### MAKING MANGROVES: ECOLOGIES OF MANGROVE RESTORATION

### IN EL SALVADOR, 2011-2013

### A Dissertation

by

## FIONA C WILMOT

## Submitted to the Office of Graduate and Professional Studies of Texas A&M University in partial fulfillment of the requirements for the degree of

## DOCTOR OF PHILOSOPHY

Chair of Committee, Committee Members, Christian Brannstrom Elisabeth Ellis Michael Ewers Wendy Jepson Vatche Tchakerian

Head of Department,

May 2014

Major Subject: Geography

Copyright 2014 Fiona C. Wilmot

### ABSTRACT

Mangrove restoration for climate mitigation based in adaptation is a national environmental policy in the Republic of El Salvador. Rural, resource-reliant communities are considered especially vulnerable to extreme weather events associated with global climate change, and mitigation based in adaptation is an intervention intended to reduce vulnerability and enhance ecological service provision from mangrove systems. The Reduced Emissions from Deforestation and Degradation (REDD+) program of the United Nations Framework Convention on Climate Change (UNFCCC) is supposed to provide guidance towards funding sources. Critical scholars from Geography and other branches of the social sciences have suggested that due to its similarities to other market-based payments-for-ecosystem-services (PES), REDD+ deepens socioeconomic inequalities in rural communities and promotes poverty, while it does nothing to mitigate climate extremes. Some scholars have called this "carbon colonialism".

This research examines those claims through a mixed-methods case study based on fieldwork in El Salvador. It engages the literatures of restoration ecology and the "new carbon economy", and uses a governmentality framework provided by anthropologist Tania Murray Li to analyze processes whereby ecological mangrove restoration became adopted, adapted and appropriated in the Lower Lempa region of El Salvador. Ecological processes include restoration ecology (manipulating nature to reach

ii

a desired state), cultural ecology (use of resources by people), and political ecology (the ways power relations determine access to resources).

The results show that throughout the mangrove restoration governance network, people adapt and appropriate knowledge and techniques in order to reconcile state restoration policy with their own ideological, social and material interests. Within the context of climate change in a globalized world, I found no evidence to support the claim that poor, resource-reliant rural Salvadorans were being subjected to coercive pressure to relinquish territory, or had access to critical resources restricted by the state, or had been deprived of voice, autonomy and agency in the process of laboring for the state, as would be predicted by claims of neocolonialism. Although the restoration workers remained poor and subject to climate extremes, they were not excluded from benefiting from the restoration process.

#### ACKNOWLEDGEMENTS

The Department of Geography and a Brown-Kruse Fellowship at the Melbern G. Glasscock Center for Humanities Research at Texas A&M University provided financial support for research during my time at the university. The Human Dimensions of Global Change sub-group of the Association of American Geographers funded fieldwork.

Dr. Christian Brannstrom, my committee chair and academic advisor, was both guide and mentor through the process of becoming a Geography Ph.D. I can never show sufficient appreciation for his kindly rescue at a time when I was directionless, nor for his relentless humor over topic fidelity, or dire warnings about the terrifying condition that he called "slippage". His editorial skills vastly improved the dissertation.

Committee members Dr. Lisa Ellis, Dr. Michael Ewers and Dr. Wendy Jepson were much more than gracious signatories to endless forms. As formidable scholars, they all taught challenging and fascinating graduate seminars. Wendy and Christian provided weekly guidance to the Human-Environment Research Group, HERG. Thanks go to fellow HERGers, especially Kristian Saguin, who set impossible standards for the rest of us to follow.

I am indebted to the people in El Salvador who made fieldwork a joy: Mike Liles for inviting me to the Bajo Lempa; Nathan Weller for introducing me to EcoViva and Asociación Mangle; José Maria "Chema" Argueta, Carlos Barahona, Maria Inés Dávila, Geovanny Díaz, Juan Luna, Mario Martínez, Luis Orellana and Walberto Gallegos of Mangle. Chema deserves a medal. Thanks to the members of the Directiva of Mangle for

iv

their generous hospitality: Don Antonio Amaya, Carmen Argueta, Amílcar Cruz, Estela Hernández, Don Luis Hernández, David Marroquín, Nohé Reyes and Elena Vigil. Thanks to all the community leaders, resource guards and *rescatistas* from the Bajo Lempa, who for confidentiality reasons I cannot name, for all their time, companionship and good humor. I'm grateful to the mangrove experts who graciously gave their time for interviews in Mérida in 2011.

Brian Keller would have been proud of the support his family has given me following his untimely death in my first year. I am so thankful to the Cameron clan. Rose Williams took care of our cats, Noche and Daisy, during my many fieldwork, conference, and family absences. My gratitude is unbounded.

Especial thanks goes to my sister, Clare. As I began graduate school, she contended with leukemia. With the help of two stem cell donors and the loving care of her husband Peter Goreau and their children David, Lodi and Tara, she beat the odds in Dartmouth Hitchcock Medical Center. Clare then cheered me on in my lesser struggles, while she in turn cared for our parents in England, Ted and Diana Wilmot, during their last, difficult, year. I hope this is worthy of them all.

# NOMENCLATURE

ADESCO	Asociación para el Desarollo Comunitario
ARENA	Alianza Republicana Nacionalista
СОР	Conferences of the Parties
Coordinadora	La Coordinadora del Bajo Lempa
EMR	Ecological Mangrove Restoration
FIAES	Fondo Iniciativa de las Américas, El Salvador
FMLN	Frente Farabundo Martí para la Liberación Nacional
Mangle	Asociación Mangle
MAP	Mangrove Action Project
MARN	Ministerio del Ambiente y Recursos Naturales
PES	Payments-for-Ecosystem-Services
PLES	Plan Local para Extracción Sostenible
PREP	Programa para la Restauración de Ecosistemas y Paisajes
PRISMA	Programa Salvadoreña de Investigación sobre Desarollo y Medio Ambiente
REDD+	Reducing Emissions from Deforestation and Degradation
REM	La Técnica REM
SICA	Sistema de la Integración de Centro América
UNFCCC	United Nations Framework Convention on Climate Change

# **TABLE OF CONTENTS**

	Page
ABSTRACT	ii
ACKNOWLEDGMENTS	iv
NOMENCLATURE	vi
TABLE OF CONTENTS	vii
LIST OF FIGURES	x
LIST OF TABLES	xii
CHAPTER I INTRODUCTION	1
Introduction Research Objectives Conceptual Framework Structure of Dissertation	
CHAPTER II BEING THERE: MANGROVES, ORGANIZATIONS AND	)
COMMUNITIES	
Introduction	
Mangroves	
Communities	
Restoration Sites	63
CHAPTER III PUTTING INTO PRACTICE: POSITIONALITY,	
METHODOLOGY AND METHODS	66
Introduction	
Positionality	
Methods	

Problems Encountered and Solutions Applied	82
CHAPTER IV EVOLVING LANDSCAPES: THE PROGRAM FOR	
RESTORATION OF ECOSYSTEMS AND LANDSCAPES (PREP)	86
Introduction	86
Reducing Emissions from Deforestation and Degradation (REDD+)	86
Salvadoran Environmental Law	95
Program for the Restoration of Ecosystems and Landscapes (PREP)	98 99
CHAPTER V NOTHING IS INNOCENT: ALIGNING RESTORATION	
GOVERNANCE, AUTHORIZING ECOLOGICAL RESTORATION	101
Introduction	101
Performing Environmental Governance	103
Applying Jordan's Typology	108
Li's Analytic	115
Discussion	138
CHAPTER VI DOING SOMETHING: BALANCING LIVELIHOODS AND	
ENVIRONMENTAL RISKS WITH RESTORATION	141
Introduction	141
Charity Begins at Home	144
Dirty Work	171
Livelihood Threats	179
Discussion	186
CHAPTER VII CHANGING THE WORLD: REASSAMBLING CLIMATE	
SUBJECTS AND LA TÉCNICA REM0	191
Introduction	191
Changing the Subjects	192
Rescatista Environmental Perceptions	195
Authorizing <i>La Técnica REM</i> 0.	210
Circulation of Ideas	220
Reassembling	223
Discussion	224

CHAPTER VIII DISCUSSION AND CONCLUSIONS	
Discussion Lower Lempa Analytic Conclusions	228 234 242
REFERENCES	244
APPENDIX A	258
APPENDIX B	261
APPENDIX C	262

# **LIST OF FIGURES**

I	Page
Figure 2.1. Map of El Salvador showing the major watersheds	27
Figure 2.2. Territories controlled by the FMLN at the close of formal hostilities	34
Figure 2.3. Organizational structure of funding for mangrove restoration, El Salvador 2011-2013	41
Figure 2.4. Organizational structure of knowledge transfer for mangrove restoration, El Salvador, 2011-2013	41
Figure 2.5. Organizational structure of influence for mangrove restoration, El Salvador, 2011-2013	42
Figure 4.1. Minister Rosa Chávez and Viceminister Pohl at a public ceremony	90
Figure 4.2. Climate-induced damage since the Funes administration took office	98
Figure 5.1. Rosa Chávez inaugurates the mangrove restoration forum	. 104
Figure 5.2. Hybrids along the government/governance continuum	. 105
Figure 5.3. Spanish language version of EMR	. 118
Figure 5.4. El Quemado	. 127
Figure 5.5. Mangle logo and resource guards	. 132
Figure 5.6. Open-air meeting	. 134
Figure 6.1. FIAES mission statement	. 147
Figure 6.2. Remittance-money house	. 150
Figure 6.3. Vendor of agrochemicals	152
Figure 6.4. Interpretive sign	. 153
Figure 6.5. <i>Rescatistas</i> from Salinas del Potrero ADESCO attending the re-opening of Radio Mangle in Romero, May 2013	157

Figure 6.6. New standpipe (L) to replace well (R)	159
Figure 6.7. Corn drying on the road	. 161
Figure 6.8. Selected expenditures reported by <i>rescatistas</i>	163
Figure 6.9. Harvesting shrimp near Las Mesas	167
Figure 6.10. Quarterly availability of important aquatic resources and mangrove restoration	168
Figure 6.11. Non-mangrove sources of income, all communities	169
Figure 6.12. Mangrove sources of income, all communities	. 169
Figure 6.13. Recommended improvements for future restoration projects	. 172
Figure 6.14. Rescatistas working at El Llorón, 2012	. 173
Figure 6.15. Cooperative returning from a morning collecting <i>curiles</i>	. 175
Figure 6.16. Pasture in Salinas del Potrero during a normal rainy season, after canal clearance, August 2013	. 183
Figure 7.1. The stage and the "climate subjects" leaving after performances by Shaka y Dres and Herman Rosa Chávez, San Salvador, April 2013	. 193
Figure 7.2. Relaunching Radio Mangle	. 196
Figure 7.3. The oldest <i>curilera</i> in Méndez	201
Figure 7.4. Planting <i>Rhizophora</i> propagules at Bird Palace	202
Figure 7.5. Jim Enright of MAP	. 210
Figure 7.6. Resource guards at El Llorón	. 219
Figure 7.7. Visitors from Nueva Granada setting out for Montecristo, July 2011	. 222

# LIST OF TABLES

Table 2.1. Restoration areas studied in this dissertation	. 63
Table 3.1. Data collected	75
Table 4.1. Two years of MARN climate change press releases	. 91
Table 4.2. Governance considerations, following Williams & Davis 2012	. 94
Table 5.1. Typology of governance types	109
Table 5.2. Governance typology for El Salvador	. 110
Table 5.3. Political ecology approach to environmental restoration	112
Table 5.4. Principles of EMR	114
Table 6.1. Householder characteristics	148
Table 6.2. Voluntary work performed by <i>rescatistas</i> during 2012 by organization type	155
Table 6.3. Pesticide and herbicide payments	162
Table 6.4. Numbers of times <i>rescatistas</i> sought work outside the community in the years 2010-2013, the majority in urban centers	166
Table 6.5. Non-mangrove, non-service sources of income	170
Table 6.6. Mangrove-derived sources of income	170
Table 6.7. Perceptions of gender equality in the mangrove restoration workplace	. 174
Table 6.8. Recommendations by <i>rescatistas</i> for future restoration projects	178
Table 6.9. Number of <i>rescatistas</i> reporting that they participated in disaster   preparedness projects	181
Table 6.10. Number of <i>rescatistas</i> whose livelihoods were affected by climate	.182
Table 6.11. Number of <i>rescatistas</i> who received outside aid after floods or droughts .	.184

Table 7.1. Cell phone ownership among rescatistas	197
Table 7.2. Changes in <i>rescatistas</i> attitudes towards the environment after restoration work	1 202
Table 7.3. Responses by <i>rescatistas</i> to the question "Is climate mitigation a good reason to restore ecosystems in the Lower Lempa?"	203
Table 7.4. Responses by <i>rescatistas</i> to the question "Will future generations be able to enjoy mangroves like now?"	204
Table 7.5. Responses by <i>rescatistas</i> to the question "Does it make sense to sacrifice using resources now so that future generations can enjoy them?"	206
Table 7.6. Responses by <i>rescatistas</i> to the question "Does it make sense for people to be good citizens locally if other people are not taking responsibility for their actions somewhere else?"	207
Table 7.7. Reponses by <i>rescatistas</i> to the question "Is restoration just work, or is it something more to you?"	208

### **CHAPTER I**

### **INTRODUCTION**

### Introduction

In early January 1840, John Stephens, the American explorer and Presidential emissary, in his search for the Federal Government of El Salvador, encountered it near modern Sonsonate:

Before entering the town and crossing the bridge over the Rio Grande, I met a gentleman well mounted, having a scarlet Peruvian pellon over his saddle, with whose appearance I was struck, and we exchanged low bows. This gentleman, as I afterwards learned, was the government I was looking after. (Stephens 1969:321)

His search had been complicated by a bout of malaria, a volcanic eruption, and the perennial difficulties of communication in the countryside. Rural El Salvador is still a challenging environment. The Salvadoran government at the time of this research was similarly lean, well-disposed towards the color red, and in rural areas, hard to locate other than as logos on roadside billboards.

