to directly invest it in a non-climate sensitive productive activity. These cases presented both ‘concurrent diversification’ and ‘temporal diversification’ strategies, which were developed mainly by women. These households were in a period of economic stability due to either a lack of crises and/or the presence to access to a more secure income from farm and off-farm work. Moreover, the synergies between different informal and formal social protection transfers, plus farm work were key to triggering the promotive feature of Oportunidades. This was the case because the value of the Oportunidades transfer on its own was not big enough to lead to the accumulation of the necessary capital for the investment in a small business. Table 6.5 presents the productive investments and the synergies of Oportunidades with other sources of income.

These investments were very small in scale and productivity, and they did not represent a real path into more secure livelihoods. Given this, these respondents explained that they diversified their livelihoods not to progress, but to stabilise their consumption, and to cope with household expenses. Therefore, these investments increase their absorptive capacity rather than their adaptive capacity. For instance, respondent 1 in table 6.3 started a small business undertaking embroidery and sewing. For the initial investment in the business, the respondent used income from the apiculture activity developed by her husband, and also from the transfer of Oportunidades. Her husband had to stop working due to some eyesight problems. Nowadays, when she receives the bimonthly transfer she uses the money to buy the thread. She explained that the income that she receives from the small business is used to cope with the daily expenses of the household.

The distinction between different trajectories of poverty (chronic poor, churning and occasionally poor) reflects the fact that there are other structural issues underpinning the adaptation of households, such as the restricted access to labour markets, to financial services, and to other forms of social protection, as will be demonstrated below. This is due to the fact that climate risk is perceived as a main cause of ill-being but to a lesser extent than illness and lack of job opportunities (see appendix 5).

Table 6.3 Livelihood innovation using Oportunidades, coastal and inland communities, based on life histories

Respondent	Investment objective	Synergies	Community	Age	Poverty trajectory
1	Embroidery and sewing small business	Oportunidades and farm work	Inland community	60	Chronic poor
2	Small convenience store	Oportunidades, Conafe and SEP (Education grants), children working	Inland community	65	Chronic poor
3	Credit for motor boat	Oportunidades, compensation for dismissal payment, farm work	Coastal community	40	Churning poor
4	Small convenience store	Oportunidades, farm work	Coastal community	50	Churning poor
5	Cooking and selling food	Oportunidades and farm work	Coastal community	40	Churning poor

Source: Author

6.1.1 Poverty trajectory of the household

For the occasionally poor, livelihoods were based on progressing while building future buffers. Informal social protection, promotive transfers, and farm activities promoted the livelihoods of these households. Their privileged power-resource position has given them access to other forms of more secure and permanent work. In these households, Oportunidades was used for household expenses, which helped to stabilise the household consumption, and this indirectly helped because other income sources were used for productive activities.

The specific cases where the churning poor managed to progress their livelihoods into more secure livelihood activities were only possible because they had their basic needs covered both from farm work and from preventive social protection. In terms of resilience they reflect patterns where the household was exposed to intermittent crises but was able to recover and increase incrementally their overall wellbeing in the long-term. These trajectories were more common in the coastal fishing community.

This stability provided the household with a certain flexibility to diversify in less climate-sensitive livelihoods. Furthermore, episodes with intermittent migration to the city helped households to progress.

In contrast, chronic poor households usually experienced several restrictions to their adaptive capacity. These households were mainly based in the inland community, which suffered from more exclusion of services and labour markets. These households identified the lack of formal jobs and their income poverty as the main causes of ill-being. For instance:

“The lack of formal jobs, the lack of business in the community which offers permanent jobs. This is what creates poverty.” 40 year-old recipient woman, churning poor, coastal community. Life-history interview.

“Stagnation. We cannot progress more. This is it.” 38 year-old recipient woman, chronic poor, inland community. Life-history interview.

Livelihoods for the chronic poor are based on recovering their wellbeing and mitigating crises. The very few small businesses that were established using Oportunidades transfers were mainly used to cope with the daily expenses of the household. The transfer was used as a form of credit due to the restricted access to financial services.

Furthermore, increasing reliance on a cash economy in rural areas made households experience new demands that came together with new expenses and economic pressures for the household. For instance, chronic poor respondents declared in their life histories how increasing expenses and demands from their children reduced their overall wellbeing, in contrast to the past when things used to be cheaper. As the children progressed into school and attending junior high school, expenses also increased. The following quotes illustrate this issue:

“School expenses were less than today. It was enough to give the children 2 pesos [0.14 USD]. They had breakfast and lunch at home. They did not require uniforms and shoes, just a pen and notebook. Children did not demand much. You did not need to buy bread, you just ate what you had from the *milpa*. In contrast, now the youngsters demand clothing, mobile phones. Before, I did not have to spend much.” 67 year-old recipient woman, chronic poor, inland community. Life-history interview.

“To fund the expenses we sold eggs and also we did not need as much money as we need now. Money used to have a higher value and we did not need to spend much. We did not have transportation costs since we had a bicycle or we walked. We gave every child 5 pesos [0.40 USD]²⁴ for their weekly expenses.” 65 year-old recipient woman, chronic poor, inland agriculture community. Life-history interview.

24 Estimated figures using an exchange rate of 12.80 Mexican Pesos per US Dollar, February, 2012 (Banxico).

During this expansion stage, households based their income generating activities on farm work and off-farm work in the community to cope with these expenses. While households transit towards the dispersion stage, older children start working and thus help with the household's expenses, including the school expenses of the younger children. During this stage of the life cycle households are able to progress, and their adaptive capacity increases. Respondents considered their children's economic support as the main cause of their wellbeing, and this was common to all poverty trajectories. This progression of the life trajectories is also related to the fact that a downward pressure in the livelihoods is removed when the children finish or drop out of school and the school expenses stop.

6.1.2 Female participation in income generating activities

Households have adapted to these economic pressures by increasing female participation in the income generating activities. As household needs increase and the main traditional livelihoods are increasingly affected by climate variability, female engagement in income generating activities has become essential for the households. Group discussions showed that the members of the communities perceived women's economic participation as a key aspect in achieving household and community wellbeing, especially during times of crises:

“Women did not use to work. Nowadays they even own small businesses. If what the husband brings is not enough [to deal with the household expenses], then we [women] have to help them.” Woman, inland community. Age and other categories not provided. Group discussion with women.

“Women's work is usually in the households but their work is important since they are able to sew hammocks when there is not enough money when there is a crisis. Money doesn't come from the *milpa* and they help with the expenses.” Male, inland community. Age and other categories not provided. Group discussion with peasants.

In the case of the chronic poor, these activities took place together with the husband and are considered as some sort of ‘team work’. This support through a husband is considered a main cause of wellbeing to some of the respondents, especially non-recipients of Oportunidades.

“To sustain my children I rely on the hammock weaving. I asked for a loan or the payment upfront. It was faster than to do *hipiles* [traditional blouses]. I charge 30

pesos²⁵ [2.30 USD] for a six-thread hammock. My husband also was doing hammock weaving. We sold two per week. We used the money for children related expenses and to buy all things that you cannot get from the harvest. From the *milpa* we use the harvest to get the food to eat.” 38 year-old non-recipient woman, chronic poor, inland community. Life-history interview.

“I taught my husband how to do the hammock weaving, but firstly he was ashamed because he is a man. What we were seeking was to achieve a better nutrition. To have certainty that we would have something to eat tomorrow. To be able to save to eat. We now work as a team. We work in the hammock weaving together and if we go to the *milpa* we go together too. I usually weed. Usually it’s a job the man does but I go anyway.” 63 year-old recipient woman, chronic poor, inland community. Life-history interview.

Scholars in the social protection literature have argued that conditionalities in cash transfers place additional demands on women’s scarce time, and they are expected to manage even further their multiple paid and unpaid work activities (Molyneux 2007). Following this train of thought, the pressures to meet the care conditionalities of the programme might decrease women’s labour force participation, which has been perceived as an autonomous adaptation strategy. This statement from a non-recipient illustrates this dynamic:

“We only once applied for Oportunidades but we did not get it. Later we realised that we would make a better use of our time if we worked in the maintenance of beach houses. The recipients have to spend time on *fajinas* [community work without remuneration] and have to go to the health centre. Also, there are people that are not using the money to help their children. They don’t save the money for their children. In contrast, for us, our ‘savings’ is our investment on our children. Some recipients rely completely on the programme and then they don’t do anything else to work for money.” 40 year-old non-recipient woman, churning poor, coastal community. Life-history interview.

This statement also illustrates the common practice of *fajinas* imposed on the recipient women as a conditionality of the programme. The *fajina* is a common practice in rural communities, where periodically members have to do community work without remuneration. It is a practice that aims to build social trust and social cohesion. However, informally the intermediaries of the programme have established the *fajina* as part of the conditionalities of the programme, reducing recipients’ scarce time even more.

25 Estimated figures using an exchange rate of 12.80 Mexican Pesos per US Dollar, February, 2012 (Banxico).

When Oportunidades was created, the administration of president Ernesto Zedillo (1994-2000) aimed to distinguish the social policy strategy of his government from that of his predecessor Carlos Salinas (1988-1994). The latter had based his social policy strategy on the National Solidarity Programme (Pronasol), a programme known for its highly clientelistic practices in rural areas, centred on the figure of the president, and with little impacts on poverty reduction (Molinar and Weldon 1994; Estévez, Magaloni and Díaz- Cayeros 2002; Meyer 2005). Rather than the community, as with Pronasol, with Oportunidades the family became the unit of intervention. This aimed to build a direct relationship between the government and the households, and eliminate previous intermediaries, who were related to the Partido Revolucionario Institucional party, reproducing old corporatist and clientelistic practices (Hevia de la Jara 2008). However, in practice the *vocales* (recipients' representatives), were responsible for confirming the fulfilment of the conditionalities of each family. As a consequence, these actors could abuse this control system against the recipients, since they could control the amount of money that went to each recipient household (ibid.).

6.1.3 Emphasis on intergenerational transmission of poverty

The fact that Oportunidades' theory of change is based on the intergenerational alleviation of poverty -and not on the poverty reduction of the current generation- has consequences for the adaptive capacity of the recipients. This limits some of the immediate promotive potential of the transfer that could increase the livelihood progression of the recipient adults. For instance, the targeting mechanism is based on the adults' income poverty status, and this is not permitted to improve without risking entitlement. In other words, recipients have to remain below the minimum wellbeing line (SEDESOL 2011). Likewise, the explicit savings restrictions established by the programme's rules, analysed in chapter 5 'Oportunidades and the absorptive capacity', also limits the long-term progression of the recipients' livelihoods. In the group discussions, women identified this particular limitation of the programme:

“Oportunidades is very important and necessary. It helps us to buy maize and to continue working with the children. But usually we have already spent it before we get the payment. It does not build capacities. It is only a support for the domestic work. It is a programme for the children not for the mothers.” Woman, inland community. Age and other categories not provided. Group discussion with women.

6.1.4 Informal social protection

The life history analysis showed how informal social protection in the form of gifts and reciprocity played a very important role in the wellbeing of the households. Social capital and social relations have been recognised in the climate change literature as a source of resilience and adaptive capacity (cf. Adger 2000; Pelling and High 2005; Nelson, Adger and Brown 2007; Eriksen and Lind 2009). Trust, reciprocity and mutual support are part of these social relations.

In the life histories, reciprocity episodes range from sharing the production from fishing or from the *milpa*, sharing the dwelling, taking care of children or other family members, or more significant gifts and inheritances (see appendix 5). The level of the reciprocity reflects the social status of the household. While for the chronic poor, reciprocity is mainly in the form of sharing the benefits from those productive activities and caring for other family members, for the transient poor –a category that includes the churning poor and the occasionally poor- it is in the form of inheritances and gifts such as land, dwellings or productive assets. Those who benefited from these latter forms of reciprocal help appeared from the analysis to have a better-off economic position relative to the community. The transient poor, who were advantaged by this particular power-resource position, also saw this reflected in their access to social networks in the bigger cities and abroad. For instance, these households had migration episodes that helped them to improve their livelihoods. These episodes of migration usually took place in bigger cities and in the United States and these factors increased their adaptive capacity. Such households also had episodes in which they had access to secure and waged jobs.

However, at the level of the community, social capital was weak. According to the household survey, 87% of the households in the inland community, and 46% in the coastal community, said that community members were less cooperative or non-cooperative with each other. This lack of trust diminishes communities' capacity to build resilience. This low social cohesion in the inland community has been identified in previous research in the area. Rosales and Moya (1999), as quoted in Rosales (2012: 81-82), describe how in the inland community “in general the communitarian institutions were weak, there was a lack of participation in the collective decision spaces, and an increasing political division”. Some pre-existing social hierarchies,

power and entitlement inequalities might be reinforced by cash transfers. Accordingly, previous work on Oportunidades has shown that in certain contexts Oportunidades has reinforced local inequalities and promoted tensions and conflict in communities (Adato 2000; Handa and Davis 2006).

These issues were difficult to explore in the communities since they are considered to be very sensitive topics. However, one ex-recipient in the coastal community did mention an episode of mistrust within the community due to Oportunidades. Recently many recipients were removed from the programme, and since the programme does not notify the reason for any recipient dismissal, as a result distrust was generated in the community. The programme has a system of anonymous complaints, thus rumours can start spreading that it was other households that had accused them of not being poor. Moreover, since they do not receive advance notification of their removal from the programme, households cannot prepare for the transfer suspension and it increases the risk of children having to drop out of school.

This analysis shows how Oportunidades has a limited potential to increase the adaptive capacity of households. The fact is that very few households used the programme as a promotive transfer. Instead they used the transfers with the aim of stabilising their daily expenses rather than progressing their livelihoods. This shows that the programme is used to increase the absorptive capacity of the household, and not resilience over the long-term.

6.2 Livelihood progression, intergenerational impact of Oportunidades

In this section, I explore if Oportunidades has the potential to facilitate contexts for livelihood progression for those young adults that received the cash transfer as children. By investing in the human capital of young generations, the programme aims to increase their skills and capabilities, thus increasing their opportunities and livelihood choices.

According to the management rules of Oportunidades, its overall objective is to “facilitate the development of education, health and nutrition capabilities of the beneficiary families in order to break the intergenerational cycle of poverty” (SEDESOL 2011:3). Greater grants are given to women, and to those young adults that reach tertiary education, thus supporting their progression. Moreover, the Jóvenes con

Oportunidades (Young with Opportunities) component of the programme aims to incentivise young adults to finish high school by paying around 4,000 pesos (312 USD)²⁶ to the graduated student with the purpose that the money is invested in a productive activity or pays any expenses related to higher education. Likewise, Oportunidades graduate students that are accepted into public universities have priority in receiving the Pronabes scholarship: this is a grant to study for a BA or technical carrier in a public school, which increases the chances of young adults accessing new livelihood options.

According to the life history analysis of young adults, it was school grants and Oportunidades that were the main drivers of their livelihood progression. These transfers played a fundamental role in the access to education of poor young adults. Given this, recipients identified Oportunidades and Pronabes as the main source of their wellbeing (see appendix 6). Given this, all the young adults that were studying or applying to a BA received Oportunidades or another education grant from the local government. In contrast, those young adults that dropped out in junior high school were mainly non-recipients. Table 6.4 shows the cases where young adults managed to graduate from senior high school and accessed higher education.

For instance, respondent 1, a Mayan female young adult from the inland community who received Oportunidades during her studies, studied higher education in the capital city. She explained that throughout almost all of her primary school, junior high, and senior high career she studied in the main town of the municipality. This helped her to improve her Spanish skills since she was very young. She received support from the teacher and some classmates. Throughout her junior high school and senior high school studies, her school expenses were funded by Oportunidades. When she finished senior high school she decided to continue studying at an undergraduate level. She passed the exam for a BA in Education Intervention in the *Universidad Pedagógica Nacional*, a public university in the capital city. During her undergraduate studies, one of her older sisters gave her accommodation in the city. Moreover, she funded her daily expenses using the Pronabes scholarship, money that her mother sent her, and remittances from siblings who resided in the United States. The respondent explained that she studied a BA because she realised that it was fundamental to have a degree in order to progress

26 Estimated figures using an exchange rate of 12.80 Mexican Pesos per US Dollar, February, 2012 (Banxico).

and have a better life, a dwelling, and not to have too many needs -but not because she actually enjoyed reading or studying. She also went to school because she liked to make friends and because she did not want to go to the *milpa*. By the time the interview took place the respondent was working for the local government in a water management project.

According to the life history analysis, Oportunidades increased the skills and capabilities of young adults through the encouragement of the use of educational facilities and providing motivation to undertake further study. It has also help inform young adults about their different educational options, helping them to plan ahead. For instance:

“The pressure not to lose the scholarship motivated me to continue studying. The programme helps you to continue studying. The programme also helps to inform you about the real options that children have.” 24 year-old sponsored young man, occasionally poor, coastal community. Life-history interview.

Young adults declared that going to senior high school helped them to develop certain skills that were useful in their work, such as a proficiency in the Spanish language (in the case of the Mayan young adults); the development of self-confidence; and IT skills such as the use of Office and the internet. The following quotes illustrate this:

“Studying senior high has been useful to learn how to express myself, develop and learn new things.” 18 year-old sponsored young man, occasionally poor, inland community. Life-history interview.

“I was working as a general employee but then I was going to get upgraded since I had some IT skills I learned in senior high. This was a course I took in school that helped me to do stuff in work such as Word Pad, Office, etc. Almost all my work peers had only studied up to junior high, so I was one of the most qualified employees.” 21 year-old non-sponsored young man, churning poor, coastal community.

Table 6.4 Non-climate sensitive livelihoods, young adults, coastal and inland communities, based on life histories

Respondent	Main livelihood young adults	Gender	Synergies	Main level of school	Type of community	Age	Poverty trajectory
1	Skilled worker with salary	Female	Oportunidades, Pronabes, father's farm work, mother's small business, remittances from older siblings, accommodation from family members	Finished BA	Inland	22	Usually poor
2	Full time student	Female	Oportunidades, father's fishing, mother's work as domestic worker	Applying to BA	Coastal	18	Churning poor
3	Full time student	Female	Oportunidades, Pronabes, father's fishing, mother's work as domestic worker and farm work	Finishing BA	Coastal	22	Churning poor
4	Informal commerce employee	Female	Oportunidades, father's fishing	Finished senior high	Coastal	20	Churning poor
5	Full time student	Female	Oportunidades, Pronabes, transfers from uncles	Finishing BA	Coastal	20	Churning poor
6	Informal services employee	Female	Oportunidades, mother's small business, father's fishing	Finished senior high	Coastal	21	Churning poor
7	Formal services employees with benefits	Male	Father's fishing, transfers from siblings	Senior high	Coastal	21	Churning poor
8	Full time student	Male	School grant from local government, mother's small business, father's fishing	Applying to BA	Coastal	18	Occasionally poor
9	Full time student	Male	School grant from local government, mother's small business, father's salaried job	Applying to BA	Coastal	18	Occasionally poor
10	Informal commerce employee with salary	Male	Oportunidades, father's salaried job, transfers from siblings	Two-year technical degree	Coastal	20	Occasionally poor
11	Full time student	Male	Oportunidades, father's small business,	Applying to BA	Inland	18	Occasionally poor

remittances							
12	Full time student	Male	Oportunidades, Pronabes, parents' small business, transfers from aunt	Studying BA	Coastal	24	Occasionally poor

Source: Author

The life history analysis showed that there were different factors that shaped the potential of Oportunidades in helping young adults to foster their skills and abilities and eventually access less-climate sensitive livelihoods. The main catalysts identified in the analysis were the poverty trajectory of the household; the demographic composition of the household; the personal motivation and interest in education of the young adults and their parents; the experience of both climate and non-climate shocks, the lack of access to schools and low education quality; and the lack of jobs. These factors are explained next.

6.2.1 Poverty trajectory of the household

Poverty plays a fundamental role in shaping the impact of the programme. In the life history analysis the chronic poor young adults usually have more difficulties in benefiting from the human capital investments when compared to the transient poor. This is the case because this group faces certain restrictions that mark an unequal access to services, markets and social infrastructure.

For instance, all young adults from occasionally poor households were studying or applying to higher education. These young adults had the economic support from their parents, covering their basic needs such as food, accommodation, and transportation costs. Some of them had other family members that acted as sponsors, such as an uncle or a sibling that migrated to the city or to the US. To a certain extent the access to these social networks reflected the social status of the households linked to these poverty trajectories, which gave them a high power-resource position as explained in section 5.1. These social networks also supported the young adults in accessing accommodation in the city or in bigger villages, which was crucial in the transition from senior high school to higher education.

The churning poor are the group that experienced more occupational mobility, compared to their parents. The life histories of their parents showed that the access to education transfers such as Oportunidades, SEP and Pronabes helped these households

to cope with the school expenses. In more than one case parents did declare that without the support of Oportunidades their children would not have been able to study.

Accordingly:

“In 1998 I started to receive Oportunidades which is quite helpful for the school expenses, uniforms and food for my girl. Thanks to the programme I have not had a difficult situation. My husband has barely known anything about the school expenses.” 40 year-old recipient woman, churning poor, coastal community. Life-history interview.

However, especially for senior high school and higher education the young adults had to engage in low skilled economic activities in order to complement the expenses for their studies. For instance:

“I have been receiving the Oportunidades programme since I was in the 4th year of primary school. I kept it up to senior high, but especially for senior high it was not enough to pay my expenses including transportation, copies and lunch at school. Since I was in junior high school I sometimes go fishing to have spare money especially for my personal expenses.” 25 year-old sponsored young man, occasionally poor, coastal community. Life-history interview.

Likewise, mothers usually engaged in small-scale income generating activities such as washing other people's clothes, house cleaning and weeding, in order to help with the young adults' school expenses, especially when they reached higher education. These young adults were mainly members of the coastal community, which explained the increased access to alternative income generating activities that supported children's education, especially during the expansion stage of the household. For example, the following quote illustrates this dynamic:

“Now that my daughter is about to finish senior high school we will stop receiving Oportunidades. I will ask for a scholarship for my (youngest) son but since its still not enough, I will look for some work at the *ejido* as a cleaning lady, in order to afford my son's expenses. My daughter is aiming to enter undergraduate education with the Pronabes scholarship from the government.” 40 year-old recipient woman, churning poor, coastal community. Life-history interview.

In contrast, the young adults that abandoned school in junior high school or before were almost all from usually poor households (except for two churning young adults), which were based on the inland community. The lack of income affected the schooling of the children, since they did not have their basic needs covered. This was reflected in the fact that these young adults identified the lack of money as a main restriction to their

livelihood mobility (see appendix 6). The analysis showed that Oportunidades helped these young adults with the school expenses, but that the grant was not big enough to cover the school expenses of all the children in the household. These two quotes illustrate this aspect:

“I studied only up to 6th year of primary school. There was no tele-high school in the community and since my parents were poor they did not have money to pay my studies, but I did want to continue studying. None of us [the children] studied junior high. We did have Oportunidades but that did not make any difference.” 22 year-old sponsored young woman, usually poor, inland community. Life-history interview.

“When I finished junior high I decided that I would not continue to study in senior high. I preferred to start working to earn some money. I would have to pay for exams in Cobay [senior high school], 300 pesos every month [23.43 USD]²⁷. The scholarship was not enough. I also needed to pay for copies and computer and cover the expenses in food and transportation [...]. When I decided to drop out my parents tried to convince me but I had already made up my mind because I saw how my parents were doing a big effort and how poor they were, they barely had something to eat. I also thought that since my brother was about to start junior high the expenses would be very high.” 19 year-old sponsored young man, usually poor, inland community. Life-history interview.

This group showed no occupational mobility compared to their parents. To a certain extent they showed horizontal mobility, meaning that the young adults performed the same activities, but with a different intensity. According to the life histories of the parents, this generation intensifies *milpa* and uses the work in the construction industry as a coping strategy in case of need such as an illness or a drought, as explained in chapter 5 ‘Oportunidades and the absorptive capacity’. In the case of the younger generation, the livelihood strategy is the opposite. They intensified their work as builders in the city and when they cannot work because it is the rainy season or because there are no contracts then they diversify with some agricultural work in the *milpa*, usually on their parents land. The analysis shows that this livelihood shift is not due to an increased access to different livelihoods, but to the fact that traditional livelihoods are already less viable for this generation.

