

 **HEINRICH BÖLL STIFTUNG**  
**MÉXICO, CENTROAMÉRICA Y EL CARIBE**

**Climate Change**

# **Women who go, women who stay: reactions to climate change**

A case study on migration and gender in Chiapas

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## Introduction

 Climate change is the biggest environmental problem currently confronting humanity and affecting all socioeconomic sectors in the country and around the world. Its impact, however, is differentiated by gender, economic, social and geopolitical factors. Its effects reveal and accentuate even more the already enormous social injustice and inequality prevailing in most developing countries, affecting the groups in the population with the fewest resources and the least power.

 One of the different strategies used by individuals to confront the effects of climate change is migration, a phenomenon still only minimally studied. The exact magnitude of climate migration is not known, partly due to the difficulty in isolating climate change and environmental deterioration from other variables influencing migration—especially economic variables. Projections for the future vary drastically, with estimates of between 25 million and one billion climate migrants around the world by the year 2050.

 Both migration and climate change are becoming increasingly important in public and political agendas, and in research. Nevertheless, the gender perspective is almost completely absent in this discussion. In the analysis conducted on the relationship between climate change and migration, differences between men and women in migration, used as a strategy for adaptation, have not been addressed thus far.

 It is for this reason that, at the Foundation, we want to contribute to this debate. Our contribution at this time is this case study in which interviews were conducted with women and men in six communities in the southern Mexican state of Chiapas. Although this is not a representative study, but rather a qualitative study conducted in homes and limited to a specific region, we believe that the results provide interesting and valuable indications regarding the strategies used by women and by men to adapt to climate change—with some of them including elements for diminishing the inequality gaps between women and men.


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## Executive Summary

 This study investigates the different ways in which women and men are affected by the impacts from climate change, and possible differences in the resulting migration strategies. An empirical study was conducted in the southern part of the Mexican state of Chiapas, an area severely affected by phenomena associated with climate change, primarily increased hurricanes and tropical storms, and changes in rainfall patterns, causing landslides, flooding and changes in the dry and rainy seasons.

 The results of this case study point to important gender differences both in terms of vulnerabilities and impacts from climate change and in the migration strategies used by women and by men.

 With regard to impacts from climate change affecting women and men, the results of this study indicate that these impacts are associated with the traditional gender roles socially assigned to women and to men. Since males are assigned the role of maintaining the family and thus, generating income, they are affected by climate change primarily in economic terms, particularly in agriculture, on which the regional economy is based. The majority of males lost harvests and/or land plots due to the Mitch (1998) and Stan (2005) hurricanes, and due to severe rains and flooding in recent years, causing severe losses in their income. At the same time, climate change also severely affects males dedicated to non-agricultural activities, since the crisis in agriculture has repercussions in essentially the entire regional economy.

 This loss of income also causes severe problems for women, given their role as those responsible for the home and for feeding their families. The lack of resources to buy food, medicine and other items necessary in household reproduction generates severe difficulties and serious psychological stress. And women who must also generate income are directly affected by the difficult economic situation, just as males are. They also report diminished income primarily in commercial activities, the area in which most women tend to work. Nevertheless, in addition to the economic difficulties suffered by women, they are also directly affected by the impacts from climate change in their homes, with a considerable increase in their daily work load. Some particularly significant examples are: the constant flooding of their homes; the lack of clean water and firewood for cooking, associated with obstructed

pipes, flooded wells and constant rain; an increase in illnesses due to the wet conditions and mosquitoes; and difficulties in access to stores and clinics in other communities, due to roads blocked by landslides and flooding.

■ With respect to the relationship between climate change and migration, it was found that—consistent with the fact that the most significant reasons for migration processes are generally economic in nature—migration in this case is a reaction to the *economic* impacts from climate change, primarily in agriculture. This implies an important difference in migration by women and by men in response to climate change. While migration is a strategy for adapting to climate change for both sexes, migration by women is *less directly* associated with its impacts. Most of the men in the case study whose migration is associated with climate change have migrated due to the direct impacts from climate change on agriculture—because they lost their land plots and/or harvests. Meanwhile, most women migrate in response to indirect impacts on the overall economy. Because agriculture is considered to be a man’s activity, and few women work in this area, women migrate primarily in response to the overall depressed economy, which provokes critical losses in their income, mostly in commercial activities. Less participation by women in agriculture is also the reason that, in general, impacts from climate change play a lesser role in decisions made by women to migrate than those made by men.

■ Another important difference between migration by women and by men in response to climate change is that in the case of married couples, women do not migrate. This is a case of household, not individual, strategies, in which, due to traditional gender roles, men are the ones who must respond to adverse economic impacts from climate change by migrating.

■ Single mothers are the women most likely to migrate in response to climate change, since they must generate income to maintain their families. The loss of income from economic depression forces them to migrate in search of work, and the same is true for many young women who provide economic support to their parents.

■ Other interesting differences between migration by women and by men, in addition to those already mentioned—but not necessarily associated with climate change—are the following:



■ Our study of migration by girls and boys aged 12 to 18 found gender-related differences in relation to the concrete reasons for migration and plans to return to their communities of origin. While most young people of both sexes have plans to migrate after finishing school, the objective of continuing to study is much more important for girls than for boys. For the latter, objectives other than studying, like working to save money and building their own home are also important. This difference is because young women do not believe they can obtain work, as women, without an education and a profession. Since agriculture, the region's primary activity, is considered men's territory, there are few economic activities "appropriate" for women. This also leads to differences in the planned duration of migration. Most girls are not interested in returning to their places of origin, and instead view migration as something definitive. In contrast, most boys, after having studied or worked to save money, want to return to live in their communities of origin. This difference is obviously associated with what has just been described. For women, there are few options in their places of origin other than marrying young and becoming housewives, something most of them are not willing to do.

■ Still another interesting finding is that many women, unlike men, have a favorable view of their places of destination, which they associate with possibilities for them, as women, to work. In their places of destination there are not only more work opportunities for them, but as well, and unlike in their communities of origin, women's employment is, in general, socially accepted. Associated with possibilities to work is also another important difference between women and men, in this case related to the destinations of migration. While the United States is almost the only destination for men, many women also migrate to destinations within Mexican territory. A likely explanation is that, for women, the primary reason for migration is *to be able to work*, something difficult in their places of origin. To achieve this goal it is not necessary, however, to migrate to the United States. Urban centers and the *maquiladora* industry at the country's northern border also offer many work opportunities for women.



## 1. Introduction

■ Debate on the effects from climate change in developing countries and the relationship of these effects with environmental deterioration, on the one hand, and the mobility of people and migration, on the other, is increasingly a subject of interest scientifically and politically (EACH-FOR 2009; IOM 2008a; Tacoli 2009; IASC 2008; Meze-Hausken 2004). The UN's Intergovernmental Panel on Climate Change (IPCC) warned as early as 1990 that the displacement of millions of people due to the effects from climate change, including coastal erosion, flooding from rising sea levels, and disturbances in agriculture, could be one of the most significant impacts from this climate phenomenon (IOM 2008a). Since that time, a number of studies have attempted to research the impacts on migration, of gradual climate changes as well as the increase in extreme climatological phenomena and climate variability (IOM 2008a; Feng et al. 2010). Due to the difficulty in isolating climate change and environmental deterioration from other variables influencing migration—especially those economic in nature—it is difficult to make precise projections of the number of potential migrants from climate change. The estimates given in the studies conducted vary drastically between 25 million and a billion migrants by the year 2050. Many of the estimates lack solid empirical foundations, and reflect the great diversity in the methodologies used for analysis (Tacoli 2009; CARE/UNU-EHS 2009; IASC 2008). Among the primary factors making it necessary for people to abandon their places of residence are rising sea levels and the subsequent flooding of inhabited territory; changes in rainfall patterns and increased drought, leading to migration especially by the population economically dependent on natural resources and agriculture; and an increase in extreme meteorological events such as hurricanes and flooding, often accompanied by landslides, causing death and destroying homes and agricultural lands (Tacoli 2009; Hunter 2007; CARE/UNU-EHS 2009). Although the relationship between climate change and environmental deterioration, on the one hand, and migration, on the other, is becoming increasingly important in the debate on the effects of climate change and possible strategies for adaptation, the gender perspective is nearly absent in this discussion. So far, the possible differences between women and men in relation to migration as an adaptation strategy have not been studied in the research analyzing the relationship between climate change and migration. Taking into consideration that gender is a determining factor in social organization in all the world's societies, the absence of this variable

in analysis of the relationship between climate change and migration constitutes a significant deficit in gaining an understanding of migration as an adaptation strategy. It is well known that the impact from climate change varies between women and men, due to the different roles they have been assigned by society. Generally, due to the sexual division of labor, and unequal access between women and men to resources and decision-making power, women are more vulnerable to climate change and its effects, and their possibilities for reactions are more limited (hbf 2010; Oxfam 2010).

■ For this reason, the purpose of the current study is to investigate the relationship between effects from climate change and migration, using a gender perspective and analyzing the possible differences between women and men in relation to migration as a strategy for confronting climate change and environmental deterioration.

■ With this aim, a case study was conducted in Mexico. Climate change has and will have severe effects in this country, due to its geological and natural characteristics, its advanced environmental deterioration, the severe levels of poverty and inequality, and economic dependence on agriculture by a significant portion of the population (RIMISP/SEDRU 2009). In the northern and central parts of the country, an increase in temperature is expected, together with a reduction in rainfall. In the southern and southeastern parts of the country, the most severe impact will be an increase in extreme meteorological phenomena such as hurricanes, tropical storms and flooding. These processes may endanger the lives and homes of the population in these areas, and may severely affect their economic foundation, which is agriculture in many cases (RIMISP/SEDRU 2009; World Bank 2009; Alscher 2009; EACH-FOR 2008). In addition, Mexico is one of the world's most significant countries in terms of international migration: over 10 million Mexicans, or approximately a tenth of the population, live in the United States. Internal migration to urban centers and the *maquiladora* industry in the country's northern region is also reaching significant dimensions. Although Mexican migration is traditionally dominated by men,<sup>1</sup> increasing numbers of women have become part of migration flows

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<sup>1</sup> This is unlike other Latin American countries, such as Colombia and the Dominican Republic, in which women are the majority of migrants. Nevertheless, women have always constituted a significant portion of Mexican migration flows. Due to the lack of data classified by gender, estimates of the percentage of women in the migration flow to the United States over the last three decades vary between 9 and 23% (Marroni 2000).

in recent years. Many of these women migrate in search of work, thus abandoning the traditional vision of women who migrate for the purpose of family reunification (CIMACnoticias 2005). Currently, it is estimated that between a fourth and a fifth of migrants to the United States are women (INEGI 2000; CIMACnoticias 2005). In this context, the matter of possible differences between women and men in the migration strategies they use to confront climate change is particularly relevant.

■ The current study is based on the results from an extensive study on the impacts from climate change and environmental deterioration on migration in two Mexican states (Tlaxcala and Chiapas),<sup>2</sup> conducted during 2007 and 2008 in the framework of the “Environmental Change and Forced Migration Studies” (EACH-FOR) project dedicated to study this relationship in various countries of the world simultaneously ([www.each-for.eu](http://www.each-for.eu)). This study demonstrated that the impacts from climate change indeed function as an accelerator of the migration processes in the areas studied, especially the southern state of Chiapas (Alscher 2009). Using these results as a starting point, the current study is concentrated on two areas of Chiapas that are severely affected by impacts from climate change, with the aim of investigating possible differences between women and men in this context; specifically, whether there are differences between female and male migration in terms of volume, patterns, reasons and motivations. This study does not pretend to be representative, and instead the intention is to present an initial look at the topic and identify lines of research for future study.

■ The study was conducted in the municipalities of Motozintla, in the Sierra Madre de Chiapas mountains, and Mazatán, in the Soconusco coastal region. Field research was carried out in a total of six communities; apart from interviews with experts, qualitative interviews were conducted with migrant and non-migrant women and men.

■ This text consists of three sections. In the first section the current discussion on climate change, migration and gender will be outlined, first describing the debate on climate change and its effects on migration, and then explaining why it is necessary to study the effects of climate change from a gender perspective. The second section

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<sup>2</sup> Alscher, Stefan (2009): Environmental factors in Mexican migration: The case of Chiapas and Tlaxcala. Mexico Case Study Report; Environmental Change and Forced Migration Studies (EACH-FOR), 2009.

includes a description of the empirical context of the case study, in terms of climate change and migration in Mexico, and a description of the study areas and study methodology used. In the last section, the results of the empirical research will be presented. First, the results will be described in terms of the differentiated vulnerability between genders, and the specific impacts from climate change for women and men in the areas studied, as a basis for understanding the possible differences in strategies used in relation to migration. Secondly, the results will be presented in terms of differences between women and men in relation to migration as a strategy. Lastly, the main results will be summarized.

## 2 Framework: Climate change, migration and gender

### 2.1 Climate change and its impacts on migration

■ Climate change has significant repercussions on the means of living for a significant portion of the world's population. Among the most important of these impacts that are already evident today—and will intensify in the future—are gradual changes such as rising sea levels, changes in the intensity, timing and geographic distribution of rainfall and changes in temperature, in addition to the impacts more visible in the short term, such as changes in the frequency, intensity and duration of extreme climatological events such as droughts, flooding and tropical storms (IPCC 2007b; RIMISP/SEDRU 2009; World Bank 2009).