A decade of civil war in the years 1980 to 1992 between the land-holding elite supported by the United States-backed military, and the poor majority represented by a guerilla movement, devastated El Salvador. The Peace Accords of 1992 did nothing to protect the Salvadoran people from the further ravages of the structural adjustment

programs imposed by international institutions and carried out by a new elite of neoliberal business and financial entrepreneurs, the so-called "G20" (Martínez 2014). The election in 2009 of the leftist Funes administration of the Farabundi Martí National Liberation Front (FMLN), after four right-wing G20 presidencies from the ARENA party, had left the incoming government considerably reduced in capacity to confront the myriad economic, security and environmental challenges which it had inherited (Seelke 2012).

The election results were close (51% of the final tally) and the world was in a state of financial uncertainty following the crisis of 2008. The FMLN coalition of five former guerrilla groups faced internal as well as external problems in exercising the art of government, as it had retained the neoliberal export-oriented economic model which privileged the budgets of some branches of the executive over others. It had to contend with an on-going security crisis, caused by the mass deportation of young Salvadoran gang members from US prisons to El Salvador in the 1990s, that drew limited state resources away from housing, education, health and the environment, and into an all-out effort against crime and drug trafficking (Seelke 2012; Ward 2013). The United Nations Office on Drugs and Crime named El Salvador top of its list for the highest homicide rate for six years out of ten between 1995 (139.1 homicides per thousand of the population) (UNODC 2012).

The peace/prosperity equation had always been in the calculus of the country's economic elite, represented electorally by the ARENA party since 1981; in the earlier context of the civil war, but no less so in the unfavorable investment climate of inter-

gang violence, "prolonged civil strife was, put simply, not good for business" (Williams 2002:184). The solution of the ARENA administrations has been to combat violence with violence. By contrast, the FMLN permits indirect negotiations to find settlements through third parties, for example the Catholic Church. The FMLN government had little to expend on an equally ravaged natural environment but a motivated Environment Minister, a novel plan for restoring ecosystems and landscapes, and the collective goodwill of FMLN supporters.

Since the Peace Accords in 1992, Herman Rosa Chávez, the Environment Minister under the Funes administration, has devoted his life to, and written about, the interconnection between the condition of natural resources and the livelihoods of the rural poor in El Salvador (Barry & Rosa 1996; Rosa et al. 2004; Hecht et al. 2006). His earlier focus was on degraded watersheds, made worse by economic and social policies that exacerbated poverty and inequality:

Present economic policies and the postwar reconstruction plans simply assume water availability, ignoring the degree of urban and rural land degradation, the negative dynamics of degradation that have been established, and their implications for national reconstruction. (Barry & Rosa 1996:234)

A situation already grave before the specter of climate change impinged on the nation's consciousness. A decade later his environmental think-tank, PRISMA, was exploring payments-for-ecosystem-services (PES) as a poverty-reduction mechanism through diversification of livelihood strategies and improved natural resource management (Rosa

et al. 2004). El Salvador experienced more frequent and more intense weather events after the Peace Accords, notably Hurricane Mitch in 1998 (\$400 million in losses), Hurricane Stan in 2005 (\$356 million in losses), and Hurricane Agatha in 2010 (\$31.1 million in losses). Much of the damage occurred in river floodplains. Understandably, Rosa Chávez turned his focus to global climate change and financing for climate governance, where it stayed throughout his time at the Environment Ministry. In this context he promoted the Reducing Emissions from Deforestation and Degradation (REDD+) program of the United Nations Framework Convention on Climate Change (UNFCCC), with funding from the German government through their overseas aid program, GIZ. His personal friendship with the Executive Secretary of the UNFCCC, Christiana Figueres of Costa Rica, further cemented El Salvador's modest leadership position of Central America's climate governance coalition, SICA. He championed the National Program for Ecosystem and Landscape Restoration (PREP) as head of the intra-governmental Committee of Climate Change (part of the National System of Environmental Management -- SINAMA). PREP is the policy outcome of twenty years of his thought on the importance of adopting a landscape perspective with a climate component, "mitigation based in adaptation", to environmental management and rural development.

The selection of the mangroves of the Lower Lempa River in southeastern El Salvador as a pilot landscape restoration project reflects their importance as the wetlands at the mouth of the nation's largest river, the Lempa River, as much as their iconic status as an FMLN refuge during the civil war (see figures on p. 27 and p. 34, Chapter II). Yet

billboards celebrating government restoration schemes hold lonely vigil in the mangroves of the Lower Lempa. Rosa Chávez has never been seen there.

My dissertation examines the restoration of mangroves through the perspective of actor-oriented political ecology. I study the processes in which a coalition of government officials from the Environment Ministry, civil society actors, and rural Salvadorans formed around the discourse of climate change, and then identified with a restoration protocol to meet the environmental challenges that confronted them. The coalition had a collective sense of the political and moral economy, and causality, of those challenges, which some, particularly Herman Rosa Chávez, expressed more forcefully than others. It is a study of ecological governmentality, that is, governance through ecological processes (Bridge & Perrault 2009:492). Ecological processes include restoration ecology (manipulating nature to reach a desired state), cultural ecology (use of resources by people) and political ecology (the ways power relations determine access to resources), all of which come together in management of the hazardscape in which El Salvador's "climate mitigation based in adaptation" program unfolded.

"Hazardscape" better captures the multiple sources of vulnerability and their effects on the people who experience them in the study region than landscape. It is defined as a landscape of spaces, naturally vulnerable to environmental hazards, in which socially differentiated impacts are produced and reproduced through power relations, making "the economically and socially marginalized and disempowered also the most vulnerable to hazards" (Mustafa 2009:467-8). The state approach in a

hazardscape to flood plain residents, for example, is typically managerial and technocratic, involving construction of dikes and levees, rather than substantive in addressing root causes of why residents are in harm's way in the first place. This approach was seen in the response to the losses caused by Hurricane Mitch in 1998 in El Salvador (Wisner 2001), but the state had been absent since then, leaving residents of the study area to fend for themselves during extreme rain events, earthquakes and tsunamis. Aid came from international NGOs, church groups and, importantly, volunteer vulnerability response organizations that developed in the communities. The Lower Lempa is famous in El Salvador for its degree of organization.

This research, using material drawn from fieldwork in the Lower Lempa, advances the climate governance literature in human-environment geography beyond the state-centered approach by examining the processes linking the international climate regime to the micro-structural world of subjects and subjectivities (Liverman 2009; Okereke, Bulkeley & Schroeder 2009). My analysis of the livelihoods and perceptions of the mangrove restorers (*rescatistas*) of the Lower Lempa River brings the lives of ordinary people into conversation with the abstract world of the international climate regime, to show that they have agency in climate governance. My contribution to studies of rural organization in post-conflict El Salvador adds a slightly different perspective to the rational actor approach adopted by one of the authorities on insurgent collective action, herself a field-worker in the department of Usulután (Wood 2003) by expanding the scope of work on participation in peasant organizations in Central America beyond

land tenure conflicts to environmental management for climate adaptation, a topic of increasing concern in the region (Todd 2010; CRS 2012).

### **Research Objectives**

The research presented here investigates the proposition that mangrove restoration carried out for the purposes of "climate mitigation based in adaptation" in El Salvador constitutes a form of neocolonialism. By contrast, state officials in El Salvador describe the national Program for Ecosystem and Landscape Restoration (PREP) as "one of the most ambitious commitments made in this country in the last 50 years" to wellbeing (Rosa Chávez 2010). This apparent contradiction, in which a climate change policy is a repetition of past colonialist exploitation, was suggested by geographers Adam Bumpus and Diana Liverman (2011), who focused on the political economy and governance of carbon offsets within the international climate regime. Bumpus and Liverman aimed to inform future offset policy by showing how carbon capital affects, often in negative ways, specific communities in the global South. Their work indicated that a colonial relationship of domination and dependence between North and South would be reproduced in climate change policy implementation. They cite critics of the local impacts of carbon offsets that include "increased local inequity, and restrictions of access to resources critical to some of the poorest people" as well as "marginalization of others from potential benefits" (Bumpus & Liverman 2011:212). The original reference to carbon colonialism has been attributed to an Indian research and advocacy organization in New Delhi, the Centre for Science and the Environment, writing on the

failure to restrict emissions in developed countries through regulation, but with reliance on market mechanisms instead (Bachram 2004:1).

Bumpus and Liverman were not alone in their suggestion that political ecology would bring useful insights to the roll-out of climate change policies. In their preface to the volume in which the geographers published their "carbon colonialism" claim, Richard Peet, Paul Robbins and Michael Watts wrote:

The book was put together as the United Nations Climate Change Conference was taking place in Copenhagen in December 2009. These were sad days of utter failure even to reach an ineffectual accord on slightly restricting carbon emissions They brought the realization to us that many of the more pessimistic conclusions emerging from the field of political ecology over the last few decades were more the case than even we had thought. (p.xiii)

But they did not altogether despair:

On the other hand, there is always a core of hope underlying any radical or progressive politics...Hope amidst sobering challenge is the guiding theme of this book. (ibid.)

My position in investigating the colonialism claim errs on the side of "hope amidst sobering challenge", while maintaining a focus on those elements of the processes involved in ecosystem restoration that shed light on practices predicted by colonial theory (Scott 1995): whether practitioners are denied voice, autonomy or

agency while engaged in the labor of restoring landscapes; whether they are engaged through the rule of force rather then the rule of law, and whether their landscapes and usage of them are modified in ways that negatively affect their livelihoods.

The question I ask, therefore, is whether mangrove restoration for climate mitigation is a form of neocolonialism. If mangrove restoration is neocolonialism, then carbon offsets are embraced by the state as a means of allowing external control of rural development, as adoption of REDD+ implies imposition of expert knowledge and dominance of territory and resources. In order to answer this question, I analyze the governance processes and activities around mangrove restoration between 2010 and 2013 in the Lower Lempa region of El Salvador. Then I examine how the communities of the Lower Lempa meet climate challenges with their limited resources. Finally I determine whether the implementation of the Salvadoran climate change policy, PREP, distinguishes it from other rural development projects through the informal manner in which knowledge circulated among practitioners.

### **Conceptual Framework**

Three bodies of literature intersect in my dissertation: restoration ecology, with particular focus on restoration for climate mitigation; the "new carbon economy" as a market solution to global climate change; and governmentality applied in the context of post-neoliberal Salvadoran environmental governance. I use a livelihoods approach founded in cultural ecology (Bebbington 2001) to gain an understanding of the people

who carried out the physical labor of restoration in the region of El Salvador known as the Lower Lempa.