As explained in chapter 4 ‘Context, exposure, and livelihood sensitivity in the inland community and coastal community’, fisheries in the coastal community are overexploited and agriculture in the inland community has a low productive potential

27 Estimated figures using an exchange rate of 12.80 Mexican Pesos per US Dollar, February, 2012 (Banxico).

mainly due to bad agricultural practices. In this light, these activities are not sustainable for these young adults. Furthermore, these households have limited access to alternative income generating activities from which adults can diversify their income. Skilled formal work in the city is not an option for these young adults since they do not have the required schooling, therefore, they can only rely on the construction industry in the city and the hammock weaving in the community, just like their parents. The next quotes from a recipient adult and a young adult illustrate this dynamic:

“Nowadays [it] is getting more difficult to work in the *milpa* because the sun is more intense. In the *milpa* you have to sweat a lot if you want to produce something. Before, young people only did *milpa*. Now, young people don’t like the *milpa* anymore. They prefer money also because it is getting hotter. In one week they can get 1000 pesos, so why wait for the *milpa*.” Male, inland community. Age and other categories not provided. Group discussion with peasants.

“It is not the same to do *milpa* compared to study because the sun is very intense. The *milpa* is easier than the construction since the latter requires that you carry heavy stuff but you earn some money since you are not always able to eat from the *milpa* since the production is lost and then that is when you have to go out to work.” 27 year-old non-sponsored young man, usually poor, inland community.

6.2.2 Demographic composition of the household

The life history analysis reflected another process taking place within the households: the demographic composition of the household, and the birth order of the children affected their likelihood of dropping out of school. For instance, the usually poor households had the largest dependency ratio of the sample, and some young adults had up to nine siblings living and sharing the expenses of the household. In contrast, young adults who were full-time higher education students, or who were applying to the university, usually had the smallest household size, with families consisting of not more than four children. The life history analysis showed that for these particularly large households, the transfer was not reducing the opportunity cost of children’s work and all the usually poor young adults engaged in child labour, regardless of their status as Oportunidades children. When first created, Oportunidades focused on ending the cycle of rural poverty, which included low productivity; high fecundity and early school abandonment; and early creation of families with the identical profile (Escobar-Latapi and Gonzalez de la Rocha 2004). For this purpose, it was proposed to improve children’s nutritional levels, increase their years of education and to offer training for families to improve their reproductive behaviour (ibid.).

However, during the expansion stage of the household, usually the first-born children started to work earlier and then drop out from school usually at the junior high school stage when their younger siblings were also starting primary school and therefore the time when the household expenses were starting to increase steadily. Not all children can receive the Oportunidades grant since the rules of the programme restrict the scholarships for up to three children in each household. Young adults usually engage in paid work during weekends or during the holidays. Even so, young adults experienced a feeling of ‘not being useful’, and eventually preferred to work on a full time basis. In contrast, the younger siblings managed to continue studying senior high school and even higher education by drawing on economic provision from older siblings. Moreover, the expansion stage in the household starts to switch towards the dispersion stage and therefore the household is less stressed with expenses.

Nevertheless, even in small-size households economic pressure increase as the level of education also increases towards higher education level. Workload at the school is very high and therefore young adults cannot work in income generating activities as they usually did in senior high school. Moreover, there is only one Pronabes scholarship per family, therefore if the younger siblings want to study higher education they cannot apply for the support. This dynamic reflects a complex process of discrimination shaped by the position of birth in the household, as illustrated by the next quotes:

“I wanted to continue studying but my parents couldn’t support both me and my sister to do a BA plus our little brother doing primary school.” 21 year-old sponsored young woman, churning poor, coastal community. Life-history interview.

“In 2009 my oldest daughter started undergraduate education. She earned the Pronabes scholarship for a BA in Business Administration in the city [...]. When my younger daughter finished senior high school she also wanted to continue studying but we cannot support both of them. Pronabes gives only one scholarship for each family. She [the youngest daughter] started to work at the commissary as a secretary [...]. She sometimes complains that it was bad luck to have been the younger daughter.” 40 year-old recipient woman, churning poor, coastal community. Life-history interview.

6.2.3 Personal motivation and parents’ interest in education

Literature on social mobility highlights the importance of parents’ expenditures on children’s learning and motivation (Becker and Tomes 1986). “Parents not only pass on some of their endowments to children, but they also influence the adult earning of their

children by expenditures on their skills, health, learning, motivation, ‘credentials’, and many other characteristics” (ibid.:5). The life-history analysis shows that young adults that studied higher education recognise their ‘personal motivation to progress in life’ as a main driver of their livelihood transformation (see appendix 6). They want to become ‘someone’ in life, usually by pursuing jobs where they can perform as professionals. Usually these young adults have someone older who gives them advice, acting as a model to follow, thus providing an inspiration for the young adults and helping to boost their motivation. For example:

“I wanted a different livelihood [from selling livestock pigs and poultry]. Not to get too dirty. During the summer break I sometimes went with my sisters who live in Merida. My sister worked as a hair stylist and the other sister as a secretary. They only studied junior high. I always wanted to stay there since I liked where they lived. That also inspired me to work hard to have a better lifestyle than in the community”, 22 year-old sponsored young woman, usually poor, inland community. Life-history interview.

Furthermore, young adults considered their parents’ moral support was a main cause of their mobility. The parents usually understood the importance of education and raised their children with this value. Reviewing the life histories of the parents of these young adults I found that this commitment usually developed from a personal motivation of the parents to study, which had been impeded by exogenous circumstances such as the income poverty of the household or the lack of access to schools.

“Since we were very young they [the parents] were always emphasising that we [the children] should make a big effort. My father did not finish primary school and we saw how hard he had to work to earn little money. This was a motivation to focus more on school.” 21 year-old non-sponsored young man, churning poor, coastal community. Life-history interview.

“We [the parents] gave all of them [to their children] the opportunity to study as much as they wished. We thought that it was important to have knowledge so that no one could lie to them. My husband did not study and for him it was very important that their children were not like him, without knowing how to read and write. This is why we emphasised that they should study, because it would be useful for them.” 50 year-old recipient woman, usually poor, inland community. Life-history interview.

The life history analysis showed that it was mainly the mothers that focused on the education of the children, especially in senior high school and higher education. The bimonthly meetings of Oportunidades aimed to inform the recipient women about the importance of children’s education. Moreover, the fact that the programme emphasises

young girls' education in particular, by giving them higher payments compared to the boys, has helped to increase young women's opportunities. Given this, some gender discrimination dynamics were identified only in non-recipient households. For instance:

“When I finished primary school my mother told me that I couldn't continue studying, because I would now have to help her in the domestic work of the household, since my other sisters were already married. They [the parents] were poor, and they couldn't finance my education in junior high. I started to do the hammock weaving.” 24 year-old non-sponsored young woman, usually poor, inland community. Life-history interview.

6.2.4 Limited access and lack of quality in schools

The life history analysis showed that the limited access to junior high school negatively affected prolonged schooling. The young adults who dropped out of school in junior high school were all based in the inland community, which is exposed to geographical isolation, thus limiting its access to services, markets and social infrastructure. By the time some of the young adults studied junior high school there was only one primary school in the community. Recently the *telesecundaria* or tele-junior high, which delivers teaching through satellite television, was built but before these existed young adults had to go to the main town in the municipality to study. The municipality provided free transportation to the schools but the investment in time implied that the young adults had to stop some of their productive activities in order to attend school. Eventually the school expenses and the lack of income negatively affected the schooling of both recipients and non-recipients.

This geographic isolation was also experienced during senior high school. During this stage, the access to internet and computers is fundamental for the successful performance of young adults. However, the communities did not have access to these tools and young adults had to go to bigger villages that had cyber cafes. This was due to the fact that Oportunidades focuses on the demand-side of human capital investments, leaving the system provision to the local governments and health and education ministries. This limited access to school resources was also identified as a main constraint to the transformation of livelihoods. For instance:

“Having to go outside the community to have access to resources like the internet [is a main constraint to her livelihood mobility]. I have to do my homework in a neighbouring village.” 18 year-old non-sponsored young man, occasionally poor, coastal community. Life-history interview.

Another factor that limited the potential of Oportunidades in increasing young adults' human capital was the lack of quality in schools. When young adults attended school in larger towns, usually they had an education lag since primary and junior high schools in small communities usually had serious deficiencies in infrastructure and teaching quality. For instance, young adults usually complained about the deficiencies of the tele-junior high school:

“The difference with primary school was basically more homework but based on television. [...]. It was a room divided in two since we shared the room with another grade. It was difficult to concentrate since you could hear the TV from the other grade.” 21 year-old sponsored young woman, churning poor, coastal community. Life-history interview.

“I was the third generation in the tele-junior high. The change [from primary school to junior high school] was difficult since the school was in very bad conditions: it had a room made from cardboard where two grades had classes and another room made from mud for the other grade. Since we shared the room with another class it was very difficult to concentrate.” 18 year-old sponsored young man, usually poor, inland community. Life-history interview.

When young adults started senior high school they had serious problems to catch-up with the educational level of the group. The lack of quality in schools has been identified as a serious challenge for Oportunidades' success in increasing the human capital of young adults (cf. Escobar-Latapí and Gonzalez de la Rocha 2004; Gonzalez de la Rocha 2008; Escobar-Latapí 2012; Yaschine 2012).

Moreover, children also experienced ethnic discrimination when they accessed junior and senior high school in bigger towns. Indigenous children from the inland community are also exposed to a large language barrier, since most of them only speak Mayan and classes in bigger towns are only in Spanish. For instance, the next quote illustrates this process:

“There was no tele-junior high school by that time so I had to go to the municipality [...] It was also very difficult because the classes were in Spanish. The teachers in the [inland] community did not know how to speak Spanish so they couldn't help much. I failed the 1st year of junior high and I did not want to try again because it was very hard.” 23 year-old non-sponsored young adult woman, usually poor, inland community. Life-history interview.

“I studied senior high school in the municipality because it was closer therefore it was less transportation costs [than going to another village more far away]. It was a strong change from junior high school to senior high school since we were bullied because we came from a smaller place than the main town of the

municipality, and therefore we knew less than them.” 20 year-old sponsored young woman, churning poor, coastal community. Life-history interview.

“You know that you don’t have the capacity [to study in high school], because everyone is telling you that you cannot do it: your family, friends, and neighbours [...] It is the community that stops young people to continue studying. They always argue that there is no point in studying, and that you are not going to succeed. They say: ‘that who is dog’s head, dog’s head will remain’.” 22 year-old sponsored young woman, usually poor, inland community. Life-history interview.

This shows an on-going process of discrimination that also reinforces the path-dependency of some young adults. The young adults experience shame and sometimes they are victims of bullying from their classmates. If the student does not have special guidance from the teacher, a classmate or from the family, eventually the young adults lose their motivation to continue studying.

6.2.5 Exposure to shocks

In the life history interviews, young respondents declared that sickness and droughts were some of the main constraints to their progression (see appendix 6). If the household is exposed to a shock, such as the illness of a family member or a heavy drought, then the chances of dropping out of school increase. These idiosyncratic and covariant shocks coincide and reinforce the other drivers of vulnerability, as explained in chapter 4 ‘Context, exposure, and livelihood sensitivity in the inland community and coastal community’. The next fragment of a life history illustrates this dynamic:

“I could see the difference with my siblings that received Oportunidades because the grant helped them to finance their education and when I was studying the money was not enough. Even one of my younger brothers that received Oportunidades had to drop out from junior high when my mother got sick because we needed the money to help with the medical expenses. During that time there was no Seguro Popular and the money from Oportunidades was not enough. My father had to go to Merida to bring money to cover the expenses from the illness. Only my two youngest siblings finished junior high because there was already the tele-junior high in the community and also because my mom recovered her health. Also the fact that I was helping my mother, helped my younger sister to continue studying. I was doing hammock weaving on a full time basis.” 24 year-old non-sponsored young woman, usually poor, inland community.

This quote also highlights the importance of protective social protection in the form of the health insurance Seguro Popular. Young adults frequently cited the programme as a source of wellbeing especially during their pregnancy (or their partner’s) and illness.

6.2.6 Lack of jobs

In general terms, young adults aim for livelihoods that are more secure than those of their parents. The aim for a secure salary is equal for both skilled young adults and those who dropped out of junior high school and it is related to the uncertainty that comes with more traditional livelihoods in the communities. For instance:

“One of the things that helps me not to drop out [of higher education] is thinking about the importance of having a secure salary and not a job that is uncertain due to the climate.” 25 year-old sponsored young man, occasionally poor, coastal community. Life-history interview.

“I would like to work in the government since they pay very well due to the social benefits and due to the fact that they have a permanent wage.” 20 year-old sponsored young man, occasionally poor, coastal community. Life-history interview.

“I would like to work as a sales man for Bimbo [processed foods industry] or as a delivering man of Coca Cola since they have a good salary and a formal wage. They treat you well and you have social security.” 18 year-old non-sponsored young man, churning poor, coastal community. Life-history interview.

However, not all the young adults had the same access to these more secure livelihoods. Mexico’s economic development predominantly favours skilled labour, from where the usually poor are generally excluded. Likewise, the communities did not offer major livelihood opportunities, due to their underdeveloped and less dynamic labour markets. For this reason, skilled young adults usually have to abandon their communities and migrate to the capital city or to the Riviera Maya to work in the tourism sector, in order to find secure and formal employment.

Even when migration has been identified as a livelihood change (Macchi et al. 2008), higher educational attainment and higher learning outcomes do not imply improved welfare and higher earnings. Improved welfare is contingent on many other factors, as it is mediated by the “quality of the education received; rates of employment; absorption of skilled labour in the economic structure; and general rates of return to education” (Britto 2008:185), plus the rates of formal and informal labour. For Mexico, these trends have not been promising for several decades.

As explained in chapter 2 ‘Theoretical foundations: review of literature and the social protection-resilience framework’, during the second part of the 20th century, Mexico experienced corporative practices that resulted in the incorporation of an important part

of the society into protected labour-capital relations and the exclusion of the rest of the population from formal employment. Thus, “roughly half of the country was ‘in’ while the other half was ‘out’” (Filgueira, 2005:27). Informal employment has accounted for more than half of the labour force despite positive economic growth over the last decade and a half (Levy 2008). Moreover, the labour market conditions are still incapable of providing social security for the population. Given this, in 2012 more than 71 million people did not have access to any social security. In other words, three of every five Mexicans were excluded from these services. High unemployment rates, informality, and bad labour conditions underpin this issue (CONEVAL 2013).

In this light, the design of Oportunidades did not consider the historical composition of Mexico’s labour market, an aspect that is fundamental to the understanding of intergenerational mobility. The programme only focuses on the demand side of the labour market, overlooking the fact that outcomes in the labour market are the result of the interaction of the choices made by both workers and firms. As explained in the introduction of this thesis, Oportunidades was designed originally with the idea that it would be complemented by other programmes that would use the same targeting mechanisms to plan and direct their actions in the same locations (Rodríguez and Pasillas 2008). However, there has not been an integrated scheme to tackle the different structural causes of poverty and vulnerability. From this perspective, Oportunidades is hardly going to help poor workers to move away from their structurally disadvantaged positions. Despite increased years of school for future cohorts of poor workers associated with Oportunidades, due to labour market structure, firms are unlikely to offer formal and secure jobs to poor workers. The next quotes illustrate this idea:

“There is no way I could develop myself [working in the coastal community]. There are no opportunities to grow even if you have studies. This is why now I am not motivated to study a BA, since there are no job opportunities. None of my cousins are working on the subject they studied, so why study if you are not going to practice your professional career? The labour supply is very bad and you get de-motivated. You are not going to get anything.” 21 year-old non-sponsored young man, churning poor, coastal community. Life-history interview.

Furthermore, the theory of change that underpins Oportunidades’ design presents a trade-off between the absorptive and adaptive capacity. As seen in section 6.1, households diversify their livelihoods with traditional livelihoods that encompass a variety of risk-spreading strategies to cope with climate shocks. Oportunidades

emphasises young adults' poverty reduction through access to formal and skilled work in urban areas. This has reinforced the current crisis of the traditional value of the *milpa*. For instance, in the inland community the lack of knowledge of traditional livelihoods, has been identified as a disadvantage, since young adults found themselves more dependent upon, and vulnerable to, external food production:

“Going to school was very helpful but I would have liked to learn to work the land too, to have a good harvest. It is like having a reserve. The secret is not to depend on only one thing. It is important to produce your own food because you can save money and have food for you and the livestock. You become self-sufficient. It is a matter of organising yourself in order to have the two things.” 18 year-old sponsored young man, occasionally poor, inland community. Life-history interview.

“Young people do not work on the land because they think the land doesn't give them money. But in fact they don't think about the fact that the money only lasts for one week while, for instance, 20 *mecates* of maize [400 metres] gives them enough food for one year.” 82 year-old man key informant, inland community.

Furthermore, if the cities have a limited capacity to absorb the educated rural workforce, and the communities have almost no opportunities for this workforce, then these traditional livelihood activities at least represented a source of resilience that will be lost. Rosales (2012) shows that in 2009 work supply in the tourist area of the Riviera Maya decreased and the young adults returned to their hometowns to do *milpa* after not finding jobs. In a context of climate change, livelihood innovation facilitated by social protection must provide a means to facilitate contexts to take up or create different livelihood options, rather than reducing the options for young adults through pathways that undermine their traditional livelihood strategies.

6.3 Livelihood diversification/progression and adaptive capacity

Adaptive capacity is the ability to adapt to the effects of a shock or a change. Livelihood diversification in different income generating strategies increases adaptive capacity in the sense that households are able to spread risk and adjust their livelihood strategies in the face of climate variability. Data in this chapter has showed that livelihood diversification takes place in the communities as part of their normal livelihood strategies and not exclusively to adapt to climate variability or uncertainty. Even so, Chapter 5 ‘Oportunidades and the absorptive capacity’ showed that households diversified their livelihoods as one strategy to deal with perceived climate variability and also to cope with the 2012 drought. Livelihood diversification portfolios vary

according to the type of shock, access to endowments and asset entitlements, poverty category and type of community.

Households developed temporal livelihood diversification by intensifying one or two economic activities and not by developing new livelihood options, creating a range of different livelihood diversification strategies. In particular, in the inland community poor households that diversify their livelihoods in order to deal with the erratic rainfalls and the changes at the start and end of the seasons, go more frequently to the city of Merida or Cancun to work in the construction industry. The ethnographic data showed that it is usually the male young adults and their fathers that develop this activity. Meanwhile in the community the rest of the family members -women and children- intensify the work in the hammock weaving. As it was explained in chapter 4 'Context, exposure, and livelihood sensitivity in the inland community and coastal community' this activity is of high importance since it represents a secure source of income. This livelihood diversification strategy was also developed to cope with the 2012 drought. Other households, usually better off households, also intensified temporary migration to the city to cope with perceived climate variability, but their diversification strategies include more secure livelihoods such as small business.

In the coastal community 41% of the households diversified their livelihoods as a strategy to deal with perceived climate variability. The ethnographic data showed that this diversification was mainly in off-farm activities such as working in tourism activities, growing coconut seedlings or casual work in the *ejido* as electricians, plumbers or masons. Few households practiced temporary migration. The majority of extreme poor households intensified fishing activity and tried to diversify it with off-farm casual work. In the focus groups discussions, households highlighted the importance of developing different livelihood options that 'are not affected by the weather' in order to deal with climate variability. They also argued that they encountered several restrictions to develop these activities. Participants also said that they were highly dependent to tourism-related activities, and that these were highly affected by the weather.

Livelihood diversification is a means to improve households' ability to adapt to stressful circumstances and improve their quality of life (Ellis 1998). This latter characteristic is of utmost importance to adaptation since it will warranty that households not only are

not creating maladaptation strategies, but they are also creating buffers for future climate shocks. Given this, households need to transition into stronger and more productive livelihoods. Nonetheless, diversification can lead to the atomisation of livelihoods into small activities with very low productivity. This has reduced the current adaptation deficit of the poor, but might be insufficient in the face of future climate change (see table 6.5).

Another important characteristic of adaptation is the capacity to innovate and take on new opportunities arising from climate change. The analysis presented in this chapter showed how certain households innovated their livelihoods, leading to increased productivity. Whilst these strategies were not explicitly developed to adapt to climate shocks, these strategies reduce households' adaptation deficit.

Even so, the fact that only non-poor households were able to develop innovation shows that there are severe restrictions to the adaptive capacity of households. Non-poor households usually have the resources that are necessary to adapt their livelihood strategies in the face of diverse stress sources, including climate change, and improving their quality of life. In contrast, poor households usually rely on small scale and low productivity strategies, without necessarily improving their wellbeing.

This chapter has also showed that young adults with increased productivity due to human capital investments aimed at accessing more secure and robust livelihood strategies and that are less vulnerable to climate shocks. Section 6.2 showed that some of these young adults managed to progress their livelihoods into non-climate sensitive income generating activities, potentially increasing their adaptive capacity to future climate shocks. Whilst this analysis lack data on the relation between these livelihoods and specific climate shocks, it is fair to imply that these livelihoods will provide them with increased adaptive capacity. Even so, future research should focus on the importance of these livelihood strategies in increasing resilience to climate shocks.

Table 6.5 Types of livelihood diversification strategies in the inland and coastal communities

Diversification strategy	Community	Type of shock	Impact on adaptive capacity
Mixes temporary migration to the city to work in the construction industry with hammock weaving	Inland community	Climate variability Drought	Spreads risk Low productivity Provides secure source of income Emotionally challenging Short-term solution Limited impact on future wellbeing
Mixes small-business with temporary migration to the city to work in the construction industry	Inland community	Climate variability Drought	Spreads risk Provides secure source of income Emotionally challenging Requires some initial capital Moderate impact on future wellbeing
Mixes intensification of fishing with casual off-farm activities	Coastal community	Climate variability	Spreads risk Seasonal and unstable strategy Requires networks with <i>ejidatarios</i> Short-term solution Limited impact on future wellbeing
Mixes intensification of touristic activities with casual off-farm activities	Coastal community	Climate variability	Spreads risk Seasonal and unstable strategy Requires networks with <i>ejidatarios</i> Short-term solution Limited impact on future wellbeing

Source: Author

6.4 Discussion and conclusion

The data presented above aimed to help provide a way to understand the linkages between promotive social protection and the adaptive capacity of households.

Specifically, the analysis presented in this chapter relates to the sub-question: How does Oportunidades affect the adaptive capacity of poor households?

In terms of the long-term impacts, the size of the transfers of Oportunidades is not large enough to support major productive investments. Households diversify and innovate their livelihoods, but the long-term exposure to Oportunidades is not crucial for this innovation. The churning poor and occasionally poor households that invested in non-climate sensitive activities, mainly used their income from farm labour, remittances, and local promotive transfers to invest in small business. Few chronic poor households

managed to invest the transfer in a productive activity in synergy with other formal and informal transfers to add to the income from farm work. These investments were very small in scale and productivity; however, they were sources of absorptive capacity rather than of adaptive capacity.

At the intergenerational scale, the data presented above showed that Oportunidades helped young adults to increase their schooling years, when compared to their parents. These investments in human capital translated into higher skills and capabilities. However, the data also showed that there were different drivers or constraints that shaped the impact of Oportunidades, creating different livelihood pathways for young adults. In other words, social protection can increase livelihood progression only when young adults have: the networks; economic assets; moral support; guidance; quality of education; and access to markets. Access to these aspects can help them undertake locally appropriate activities that increase resilience and reduce vulnerability to a range of factors including climate change. Social protection needs to engage with other complementarity interventions -such as the provision of services of quality and social infrastructure- as well as fiscal and labour reforms that aim to reduce discrimination in the labour market, if it is serious in its aims of increasing the future agency of all vulnerable young recipient adults.

The results also show how power relations and structural inequalities in different geographical scales, lead to different adaptation outcomes. At the local scale the high power-resource position of some of the households allow them to access different endowments that underpin the adaptive capacity of households. For instance, households with *ejidal* land rights in both communities have a broader range of livelihood strategies, compared to the rest of the community members. These households also have a discretionary use of certain key resources of the socio-ecological system, usually excluding non-*ejidatarios*. Moreover, households with high power-resource position also have access to diverse social networks, such as political institutions and contacts in the city and abroad, giving them access to certain assets and livelihoods. These factors underpin the type of livelihood diversification developed by households.

At the regional scale, the labour market dynamics have hindered the rural poor by favouring skilled and urban labour, creating almost no opportunities of employment for

the rural poor both in and outside the communities. Moreover, poor macroeconomic performance has resulted in high unemployment rates, informality, and bad labour conditions. Given this, people in the communities have to migrate to access informal and low skilled jobs in the cities, which most of the time does not represent significant improved welfare. Not only do these dynamics affect the potential impact of Oportunidades in the adaptive capacity of households, but also social protection has not helped to challenge or reconfigure these power dynamics.