■ These effects impact developing countries in particular, on the one hand due to their geological characteristics, and on the other, because of their levels of poverty and inequality, and the lack of resources for developing effective adaptation measures. These factors, especially in combination with signs of environmental deterioration, such as increasing deforestation, erosion and desertification in many countries, are currently forcing the populations in affected regions to develop adaptation strategies. Some examples of the measures adopted by populations inhabiting affected areas are searching for other sources of income, changing patterns of growing crops, and adapting housing construction to increased temperatures and rainfall, and flooding. In this context, an important strategy for many will be to abandon their places of residence and migrate to other areas—and in many cases this will be the only viable option in response to the effects of climate change, including losses

of coastal areas due to rising sea levels, prolonged drought and/or rainfall affecting agriculture, and an increase in phenomena such as hurricanes and flooding. These effects frequently imply the destruction of entire villages and in many cases the affected population will have no other choice but to migrate to areas less affected (IPCC 2007b; CARE/UNU-EHS 2009; IOM 2008a; Hunter 2007).



Flooded kindergarten. López Mateos, Mazatán Municipality, September 2010  
Photo: Nestor Quintana de León

### Scientific debate on the relationship between climate change and migration

■ In the emerging research in this area, the relationship between climate change and migration processes and the magnitude of potential migration flows in the future are intensely discussed at a scientific level (EACH-FOR 2009; Tacoli 2009; Feng et al. 2010; IOM 2008a). This is due to a number of factors, the most important of which is that the effects from climate change and environmental deterioration constitute only one of various elements causing migration flows, and it is difficult to isolate this element from other motivations leading to the decision to migrate, and to evaluate its importance in relation to other elements. It is evident

that other factors have a strong influence on the decision to migrate, and in most cases, the primary motivation consists of economic reasons. Thus, the impacts from climate change may become an element of increasing importance in many regions, but it will seldom be the only relevant factor in migration (EACH-FOR 2009; IOM 2008a; Tacoli 2009).

■ Another difficulty encountered in attempts to predict migration flows due to climate change is the fact that, although some of the effects such as changing temperatures and increased extreme meteorological phenomena can currently be measured, most of these effects will not be perceptible until several years in the future. Therefore, due to the complexity of these processes, it is extremely difficult to precisely predict the effects in specific areas (IPCC 2007b; RIMISP/SEDRU 2009; Tacoli 2009).

■ Another problem in the debate on the impacts from climate change on migration is the lack of empirical research on processes currently underway; most of the scientific discussion is concentrated on projections for future migration processes on the basis of climatological models, and seldom includes results from empirical research on processes taking place (EACH-FOR 2009).

■ Nevertheless, even though it is impossible to precisely predict, based on existing climatological knowledge and models, how many people will decide to migrate in response to climate change within the next 40 years, the few empirical studies conducted in recent years have proven that migration, as a strategy for adapting to climate change, is already a reality that can be observed in many regions. An important exercise in this context is the "Environmental Change and Forced Migration Scenarios (EACH-FOR)" project that conducted empirical studies during 2007 and 2008 on the effects of climate and environmental changes on migration processes currently underway. In all, 23 case studies were conducted in Latin America, Africa, Europe, Asia and the Middle East. One of the primary results from the case studies is the conclusion that migration is a strategy adopted primarily when climate and environmental changes threaten livelihoods, especially when agriculture is affected by environmental degradation or extreme weather events, and that in this context, an increase in *permanent* migration is evident (EACH-FOR 2009).



### Main effects of climate change that accelerate migration

■ Thus far, the effects from climate change that exert the most pressure on the affected population and that have the potential to act as accelerators of migration, are extreme weather events. Examples of these events are hurricanes and flooding, and changes in rainfall and temperature patterns, especially when they are accompanied by landslides, which can directly endanger the lives, homes, and properties of the population inhabiting the area, forcing them to migrate to other areas less affected (Tacoli 2009). At the same time, phenomena associated with an increase and intensification in climate variability and changes in rainfall and temperature patterns, increased droughts, desertification and changes in dry and rainy seasons primarily affect the productive sector that is the economic foundation for a significant portion of the population in developing countries: agriculture.

■ Since for a significant portion of the population in developing countries, agricultural production constitutes the primary source of income, and agriculture for family consumption is often an important element in providing food for families, the impacts from climate change and environmental deterioration, often severely affecting agricultural production, constitute one of the main incentives for migration due to climate change (CARE/UNU-EHS 2009; Hunter 2007; Feng et al. 2010; Tacoli 2009). Migration is an important strategy for the rural population in many countries, aimed at confronting the various factors threatening the viability of small-scale agriculture, such as the constant decline in prices for primary products and economic liberalization in the 1980s (Hunter 2007; CARE/UNU-EHS 2009). However, among the factors determining emigration in rural areas, the damaging impacts of climate change are becoming increasingly important. For example, in African countries such as Burkina Faso and Ethiopia, severely affected by declining rainfall and increases in long droughts, short-distance migrations have already been documented as reactions to the damaging impacts of these processes on agriculture (Hunter 2007). As well, in a number of case studies in the EACH-FOR project, examples of migration movements in reaction to environmental deterioration and climate change were found in countries such as Vietnam, Bangladesh, Ecuador and Mexico. Migrations were detected in these countries in reaction to flooding of agricultural lands, landslides, changes and irregularities in rainfall patterns, cyclones and hurricanes, and the *El Niño* phenomenon in South America (EACH-FOR 2009). With the projected intensification of changes in rainfall, increased temperatures, and increasing desertification in

many areas, it is likely that migration will be increasingly important as an adaptation strategy in many developing countries, especially for groups and sectors of the population characterized by greater vulnerability (CARE/UNU-EHS 2009; Hunter 2008).

## 2.2 Climate change and Gender: Vulnerabilities and impacts differentiated by gender, and implications for adaptation strategies

### Gender differences in vulnerabilities to climate change

■ Impacts from climate change on individuals and different groups of the population are associated with their respective vulnerabilities. Here, vulnerability is understood, according to the Intergovernmental Panel of Experts on Climate Change (IPCC), as the *“the degree to which a system is susceptible to, and unable to cope with, adverse effects of climate change, including climate variability and extremes”* (IPCC 2007a: 883). According to this definition, *“vulnerability is a function of the character, magnitude, and rate of climate change and variation to which a system is exposed, its sensitivity, and its adaptive capacity.”* (IPCC 2007a: 883).

■ Thus, vulnerability depends on the degree to which a population group is exposed to climate change impacts, on its sensitivity to these impacts and on its capacity for adapting to them. Basically, population groups that are marginalized, whether economically, politically or socially, are more vulnerable to climate change, and they will be the most severely affected by its impacts, since they are often exposed to climate change phenomena (for example, when they live in high-risk areas such as mountain slopes and along rivers), they are more sensitive to such events (particularly in rural areas, where most of the world’s poorest population lives, the survival of a significant portion of the population depends directly on natural resources very much affected by climate change impacts), and they have less capacity for adaptation especially due to the lack of economic resources.

■ In this context, there has been a growing recognition in recent years of the fact that climate change also has a different impact for women than for men. Due to the gender roles historically and socially assigned to women and men, and the sexual division of labor, their vulnerabilities in relation to climate change are different and they are affected in an unequal manner by its impacts (PNUD 2009a; FAO 2010; hbf 2010; INSTRAW 2005). A number of empirical studies have investigated vul-

nerabilities in relation to climate change from a gender perspective, and it has been documented that women are generally those more exposed to and more affected by its impacts, due to their roles and responsibilities in society and in the home (hbf 2010; WEN 2010; also see PNUD 2008). Specifically, women are those responsible for caretaking tasks, while men are those providing the family's economic support, generally through wage-earning work or agricultural activities. These differentiated dynamics have diverse implications: unequal access to both material resources—women generally do not earn income or earn less income than men—and knowledge; less participation by women in the public sphere and in decision-making processes, and therefore in positions of power; and less social status for women than for men (PNUD 2009a; Martínez Corona 2003; hbf 2010).

■ These factors, added to women's more limited mobility in comparison to men's—due to their role in caring for the home—together with holding fewer land property titles in many rural areas, as well as having a generally lower educational level, all make women more vulnerable to climate change events, and diminish their capacities for adapting to these events (PNUD 2009a; IOM 2008b; FAO 2008; PNUD 2009b). This indicates to us that in many cases most of the burden from climate change impacts falls on women. In a number of studies it has been documented that women's responsibilities in terms of caring for and looking after the health of family members—especially children and the elderly—and providing them with food and water, imply that women are generally those in charge of addressing the problems associated with increased illnesses caused by rising temperatures, increased rainfall and epidemics, problems of access to water, more difficulties providing food, etc. (hbf 2010; PNUD 2009a). It is also widely documented that when natural disasters strike, the majority of victims tend to be women, due to their reduced mobility and their role in taking care of children, the sick and elderly. What this implies is that women attempt to protect family members before saving their own lives (IOM 2008b; Oxfam 2010; UICN). For example, when Asia was hit by the tsunami in 2004, nearly 80% of the victims in some regions of India were women (IOM 2008b).

### Implications for adaptation strategies

■ The differentiated impact of climate change for women and men has significant implications for potential adaptation strategies. The IPCC defines adaptation as "adjustment in natural or human systems in response to actual or expected climatic

stimuli or their effects, which moderates harm or exploits beneficial opportunities” (IPCC 2007a: 869), and it distinguishes between adaptations that are preventative or reactive, private or public, autonomous or planned (IPCC 2007b: 76). Because of the different capacities and opportunities as well as the different priorities of women and men, we find that their reactions and strategies for adapting to changes—such as migration—can also be different (IPCC 2007b: 76). Thus, knowledge in areas such as agriculture, access to water or gathering food may be different between women and men, and consequently lead to the adoption of different strategies in response to climate change. For example, in a study conducted in rural areas of South Africa, it was found that women—who are in charge of agriculture in most of Africa—have much more knowledge regarding possibilities for adaptation in agriculture, the use of crops and seeds that are more resistant to drought, etc. (hbf 2010).

■ Also, due to the differences in the roles and responsibilities of women and men, priorities for potential adaptation strategies may differ by gender. For example, the importance placed on the different contexts in which water is used (agriculture, domestic chores, for animals, etc.)—in a context of increasing scarcity of water—may depend on the daily responsibilities of women and men. To date, even though gender is acknowledged as a key factor, and it has been incorporated in assessments of vulnerabilities to climate change, a gender perspective is seldom included in the research, development and implementation of viable adaptation strategies that are sensitive to gender (FAO 2010).

■ With regard to migration as an adaptation strategy, the differences between gender in terms of priorities and possibilities in response to climate change impacts, as well as their different roles and vulnerabilities likely produce differences between the migration strategies used by women and men. Of the various differences typically observed in the migration patterns of women and men, some have been documented in detail in the research on migration. For example, due to women’s reduced access to material resources (necessary for paying the costs involved in migration) and also non-material resources such as social networks, women’s migration possibilities may be more limited than those of men. And sometimes, it is simply not socially accepted for women to migrate, due to their role in taking care of the home and family (ALOP/enlace 2009). Nevertheless, **in the context of climate change and its unequal impacts on women and men, the possible**

differences or similarities characterizing migration as an adaptation strategy used by women and by men have not yet been explored. (IOM 2008b).

### 3 Case study: Empirical context and introduction to the areas studied

■ As mentioned in the introduction to this text, the case study was conducted in Mexico, in the southern state of Chiapas that borders Guatemala. The following section will give a synthesis of climate change and its impacts in Mexico and in Chiapas, followed by a brief description of the socioeconomic context in Chiapas, and the history and patterns of migration in Mexico and in Chiapas. Then the area studied in southern Chiapas will be introduced.

#### 3.1 Empirical context: climate change and migration in Mexico and Chiapas

##### 3.1.1 Climate change in Mexico and Chiapas

###### Effects of climate change in Mexico

■ In Mexico, due to the considerable size of its territory, together with its diversity in topography and vegetation, climate change will have varying effects. In the warm, arid areas in the north and northwest, significant reductions in rainfall and rising temperatures are predicted, with the resulting increase in droughts. In the warm, humid areas along the coastline in southern and southeastern Mexico, located between the Caribbean, the Gulf of Mexico and the Pacific Ocean, the most severe impacts will consist of an increase in extreme meteorological phenomena such as hurricanes and tropical storms, and also in changes in rainfall patterns, as well as the gradual displacement of the semi-arid conditions in the north-northwestern area to the south-southeastern area, with the respective impacts on ecosystems (World Bank 2009; RIMISP/SEDRO 2009; EACH-FOR 2008). Finally, in the long term, there is a danger in these areas of rising sea levels, particularly in the low-level Gulf of Mexico and Caribbean areas (Alscher 2009). The impacts from climate change are more severe due to the advanced state of environmental deterioration—which increases vulnerability to climate changes. The advanced state of deforestation and soil erosion in large parts of the country—particularly in the southern states—considerably increases the risk of flooding, landslides and overflowing rivers in the

context of increased extreme weather events and changes in rainfall patterns (RIMISP/SEDRO 2009; Alscher 2009; EACH-FOR 2008). One of the most severe effects of these phenomena is the one related to agriculture, since approximately a fifth of Mexico's population live in rural areas and agricultural activities are a fundamental part of their income. In addition poverty is much more pronounced in rural areas, making this population more vulnerable to climate change impacts. This is particularly true for small producers who do not have irrigation systems (World Bank 2009).