### **Restoration Ecology**

"Restoration ecology" is an evasive term. It can imply rehabilitation to a functional state, restoration to a former state, or remediation for an environmental wrong; its meanings are as varied as the situations to which it is applied (Woolley & McGinnis 2000; Hobbs & Harris 2001; Basl 2010). I have chosen to follow the definition of ecological restoration provided by the Society for Ecological Restoration: the process of assisting the recovery of an ecosystem that has been degraded, damaged or disturbed (SER 2004). Ecological restoration underpins El Salvador's National Program for the Restoration of Ecosystems and Landscapes (PREP), which is discussed in more detail in Chapter IV.

Ecological restoration has become an established practice of environmental management and is now represented by a large literature. It is the subject of a series of foundational texts (Perrow & Davy 2002; Falk, Palmer & Zedler 2006; Clewell & Aronson 2007; Egan, Hjerpe & Abrams 2011) and has been comprehensively reviewed by scholarly practitioners (Hobbs & Cramer 2008). There is a substantive edited volume on the global challenges which the practice addresses. These include sustainability and restoration to mitigate climate change at landscape scales, as in the Salvadoran case (Comín 2010).

Restoration ecology is an approach that allows informed intervention in ecosystems to ensure the continuation of ecosystem provision, while creating novel ecosystems in the process (Hobbs et al. 2011, 2013). Novel ecosystems (those that are formed by plants and animals in non-historical combinations and densities) are the foundation of the landscape matrices of agroforestry, fields and garden plots that characterize the Salvadoran countryside at present (Hecht 2004; Hecht et al. 2006; Hecht & Saatchi 2007; Perfecto, Vandermeer & Wright 2009). The Lower Lempa and land surrounding Jiquilisco Bay are just such matrices of mangroves, pasture, fruit orchards, woodlots, shrimp ponds, salt pans, and maize and vegetable fields (Appendix A).

The pioneer of mangrove ecosystem studies observed that the "ecosystem has been a key concept in the development of modern ecology, yet today it is widely misunderstood and misused" (Golley 1993:xi). The cause for the misunderstanding stems from the wide range of meanings--as a philosophical idea, the animator of studies in environmental management, and a paradigm that structures scientific research–which people impose on a device he prefers to characterize as "flows of energy and cycles of materials" (ibid, p. 204). This conception allows for theoretical acceptance of the novel ecosystems formed in landscape matrices, which include mangrove restoration sites.

The staffers at PRISMA, the environmental think-tank which informs much of the policy adopted by MARN, and the former institutional home of the Environment Minister, Herman Rosa Chávez, are undoubtedly familiar with the idea of novel ecosystems, as well as other systems-oriented approaches such as complexity theory, systems ecology and resilience thinking in socio-ecological systems, as evidenced by

their publications on payments-for-ecosystem-services, vulnerability and REDD-Readiness (PRISMA 2010, 2013). Two economic geographers from PRISMA, Deborah Barry and Susan Kandel, were active participants in one of the key meetings on ecological mangrove restoration (EMR) at MARN in July 2011, discussed in Chapters IV and V. However, the simpler idea of plants and animals as parts of a community of living organisms, interacting with the environment, other organisms, and humans, probably describes what most of the people in El Salvador interviewed for this research intend when they use the term *ecosistema* to describe the patterns, organizations and processes of genes, individuals and populations they are conceptualizing in the mangrove systems of the Lower Lempa.

Critics of restoration have published principally in the literatures of political ecology and science and technology studies, concerning themselves with constructions of nature, production of knowledge, and commodification in "neoliberal environments" within the capitalist world economy (Braun & Castree 1998; Katz 1998; McCarthy & Prudham 2004; Prudham 2005; Robertson 2000, 2004, 2006, 2012, 2013; Castree 2008a, 2008b; Lave 2011, 2012). Rebecca Lave, a critical physical geographer and science studies scholar, is particularly critical of the move of the multi-million stream restoration business out of the public sector of universities and government departments into a virtual personal monopoly in the US, as knowledge claims, techniques and training for riparian and hydrologic restoration have become privatized by one individual. Morgan Robertson has critiqued wetland mitigation banking, concluding that attempts to commodify nature through the creation of ecosystem services are complicated by the

fragility of the science that underpins them. He joins with Lave and Doyle to critique the new field of stream mitigation banking (SMB), which has become established in a number of US states (Lave, Doyle & Robertson 2010). Like Liverman (2009), McAfee (2012) and Shapiro-Garza (2013), their criticisms of market solutions to political economic problems expressed in the environment, reflect substantive concerns about accumulation strategies on the part of politically powerful actors. They are wellrespected and influential scholars. However, much of their argument would be lost in the restoration situations of the developing world, where there are few academics or agency scientists to compete with the private sector, and the private sector has no interest in restoration whether for profit or philanthropic purposes.

My contribution to this literature is to broaden the empirical field of application outside the US to neotropical wetlands under legal/legislative frameworks at both the global scale (UNFCCC/REDD+) and at the national scale (Salvadoran National Environmental Law), where funding is hard to obtain, and not a mandate of the Clean Water Act. Mangroves since COP16 in Cancún have now become involved in carbon offset projects around the world (Beymer-Farris & Bassett 2012), so there is a need for research in multiple contexts to determine how mangrove-dependent people can conserve and restore them in degraded environments without compromising their livelihoods in the process. My research details how a resource-poor state environmental ministry acquired knowledge without cost from the private sector and then secured unencumbered funding for restoration, while at the same time apparently benefiting the

people who did the actual work of restoration. This is not a typical narrative about government bureaucrats in political ecology (Ferguson 1994; Mitchell 2002; Li 2007).

#### The New Carbon Economy

One of the most abundant elements in the universe, carbon is a foundational element for life and has been the basis of all human economies, past and present. The "new carbon economy" refers to the linkage between fossil fuel extraction and sinks for greenhouse gas emissions in modern high-energy societies. This linkage is realized in economic life by marketization of carbon as a commodity to mitigate global climate change caused by releases of the gas carbon dioxide into the upper atmosphere. Fossil-fuel intensive lifestyles in the industrialized economies of the capitalized world and forest conversions to other uses contribute the bulk of the throughput in the "hydrocarbon commodity chain" (Bridge 2010).

Sequestration of carbon in terrestrial and aquatic ecosystems is one aspect of the governance of the "anthropocene" that scientists favor as a climate mitigation strategy (Steffen et al. 2004, IPCC 2007:213). Approaches to reduce greenhouse gas (GHG) emissions (conceptualized as carbon in metric tonnes of carbon dioxide or tCO<sub>2</sub>e) to an idealized level of 350 parts per million, rely upon the creation of carbon offsets through market-based principles (Boyd, Boykoff and Newell 2012). These offsets remove carbon through sequestration (carbon sinks) or reduced consumption of fuels through improved technologies (Bumpus & Liverman 2008). Offsets can be traded on open markets, such as the European Union Emissions Trading Scheme (EU ETS), which does not permit

carbon sinks, or under the heavily regulated mechanisms of the UNFCCC. The World Bank has an in-house climate mitigation program, the Community Development Carbon Fund (CDCF), which has its own regulatory processes (Bumpus 2011). There are also numerous corporate social responsibility schemes for GHG reductions which operate on a voluntary basis and typically contract with local groups or organizations on projects (Bayon, Hawn & Hamilton 2007).

However, the desired level of 350 parts per million was exceeded during the course of this research, calling into question the efficacy of any mitigation efforts. The European Union Emissions Trading Scheme (EU ETS) fell into disarray, trading at less than  $\notin$ 5 per tonne in September 2013. As *The Economist* reported "The world's largest carbon market has been holed below the water line" (*The Economist: Finance & Economics,* April 20, 2013).

If the carbon market is not to be trusted as a means for reducing carbon, other ecosystem service provisioning schemes are equally called into question. There exists a large and growing critical literature on payment-for-ecosystem-services (PES) which have become widespread since the Millennium Ecosystem Assessment of 2005. PES schemes target elements of ecosystems which provide services considered beneficial to humans, under the general groupings of supporting, provisioning, regulating and cultural services, such as carbon sequestration for climate mitigation, purification of water and biodiversity conservation (MEA 2005: vi). McAfee & Shapiro (2010) analyze PES programs in Mexico to expose more generally the contradictions in commodifying "nature's services" while ostensibly tackling the causes of forest loss and ecological

degradation through rural poverty alleviation schemes. Their argument, sustained in McAfee (2012) and Shapiro-Garza (2013), is that market-based mechanisms to provide payments-for-ecosystem-services have consistently failed as they require concerted government interventions in order to survive, if not succeed, and logically require that intended beneficiaries remain poor in order for the schemes to be efficient. Nonetheless, PES schemes persist, particularly through the Clean Development Mechanism (CDM) of the United Nations Kyoto Protocol for coping with climate change.

The PES scheme I treat in this dissertation is called carbon forestry, which was introduced through the Reducing Emissions from Deforestation and Degradation (REDD+) program, discussed in Chapter II. There are a number of countries preparing to participate in REDD+, a lengthy formal process with guidelines and benchmarks, El Salvador among them.

Carbon forestry has its own critical literature that questions sequestration of carbon in growing trees as a climate mitigation strategy, both on social justice issues and as a fallacy of market operations (Alíx-Garcia et al. 2008; Brown & Corbera 2003; Bäckstrand & Lövbrand 2006; Bumpus & Liverman 2008; Boyd 2009; McAfee 2012). Proponents of carbon forestry have not yet adequately addressed criticisms that it can be used for plantation forestry, thus simplifying ecologically sensitive areas and defeating the goal of biodiversity conservation, and is inadequate for the task of removing atmospheric carbon dioxide at the local and regional scales at which it has been adopted (Gutiérrez 2012).

Nonetheless, under the *Kyoto Protocol* and subsequent amendments such as the CDM and REDD+, highly regulated offsets are still under consideration to remove carbon through sequestration or reduced consumption through improved technologies. Funding for these schemes continues to be contested at the annual Conference of Parties (COPs) due to verification issues, as is the World Bank's in-house climate mitigation program, the Community Development Carbon Fund (CDCF). There are a number of corporate social responsibility schemes that operate on a voluntary basis without the same degree of contention, due to lack of regulatory oversight (Bayon, Hawn & Hamilton 2007). Afforestation and reforestation schemes can be included in the regulated schemes, provided that they bear the proof of additionality, which means that without carbon financing the projects would not have been undertaken, for example in a timber concession area or a plantation (Bumpus & Liverman 2008).

Geographers have either been outright critical of carbon forestry, raising social justice issues (Bumpus & Liverman 2008, 2011; McAfee & Shapiro 2010; Beymer-Farris & Bassett 2011), or dubious about their efficacy (Boyd 2009; Lansing 2012a) – McAfee (2012:107) has called them "miracle export crops" -- or sympathetic under specific conditions (Bumpus 2011; Fletcher & Breitling 2012). Given that many forests are inhabited by forest-product users, the limited market opportunities for forest-related projects due to additionality problems have thus encouraged imaginative forays on the part of financiers into less obvious realms.

One example of such an imaginative foray is the use suggested for mangrove forests at the 2010 COP16 held in Cancún, Mexico. The irony that the mega tourist

resort of Cancún where the climate meeting was held had been constructed on a mangrove lagoon was seized upon by one section of the press. These observers supported institutional measures to deal with further conversions of "desolate sandbars" to tourist hotspots" (Rucker 2010). Rather less breathlessly, Conservation International (CI) and the International Union of Conservation Scientists (IUCN), as well as academic organizations such as the Nicholas Institute of Duke University, rolled out "Blue Carbon: Valuing CO<sub>2</sub> Mitigation by Coastal Marine Systems" at a press conference at the meeting by "Crooks et al." (Fieseler 2010). This particular coalition arrived at a value of US\$1.6 billion annually for ecosystem services provided generically by mangroves, following the market-based principles espoused by earlier COPs (Murray et al. 2012). Despite the lack of success by New Guinea to put Blue Carbon officially on the UNFCCC agenda during 2011, subsequent publications show no loss of interest by either the mainstream scientific community or their policy adherents around the world in proposing the commodification of the coastal systems of mangroves, saltgrass marshes and seagrass meadows for climate mitigation purposes (Pendleton et al. 2012).

Major funding for mitigation initiatives remains elusive. The collapse of carbon markets globally following the financial collapse of 2008 has been tracked by a failure at the COPs since Cancún to arrive at any kind of agreement over financing. The *Durban Platform* at COP17 in 2011 concluded without resolution of the finance issue. The COP18 *Doha Climate Gateway* was at least not bedeviled by high expectations (Dooley 2013). The Salvadoran Environment Minister provided a response on these limited developments, on behalf of the Least Developed Countries and the European Union: "Our past inaction is costing us dearly already, and if we do not rise to the climate change challenge, the coming costs will simply become catastrophic for us all. We have to act and we have to act now" (Rosa Chávez 2012).