This chapter concludes the presentation of the empirical section of the thesis. Chapter 4 presented the contextual background of the research by describing the social-ecological system in each community. Chapter 5 explored the linkage between protective and preventive social protection and the absorptive capacity of households. This chapter analysed the relation between promotive social protection and the adaptive capacity of households. The following chapter will conclude the thesis by summarising the main findings, as well as by presenting the main contributions of the thesis.

Chapter 7 Discussion and general conclusions

I have argued throughout this thesis that social protection interacts with the resilience to climate change and variability of poor rural households. In doing so I have focused on the linkages between social protection and the absorptive and adaptive capacities of households. I have done so in order to answer the research question of how Oportunidades interacts with resilience to climate change and variability of poor households. I answered this question by developing and applying the resilience- social protection analytical framework, where I make the case that protective and preventive social protection are linked to the absorptive capacity of households, because of the way they support self-organisation and anticipatory behaviour in the short-term. I have also argued that promotive social protection interacts with the adaptive capacity of the households in the long-term -and in the intergenerational term- by supporting innovation and livelihood diversification.

In this chapter I firstly present a summary of the empirical evidence based on the theoretical propositions that have guided the thesis. I then analyse the main theoretical implications that draw from the resilience-social analytical framework. I also discuss some policy implications in terms of Oportunidades and the resilience of households. Lastly, I present some future research ideas that derive from this thesis.

7.1 Summary of findings

This section presents the main empirical findings based on the two theoretical propositions developed for the social protection-resilience analytical framework. Each of these theoretical propositions aimed to guide the data collection and the analysis. Likewise, these theoretical propositions are related to the two sub-questions of the research: 1) how does Oportunidades affect the absorptive capacity of poor households?; and 2) how does Oportunidades affect the adaptive capacity of poor households? The first research sub-question aimed to explore the linkage between Oportunidades and the absorptive capacity of households, and the latter the linkage between Oportunidades and the adaptive capacity of households.

7.1.1 How does Oportunidades affect the absorptive capacity of poor households?

The purpose of this research sub-question was to analyse the link between protective and preventive social protection with the absorptive capacity of households. The rationale that underpins this linkage is that the protective feature of Oportunidades helps recipient households to cope with, and recover from, climate shocks by reducing their vulnerability. It also hypothesises that the preventive features of the programme will help poor households to plan and anticipate climate risk.

The empirical findings showed that Oportunidades helped households to protect their assets during and after being exposed to climate shocks. The data also showed that the programme smoothed households' consumption during Hurricane Isidore in 2002 and the drought in 2012. The role of Oportunidades varied with the type of shock and community, but mainly it supported consumption smoothing strategies, by protecting short-term consumption. Indirectly it also protected economic assets by avoiding further impoverishment of households.

Life trajectories showed that the majority of households in both communities have the capacity to prepare for future shocks. This behaviour developed through a learning process, but it was also an acquired capacity inherited from their families that they would prepare for future shocks. Oportunidades worked as a preventive driver that was used to stabilise recipients' consumption, and indirectly helped households to redirect some of their farm income to save 'for the bad times'. The programme provided a basic security, or a 'floor', that supported households' autonomous strategies to plan for the future and anticipate risk. The predictability of the cash transfer and the regularity of the payment are what makes Oportunidades a main source of resilience in the short-term. Even when the impact is indirect, preventive social protection is fundamental to allow stability in the face of uncertainty, especially for the chronic poor.

Nonetheless, the protective and preventive features of social protection are not sufficient to enhance household's absorptive capacity. Oportunidades cannot address the restrictions and limitations that underpin asset endowments and entitlements in the social-ecological system, which are necessary for households' absorptive capacity. Land property rights, along with access to markets and services, are fundamental for

absorptive capacity. Social protection cannot substitute for these functions, but even if some of the factors just mentioned, such as land ownership, were dealt with they would still not be enough to guarantee the protective and preventive role of a robust and predictable safety net, such as Oportunidades.

7.1.2 How does Oportunidades affect the adaptive capacity of poor households?

The purpose of this research question was to analyse the relation between social protection and the adaptive capacity of households. The analysis was developed in two resilience timescales: over the long-term and in the intergenerational term.

The thesis explored the relation between promotive social protection and adaptive capacity in the form of livelihood diversification and innovation. The empirical findings show that the regularity of the cash transfers does help households to invest in livelihood innovation in the long-term, but mainly indirectly by stabilising households' consumption. The analysis also showed that Oportunidades supports adaptation at this long-time scale, but only through the interaction with other sources of resilience. The empirical findings indicate that this impact is differentiated between different poverty profiles. For instance, the churning poor and occasionally poor households invested in productive activities that helped them not only to diversify their livelihoods, but also to have a more secure livelihood strategy. Livelihood innovation takes place, mainly with the support of farm work, promotive transfers from local government, and remittances. In these households, Oportunidades is used to stabilise the consumption of the household. Through their power-resource position they had access to remittances and large promotive transfers.

For the chronic poor, the transfer was invested in productive activities only in very few cases. These households do not have the necessary resilience sources for these investments in the form of financial resources since they first need to secure their current needs. In times of stability, when households manage to accumulate assets, innovation can develop incrementally and in synergy with other drivers such as farm work; off-farm work; large promotive transfers of the government such as the *Fomento Agropecuario* programme; and informal social protection in the form of remittances. These transfers are invested in small businesses that help households to diversify their

livelihoods, cope with daily expenses and not to lag behind, but, nevertheless, livelihoods are not transformed. These empirical findings highlight the importance of the preventive, more than the promotive feature of Oportunidades, for the adaptive capacity of households.

The thesis also analysed the link between promotion and innovation, but over an intergenerational time scale. It explored the different processes and dynamics that allowed (or restricted) the progression into less climate-sensitive livelihoods of young adults, and the role of social protection in those dynamics. Drivers such as the poverty trajectory of the household; its demographic composition; the (lack of) personal interest and motivation of the young adults and their parents; the lack of access and quality in schools; the exposure to non-climatic shocks of young adults and the lack of jobs in the labour market; all shaped the potential way Oportunidades affected the adaptive capacity of young adults. In this light, the programme did increase the human capital of young adults but it needs to engage with other interventions- such as the provision of services of quality, and fiscal and labour reforms to reduce the discrimination in the labour market- if it aims to increase the livelihood innovation of young recipient adults.

7.2 Main theoretical implications of the thesis

In terms of the main research question of this thesis, namely, how Oportunidades interacts with the resilience to climate change and variability of poor rural households, the empirical results reveal how and why that these impacts are limited. The role of the programme is mainly preventive, by increasing self-insurance mechanisms and the anticipation of risk behaviour. Whilst this was a key feature for resilience as absorptive capacity, the findings also show that the role of complementary programmes, services and other sources of income was fundamental. Furthermore, there was a differentiated impact between the different poverty categories. The empirical findings also show that certain aspects of Oportunidades' theory of change, and consequently of its design, explicitly reduced its impacts on resilience such as the exclusive focus on poverty reduction in the intergenerational scale through the human capital investments because it excluded the long-term income poverty reduction of the adult recipients. In this section, I will present some theoretical reflections that draw from these findings.

7.2.1 Dynamic system: integrating the different scales in resilience

In this thesis I addressed resilience as a dynamic system integrated by two main capacities: the absorptive and adaptive capacities; and by three different timescales: the short-term, long-term and intergenerational scale. The results showed that Oportunidades had a stronger effect in the absorptive capacity and in the short-term scale, mainly through the protective and preventive features. The thesis also showed that preventive and promotive social protection measures had a strong relationship. As established by Sabates-Wheeler and Devereux (2008), most preventive interventions have promotive effects “in the sense that risk reduction enables people to take advantage of opportunities that they would otherwise not have been unable to do” (ibid: 72). This synergy is most relevant for adaptive capacity, in the sense that it supports innovation.

Given this, a predictable minimum income provided by preventive social protection helps poor households to achieve a level of basic security. Over time this provides households with the necessary stability to incrementally adjust their livelihoods through innovation. This shows how adaptive capacity requires robust preventive social protection that can be used in the short-term to cope with shocks and, in times of prosperity, can be accumulated in synergy with other formal and informal transfers. Other promotive transfers in the form of productive projects are very relevant for innovation, but if they are implemented on their own, the preventive element of social protection could be lost, thus affecting households’ absorptive capacity. These promotive programmes sacrifice stability for change, when stability is crucial for this adaptive stage in the face of climate change.

The empirical results also show how adaptive capacity will be enhanced mainly within the timescale upon which the social protection intervention focuses its theory of change. In the case of Oportunidades, the theory of change is focused on the intergenerational timescale, where it expects to break the intergenerational transmission of poverty through the human capital investments of the younger generation. This means that since the poverty reduction of the current generation of adults is not a priority of Oportunidades, these adults will experience a limitation in their long-term adaptive capacity.

Addressing resilience as a system also showed how Oportunidades presents a trade-off between different components of resilience. Households diversify their livelihoods with traditional activities that encompass a variety of risk-spreading strategies to cope with climate shocks. These traditional strategies provide a source of resilience as absorptive capacity. However, Oportunidades emphasises young adults' poverty reduction by concentrating on their access to formal and skilled work in urban areas. This design increases their adaptive capacity, but also undermines more traditional livelihoods, which were found to increase the absorptive capacity of households. This can be generalised to all social protection programmes that have promotive objectives, in terms of their trade-offs between an effective, comprehensive and permanent safety net versus investing in livelihoods and entrepreneurship for poverty reduction and economic growth.

The idea of 'less climate-sensitive livelihoods' found in the literature (cf. Cooper 1997; Sabates-Wheeler, Mitchell and Ellis 2008; Cipryk 2009; Davies et al., 2009; Wiseman Van Domelen and Coll-Black 2009; Johnson et al. 2013) as a proxy for resilience reinforces this idea by highlighting that the path out of poverty and vulnerability is found outside traditional livelihood systems. Even so, this perspective fails to explain why these livelihood systems are vulnerable to climate change in the first place. This narrative negatively affects the most deprived members in the society, such as the indigenous groups, since they depend on traditional livelihood systems that are considered 'climate-sensitive'. In this thesis the evidence also shows how these traditional systems provide sources of resilience to the households. The empirical results also showed that young generations sought livelihoods that were diverse, and not exclusively connected with urban labour.

In a context of climate change, resilience facilitated by social protection must be a means to facilitating contexts in which it is possible to take up or create different livelihood options by increasing people's agency, rather than by reducing their options through undermining traditional livelihood strategies. In the words of Eriksen (2013:371): "strengthening people's ability to choose and achieve their aspirations entails empowering individuals and communities to make decisions about their own adaptation outcomes". Given this, conventional forms of social protection require a

more systemic approach, in order to increase both the absorptive and adaptive capacities.

7.2.2 Resilience to climate change and social protection: a common agenda?

One important theoretical implication of this thesis is that the evidence does not sustain the assumption that vulnerability reduction and resilience to climate change and variability are complementary concepts. In chapter 2 ‘Theoretical foundations: review of literature and the social protection-resilience framework’, I argued that by means of the vulnerability reduction outcomes of social protection (through its protective, preventive and promotive features), the capacities of resilience (absorptive and adaptive capacities) would be increased. Even so, the empirical findings and the analysis developed in this thesis have shown that vulnerability reduction through social protection is not enough to build resilience to climate change. To a certain extent this is the case because the two literatures have different motivations, as it will be explained below. Furthermore, these findings also confirm that whilst resilience and vulnerability are complementary approaches, they also have fundamental differences, such as their analytical focus (Cannon and Muller-Mann 2010; Miller et al. 2010).

Social protection comes from a development and welfare economics tradition, where poverty reduction is framed as an outcome of increased access to formal urban labour in a market and service economy. The approach that underpins this rationale is that through the implementation of structural adjustment programmes and the policies of the Washington Consensus, rural poverty reduction would be achieved through rural-urban migration combined with these transfer programmes (Rodrik 2006). Social protection is ‘commodified’, and the poor have to rely on the market in order to progress and be more productive. Its focus is based on the local scale, where the maximization of households’ assets in relation to its vulnerability context and the institutional structures is sought (Ellis 2000).

In contrast, climate change is presented as a global crisis and hence, the literature focuses mainly on the national and supranational scales, and its different feedback loops (Adger, Arnell and Tompkins 2005; Burton 2008; Osbahr et al. 2008; Ostrom 2009). It is framed as a global cross-cutting problem, which requires an international institutional architecture in order to limit the atmospheric green gas concentrations to the levels that

will avoid dangerous climatic change, as well as to adjust human and natural systems to climate stimuli (Tanner and Allouche 2011). This approach also contests the dominant model of capitalist development (*ibid.*), which is criticised for its implications with regard to sustainable development, since it is centred on the idea of economic growth based on fossil-fuel intensive systems that negatively affect ecosystems, which have led to the current climate crisis (Moore 2001; Lemos et al. 2007; UNDP 2008; Eriksen and Brown 2011; IPCC 2012; 2014).

Given this, conventional forms of social protection such as Oportunidades do not frame vulnerability as part of the wider and global process that underpin climate change. They are ‘business-as-usual’ development programmes that implicitly accept the development paradigm. This paradigm has been criticised for its potential impacts on ecosystems and to sustainable development, by maintaining that the pathway to poverty reduction is exclusively through urban labour in a market and service economy, based on fossil-fuel intensive systems. In other words, social protection’s paradigm supports maladaptation in the form of ‘increasing emissions of greenhouse gases’ (Barnett and O’Neill 2010). These are actions that address needs in the short-term, but that also create a positive feedback by increasing emissions of greenhouse gases, hence increasing the chance of further adaptation needs in the long-term. The different approaches in both literatures have other implications such as the unit of analysis and the time perception, as addressed by Sabates-Wheeler, Mitchell and Ellis (2008):

“There is a clear contradiction for chronically poor households who need to weigh up the outcomes of withholding ‘consumption’ today and death tomorrow with consumption today and life tomorrow. This brings us back to the classic Hardin’s dilemma and tragedy. The point for us must therefore be to find synergies between maximising productivity of livelihoods at the same time as maximising the ecological sustainability of the community” (*ibid.*:55).

This argument also highlights how social protection draws from a linear perspective, where multiple individuals, with actions based on their self-interest aim to maximize their asset profiles and livelihoods in the short-term, depleting the shared natural assets of the communities in the long-term, without any consideration of the feedbacks to the environment.

Given this, the dilemma for social protection is how to shift into a more systemic approach where such programmes can include the different spatial scales and timescales and their associated feedbacks. Such schemes need to do this in a way that people are protected from risk, where they can increase their productivity, and at the same time protect the ecological sustainability of their communities.

Climate change scenarios in the region are projecting mean annual temperature changes of 2°C in the mid-21st-century period, and 4°C in the late-21st-century period (Romero-Lankao et al. 2014) (see appendix 1). In this light, it is important to understand the potential role of social protection in relation to these projected climate changes.

According to the IPCC Fifth Assessment Report (AR5) chapter 13 ‘Livelihoods and Poverty’, climate change will lead to an increase in poverty, exacerbate inequalities and create new vulnerabilities. Furthermore, by the end of the century it will create new poor people and will jeopardise sustainable development (Olsson et al. 2014). Given this, the preventive role of social protection becomes essential to provide resilience to such impacts.

At the very least, poor households will require a robust safety net that provides them with basic security and a capacity to recover and self-organise rapidly enough after a climate shock. This thesis has shown how social protection helps to increase relief and recovery from the impacts of hurricanes or drought, and this is of utmost importance in a context of climate uncertainty. Households will also require support to anticipate risks. The thesis has also showed that social protection can increase this behaviour if it is delivered in a predictable and regular way. However, this capacity emerges from different adaptation strategies developed autonomously by households. Therefore, it cannot be expected that business-as-usual social protection approaches will trigger this anticipation of risk behaviour on their own. The design of social protection should consider mechanisms that explicitly enhance households’ ability to anticipate risk. Advise on savings and use of financial services, training in planning and long-term thinking, should accompany these mechanisms if governments and donors aim to use them to increase resilience to long-term climate change. This means that social protection should avoid using conditionalities relating to the behaviour of the households, and that it should be as flexible as possible in order to let household adjust their livelihoods and hence develop their own autonomous adaptation strategies.

The fact that the results of this thesis show that social protection has limited impacts on the adaptive capacity of households is very relevant for long-term climate change scenarios. For instance, it should not be expected that households will develop strong and secure livelihoods in order to adapt to climate change as a consequence of productivity enhancing safety nets. Adaptive capacity is dependent on other factors over which social protection has very little influence. Enhancing productivity depends on the performance of macroeconomic activity, the success of developing a dynamic labour market, and the provision of different labour opportunities for poor households – and all of these lie outside the realm of social protection. The structural causes of vulnerability and poverty should be addressed, such as regional isolation and exclusion; discrimination in the labour market and also in the delivery and quality of services. All of the latter aspects require transformative mechanisms that are not part of the aims of conventional social protection schemes. However, the preventive role of social protection is fundamental in order to provide the necessary stability in the household that then allows other factors to play an effective role in the potential adjustment of livelihoods. Those other factors to help adaption to climate change include: structural reforms, transformative activities, and explicit climate change mechanisms. This reinforces the idea of the importance of a universal and unconditional safety net for all vulnerable households, within a holistic development strategy that is resilient in relation to climate change effects.

7.2.3 The role of power

The social protection-resilience analytical framework drew from a normative assumption where resilience was framed as ‘specific’ pro-poor resilience to climate change, where resilience increases the wellbeing of the poor. However, this approach mainly focuses on the material dimensions of poverty and wellbeing such as raising incomes, but not on its social dimensions.

Oportunidades does not challenge the socio-economic structures that reproduce economic inequality and have a direct relation to ethnic discrimination. As shown from the empirical results, the indigenous people and the chronic poor households have an accumulation of disadvantages that lead them to the path dependent trajectory of discrimination and increased poverty. In this light, several studies that have assessed Oportunidades’ impact on indigenous people show that the one-size-fits-all programme

design plus the failure to tackle the diverse structural conditions that underpin their social exclusion have contributed to the perpetuation of disadvantage for the indigenous people (cf. Yaschine 1999; Quiñones 2006; Arroyo et al. 2008; González de la Rocha 2008; Rodríguez-Oreggia 2010; Ulrichs and Roelen 2012).

In Yucatan, the Mayas are exposed to harsh discrimination that has led to their exclusion from the diverse institutional arrangements. For instance, the top-down model of education is disjointed from the local traditions and needs. Oportunidades reproduces this model through the imposition of specific conditionalities with regard to behaviours that hinder traditional practices and knowledge. This has led to a crisis of the traditional system within the communities. This crisis contributes to unsustainable practices and weakens collective resilience.

Structural inequalities are present at different geographical scales. For instance, the rural-urban division has affected labour market dynamics. This has hindered work possibilities for the rural poor, in particular the indigenous communities, and has created almost no opportunities for employment inside or outside the communities. The tourism industry has focused exclusively on hotspot tourism development. This has not led to any spill-over effects into the rural communities, thus increasing regional inequality. Migration has provided the only alternative livelihood for young adults, but it is not sustainable in the long term if the labour market is constrained and the economic activity is limited. Unequal access to different livelihood options; limited provision of services; limited access to roads and markets; and poor distribution of public resources underpin the regional dynamics in Yucatan.

These political dimensions that underlie vulnerability and poverty should be considered in order to maximise the potential impacts of social protection so as to contribute to the resilience of households, but also to reduce vulnerability and poverty. However, in certain contexts social protection has not only not helped to challenge these power dynamics but it has contributed to reproducing them. Given this, authoritarian practices of the PRI party's dictatorship of the electoral system are still present in rural areas, where there is a lack of democratic tradition. Oportunidades reproduces, at the local level, state-peasant relationships under the culture of authoritarian corporatism and political proselytism, where social policies have been used as concessions to negotiate power with the masses (Hevia de la Jara 2008). The use of the *fajina* by some of the

vocales highlights how Oportunidades still reproduces some of these traditional power dynamics.

The programme draws from a top-down approach and it was implemented in a context of structural adjustment reforms that ‘individualised’ the ejido, diminishing communities’ collective organisation and their autonomy. The consequence for resilience has been that the programme will support a resilience agenda based on the status-quo. It can support livelihood transition, as it emphasises the promotion of livelihoods, but it does not support social change. Social protection should challenge or help to rearrange these power dynamics. Failure to consider the different power structures and political dimensions that underpin local adaptation can lead to an exacerbation of people’s vulnerability (Eriksen and Lind 2009). In its original conceptualisation, the transformative social protection framework considers the synergies of social protection with other interventions in order “to contribute to economic growth and productivity as well as to social equity, either through achieving both objectives simultaneously or through linkages with other interventions” (Sabates-Wheeler and Devereux 2007:26). These interventions can be in the form of services, regulations and resources (ibid.).

If resilience requires the enhancement of transformational capacities, social protection has the potential to support these capacities, but only in synergy with other transformative interventions that change some of the institutional and power constraints faced by recipients. For example, far reaching fiscal and labour reforms that warrant equality and non-discrimination can support transformational capacities of young adults. Access to land with secure property rights will increase the entitlements of households to key resources that are necessary to adapt to climate change. Likewise, extended roads, transportation and connections to the city and to markets are fundamental to break the geographical isolation and social exclusion of the communities. However, this does not resolve the issue around the individualisation of the rural sector, which undermines community organisation and autonomy, as well as other political obstacles. A stand-alone social protection intervention like Oportunidades cannot increase resilience and reduce all the social causes of vulnerability. Wider development strategies that consider the synergies between different interventions should consider ways of tackling social exclusion, inequality and

the redistribution of power. This will maximise the potential ‘pro-poor’ impact of social protection in resilience.

7.3 Moving towards a universal safety net in a systemic social protection strategy

The analysis presented in this thesis showed some concerns in terms of the one-size-fits-all design of Oportunidades that might be limiting the resilience of households. If it is to be effective in responding to shocks, social protection should be flexible enough to be adapted to different needs, and to be able to expand its coverage to all the people in need (Bastagli 2014). Nonetheless, the fact that Oportunidades is a cash transfer programme conditional on the behaviour of the recipients has restricted its expansion, excluding some of the most affected communities in the country. Given this, it has been argued that Oportunidades is not flexible enough to quickly protect affected households who may not be eligible for the programme. This is the case, since its main objective is to build capacities at the intergenerational scale, and not to deal with transitory income shocks (IEG 2012; CONEVAL 2013).

Additionally, targeted communities require public services, such as health clinics and schools, upon which transfers are conditioned (SEDESOL 2011). This excludes from the programme coverage all the communities without these public services, which are typically among the most socially deprived and excluded communities in the country. Such was the case during the unprecedented drought in 2012, which had a very strong impact on the indigenous communities in the north of the country. Whilst they had very high rates of chronic poverty, these communities were excluded from receiving relief support during and after the drought through Oportunidades, because they did not even have the appropriate social infrastructure upon which conditionalities could be levied. Therefore, the poorest members of the society are doubly excluded and marginalised: they lack access to basic social services, and they are penalised by not getting access to social protection because they have no social services. Furthermore, the data presented in this thesis shows that the emphasis of the programme on intergenerational poverty reduction, and not on current generation poverty reduction, has limited the promotive feature of the programme. For instance, the conditionalities and the *fajinas* represent an opportunity cost in terms of women’s allocation of time into income generating activities. The restrictions on savings in effect limit the absorptive capacity that

households have been developing autonomously in the form of anticipation of risk behaviour. Likewise, the periodic means testing has encouraged graduation avoidance behaviour, restricting households' livelihood progression and innovation.

The empirical results also show the different uses and impacts of Oportunidades on the resilience of the household, depending on their poverty profile. For instance, the transfers work as a social insurance mechanism, through their preventive features. The categories of churning poor and occasionally poor were able to save the transfer money, and the chronic poor were able to borrow through *fiado* mechanisms, due to the predictability and regularity of the payments. For the churning and occasionally poor the transfer indirectly helped to increase innovation, by consolidating short-term consumption. In few cases chronic poor households used the transfer to invest it in productive activities in synergy with other transfers, but these investments were very small in both scale and productivity, and only increased their absorptive capacity. Moreover, the vulnerable near-poor households run the risk of slipping into poverty after a climate shock (de Janvry, Sadoulet and Vakis 2010). Differentiated policies could help to maximize the impact of the policies in each category.

Oportunidades could transition to a basic safety net in order to address risk in a systematic way among all poor households, regardless of their access to social infrastructure. This would help to increase the absorptive capacity of those households that are exposed to idiosyncratic shocks. Oportunidades should be flexible about recipients' use of the transfer in order not to obstruct the autonomous adaptation strategies that households might be developing, and it should facilitate the participation of those most affected by climate shocks. It would thus be sensitive to the different needs of households. This includes the removal of the limitation on the transfers' savings and a softening of the households' mid-term means testing. This would also reduce the graduation avoidance behaviour.