### Effects of climate change in Chiapas

■ In Chiapas the most important impacts from climate change consist of an increase in the number and intensity of extreme meteorological phenomena. According to the study conducted in the EACH-FOR project mentioned earlier, the incidence of hurricanes and tropical storms in Chiapas—which has always suffered these phenomena, due to its location between the Pacific Ocean, the Caribbean and the Gulf of Mexico—has increased since the mid-1990s, as in other southern Mexican states (Alscher 2009). In addition, the advanced environmental deterioration in Chiapas increases vulnerability to these phenomena. According to data from Greenpeace Mexico, 76% of the forested area in Chiapas is in a state of degradation, generating a severe erosion problem (Castro Soto 2005). Thus, the heavy rains accompanying hurricanes and tropical storms often lead to serious, prolonged flooding and cause landslides that completely bury homes and agricultural lands (Alscher 2009; Angulo Barredo 2010). In recent years, the two most significant phenomena in this context in Chiapas were the already-mentioned Hurricane Mitch in 1998, and Hurricane Stan in 2005, which had devastating impacts in a number of areas in the state (Alscher 2009). For example, Hurricane Mitch caused the death of between 400 and 500 people and destroyed 200,000 hectares of crops in Chiapas (Castro Soto 2005; Villafuerte/García 2008). Hurricane Stan caused the death of approximately 500 people and damages in 600-800 localities. The prolonged rainfall and serious landslides led to the total destruction of the homes of 25,000 families, in addition to the loss of hundreds of thousands of hectares of cropland (Villafuerte/García 2008; Ruiz Meza 2010).

■ In addition to hurricanes and storms, other changes were registered in rainfall, as well as more prolonged droughts and changes in the start of the rainy season,

accompanied by an increase in forest fires (Ruiz Meza 2010). All of this not only directly endangers the lives and homes of the affected population, but also severely affects the region's economy—based primarily on agricultural production and commercialization—and finally, also affects the population's socioeconomic situation.

### 3.1.2 Socioeconomic context in Chiapas

■ Chiapas is particularly vulnerable to these phenomena, not only due to high levels of deforestation, but also because of high levels of poverty and marginalization and the predominantly rural nature of the state—factors that increase the population's vulnerability to climate change. The state ranks first in the country in poverty and marginalization, and this has intensified over time: between 1990 and 2000 the percentage of the state's population earning two minimum wages or less increased from 61% to 76%, and of the population that received an income in the year 2000, three-fourths received less than one minimum wage (Villafuerte/García 2008; Villafuerte/García 2006).<sup>3</sup>

■ The situation is especially severe in rural areas, where the majority of the Chiapas population lives. In the year 2000, 71.4% of the population lived in rural areas, and today, 45% of the economically active population works in agriculture (in comparison to 15.8% nation-wide). The agricultural sector only contributes 15.5% of the state's GDP, however, indicating the low productivity of the agricultural sector and the resulting poverty of the population dedicated to this activity (ALOP/enlace 2009; Villafuerte/García 2008). The majority of small producers in Chiapas grow coffee, corn and beans, these products together representing 65% of the state's cultivated land (Villafuerte/García 2006). More than 80% of the coffee plots are five hectares or smaller, indicating one of the causes of extended poverty (Villafuerte/García 2008). Other economically important crops are bananas and mango, grown primarily in large plantations in the low-lying areas of the state (Villafuerte/García 2008).

■ The agricultural sector in Chiapas has been suffering a severe crisis for some time now. It started with the generalized rural crisis that began in Mexico in the

<sup>3</sup> In 2010, the minimum wage (salario mínimo) in Mexico was around 56 MXN (4.65 US-\$) per day, which adds up to 1,340 MXN (111 US-\$) per month.

1970s, and then intensified with the economic liberalization policies of the 1980s and 1990s. The economic liberalization process in Mexico included, on the one hand, the withdrawal of the State from the economy, accompanied by severe reductions in public spending in the rural sector and the dismantling of institutions for providing agricultural aid. Secondly, it included a drastic trade liberalization that began when Mexico entered the General Agreement on Tariffs and Trade (GATT) in 1986. The opening of the Mexican economy to foreign trade intensified until the point of total liberalization of trade with the United States and Canada in the framework of the North American Free Trade Agreement (NAFTA) that went into effect in 1994 (Villafuerte/García 2008).

■ Another key factor in the agricultural crisis in Chiapas was the prolonged drop in international coffee prices, beginning in the late 1980s. The international coffee price dropped from 180 dollars per quintal in 1986, to 53 dollars in 1992 (Villafuerte/García 2008). As the rural crisis has become increasingly severe in response to these processes, poverty in rural areas has intensified. Between 1990 and 2000, the per capita GDP in rural areas did not increase in real terms, and in 2000, over 90% of the rural labor population reporting income earned two minimum wages or less, indicating a severe process of rural impoverishment (Villafuerte/García 2006; Villafuerte/García 2008).

### 3.1.3 Migration in Mexico and Chiapas

#### Migration in Mexico

■ Migration in Mexico, at both national and international levels, has a long history. The internal migration flow has been directed primarily toward urban centers (especially Mexico City), as well as the *maquiladora* industry in the northern border region, large agricultural plantations in the country's northwestern region, and tourist areas along the coasts. International migration, for its part, has been directed almost exclusively toward the United States. Migration to the United States began in the 19<sup>th</sup> century, and then significantly intensified particularly with the *Bracero Program*<sup>4</sup> for hiring Mexican laborers, a program that began in the 1940s.

<sup>4</sup> The *Bracero Program* was a program for hiring labor (primarily for the agricultural sector) that was negotiated by the Mexican and US governments in 1942 in response to an impending scarcity of labor in the United States. The program was in effect between 1942 and 1964,



By the period between 2001 and 2005, approximately 400,000 migrants were arriving every year (CONAPO 2005; Durand 2005). Traditionally, the migration flow was directed particularly toward the US central-western region (referred to as the “traditional region”), since the *Bracero* Program was focused in this part of the country, and over time strong transnational migration networks were established there. Nevertheless, beginning with the 1980s and 1990s, and as a consequence of Mexico’s agricultural crisis and the socioeconomic effects of economic liberalization, Mexico’s international migration increased considerably. Since that time, there is now reference to a “new era of migration” (CONAPO 2005). At the same time, Mexican states, mainly in the country’s central and south-southeastern regions, in which migration was not previously a significant phenomenon, were gradually incorporated into the list of states with considerable outgoing migration flows (Freyermuth et al. 2008; Villafuerte/García 2006).

### Migration in Chiapas

■ One of these is Chiapas, being one of the states most recently becoming part of the areas in Mexico where migration originates. There has always been considerable intra-state migration within Chiapas, particularly temporary migration to coffee plantations, and beginning in the 1970s, also considerable migration to tourist and petroleum-producing areas in neighboring states, and also to Mexico City. Until recently, however, there were very low levels of migration to the northern part of the country and especially to the United States. (Villafuerte/García 2006; ALOP/enlace 2009; Santacruz/Pérez 2009). This is due to a series of factors, and one of those especially worth mentioning is that the system for hiring workers functioned exclusively for internal migration; secondly, Chiapas participated only minimally in the *Bracero* Program; and a third factor points to high levels of poverty and marginalization (extreme poverty is not associated with international migration because of the high costs of traveling) (Villafuerte/García 2008).

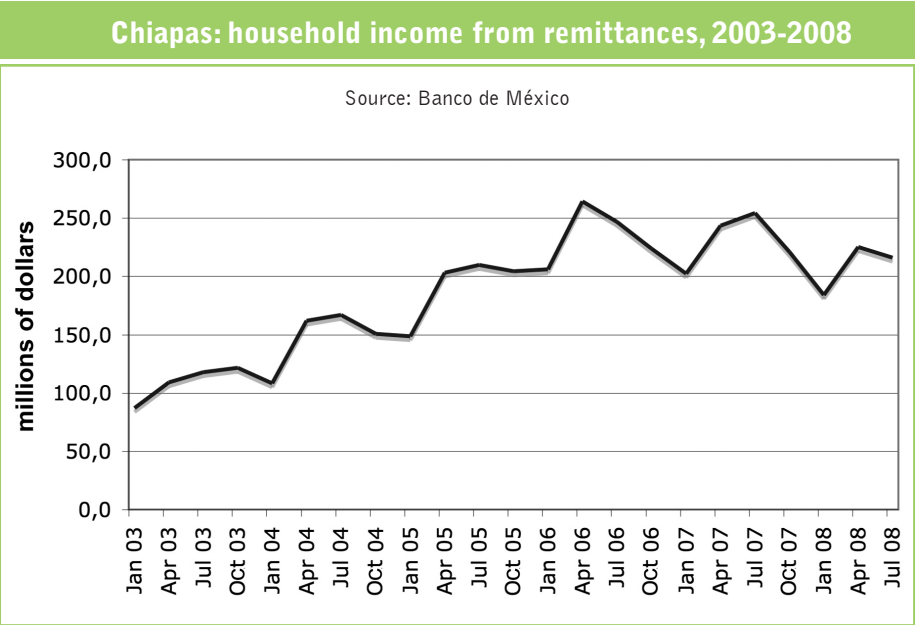
■ Since approximately 15 years ago, however, migration to the northern part of the country and to the United States has increased considerably, and since the year 2000, Chiapas is one of the major states in which migration toward those destinations originates. In the case of internal (national) migration, the most significant

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and mobilized an average of 350,000 workers annually, with a total of 4.5 million workers during the twelve years it was operating (Durand 2005).

destinations are—apart from the state of Mexico, Mexico City (Federal District) and Quintana Roo—the *maquiladora* industries and the agro-industrial areas of Baja California, Sonora, Jalisco, Sinaloa, Chihuahua and Tamaulipas (Ruiz Meza 2010; Villafuerte/García 2006; ALOP/enlace 2009).

■ According to data from the *Banco de México*, the remittances sent to Chiapas increased from approximately 75 million dollars in 2003, to approximately 210 million dollars in 2007, indicating a strong increase in migration flows.<sup>5</sup> In 2005 remittances sent to Chiapas represented four times the value of the state’s coffee production—and coffee ranks number one among the state’s export products (Santacruz/Pérez 2009; CESMECA-UNICACH 2010). With this increase, Chiapas went from being ranked as number 27 among Mexican states receiving remittances to number 11, and in a period of only ten years (1995-2005) (Villafuerte/García 2008).



<sup>5</sup> Due to a lack of precise data on the magnitude of migration, the amount of remittances is an important indicator for measuring migration processes.

■ The most important regions of Chiapas where these migration processes originate are the Soconusco and Costa regions. Approximately one-third of migrants from Chiapas living in the United States are from these regions (Freyermuth et al.). However, recently the Sierra and Fronteriza regions are also becoming significant in this regard (Ruiz Meza 2010; ALOP/enlace 2009).

■ The increase in migration from Chiapas is due to a number of factors. Clearly, the main trigger for migration from Chiapas “to the north” is the prolonged agricultural crisis, particularly because of the already-mentioned neoliberal policies beginning in the 1980s and the implementation of NAFTA, as well as the severe drop in international coffee prices. Another important factor is the Zapatista uprising in 1994, with the subsequent armed conflicts, which led to displacements of populations, which in turn contributed to the increase in migration processes (Villafuerte/García 2008). Nevertheless, during the last decade, impacts from climate change and particularly from extreme meteorological phenomena—especially the two hurricanes, Mitch (1998) and Stan (2005)—were significant factors triggering international migration (Castro Soto 2005; Villafuerte/García 2008; ALOP/enlace 2009).

### Women’s participation in Chiapas’ migration flows

■ Women play an important role in intra- and inter-state migration in Chiapas. In inter-municipal migration, women represent 53% of the migration flow, and according to data from the 2000 General Population and Housing Census, slightly more than half of the over 330,000 residents of Chiapas who migrated to other Mexican states were women. The primary destinations were the state of Mexico, Mexico City (Federal District), Tabasco, Veracruz and Quintana Roo (Freyermuth et al. 2008; INEGI 2000). Of these women, 80% were between the ages of 15 and 34 (Villafuerte/García 2006). The available data on migration to the United States are not very reliable. According to a number of experts, statistics from the 2000 General Population and Housing Census significantly underestimate migration flows from Chiapas (Santacruz/Pérez 2009; also see Villafuerte/García 2006). Nevertheless, what is certain is that the migration flow from Chiapas to the United States consists of mostly men—as in the rest of the country. According to data from the 2000 Census, approximately 20% of international migration from Chiapas consists of women (Villafuerte/García 2006). Other sources mention slightly different statistics. Ac-

According to the Survey on Migration at Mexico's Northern Border (*Encuesta sobre Migración en la Frontera Norte de México*—EMIF), which only counts migrants turned back by the border patrol—and this is not necessarily a precise indicator of migration processes—4% of Chiapas migrants turned back in 1994-95 were women, while 13% in 1999-2000 were women, indicating a significant increase in women's participation in international migration (Freyermuth et al. 2008; ALOP/enlace 2009). Other sources also verify that women's participation in international migration is increasingly significant, and this tendency was confirmed in interviews with experts.<sup>6</sup> This is consistent with a national tendency. Specifically, according to the 2000 Census, a fourth of Mexican migrants going to the United States in 2000 were women, while some decades ago, women represented less than a sixth of the total (INEGI 2000; CIMACnoticias 2005; Marroni 2000; Cerrutti/Massey 2001).