There seems to be a polarization of viewpoints in the carbon economy literature between the pessimism of some sections of the academy and the optimism of development practitioners, straddled by the vulnerability and resilience school (Pagiola et al. 2004; Adger et al. 2006; Newell et al. 2012). Okereke et al. (2009) suggest that scale is at issue, and that governance of the global climate regime needs to be considered at more local scales.

My contribution to the carbon economy literature is to apply a cultural and political ecology approach to a REDD+ pilot project in order to understand how carbon forestry interventions impact the lives of those most intimately affected by policies constructed for global climate mitigation. I reveal how small, timely and well-targeted forestry offset projects can achieve, in the short-term, quite acceptable results to the communities involved. While I am aware that this appears to concede to market logic and does little to alleviate the global crisis of sustainability in capitalism, this small concession to "green rule" (Peet et al. 2011) contributes to an understanding of the institutional conditions that foster both livelihood security and reduced forest degradation. Bumpus and Liverman indicated (2011:211) that "several dissertations currently underway" were asking questions about "the existence and distribution of development benefits, the amount and legitimacy of the carbon reductions, and local perceptions of the projects". However, at the time of proposing this research, only

Bumpus' work in Honduras on community-based hillslope reforestation for a private micro-hydroelectric project had been published (Bumpus 2011). The project he described is one of the few that detail the integration of local communities in the process of creating offsets, although as he says "this project fits more within debates on corporate activity in developing countries, than pro-development carbon finance" (Bumpus 2011:7). The carbon forestry literature, since Brown and Corbera (2003) showed that large, state-sponsored carbon offsets in Mexico and Bolivia do not support equitable and sustainable development, has inclined towards criticizing REDD+ as a form of coercive conservation (Beymer-Farris & Bassett 2011), green-grabbing, or land appropriation (Fairhead et al. 2012), or has expressed concerns about recentralization of forest management through REDD+, thus depriving local actors of their ownership, use and management of forests (Phelps et al. 2010). International donors and policy-makers acknowledge the legitimacy of these concerns, and concede that national-level barriers, particularly the economic interests of powerful elites, often prevent REDD+ projects from benefiting indigenous peoples and rural populations (Lawlor et al. 2010). The critical literature in political ecology has remained silent on those acknowledgments and concessions. If research is to contribute to better policies, and therefore more equitable outcomes for rural people, the processes involved in REDD+ must be investigated more equitably as well.

My analysis of the labor, livelihoods and perceptions of small cash-poor communities involved in pilot projects for creating carbon offsets indicates that these projects can be acceptable and beneficial. The circumstances necessary to produce these

benefits include the "good governance" considerations for managing degradation and deforestation raised in Chapter IV, which are: stakeholder participation, cross-government coordination, transparent accounting and independent monitoring and oversight.

### Li's Analytic

Anthropologist Tania Murray Li used the analytic of assemblage to track planned development interventions in highland Sulawesi, Indonesia as they "shaped the landscapes, livelihoods, and identities" of the highland peoples she has researched for over two decades (Li 2007b:3). Her intent was to outline the practices necessary to overcome the contradictions and tensions within the diverse array of elements that come together to improve environmental management.

Assemblages have been used analytically in geography in a variety of ways (Anderson & McFarlane 2011), but not for the purpose of understanding the governance of ecosystem restoration for climate mitigation. Similarly, although Li's work is highly cited (according to Google scholar, 845 citations for *The Will to Improve*), published accounts of applications of her governmentality framework to programs of improvement in environmental management, such as ecosystem restoration, are hard to find. My contribution to this literature comes in the form of a selective application of elements of Li's assemblage to knowledge circulation in new geographies of conservation. Here I apply the reassemblage practice of Li's governmentality framework to community forest management in a biosphere reserve in Central America. I contribute to an understanding

of how mangrove restoration knowledge changes in the hands of different actors as it is passed around. This suggests a greater role for local networks than the normal hierarchical model of the UN conservation framework which considers scientists and managers to be the loci of expertise and authority (Chapter VII).

Li's analytic is intended to dissect "development in action", and is based on "the will to improve"--livelihoods, outcomes, prospects and other intangibles— in poor areas, despite the lack of desired outcomes, for example, turning a profit. It is particularly apt for the Lower Lempa where there is little chance of any improvement scheme realizing a profit in the small-holder world of the biosphere reserve, much as no profiteer would rationally select the highlands of Central Sulawesi (Li 2007b). The tension between the international donor community (USAID, World Bank), seeking market-based, expert-driven solutions to climate vulnerability, the government (MARN) seeking good-faith, technocratic results with political pay-back, and the population on whom the burden of interpreting and putting expertise into practice is at the center of the question of restoration governance.

The first three of Li's six provisional practices which hold community forest management together, *forging alignments, rendering technical* and *authorizing knowledge,* are particularly suitable for exploring the processes involved in Salvadoran environmental governance during the research period of 2011-2013. Two of the other three practices: *managing failures and contradictions* and *antipolitics* will have to await future research for full development. In the first instance, insufficient time has elapsed since restoration began for a full development of this theme, although the way in which

EMR was transformed into *la técnica REM* (Chapter VII) is likely to open up many fruitful avenues of research. Political questions of responsibility for climate change were conducted at the level of national governments within the United Nations, so that anti*politics*, the practice of transforming political problems into economic or scientific strategies, takes place in this case study at several scales. However, the Ministry of the Environment and the people of the Coordinadora of Lower Lempa undertook the work of forging alignments with the objective of ecosystem restoration during that time. Extreme weather events, inadequate agrarian reforms and the United Nations global governance regime became articulated with other elements as a set of relations that was rendered as the technical problem "climate change" or *cambio climático* in El Salvador. The problem (a) of climate change plus (b) the intervention of ecosystem and landscape restoration was intended (c) to produce the beneficial result of reduced vulnerability and enhanced ecological services, The requisite body of knowledge authorized to do this came through the Mangrove Action Project as Ecological Mangrove Restoration (EMR), which became reassembled, as it moved from the capital city to rural areas and was put into practice, as la técnica REM.

I use Li's analytic to evaluate how a particular intervention "plays out at a particular time and place" and draws out the constantly changing boundary between governance and governmentality in neoliberal management practices (Li 2007a:264-5). There are significant historical and contextual differences between the Asian forest communities of which Li writes, and the people of the Lower Lempa, not least their colonial backgrounds and the almost complete large-scale rupture with past livelihood
practices in the aftermath of the civil war in El Salvador. However, the overarching structure of late capitalism and the global institutions that dominate the discourses of sustainable development, biodiversity conservation and climate vulnerability which apply to financially peripheral regions, such as El Salvador, make Li's analytic compelling. Governmentality applied in this framework allows me to follow "forms of thought, knowledge, expertise, strategies, means of calculation" employed in practices for governing (Dean 2010:42).

### **Structure of Dissertation**

Chapter II (Being there: Mangroves, organizations and communities) provides an overview of the geographic and historic background to the research. I introduce mangroves as the key biome in the research and give some context to their special place in El Salvador. Since the body of empirical work was ethnographic, I describe the communities involved in mangrove restoration in which I administered surveys and conducted interviews with community leaders. Chapter III (Putting into practice: Positionality, methodology and methods) presents my positions related to the research to clarify my inclinations and biases towards framing questions, collecting data and analyzing my materials. It describes the research methodology I employed and discusses the methods that I used. Chapter IV (Evolving Landscapes: Program for Restoration of Ecosystems and Landscapes (PREP)) provides a timeline for the development of the Environment Ministry's REDD-Readiness program, PREP, in response to the failures of the UNFCCC Conferences of the Parties to provide funding or technological transfer

from Annex I (developed) countries to Annex II (developing) countries for mitigation of or adaptation to, climate change. In Chapter V (Nothing is innocent: Constructing restoration governance) I analyze how key state and non-state actors within El Salvador engaged in the *art* of governance of mangrove restoration; how their positions changed over time relative to circumstances; and it attempts to shed light on some of their not-soapparent motives for changing positions. Chapter VI (Doing something: Coping with limited resources) tests the claim of "carbon colonialism" through analysis of the way people involved in the physical labor of mangrove restoration understand their efforts. Using survey data from five rural communities, I describe their natural resource-based livelihoods, their views on the work itself and the challenging environmental backdrop in which their lives are carried on. In Chapter VII (Changing the world: Reassembling, appropriating and circulating knowledge) I draw on Li's practice of reassemblage to analyze the processes involved in the collaborative actions that emerged in the Lower Lempa in response to climate change-induced flooding and droughts. I use participant observation and interview data as well as survey data from the *rescatista* households.

In Chapter VIII (Summary and conclusions) I advance my own analytic to provide actionable lessons to avoid neocolonial relationships, drawn from this research in the Lower Lempa. I present a synthesis argument refuting the claim that mangrove restoration for climate mitigation is a form of carbon colonialism in the short term.

#### **CHAPTER II**

# **BEING THERE: MANGROVES, ORGANIZATIONS AND COMMUNITIES**

## Introduction

This chapter provides an overview of the geographic and historic background relevant to the research. It then places mangroves as a biome into the context of the study area within El Salvador before describing the major governmental, non-governmental and social organizations involved in mangrove management during the research period of 2011-2013. A short description of the communities involved in mangrove restoration during this period follows, along with a summary of population size, average household size and resource base. These are the communities in which the household surveys described in Chapter VI were administered during early 2013. Interviews were conducted with community members and members of the organizations described below from 2011-2013.

# **Study Area Background**

El Salvador is the smallest mainland Latin American country covering a territory of 21,040 km<sup>2</sup>. Bounded by Guatemala and Honduras, it has a Pacific coastline of 300 km along the seismically active Cocos Plate. There are 22 volcanoes in this portion of Central America, some recently active, contributing to its reputation as hazard-prone, although soil fertility in the 58 watersheds has since prehistoric times encouraged human settlement along the rivers and in the coastal plain (Sheets 2013). The Lempa River, the

lower portion of which is the spatial focus of this dissertation, is the largest river in Central America at 422 km. Rising in Guatemala, the Lempa then passes through Honduras into the central portion of El Salvador where it turns south into a shallow depression in the coastal plain before draining into the Pacific Ocean (Figure 2.1). Several villages in the lower portion of the Lempa were the location for data collection; these are described in the latter section of this chapter.



**Figure 2.1.** A map of El Salvador showing the major watersheds. The Lempa watershed is the largest, colored in dark tan. (Retrieved from the MARN website <u>www.marn.gob.sv</u>, 3 July 2013).

At 13<sup>0</sup>N, El Salvador is tropical, with a marked dry and wet season. The current "normal" dry season runs from October to April, followed by the rains from May to September. As with all climate influenced by the El Niño-Southern Oscillation (ENSO),

this is subject to considerable inter-annual variability. In such a small territory, the movement of the Intertropical Convergence Zone (ITCZ) which determines rainfall has considerable repercussions in a non-normal year, as droughts and floods affect large swathes of agricultural land and watersheds within the country. Heavy rainfall events in the form of hurricanes for the past 30 years have tended to come from the Caribbean, as was the case with Hurricanes Mitch in 1998, Stan in 2005 and Agatha in 2010, but in the past few years they are increasingly coming from the Pacific, with tropical depression 12E in October 2011 proving particularly lethal. Increased numbers and intensity of storms appear to follow patterns predicted by the Intergovernmental Panel on Climate Change (IPCC Vol. II 2007:109).

The impacts of divergences from the climatic norm are felt in a variety of ways, importantly, but not solely in the agricultural sector. Over half of El Salvador's electric power is generated by the "September 15" hydroelectric dam on the Lempa River (Appendix A), about 45 km upstream from the study area. As water levels rise during extreme rain events, dam managers release huge quantities to protect dam infrastructure, often without warning, with devastating consequences downstream, as surges break the levees on meanders in the coastal plain and floodwaters engulf communities, livestock and crops. Likewise in times of low rainfall, water is retained for electricity generation, resulting in a shortfall of water downstream which depletes the riparian aquifer and thus affects water availability for irrigation and in domestic wells.