The results show how different social protection interventions interact with synergy, increasing their impact on resilience. Households have other resilience sources such as remittances or income from farm work that are also used in synergy with these interventions. However, these are usually uncoordinated actions with duplicated efforts so that their effects are not being maximized. A systemic social protection strategy would consider, first, all poverty reduction (promotive measures); second, risk reduction

(preventive measures); and third, insurance mechanisms (protective measures); within a general common frame with the different institutions working together. If Oportunidades focuses on the intergenerational dimensions, other interventions should focus on the short-term and long-term scales. This systemic view also recognises that one social protection intervention cannot achieve everything on its own. Each type of intervention needs to act in coordination with other such actions at different scales in order to reduce vulnerability and poverty, and increase resilience.

In this light, increasing awareness of climate change should be highlighted in order to increase vulnerability reduction efforts and avoid potential maladaptive outcomes. This would mean that social protection would not create feedbacks that increase vulnerability on other scales -such as pollution and environmental degradation in the socio-ecological systems- as was found in the empirical results. Coordinated synergies with disaster risk management, climate-proofing projects, and other more radical policy and technological approaches would be necessary if unprecedented levels of climate change are reached (McGray et al. 2007).

Having a social protection system in place would guarantee that the promotive aim of social protection is not lost, while, at the same time, it would ensure that households hold a basic and universal safety net –thus helping them to manage risk and supporting them as active agents in creating resilience. Local ministries of education and health should provide the social infrastructure to guarantee access to schools and clinics, even in remote communities. If the country were to move through a transition towards universal coverage of these services, conditionalities based on the utilisation of services could be calibrated according to the availability of services of good quality. They could also be softened as with *Bolsa Família* in Brazil, where the monitoring of conditionalities is mild, and when conditionalities are not met, the grant is not cut off but social services are called in to support the family (Hanlon, Barrientos and Hulme 2010).

Conditionalities could also be eliminated altogether. Instead, a universal basic safety net recognised as a constitutional social right could be established for all poor and vulnerable households in Mexico, while simultaneously a package of scholarships for all levels of schooling could be implemented. This would be in line with the recent legal reforms of the educational system that took place in 2013, where compulsory education

in the country increased up to senior high school level. The reforms also established that the State should be responsible for providing educational services up to this level of studies to all Mexicans (DOF 2013). As the empirical results of this thesis show, the chronic poor households can hardly benefit from the intergenerational investments in human capital of Oportunidades, since these households are usually already struggling to cover their basic daily activities, and children usually drop-out of school before reaching senior high school. Given this, there is an implicit regressivity in the programme design, because the conditionalities are imposed on the consumption of health and education, which are considered ‘normal goods’, or those goods that are consumed more by richer households than poorer households (Rodríguez Castelán 2011).

Scholars have argued that in fact the reason to opt for CCTs, compared to an unconditional cash transfer, is more based on political grounds because the programme design aims to ease middle class concerns, rather than a belief that such approaches are actually more effective for poverty reduction (cf. Samson, van Niekerk and Mac Quene 2006; Freeland 2007; Jusidman 2009; Kanbur 2014). As noted by Kanbur (2014:96): “The somewhat unconditional support for CCTs is disconcerting. [...] The gain from conditioning seems political in nature, assuaging middle-class concerns about ‘handouts’ versus ‘investment’”. Given this, using household survey data from rural Mexico, Rodríguez Castelán (2011) shows that with a fixed budget, the depth of income poverty and education poverty are reduced more with an unconditional cash transfer than with a CCT. In this light, the preference for CCTs– set against an unconditional cash transfer programme based on the argument of breaking the intergenerational transmission of poverty, through human capital investments– loses strength.

The presence of a strong primary sector is also crucial. While increasing productivity and access to highly skilled formal labour should be a long-term development goal, this may not be realistic. With insufficient employment creation in the cities, high discrimination and unequal power relations in Mexico, informal employment (including illegal activities in drug cartels), and illegal migration to the US remain the real long-term options for the young rural poor. An upfront and clear recognition of this context should be central to the development paradigm that underpins social protection. In this light, increasing the earned incomes of the rural poor should be pursued as part of a

transition strategy. The empirical results showed the importance of non-farm labour in the communities and of subsistence agriculture and artisanal fishing to build both absorptive and adaptive capacities. Given this, increasing resilience in the rural sector to set against the challenges of climate change, instead of incentivising the exit of people from these livelihoods systems could be a more effective strategy to both reduce poverty and increase resilience. Initiatives that aim to raise rural incomes through the creation of employment options in agricultural and fishing value chains, increase access to rural non-farm income (de Janvry 2010), and they thus provide support for innovating upon the activities that households are already developing so as to reduce poverty in the short-term. At the same time, these measures will help to increase people's resilience. This can be achieved by linking subsistence farming and artisanal fisheries to markets, as well as by: increasing their access to productive inputs; financial services; land rights; irrigation systems; and increasing their capabilities to achieve productive rural livelihoods in a sustainable way. State government should initiate community development projects and training in the communities, for example in tourism-related activities. At the same time, fiscal and labour reforms should also be established, in order to reduce discrimination in the labour market and inequality in the long-term.

Moreover, strengthening adaptation requires addressing imbalances in the distribution of powers and resources within a political system that produces and maintains development inequalities. Social protection should enable local and regional adaptation options, but this requires shifting power relations between policy makers and local populations. Communities and individuals should have their own autonomous capacity to steer their own development, with the possibility of self-determination, and the management of their own decisions (Bonfil Batalla 1995). Agency and choice are fundamental for resilience. The analysis in this thesis shows how people use their different resilience sources and their local knowledge to innovate and create different development paths. Given this situation, strengthening traditional social networks - and the spaces in which these can interact - will be fundamental in order to increase intra-community cohesion, coexistence and reciprocity, and thereby recreating local culture and identity building. This means that social protection in Mexico should move towards a stronger rights-based perspective, by distancing itself from previous paternalistic and

authoritarian approaches, and supporting communities' and people's agency, advocacy and self-determination.

7.4 Future Research

The social protection-resilience framework requires further exploration. Testing the framework with different types of social protection interventions may throw up interesting results. For instance, a social protection intervention that aims to reduce poverty in the short-term, such as a graduation programme, might have different results, since the theory of change on which it is based lies on a different scale to Oportunidades. It might be expected that these different features in the social protection programmes will change the ways that social protection affects resilience. It would also be interesting to understand the different synergies with risk reduction initiatives and insurance mechanisms, *vis-à-vis* other initiatives oriented to climate change impacts.

Another research question for future research is how to integrate the power dimensions that underpin adaptation (Eriksen and Lind 2009), into a social protection and resilience analytical framework. I argue that resilience to climate change should integrate the concept of autonomy. Conventional forms of social protection are increasing neither the autonomy nor the agency of individuals and communities. Whilst the transformative social protection framework expands its vulnerability focus and integrates social and economic risks, it also departs from a perspective of transformation of social structures. It does this without an explicit consideration of the importance of the agency and autonomy of individuals and communities, which is an aspect that is highly important for resilience and adaptation. For example, research on synergies with community-based adaptation interventions, which address community participation and agency as a central focus in the analysis (Huq and Reid 2007; Berger and Ensor 2014), could shed some light on the role of power. This question also raises the importance of developing more research on resilience and power. This research shows that even when resilience is framed as 'specific' pro-poor resilience, as with the social protection-resilience analytical framework, it is not enough to bring about social change.

Future research should also explore how social protection systems could evolve (both conceptually and operationally) to include a more systemic approach that includes social and ecological concerns. Research in this area could explore the possible pathways that social protection could support in order to deliver inclusive and

sustainable development, and how these pathways could be pursued. More specific questions about how social protection could create low-carbon pathways at the same time that it reduces the current adaptation deficit of the poor, and how to increase innovation and at the same time increase the absorptive capacity of the poor, could also be explored.

Climate change adaptation raises critical issues of social justice since the people that will suffer the most from the negative impacts of climate change are also those who have tended to contribute the least to greenhouse gas emissions. Knowledge on how social protection can increase resilience to climate change and achieve poverty reduction is key to pursuing policies that frame adaptation in terms of social justice. This research may have some important insights to inform both the academic community and policy makers in governments and international organisations.

References

- Adato, M., 2000. *The impact of Progresa on community social relationships*, Washington, DC: International Food Policy Research Institute.
- Adger, W.N., 2000. Social and ecological resilience: are they related? *Progress in Human Geography*, 24(3), pp.347–364.
- Adger, W.N., 2006. Vulnerability. *Global Environmental Change*, 16(3), pp.268–281.
- Adger, W. N., I. Lorenzoni, & K. L. O'Brien, (eds.), 2009. *Adapting to climate change: thresholds, values, governance*. Cambridge: Cambridge University Press
- Adger, W.N., Arnell, N.W. & Tompkins, E.L., 2005. Successful adaptation to climate change across scales. *Global Environmental Change*, 15(2), pp.77–86.
- Adger, W.N., Paavola, J. & Huq, S., 2006. Toward justice in adaptation to climate change. In W. N. Adger, J. Paavola, S. Huq, & M. J. Mace, (eds.). *Fairness in adaptation to climate change*. Cambridge, Mass.: The MIT Press, pp. 1–20.
- Adger, W. N., Dessai, S., Goulden, M., Hulme, M., Lorenzoni, I., Nelson, D. R., Naess, L.O., Wolf, J., & A. Wreford, 2009. Are there social limits to adaptation to climate change? *Climatic Change*, 93(3-4), pp.335–354.
- Adger, W. N., Brown, K., Nelson, D. R., Berkes, F., Eakin, H., Folke, C., Galvin, K., Gunderson, L., Goulden, M., O'Brien, K., Ruitenbeek, J. and E. L. Tompkins, 2011. Resilience implications of policy responses to climate change. *Climate Change*, 2(5), pp.757–766.
- Agrawal, A. 2010. Local institutions and adaptation to climate change. In R. Mearns & A. Norton, (eds.). *Social dimensions of climate change: equity and vulnerability in a warming world*. World Bank, Washington, D.C., pp.173-197.
- Agrawal, A. & Perrin, N., 2009. Climate adaptation, local institutions and rural livelihoods. In W. N. Adger, I. Lorenzoni, & K. L. O'Brien, (eds.). *Adapting to climate change: thresholds, values, governance*. Cambridge: Cambridge University Press, pp. 350-367.
- Aguilar, A. & Vicarelli, M., 2011. El Niño and Mexican children: medium-term effects of early-life weather shocks on cognitive and health outcomes. [Online]. *Job Market Paper*. Harvard. Available from: http://isites.harvard.edu/fs/docs/icb.topic1126414.files/Aguilar%20El%20Nino%20and%20Mexican%20children_v190911.pdf [Accessed July 3, 2014]
- Alayón-Gamboa, J.A. & Ku-Vera, J., 2011. Vulnerability of smallholder agriculture in Calakmul, Campeche, Mexico. *Indian Journal of Traditional Knowledge*, 10(1), pp.125–132.

- Alix-Garcia, J., McIntosh, C., Sims, K. R. E., & Welch, J. R., 2013. The ecological footprint of poverty alleviation: evidence from Mexico's Oportunidades program. *The Review of Economics and Statistics*, 95(May), pp.417–435.
- Anderson, S., Geoghegan, T. & Ayers, J., 2009. An assessment of channels to support climate adaptation by the poorest. *IOP Science, Earth and Environmental Science*, 6.
- Armitage, D., 2005. Adaptive capacity and community-based natural resource management. *Environmental Management*, 35(6), pp.703–715.
- Armitage, D., Béné, C., Charles, A. T., Johnson, D., & Allison, E. H., 2012. The interplay of well-being and resilience in applying a social-ecological perspective. *Ecology and Society*, 17(4), pp.1-15.
- Arnall, A., Oswald, K., Davies, M., Mitchell, T., & Coirolo, C., 2010. Adaptive Social Protection: mapping the evidence and policy context in the agriculture sector in South Asia. *IDS Working Paper*, 345.
- Arroyo, J., Ordaz, J., Li, J., & Zaragoza, M. L., 2008. Estudio sobre los efectos de Oportunidades a diez años de intervención, en el consumo e inversión de las familias beneficiarias en zonas rurales, con base en la encuesta de evaluación de los hogares rurales 2007. In *Evaluación externa del Programa Oportunidades 2008. A diez años de intervención en zonas rurales*. Mexico, D.F.: Secretaría de Desarrollo Social.
- Ávila, J.L., 2012. *Población y desarrollo rural en México*, Mexico, D.F. Consejo Nacional de Población. Secretaría de Gobernación.
- Bahadur, A., Ibrahim, M. & Tanner, T., 2011. The resilience renaissance? Unpacking of resilience for tackling climate change and disasters. *Strengthening Climate Resilience Discussion Paper 1*, Brighton: Institute of Development Studies.
- Bahadur, A. V & Tanner, T., 2014. Transformational resilience thinking: putting people, power and politics at the heart of urban climate resilience. *Environment and Urbanization*, 26(1), pp.1–15.
- Banco de México (BANXICO), 2012. No Title. [Online]. Available from: www.banxico.org.mx . [Accessed March 10, 2012]
- Barham, T., 2005. *Providing a healthier start to life: the impact of conditional cash transfers on infant mortality*, Department of Agriculture and Resource Economics, California, USA: University of California at Berkley.
- Barnes, G., 2009. The evolution and resilience of community-based land tenure in rural Mexico. *Land Use Policy*, 26, pp.393–400.
- Barrett, C. & Maxwell, D., 2005. *Food aid after fifty years*. London: Routledge.

- Barrett, C. & Carter, M.R., 2006. Social protection policy to overcome poverty traps and aid traps. *Paper Presented to Brookings Conference on Asset Based Approaches to Poverty Reduction in a Globalized Context*, Washington, DC: International Food Policy Research Institute.
- Barrett, C.B. & Swallow, B.M., 2006. Fractal poverty traps. *World Development*, 34(1), pp.1–15.
- Barrett, C., Bell, R., Lentz, E., & Maxwell, D. 2009. Market information and food insecurity response analysis. *Food Security*, 1(2), pp.151–168.
- Barnett, J., and O'Neill, S. 2010. Maladaptation. *Global Environmental Change* 20(2), pp.211–213.
- Barrientos, A., 2010. Social protection and poverty. *UNRISD Working Paper 42*.
- Barrientos, A. & Hulme, D., (eds.) 2008. *Social protection for the poor and poorest: concepts, policies and politics*. London: Palgrave Macmillan.
- Barrientos, A. & Hinojosa-Valencia, L. 2009. *A review of social protection in Latin America*. Centre for Social Protection. [Online]. Paper prepared for the Social Protection Scoping Study. Centre of Social Protection. Brighton: Institute of Development Studies. Available from: <http://www.ids.ac.uk/files/dmfile/SocialProtectioninLatinAmerica.pdf> [Accessed February 17, 2013].
- Barrientos, A. & Sabatés-Wheeler, R., 2011. Strategic complementarities and social transfers: How do PROGRESA payments impact non-beneficiaries? *Applied Economics*, 43(23), pp.3175–3185.
- Bastagli, F., 2014. *Responding to a crisis protection*, London: Overseas Development Institute.
- Batllore-Sampedro, E., 2002a. *Análisis integrado de la cuenca de Chabihau*, Mérida, Yucatán: Centro DAAR.
- Batllore-Sampedro, E., 2002b. Manifestación de impacto ambiental. In F. Dickinson, (ed.). *Innovando viviendas para conservar ecosistemas costeros. Informe final*. Mérida, Yucatán: Cinvestav-Unidad Mérida.
- Batllore-Sampedro, E. & Febles-Patron, J., 2009. Adaptive management response of a rural fishery due to changes in the hydrological regime of a Tropical Coastal Lagoon. *Journal of Human Ecology*, 26(1), pp.9–18.
- Batllore-Sampedro, E. Canto Polanco, G. & Febles-Patron, J.L., 2006. El huracán Isidoro en las costas de Yucatán. *Arborea*, 8(20-21), pp.19–33.
- Becker, G. & Toms, N., 1986. Human capital and the rise and fall of families. *Journal of Labor Economics*, 4(3), pp.1–39.

- Béné, C., 2003. When fishery rhymes with poverty: a first step beyond the old paradigm on poverty in small-scale fisheries. *World Development*, 31(6), pp.949–975.
- Béné, C., Devereux, S. & Sabates-Wheeler, R., 2012. Shocks and social protection in the Horn of Africa: analysis from the Productive Safety Net Programme in Ethiopia. *IDS Working Paper*, 395.
- Béné, C., Wood, R. G., Newsham, A., & Davies, M., 2012. Resilience: new utopia or new tyranny? Reflection about the potentials and limits of the concept of resilience in relation to vulnerability reduction programmes. *IDS Working Paper*, 405.
- Béné, C. Newsham, A., Davies, M., Ulrichs, M., & Godfrey-Wood, R., 2014. Resilience, poverty and development. *Journal of International Development*, 26(5), pp.598–623.
- Berger, R. & Ensor, J., 2014, Introduction: progress in adaptation. In Ensor, J., Berger, R., & Huq, S. (eds.). *Community-based adaptation to climate change. Emerging Lessons*. Rugby, UK: Practical Action Publishing, pp.1-12.
- Berkes, F., 2007. Community-based conservation in a globalized world. *Proceedings of the National Academy of Sciences of the United States of America*, 104(39), pp.15188–15193.
- Berkes, F. & Folke, C., 1998. Linking social and ecological systems for resilience and sustainability. In F. Berkes & C. Folke (eds.). *Linking social and ecological systems: management practices and social mechanisms for building resilience*. Cambridge, UK: Cambridge University Press, pp.1–25.
- Berkes, F., Colding, J. & Folke, C., 2003. Introduction. In F. Berkes, J. Colding, & C. Folke, (eds.). *Navigating Social–Ecological Systems: Building Resilience for Complexity and Change*. Cambridge: Cambridge University Press, pp. 1–31.
- Bonfil Batalla, G., 1995. Etnodesarrollo: sus premisas jurídicas, políticas y de organización. In G. B. Batalla, (ed.). *Obras elegidas*. Mexico, D.F.: INAH/INI, pp. 464–480.
- Boyd, R. & Ibararán, M.E., 2008. Extreme climate events and adaptation: an exploratory analysis of drought in Mexico. *Environment and Development Economics*, 14(03), pp.371–395.
- Brand, F.S. & Jax, K., 2007. Focusing the meaning(s) of resilience: Resilience as a descriptive concept and a boundary object. *Ecology and Society*, 12(1), pp.23–38.
- British Education Research Association (BERA), 2011. Ethical guidelines for educational research. [Online]. Available from: <https://www.bera.ac.uk/wp-content/uploads/2014/02/BERA-Ethical-Guidelines-2011.pdf> [Accessed November 14, 2011]

- Britto, T., 2008. The emergence and popularity of conditional cash transfers in Latin America. In A. Barrientos & D. Hulme (eds.). *Social protection for the poor and poorest: concepts, policies and politics*. London: Palgrave Macmillan, pp.181-193.
- Brockington, D. & Sullivan, S., 2003. Qualitative research. In S. Scheyvens & D. Storey, eds. *Development Fieldwork: A Practical Guide*. London: Sage Publications, pp. 57–72.
- Brown, K., 2012. Policy discourses of resilience. In M. Pelling, D. Manuel-Navarrete, & M. Redclift (eds.). *Climate change and the crisis of capitalism*. Abingdon: Routledge, pp. 37–50.
- Brown, K., 2014. Global environmental change I: A social turn for resilience? *Progress in Human Geography*, 38(1), pp.107–117.
- Buenfil, J., 2009. *Adaptación a los impactos del cambio climático en los humedales costeros del Golfo de México*. [Online]. Instituto Nacional de Ecología-Secretaría del Medio Ambiente. México, DF.
- Burton, I., 2008. *Beyond borders: the need for strategic global adaptation*. London, UK: International Institute for Environment and Development.
- Burton, I., Smith, J.B. & Lenhart, S., 1998. Adaptation to climate change: theory and Assessment. In J. F. Feenstra et al., (eds.). *Handbook on methods for climate change impact assessment and adaptation strategies*. United Nations Environment Programme, pp. 5.1–5.20.
- Burton, I., Huq, S., Lim, B., Pilifosova, O., & Schipper, E. L., 2002. From impacts assessment to adaptation priorities: the shaping of adaptation policy. *Climate Policy*, 2, pp.145–159.
- Cannon, T. & Muller-Mahn, D., 2010. Vulnerability, resilience and development discourses in context of climate change. *Natural Hazards*, 55, pp.621–635.
- Carpenter, S., Walker, B., Anderies, J., & Abel, N., 2001. From metaphor to measurement: resilience of what to what? *Ecosystems*, pp.765–781.
- Carter, M. R., Little, P. D., Mogues, T., & Negatu, W., 2008. Poverty traps and natural disasters in Ethiopia and Honduras. In A. Barrientos & D. Hulme, eds. *Social protection for the poor and poorest: concepts, policies and politics*. London: Palgrave Macmillan, pp.85–118.
- Castillo, M.T., Viga, D. & Dickinson., F., 2008. Changing the culture of dependency to allow for successful outcomes in participatory research: Fourteen years of experience in Yucatan, Mexico. In P. Reason & H. Bradbury, (eds.). *The SAGE Handbook of Action Research: Participative Inquiry and Practice*. London: SAGE Publications, pp. 522–533.
- Chambers, R., 1994. The origins and practice of participatory rural appraisal. *World Development*, 22(7), pp.953–969.

- Chambers, R., 1997. *Whose reality counts? Putting the first last*, London: Intermediate Technology Publications.
- Chapin, F. S., Carpenter, S. R., Kofinas, G. P., Folke, C., Abel, N., Clark, W. C., ... Swanson, F. J., 2010. Ecosystem stewardship: Sustainability strategies for a rapidly changing planet. *Trends in Ecology and Evolution*, 25(4), pp.241–249.
- Chapman, K., 2006. *Using social transfers to scale up equitable access to education and health services*, Policy Division Background Paper. London: DFID.
- CIGA, Factor CO2, SEDUMA, INECC, IDB, 2013. *Programa especial de acción ante el cambio climático del estado de Yucatán. Análisis de la variabilidad climática e impactos socio-económicos de fenómenos hidrometeorológicos extremos en los sectores y sistemas de interés para el Estado*. [Online]. Mérida, Yucatán. Available from: http://www.cambioclimatico.yucatan.gob.mx/agendas-cambio-climatico/documentos-estatal/anexos_peacc/anexo6.pdf. [Accessed September 7, 2014]
- Cipryk, R., 2009. Impacts of climate change on livelihoods: what are the implications for social protection? *CDG Working Paper: Development*, February.
- Coirolo, C., Commins, S., Haque, I. & Pierce, G., 2013. Climate change and social protection in Bangladesh: Are existing programmes able to address the impacts of climate change? *Development Policy Review*, 31(S2), pp.74–90.
- Consejo Nacional de Evaluación de la Política de Desarrollo Social (Coneval), No Date. *Poverty measurment. Evolution of the wellbeing lines and the food basket*. [Online]. Available from: <http://www.coneval.gob.mx/Medicion/Paginas/Lineas-de-bienestar-y-canasta-basica-en.aspx> [Accessed March 3, 2012]
- Consejo Nacional de Evaluación de la Política de Desarrollo Social (Coneval), 2009. *Evolución de la pobreza en México 2009*, Mexico, D.F.
- Consejo Nacional de Evaluación de la Política Social (Coneval), 2010. *Informe de pobreza multidimensional en México 2008*, Mexico, D.F.
- Consejo Nacional de Evaluación de la Política de Desarrollo Social (Coneval), 2012. *Evaluación estratégica de protección social en México*, Mexico, D.F.
- Consejo Nacional de Evaluación de la Política de Desarrollo Social (Coneval), 2013. *Informe de pobreza en México, 2012*, Mexico, D.F.
- Conway, T., de Haan, A. & Norton, A., 2000. *Social protection: new directions of donor agencies*, London: Department for International Development (DFID).
- Conway, T. & Norton, A., 2002. Nets, ropes, ladders and trampolines: the place of social protection within current debates on poverty reduction. *Development Policy Review*, 20(5), pp.533–540.