### 3.2 Introduction to the areas studied

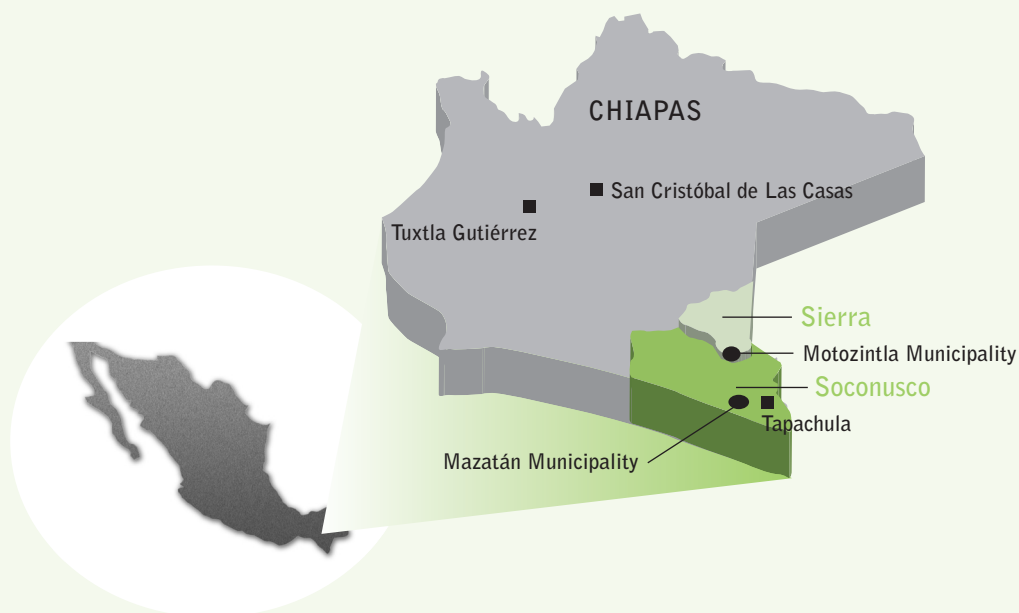
Research was conducted in the southern part of Chiapas, in two of its nine geographic regions. For the purposes of this study, one municipality was selected from each of the two regions: the Mazatán municipality in the Soconusco coastal lowland region, and the Motozintla municipality in the Sierra mountain region. Both municipalities are predominantly rural.

#### Mazatán municipality, Soconusco region

Soconusco extends from the Pacific Ocean coast to the Sierra Madre mountains. It is the region in Chiapas with the lowest index of marginalization, and its population is predominantly *mestizo*. Thus, in Mazatán, the municipality selected for this study, less than 1% of the population speaks an indigenous language (INEGI 2005; Oliva 2003). The engine of Soconusco's economy, employing over 50% of the labor force, is the primary sector, and in particular, export agriculture. Soconusco is characterized by very fertile land and a warm, humid climate, and its agricultural activities are strongly linked with international markets, especially the US market (Santa-cruz/Pérez 2009; Santacruz et al. 2007). For example, of the total population of

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<sup>6</sup> Interview with Laura Ruiz Meza, a researcher with the Centro de Estudios Superiores de México y Centroamérica (CESMECA) at the Universidad de Ciencias y Artes de Chiapas (UNICACH), and with Mercedes Olivera, CESMECA-UNICACH, San Cristóbal de las Casas, 6.9.2010.



24,000 in the Mazatán municipality, 60.5% of the economically active population works in the agricultural sector, while 21.5% works in commerce and other services (INEGI 2000). In Soconusco's primary sector, the most important crop is coffee, both in economic terms and in total land cultivated. Coffee is grown in the higher regions next to the Sierra, both in large plantations and by small producers. The crops next in importance economically are bananas and mango, both grown at low elevations, and together these three crops represent over 80% of Soconusco's total agricultural production (Santacruz/Pérez 2009). However, the second most important crop in terms of total land cultivated (after coffee) is corn, representing 25% of the total land cultivated, since most small producers plant at least part of their land plots with corn (Santacruz et al. 2007).

#### Motozintla municipality, Sierra region

■ The Sierra region, located to the north of the Soconusco region, is characterized by a higher level of poverty. In fact the population in the Sierra region is characterized by the highest levels of poverty and marginalization in not only the entire state, but the entire country; 94% of the population lives in rural areas (Villafuerte/García 2008; Angulo Barredo 2010). The population here is also predominantly

*mestizo*. For example, in the Motozintla municipality, only 1.5% of the total population of 58,000 speaks an indigenous language (INEGI 2005). The most important economic activity in the Sierra region is agriculture, particularly coffee-growing, with 70% of the region's economically active population working in this activity. Motozintla, where the research was conducted, is the municipality with the most land area dedicated to coffee-growing (Villafuerte/García 2008; Villafuerte 2010). In addition to growing coffee, most *campesinos* also dedicate a portion of their land plot for growing corn, beans and sometimes potatoes and other vegetables for family consumption (Villafuerte 2010). Another important component of the regional economy is commerce, mainly of agricultural products. This is the case for one of the communities studied, Belisario Domínguez, in which the primary source of income is not agriculture, but rather commerce. This community is, in fact, the region's commercial center.

■ In the Mazatán municipality, located between the highway connecting Tapachula with the northern part of the country (Huixtla, Arriaga and Oaxaca) and the ocean, approximately ten kilometers from the ocean, the four communities of Aquiles Serdán, López Mateos, Rogelio Peñaloza and El Triunfo were studied. In the Motozintla municipality, the communities of Belisario Domínguez and Tolimán were studied.

### 3.2.1 Impacts from climate change in the areas studied

■ The most important recent impacts from climate change in the two areas studied are primarily the two hurricanes mentioned, plus heavier and more prolonged rainfall, and at the same time, drought seasons that are longer than usual.<sup>7</sup>

#### Impacts from Hurricanes Mitch and Stan

■ The Soconusco, Sierra and Costa regions, the latter bordering with Soconusco to the northwest, were the regions most severely affected by Hurricanes Mitch and Stan. This is partly because these three regions of Chiapas are those with the most soil erosion. For example, it is calculated that the forested areas of the Sierra re-

<sup>7</sup> Interview with Laura Ruiz Meza, researcher with the *Centro de Estudios Superiores de México y Centroamérica* (CESMECA) at the *Universidad de Ciencias y Artes de Chiapas* (UNICACH), San Cristóbal de las Casas, 6.9.2010; and with Román Montes Ordóñez, agronomist, Tapachula, 12.9.2010.

gion have diminished by 70% over the last 15 years. This explains the severity of the impacts from the hurricanes and the resulting incidence of serious landslides that occur frequently during each rainy season (Ruiz Meza 2010; Villafuerte 2010; Angulo Barredo 2010). The landslides caused by Hurricane Stan buried entire villages, destroyed agricultural lands and public infrastructure, and left many localities cut off from the rest of the world and without electricity or water for weeks. In fact, a major part of the infrastructure destroyed by Hurricane Stan has not yet been rebuilt.<sup>8</sup> Hurricane Mitch had already destroyed half of the Motozintla municipal seat, where it caused the death of 200 people, and flooded 200,000 hectares (Castro Soto 2005; Santacruz/Pérez 2009). Both hurricanes severely affected the economy in the Sierra, Soconusco and Costa regions. After Hurricane Mitch had already done away with major portions of the agricultural lands, especially coffee-growing land, Hurricane Stan is calculated to have affected 122,000 producers and over 300,000 hectares used for agriculture. Coffee production, the activity to which most producers are dedicated, was impacted with particular severity (75,000 hectares) (Villafuerte/García 2008). In addition 11,000 hectares planted with corn were lost as a result of Hurricane Stan, and corn is the basic source of food for the population (Villafuerte 2010). In Soconusco, and particularly in the Mazatán municipality, 65% of the land area planted with bananas was lost. Bananas are one of the most important crops economically and in terms of employment, so the region's economy was severely impacted (Santacruz/Pérez 2009).

#### Current impacts from climate change in the areas studied

Currently, the most severe problem confronting the Mazatán municipality is that since Hurricane Stan struck in 2005, the area has experienced frequent flooding during the rainy seasons. According to Néstor Quintana, who works in Civil Protection in Mazatán, since Hurricane Stan passed through, 95% of local communities are vulnerable to flooding. Because of the hurricane, rivers are filled with rocks and soil from the Sierra region that have not yet been removed from the river beds. As a result, the numerous rivers in the area frequently overflow every rainy season.<sup>9</sup> This severely impacts housing, agricultural lands and public infrastructure such as highways and roads. During the field work conducted, stagnant water was still observed

<sup>8</sup> Interview with Laura Ruiz Meza, researcher with the *Centro de Estudios Superiores de México y Centroamérica* (CESMECA) at the *Universidad de Ciencias y Artes de Chiapas* (UNICACH), San Cristóbal de las Casas, 6.9.2010.

<sup>9</sup> Interview with Néstor Quintana de León, Mazatán Civil Protection, Mazatán, 15.09.2010.

in large portions of the area, from the most recent of the already four flooding episodes during the previous four months.

■ In the Motozintla municipality, a notable increase in rainfall is reported in the last 15 years. During the field work conducted in 2010, a number of tropical storms brought heavy, prolonged rains, causing severe landslides and the loss of a major portion of the corn and coffee harvests in the area. In addition, the Sierra region suffered a long, severe drought in 2009, resulting in the loss of a considerable portion of the corn harvested in the area (Alscher 2009; Villafuerte 2010).

### 3.2.2 Migration in the areas studied

■ Regarding migration in the areas studied, it has already been mentioned that migration is particularly pronounced in the Soconusco and Costa regions of Chiapas (Villafuerte/García 2008). However, as also explained earlier, the Sierra region is also recently becoming a significant area from which migration originates. Currently, according to estimates from experts, remittances are the most important factor in the economic dynamics of the Sierra region (Villafuerte 2010), and the Motozintla municipality is particularly significant in this regard. It has registered negative population growth rates for the last ten years, and is currently one of the municipalities with the most outgoing migration in the state (ALOP/enlace 2009; Angulo Barredo 2010; Villafuerte 2010). In terms of migration flows originating in Mazatán, the other municipality studied in this research, the situation is even more complicated. Even though the Soconusco region and the Costa region are the most important in terms of migration, statistics from the 2000 General Population and Housing Census indicate a very low migration index for the Mazatán municipality (Santacruz et al. 2007). Still, in the field work conducted, a very high incidence of migration was verified for the region, with a considerable portion of young people migrating to the United States and to other Mexican states. It is likely that the heavy migration in the region began after the severe impacts from Hurricane Stan, and for this reason is not reflected in the 2000 Census statistics.

#### Impacts from climate change on migration in the areas studied

■ The case study conducted in this area in 2007 and 2008 (Alscher 2009) in the framework of the EACH-FOR project indicated a clear relationship between climate change—primarily the devastating impacts from the Mitch and Stan hurricanes—



on the one hand, and the increase in migration, on the other. The study, which considered population statistics for the areas studied (based on the 2000 General Population and Housing Census and the 2005 Population and Housing Count) as well as a total of 39 interviews with migrants and non-migrants, found an increase in migration that was much more pronounced in the localities most affected by the hurricanes than the rest of the area and the state, and than in the years following Hurricane Mitch (Alscher 2009: 16). The statistics were confirmed by the field work conducted, which revealed a significant trigger effect from these meteorological phenomena. In the communities studied, the majority of those interviewed reported that their living conditions were affected by environmental degradation and natural disasters. The migrants interviewed declared that environmental problems, and particularly natural disasters, had affected their decision to migrate, and non-migrants mentioned natural disasters and uncertain harvests as primary reasons for migration (Alscher 2009). These findings are similar to those found by other authors, who considered “*natural phenomena to be triggers for international migration*” (Villafuerte/García 2002008: 50) in the Soconusco, Sierra and Costa regions, from both the Mitch and Stan hurricanes. According to these authors, the devastating impacts from these phenomena on this area’s agriculture were particularly significant for migration, causing a severe crisis in the regional economy (Santacruz/Pérez 2009; Villafuerte/García 2008; Castro Soto 2005).

■ These results clearly indicate that **in relation to the impacts from climate change in the area, migration is an important adaptation strategy, whether as a necessary response to the total loss of homes from landslides or flooding, or as a strategy for diversifying income, given the loss of previous sources of income (particularly, agricultural lands).**

■ Based on these results, this research inquires into the issue of possible differences between genders with regard to migration as a strategy for confronting these processes.

### 3.3 Research methodology

■ Research was conducted in basically two stages. The first stage consisted of interviews with experts on migration, on climate change and on gender in the state

of Chiapas, as well as a review of publications on these topics. The objective of this first stage was to identify important issues in relation to specific vulnerabilities experienced by women and men, and gender differences in the concrete impacts from climate change in the areas studied, and also topics related to migration in the region, and migration patterns of women and men in the area.