One-third of the population of 6 million Salvadorans living in the country are subsistence maize growers. Nearly 3 million urbanites live in the greater metropolitan

area of the capital, San Salvador, at a density of over 340 people per km<sup>2</sup>. Regional centers, such as Usulután with a population nearer 60,000, are considerably smaller, yet of vital importance to the surrounding communities for the goods and services they provide, such as health, finance and administrative needs, but also as a regional market for agricultural and other products. There is little in the way of artisanal handicraft production in the department of Usulután, despite rich prehistoric ceramic traditions in the area, due to the systematic extirpation of indigenous culture from the nineteenth century onwards by the military and land-owning élites (Sheets 2004; Interview 4-2012). Geographers have focused on coffee in the highlands, remittances and forest cover in El Salvador, and therefore apart from Williams' work on export agriculture, and Wood's ethnographic work on collective action in the autonomous political space carved out by the FMLN in the Tierra Blanca area between the study sites and the city of Usulután, there has been little attention paid to the coastal plain (Williams 1986; Wood 2003; Hecht et al. 2005; Hecht & Saatchi 2007).

For the past two centuries the economy has been based on export agriculture (Williams 1986). Indigo, then coffee, cotton and now sugar cane cultivation have left their marks on the landscape and the people. Understandings of the history of intensive land use has led the country to be portrayed as a deforested, environmental basket-case, a charge refuted by a number of scholars as both the civil war (1980-1992) and remittances from abroad have promoted forest resurgence (Hecht 2007). Depopulation of mountainous areas during the civil war resulted in coffee that was more likely to be

shade-grown and therefore less labor-intensive, and abandonment of cotton plantations allowed significant re-growth of woodland in the coastal plain.

Economic alternatives such as the clothing *maquilladoras* around San Salvador which formerly used home-produced cotton, and more significantly remittances from the Salvadoran diaspora of 2 million in the United States have contributed to a reduction in the importance of subsistence agriculture (Segovia 1996), although the reforestation trend reported by Hecht now seems to be reversing with the current interest in sugar cane as a biofuel (Díaz 2011). High urban unemployment levels remain an unresolved problem of which membership in the violent street gangs, or *maras*, is indicative (Zilberg 2011; Farah 2013; Ward 2013). Since joining the Central American Free Trade Agreement (CAFTA) in 2004, over 80% of basic foods such as maize are imported, creating a trade deficit against the smaller exports of coffee and sugar. The country rates low on classic economic indices, with 35% of the population below the UN poverty line, despite having rigorously followed structural adjustment programs, dollarizing the monetary system and signing on to CAFTA (European Commission Country Strategy Paper 2006-2013). Earlier economic arrangements, as embodied in the commoner village at Joya de Cerén, the Pompeii of Central America buried in volcanic ashes one early August evening around 595 A.D., indicate household specialization of raw materials and prepared goods, sophisticated long-distance market networks and a degree of material comfort enjoyed by ordinary people not seen since the advent of export agriculture following the establishment of the republic of El Salvador in 1838 (Sheets 2013).

The Spanish colonial legacy to the indigenous people was one of land scarcity, oppression, servitude and ethnic cleansing in exchange for property titles to coffeegrowing lands. The "fourteen families" of the European coffee élite, in collusion with the military, made community-held lands illegal in 1881-82, following peasant uprisings (Lauria-Santiago 1999). During the 1920s teachers led the nascent professional classes in protests in San Salvador that were violently quelled by the military. In 1932 in a historic killing spree known as "La Matanza", the armed forces systematically eradicated 30,000 indigenous people in response to a collective revolt against accumulated injustices (Anderson 1971; Liss 1991; Wickham-Crowley 1992). This led to the abandonment by the survivors of indigenous clothing, customs and language as cultural identifiers, and now only 2% of Salvadorans are considered "indigenous", the majority falling under the term "mestizo" (Anderson 1971; Wood 2003).

The next half century saw no significant improvement in the lot of the peasantry, as export-led agriculture forced even more off their land and tied all available labor into indentured servitude on the cotton and cattle plantations of the coastal plain. For example in the Lower Lempa the large plantations of Nancuchiname (around Ciudad Romero) and Limón (around Isla de Méndez) employed both sexes and all age groups. Regardless of the status of the peasant, landowners inflicted violence, humiliations and extreme physical hardship on both old and young: an old man was knocked to the ground with a rifle butt in the cotton boll weighing-line at Nancuchiname by a guard for being rebellious (Reyes 2012); almost an entire family was shot in front of the tiny chapel in Los Cálix as a lesson to the rest of the community (Interview 5-2013). The

owner of the Limón plantation had his armed guards confiscate fishing nets and catapults regularly from the workers trying to augment their protein intake, and personally shot peasants' pigs from his green automobile. They stopped raising them, despite their protein needs (Interview 6-2013).

*Campesinos* in the region felt the world economic crisis of the 1970s particularly hard after the collapse of the Central American Common Market, due to a border dispute called the Football War of 1969 between El Salvador and Honduras. This brief conflict resulted in the forced repatriation of 300,000 Salvadoran migrant workers to an already hostile labor environment. Cotton production had declined for a number of reasons during the 1960s yet El Salvador's elite in the Cotton Cooperative were barely affected. They merely reinvested their landholdings and equipment with vigor into the less laborintensive production of cattle and sugar. The returning peasants were landless and jobless (Williams 1986).

The brutal civil war of 1980-1992, sparked by the sniper assassination of Archbishop Oscar Romero during the celebration of a memorial mass for an opposition journalist in San Salvador, and subsequent government crackdown on his shocked supporters outside the cathedral, dispersed 2 million Salvadorans into exile. The lucky ones went eventually to the United States, but many fled to still-hostile Honduras and from there, thanks to the timely intervention of peace-keepers from the Organization of American States, were given refuge in other Central American countries, including Panamá, Nicaragua and Belize (Pedersen 2013). What set the civil war apart from earlier conflicts within El Salvador was the involvement of the government of the United States

of America on the side of the Salvadoran military, which in this instance lined up with the right-wing government and its death squads (Didion 1983).

As a Cold War strategy in the region, the U.S. government dispensed \$4 billion in anti-communist activities, largely military expenses against the civilian population in conjunction with a domestic program of almost compulsory conscription. An intense propaganda program was also part of the anti-communist strategy. Romero's increasing inclination toward liberation theology broadcast through his weekly radio homilies had given the masses hope that a higher justice would prevail. His murder faced them with the harsh reality that now there was no-one in their corner and they had two stark choices to the status quo: exile or resistance. Many fled the air power and guns of the right-wing military and the arbitrary nocturnal visits of the death squads across the borders. Others perished in the attempt. 600 men, women and children trying to cross the Lempa River to safety in Honduras in 1980 were gunned down from both sides. 900 were massacred at El Mozote, in the mountainous eastern department of Morazán in 1981 by the elite American-trained Atcalatl Brigade (Danner 1994). An armed opposition developed along factional lines that eventually coalesced into the Farabundo Martí Liberation Front (FMLN), named for the leader of the communist uprising in 1932. He was executed after a mock trial by the government (Liss 1991; Wickham-Crowley 1992).

The injection of foreign military might by proxy could have been overwhelming, but ruthless leadership within the FMLN coalition and the extraordinary will of Romero's followers, represented in distinctive collective actions both inside the country

and abroad, brought the conflict to a UN-brokered stalemate (Wood 2003). The balance of power reflected in territory controlled by the FMLN towards the end on a handcolored map (by the FMLN) shows insurgent-controlled territory in black, disputed territory in yellow and government-controlled areas in white. The Lower Lempa is in dark green, with the boundary between it and eastern Jiquilisco bay running through lands adjacent to Salinas del Potrero, Sisiguayo and Isla de Mendéz (Figure 2.2 from Chávez 2011). Communities like Méndez were equally divided during the war, although they did not fight overtly, through the government system of creating local



**Figure 2.2.** Territories controlled by FMLN at the close of formal hostilities. FMLN areas are dark, contested areas are in yellow and areas under government control in white. Source: Chávez 2011.

paramilitaries, to police local communities. The divisions created by this system are still in evidence today (Interview 6-2013). Despite the divisions, the department of Usulután has returned FMLN candidates to the Legislative Assembly in the last two elections. The stalemate was formalized in the Peace Accords, signed by the government of El Salvador and the FMLN insurgents at Chapultepec Palace, Mexico on January 16 1992. The Peace Accords also provided for political participation in the election process by the FMLN as a legal, registered party. At the time of writing the presidential palace is occupied by a reformist non-combatant member of the party, Mauricio Funes, although the Legislative Assembly passed back into right-wing ARENA control at the last election. Presidential elections were scheduled for early 2014.

Another pillar of the Peace Accords was resumption of agrarian reform, a sporadic project in the history of El Salvador. Land ownership is still an arena of contestation as land titles are often unclear and the former owners of large estates dissatisfied with the outcomes of the program for land transfer (Programa de Transferencia de Tierras, PTT) exploit legal loopholes that favor privatization over collectivization of holdings (Interviews 6-2013; MRII-1-2013). This is the case in the fertile lands of the coastal plain along the Lempa River, a region that used to be called the breadbasket of the country.

The lower reaches of the Lempa River in the district of Usulután, where it meets the Pacific Ocean, are known as the Lower Lempa. It is a region bounded to the west by the river itself and extends eastward into the center of the Bay of Jiquilisco, a large estuarine lagoon formed by the San Juan del Gozo Peninsula. The Pacific Ocean forms the southern boundary, and the coastal highway of El Salvador its northern extent. Today the Lower Lempa is a mosaic of sugar cane fields, dry forest, small agricultural plots, fruit tree plantations, mangroves, beaches and estuary (Appendix A). However, from the

Spanish colonial period until the export heyday of cotton, which lasted from the 1930s until the 1970s, it was mostly uninhabited apart from peasant subsistence plots and a few large cattle ranches (Williams 1986). Many of the older inhabitants have their origins in other parts of the country but worked seasonally on the cotton and cattle *haciendas* (landed estates) of the region where they were familiar with the fertility of the soil and the richness of the natural resources (Wood 2003).

Under the land reform provisions of the 1992 Peace Accords, in the Lower Lempa land distribution to cooperatives permitted settlement of former combatants from both sides of the conflict on the former *haciendas*. Settlement was not a smooth process. Infrastructure was lacking and the people had little preparation for living in flood-prone lowlands. As a result, survival meant heavy reliance on natural resources, such as mangrove lumber for house construction, bushmeat and other forms of wild-caught protein, and conversion of mangroves to food plots and pastures. Pressure from USAID, FIAES and Salvadoran environmental organizations such as PRISMA (described below) about over-exploitation led in 2007 to the government declaring the whole area of Lower Lempa, Jiquilisco Bay and the San Juan del Gozo Peninsula as a UN biosphere reserve, overlying fifteen national protected areas and a UN Ramsar site. (Ramsar is a conservation wetland area considered by the Convention on Wetlands significant to the welfare of migrating waterfowl named for the city in Iran where the convention was signed in 1971.) Neither UN designation is legally binding, but the three main goals of a biosphere reserve--conservation, sustainable livelihoods and education--make it a compelling framework for aid and development agencies to work within.

The fields, orchards, estuaries, mangroves and beaches of the buffer zone of the Biosphere Reserve Xiriualtique-Jiquilisco have been eyed by various government ministries over the years with a view to developing tourism (both sun-and-sand, and ecotourism), intensive shrimp aquaculture, biofuel production and payments for carbon sequestration under the UN REDD+ program. The biggest threat as perceived by the local communities comes from a public-private US government backed investment scheme to develop the San Juan del Gozo peninsula by multinational hotel corporations as part of a larger airport, port and road-building construction project called Fomilenio II. The first phase, Fomilenio I, brought roads and bridges to the impoverished northeast mountains, but to date the major beneficiaries have been cliques of the Salvadoran gang MS-13 transporting drugs between Honduras and Guatemala (Farah 2013; Interview 4-012). The likely beneficiaries of Fomilenio II are members of the new entrepreneurial Salvadoran elite. They replaced the land-owning families that in the past owned the haciendas and virtually enslaved the rest of the population, creating the disparities that helped provoke the civil war of 1980-1992, with property development schemes based on a different form of exploitation. For example, an ersatz ecotourism theme park has been constructed outside Isla de Méndez by the powerful Tesak family, who also operate a private tourism technical school in the San Juan del Gozo Peninsula in anticipation of further development (Dávila 2012). Among the many concerns that have been raised about the impacts to the area are the effect of major development on the mangroves of the Lower Lempa and Jiquilisco Bay on which many people depend for their livelihoods.

Resource-based livelihoods are described in Chapter VI based on information gathered from household surveys.