- Cook, S. & Kabeer, N., 2009. Socio-economic security over the life course: a global review of social protection. *Paper prepared as the final report of a Social Protection Scoping Study funded by Ford Foundation*. [Online]. Brighton: Institute of Development Studies. Available from: <https://www.ids.ac.uk/files/dmfile/AGlobalReviewofSocialProtection.pdf> [Accessed February 2, 2013]
- Cooper, F., 1997. Modernizing bureaucrats, backward Africans, and the development concept. In F. Cooper & R. Packard, eds. *International Development and the Social Sciences. Essays on the history and politics of knowledge*. Berkley, CA: University of California Press, pp.64-92.
- Corbett, J., 1988. Famine and household coping strategies. *World Development*, 16(9), pp.1099-1112.
- Cote, M. & Nightingale, A.J., 2012. Resilience thinking meets social theory: Situating social change in socio-ecological systems (SES) research. *Progress in Human Geography*, 36(4), pp.475–489.
- Davidson, D., 2010. The applicability of the concept of resilience to social systems: Some sources of optimism and nagging doubts. *Society and Natural Resources*, 23(12), pp.1135–1149.
- Davies, M. & Leavy, J., 2007. Connecting social protection and climate change. In *Focus*. Brighton: Institute of Development Studies.
- Davies, M., Guenther, B., Leavy, J., Mitchell, T., & Tanner, T., 2008. Adaptive Social Protection: synergies for poverty reduction. *IDS Bulletin*, 39(4), pp.105–112.
- Davies, M., Guenther, B., Leavy, J., Mitchell, T., & Tanner, T., 2009. Climate change adaptation, disaster risk reduction and social protection: Complementary roles in agriculture and rural growth ? *IDS Working Paper*, 320.
- Davies, M., Béné, C., Arnall, A., Tanner, T., Newsham, A., & Coirolo, C., 2013. Promoting resilient livelihoods through Adaptive Social Protection: Lessons from 124 programmes in South Asia. *Development Policy Review*, 31(1), pp.27–58.
- Davis, P., 2006. Poverty in time: Exploring poverty dynamics from life history interviews in Bangladesh, *CPRC Working Paper*, 69.
- Davis, P., 2010. Exploring the long-term impact of development interventions within life history narratives in rural Bangladesh. *IFPRI Discussion Paper*, 991.
- Davis, P., 2011. Passing on poverty: the intergenerational transmission of well-being and ill-being in rural Bangladesh, *CPRC Working Paper*, 192.
- Daw, T., Adger, N.W., Brown, K., 2009. Climate change and capture fisheries: potential impacts, adaptation and mitigation. In K. Cochrane, C. De Young, D. Soto, & T. Bahri, (eds.). *Climate change implications for fisheries and aquaculture: overview*

of current scientific knowledge. FAO Fisheries and Aquaculture Technical Paper, 530, Rome, FAO:107-150

- De Janvry, A., 2010. Agriculture for development: new paradigm and options for success. *Agricultural Economics*, 41, pp.17–36.
- De Janvry, A., Finan, F., Sadoulet, E., & Vakis, R., 2006. Can conditional cash transfer programs serve as safety nets in keeping children at school and from working when exposed to shocks? *Journal of Development Economics*, 79(2), pp.349–373.
- De Janvry, A., Sadoulet, E. & Vakis, R., 2010. Protecting vulnerable children from uninsured risks: adapting conditional cash transfer programs to provide broader safety nets. *Well-being and Social Policy*, 6(1), pp.161–183.
- De la Fuente, A. & Olivera Villarroel, M., 2013. The poverty impact of climate change in Mexico. *World Bank Policy Research Working Paper*, May.
- De la Peña, G., 1986. Poder local, poder regional: perspectivas socio-antropológicas. In: J. Padua & A. Valenzuela, (eds.). *Poder local, poder regional*. El Colegio de México, Centro de Estudios Mexicanos y Centroamericanos, México, pp. 27-56.
- Deacon, B., 2013. *Global social policy in the making. The foundations of the social protection floor*, Bristol, UK: Policy Press.
- Dercon, S., 2004. *Insurance against poverty*, Oxford: Oxford University Press.
- Devereux, S., 1993. Goats before ploughs: Dilemmas of household response sequencing during food shortages. *IDS Bulletin*, 24(4), pp.52–59.
- Devereux, S., 2002. Social protection for the poor: Lessons from recent international experience. *IDS Working Paper*, 142.
- Devereux, S. & McGregor, J.A., 2014. Transforming social protection: Human wellbeing and social justice. *European Journal of Development Research*, 26(3), pp.296–310.
- Devereux, S. & Sabates-Wheeler, R., 2004. Transformative Social Protection. *IDS Working Paper*, 232.
- Devereux, S. & Sabates-Wheeler, R., 2007. Whose (Transformative) reality counts ? A reply to Aoo et al . *IDS Bulletin*, 38(3), pp.32–33.
- Devereux, S., Roelen, K., Béné, C., Chopra, D., Leavy, J. & McGregor, A. 2013. Evaluating outside the box : An alternative framework for analysing social protection programmes. *IDS Working Paper*, 431
- DeWalt, B., 1979. *Modernization in a Mexican ejido. A study in economic adaptation*, Cambridge: Cambridge University Press.

- Diario Oficial de la Federación (DOF), 2013. *Decreto por el que se reforman los artículos 3o., 4o., 9o., 37, 65 y 66; y se adicionan los artículos 12 y 13 de la Ley General de Educación*. [Online]. Available from: http://www.dof.gob.mx/nota_detalle.php?codigo=5301832&fecha=10/06/2013. [Accessed September 3, 2014]
- Dominguez, C., 2012. *El papel de los ciclones tropicales en el clima de México*. Tesis de Maestría en Ciencias de la Tierra. Universidad Nacional Autónoma de México. México. (Cited in INECC-SEMARNAT 2013).
- Dorward, A. & Sabates-Wheeler, R., 2006. Promoting agriculture for social protection or social protection for agriculture: Strategic policy and research issues. In *Future Agricultures Consortium*. [Online]. Brighton: Institute of Development Studies. Available from: http://www.future-agricultures.org/pdf_files/SP_Growth_Final.pdf [Accessed November 7, 2013].
- Eakin, H., 2005. Institutional change, climate risk, and rural vulnerability: cases from Central Mexico. *World Development*, 33(11), pp.1923–1938.
- Eakin, H. (2006) *Weathering risk in rural Mexico: climatic, institutional, and economic change*, University of Arizona Press.
- Ellis, F., 1998. Household strategies and rural livelihood diversification. *Journal of Development Studies*, 35, pp.1–38.
- Ellis, F., 2000. *Rural livelihood diversity in developing countries*, Oxford: Oxford University Press.
- Ericksen, P.J., 2008. Conceptualising food systems for global environmental change. *Global Environmental Change*, 18, pp.234–245.
- Eriksen, S., 2013. Understanding how to respond to climate change in a context of transformational change. In L. Sygna, K. L. O'Brien, & J. Wolf, (eds.). *A Changing Environment for Human Security, Transformative approaches to research, policy and action*. New York: Routledge, pp.363–374.
- Eriksen, S. & Brown, K., 2011. Sustainable adaptation to climate change. *Climate and Development*, 3(3), pp.1-6.
- Eriksen, S. & Lind, J. 2009. Adaptation as a political process: adjusting to drought and conflict in Kenya's drylands. *Environmental Management* (43), pp. 817–35.
- Eriksen, S. & O'Brien, K.L., 2007. Vulnerability, poverty and the need for sustainable adaptation measures. *Climate Policy*, 7(4), pp.337–352.
- Eriksen, S., O'Brien, K.L. & Rosentrater, L., 2008. *Climate change in eastern and southern Africa: impacts, vulnerability and adaptation*, Oslo: Global Environmental Change and Human Security International Project Office.

- Escobar-Latapí, A., 2012. Trayectorias vitales de jóvenes pobres extremos mexicanos, o la vida después del programa “Oportunidades.” *Revista de Trabajo*, 8(11: julio-diciembre), pp.185–204.
- Escobar-Latapí, A. & Gonzalez de la Rocha, M., 2004. *External evaluation of the impact of mid-term qualitative evaluation of the Oportunidades program in rural areas*, Mexico, D.F.: SEDESOL.
- Esping-Andersen, G., 2010. *The three worlds of welfare capitalism*, Cambridge, UK: Polity Press.
- Estévez, F., Magaloni, B. & Díaz-Cayeros, A., 2002. *A portfolio diversification model of electoral investment*, Stanford University.
- Faust, B., 2001, Maya environmental successes and failures in the Yucatan Peninsula, *Environmental Science & Policy* 4, pp.153–169.
- Filgueira, F., 2005. Welfare and democracy in Latin America: the development, crises and aftermath of universal, dual and exclusionary social states. *UNRISD Working Paper*, May.
- Fischer, A. & Kothari, U., 2011. Resilience in an unequal capitalist- virtual issue. *Journal of International Development*, August.
- Fiszbein, A. & Schady, N., 2009. Conditional cash transfers: reducing present and future poverty. *World Bank Policy Research Report*, 47603.
- Flyvbjerg, B., 2006. Five misunderstandings about case-study research. *Qualitative Inquiry*, 12(2), pp.219–245.
- Folke, C., Carpenter, S., Elmqvist, T., Gunderson, L., Holling, C. S., & Walker, B., 2002. Resilience and sustainable development: Building adaptive capacity in a world of transformations. *Ambio*, 31(5), pp.437–440.
- Folke, C., Carpenter, S. R., Walker, B., Scheffer, M., & Chapin, T., 2010. Resilience thinking: Integrating resilience, adaptability and transformability. *Ecology and Society*, 15(4), pp.1–20.
- Folke, C., Colding, J. & Berkes, F., 2008. Synthesis: Building resilience and adaptive capacity in social-ecological systems. In F. Berkes, J. Colding, & C. Folke, eds. *Navigating Social–Ecological Systems: Building Resilience for Complexity and Change*. Cambridge University Press, pp. 352– 387.
- Folke, C., Chapin, F.S. & Olsson, P., 2009. Transformations in ecosystem stewardship. In C. S. III, G. P. Kofinas, & Carl Folke, eds. *Principles of Ecosystem Stewardship: Resilience-Based Natural Resource Management in a Changing World*. New York: Springer, pp. 103–125.

- Food and Agriculture Organization of the United Nations (FAO), 2013. *The state of food and agriculture. Food systems for better agriculture* [Online] Available from: <http://www.fao.org/docrep/018/i3300e/i3300e00.htm>. [Accessed June 20, 2013]
- Fraga, J., G. Villalobos, S. Doyon, and A.E. García (eds) 2008. *Descentralización y manejo ambiental. Gobernanza costera en México*, México, Ottawa: Plaza y Valdés, IDRC.
- Freeland, N., 2007. Superfluous, pernicious, atrocious and abominable? The case against conditional cash transfers. *IDS Bulletin*, 38(3), pp.75–78.
- Gaillard, J., 2010. Vulnerability, capacity and resilience: Perspectives for climate and development policy. *Journal of International Development*, 232, pp.218–232.
- Garbarino, S. & Holland, J., 2009. Quantitative and qualitative methods in impact evaluation and measuring results. [Online]. *Discussion Paper*. University of Birmingham. Available from: <http://www.gsdr.org/docs/open/EIRS4.pdf> [Accessed April 12, 2013]
- García Acosta, V., 2005. *Construcción social de riesgos y el huracán Paulina*, Mexico, DF: CIESAS.
- Gay, C., 2003. *México: Una Visión Hacia el Siglo XXI. El Cambio Climático en México*, Mexico, D.F.: UNAM Press.
- Gentilini, U., 2007. Food transfers and food insecurity. *IDS Bulletin*, 38(3), pp.82–86.
- Gertler, P., 2004. Do conditional cash transfers improve child health? Evidence from PROGRESA's control randomized experiment. *American Economic Review*, 94(2), pp.336–341.
- Giugale, M., Lafourcade, O. & Nguyen, V.H., 2001. *Mexico. A comprehensive development agenda for the New Era*, World Bank. Washington D.C.
- Gonzalez de la Rocha, M., 2008. La vida después de Oportunidades: Impacto del programa a diez años de su creación. In M. Hernández & M. González de la Rocha, (eds.). *Evaluación externa del Programa Oportunidades 2008. A diez años de intervención en zonas rurales*. Mexico, D.F.: SEDESOL.
- Goulden, M. C., Adger, W. N., Allison, E. H., & Conway, D., 2013. Limits to resilience from livelihood diversification and social capital in lake social–ecological systems. *Annals of the Association of American Geographers*, 103(4), pp.906–924.
- Grindle, M., 1977. *Bureaucrats, politicians and peasants in Mexico: a case study in public policy*. California: University of California Press.
- Gunderson, L.H., 2000. Ecological resilience: In theory and application. *Annual Review of Ecology and Systematics*, 31(1), pp.425–439.
- Gunderson, L.H. & Holling, C.S., 2002. *Panarchy: understanding transformations in human and natural systems*, Washington, DC: Island Press.

- Hammill, A., Leclerc, L., Myatt-Hirvonen, O., & Salinas, Z., 2005. Using the sustainable livelihoods approach to reduce vulnerability. In C. Robledo, M. Kanninen, & L. Pedroni, (eds.). *Tropical Forests and Adaptation to Climate Change in Search of Synergies. Adaptation to climate change, sustainable livelihoods and biological diversity*, Turrialba, Costa Rica: Centre for International Forestry Research, pp. 71-96.
- Handa, S. & Davis, B., 2006. The Experience of Conditional Cash Transfers in Latin America and the Caribbean. *Development Policy Review*, 24(5), pp.513–536.
- Hanlon, J., Barrientos, A. & Hulme, D., 2010. *Just give money to the poor: The development revolution from the global south*, Sterling, USA: Kumarian Press.
- Harvey, P. & Bailey, S., 2011. *Cash transfer programming in emergencies*, Humanitarian Practice Network. Good Practice Review, 11. London: Overseas Development Institute.
- Heltberg, R., Siegel, P. & Jørgensen, S., 2009. Addressing human vulnerability to climate change: Toward a “no-regrets” approach. *Global Environmental Change*, 19(1), pp.89–99.
- Hernandez, B., Ramirez, M., Moreno, H., & Laird, N., 2005. Impacto de Oportunidades en la mortalidad materna e infantil. In B. Hernandez & M. Hernández, (eds.). *Evaluación externa de impacto del Programa Oportunidades 2003*. Cuernavaca, Morelos: Instituto Nacional de Salud Pública.
- Hevia de la Jara, F., 2008. Between individual and collective action. Citizen participation and public oversight in Mexico’s Oportunidades programme. *IDS Bulletin*, 38(6), pp.64–72.
- HLPE, 2012. Food security and climate change. [Online]. *A report by The High Level Panel of Experts of Food Security and Nutrition*. Available from: <http://digitalcommons.unl.edu/nasapub/131/> [Accessed March 25, 2014].
- Hoddinott, J., 2014. Resilience: a primer. In *Building Resilience for Food & Nutrition Security 2020 Conference Brief*.
- Holling, C.S., 1973. Resilience and stability of ecological systems. *Annual Review of Ecology and Systematics*, 4(1), pp.1–23.
- Hou, X., 2010. Can drought increase total calorie availability? The impact of drought on food consumption and the mitigating effects of a conditional cash transfer program. *Economic Development and Cultural Change*, pp.713–737.
- Hulme, D., Moore, K. & Shepherd, A., 2001. Chronic poverty: meanings and analytical frameworks. *CPRC Working Paper*, 2.
- Huq, S. & Reid, H., 2007. *Community-Based Adaptation: an IIED Briefing*, London: IIED.

- Ibarrarán, M.E., 2011. *Políticas de adaptación del sector agropecuario al cambio climático: El caso de maíz, frijol y forraje en México*. Mexico: CEPAL.
- Ibarrarán, M.E., Brenkert, A.L. & Malone, E.L. 2008, Climate change vulnerability and resilience: current status and trends for Mexico. *PNNL Paper*, 18136.
- IFPRI, 2013. *Definitions of resilience: 1966-present*, Building resilience for food and nutrition security. Washington, DC.
- Independent Evaluation Group (IEG), 2012. Chapter 6. Support to social protection during the global financial crisis. In *The World Bank Group's Response to the Global Economic Crisis—Phase II*. Washington, DC: World Bank, pp. 91–107.
- Instituto Nacional de Ecología-Secretaría del Medio Ambiente (INECC-Semarnat), 2006. *México Tercera Comunicación Nacional ante la Convención Marco de las Naciones Unidas sobre el Cambio Climático*., Mexico, D.F.
- Instituto Nacional de Ecología-Secretaría del Medio Ambiente (INECC-Semarnat), 2012. *México Quinta Comunicación Nacional ante la Convención Marco de las Naciones Unidas sobre el Cambio Climático*., Mexico, D.F.
- Instituto Nacional de Ecología y Cambio Climático-Secretaría del Medio Ambiente (INECC-Semarnat), 2013. *Climate change adaptation in Mexico: Vision, elements, and criteria for decision-making*, Mexico, D.F.
- Instituto Nacional de Estadística y Geografía (INEGI), 2008. *México de un vistazo 2008*, Mexico, D.F.
- Intergovernmental Panel on Climate Change (IPCC), 2012. *Managing the risks of extreme events and disasters to advance climate change adaptation. A special report of working I and II of the Intergovernmental Panel on Climate Change C.* B. Field et al., eds., Cambridge: Cambridge University Press.
- Intergovernmental Panel on Climate Change (IPCC), 2014. *Climate Change 2014: Impacts, adaptation, and vulnerability. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, New York.
- IUCN, IISD, SEI-B, & Intercooperation, 2004. *Sustainable livelihoods and climate change adaptation. A review of phase one activities for the project on 'Climate change, vulnerable communities and adaptation'*. International Institute for Sustainable Development.
- Janssen, M. A., Schoon, M. L., Ke, W., & Börner, K., 2006. Scholarly networks on resilience, vulnerability and adaptation within the human dimensions of global environmental change. *Global Environmental Change*, 16(3), pp.240–252.
- Jerneck, A. & Olsson, L., 2008. Adaptation and the poor: Development, resilience and transition. *Climate Policy*, 8(2), pp.170–182.

- Johnson, C. & Krishnamurthy, K., 2010. Dealing with displacement: Can “social protection” facilitate long-term adaptation to climate change? *Global Environmental Change*, 20(4), pp.648–655.
- Johnson, C., Dulal, H. B., Prowse, M., Krishnamurthy, K., & Mitchell, T., 2013. Social protection and climate change: Emerging issues for research, policy and practice. *Development Policy Review*, 31(S2), pp.2–18.
- Jones, L., Jaspars, S., Pavanello, S., Ludi, E., Slater, R., Arnall, A., & Grist, N., 2010. Responding to a changing climate. Exploring how disaster risk reduction, social protection and livelihoods approaches promote features of adaptive capacity. ODI *Working Paper*, 319.
- Jusidman, C., 2009. Desigualdad y política social en México. *Nueva Sociedad*, 220(Marzo-Abril), pp.190–206.
- Kanbur, R., 2014. Social Protection: Consensus and challenges. In G. A. Cornia & F. Stewart, eds. *Towards human development: New approaches to macroeconomics and inequality*. New York: Oxford University Press, pp. 86–98.
- Kates, R.W., Travis, W.R. & Wilbanks, T.J., 2012. Transformational adaptation when incremental adaptations to climate change are insufficient. *Proceedings of the National Academy of Sciences*, 109(19), pp.7156–7161.
- Klein, R.J.T., Nicholls, R.J. & Thomalla, F., 2003. Resilience to natural hazards: How useful is this concept? *Environmental Hazards*, 5(1-2), pp.35–45.
- Konrad, W.H., 2003. Caribbean tropical storms: Ecological implications for pre-Hispanic and contemporary Maya subsistence on the Yucatan Peninsula'. *Revista Universidad Autónoma de Yucatán*, 18(224), pp.99–126.
- Kuriakose, A. T., Heltberg, R., Wiseman, W., Costella, C., Cipryk, R., & Cornelius, S., 2013. Climate-Responsive Social Protection. *Development Policy Review*, 31(S2), pp.19–34.
- Leach, M., 2008. Re-framing resilience: A symposium report. *STEPS Working Paper*, 13.
- Lemos, M. C., E. Boyd, E. L. Tompkins, H. Osbahr, and D. Liverman. 2007. Developing adaptation and adapting development. *Ecology and Society* 12(2), pp. 1-26.
- Leichenko, R.M. & O'Brien, K.L., 2013. Climate change and the global financial crises: Stresses, synergies and challenges for human security. In L. Sygna, K. L. O'Brien, & J. Wolf, (eds.). *A changing environment for human security: transformative approaches to research, policy and action*. Abingdon: Routledge.
- Leisering, L. & Barrientos, A., 2013. Social citizenship for the global poor? The worldwide spread of social assistance. [Online]. *International Journal of Social Welfare*, 22, pp.S50–S67.

- Levy, S., 2008. *Good intentions, bad outcomes. Social policy, informality and economic growth in Mexico*, Washington D.C: Brookings Institution Press.
- Lindert, K., 2005. Brazil: Bolsa Família program scaling-up cash transfers for the poor. [Online]. *Principles in action: Sourcebook on emerging good practices*, (January 2005), pp.67–74. Available from: <http://www.mfdr.org/sourcebook/6-1brazil-bolsafamilia.pdf> [Accessed November 7, 2013].
- Liverman, D.M., 1999. Vulnerability and adaptation to drought in Mexico. *Natural Resources Journal* 39(1), pp.99–115.
- Lloyd-Sherlock, P., 2008. Doing a bit more for the poor? Social Assistance in Latin America. *Journal of Social Policy*, 37(04), pp.621–639.
- Locke, C. & Lloyd-Sherlock, P., 2011. Qualitative life course methodologies: Critical reflections from development studies. *Development and Change*, 42(5), pp.1131–1152.
- Luers, A. L., Lobell, D. B., Sklar, L. S., Addams, C. L., & Matson, P.A., 2003. A method for quantifying vulnerability applied to the agricultural system of the Yaqui Valley, Mexico. *Global Environmental Change*, 13(4), pp.255–267.
- Macchi, M., Oviedo, G., Gotheil, S., Cross, K., Boedhihartono, A., Wolfangel, C., & Howell, M., 2008. *Indigenous and traditional peoples and climate change. How will climate change impact indigenous and traditional peoples?* International Union for Conservation of Nature. Gland, Switzerland
- Mack, N., Woodson, C., MacQueen, K. M., Guest, G., & Namey, E., 2005. *Qualitative research methods: a data collector's field guide* In: N. Denzin & Y. Lincoln, (eds.). Family Health International. [Online]. Available from: <http://www.fhi.org>. [Accessed May 17, 2014]
- Marshall, N. a, Park, S. E., Adger, W. N., Brown, K., & Howden, S. M., 2012. Transformational capacity and the influence of place and identity. *Environmental Research Letters*, 7(3), pp. 1-9.
- Marshall, T.H., 1964. *Class, citizenship and social development*, New York: Doubleday.
- Marschke, M., and Berkes, F. 2006. Exploring strategies that build livelihood resilience: a case from Cambodia. *Ecology and Society*, 11(1), pp.1-16
- Martin-Breen, P. & Anderies, J.M., 2011. *Resilience. A literature review*, Resource Alliance and Rockefeller Foundation for the Bellagio Initiative. Brighton: Institute of Development Studies.
- McCord, A., 2013. *Review of the literature on social protection shock responses and readiness*, London: Overseas Development Institute.