■ The second stage consisted of field work in the two municipalities studied, in a total of six communities. During this stage, various interviews were conducted with local experts, including junior and senior high school teachers in the communities, Civil Protection representatives, *comisariados ejidales* (representatives of *ejidos*, or collectively-owned land) and municipal agents. Also, a total of 77 interviews were conducted with migrants and non-migrants, including persons directly affected by weather events attributed to climate change, as well as others not directly affected. In addition, to obtain more general data on the population's socioeconomic conditions, effects from climate change on the population, and migration patterns, a total of 192 questionnaires were distributed in schools, specifically 134 in the Aquiles Serdán junior high school in the Mazatán municipality, and 58 in the Belisario Domínguez senior high school in the Motozintla municipality. Interviews with experts were useful in obtaining information on the economic and social situation, impacts from climate change, and migration history and patterns in the area and in the community. As part of field work with the population, semi-structured interviews were used, mostly with individuals and some with groups. Two blocs of topics were covered in the interviews. First, questions were directed toward the roles and responsibilities of women and men in the home, the community and society, for the purpose of establishing conclusions on the specific, gender-related vulnerabilities to climate change impacts. This first bloc also included climate change impacts, particularly the specific manner in which those interviewed were and continue to be affected, and the concrete problems they are confronting. Then, in the second bloc of topics, those interviewed were asked regarding their migration-related strategies, particularly the reasons for migrating or not migrating, the difficulties confronted by women and men, destinations and duration of time spent away from places of origin, and also plans for returning or not returning. Due to the difficulty in conducting research on migration in places of *origin*—where the object of study, the migrants, are absent—this bloc included not only interviews with migrants who had returned, but also questions regarding family members who had migrated. In this way it was

possible to address information beyond the individual histories of the 77 persons interviewed. In addition, in order to obtain information on the plans and attitudes of young people in relation to migration, a total of 29 interviews were conducted with students in the two schools mentioned above.

■ Of the 77 interviews, 41 were conducted with women and 36 with men. Through the experiences told by these individuals, however, it was possible to learn about the migration history of a number of migrants with whom it was not possible to speak directly. A total of 33 interviews were conducted in the Sierra region, and of these, 18 were in Belisario Domínguez and 15 in Tolimán. A total of 44 interviews were conducted in the low-elevation area, with 41 in the three neighboring communities of Aquiles Serdán, López Mateos and Rogelio Peñaloza, and 3 in the more remote community of El Triunfo.

#### Distribution of interviews, by communities

	MOTOZINTLA MUNICIPALITY (SIERRA)		MAZATÁN MUNICIPALITY (SOCONUSCO)			
	Belisario Domínguez	Tolimán	Aquiles Serdán	López Mateos	Rogelio Peñaloza	El Triunfo
Women	8	7	8	6	5	2
Men	10	8	13	7	2	1
Total	18	15	21	13	7	3

## 4. Research Results

■ Results from the field work conducted are presented in this section. The first part will describe the results in terms of differences in the vulnerabilities of women and men derived from their gender roles, as well as the resulting specific impacts from climate change on women and men in the areas where the research was conducted. Based on these results, the findings regarding differences between women and men in relation to migration as a strategy in response to climate change will be presented.

## 4.1 Vulnerabilities and impacts from climate change, differentiated by gender

### 4.1.1 Gender roles and vulnerabilities

■ Analysis of gender roles in the communities studied clearly demonstrates that the vulnerabilities of women and men vary in relation to the specific impacts from climate change in the area, as documented in other research as well. This is because there is a very clearly defined division of responsibilities between women and men, implying unequal participation in decision-making, unequal access to resources and to power, and there are also different effects from climate change impacts on the spheres assigned to women and to men.

#### Traditional gender roles and clearly separated spheres

■ In the areas where this research was conducted, as in the majority of Mexico's rural areas, gender roles are still very traditional, with men assigned responsibility for generating income and economically maintaining the family, and women in charge of the home and caretaking. In the context of the communities studied, this means that most men are dedicated to agriculture; they are in charge of working the family plot, or if they do not have their own land, they work as agricultural day workers. In some cases they have other wage-earning work, are self-employed or operate a small business. This is predominantly the case in the community of Belisario Domínguez, since agriculture is not very significant there as a source of income, and most men work in commerce and other businesses. Very few men in this entire area participate in household chores. Meanwhile, in all the communities studied, women's responsibilities are clearly associated with the home and family reproduction. Women—particularly married women, and to a lesser extent, single women—are in charge of caring for household members, primarily children and elderly family members. This includes responsibility for feeding and caring for the health of household members, as well as housecleaning and everything else associated with the home. In addition, these women are in charge of their yards, where many have fruit trees and sometimes grow vegetables and herbs, or raise chickens, ducks or sheep, primarily for family consumption, but they sell any surplus.

■ This traditional division of labor is already observed in children and adolescents. Most girls perceive household chores as a natural part of their responsibilities, while boys participate only minimally in these chores, and instead sometimes help their

fathers in agricultural activities. Because of poverty conditions, household responsibilities for women often imply a huge burden, both emotionally and psychologically, and also physically. This is especially true when economic resources are scarce, since women are the ones who must find solutions to be able to continue to feed their families. Also, certain housing conditions often increase women's work load. Many homes do not have piped-in water, sewage systems or stoves, and thus women must wash their clothes at a nearby river, and cook with firewood, which is not always available.<sup>10</sup> Another important factor in this context is that families living in the area are large, and this not only means that more food is required, but also that there are many children to be cared for, and there is always at least one who is sick. According to a recent study on the situation for women in Soconusco, the average number of children per family is 4.6, and in the Sierra region, more than 43% of households have more than six members (CESMECA-UNICACH 2010; Villafuerte 2010). Although the average per family in this study was only 3.8 children, many of the families interviewed have 7, 8, 9 or even 10 children. Among the women interviewed, there was a nearly generalized sensation of having a too-heavy work load, of being very tired, and that feeding and educating their children is becoming increasingly difficult.

#### Minimal participation by women in remunerated work

■ Approximately a third of the women interviewed also generate income, primarily by selling food or other activities: some have corner stores, and only a few work in agriculture. Generally, married women consider any income they generate to be "support" for their husbands, and not a fundamental part of the family economy. Obviously, the situation is different in the case of single mothers. When there is no husband to maintain the family economically, women must carry the double burden of reproduction work and income generation in order to feed their children. Also, more young, single women work, primarily to help their parents or to be able to pay for their own studies.

■ The clearly-defined separation between the spheres of remunerated work and reproductive work in the areas in which research was conducted is a consequence of

<sup>10</sup> In the Sierra region, approximately 57% of homes have piped-in water, and 75% have sewage systems. In the Soconusco region, 71% of the women interviewed in a recent representative study said they have piped-in water (Angulo Barredo 2010; CESMECA-UNICACH 2010).

the traditional gender roles dominating social relationships in the region. This is true to such an extent that many women explained in their interviews that they would like to work and generate income, but their husbands do not allow them to do so, because “women’s place is in the home.” Another factor in this context, however, is that the predominant economic activity in the region is agriculture, and unlike other activities such as certain services and commerce, and with the exception of some particular crops like coffee (dominant in the Sierra region) for which women’s participation is significant, agriculture is considered to “belong” to men.<sup>11</sup> Consequently, only three of the women interviewed work in agriculture: one of them grows coffee with her husband; one is in charge of the family plot when her husband is in the United States; and one is a single mother who works the land she inherited from her husband.

■ This signifies that for women—in addition to the fact that social norms stipulate that their place is in the home—it is also more difficult to find “appropriate” work. Many women explained that commerce is almost the only activity “permitted” for women.

#### Consequences of minimal participation in remunerated work

■ Women’s minimal participation in generating income has significant consequences for their access to economic resources. Generally, although women are often those who manage daily expenses, their husbands are the ones who make decisions regarding larger investments, as it is considered to be *their* money. Women seldom have access to their own resources, and this means they are economically dependent on their husbands, they have a lower social status than men, and they participate in only a limited manner in decision-making both within and outside the home. This can be observed in many of the interviews conducted. It was very evident that generally (although there were some exceptions) the husbands make the decisions, since everything depends on *their* income. Most women spoke very little in the presence of their husbands, and many did not dare to give their opinion when their husbands were present.

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<sup>11</sup> This reality has been highlighted in a recent study on the situation for women in Soconusco which states that “women are not perceived as owners, they do not make decisions about the land or crops, and they are not familiar with the prices and costs of inputs for production. Land is associated with men, whether they are fathers, husbands or sons. In some cases, vegetable and flower growing is changing this perception, when women are in charge and take initiative in making decisions” (CESMECA-UNICACH 2010: 14).

■ Another consequence of women's minimal (recognized) participation in remunerated work outside the home and their heavy work load in the home is women's minimal mobility. The majority of the women interviewed do not leave their homes very often, except when necessary for household-related tasks (going shopping, taking their children to the doctor, etc.); they do not participate very much in the public sphere (exceptions are participation in the church and in their children's schools); and many declared they were "cooped up at home"—both because of their heavy work load and because it is not viewed positively when women go outside their homes. In fact some women commented that in order to go anywhere outside their homes, they had to ask permission from their husbands. For many of them, however, another important factor is that they feel they would be abandoning their children if they worked outside the home. A factor that likely contributes to the subordinated position assumed by many of the women interviewed is that they married at a very young age, and often to husbands who are considerably older than they are. In this study the average age of women when their first child was born (generally, accompanied by their weddings) was 18 years of age, and in a number of cases women had their first child at 14, 15 or 16 years of age. Generally, husbands were several years older than their wives; the age difference was an average of seven years.

■ Another important element in the context of vulnerabilities is the matter of land ownership. Most women do not own land, since men are typically those who inherit land. Several of those interviewed insisted that these patterns are in the process of changing, and women and men will inherit on equal terms in the new generations. However, in the cases studied, few women (a total of four) possessed a land title in their name. Several explained that their brothers inherited all of their parents' land. This is consistent with official statistics from INEGI<sup>12</sup>, according to which women are only 13.5% of those in Chiapas who hold land titles in their names, with agrarian rights (this figure is 20% at the national level) (Ruiz Meza 2010).

■ Meanwhile, it is interesting to point out that, unlike statistics on the education of the region's women and men—26.5% of women, but only 19.5% of men are illiterate in Chiapas (compared with 11.8% and 9.9% at the national level) (INEGI 2005)—the educational levels of the women and men in the cases studied were

<sup>12</sup> *Instituto Nacional de Estadística y Geografía*, National Institute for Statistics and Geography.

nearly the same. In fact in the case of several married couples, the wives had more education than the husbands.

#### 4.1.2 Differences by gender in impacts from climate change in the areas studied

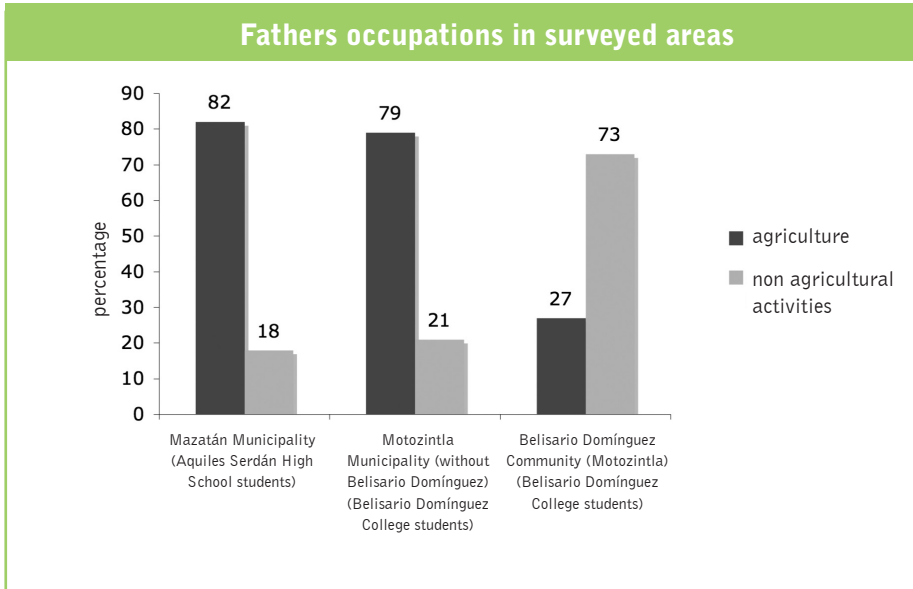
■ Gender roles and differing vulnerabilities translate into different impacts from climate change in women and men. Although both women and men are affected, their respective spheres are affected in very distinct ways.

■ As described earlier, the most noticeable impacts from climate change in the areas where research was conducted are the increase in extreme meteorological phenomena, particularly Hurricanes Mitch and Stan, and the increase in climate variability with changes in rainfall amount and rainy seasons. This can involve longer droughts and also more prolonged, heavy rains causing landslides in the Sierra region and flooding in the lower Soconusco region. Presented below are the results in terms of the consequences of these processes in women's and men's spheres and their respective responsibilities.

##### Impacts for men

■ Naturally, the most important concern for the men interviewed was the impact on their sources of income, particularly agriculture—which is the main source of income for the great majority of men in the area. Over 80% of the parents of students at the junior high school in Aquiles Serdán (which includes students from the three communities studied Aquiles, López Mateos, Rogelio Peñaloza, and other communities) work in the area of agriculture. In the senior high school in Belisario Domínguez, with students from the entire Motozintla municipality, this is the case for 79% of the parents (excluding students from the Belisario Domínguez community, where most of the population is dedicated to non-agricultural activities).





As a result of Hurricanes Mitch and Stan, many of the peasants interviewed, particularly in the Sierra region, lost their land plots or portions of them. This was primarily due to landslides, and for the majority, their crop-planting activities were affected during those years. As for the current situation, many of the men interviewed explained that they lost all or most of their harvests this year. In the Sierra region, this was due to prolonged, heavy rains that make the still-green coffee beans fall from the plant, and make the corn spoil before it is harvested. In the Mazatán lowlands, this was due to flooding caused by rivers overflowing, destroying practically all the crops grown in the area. There is a generalized feeling of insecurity due to uncertainties regarding the rainy season, its duration and intensity. Most agricultural producers complained that “*you can’t farm the land anymore,*” because it is impossible to know when the rains will begin and how long they will last.