## Mangroves

Mangroves are salt-tolerant plants that occur throughout the tropics in inter-tidal zones. Their specialized physical structures (prop roots and pneumatophores) enable them to thrive in this demanding physical environment where they evolved 200 million years ago around the Tethys Sea (Duke et al. 1998). Although they can survive in saltwater alone, they are most productive in protected areas of mixed salinities with abundant fresh water and nutrient supplies, as in the unmodified tidal estuaries and lagoons of the Biosphere Reserve Xiriualtique-Jiquilisco.

Tidal range along the Salvadoran coast is variable and complex, but high tides can be nearly 6 m above low tides, so that considerable penetration up the Lempa and its canals occurs at high tide, especially during the dry season (October-April). During the wet season (May-September) flooding was common in the riparian zone, known as *las llenas*, but not life-threatening. Hurricane Mitch in 1998 changed flood management in the country, as sudden releases from the "September 15" hydroelectric dam wiped out livelihoods and communities downstream and caused loss of human life. Levees were hastily constructed in the Lower Lempa by the government at the behest of the Coordinadora, which petitioned the Legislative Assembly to do so. These tend to give way during extreme weather events of heavy rain, as happened during tropical depression 12E in October 2011, when dam management released a huge pulse of water

without warning (Dávila 2012). The levee system has undoubtedly had some effect on mangrove community composition due to reduced freshwater flows, as did the construction of the dam which has impounded nutrients upstream. No environmental impact assessment was carried out for either major construction and there is little biophysical data available for the region to construct an after-the-fact baseline. Anecdotally the death of swathes of mangroves and reduction in catches of various economically important species in Jiquilisco Bay are ascribed to management of the dam (Interviews 6-2011; 1-2012; 2-2012; 5-2012; 7-2012; 6-2013).

Five of the seventy species of mangrove are found in El Salvador but only three are economically significant. The red mangrove, *Rhizophora mangle*, "mangle rojo", is the most common fringing mangrove in Jiquilisco Bay. Its pyramidal prop roots provide shelter and substrate for a large number of sponges, shellfish, crabs, fish, birds and the endangered marine turtle, the Eastern Pacific Hawksbill, *Eretmochelys imbricata* or "tortuga carey". Higher up the saltwater gradient, the black mangrove, *Avicennia germinans*. "iztatén", sends up pneumatophores through the clay in which the mangrove crab, *Ucides occidentalis*, or "punche", burrows. The tallest mangrove *Rhizophora racemosa* "mangle rojo espigado" fringes the canals and tidal creeks that penetrate from the mouth of the Lempa into the delta, particularly the 5 km canal "El Izcanal", with more than a dozen secondary canals branching off it. (El Llorón is one of these branching canals.) This tree is most highly valued for construction, although within the core area of the biosphere reserve cutting trees is prohibited.

Overall the condition of the mangroves of the Lower Lempa is comparable to those world-wide, where human activities have reduced aerial cover of mangroves by 50% in the past century by land use changes. Most of what remains is degraded through altered hydrology, pollution and firewood harvesting (Duke et al. 2007; Giri et al. 2010; Polidoro et al. 2010; Rivera & Cuéllar 2010). A number of institutional arrangements are in process of addressing mangrove degradation in the Lower Lempa, including the National Plan for the Restoration of Ecosystems and Landscapes, PREP. The major players are described below.

# Organizations

The organizations and institutions engaged in mangrove restoration range from the Ministry of the Environment (MARN) which has oversight over the El Salvador's mangroves, through national and international NGOs (MAP, EcoViva, Mangle) fulfilling the different functions of financing (Figure 2.3), providing expertise (Figure 2.4) and organizing logistics to local groups and communities which provide labor for restoration work (*rescatistas*). Influence is more complex than a linear arrangement can capture (Figure 2.5), as one of the actors, the Environment Minister, changed the power relations by placing his Viceminister as the titular head of FIAES, which had previously been seen as a non-governmental organization, and by seeking funding for his restoration program through REDD rather than the debt-for-nature swap administered by FIAES. Yet without its own significant source of funding or staff capacity, MARN was not able entirely to take over programs that were funded by FIAES, so that when the

request for proposals went out to restore the biospheres and wetland sites, staff from

FIAES reviewed and ranked the proposals (Chapter V).

**Figure 2.3.** Organizational structure of funding for mangrove restoration, El Salvador 2011-2013. Money is paid out in the Lower Lempa through Mangle's accountants.



**Figure 2.4**. Organizational structure of knowledge transfer for mangrove restoration, El Salvador 2011-2013. Ecological mangrove restoration (EMR) becomes *la técnica REM*.



**Figure 2.5** Organizational structure of influence for mangrove restoration, El Salvador 2011-2013.



# Ministerio del Ambiente y Recursos Naturales (MARN)

The 1973 Forestry Law (Ley Forestal) declared mangroves to be natural resources of the State, separate from national protected areas (NPAs) but with restrictions on access and use. The Ministry for the Environment and Natural Resources (hereafter MARN, the Spanish acronym) was created by Presidential Decree in 1997, and came into effect through the first national Environmental Law the following year (MARN 1998). Major agrarian reform and institutional reconstruction took place at that time. MARN was given jurisdiction over the nation's NPAs and 35,500 ha of mangroves by the 2002 Forestry Law. In 2012 MARN, staffed by FMLN appointees since 2009, undertook revision and ratification of the Environmental Law (Ley del Medio Ambiente 2012). The environment is one of the least-funded of the 19 government ministries (Roundtable MRII-7-2013), and therefore delegates management of both NPAs and mangroves to autonomous entities, municipalities, NGOs and legally established civilian groups. These groups provide the workforce, people known as

resource guards, for patrolling the mangroves, armed only with machetes and two-way radios, and calling in infractions to the handful of MARN police based in the larger centers of Usulután, Jiquilisco and Puerto El Triunfo. They seldom get a response. Salaries for the resource guards are sometimes paid for by the ministry, but more often by NGOs such as EcoViva and MAP, if they are paid at all. Some community members spend years volunteering their time for nothing more than a pair of boots and a bicycle (Interviews MRII-3-2013; MRII-5-2013). The lack of funding and input from the government rankles locally, and came up repeatedly in both roundtables held with resource guards in January and May 2013. MARN also had direct oversight of a 5-year project operating from 2007-2012 funded by the World Bank's GEF. The Protected Area Consolidation and Administration Program (PACAP) was intended to bring some order and clarity to the confused status of land tenure in the NPAs. The Minister, Herman Rosa Chavéz and Vice Minister Lina Pohl, during the study period ran the ministry somewhat autocratically (Interviews 3-2012; 4-2012; 7-2012; 8-2012). They were instrumental in positioning MARN at the head of the country's climate change and biodiversity programs, and thereby leading national delegations to international meetings on both topics (MARN Press Releases, 28 June 2010, 29 Nov. 2010, 8 Feb. 2011, 7 December 2011, 6 December 2012, Retrieved from www.marn.gob.sv, Documentos, March 2013). Both of these programs have mangrove components, specifically in the Program for the Restoration of Ecosystems and Landscapes (PREP), the REDD-Readiness proposal for El Salvador as part of its "mitigation based in adaptation" approach to climate change (PRISMA 2010). Several of MARN's programs are financed

by FIAES through the post-war debt-for-nature agreement with the US government (Interview 6-2012).

### Fondo de la Iniciativa para Las Américas (FIAES)

One outcome of the Peace Accords of 1992 was a bilateral debt-for-nature swap agreement between the governments of the United States and El Salvador, whose funds are administered and invested by the Salvadoran NGO, FIAES. This to date has brought \$55 million through USAID to small-scale environmental programs in El Salvador, many centred on NPAs and mangroves (FIAES website). These mangrove restoration projects in conservation areas are the focus of the household surveys in Chapter VI. The Biosphere Reserve of Xiriualtique-Jiquilisco has been a frequent beneficiary of its programs. FIAES partially sponsored a workshop on mangrove restoration there in July 2011, in conjunction with the local and international NGOs Asociación Mangle, EcoViva and Mangrove Action Project. FIAES also funded half of the mangrove restoration project at El Llorón in 2012. The vice minister of MARN, Lina Pohl, is also the titular head of FIAES, compromising its theoretically apolitical position as an NGO. During the study period she was a frequent visitor to the region whenever a photo opportunity with endangered charismatic fauna presented itself, for example appearing for turtle tagging and hatchling release events and the liberation of a captured crocodile (Retrieved from <u>www.ecoviva.org</u>, 8 March 2013). This impressed neither the people of the Lower Lempa, who felt that their needs were more important than her political

future, nor Salvadoran biologists interviewed (Interviews 4-2012; 7-2012; 8-2012; MRI-2-2013; MRII-2-2013).

### La Coordinadora del Bajo Lempa

Little of an institutional character is possible in the Lower Lempa without the prior engagement of the Coordinadora, an umbrella group of eight local groups representing all 86 of the communities in the Lower Lempa. Self-described as a social movement, it came into being in 1996 through the organization of a few visionary individuals around common flooding problems arising after the post-war resettlement. Several of these individuals were from Ciudad Romero. These people had honed their community-level problem-solving skills in exile in Honduras and Panamá (Reyes 2012), and used them to great effect in joining the cooperative that settled the former hacienda of Nancuchiname. Through association with the Cooperativa Nancuchiname the exiles were in a legal situation that allowed repatriation under the Peace Accords. Other communities joined forces, and now the Coordinadora has 86 members in the Lower Lempa. The leadership is divided into a smaller number of local associations and is elected on that basis. Some of the same individuals appear time and again as leaders of ADESCOs, local groups, municipalities and the board of directors of Asociación Mangle (Dávila 2012).

### Asociación Mangle

Mangle functions as an extension agency of the Coordinadora in the Lower Lempa. The elected board, or Directiva, meets daily in rudimentary donated offices on the coastal highway in the community of San Nikolas Lempa. All five members are elected from the communities of the Coordinadora for a period of two years. Term limits do not exist, so there is considerable stability of membership. The Directiva deliberates requests, solves problems and reviews proposals coming from community members. It is a consensus-based policy-setting body, working closely with community leaders and community development associations (ADESCOs) on a wide range of issues related to sustainable living, vulnerability and risk and social welfare (Dávila 2012; Reyes 2012). Mangle operates a community radio station out of the shelter in Ciudad Romero whose primary function is to alert the members of La Coordinadora to climatic hazards and to keep them informed of relevant developments and activities in the region. The founder of Mangle, Aristídes Valencia, and Estela Hernández, a former president of the Directiva, represent the department of Usulután in the national legislative assembly through the FMLN, the latter being the first woman representative from the department. Within Mangle there is a Program Director, and divisional heads responsible for alternative agriculture, irrigation and potable water, and mangrove management. Funding sources are various, but one consistent source has been the San Francisco Bay Area-based non-profit EcoViva.

# EcoViva

Formerly a faith-based organization, EcoViva fund-raises in the US for projects within the Bajo Lempa, as well as arranging volunteer tourism programs with groups from the Monterey Institute and diverse religious entities. An intern is embedded within Mangle for a year at a time, working on topical issues such as blast-fishing, solid waste disposal or common resource management. There is a Program Manager based half-time in El Salvador and half-time in Washington, D.C. who acts as a liaison between the Coordinadora and the wider world of donors and activists. Through his intervention a workshop on mangrove restoration was held in Bajo Lempa during July 2011, led by field personnel from the U.S.-based Mangrove Action Project.

# Mangrove Action Project (MAP)

MAP is a US-based NGO that works primarily in Southeast Asia, Indonesia and the Americas and provides technical assistance for community-based mangrove restoration. It promotes alternatives to using mangroves for fuelwood and construction in order to maintain habitat for fish and crustaceans, and supports other livelihood functions related to mangrove use. I have been involved in MAP since 2007 as a board member. In this capacity I first went to El Salvador to make arrangements for the restoration workshop which MAP led in July 2011. Subsequently I decided on El Salvador as a study area for my dissertation research and have had two roles in the region since then. I have always tried to avoid confusion, and announced in ambiguous

situations whether I was acting as a MAP board member, or as a Texas A&M graduate student. My positionality is covered more fully in Chapter III.

MAP promotes a mangrove restoration method that is at variance with prevailing models, which are primarily massive silvicultural plantings of single species, typically *Rhizophora*. MAP advocates "ecological mangrove restoration" (EMR) based on some simple principles of site characterization, problem-solving and autecology, or letting nature take its course (discussed in Chapter V).