- McGray, H., Hammill, A., Bradley, R., Schipper, E. L., & J.E. Parry., 2007. *Weathering the storm options for framing weathering the storm options for framing adaptation and development*, Washington, DC: World Resources Institute.
- McSweeney, C., New, M. & Lizcano, G., 2010. *UNDP Climate Change Country Profiles: Mexico*. [Online]. Available at: <http://country-profiles.geog.ox.ac.uk/>. [Accessed September 8, 2014]
- Mearns, R. & Norton, A., 2010. *Social dimensions of climate change: equity and vulnerability in a warming world*, Washington, DC.: World Bank.
- Mendoza, V.M., Villanueva, E.E. & Adem, J., 1997. Vulnerability of basins and watersheds in Mexico to global climate change. *Climate Research*, 2, pp.139–145.
- Meyer, J. 1991. *La Revolución Mexicana (1910- 1940)*, México, D.F.: Editorial Jus.
- Meyer, L., 2005. *El estado en busca del ciudadano: un ensayo sobre el proceso político mexicano*, Mexico, D.F.: Oceano.
- Miller, F., Osbahr, H., Boyd, E., Thomalla, F., Bharwani, S., Ziervogel, G., ... Nelson, D., 2010. Resilience and vulnerability: complementary or conflicting concepts? *Ecology and Society*, 15(3), pp. 1-25.
- Mitchell, T. & Tanner, T., 2006. *Adapting to climate change: Challenges and opportunities for the development community*. Brighton: Institute of Development Studies, Tearfund.
- Mitchell, T. & Harris, K., 2012. Resilience: A risk management approach. *Background Note*, January. London: Overseas Development Institute.
- Mitchell, T., Cameron, C., Norrington-Davis, G., & te Velde of Aguilhas, V., 2012. *Managing climate extremes and disasters in Asia : Lessons from the IPCC SREX Report Contents*, London: Overseas Development Institute.
- Moench, M. & Dixit, A., 2004. *Adaptive capacity and livelihood resilience: Adaptive strategies for responding to floods and droughts in South Asia*, Boulder, Colorado; Nepal: The Institute for Social and Environmental Transition, International: Boulder.
- Molinar, J. & Weldon, J., 1994. Electoral determinants and consequences of national Solidarity. In W. A. Cornelius, A. L. Craig, & J. Fox, (eds.). *Transforming state-society relations in Mexico: the national solidarity strategy*. San Diego: Center for U.S.-Mexican Studies, UCSD.
- Molyneux, M., 2007. Two cheers for CCTs. *IDS Bulletin*, 38(3), pp.69–74.
- Moore, K., 2001. Frameworks for understanding the inter-generational transmission of poverty and well-being in developing countries, *CPRC Working Paper*, 8

- Morton, J.F., 2007. The impact of climate change on smallholder and subsistence agriculture. *Proceedings of the National Academy of Sciences of the United States of America*, 104(50), pp.19680–19685.
- Moser, S.C. & Ekstrom, J.A., 2010. A framework to diagnose barriers to climate change adaptation. *Proceedings of the National Academy of Sciences of the United States of America*, 107(51), pp.22026–22031.
- Moya, X. & Way, S., 2003. Winning spaces: Participatory methodologies in rural processes in Mexico. *IDS Working Papers*, 180.
- Moya, X., Caamal, A., Ku, B. K., Xool, E. C., Armendáriz, I., Flores, J., Moguel, M. N. Poot, M. Rosales, & J. X. Domínguez, 2003. La agricultura campesina de los mayas en Yucatán. [Online]. *LEISA Revista de Agroecología*, Edición Es. Available from: <http://www.leisa-al.org/web/images/stories/revistapdf/vol19n0.pdf#page=6> [Accessed March 25, 2014].
- Nelson, D.R., 2009. Conclusions: transforming the world. In W. N. Adger, I. Lorenzoni, & K. L. O'Brien, (eds.). *Adapting to Climate Change: Thresholds, Values, Governance*. Cambridge: Cambridge University Press, pp. 491-501.
- Nelson, D.R., Adger, W. & Brown, K., 2007. Adaptation to environmental change: contributions of a resilience framework. *Annual Review of Environment and Resources*, 32, pp.395–419.
- Niño-Zarazúa, M., Barrientos, A., Hickey, S., & Hulme, D., 2012. Social protection in Sub-Saharan Africa: getting the politics right. *World Development*, 40(1), pp.163–176.
- Norton, A., Conway, T. & Foster, M., 2002. Social protection: Defining the field of action and policy. *Development Policy Review*, 20(5), pp.541–567.
- O'Brien, K.L. & Leichenko, R.M., 2000. Double exposure: assessing the impacts of climate change within the context of economic globalization. *Global Environmental Change*, 10(3), pp.221–232.
- O'Brien, K.L. & Leichenko, R.M., 2006. Climate change, equity and human security. *Die Erde*, 137(7), pp.223–240.
- O'Brien, K.L., Leichenko, R., Kelkar, U., Venema, H., Aandahl, G., Tompkins, H., A. Javed, A., Bhadwal, S., Barg, S., Nygaard, L. & J. West, 2004. Mapping vulnerability to multiple stressors: climate change and globalization in India. *Global Environmental Change*, 14, pp.303–313.
- O'Brien, K. L., Eriksen, S., Nygaard, L., & Schjolden, A., 2007. Why different interpretations of vulnerability matter in climate change discourses. *Climate Policy*, 7(1), pp.37–41.

- O'Brien, K. L., Pelling, M., Patwardhan, A., Hallegatte, S., Maskrey, A., Oki, T., U. Oswald-Spring, U., Wilbanks, T. & P. Z. Yanda, 2012. Toward a sustainable and resilient future. In P. M. M. Field, C.B., V. Barros, T.F. Stocker, D. Qin, D.J. Dokken, K.L. Ebi, M.D. Mastrandrea, K.J. Mach, G.-K. Plattner, S.K. Allen, M. Tignor, (eds.). *Managing the risks of extreme events and disasters to advance climate change adaptation. A special report of Working Groups I and II of the Intergovernmental Panel on Climate Change (IPCC)*. Cambridge: Cambridge University Press, pp. 437–486.
- Organisation for Economic Co-operation and Development (OECD) 2007. *Territorial Reviews, Yucatan, Mexico*.
- Oportunidades, 2014. External Evaluation. [Online]. Available from: <https://www.oportunidades.gob.mx/EVALUACION/index1.php>. [Accessed August 20, 2014] Organization for Economic Cooperation and Development (OECD), 2007. *Territorial Reviews, Yucatan, Mexico*. OECD, Paris.
- Osbahr, H., Twyman, C., Neil Adger, W., & Thomas, D. S. G., 2008. Effective livelihood adaptation to climate change disturbance: Scale dimensions of practice in Mozambique. *Geoforum*, 39(6), pp.1951–1964.
- Osbahr, H., Twyman, C., Neil Adger, W., & Thomas, D. S. G., 2010. Evaluating successful livelihood adaptation to climate variability and change in Southern Africa. *Ecology and Society*, 15(2), p.27.
- Olsson, L., M. Opondo, P. Tschakert, A. Agrawal, S.H. Eriksen, S. Ma, L.N. Perch, & S.A. Zakieldean, 2014. Livelihoods and poverty. In: Field, C.B., V.R. Barros, D.J. Dokken, K.J. Mach, M.D. Mastrandrea,... (eds.) *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC)*. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 793-832.
- Orellana R., Espadas C., Conde C., Gay C., 2009. *Atlas escenarios de cambio climático en la Península de Yucatán*. Unidad de Recursos Naturales, Centro de Investigación Científica de Yucatán y Centro de Ciencias de la Atmósfera-UNAM, Mérida, Yucatán, México.
- Ostrom, E., 2009. A polycentric approach for coping with climate change. *World Bank Policy Research Working Paper*, 5095.
- Panda, A., 2013. Climate variability and the role of access to crop insurance as a social-protection measure: Insights from India. *Development Policy Review*, 31(S2), pp.57–73.
- Park, S.E., Marshall, N.A., Jakku, E., Dowd, A.M., Howden, S.M., Mendham, E., & Fleming, A., 2012. Informing adaptation responses to climate change through theories of transformation. *Global Environmental Change*, 22(1), pp.115–126.

- Parry, M., Canziani, O., Palutikof, J., van der Linden, J., & Hanson, C., 2007. *Climate change 2007: impacts, adaptation and vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the IPCC*, Cambridge University Press.
- Pasteur, K., 2011. *From vulnerability to resilience: A framework for analysis and action to build community resilience*, Warwickshire, UK: Practical Action.
- Pech, N., 2010. "Es nuestra empresa porque la hemos hecho prosperar y de eso queremos vivir en un futuro..." *Organización y manejo de recursos naturales en un ejido de la costa yucateca*. Tesis para obtener el grado de Maestra en Ciencias en la especialidad de Ecología Humana. Yucatan: Cinvestav-Unidad Mérida.
- Pelling, M., 2011. *Adaptation to climate change: from resilience to transformation*, London, UK: Routledge.
- Pelling, M. & High, C., 2005. Understanding adaptation: What can social capital offer assessments of adaptive capacity? *Global Environmental Change*, 15(4), pp.308–319.
- Pelling, M. & Manuel-Navarrete, D., 2011. From resilience to transformation: The adaptive cycle in two Mexican urban centers. *Ecology and Society*, 16(2), p.11.
- Powell, J., 1970. Peasant society and clientelist politics. *The American Political Science Review*, 64(2), pp.411-425.
- Presidencia de la República, 2011. *Quinto Informe de Gobierno*, Mexico, D.F.
- Quiñones, E., 2006. The indigenous heterogeneity of Oportunidades: ample or insufficient human capital accumulation? *MPRA Paper 19539*. The School of International Service (SIS) at American University, International Development Program.
- Ramírez, L.A., 2010. Escenario histórico social. Las relaciones peligrosas: sociedad, naturaleza y construcción de la modernidad. In D. R. & M. Méndez, eds. *Biodiversidad y Desarrollo Humano en Yucatán*. Mérida, Yucatán: CICY, PPD-FMAM, CONABIO, SEDUMA, pp. 29–34.
- Rawlings, L. & Rubio, G., 2005. Evaluating the impact of conditional cash transfer programs. *World Bank Economic Observer*, 20(1), pp.29–55.
- Reid, H. & Huq, S., 2005. Climate change: biodiversity and livelihood impacts. In C. Robledo, M. Kanninen, & L. Pedroni. (eds). *Tropical forests and adaptation to climate change in search of synergies*. Centre for International Forestry Research (CIFOR).
- Resilience Alliance, 2010. Assessing resilience in social-ecological systems: Workbook for practitioners. [Online]. Available from:
<http://scholar.google.com/scholar?hl=en&btnG=Search&q=intitle:Assessing+Resil>

[ience+in+Social-Ecological+Systems+:+Workbook+for+Practitioners#0](#) [Accessed November 12, 2013].

- Rodríguez Castelán, C., 2011. *Participation of the poorest and distributional effects of conditional cash transfer programs*. Ithaca, NY: Department of Economics, Cornell University.
- Rodríguez, E. & Pasillas, M., 2008. Efectos de Oportunidades en la economía y la infraestructura local en zonas rurales a diez años de intervención. In M. Hernández & M. González de la Rocha, (eds.). *Evaluación externa del Programa Oportunidades 2008. A diez años de intervención en zonas rurales*. Mexico, D.F.: SEDESOL, pp. 1–59.
- Rodríguez-Oreggia, E., 2010. Movilidad social intergeneracional de los jóvenes beneficiarios de Oportunidades provenientes de hogares en zonas rurales. EGAP, Tecnológico de Monterrey, Campus Estado de México, pp.1–69.
- Rodrik, D., 2006. *Industrial development: stylized facts and policies* [Online]. Cambridge, Mass: John F. Kennedy School of Government, Harvard University. Available from: <http://www.tandfonline.com/doi/full/10.1080/09638190902748938> [Accessed October 27, 2014].
- Romero-Lankao, P., J.B. Smith, D.J. Davidson, N.S. Diffenbaugh, P.L. Kinney, P. Kirshen, P. Kovacs, & L. Villers Ruiz, 2014. North America. In Barros, V.R., C.B. Field, D.J. Dokken, M.D. et al. (eds.). *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC)* Cambridge, United Kingdom and New York, NY, USA: Cambridge University Press, pp. 1439-1498.
- Rosales, M., 2003. Perder la milpa: los efectos de Isidoro en comunidades del sur del estado. *Revista de la Universidad Autónoma de Yucatán*, 17(223), pp.54–65.
- Rosales, M., 2012. Estrategias de intervención para el desarrollo local. Experiencias en comunidades mayas del sur de Yucatán. *Península CPHCS, UNAM*, 7(1), pp.79–102.
- Rosales, M. & Moya, X., 1999. *Diagnóstico socioproductivo y ambiental para el desarrollo sostenible. Microregión sur de Yucatán. Proyecto Peninsular de Desarrollo Participativo. Mecanoscrito*. Mérida, Yucatán: PNUD, SEMARNAT, Misioneros A.C y Centro INAH-Yucatán. (Cited in Rosales 2012:81-82).
- Sabates-Wheeler, R. & Devereux, S., 2007. Social protection for transformation. *IDS bulletin*, 38(3), pp.23–28.
- Sabates-Wheeler, R. & Devereux, S., 2008. Transformative Social Protection: The currency of social justice. In A. Barrientos & D. Hulme, (eds.). *Social protection for the poor and poorest. Risk, needs and rights*. London: Palgrave Macmillan, pp. 64–84.

- Sabates-Wheeler, R. & Devereux, S., 2013. Sustainable graduation from social protection programmes. *Development and Change*, 44(4), pp.911–938.
- Sabates-Wheeler, R. and Haddad, L. 2005. *Reconciling Different Concepts of Risk and Vulnerability: A Review of Donor Documents*. Brighton: IDS pp.1-7
- Sabates-Wheeler, R., Mitchell, T. & Ellis, F., 2008. Avoiding repetition: time for CBA to engage with the livelihoods literature? *IDS Bulletin*, 39(4), pp.53–59.
- Sagarpa-FAO, 2012. *México. El sector agropecuario ante el desafío del cambio climático*, Secretaria de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación. Organización de las Naciones Unidas para la Alimentación y la Agricultura. México, D.F.
- Samson, M., van Niekerk, I. & Mac Quene, K., 2006. *Designing and implementing social transfer programmes*. Cape Town: EPRI.
- Secretaría de Desarrollo Social (Sedesol), 2010. *Sedesol 2010, Aprendamos a vivir juntas. Guía de orientación y capacitación para titulares beneficiarias del programa Oportunidades*, Mexico, D.F.
- Secretaría de Desarrollo Social (Sedesol), 2011. *Reglas de Operación del Programa de Desarrollo Humano Oportunidades para el Ejercicio Fiscal 2012*, Mexico, D.F.
- Secretaría de Desarrollo Social (Sedesol), 2014. Busca el Gobierno Federal inclusión productiva a través de PROSPERA. [Online]. *Boletín de Prensa 015/2014*. Available from: https://www.prospera.gob.mx/Portal/wb/Web/busca_el_gobierno_federal_inclusio_n_productiva_a_t. [Accessed September 17, 2013].
- Shaw, K., 2012. The rise of the resilience local authority? *Local Government Studies*, 38(3), pp.281–300.
- Siegel, P.B. & Jørgensen, S.L., 2013. Global climate change justice: Toward a risk-adjusted social floor. *IDS Working Paper*, 2013(426).
- Sistema Meteorológico Nacional (SMN), No Title. [Online]. Available from: www.smn.gob.mx. [Accessed March 17, 2013]
- Skoufias, E. & McClafferty, B., 2001. Is PROGRESA working? A summary of the results of an evaluation by IFPRI. *Food Consumption and Nutrition Division*, 118.
- Skoufias, E. & Vinha, K., 2012. Grounding precious resources: climate variability and child height in rural Mexico. In E. Skoufias, (ed.). *The poverty and welfare impacts of climate change quantifying the effects, identifying the adaptation strategies*. Washington D.C.: World Bank, pp. 99–124.
- Smith, A. & Striling, A., 2010. The politics of social–ecological resilience and sustainable sociotechnical transitions. *Ecology and Society*, 15(1), p.11.

- Solórzano, A., 2006. Análisis instrumental de la conflictividad agraria en México. *AgroNuevo*, 2(15).
- Solórzano, A., 2010. *Similarities and differences in contemporary Latin American anti-poverty strategies: a comparative study in conditional cash transfers in Brazil and Mexico*. Thesis. Master in Science. University of Oxford.
- Stepan, A., 1978. *The state and society: Peru in comparative perspective*. USA: Princeton University Press.
- Stern, N., 2006. *Stern review report on the economics of climate change*, UK: HM Treasury.
- Stocker, T.F., D. Qin, G.-K. Plattner, L.V. Alexander, S.K. Allen, N.L. Bindoff, F.-M. Bréon, et al., 2013 Technical Summary. In Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen,... (eds.). *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC)*. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.
- Swiss Agency for Development and Cooperation and World Food Programme (SDC and WFP), 2011. *Building resilience: Bridging food security, climate change adaptation and disaster risk reduction*. [Online]. Available from: http://www.preventionweb.net/files/24163_workshopbuildingresiliencecasestudy.pdf. [Accessed April 14, 2014]
- Tanner, T. & Allouche, J., 2011. Toward a new political economy of climate change and development. *IDS Bulletin*, 42(3), pp.1-14.
- Tanner, T. & Mitchell, T., 2008. Entrenchment or enhancement: could climate change adaptation help to reduce chronic poverty. *IDS Bulletin*, 39(4), pp.1–19.
- Teichman, J., 2008. Redistributive conflict and social policy in Latin America. *World Development*, 36(3), pp.446–460.
- Titmuss, R., 1974. *Social policy*, London: Allen and Unwin.
- Tompkins, E.L. & Adger, W.N., 2004. Responding to climate change: implications for development. *id21 insights*, 53, p.4.
- Turner, B. L., Kasperson, R. E., Matson, P. A., McCarthy, J. J., Corell, R. W., Christensen, L., N. Eckley, J. X. Kasperson, A. Luers, M. L. Martello, C. Polsky, A. Pulsipher, & Schiller, A., 2003. A framework for vulnerability analysis in sustainability science. *Proceedings of the National Academy of Sciences of the United States of America*, 100(14), pp.8074–8079.
- Twigg, J., 2007. *Characteristics of a disaster-resilient community*, A guidance note to the DFID Disaster Risk Reduction Interagency Coordination Group, London.

- Ulrichs, M. & Roelen, K., 2012. Equal opportunities for all? – A critical analysis of Mexico's Oportunidades. *IDS Working Paper*, 413.
- Universidad Autonoma de Yucatan (no date), *Programa de Medidas Preventivas y de Mitigación de la Sequía (PMPMS) en el Consejo de Cuenca Península de Yucatán*. Conagua, UADY, Yucatan.
- United Nations Development Program (UNDP), 2008. *Human Development Report, 2007/8. Fighting climate change: Human solidarity in a divided world. Human Development and Climate Change*. United Nations Development Programme, New York.
- Vázquez, A., 2008. *Evaluación regional de la vulnerabilidad actual y futura de la zona costera mexicana y los deltas más impactados ante el incremento del nivel del mar debido al cambio climático y fenómenos hidrometeorológicos extremos*, Mexico, D.F.
- Vernon, T., 2008. The economic case for pro-poor adaptation: What do we know? *IDS Bulletin*, 39(4), pp.32–41.
- Walker, B. H., Anderies, J. M., Kinzig, P. M., & Ryan, P., 2006. Exploring resilience in social-ecological systems through comparative studies and theory development: Introduction to the special issue. *Ecology and Society*, 11, p.12.
- Warman, A., 2001. *El campo mexicano en el siglo XX*, Mexico: Fondo de Cultura Económica.
- Watts, M., 1983. On the poverty of theory: natural hazards reviewed in context. In K. Hewitt, ed. *Interpretations of Calamity: From the Viewpoint of Human Ecology*. Allen & Unwin, pp. 231–262.
- White, H. & Phillips, D., 2012. *Addressing attribution of cause and effect in small n impact evaluations: towards an integrated framework*, [Online] New Delhi. Available from: <http://www.mande.co.uk/blog/wp-content/uploads/2012/06/White-Phillips-Small-n-Impact-Evaluation-WP-version.docx> [Accessed August 14, 2014].
- Wilson, S., Pearson, L. J., Kashima, Y., Lusher, D., & Pearson, C., 2013. Separating adaptive maintenance (Resilience) and transformative capacity of social-ecological systems. *Ecology and Society*, 18(1), p.22.
- Wiseman, W., Domelen, J. Van & Coll-Black, S., 2009. Designing and implementing a rural safety net in a low income setting: Lessons learned from Ethiopia's Productive Safety Net Program 2005-2009. Washington: World Bank.
- Wisner, B., Blaikie, P., Cannon, T., & Davis, I., 2004. *At risk: natural hazards, people's vulnerability and disasters* Second. London: Routledge.
- Wood, R., 2011. Is there a role for cash transfers in climate change adaptation? [Online] In: *Social Protection for Social Justice conference*, Brighton: Institute of

Development Studies April 13-15 2011. Available from:

<http://www.ids.ac.uk/files/dmfile/GodfreyWood2011CashtransfersandclimatechangeadaptationCSPconferencedraft.pdf> [Accessed July 13, 2013]

World Bank, 2012. *Improving the assessment of disaster risks to strengthen financial resilience. A special joint G20 publication by the government of Mexico and the World Bank*. Washington D.C.

World Bank, 2013. *Building resilience: Integrating climate and disaster risk into development*, Washington D.C.

World Bank, 2014a. Climate Change Knowledge Portal: Mexico. [Online] Available from: <http://sdwebx.worldbank.org/climateportal/index.cfm>. [Accessed September 12, 2014].

World Bank, 2014b. World Development Indicators. [Online]. Available from: <http://databank.worldbank.org/data/views/reports/tableview.aspx>. [Accessed August 28, 2014].

World Vision UK., 2013. *Promoting resilience in development programming: World Vision UK's Approach, Policy and Practice Paper*, World Vision UK-PP-RU-02. London, UK.

Yaschine, I., 1999. The changing anti-poverty agenda. What can the Mexican case tell us? *IDS Bulletin*, 30(2), pp.47–60.

Yaschine, I., 2012. *¿Oportunidades? Movilidad social e impacto*. Tesis de Doctorado. El Colegio de México.

Yaschine, I. & Dávila, L., 2008. Why, when and how should beneficiaries leave a CCT programme? *Poverty in Focus*, 15. Brasilia: International Poverty Centre.

Yin, R.K., 2003. *Case study research: design and methods*. Third Edition. California: Sage Publications.

Yohe, G., Lasco, R., Ahmad, Q., & Cohen, S., 2007. Perspectives on climate change and sustainability. In M. L. Parry, O. F. Canziani, J. P. Palutikof, P. J. van der Linden, & C. E. Hanson (eds.). *Climate change 2007: impacts, adaptation and vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge, UK: Cambridge University Press, pp. 811–841.

Appendices

Appendix 1 Mexico's climate and climate change scenarios

The geography of Mexico is heterogeneous. The country covers an area of 1.96 million km² and it has two large coastal zones: one in the Pacific Ocean and another in the Atlantic Ocean, representing 11.1 thousand km (INEGI 2008). The country also has a large network of rivers grouped in the Pacific basin, Gulf basin, and interior basin. Mexico can boast of several large mountain chains, like the *Sierras Madres Occidental* and *Oriental*, and the *Sierra de Baja California* (ibid.). Mexico has a wide latitudinal band stretching from 15° to 32.5° north of the equator, and from the limit of the tropics to the arid sub-tropics (McSweeney, New and Lizcano 2010).

These aspects are reflected in the development of a wide diversity of climate zones: dry climate zones represent 51% of the country; warm climate is equivalent to 26%; temperate climate amounts to 23%; and cold climate accounts for 1% of Mexico (INEGI 2008). Mean annual temperatures are lowest in the central, upland areas (15-20°C) and higher in coastal lowland regions (23-27°C). In the far north, average rainfall is less than 50mm per month throughout the year, while in the southern regions and central highlands the wettest regions receive up to 550mm per month on average. The rainfall experienced in this region is controlled, largely, by the North American Monsoon and the position of the Inter-Tropical Convergence Zone (ITCZ). These climate variations have helped to nurture diverse ecosystems with their respective variations of flora and fauna, which makes Mexico rank second place in ecosystem types, and fourth place in its abundance of species worldwide. It is one of the four countries in the world with the greatest biological diversity, containing between 10% and 12% of the worldwide total of species (INECC-SEMARNAT 2013).

Extreme hydro-meteorological conditions, like hurricanes and floods, as well the El Niño Southern Oscillation (ENSO) and La Niña phenomena, are recurrent (INECC-SEMARNAT 2006). Hydro-meteorological hazards occur most frequently on the eastern coast of the country, particularly in the regions of the Gulf of Mexico and the Caribbean Sea, while the lower central region of the country also experiences some hydro-related hazards (World Bank 2012). Furthermore, El Niño events bring relatively

cool and wet conditions, during the winter in northern regions of Mexico, and La Niña episodes bring warmer and drier conditions at that time of the year. Likewise, while in El Niño years, the number of Pacific hurricanes increases along with decreases in Atlantic hurricanes, the opposite pattern occur in La Niña episodes (McSweeney, New and Lizcano 2010). Moreover, droughts occur in the semi-arid regions of the north, and in certain south-eastern areas (Buenfil 2009).