A serious problem is that a significant number of peasants typically borrow money at planting time to finance the necessary inputs, and when they lose their entire harvest or part of it, they are often unable to return the money they borrowed, so they remain in debt (an important motivation for deciding to migrate). This problem is particularly severe in the Mazatán area, where agricultural lands have flooded repeatedly during each rainy season since the Stan hurricane in 2005.

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■ This situation also affects the most marginalized group: those who do not own any land. The agricultural day workers interviewed unanimously declared that recently, instead of working the entire week, they only work two or three days a week. Due to the current harvest losses, not even the large fruit plantations or coffee plantations in the area are hiring.



Flooded banana and mango plantation. López Mateos, Mazatán Municipality, June 2010.

Photo: Néstor Quintana de León

■ The current agricultural crisis affects not only those directly involved in agricultural activities, but rather impacts basically the entire regional economy, since a crisis in agriculture—which is the economy's foundation—has severe repercussions for other economic activities as well. The men in Belisario Domínguez are an example. As mentioned earlier, most of the population in this community works in non-agricultural activities, specifically commerce, but also other activities such as construction and transportation. Thus, nearly three-fourths of the fathers of students living in Belisario Domínguez work in non-agricultural activities, primarily commerce.

■ Many of the men who work in non-agricultural occupations affirmed that the agricultural crisis is causing an overall depressed economy, that many of them are

losing their jobs, and that due to the generalized lack of income, most businesses are facing serious difficulties. Consequently, those interviewed who work in stores, for example, said that sales are down; the owner of a blacksmith's shop said work orders have diminished, and a taxi driver even said he has fewer clients. It is evident that the flooding and heavy rains are not the only factors influencing the region's socioeconomic crisis. Other significant factors, as mentioned earlier, include the structural crisis impacting agriculture in Mexico in general and in Chiapas; the socioeconomic consequences of economic liberalization; and the current international economic crisis. Another very important element mentioned by several of those interviewed is the economic crisis in the United States, causing many Mexican immigrants in that country to lose their jobs and no longer send remittances—signifying the disappearance of one of the important pillars of the regional economy. Still, the loss of harvests due to changes in the climate is a key factor in the current economic crisis in the area studied.

■ Another concern for men, although less important, is focused on their homes and belongings. In the Sierra region, many of the homes were severely affected by the hurricanes. Several lost their homes completely, some were relocated, and others lost parts of their homes or yards, their furniture, household appliances or vehicles. Currently, homes and belongings are a factor of great concern for many men, particularly in the flooded Mazatán area. Many of the families interviewed have lost belongings such as furniture, household appliances or vehicles during recent months, damaged by the water entering their homes during flooding.

### Impacts for women

■ Basically, the primary concerns of women, given their role as being in charge of the household, are associated with their homes, providing food and caring for their children. The poverty that, on its own, implies an enormous emotional and work load for women, who are in charge of feeding their families, is worsened by the impacts from climate change. The lack of income as a result of lost harvests or the economic crisis in general increases the problems in this area and is a determining element in their daily lives. Since women are those who manage food and who are responsible for feeding their families, the worsening of the situation in terms of available resources for purchasing food causes them severe psychological stress. Many women stated that their income was no longer enough to even feed their families, and that at

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times their families' diet consisted of only tortillas with salt. Many did not know how they would be able to purchase school uniforms and notebooks for their children, much less clothes or other things for themselves. In addition to their concern over lack of income, women are also severely affected in other spheres associated with their responsibilities in the home. The following are especially noteworthy:

**Access to clean water.** One of the biggest problems confronting women, in both the lowlands and the Sierra region, is access to clean water. Women need water for nearly all household chores—to cook, wash clothes, clean, wash dishes, bathe children, for human consumption, for animals, etc. Since women are those who use the most water, and since men use almost no water in the areas of their activities—the region's agriculture is predominantly seasonal, without irrigation—women are

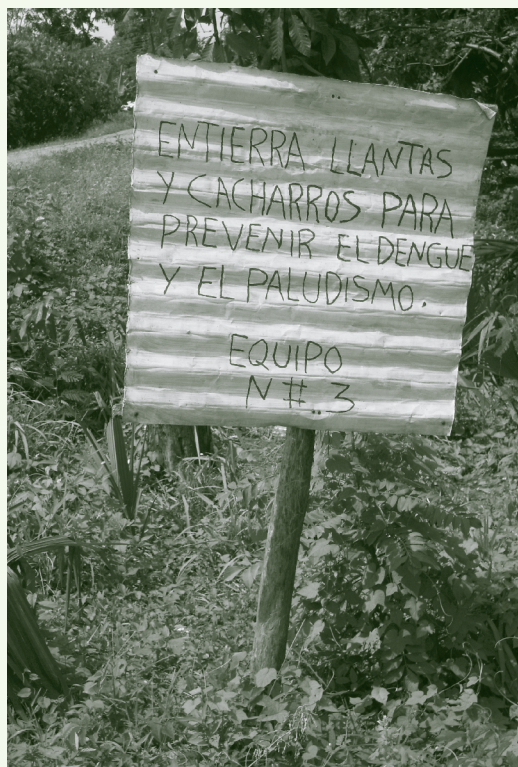
much more vulnerable to problems with access to water or the quality of water, due to heavy rains, flooding or times of drought. In the Mazatán area, during flooding episodes, water frequently enters wells, contaminating the water. This water can therefore no longer be used for human consumption and is often not adequate for other uses either. Several women complained that since Hurricane Stan, with flooding occurring every year, the water in wells, even after flooding, remains dirty and has an oily yellowish layer on the top. This is associated with an oil well dug by Pemex (Petróleos Mexicanos, the national oil company) near the López Mateos community. This contaminated water is no longer useful for even washing dishes or clothes, since it leaves a



Buckets for water collection,  
Belisario Domínguez, Motozintla  
Photo: Jenny Jungehülsing

yellowish stain on everything. The problems experienced in the Sierra region are similar. Landslides frequently damage pipes, often leaving affected households without access to piped-in water for several weeks at a time. Also, with the mud carried by the heavy rains during tropical storms, pipes become obstructed, and water often becomes very dirty.

**Increased illnesses.** The increased illnesses caused by contaminated water, stagnant water and mosquitoes, due to the very wet conditions and extraordinarily severe changes in temperatures and weather is another issue that causes great difficulties for many of the women interviewed. The population in the lowlands unanimously agreed that nearly the entire population in the area became ill with flu, coughs, fever and “achy body.” In the Sierra region, due to prolonged rains and the extreme wet conditions, many children, and also adults, also became ill. Furthermore, because of the hurricane, a number of individuals became ill with diabetes, signifying a tremendous increase in the caretaking that must be fulfilled by women. According to an expert who has studied the psychological and emotional consequences of the hurricane in the city of Motozintla, the shock in response to the hurricane had a severe effect of triggering illnesses such as diabetes, psychological problems and respiratory illnesses.<sup>13</sup>



López Mateos, Mazatán Municipality

Photo: Jenny Jungehülsing

<sup>13</sup> Interview with Dr. Guadalupe Álvarez, researcher at *El Colegio de la Frontera Sur* (ECO-SUR), San Cristóbal de las Casas branch; Comitán, 7.9.2010.



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**Loss of yards.** Several of the women interviewed in the Mazatán lowlands lost the possibility of growing herbs or fruit in their yards, since the stagnant water from flooding ruins the plants. Also, in many cases, their chickens and/or ducks were carried away by rising water levels. These losses seriously affect women's ability to feed their families and increase their emotional stress, since in many cases, a significant portion of their daily food was previously obtained from their yards.

**Access to other communities.** Due to the remote location of many of the communities, women have to cross long distances to buy what they need, take their children to the doctor, and take care of other matters. When they have enough resources, they use public transportation, and when they do not, they walk. Flooding in the lowlands has made access to other communities more difficult. When water levels rise, public transportation is suspended, and walking signifies walking in water up to their knees and sometimes up to their waists. Due to the increased work load for mothers, the responsibility of going to other communities to buy what is needed for the home often falls on their daughters. In the Sierra region, paths are frequently blocked by landslides, and this implies similar difficulties for women.



Fishing in flooded roads, López Mateos, Mazatán Municipality, September 2010

Photo: Néstor Quintana de León

**Housecleaning.** Frequent flooding of homes in lowland areas obviously causes an increase in housecleaning work, since it is necessary to remove mud from homes after each flooding episode, and with paths and yards full of mud, clothes and everything else becomes much dirtier than usual, signifying that women must dedicate more time to cleaning and washing. Some of the households visited have dirt floors in the kitchens—the place where women spend most of their day. When there is flooding, these dirt floors turn into mud, forcing women to cook and wash while standing in mud. The flooding of homes and mud everywhere causes particularly serious problems for mothers of small children. As many of them commented, they have to be constantly watching their children to keep them from getting into the mud, to prevent them from getting sick or getting completely dirty.

**Wet conditions.** Wet conditions present another difficulty, since in addition to causing illnesses like flu, they prevent clothes from drying, the walls of homes become wet and damaged, and in addition, a significant problem for many women is the lack of firewood for cooking, since it takes a long time for firewood to dry. While in many cases men (husbands and sons) are those in charge of finding firewood—an increasingly difficult task in the current conditions—the primary problem of scarce firewood is confronted by women, who are responsible for preparing and providing food for their families. When firewood is scarce, it becomes nearly impossible to cook beans or corn for making tortillas, for example, since it is necessary to maintain a fire for a long period of time.

■ All of this signifies, on the one hand, that women's daily work load increases considerably. They must dedicate more time to reproduction work and this becomes much more difficult in a number of contexts. In addition, it can be observed that women's emotional burden also increases, in response to the enormous amount of problems they must face, especially with regard to feeding their families and taking care of their children and elderly family members. In general, the women interviewed were very tense and it was clear they were greatly concerned about feeding and caring for the health of their family members, especially their children.

■ These impacts are particularly severe for women who, in addition to reproduction responsibilities, must also generate income. While the problems described have severe consequences for the work load and emotional burden that must be confront-

ed by women whose husbands are those responsible for economically maintaining the family (this is the case for the majority of the cases studied), when women, particularly single mothers, work, the situation is even more difficult. In addition to the increased work load and emotional burden in the reproductive sphere, these women confront severe problems associated with generating income. Thus, single mothers currently face critical economic problems, since they can no longer find work, or, as in most cases, selling food, household supplies or items such as cosmetics or shoes no longer provides enough income to maintain their families, since *“people don’t have money to buy anything anymore.”*

## 4.2 Migration as a strategy for adapting to climate change, and gender differences

### 4.2.1 Strategies for adapting to climate change

#### Adaptation strategies used by agricultural producers

■ The population affected by climate change impacts in the areas where research was conducted use a number of strategies for adapting to the problems described. The most important strategy used by agricultural producers in the Mazatán area is adapting crop cycles to the new conditions. Many peasants stopped planting in the rainy season, and instead, they use the moisture in the land from flooding to plant at the beginning of the dry season. This strategy does not, however, bring the same harvests. Another strategy is changing the particular crops grown. Soybeans, which are less vulnerable to constant rain or flooding, are increasingly grown in Mazatán. A new crop is African palm, which is also more resistant. In the Sierra region, some agricultural producers who have always planted corn said they were not going to plant it anymore, since this crop does not tolerate the constant rains.

#### Adaptation strategies used by women

■ Women also use adaptation strategies. In response to lost income, a number of the women interviewed began to work in order to contribute to the family economy, primarily by initiating small businesses for selling food such as tamales or quesadillas. Also, some women who were already working began to diversify their sources of income. For example, a woman who was already a day worker in a banana-packing plant found additional work in a store. Another who worked in agriculture started



to sell tamales, and several others diversified the items they sold. Still, due to the economic situation in the region, most of these projects were not very successful, and a number of women said they abandoned these efforts after a period of time.

■ Strategies used by women in the home in response to climate change impacts are predominantly reactive, and as described earlier, they consist basically of increased time dedicated to household tasks. For example, due to the frequent illnesses of children and elderly family members, women must dedicate more time to caring for them. They must remove the mud from their homes after each flooding episode. Due to flooding and landslides, and in order to save money, many do not use public transportation anymore, and instead walk long distances to stores and clinics. In response to the loss of income, the only option for many women is to reduce the diversity of the food their families eat, and to no longer buy meat, and in some cases, vegetables. Women respond to the scarcity of clean water in a number of ways. Nearly all of them harvest rainwater for their animals, for washing dishes and washing clothes. Some explained that they try to save water and wash as little as possible. A few of them who have sufficient economic resources said they had to use purchased bottled water for even washing their clothes. The most serious water-related problems, however, occur in the dry season, when rainwater cannot be harvested. Many women have to wash clothes in a distant river when water is scarce. In Mazatán, a strategy used in most households to confront the problems of flooding is to keep their belongings, such as furniture and household appliances, in elevated places such as on tables, boxes or rocks, in order to protect them from the next flooding episode. This makes daily living more difficult, especially for women.