In El Salvador, MAP has been involved with leading a restoration workshop in July 2011, following the invitation extended by Nathan Weller of EcoViva. After repeated failure of mangrove silviculture projects funded by FIAES and undertaken throughout El Salvador by various groups over the years, the discovery by EcoViva of EMR resonated with MARN (Chapter V) and became appropriated in El Salvador by Mangle and the restoration workers as *la técnica REM* (Chapter VII). Ecological mangrove restoration has been adopted by MARN, FIAES and Mangle and is at present being undertaken with almost missionary zeal despite the time-lag of four to five years between intervention effort and measurable results.

# Municipalities, ADESCOS, Local Groups and Cooperatives

Although municipalities are directly legally responsible for the resources under their care, the reality is that they are woefully underfunded, and even regional offices of government ministries exist in title only. The regional office of MARN in Usulután consists of a room at the top of a decrepit building with an apologetic official filing

denouncements in a desk drawer while birds enter and exit through a gap at the top of the walls. The environmental department of the municipality of Jiquilisco is equally ineffectual. A solution, born out of local frustration and in perfect keeping with the decentralization efforts favored by structural adjustment programs, has been the formation of local development associations or ADESCOs (Asociación para el Desarollo Social Comunitario). Provided that they are legally sworn in (*juramentada*) by competent authorities, they can undertake many of the roles that might normally pertain to the municipalities and government agencies. They receive scant government funding and rely heavily on volunteer labor and locally raised funds, as the household surveys show (Chapter VI). Some are more organized and effective than others, leading to local disparities and sometimes conflict over resource use. Local groups likewise can form to address particular issues, as in the case of PLES (Plan Local para la Extracción Sostenible) a coalition of eight communities in Lower Lempa to deal with resource harvesting and extraction in the mangrove areas at the eastern mouth of the Lempa River (Interviews 3-2012; MRI-2-2013; MRII-1-2013). Cooperatives are also common in the region, historically constituting the legal basis for land reform. In the Lower Lempa there are resource cooperatives organized around fishing, shellfish collecting, turtle egg collecting and artisanal shrimp fishing as well as various agricultural cooperatives for livestock and fruit growing.

Collaborative actions and community-based resource management are, despite the prevalence of individual *milpas*, the idealized norm according to some interview respondents, as a means to spread risk and pool tools, seeds and labor, particularly at the

establishment of a new settlement (Interviews 4-2012; 5-2013; 6 2013). Reyes (2012) describes this system on the establishment of Ciudad Romero in Panamá during the civil war. Almost everyone living in the Lower Lempa identifies with a named community, and labor for mangrove restoration efforts undertaken during 2011-2013 was drawn specifically from the local communities described below. Sites for restoration and nearby communities were selected by Mangle, FIAES and MARN through a process of perceived need on the part of the agencies and institutions, and the capacity of the local organizations to meet proposal requirements.

# Communities

All of the communities in this study are located on the western side of the Bay of Jiquilisco, to the east of the Lempa River. They are small ( $\leq$  1,500 individuals), primarily sustained by agriculture, fishing and other resource-based activities, and considered to be low income. All were founded on lands that were used before the civil war by cotton, cattle and sugar *haciendas*, although few of the current inhabitants are originally from the area. Given the pre-war seasonal pattern of hiring on the *haciendas* on the coastal plain, many migrants from other areas knew and worked on these fertile lands before electing to settle here at the end of the war (Wood 2003). One of the leaders of the pioneer community of Ciudad Romero, whose core population came originally from Nueva Esparta in La Libertad province bordering Honduras, had experience in the 1970s picking cotton near Nancuchiname and worked in the salt ponds near Salinas del Potrero (Reyes 2012).

Subsistence agriculture, however, differs substantially from plantation monocultures, and it has been a challenge to adapt upland maize and bean-growing knowledge to the demands of the seasonally flooded coastal lowlands. Mangle has been instrumental in developing suitable strains of domestic crops, although conditions of the coastal plain present obstacles to cultivation of the Salvadoran staple, black beans.

Construction has also been problematic given seismic activity in the region. Houses are built of a mixture of materials. They range from traditional wattle and daub with palm thatch roofs, through scavenged corrugated iron and wood to cinder block (the most desirable), and sometimes enterprising combinations of all three types of material. Larger and more affluent brick and concrete houses are built with remittances (*remesas*) from abroad, and are regarded less with awe than disdain locally, as though they were somehow built with easy money. Traveling with resource guards and employees of Mangle in the region, several houses of this kind were identified with a dismissive wave and a derogatory exclamation of *¡Remesas!* (see the figure found on p. 150, Chapter VI).

Domestic animals are the norm, and streets and lanes in Romero and Méndez are regularly patrolled by pigs and dogs scavenging household waste which is dumped outside domestic compounds on common byways. Solid waste is a perennial problem, although Mangle has started a composting program and an EcoViva intern ran a youth program to burn the trash rather than allow it to accumulate in the lanes. Chickens are also common around houses, and the occasional cat and parrot can be seen. Cattle are a part of the fabric of life in most communities of Lower Lempa, and herds occupy the roads on the way between their byres in the communities and their daytime pasturage, a

leisurely event accorded the term "cow time" -- *la hora vacuna*. Journey time needs to be adjusted by motorists accordingly. Flowers and fruit trees are planted around even the humblest shacks and are a source of pride in tidy yards, scraped to the dust to keep mosquitoes at bay. Household yards with trash are indicative of social problems not addressed here, and are more common in Méndez and Sisiguayo than other communities in this study.

Cell phone coverage is available in every community and at least one entrepreneur in each offers re-charge services for the two main companies, Claro and Digicel. Electricity and water are available to those that can afford them. A one-time payment of \$370 (based on a contingency valuation survey conducted through the ADESCOs) gives a household in the Lower Lempa the right to piped drinking water. Cost per month, or for 20 cubic meters, is \$3.25 for households that are earning, free if not. The alternative is well-water contaminated with protozoans, bacteria and chemicals from the cane fields. Few households choose this option, but many retain wells for other domestic uses. At the time of this study a small group of squatter households in Salinas del Potrero was using wells for drinking water that had been condemned by MARN as outside the acceptable range of contamination because they could not afford the usufruct fee. One man managed to use his time on the restoration project to install piped water (Chapter VI). Much of the infrastructure for water distribution was installed through Mangle, often with the help of church groups from the US. Similarly, a program to install composting toilets is underway throughout the area as a preventative health measure against water-borne diseases. Electricity is used sparingly, as most households

seem to retire early and rise with the dawn. Costs can be as low as \$6 a month, but \$20-30 is more normal (Interview 6-2013).

Cooking is still mostly done over open fires, although two commercial eateries in Méndez have propane cookers, one for stuffed corn tortillas (*pupusas*), the other for boiling and frying. Some households also have them but only use them for certain preparations. There is therefore a high consumption of firewood (*leña*) in the area, particularly for the preparation of tortillas. Salvadoran tortillas are thicker than Mexican ones, but the process for preparing the paste is the same. Dried corn is soaked in hot water with lime, ground into flour, mixed with water and shaped into circles before being toasted on a griddle. With few exceptions tortillas are eaten with every meal in every household. One of the reasons why the exiled community in Ciudad Romero, Panamá ached to come home was nostalgia for tortillas. The rainy Caribbean coast was inimical to growing successful crops of Zea mays (Reyes 2012). Most households value home-grown corn above the commercial flour, but few own their own milling apparatus. Typically the owner of a corn mill appears to have more household effects, cows and outward signs of prosperity or is a community leader of some sort. A mill owner certainly knows as much about community affairs as anyone, which is why one of the founders of Ciudad Romero and a local mill owner was selected to lead the mangrove restoration project on the Borbollón River.

## Ciudad Romero

### Number of households, population estimate and qualitative description

Romero is the largest and oldest community in the region, of 220 households with an estimated population of around 1000 (Interview 8-2013). Named for assassinated Archbishop Oscar Arnulfo Romero, it has an extraordinary history. It was founded in 1990 by a resettled community of 600 returned exiles from Panamá camped on the hacienda Nancuchiname. Out of this tent city grew a more stable and solid enterprise, now formalized in cinder block houses laid out on a grid pattern not far from the original encampment. Immediately prior to the signing of the Peace Accords, a contingent of ex-combatants who had fought on the government side were dumped without ceremony by the military at Nancuchiname as a counter-balance to the FMLN stronghold that the Romereños represented. They form the core of the community of 140 households of Nuevo Amanecer which is indistinguishable to the uninformed eye from Romero. The Catholic chapel dedicated to Romero is the focus of an annual procession and celebration every 24 March on the anniversary of his death. There are other smaller chapels belonging to evangelical groups similarly devoted to the slain archbishop. Romero has two schools, a women's community center and a civic center which also functions as a refuge during flood events. It is from here that Mangle broadcasts its radio programs, and where the experimental organic farm tests seed varietals. A hospital and community park are under construction and a number of small corner shops and a pizza parlor on the main road attest to the entrepreneurial spirit of the community, but

curiously there are no *pupusa* stands in Romero itself, unlike other communities where they are a mainstay.

### Resource Base

Romero is fundamentally agricultural, based on cattle, maize, cashews, sesame and sugar cane. Apart from fishing on the Borbollón River, it is dependent on its cultivated resources. Some work is available seasonally in cane fields, and a number of people commute to large towns to work. However a sizeable amount of income comes from outside in the form of donations, grants and loans garnered through the resourcefulness of the leadership in engaging NGOs and donor agencies. Mangle, with its over-stretched staff which includes an accountant and a purchasing agent, provides institutional support to administer funds to particular projects, for example funds donated annually by the American Jewish World Service are applied through Mangle to agricultural diversification projects and the model farm at the community center.

# Isla de Méndez

### Number of Households, Population Estimate and Qualitative Description

There are about 150 households in Isla de Méndez, with an estimated population of 600 people. Multi-generational households seemed more common than in other communities surveyed, perhaps because the community was in existence throughout the war and therefore founding members were present and living with their offspring.

Until the paved road was constructed by tourism speculators in 2009 linking the communities along the south-western edge of Jiquilisco Bay to the San Juan del Gozo

Peninsula, Méndez was oriented towards the water. Communication with Puerto Triunfo, Sisiguayo, Salinas del Potrero and Corral del Mulas was by boat. Almost all persons interviewed describe the founding population on a mangrove promontory as a family called Méndez, hence the name. Now most communication is landward directed towards the towns of San Marcos Lempa and Usulután and communities along the daily bus route, although the fishermen still retain contact with like-minded organizations in Puerto Triunfo.

Méndez is organized for administrative purposes into six zones, each of which reflects a slightly different history. Nearest to the water and built along the seawall are the older families and the fishing cooperatives, conglomerated in a maze of buildings and small yards frequented by pigs, chickens and dogs. Behind these a small street called "Central" permits vehicular traffic and has the greatest concentration of commercial outlets, including the ice factory, the tortilla bakery and a small market that sells imported fruit. Motorized traffic is uncommon, the most common mode of transport being a bicycle. Two blocks of larger houses laid out on a grid system link it to the paved road. Across the road on the ocean side are more expansive properties, with a decided suburban look to them. The community takes pride in its two soccer fields, two schools and clinic. It supports at least five churches, mostly evangelical Christian denominations. There is an active ADESCO which operates the only sit-down restaurant in Lower Lempa as well as a hostel of basic cabins and an information center, the whole enterprise charmingly named "Villa Tortuga".

# Resource Base

Finfish caught using nets and handlines in the bay are the main source of income, snappers being favored over catfish and grunts. Price depends on season and size of catch and fish are marketed through men's and women's cooperatives. Mangrove clams (*curiles*) are harvested by two boat-owning cooperatives on a daily basis, each boat taking out about ten persons, known as *curileros/as*. A good harvest consists of six baskets of 60 shells apiece, an adequate number is three baskets. A good price is around \$2 a basket. Crabs (*punches*) are also caught and sold but they are less important than in Montecristo. Turtle eggs are harvested from the ocean beach a few kilometers from the village as part of a project to conserve marine turtles by finding alternatives to human consumption. This has its own cooperative. Each harvester (tortuguero) patrols a section of the beach during laying season and digs up newly laid eggs when the female returns to the ocean and brings them to an incubation site where they are counted and reburied under controlled conditions for optimal hatching. The *tortugueros* are paid for the eggs, a program that is subsidized directly by international NGOs involved in turtle conservation, and by selling the opportunity to release hatchlings as part of an ecotourism effort. A limited amount of cattle-rearing takes place, as does work in cashew and coconut plantations. Fishermen are more inclined not to have their own maize plots due to time constraints, although many have fruit trees and gardens.