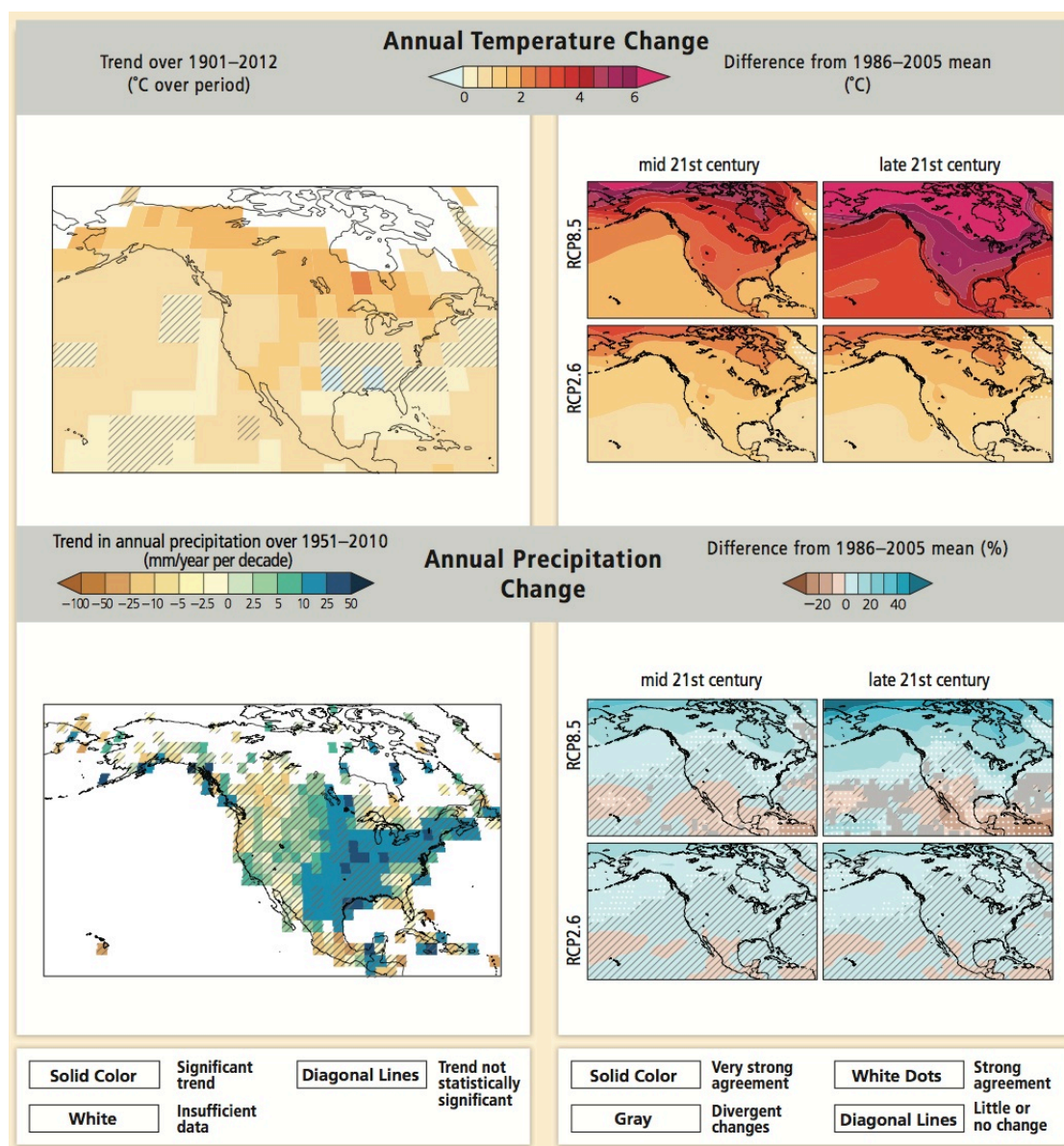
IPCC AR5: current climate trends and climate projections for Mexico

The IPCC Fifth Assessment Report (AR5) adopted four different Representative Concentration Pathways (RCPs) that describe different greenhouse gas concentration trajectories for the modelling of climate change projections.

The chapter 26 ‘North America’ of the Working Group II of the AR5, projects *very likely* increases in mean annual temperature over North America, including Mexico, with *very likely* increases in temperature over all land areas in the mid- and late-21st-century periods in RCP2.6 and RCP8.5. Ensemble-mean changes in mean annual temperature exceed 2°C over most land areas of all three countries in the mid-21st-century period in RCP8.5 and the late-21st-century period in RCP8.5, and exceed 4°C over most land areas of all three countries in the late-21st-century period in RCP8.5. However, ensemble-mean changes in mean annual temperature remain within 2°C above the late- 20th-century baseline over most North American land areas in both the mid- and late-21st-century periods in RCP2.6 (see figure A1.1) (Romero-Lankao et al. 2014).

In terms of current climate trends, the report shows that it is *very likely* that mean annual temperature has increased over the past century over most of North America (see figure A1.1). Observations also show a result in agreement with observed late-20th-century increases in extremely hot seasons over a region encompassing northern Mexico. Furthermore, the report also shows that between the mid-20th and the early 21st century increases in heavy precipitation over Mexico were found. Mixed sign of trend in dryness over Mexico are also found (Romero-Lankao et al. 2014).

Figure A1. 0.1 Observed and projected changes in annual average temperature and precipitation.



(Top panel, left) Map of observed annual average temperature change from 1901–2012, derived from a linear trend. (Bottom panel, left) Map of observed annual precipitation change from 1951–2010, derived from a linear trend. For observed temperature and precipitation, trends have been calculated where sufficient data permit a robust estimate (i.e., only for grid boxes with greater than 70% complete records and more than 20% data availability in the first and last 10% of the time period). Other areas are white. Solid colours indicate areas where trends are significant at the 10% level. Diagonal lines indicate areas where trends are not significant. (Top and bottom panel, right) CMIP5 multi-model mean projections of annual average temperature changes and average per cent changes in annual mean precipitation for 2046–2065 and 2081–2100 under RCP2.6 and 8.5, relative to 1986–2005. Solid colours indicate areas with very strong agreement, where the multi-model mean change is greater than twice the baseline variability (natural internal variability in 20-yr means) and $\geq 90\%$ of models agree on sign of change. Colours with white dots indicate areas with strong agreement, where $\geq 66\%$ of models show change greater than the baseline variability and $\geq 66\%$ of models agree on sign of change. Gray indicates areas with divergent changes, where $\geq 66\%$ of models show change greater than the baseline variability, but $< 66\%$ agree on sign of change. Colours with diagonal lines indicate areas with little or no change, where $< 66\%$ of models show change greater than the baseline variability, although there may be significant change at shorter timescales such as seasons, months, or days. Analysis uses model data and methods building from WGI AR5 Figure SPM.8. See also appendix I of WGI AR5.

Source: Romero-Lankao et al. 2014:1453

Fifth National Communication of Mexico to the UNFCCC: current climate trends and climate projections for Mexico

The most recent projections for future climate change exclusive to Mexico are contained in the Fifth National Communication of Mexico to the United Nations Framework Convention on Climate Change. These projections are based on the Special Report on Emissions Scenarios (SRES).

The report shows an increase in temperature, with a projected increase of between 2°C to 4°C by the end of the 21st century, and with the largest increases anticipated in the north of the country (INECC-SEMARNAT 2012).

Projections of mean annual rainfall from different models in the ensemble are broadly consistent in indicating decreases in rainfall for Mexico. Ensemble median values of rainfall for almost all seasons and emissions scenarios are negative. Projections vary between -60% and +8% by the 2090s, with ensemble median values of -3% to -15%. Relative changes in projected rainfall signal the strongest decreasing fall in the dry season (DJF and MAM) rainfall.

In terms of current climate trends, the report shows that in the period 1901-2009, the average surface temperature of Mexico experienced an average increase of less than 2°C. Some north-western regions have experienced greater increases than the national average, and other areas of the northeast, show a cooling trend. Likewise, the World Bank's Climate Change Knowledge Portal for Mexico (World Bank 2014b) shows that since 1960 the mean annual temperature has increased by 0.6°C, at a rate of 0.13°C per decade.

Precipitation trends in Mexico do not show any consistent increase or decrease since 1960. Some regions in the country have experienced greater increases than the national average (south-centre), while others have shown slight decreases (centre). The range of natural variability is much greater than this trend and therefore drought remains as intense as in the past, as well as episodes of rainfall above the average (INECC-SEMARNAT 2012).

Climate change institutional arrangements in Mexico

Mexico signed and ratified the United Nations Framework Convention on Climate Change (UNFCCC) held in 1992, and it is the only Non-Annex I party that has published and presented five National Communications. These integrate the scientific and governmental status of the country in terms of climate change mitigation and adaptation. The country has also created a series of institutional arrangements in order to coordinate the different actions and policies related to mitigation and adaptation to climate change, which locates it as a leader compared to other developing countries. For instance, the Federal Government created the Inter-Ministerial Commission on Climate Change, which is the main organisation to make decisions related to climate change. The National Strategy for Climate Change (developed in 2007) and the 2009-2012 Special Program on Climate Change (created in 2009) identify the key cross-sectorial actions necessary for adaptation to, and mitigation of, climate change effects. The Framework of Medium-Term Adaptation Policies was created in 2010 and sets out the national public policy approach to adaptation strategies (INECC-SEMRANT 2013). Likewise, in 2012 the Mexican Congress published the General Act on Climate Change, which "establishes definitions; distributes competencies; sets out attributions for the three levels of government; defines the principles and basic instruments for climate change policies; and establishes the goals for both adaptation policies and mitigation policies" (ibid.:19).

Mexico is also recognised for its institutional efforts to increase its disaster risk management capacity. After the earthquake in 1985 -which affected Mexico City- causing 6,000 human deaths, 250,000 homeless and 900,000 damaged homes, and accounting for more than 11.4 billion dollar losses, the country implemented the National Civil Protection System (Sistema Nacional de Protección Civil, SINAPROC) in 1986. Two main funding mechanisms have been created to finance the activities of the SINAPROC: the Natural Disaster Fund (Fondo de Desastres Naturales, FONDEN), and the Natural Disaster Prevention Fund (Fondo para la Prevención de Desastres Naturales, FOPREDEN). These funds have focused on preventive action rather than response and reconstruction, consolidating a system to protect "human integrity and the nation's material wealth" (World Bank 2012:211).

Appendix 2, List of group discussion by topic, date, and communityCoastal community:

Group discussion 1 with women: Seasonal calendar and targeting social protection interventions. Wellbeing discussion. 06/02/2012, no recording available

Group discussion 2 with women: Reflections on preliminary results. 10/07/2012, 1h, 24 min.

Group discussion with fisher folks: hurricanes, climate variability, and coping strategies. 11/07/2012 1h, 16 min.

Inland community:

Group discussion 1 with women: Seasonal calendar and targeting social protection interventions. Wellbeing discussion. 23/08/2012, no recording available

Group discussion 2 with women: Reflections on preliminary results, 10/10/2012, 50 min.

Group discussion with peasants: Droughts, climate variability, and coping strategies. 09/10/2012, 45 min.

Appendix 3.1, Survey questionnaire templates

Survey questionnaire in the coastal community

How many people live in this household?	_____
Age and education level of all household members	_____
Could you please list the ages and sexes of every person who eats and sleeps in this house?	_____
How many household members work to earn money?	_____
Does anyone in the household speaks Mayan language?	A. Mayan and Spanish B. Only Mayan C. Only Spanish
Who makes the decisions in the household?	A. Woman B. Man C. Both
What form of land tenure do you have?	A. Small owner B. Ejidatario C. Renter or borrow land from others D. Have use-right on land owned by the state E. Use-right on land owned by the community F. Use land through other arrangements (specify)
What are the livelihood strategies of the household during the year? List all activities	A. Timbering B. Backyard agriculture C. Coconut seedlings D. Off-shore fishing E. Handcrafts F. Ecotourism G. Takes care of beach houses H. Small business I. Sells food J. Taylor K. Masonry workshop L. Transportation services M. Other _____
What is the household monthly income? Cash, in kind and transfers	\$ _____
What livestock or animals does the household own?	A. Poultry b. Pork c. Cow d. Other e. None
Do you practice backyard agriculture?	A. Yes B. No
Access to social protection programmes	A. Oportunidades B. 70 y más. C. Procampo D. Other (which) F. None
Since when have you received Oportunidades	A. 1998 B. 2004 C. 2007 D. Other E. Never F. Suspended
Value of bimonthly transfer	\$ _____
In the past 12 months, has anyone threatened to suspend any social programme in case you do not give your political support to a candidate or political party?	A. No B. Yes
Why don't you receive the Oportunidades?	A. I have applied but haven't been successful B. I don't have children below 21 years old C. I don't need the economic support D. I haven't applied E. The support was suspended
Do you think the programme helps those families that need it the most?	A. Always

What percentage of the fishing production is consumed by the household?

- B. Sometimes
- C. Never
- A. All
- B. Almost all
- C. Half
- D. Less than half
- E. Nothing
- F. I don't do fishing activities

Does anyone in the household is saving money?

- A. Yes
- B. No

Where?

- A. In the house
- B. Microfinance
- C. Bank account

For what will you use the money?

- A. Consumer valuables
- B. Buy productive assets
- C. Invest in productive activity
- D. For the bad times
- E. Health expenses
- F. School expenses
- G. Food
- H. Clothing
- I. Dwelling
- J. Transportation expenses
- K. Other

Did anyone in the household receive credit within previous six months?

- A. Yes
- B. No

Where?

- A. In the house
- B. Microfinance
- C. Bank account

For what will you use the money?

- A. Consumer valuables
- B. Buy productive assets
- C. Invest in productive activity
- D. For the bad times
- E. Health expenses
- F. School expenses
- G. Food
- H. Clothing
- I. Dwelling
- J. Transportation expenses
- K. Other

Does anyone in the household receive any cash transfer from friends or family?

- A. Yes
- B. No

How much did you received the last month?

\$

What is the frequency of the transfer?

- A. Daily
- B. Weekly
- C. Every 15 days
- D. Monthly
- E. Every three months
- F. Every six months
- G. Annual

For what will you use the money?

- A. Consumer valuables
- B. Buy productive assets
- C. Invest in productive activity
- D. For the bad times
- E. Health expenses
- F. School expenses
- G. Food
- H. Clothing
- I. Dwelling
- J. Transportation expenses
- K. Other

What is the monthly household income, considering the productive activities,

- A. \$100 to \$1000

transfers from government, and from friends and family?

- B. \$2001 to \$4000
- C. 4001 to 5000
- D. \$5001 to \$7000
- E. More than \$7000

Last week, how much did you spend in?

A. Food?

\$ | | | | |

B. Transportation

\$ | | | | |

C. School expenses

\$ | | | | |

Every TWO months, how much does your household spend on:

A. Household basic services (water, electricity, gas).

\$ | | | | |

B. Clothing

\$ | | | | |

ANUALLY, how much does your household spend on:

A. School expenses

\$ | | | | |

B. Consumer durables

\$ | | | | |

C. Social and recreational activities

\$ | | | | |

D. Other

\$ | | | | |

Do you think people in the community like to participate in communitarian activities?

A. Very much

B. Somehow

C. Very little

D. None at all

How often do you share fishing production with other family members, neighbours, and friends?

A. Daily

B. Weekly

C. Every two weeks

D. Monthly

E. Never

Does your household have access to social security (IMSS, SAR/AFORE, Pension)?

A. Yes

B. No

Do you have access to health services through the Seguro Popular?

A. Yes

B. No

Does your dwelling has at least any of the following characteristics: dirt floor; the roof is made of cardboard sheets or waste; and if the walls are made of mud or daub and wattle; reed, bamboo or palm tree; cardboard, metal or asbestos sheets; or waste.

A. Yes

B. No

Does the dwelling has at least one of the following characteristics: is deprived of basic services of electricity, drainage, lack of access to water faucet, wood or coal with no chimney inside the dwelling

A. Yes

B. No

In the last year, has your family suffered from food shortages (staple food, vegetables/fruit, vegetable proteins and/or animal proteins)?

A. Yes

B. No

Does your household has any of the next consumer durables?

A. Car

B. Motorbike

C. Bicycle

D. TV

E. DVD player

F. Radio

G. Stereo

H. Laptop/computer

I. Refrigerator

During the last year did your household had a crisis such as a robbery, accident, sickness, or other, that meant an additional expenditure to the household?

A. Yes

B. No

What did you do to cope with these expenditures?

A. Ask for a loan

B. Use savings

C. Seek extra work

D. Remove children from school

E. Sell livestock

F. Sell lands

G. Sell consumer durables

- What were the main impacts that your household suffered after hurricane Isidore hit the community in 2002?
- H. Temporary migration of a family member
 - I. Permanent migration of a family member
 - J. Other _____
- What did you do to cope with these expenditures?
- A. I did not reside in the community
 - B. Total loss of the dwelling
 - C. Partial loss of the dwelling
 - D. Total loss of crops
 - E. Partial loss of crops
 - F. Loss of livestock
 - G. Loss of consumer durables
 - H. Temporary loss of livelihood
 - I. Permanent loss of livelihood
 - J. Loss of productive assets
 - K. Other _____
- What type of humanitarian aid did your household receive?
- A. Ask for a loan
 - B. Use savings
 - C. Seek extra work
 - D. Remove children from school
 - E. Sell livestock
 - F. Sell lands
 - G. Sell consumer durables
 - H. Temporary migration of a family member
 - I. Permanent migration of a family member
 - J. Other _____
- Who provided the humanitarian aid?
- A. Food transfers
 - B. Cash transfers
 - C. Consumer durables
 - D. Clothing
 - E. Construction materials
 - F. Medicines
 - G. Workforce
 - H. Other _____
 - I. None
- How long did it took to recover the household wellbeing to the level before the hurricane?
- A. Friends and family
 - B. Social organisation in the community
 - C. Government
 - D. International organisation/private sector
 - E. None
- Which are the social protection programmes that helped you the most to cope and recover your wellbeing?
- A. Less than a year
 - B. Up to two years
 - C. Up to three years
 - D. More than three years
 - E. We are still recovering
- In your household how do you get informed about the weather?
- A. Fonden programme (reconstruction of dwelling)
 - B. Oportunidades
 - C. Pet
 - D. Other _____
 - E. Not received
 - F. Received but none helped
- A. Radio
 - B. Tv
 - C. Internet
 - D. Newspaper
 - E. Authorities
 - F. Neighbours and friends
 - G. Other _____

- Is there a difference in the timing of the rainy, dry, and the north-wind seasons compared to 10 years ago?
- Do you think this has affected the productive activity in the household?
- What does your household do to cope with this impact?
- Comparing with 5 years ago, do you think the wellbeing of your household is
- What are your expectations for your future wellbeing?
- Compared to the other households in the community, your wellbeing is:
- H. We don't inform ourselves
- A. Yes
- B. No
- A. Yes
- B. No
- A. Work more hours
- B. Seek alternative income generating activities
- C. Ask for a loan
- D. Use savings
- E. Temporary migration
- F. Sell consumer durables
- G. Nothing
- H. Other _____
- A. Better
- B. Same
- C. Worse
- A. Better than the present
- B. Same as the present
- C. Worse than the present
- A. Better than the majority of households
- B. Same as the majority of households
- C. Worse than the majority of households

Survey questionnaire in the inland community

How many people live in this household?	_____
Age and education level of all household members	_____
Could you please list the ages and sexes of every person who eats and sleeps in this house?	_____
How many household members work to earn money?	_____
Does anyone in the household speaks Mayan language?	A. Mayan and Spanish B. Only Mayan C. Only Spanish
Who makes the decisions in the household?	A. Woman B. Man C. Both
What form of land tenure do you have?	A. Small owner B. Ejidatario C. Renter or borrow land from others D. Have use-right on land owned by others E. Use-right on land owned by the F. Use land through other
What are the livelihood strategies of the household during the year? List all activities	A. Hammock weaving B. Sewing C. Weeding D. Timbering E. Beekeeping F. Milpa G. Backyard agriculture and horticulture H. Masonry and construction in the city I. Hunting J. Transportation services K. Sells food L. Sells meat M. Small convenience store N. Mill O. Domestic work P. Temporary migration Q. Other _____
What is the household monthly income? Cash, in kind and transfers	\$
What livestock or animals does the household own?	A. Poultry B. Pork C. Cow D. Other E. None
Do you practice backyard agriculture?	A. Yes B. No
Access to social protection programmes	A. Oportunidades B. 70 y más. C. Procampo D. Huertos Familiares E. Other (which) _____ F. None
Since when have you received Oportunidades	\$ A. 1998 B. 2002 C. 2009 D. Other E. Never F. Suspended
Value of bimonthly transfer	\$

- In the past 12 months, has anyone threatened to suspend any social programme in case you do not give your political support to a candidate or political party?
- Why don't you receive the Oportunidades?
- Do you think the programme helps those families that need it the most?
- What percentage of the agricultural production is consumed by the household?
- Does anyone in the household is saving money?
- Where?
- For what will you use the money?
- Did anyone in the household receive credit within previous six months?
- Where?
- For what will you use the money?
- Does anyone in the household receive any cash transfer from friends or family?
- How much did you received the last month?
- What is the frequency of the transfer?
- For what will you use the money?
- A. No
- B. Yes
- A. I have applied but haven't been
- A. Always
- B. Sometimes
- C. Never
- A. All
- B. Almost all
- C. Half
- D. Less than half
- E. Nothing
- F. I don't do fishing activities
- A. Yes
- B. No
- A. In the house
- B. Microfinance
- C. Bank account
- A. Consumer valuables
- B. Buy productive assets
- C. Invest in productive activity
- D. For the bad times
- E. Health expenses
- F. School expenses
- G. Food
- H. Clothing
- I. Dwelling
- J. Transportation expenses
- K. Other
- A. In the house
- B. Microfinance
- C. Bank account
- A. Consumer valuables
- B. Buy productive assets
- C. Invest in productive activity
- D. For the bad times
- E. Health expenses
- F. School expenses
- G. Food
- H. Clothing
- I. Dwelling
- J. Transportation expenses
- K. Other
- A. Yes
- B. No
- \$ | | | | |
- A. Daily
- B. Weekly
- C. Every 15 days
- D. Monthly
- E. Every three months
- F. Every six months
- G. Annual
- A. Consumer valuables
- B. Buy productive assets
- C. Invest in productive activity
- D. For the bad times
- E. Health expenses
- F. School expenses
- G. Food
- H. Clothing
- I. Dwelling

What is the monthly household income, considering the productive activities, transfers from government, and from friends and family?

Last week, how much did you spend in?

a. Food?

b. Transportation

c. School expenses

Every TWO months, how much does your household spend in:

a. Household basic services (water, electricity, gas).

b. Clothing

ANUALLY, how much does your household spend in:

a. School expenses

b. Consumer durables

c. Social and recreational activities

d. Other

Do you think people in the community like to participate in communitarian activities?

How often do you share fishing production with other family members, neighbours, and friends?

Does your household have access to social security (IMSS, SAR/AFORE,

Do you have access to health services through the Seguro Popular?

Does your dwelling has at least any of the following characteristics: dirt floor; the roof is made of cardboard sheets or waste; and if the walls are made of mud or daub and wattle; reed, bamboo or palm tree; cardboard, metal or asbestos sheets; or waste.

Does the dwelling has at least one of the following characteristics: is deprived of basic services of electricity, drainage, lack of access to water faucet, wood or coal with no chimney inside the dwelling

In the last year, has your family suffered from food shortages (staple food, vegetables/fruit, vegetable proteins and/or animal proteins)?

Does your household has any of the next consumer durables?

During the last year did your household had a crisis such as a robbery, accident, sickness, or other, that meant an additional expenditure to the household?

What did you do to cope with these expenditures?

J. Transportation expenses

K. Other

A. \$100 to \$1000

B. \$2001 to \$4000

C. 4001 to 5000

D. \$5001 to \$7000

E. More than \$7000

\$ | | | | |

\$ | | | | |

\$ | | | | |

\$ | | | | |

\$ | | | | |

\$ | | | | |

\$ | | | | |

\$ | | | | |

\$ | | | | |

A. Very much

B. Somehow

C. Very little

D. None at all

A. Daily

B. Weekly

C. Every two weeks

D. Monthly

E. Never

A. Yes

B. No

A. Yes

B. No

A. Yes

B. No

A. Yes

B. No

A. Yes

B. No

A. Car

B. Motorbike

C. Bicycle

D. TV

E. DVD player

F. Radio

G. Stereo

H. Laptop/computer

I. Refrigerator

A. Yes

B. No

A. Ask for a loan

B. Use savings

C. Seek extra work

D. Remove children from school

E. Sell livestock

F. Sell crops

What were the main impacts that your household suffered after hurricane Isidore hit the community in 2002?