#### Migration as an adaptation strategy

■ A very important strategy in response to climate change impacts is migration, which may be to cities in the state of Chiapas, to other parts of Mexico or to the United States. While migration to urban centers in Chiapas, and to destinations in other Mexican states, has been taking place for many years, there is a generalized opinion in both areas where research was conducted that the climate changes described represent one of the primary reasons for the recent substantial increase in migration to the United States and Mexico's northern border. The main destinations of migration in the northern region of the country are Tijuana and Nuevo Laredo, but there is also significant migration to Mexico City and to tourist areas in Quin-

tana Roo (Cancún, Playa del Carmen). In our field work, many cases were found in which family members decided to migrate in direct response to the effects of climate change confronted in their homes. The reasons for migration in these areas, as in other regions, are primarily economic in nature. In the context of this research, this means that the most significant impacts from climate change influencing migration are the effects on the family economy. Only a few cases were found in which the decision to migrate was due to non-economic impacts from climate change. Even when homes are seriously damaged or even completely destroyed, most of those affected do not migrate for this reason, but instead rebuild their homes in the same community. Thus far, the risk of losing one's home from landslides or the constant flooding of homes does not appear to be a determining factor in the decision to migrate. In only one case, a young mother of four children who had recently returned from Idaho with her husband—after living there for ten years—said she wanted to return to the United States due to the difficult situation and the work load caused by the floods in López Mateos.

#### 4.2.2 Gender differences in migration strategies

■ Migration in response to climate change impacts is a strategy used by both men and women, and in both cases, the reasons are primarily economic in nature. As in the rest of the country, the majority of migrants from the areas studied are men—especially because women participate relatively little in international migration. However, women's migration from these areas, as in the case of other regions, is increasing (Angulo Barredo 2010). This was also evident in the field research conducted. While it was impossible to verify the current percentage of women and men participating in migration from these areas (the new 2010 General Population and Housing Census has not yet been published), most of those interviewed stated that increasingly more women are migrating, and especially in the case of young people, the number of young women migrating will soon be equal to the number of young men migrating. There is a series of significant differences between women's and men's migration, however, to be presented in the following sections.

##### 4.2.2.1 Gender-related differences: Impact from climate change on agriculture, as a primary factor accelerating migration

■ The depressed regional economy caused by climate change impacts in the area has a considerable influence on many individuals' decision to migrate. Thus, for

business owners, for employees and day workers, the loss of employment and the limited possibilities for working as day workers have led, in many cases, to the decision to migrate or to consider migration as a possibility. This is particularly true in the mountain community of Belisario Domínguez, where commerce and other service-related activities are the foundation of the local economy. Nevertheless, generally in the areas researched—as in other regions of the world—the most evident reason for migration in relation to climate change is the loss of harvests and agricultural lands due to rains, flooding and landslides—since this directly impacts the economic situation for affected individuals (CARE/UNU-EHS 2009). In both areas where research was conducted, but particularly in the Mazatán lowlands, many of the peasants explained that today, *“you can’t live from farming here anymore.”* In the Sierra region, this opinion is strongly associated with not only the current crisis caused by the constant rains and resulting loss of corn and coffee harvests, but also with the prolonged drop in coffee prices. For many coffee growers, the 1980s—when *“you could still make money from agriculture”*—are the point of reference. In contrast, for agricultural producers in Mazatán the current crisis is directly associated with the frequent flooding. For many peasants, farming their land plots has not been profitable since the floods began. And as a result, many agricultural producers have decided in recent years to migrate, primarily to the United States.

■ This very *direct* relationship between climate change and migration is predominantly a male phenomenon. Since agriculture is the sphere most affected, and women participate only minimally in agriculture and very few are landowners, their decisions to migrate are typically affected less directly by climate change. In fact, in all, the impact from climate change on decisions to migrate was more generalized among men. In approximately half the cases of male migrants studied, the impacts from climate change were an important factor in their decision to migrate. However, in the case of women, this relationship is less evident. Even though most women also migrate as a result of economic need, in most of the cases studied the decision was not associated with climate change impacts, and this was primarily because of their already-mentioned minimal participation in agriculture. This does not mean, however, that women’s decisions to migrate are *never* affected by climate change impacts. In fact, in several of the cases studied, women were forced to migrate due to lost income resulting from the depressed re-

gional economy, primarily in activities related to selling food or other items. These problems are confronted particularly by single mothers and young women who work to help their parents. In reaction to this situation, six women were planning to migrate (four single mothers, one young woman, and a mother with her husband and two children), and three had already left (a woman with her husband, and two young women, one of whom migrated because of the rains' devastating impacts on her father's land plot).

■ In the framework of this growing migration by both women and men, and in which climate change impacts play a significant role—although not the main factor in each decision to migrate—there are a number of differences between genders that are worth mentioning. However, in order to compare the migration strategies used by women and men, it is necessary to distinguish between the different “types” of women and men, according to age, life stages and marital status, since the migration strategies and patterns tend to differ considerably depending on these factors, particularly in the case of women. Specifically, it is necessary to distinguish especially between women who are mothers, on the one hand, and young, single women, on the other. Also, to compare migration by mothers and fathers, it is necessary to differentiate between married mothers and single mothers.

#### 4.2.2.2 Mothers who migrate in comparison with fathers who migrate

■ The most obvious difference is the difference in migration strategies used by married fathers and married mothers, although both are often strongly impacted by climate change. While fathers are traditionally one of the groups most likely to migrate in response to economic need, married mothers in the area studied, as well as in the rest of the country, are the group of women least likely to migrate (Massey et al. 2006). These patterns remain equal when impacts from climate change are considered. In the married couples studied, the men are the ones who migrate, independently of whether or not migration is associated with climate change. This is manifested very clearly in the case of the fathers of students interviewed in the Aquiles Serdán junior high school in the Mazatán municipality, and in the Belisario Domínguez senior high school in the Motozintla municipality. Four times more fathers than mothers had migrated (of the mothers who had migrated, the great majority had gone with their husbands or were single mothers). Consistent with results from other studies, it was also established in this research that in

the few cases (5) of married mothers migrating, they did so with their husbands (Massey et al. 2006; Cerrutti/Massey 2001). In the field work conducted, only one case was found in which the wife went first to the United States, and then the husband joined her there.

### Migrated mothers and fathers in surveyed areas

#### Results of questionnaires in schools

	Mothers who migrated	Fathers who migrated
Mazatán Municipality (Soconusco)	12	49
Motozintla Municipality (Sierra)	3	15
Total	15	64

Few married women migrate because migration strategies within married couples are *household strategies* and not individual strategies (De Haas 2007). Because women and men generally have clearly defined roles within the home, associated with responsibilities assigned to genders by society, it is up to men to react when the family economic situation worsens, and in many cases, this means to migrate. Men are responsible for economically maintaining the family and generating income, while women are generally responsible for the home, and cannot “abandon” their family, and particularly, their children. This clear division of responsibilities in relation to migration, in the case of married couples, is based on two elements that were observed in the field work conducted. First of all, men are considered to be those naturally suited for economically maintaining the family and are frequently not willing to allow their wives to play a part in this role. In many cases the mere idea causes embarrassment for them, and it is incompatible with their sense of honor. Secondly, married mothers feel responsible for their home and their family, and above all, they do not want to leave their children on their own. This sense of responsibility is due to a very strong social norm that defines women’s place in the home as a matter of their very nature, and women who migrate or work outside the home are quickly described as “bad mothers” or “bad wives” who are “abandoning” their families. In effect, several married women explained in the interviews that they could not migrate because they did not want to “abandon” their children,

who need their mother, and furthermore they would not know who to leave them with. Because of the roles assigned to mothers and fathers, it is not a viable option in most cases for women to leave their children with their husband (generally, when mothers do migrate, children stay with their grandmother, aunt or an older sister) (INSTRAW 2006). For the same reason, several of the women interviewed said they could not work, even though they wanted to, until their children reached a certain age, and would be going to school.

■ It is therefore evident that the relationship between climate change and migration is much stronger in the case of fathers than in the case of mothers. While the current situation in agriculture caused by impacts from climate change is a factor that accelerates the migration of many fathers—most of them are peasants—these factors will rarely increase mothers' migration. This is not, however, because mothers are less affected than fathers by climate change, but rather because for a married couple, migration decisions are household strategies, and the role of migrating corresponds to men, not to women.

■ In the case of *single mothers*, the exact opposite is true. While married mothers are the group of women least likely to migrate, single mothers are the group most likely to migrate. During the field work conducted, many single mothers who had migrated or were thinking about migrating were identified. And the reason for this is evident: one of the main factors determining the migration behavior of individuals is the role they have in relation to economically maintaining their families. Many single mothers, who are the main or only income generator for the family, have no other option in response to economic need than to migrate in search of work. In none of the cases investigated were single mothers' *prior migrations* directly associated with impacts from climate change—although it was difficult to verify this since they had typically migrated and returned many years before—most single mothers who had previously migrated *planned to go again* due to the difficult economic situation caused by the current agricultural crisis. The economic activities of the single mothers interviewed were typically the sale of food, household supplies, cosmetics or other items, or they cleaned other people's homes. Two of them worked in agriculture. All confirmed that the current situation is extraordinarily difficult. Due to the population's economic situation, sales have diminished, and work cannot be found in other areas, such as cleaning homes

or working as day workers. In order to feed their children, all the mothers who are the only ones sustaining their families (this is sometimes not the case because they married again or their parents support them) are currently thinking of going “north” (again). For those who have already been in the United States, the only reason they have not left yet, as explained by all of them, is that because of the economic crisis in that country, it will also be difficult to find work there.

■ Another interesting aspect in the differences between migration by fathers and by mothers consists of the concrete objectives they propose for using future remittances. For the great majority of mothers, the main goal is to finance their children’s education and the second goal, but much less important, is building their own home. For fathers, the main objective is to build a house, followed by their children’s education, and then paying debts and investing in land or a business.

#### 4.2.2.3 Migration by young single women, in comparison to migration by young single men

■ Various differences between genders were also detected in the migration strategies used by single young people. Although migration patterns in the areas studied seem to be similar among male and female young single adults—as mentioned earlier, young single women’s migration seems to be moving toward reaching the same levels as for young single men, the search for work and providing support to their parents are primary factors for both young single men and young single women, and also both migrate in response to economic impacts from climate change (among other factors)—significant differences were found between genders in the case of adolescents (aged 12 to 18, interviewed in the junior and senior high schools). While the strategies, or rather, the future plans and wishes in relation to migration are not necessary associated with impacts from climate change in this group, they are equally interesting due to the marked differences between genders revealed in their attitudes toward migration.

#### Migration and education, requirements for being able to work

■ The most notable difference is associated with the reasons for and objectives of migration for girls and boys. While the great majority of both sexes reported wanting to go somewhere else after finishing school, and for both, the plan to continue studying is the most common objective, the girls have much more concrete ideas

about their future. For them, an education, particularly a university education, has much greater meaning than for boys. When asked about their plans after finishing school, the great majority of girls—more than twice as many as boys—answered that they planned to finish a university degree. In addition, unlike the boys in this group, the girls could generally state very concretely the area they wanted to study. This is because, as most of the girls (and also a number of adult women) insisted, “without an education, there’s no work for women.” It was very clear in the interviews with women that it is very difficult for women to work in the area studied in this research, and consequently, in order for women to be able to work, it is necessary for them to go somewhere else and/or get an education.

■ This viewpoint is not surprising. Since the main economic activity in the area studied is agriculture, which is clearly considered to be a male occupation—together with the fact that many of the other areas of work for unskilled labor are not considered to be appropriate for women (such as being a driver or mechanic), the only option for women who want to work and not be economically dependent on their husbands, is to go somewhere else and study. In fact, some of the girls explained that the only thing a woman can do in the area studied is to marry young, have kids and become a housewife—which is incompatible with the plans they have for their lives. The great majority of girls want to have a professional career, to be successful, and in fact several of them said they wanted to continue to work even after they had children of their own—something unthinkable in their communities of origin. The situation in their places of origin helps to explain why the desire to *live somewhere else* is much more pronounced for women and is the second most important reason for migrating, often connected to the desire to study. Approximately half of the girls interviewed stated that they want to leave their places of origin because in other places “there is more freedom,” because “it’s nicer there,” because “life is better there,” because there they can do “whatever I want,” or because “I don’t like it here.”

■ Meanwhile, among the concrete reasons for migration among boys, apart from studying and looking for work because “there’s none here,” those especially worth noting are: saving money to “build my house here,” to buy land, and “making money”—objectives that are not at all important for young women. This also indicates a difference in whether or not girls and boys plan to return to their places of origin.



■ As a result of what has just been described, migration is viewed generally by the girls interviewed as something *definitive*—few have the intention of returning. Less than a fifth of the girls said they wanted to return to live in their places of origin. Meanwhile, for most boys, migration is viewed as something *temporary*. About four-fifths of them want to return to their places of origin after having studied or worked somewhere else, and “live here.” This is also consistent with an impression obtained from the field work: that young single women who migrate tend to remain in their places of destination longer or not return at all: Among those interviewed, there were many young single men who had migrated in recent years and had returned, however not a single young woman who had recently migrated and already returned was identified. Also, many of those interviewed stated that a significant portion of the young women who migrate never return. This impression is backed by official figures indicating that in Mexico women’s migration tends to be more permanent than men’s migration (CIMACnoticias 2005).