G. Sell consumer durables
H. Temporary migration of a family member

I. Pawned
J. Asked for help
K. Other____
A. I did not reside in the community
B. Total loss of the dwelling
C. Partial loss of the dwelling
D. Total loss of crops
E. Partial loss of crops
F. Loss of livestock
G. Loss of consumer durables
H. Temporary loss of livelihood
I. Permanent loss of livelihood
J. Loss of productive assets
K. Loss of beehives
L. Other_____

What did you do to cope with these expenditures?

A. Ask for a loan
B. Use savings
C. Seek extra work
D. Remove children from school
E. Sell livestock
F. Sell lands
G. Sell consumer durables
H. Temporary migration of a family member
I. Permanent migration of a family member
J. Other_____

What type of humanitarian aid did your household receive?

A. Food transfers
B. Cash transfers
C. Consumer durables
D. Clothing
E. Construction materials
F. Medicines
G. Workforce
H. Other_____

Who provided the humanitarian aid?

I. None
A. Friends and family
B. Social organisation in the community
C. Government
D. International organisation/private sector

How long did it took to recover the household wellbeing to the level before the hurricane?

E. None
A. Less than a year
B. Up to two years
C. Up to three years
D. More than three years
E. We are still recovering

Which are the social protection programmes that helped you the most to cope and recover your wellbeing?

A. Fonden programme (reconstruction of dwelling)
B. Oportunidades
C. Pet
D. Other_____

In your household how do you get informed about the weather?

E. Not received
F. Received but none helped
A. Radio
B. TV
C. Internet
D. Newspaper

Is there a difference in the timing of the rainy, dry, and the north-wind seasons compared to 10 years ago?

Do you think this has affected the productive activity in the household?

What does your household do to cope with this impact?

Comparing with 5 years ago, do you think the wellbeing of your household is

What are your expectations for your future wellbeing?

Compared to the other households in the community, your wellbeing is:

Total number of hectares of land

Do you have irrigation system in your lands?

Compared to 5 years ago, you sow:

Average production of maize per hectare

Pumpkin

Green beans

Beans

Total number of beehives

Total production of honey

E. Authorities

F. Neighbours and friends

G. Other _____

H. We don't inform ourselves

A. Yes

B. No

A. Yes

B. No

A. Diversification of crops

B. Intensification of crops

C. Changes the timing of sowing

D. Sows in different areas of the ejido

E. Changes the time schedule to go to the milpa

F. Sow more

G. Sow less

H. Seek alternative jobs

I. Intensify off-farm work

J. Use savings

K. Ask for loans

L. Go to the city to work in

M. Sell consumer durables

N. Nothing

O. Other _____

A. Better

B. Same

C. Worse

A. Better than the present

B. Same as the present

C. Worse than the present

A. Better than the majority of households

B. Same as the majority of households

C. Worse than the majority of households

A. Yes

B. No

A. More

B. Less

C. Same

Appendix 3.2, Correlation tests that were statistically significant

Fisher's Exact Test, Use Savings to cope with Isidore hurricane * Oportunidades, inland community

Crosstab				
		Oportunidades		Total
copIsiSavings	No	Count	70	33
		Expected Count	66.8	36.2
	Yes	Count	2	6
		Expected Count	5.2	2.8
	Total		72	39
	Expected Count		72.0	39.0

Chi-Square Tests					
	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	6.012 ^a	1	.014		
Continuity Correction ^b	4.275	1	.039		
Likelihood Ratio	5.725	1	.017		
Fisher's Exact Test				.022	.022
Linear-by-Linear Association	5.958	1	.015		
N of Valid Cases	111				

a. 1 cells (25.0%) have expected count less than 5. The minimum expected count is 2.81.

b. Computed only for a 2x2 table

Phi and Cramer's V Test, Asked for Loan to cope with Isidore hurricane * Oportunidades, coastal community

Crosstab		Oportunidades recipient			Total
AskedLoanIsidore	No	Count	14	59	73
		Expected Count	10.8	62.2	73.0
		% within Long term Op recipients	93.3%	68.6%	72.3%
	Yes	Count	1	27	28
		Expected Count	4.2	23.8	28.0
		% within Long term Op recipients	6.7%	31.4%	27.7%
Total	Count	15	86	101	
	Expected Count	15.0	86.0	101.0	
	% within Long term Op recipients	100.0%	100.0%	100.0%	

Chi-Square Tests					
	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	3.898 ^a	1	0.048		
Continuity Correction ^b	2.761	1	0.097		
Likelihood Ratio	4.873	1	0.027		
Fisher's Exact Test				0.061	0.040
Linear-by-Linear Association	3.859	1	0.049		
N of Valid Cases	101				

a. 1 cells (25.0%) have expected count less than 5. The minimum expected count is 4.16.

b. Computed only for a 2x2 table

Symmetric Measures			
		Value	Approx. Sig.
Nominal by Nominal	Phi	0.196	0.048
	Cramer's V	0.196	0.048
N of Valid Cases		101	
a. Not assuming the null hypothesis.			
b. Using the asymptotic standard error assuming the null hypothesis.			

Phi and Cramer's V Test, Pawned to cope with Drought * Oportunidades, inland community

Crosstab					
			Op and No Oportunidades		Total
			Non recipient	Op recipient	
copDroPawned	No	Count	41	66	107
		Expected Count	43.4	63.6	107.0
	Yes	Count	4	0	4
		Expected Count	1.6	2.4	4.0
Total		Count	45	66	111
		Expected Count	45.0	66.0	111.0

Chi-Square Tests					
	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	6.086 ^a	1	.014		
Continuity Correction ^b	3.796	1	.051		
Likelihood Ratio	7.444	1	.006		
Fisher's Exact Test				.025	.025
Linear-by-Linear Association	6.031	1	.014		
N of Valid Cases	111				
a. 2 cells (50.0%) have expected count less than 5. The minimum expected count is 1.62.					
b. Computed only for a 2x2 table					

Symmetric Measures			
		Value	Approx. Sig.
Nominal by Nominal	Phi	-.234	.014
	Cramer's V	.234	.014
N of Valid Cases		111	
a. Not assuming the null hypothesis.			
b. Using the asymptotic standard error assuming the null hypothesis.			

Phi and Cramers'V Test, Savings to cope with drought * Oportunidades, inland community

Crosstab					
			Op and No Oportunidades		Total
			Non recipient	Op recipient	
copDroSavings	No	Count	45	61	106
		Expected Count	43.0	63.0	106.0
	Yes	Count	0	5	5
		Expected Count	2.0	3.0	5.0
Total		Count	45	66	111
		Expected Count	45.0	66.0	111.0

Chi-Square Tests					
	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	3.570 ^a	1	.059		
Continuity Correction ^b	2.026	1	.155		
Likelihood Ratio	5.359	1	.021		
Fisher's Exact Test				.079	.070
Linear-by-Linear Association	3.538	1	.060		
N of Valid Cases	111				
a. 2 cells (50.0%) have expected count less than 5. The minimum expected count is 2.03.					
b. Computed only for a 2x2 table					

Symmetric Measures			
		Value	Approx. Sig.
Nominal by Nominal	Phi	.179	.059
	Cramer's V	.179	.059
N of Valid Cases		111	

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Asked for Loan Non Climate * Oportunidades recipients, inland community

Crosstab					
	Oportunidades recipients	Total			
	Op hh	Non Op hh			
Asked for Loan Non Climate	No	Count	44	32	76
		Expected Count	38.4	37.6	76.0
		% within Asked for Loan Non Climate	57.9%	42.1%	100.0%
		% within Oportunidades recipients	86.3%	64.0%	75.2%
	Yes	Count	7	18	25
		Expected Count	12.6	12.4	25.0
		% within Asked for Loan Non Climate	28.0%	72.0%	100.0%
		% within Oportunidades recipients	13.7%	36.0%	24.8%
	Total	Count	51	50	101
		Expected Count	51.0	50.0	101.0
		% within Asked for Loan Non Climate	50.5%	49.5%	100.0%
		% within Oportunidades recipients	100.0%	100.0%	100.0%

Chi-Square Tests					
	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	6.725 ^a	1	0.010		
Continuity Correction ^b	5.583	1	0.018		
Likelihood Ratio	6.902	1	0.009		
Fisher's Exact Test				0.012	0.009
Linear-by-Linear Association	6.659	1	0.010		
N of Valid Cases	101				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 12.38.

b. Computed only for a 2x2 table

Symmetric Measures			
		Value	Approx. Sig.
Nominal by Nominal	Phi	0.258	0.010
	Cramer's V	0.258	0.010
N of Valid Cases		101	

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Mann-Whitney U Test Socio-demographic, coastal community

Test Statistics ^a					
	Household size	Age of head of the household	Dependency Ratio	Educational gap	Proportion of labour units
Mann-Whitney U	986.500	1227.500	1121.500	962.500	1257.500
Wilcoxon W	2261.500	2502.500	2396.500	2237.500	2532.500
Z	-1.997	-0.157	-1.059	-2.573	-0.128
Asymp. Sig. (2-tailed)	0.046	0.875	0.290	0.010	0.898
a. Grouping Variable: Oportunidades recipients					

The data set for San Crisanto was tested for normality but it does not have a normal distribution.

Mann-Whitney U Test, Socio-demographic, inland community

	Household size	Age of the household head	Dependency Ratio	Educational gap ratio	Household total labour units	Proportion of household labour units
Mann-Whitney U	921.000	576.500	1058.000	1296.000	1226.500	1144.000
Wilcoxon W	1956.000	1611.500	3269.000	3507.000	2261.500	3355.000
Z	-3.452	-5.506	-2.595	-1.148	-1.710	-2.083
Asymp. Sig. (2-tailed)	.001	.000	.009	.251	.087	.037

The data set for Kimbila was tested for normality but it does not have a normal distribution.

Appendix 4, List of life history interviews by date, age, gender, and community

Coastal community

40 year-old recipient woman, churning poor, 24/05/2012, 40 min
 47 year-old recipient woman, churning poor, 25/05/2012, 1h 06 min
 24 year-old recipient young man, occasionally poor, 29/05/2012 1h 38 min
 50 year-old recipient woman, occasionally poor, 01/06/2012, 1h 16 min
 54 year-old recipient woman, occasionally poor, 01/06/2012, 1h 21 min
 40 year-old recipient woman, churning poor, 08/06/2012, 1h 18 min
 38 year-old recipient woman, churning poor, 08/06/2012, 2h, 20 min
 18 year-old recipient young woman, churning poor, 09/06/2012, 1h 13 min
 20 year-old recipient young man, occasionally poor, 14/06/2012, 52 min
 22 year-old recipient young woman, churning poor, 16/06/2012, 52 min
 27 year-old non-recipient young man, churning poor, 16/06/2012, 1h 28 min
 38 year-old non-recipient woman, occasionally poor, 20/06/2012, 52 min
 50 year-old non-recipient woman, churning poor, 21/06/2012, 1h
 21 year-old recipient young woman, churning poor, 22/06/2012, 1h 11 min
 38 year-old non-recipient woman, churning poor, 22/06/2012, 1h 17 min
 18 year-old non-recipient young man, occasionally poor, 23/06/2012, 43 min
 40 year-old non-recipient woman, churning poor, 26/06/2012, 1h 16min
 40 year-old non-recipient woman, churning poor, 27/06/2012, 1h 54 min
 43 year-old non-recipient woman, churning poor, 28/06/2012 no recording available
 22 year-old non-recipient young man, occasionally poor, 29/06/2012, 51 min
 45 year-old non-recipient woman, occasionally poor, 30/06/2012, 1h 19 min
 40 year-old recipient woman, churning poor, 26/06/2012, 16 min (part 1)
 30/06/2012, 51 min (part 2)
 18 year-old non-recipient young woman, occasionally poor, 03/07/2012, 1h 6min
 20 year-old recipient young woman, churning poor, 03/07/2012, 50 min
 20 year-old recipient young woman, churning poor, 03/07/2012, 43 min
 18 year-old non-recipient young man, churning poor, 06/07/2012, 41 min
 21 year-old non-recipient young man, churning poor, 08/07/2012, 1h, 18 min

Inland community

37 year-old recipient woman, churning poor, 22/09/2012, 59 min
 19 year-old recipient young woman, churning poor, 24/09/2012, 1h, 2 min
 28 year-old non-recipient young woman, usually poor, 24/09/2012, 1h, 10 min
 45 year-old non-recipient woman, usually poor, 25/09/2012, 40 min
 49 year-old non-recipient woman, usually poor, 25/09/2012, 58 min
 45 year-old recipient woman, churning poor, 26/09/2012, 1h, 44 min
 22 year-old recipient young woman, usually poor, 26/09/2012, 1h, 27 min
 25 year-old non-recipient young woman, usually poor, 27/09/2012, 49 min
 60 year-old non-recipient woman, usually poor, 28/09/2012, 1h, 53 min
 22 year-old recipient young woman, usually poor, 28/09/2012, 40 min
 53 year-old recipient woman, usually poor, 28/09/2012, 1h, 13 min
 24 year-old non-recipient young woman, usually poor, 30/09/2012, 53 min
 60 year-old recipient woman, usually poor, 30/09/2012, 1h, 36 min
 19 year-old recipient woman, churning poor, 30/09/2012, 48 min
 35 year-old non-recipient woman, usually poor, 01/10/2012, 58 min
 23 year-old recipient young woman, usually poor, 01/10/2012, 59 min
 28 year-old non-recipient young woman, usually poor, 01/10/2012, 23 min
 48 year-old non-recipient woman, usually poor, 01/10/2012, 1h, 43 min
 54 year-old recipient woman, usually poor, 02/10/2012, 2h, 28 min
 23 year-old recipient young woman, usually poor, 02/10/2012, 1h, 17 min
 27 year-old non-recipient young man, usually poor, 03/10/2012, 1h, 13 min
 22 year-old recipient young woman, usually poor, 03/10/2012, 52 min
 38 year-old, non-recipient woman, usually poor, 05/10/2012, 1h, 31 min
 19 year-old recipient young man, usually poor, 05/10/2012, 44 min
 50 year-old recipient woman, usually poor, 05/10/2012, 1h, 40 min
 67 year-old non-recipient woman, usually poor, 06/10/2012 no recording available
 28 year-old non-recipient young woman, usually poor, 06/10/2012, 1h, 38 min
 23 year-old non-recipient young woman, usually poor, 06/10/2012, 44 min
 48 year-old recipient woman, occasionally poor 07/10/2012, 1h, 3 min
 18 year-old recipient young male, occasionally poor 07/10/2012, 46 min

Appendix 5, Frequencies of the main sources and restrictions for livelihood change/progression based on life histories of the adults by poverty trajectory

Main cause of wellbeing reported by the respondent	Chronic poor	%	Churning poor	%	Occasionally poor	%	Total
Children working	7	50	6	43	1	7	14
Personal motivation/ Entrepreneurial	0	0	6	60	4	40	10
Oportunidades	4	50	3	4	1	12	8
Support with husband	2	40	2	40	1	20	5
Migration	1	25	1	25	2	50	4
Secure and waged job	1	25	3	75	0	0	4
Procampo	4	100	0	0	0	0	4
Help from family and friends	0	0	3	100	0	0	3
Small business	0	0	1	33	2	66	3
Farm work	0	0	2	100	0	0	2
Off farm work in the community	0	0	2	100	0	0	2
Capacity to plan for the future	1	50	0	0	1	50	2
Female work in income generating activity	0	0	2	100	0	0	2
Savings (as preventive)	1	50	0	0	1	50	2
Social capital/reciprocity	0	0	0	0	1	100	1
Seguro popular	0	0	1	100	0	0	1
Work in the city	1	100	0	0	0	0	1

Secondary causes of wellbeing	Chronic poor	%	Churning poor	%	Occasionally poor	%	Total
<i>Coping with crises</i>							
Off farm work in the community	2	50	2	50	0	0	4
Work in the city	4	67	2	33	0	0	6
Farm work	0	0	1	50	1	50	2
Raise sell livestock	3	75	0	0	1	25	4
Loan	0	0	5	83	1	17	6
Help from family and friends	3	20	9	60	3	20	15
Humanitarian aid	3	25	6	50	3	25	12
Savings	2	50	1	25	1	25	4
Reduce consumption	2	100	0	0	0	0	2
Pawn	2	100	0	0	0	0	2
<i>Preventive drivers</i>							
Oportunidades	7	35	10	50	3	15	20
Seguro popular	2	50	2	50	0	0	4
Social security	0	0	3	100	0	0	3
Children working	6	54	4	36	1	1	11
Loans	1	25	1	25	2	50	4
Inheritance/gifts	3	23	4	31	4	31	13
Marriage	6	33	8	44	4	22	18
Other preventive SP	1	25	2	50	1	25	4
Remittances	1	33	0	0	2	66	3
Savings threshold	8	35	10	43	5	22	23
Social capital/reciprocity	8	44	6	33	4	22	18
<i>Promotive drivers</i>							
Personal motivation	6	50	3	25	3	25	12
Farm work	10	48	8	38	3	14	21
Other promotive SP	0	0	2	50	2	50	4
Procampo	4	100	0	0	0	0	4
Pronabes	0	0	2	100	0	0	2
Capacity to plan for the future	9	53	5	29	3	18	17
Credits or loans	0	0	2	100	0	0	2
Female work in income generating activity	10	42	9	37	5	21	24
Migration	3	23	6	46	4	31	13
Off farm work in the community	9	50	8	44	1	6	18
Secure and waged job	2	22	4	44	3	33	9
Small business	4	27	6	40	5	33	15
Support with husband	7	70	2	20	1	10	10
Work in the city	3	23	5	38	5	38	13
Cheap living costs	5	83	1	17	0	0	6

Main restrictions to livelihood change/wellbeing reported by adults	Chronic poor	%	Churning poor	%	Occasionally poor	%	Total
Illness/death	7	50	4	28	3	22	14
Hurricanes	1	10	5	50	3	30	9
Lack of jobs and opportunities	3	30	5	50	1	10	9
Income poverty/economic crisis	3	50	2	30	1	20	6
Education expenses	0	0	4	100	0	0	4
Not going/children dropping out of school	3	75	0	0	1	25	4
Migration	1	50	0	0	1	50	2
Low holiday season	1	100	0	0	0	0	1
Lack of social security	1	100	0	0	0	0	1
Drought	1	100	0	0	0	0	1
Stopped productive activity	0	0	0	0	1	100	1
Transportation expenses	1	100	0	0	0	0	1
Medical expenses	1	100	0	0	0	0	1

Secondary restrictions for livelihood change/wellbeing	Chronic poor	%	Churning poor	%	Occasionally poor	%	Total
Hurricanes	9	36	11	44	5	20	25
Pregnancy	8	34	12	50	4	16	24
Not going dropping out of school	9	39	12	52	2	8	23
Illness/death	9	45	8	40	3	15	20
Education expenses	6	40	8	53	1	7	15
Child labour	6	43	6	43	2	14	14
Stopped productive activity	3	23	7	54	3	23	13
Drought	6	85	0	0	1	15	7
Gender discrimination	4	67	2	13	0	0	6
Environmental degradation	3	60	1	20	1	20	5
Divorce/split	1	25	2	50	1	25	4
Domestic violence	1	33	2	66	0	0	3
Lack of social security	0	0	2	66	1	33	3
Transportation expenses	1	33	1	33	1	33	3
Income poverty/economic crisis	0	0	0	0	2	100	2
Lack of jobs and opportunities	1	50	0	0	1	50	2
Migration	1	50	1	50	0	0	2

Appendix 6, Frequencies of the main sources and restrictions for livelihood change/progression based on life histories of the young adults by poverty trajectory

Main sources of livelihood change/wellbeing reported by young adults	chronic poor	%	churning poor	%	occasionally poor	%	Total
Parents support for education	2	17	6	60	3	50	11
Economic help from family	2	17	3	30	5	83	10
Work in the city	5	42	3	30	0	0	8
Hammock weaving	6	50	1	10	0	0	7
Entrepreneurial/personal motivation	1	8	3	30	2	33	6
Oportunidades/Pronabes	0	0	5	50	0	0	5
Have a formal job				0			4
Economic support with wife/husband	1	8	1	10	1	17	3
Help from older siblings	1	8	0	0	0	0	1
Social networks	1	8	0	0	0	0	1
Curiosity about city life	1	8	0	0	0	0	1
Motivation from friends	0	0	0	0	1	17	1
Capacity to plan for the future	0	0	0	0	1	17	1
Religion	1	0	0	0	0	0	1
Temporal agricultural work outside community	1	0	0	0	0	0	1
State transfer	0	0	0	0	1	17	1
Seguro Popular	1	8	0	0	0	0	1
Work in milpa	1	8	0	0	0	0	1
Work in ejido	0	0	1	10	0	0	1
Going to school	1	8	0	0	0	0	1
Migration	0	0	1	10	0	0	1

Secondary sources of livelihood change/wellbeing	chronic poor	%	churning poor	%	occasionally poor	%	Total
Education as investment in the future	4	33	4	40	6	100	14
Oportunidades/Pronabes	4	33	6	60	3	50	13
Parents support for education	3	25	4	40	3	7	10
Work in the city	2	17	6	60	0	0	8
Entrepreneurial/personal motivation	2	17	3	30	3	50	8
Economic help from family	2	17	3	30	2	33	7
Social networks	3	25	3	30	2	33	7
Migration	3	25	3	30	1	17	7
Economic support with wife/husband	4	33	2	20	0	0	6
Seguro Popular	4	33	0	0	1	17	5
Use of skills	1	8	2	20	2	33	5
Support from children that are lagging behind	2	17	1	10	1	17	4
Curiosity about city life	2	17	2	20	0	0	4
Help from older siblings	1	8	1	10	3	50	4
Guidance/inspiration from friend family	1	8	2	20	1	17	4
Other education grants	0	0	0	0	2	33	2
Capacity to plan for the future	1	8	1	10	0	0	2
Procampo	1	8	0	0	0	0	1
Oportunidades school expenses	4	33	4	40	3	50	11
Oportunidades motivation to study more	1	8	4	40	2	33	7
Oportunidades points	0	0	4	40	0	0	4
Oportunidades not big enough	3	25	2	20	1	17	6

Main restrictions to livelihood change/wellbeing reported by young adults	chronic poor	%	churning poor	%	occasionally poor	%	Total
Lack of jobs and opportunities	6	50	2	20	1	17	9
Illness	5	42	2	20	1	17	8
Income poverty/lack of money	1	8	3	30	3	50	7
Droughts	6	50	0	0	0	0	6
Envy from others	0	0	1	10	2	33	3
Climate variability	1	8	0	0	0	0	1
Lack of access to school resources	0	0	1	10	1	17	2
Bad influences/addictions	0	0		0	2	33	2
Not going/dropping out of school	0	0	1	10	1	17	2
Religious discrimination	1	8	0	0	0	0	1
Feels unproductive	1	8	0	0	0	0	1
Loneliness	0	0	0	0	1	17	1
Hurricanes	0	0	0	0	1	17	1
Transportation expenses	0	0	1	10	0	0	1
Lack of support from government	1	8	0	0	0	0	1
Lack of guidance in school	0	0	0	0	1	17	1
Robbery	1	8	0	0	0	0	1
Lack of skills	1	8	0	0	0	0	1

Secondary restrictions for livelihood change/wellbeing	chronic poor	%	churning poor	%	occasionally poor	%	Total
School expenses	6	50	6	60	2	33	14
Limited access to schools	8	67	4	40	1	17	13
Child labour	8	67	3	30	1	17	12
Work and study	2	17	7	70	2	33	11
Early marriage	5	42	3	30	1	17	9
Lack of jobs and opportunities	3	25	3	30	2	33	8
Transportation expenses	2	17	4	40	2	33	8
Pregnancy	7	58	0	0	1	17	8
Lack of quality in school	2	17	5	50	1	17	8
Education lag	4	33	3	30	1	17	8
Lost motivation	4	33	3	30	0	0	7
Feels unproductive	2	17	3	30	2	33	7
Drought	7	58	0	0	0	0	7
Help younger siblings to go to school	3	25	3	30	1	17	7
Income poverty/lack of money	5	42	2	20	0	0	7
Gender discrimination	2	17	3	30	0	0	5
Lack of access to school resources	2	17	1	10	1	17	5
Ethnic discrimination	3	25	0	0	1	17	4
Loneliness	0	0	4	40	0	0	4
Lack of support of children that are lagging behind	4	33	0	0	0	0	4
Illness	1	8	1	10	1	17	3
Lack of support of parents for education	2	17	1	10	0	0	3
Bullying	1	8	1	10	1	17	3
Bad influences addictions	0	0	0	0	2	33	2
Hurricanes	0	0	2	20	0	0	2
Not going/dropping out of school	9	75	5	50	2	33	16