■ These differences in terms of returning to places of origin—apart from the reasons already described—may also be associated with the fact that, although this is slowly changing, young men are generally those who inherit land and homes from their parents. It was evident from the interviews that most girls and boys take for granted that some of the brothers in the family will remain living in the community, and will assume responsibility for taking care of the family home and working the land—even though when asked who will inherit their parents’ assets, the majority responded: males and females equally.

■ Taking all of this into consideration, it seems that for girls, migration is associated with the desire to “escape” not only from economically and socially depressing conditions in their places of origin, but also, and primarily, from conditions that are restrictive for women, both in terms of reduced possibilities for work as women, as well as social norms that allow few options for women except being housewives. The majority of young women no longer want to get married young and become a housewife. Instead, they want to have a career and a “good job.” It is necessary to clarify that this strong desire to have a profession, and the degree of importance placed on acquiring an education—also by mothers and fathers—is also likely associated with the fact that in the framework of the *Oportunidades* federal assistance program, many girls (and also boys) currently have the opportunity to study—while

in the past many did not have this opportunity.<sup>14</sup> Many of the mothers interviewed emphasized how important this program is economically for their families, and in fact a number of them said their sons and daughters would not be able to go to school without it.

■ An interesting and necessary point to mention in the context of migration for young women is that, unlike for married mothers, it appears to be socially acceptable for young single women (and also single mothers) to migrate. Generally, when asked for their opinion on young single women migrating, those interviewed during the field work answered that “they don’t have any other option,” “they have to help their parents” or “they couldn’t keep studying here,” while it was very clear that if married mothers migrate, they are viewed as “abandoning” their family. The social acceptance of young single women migrating allows them to migrate (or plan to migrate) to a much greater extent than for married women.

#### 4.22.4 Interest in staying: Differences in opinions on places of destination

■ An important difference between the migration of women and men—which may or may not be associated with climate change—and independently of age and marital status, is that a significant portion of female migrants view places of destination favorably and in fact many of them wish to stay there, while this is the case for very few male migrants.

■ As described above for boys, most adult men also view migration as something temporary. Nearly all those interviewed reported not viewing their places of destination favorably, and during the entire time of their stay, they clearly intended to return to their places of origin. In fact, the great majority of male migrants described the time during their migration as very difficult, and something they had to tolerate, with the intention to leave it behind as quickly as possible—especially when the place of destination was the United States, which was the case for most men. In contrast, although the great majority of female migrants interviewed also had the intention to return when they left—especially mothers who left their children

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<sup>14</sup> In the framework of the *Oportunidades* program for fighting poverty (prior to 2001, known as PROGRESA), operated by the Ministry of Social Development (*Secretaría de Desarrollo Social*—SEDESOL), education scholarships are granted in exchange for regular school attendance by children and youth. With this program, school enrollment and attendance has been improved considerably, primarily in rural areas (INSP 2005).

behind—approximately half of the women with whom this matter was addressed reported that when they were in their places of destination, they viewed them favorably, and many of them wanted to stay there or go back again.

■ In addition, for many of the migrants who are mothers, when they were in their places of destination (with or without their husbands), they intended to or thought about bringing their children (and some did), while fathers rarely considered this possibility. In fact, for many of the married couples who migrated together, leaving their children behind with relatives, conflicts arose when the mothers wanted to bring their children, but their husbands refused.

■ The reasons for this are primarily those already described for girls. The majority of female migrants reported that what they most like about their places of destination is the possibility of working. It became clear in the conversations that this includes both the more numerous and better opportunities for work for women—for example, in factories and in restaurants, stores and in other services—which do not exist in their places of origin, as well as the social acceptance of women working, including on the part of their husbands. It was clear that for many female migrants, the possibility of working and generating their own income, and the resulting changes in gender roles, was an important experience for them. Many migrant women reported wanting to go back or to stay in their places of destination, primarily because women are *permitted* to work there. This is the case particularly for married women who migrated together with their husbands—a number of these women wanted to continue working when they returned to their places of origin, but their husbands would not allow it. Several of them declared that “*here, working is just for men*” and married women must be housewives. At the same time, some of the married women who had migrated mentioned a change in gender roles as a positive factor in their places of destination. In some cases, because the wives had wage-earning work, the husbands began to participate more in household tasks, learning to cook, clean or wash clothes. When these couples returned to their places of origin, however, all of them returned to traditional gender roles.

#### 4.2.2.5 Destinations of migration: gender-related differences

■ Another difference between women and men, found at all ages and for both married and single migrants, lies in the destinations of migration.

■ The great majority of men (82% of the cases studied) migrate to the United States, while for women at all ages and stages of their lives, other parts of Mexico are also significant destinations. Even though more than half of women in the cases studied also migrate to the United States (55%), many also migrate to Mexican cities, primarily Tijuana, Mexico City and Nuevo Laredo, and to Cancun and Los Cabos. The same tendencies are found in the intentions of girls in school, with the great majority reporting they want to migrate to other places in Mexico, while in the case of boys, approximately half of them state their intention to migrate to the United States. This is consistent with what was mentioned earlier regarding inter-state migration from Chiapas to other Mexican states—that women represent slight over half of those in this category.

■ The reasons that the United States is less significant as a place of destination for women vary. A very important factor mentioned by many women is that crossing the US border is very difficult and increasingly dangerous especially for women, many of whom are raped by *polleros*, the persons smuggling illegal migrants across the US border. Also, in the case of single mothers, the risk of not surviving the journey across the desert and leaving their children without a mother makes some of them discard this option.

■ There is however another factor that seems to play a key role in the decisions made by many women to migrate within Mexican territory. As described earlier, one of the primary reasons that women migrate is the possibility to work, both due to greater opportunities for work in their places of destination, and because unlike in their places of origin, it is socially acceptable there for women to work. This is independent of whether or not the place of destination is in the United States or Mexico. Both the employment situation for women and social acceptance of remunerated work for women are better not only in the United States, but also in the cities and factories in northern Mexico and Mexican tourist areas. It is therefore not necessary for women to cross the US border in order to be able to work. In fact many women migrants who reported wanting to stay or return to their places of destination were working in Tijuana, Nuevo Laredo or Mexico City.

## 5. Final considerations

■ The objective of this study was to investigate the different ways in which women and men are affected by climate change phenomena and the possible differences in the resulting migration strategies. The empirical research was conducted in the southern part of the Mexican state of Chiapas, in an area highly affected by phenomena associated with climate change—primarily, increased hurricanes and tropical storms, as well as changes in rainfall patterns—which are intensified by accelerated environmental deterioration.

■ Two areas with different socioeconomic and climate characteristics were selected, in order to address different contexts in terms of impacts from climate change on the local population: the Motozintla municipality in the Sierra Madre de Chiapas mountains, and the Mazatán municipality in the coastal lowland area. Based on the results from a broad-based study of the relationship between environmental change and migration in the area, conducted in 2007 and 2008, the current study focused on possible gender differences in relation to impacts from climate change and migration strategies adopted in response to these impacts. The results from the field research conducted indicate some interesting gender differences in terms of vulnerabilities to climate change and migration strategies.

■ In terms of differences in impacts from climate change in women and men, it was found that basically, due to the gender roles assigned by society, men are affected in the sphere of remunerated work, while most women are affected primarily in the sphere of the home. Specifically, this means that the main problem faced by the great majority of men is the devastating impact from climate change on agriculture. Climate change impacts in the area, particularly from Hurricanes Mitch and Stan, and changes in rainfall patterns such as prolonged, heavy rains that provoke flooding and landslides, have led to severe losses of land plots and harvests in recent years. Since most men in the region are agricultural producers, this seriously impacts the economy of many families, signifying a significant loss of income in many cases. The agricultural crisis also affects the income of men dedicated to non-agricultural activities. Since agriculture is the foundation of the regional economy, the effects from climate change have led to an overall depressed economy. Consequently, the majority of the interviewed men reported not finding work or having

difficulties in their businesses, with often severe effects on their families' economic situation. For women, in the context of their homes, they are also severely affected by lost income due to the agricultural crisis and the economic situation in general. Since women are those who manage food in the home, they are left with the task of dealing with limited resources for purchasing food and other necessary items such as medicine and school uniforms for their children. However, in addition to economic impacts from climate change, women are also directly affected in their homes. For women in the areas studied, the main problems arising from hurricanes, from prolonged, heavy rains, and the resulting flooding and landslides are: serious difficulties in access to clean water and firewood for cooking; increased illnesses due to wet conditions and mosquitoes; constant flooding of their homes; loss of their yards, and consequently chickens, ducks and fruit trees; and difficulties in access to other communities, and thus, stores and clinics. All of this implies a considerable increase in their work load of domestic tasks.

■ The situation is especially serious for women who must generate income to maintain or support their families, and this is particularly true for single mothers, but also for some young single women. They are affected not only in the home environment, but in addition the economic impacts from climate change cause difficulties in maintaining their families. Especially single mothers confront serious problems, on the one hand, due to their huge work load in the home, and on the other, due to increasingly severe difficulties in generating enough income by selling food or other items, or from wage-earning work.

■ Also in terms of migration as a strategy for adapting to these processes, a number of differences between women and men were identified. Although migration as a reaction to the processes described is a strategy followed by both men and women, the relationship between climate change and migration is generally more evident in the case of men. In the area studied, as in other regions, the main reasons for migration are economic in nature. In this specific case these reasons consist of the impacts from climate change on the region's economy and particularly, agriculture. Traditional gender roles assign the task of maintaining the family to men, and thus it is up to them, within household strategies, to respond to the loss of income and use migration as a strategy for diversifying income. Several of the men interviewed had migrated in recent years as a direct response to the loss of land or harvests provoked

by hurricanes. Currently, in the Mazatán lowland area, the constant flooding during the rainy season is a significant factor for many men in their decision to migrate. Many of them said they planned to migrate because they lost all or part of their harvest. In the Sierra region, prolonged rains that caused the loss of coffee and corn harvests also acted as a factor that pushes them toward migration. In addition the overall depressed economy acts as an accelerator of migration for men employed in non-agricultural jobs. In a number of the cases studied, men migrated or planned to migrate due to a lack of employment or difficulties in their businesses.

■ In contrast, the relationship between climate change and migration is not as strong in the case of women. Married women have the task of taking care of the home, so very few of them migrate in response to economic impacts from climate change. Still, in the case of unmarried women who must generate income to support or maintain their families—young single women, and particularly, single mothers—impacts from climate change do affect their migration strategies, although less *directly* than for most men. Since agriculture is considered to be a man's activity, and few women work in this activity, most women are affected by the overall depressed economy caused by impacts from climate change on agriculture. Thus, in several cases studied, women decided to migrate in response to lost income in their economic activities—primarily the sale of food, household supplies or other items. In other cases, they planned to migrate again due to the difficult economic situation.

■ In addition to what was just described, some interesting results were found in terms of gender differences in migration strategies not necessarily associated with impacts from climate change.

■ An interesting finding consists of gender differences in the concrete reasons that young people migrate. While the great majority of adolescents interviewed in junior and senior high school have plans to migrate, the objective of continuing to study (primarily, a university education) is much more important for females than for males. For the latter, other objectives such as looking for work or saving to build their own home are also important. This is primarily because an education is considered necessary for women to be able to work. Since the main economic activity in the areas studied is agriculture, which is considered to be men's territory, and there are few other "appropriate" economic activities for women, the latter need

to obtain an education in order to be able to work. This is also associated with the fact that most girls said they wanted to live somewhere else because in their places of origin, women are expected to marry young and become housewives—something they are not willing to do. To the contrary, the great majority of girls want to study a career and become successful in their profession. As a result, migration is viewed as something definitive for the great majority of girls. To the contrary, boys mostly view migration as something temporary—for most of them, after they study and/or work somewhere else, they want to return to live in their communities of origin. Another difference between migration by women and by men that was found in this research, and that is related to what has been described, is that many women, unlike men, view their places of destination favorably. The great majority of men described their places of destination as unpleasant places, and during the entire time of their stay, they knew they wanted to return to their places of origin. However, approximately half of the women reported viewing their places of destination favorably and many of them even wanted to remain there. The reasons for this are associated primarily with the greater opportunities for women to work in places of destination. For them, it is easier to work there not only because “there is more work for women” but also because it is socially acceptable for women to work in those places. In contrast, in their communities of origin, many women, especially those who are married, have no choice but to become housewives.

■ Lastly, a difference between women and men was also found in the destinations of migration. The United States is the main destination for both sexes, however it is almost the only one for men, while destinations in Mexican territory are also very important for women. Nearly half of the women migrated to Mexican cities such as Tijuana, Mexico City, Nuevo Laredo and Cancun. An important reason that the United States is less common as a destination for women than for men is the danger involved in crossing the US border, particularly for women. Nevertheless, another and probably the main reason that most women decide to migrate is because in their places of origin *they can't work*—whether because there is no work (for women) or because social norms do not permit them to work. To overcome this situation, it is not necessary to migrate to the United States. There are work possibilities for women in Mexico's major cities and in factories at the northern border region, plus women working is socially accepted in those places.



■ This study contributes to the emerging research on the relationship between climate change and migration from a gender perspective. Considering that the impacts from climate change, and particularly, extreme meteorological phenomena such as hurricanes and droughts, will be increasingly more frequent and more intense, the findings emphasize the need to develop gender-differentiated adaptation strategies. While the results obtained from this case study cannot be viewed as representative and need to be further studied in future research, they are however an important initial step toward a greater understanding of the differences in the migration strategies used by women and by men in response to climate change and toward the development of adaptation strategies sensitive to these differences.



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