#### Las Mesas: Las Mesitas, Los Cálix and La Canoíta

### Number of Households, Population Estimate and Qualitative Description

There are approximately 600 households in this community, although some families live in close-enough proximity to be considered compounds and share facilities such as showers and hearths. A census conducted for the Protected Area Consolidation and Administration Program (PACAP) administered by MARN in 2007 lists 321 persons living in 70 families for Las Mesitas, 161 persons living in 40 families for Los Cálix and 110 persons in 29 families for La Canoíta, an average of 4-5 per family (Rivera & Cuéllar 2010). Personal observation supports this. The largest household in Las Mesas is comprised of two adults and their eight children, and the smallest of a single woman.

Three separate names for each hamlet (*casería*) bely the fact that this is one functional community in the cantón of Las Mesas. The paved road from Romero to Méndez separates Los Cálix from Las Mesitas and La Canoíta, and a dirt road divides the latter two communities. Since there are no street names or house numbers in Lower Lempa, community sub-division along physical lines makes for easier reference.

The communities are built on a dog-leg in the paved road, approached from the north through a growing complex of shrimp aquaculture ponds, most of which have shown no signs of commercial use in the period 2011-13. Heavy machinery appears sporadically to grade the empty ponds and a hand-painted sign has appeared in front with the Ministry of Agriculture (MAG) logo apparently endorsing the effort. In 2011 a semi-clandestine meeting between the resource guards and the environment staffer from Mangle in the open air chapel in Los Cálix indicated that the ponds were initiated by

someone who had returned from the United States with substantial amounts of money and therefore influence (discussed in Chapter V). There was no record of a permit being issued for the destruction of mangroves adjacent to Los Cálix and the individual was apparently widely disliked in the community for his individualistic approach to the landscape and his disrespect for community norms and mores. A formal objection was subsequently filed with the environment ministry in Usulután, to no apparent effect, as the MAG endorsement suggests.

#### *Resource Base*

The Las Mesas communities are surrounded by a patchwork of individual maize and vegetable plots (*milpas*), pastures, cashew orchards and small agroforestry schemes to reduce the pressure on mangroves for firewood. Many community members earn money in the wet season from harvesting wild shrimp from community ponds to the south and east of the settlement, for which they pay a lifetime usufruct fee of \$400 to the Ministry of Agriculture (MAG). Tidal creeks, such as El Llorón are connected to the canal Izcanal, which opens onto the mouth of the Lempa River and not to the Bay of Jiquilisco. There is some crab collecting as the mangroves nearby provide suitable habitat, but there are no shellfish beds. Cattle are not much in evidence in Las Mesas, while poultry abound. Pigs are also scarce. This is the community with the most to gain from the successful restoration of El Llorón, as the yield of crabs and shrimp is likely to increase significantly over time.
#### Sisiguayo

### Number of Households, Population Estimate and Qualitative Description

Sisiguayo lies near Jiquilisco Bay, about 20 km from Ciudad Romero. There are 180 families in the community (Interview 7-2013). No information is available on range of family size, but of the households visited for this research, the largest was seven people, comprising a woman, her three children and three grand-children, and the smallest consisted of a recently married couple.

Two parallel roads crossed with side lanes lined with small house plots leading towards the bay form the heart of the community of Sisiguayo. There are also larger holdings located off the entrance road from Romero. A large Ceiba tree constitutes the central meeting point of the community, although there is a school, Catholic church and clinic as well as a small cemetery. The cemetery is the site of a small mausoleum for guerillas who fell in combat or were killed by the military.

## Resource Base

Formerly called Salinas de Sisiguayo, the name change followed conversion of the salt ponds to shrimp aquaculture after the Peace Accords in a move brokered by the European Community (EC) commission to raise incomes in the area. The counterinsurgency agrarian reform program (PTT) of 1980 stipulated that former *hacienda* lands had to be managed at a cooperative, not individual, level and this arrangement continues, with exceptions, today. The ponds are built behind the mangrove zone, although they depend upon tidal inflow through man-made canals to fill them and to transport shrimp larvae from the bay. Shrimp aquaculture provides some work of a

semi-skilled nature when the ponds are functional, but there have been problems with disease, hypersalinity and pollution from cane burning (Hernández et al. 2005). A FIAES-sponsored mangrove replanting scheme in former saltponds apparently benefited 29 households around the same time. Some households raise chickens, ducks or pigs for sale. One household that formed part of the survey was on the outskirts of the community, built near a grove of huge mango trees, with a carpet of yellow fruit rotting underneath. The older owner's young bride quite vocally expressed her dislike for pigs. Any other household would have made use of surplus fruit for fattening animals for resale. Sisiguayo is base to the only female *guarda* in the Lower Lempa, and is also home to one of the few professional female oxcart drivers in the region. Like Romero, it is otherwise primarily agricultural.

## Salinas del Potrero

## Number of Households, Population Estimate and Qualitative Description

Salinas del Potrero is one of the most isolated and poorest communities of Lower Lempa. There are 1000 people in 240 households divided into the smaller hamlets of La Salvadoreña, La Hermita, La San Francisco, Caña Colorada, Los Pinos del Sur and La Sara y Ana. A number of households on the roadside are considered to be squatters. Family size ranges from 17 siblings (two original families combined) to an elderly couple whose children have left home (MR-III 2013).

At present access by road is difficult and convoluted as the main route to the coastal highway was washed out by the floodwaters of the Lempa during 12E. The

communities share a central collection of buildings – a Catholic church, a flood shelter (*albergue*) and warning tower, and a community center, all built of cinder block, and all padlocked firmly shut when not in use. Likewise the community leader had bars on his windows and padlocked doors, a feature not normally seen in smaller homes in Lower Lempa. The ADESCO committee at the time of the study was composed almost entirely of women, four of whom were sisters living in different hamlets. The squatter families (they live on *la nacional*, a term which denotes state-held land which borders all state roads) are supported by other members of the community, who share maize and other basics with them, as well as assisting with physical work. One couple is elderly, the other family has a disabled head of household and one handicapped child.

## Resource base

Community members are dependent for income upon shrimp, salt, cattle and to a lesser extent on mangrove products. Although similarly situated as Méndez on the Bay of Jiquilisco, there are no motorized boats to facilitate cooperative fishing, but individuals fish from their own skiffs using handlines. Shellfish populations were decimated by floodwaters from the Lempa during 12E, a fact corroborated by the *curileros/as* from Méndez who used regularly to harvest from Salinas del Potrero's mangrove areas to reduce pressure on their own. The difficulty of access to outside markets either by road or across the water makes marketing perishable products outside the immediate community cost-prohibitive, especially since there is no ice factory in Salinas del Potrero.

## **Restoration Sites**

There were three separate restoration projects in different phases of execution during the research period of 2011-2013. Each was nominally approved by MARN, as the authority responsible for mangroves. Each one had slightly different funding sources, although all the labor was paid for through Mangle and oversight was provided by Mangle for all three projects. They were all supposed to be carried out according to the protocols of Ecological Mangrove Restoration (EMR), called in Spanish *la técnica REM*. Each community described above participated in a separate restoration effort: Las Mesas in El Llorón, Méndez in Méndez, Romero in El Espino River, Salinas del Potrero in Borbollón River and Sisiguayo in Cuche de Monte Estuary (Table 2.1).

Community	Work Site	Kilometers	Time	Budgeted	No. of
		cleared	allotted	cost*	participants
Las Mesas	El Llorón	4.4	60 days	>\$11,000	20-30
Méndez	Méndez	Tbd	Tbd	<\$12,000	15-25
Romero	Espino	4	60 days	<\$12,000	15-25
Sisiguayo	Cuche de	2	60 days	<\$15,000	20-30
	Monte		-		
Salinas del	Borbollón	4	60 days	<\$15,000	20-30
Potrero					

**Table 2.1.** Restoration areas studied in this dissertation. Communities, budgets and numbers of participants.

\* Only cost for El Llorón was published. The rest were estimated based on maximum number of persons employed for 60 days at a rate of \$10 per day. The CFP called for estimates per kilometer. At the El Llorón rate this would have come to around \$2,500 per kilometer, so the upper limit is quite high. Interviews suggest that on each project at most a dozen people lasted beyond the first payday, at week's end.

## El Llorón

The communities of Los Cálix, Las Mesas and La Canoita (collectively known as Las Mesas) provided over 30 people to work on clearing the canal of El Llorón, of whom only four worked to the very end of the project. El Llorón carries water from the larger canal, El Izcanal, that begins at the mouth of the Lempa River, to the denuded site of El Quemado, the object site of mangrove restoration near Las Mesitas (the figure found on p. 127, Chapter V). Locally the project was called El Llorón, as the work took place there, which could give rise to confusion as the intention on the part of MAP, EcoViva and FIAES was to restore mangroves to the area of higher ground known as El Quemado, not along the banks of canal El Llorón which were well-covered in *Rhizophora mangle*. Since all the actors referred to the project as El Llorón, I retain that name.

## Méndez,

MARN put out a call for proposals for restoration at all six RAMSAR and three Biosphere Reserve sites in the country on May 12, 2012 at the launch of the Program for the Restoration of Ecosystems and Landscapes (PREP). The criteria were specific and in the case of the Biosphere Reserve of Xiriualtique-Jiquilisco and RAMSAR site of Lower Lempa (which lies within the biosphere reserve) called for application of EMR, and experience using it. This restricted applicants to those who had participated in the EMR workshop organized by EcoViva and Mangle in July 2011. One of the participants was an employee of Mangle, and a member of the ADESCO at Méndez, thus qualifying the

community for participation. Evaluation of the proposals was carried out by FIAES as the originator of the funding during 2012, and the results unofficially known by December that year, but were not officially announced until April 22, 2013 to coincide with the special climate change-themed Earth Day for the year. Nevertheless I included Méndez in this research for reasons given in the methods in Chapter III.

## Borbollón, Cuche de Monte and Espino

Smaller rivers than the Lempa drain into the western end of Jiquilisco Bay, among them the Borbollón and Espino Rivers. They pass through creeks in the mangroves in Cuche de Monte Estuary (Appendix B). These three areas were targeted by MARN as part of the Program for the Management of Ecosystems and Reduction of Vulnerability in the Lempa Watershed. Work was contracted to Mangle and completed by sub-contractors in December 2012. Labor was provided by the communities of Romero, Sisiguayo and Salinas del Potrero under the same conditions that Mangle imposed for El Llorón concerning eligibility, hours of work, and working conditions. Wherever possible, the less advantaged households (for example, female-headed) would be hired preferentially; ages were limited to between 14 and 60 and no pregnant women were allowed to work. One woman left El Llorón due to pregnancy, although her mother carried on until the end to support her daughter. In January 2013 the little boy appeared to have suffered no ill-effects from two weeks gestation in El Llorón (Survey 11-2013).

#### **CHAPTER III**

# PUTTING INTO PRACTICE: POSITIONALITY, METHODOLOGY AND METHODS

## Introduction

This chapter describes the research design for this dissertation. I clarify my inclinations and biases towards framing questions, and collecting and analyzing data. The chapter describes the methodology employed.

## Positionality

I present my positions first as someone who has lived in Central America, in Honduras and Panamá, during the turbulent decade of the 1980s and therefore has some lived experience of US-sponsored state violence. Secondly, in common with the people of Asociación Mangle, I have a long-term interest in mangroves as places from which people derive livelihoods as well as being places that present unique biophysical challenges, both in my position as an NGO board member and as a doctoral student. This duality presented its own challenges, as I discuss below. Thirdly, I am a female researcher. Gender is unavoidable in any discussion of position in research concerning human subjects. My experiences did not match my hesitant expectations of the negative side of *machismo*, but since so many of the research subjects were female this made for easier communication about, say, the physical hardships of working up to one's neck in

muddy water. Positions of power also need to be addressed in discussing positionality. As an adult student, I was an anomaly, but with Asociación Mangle and EcoViva as my gatekeepers, I was given a generous pass as being closely associated with "solidarity organizations". The only power I held through this affiliation was potential, and therefore lay well in the future after completion of my research, but as discussed below, never forgotten. Opportunities are seldom passed up in the Lower Lempa.

My first interchange in Ciudad Romero in July, 2011 with the Panamanian returnees was like a joyous family reunion. What in Panamá between 1983 and 1989 under the Noriega dictatorship was called *la amargura del exilio* – the bitterness of exile - had become an intolerable longing for the tortilla-desperate Salvadoran community of Ciudad Romero, scratching out a living in the rain-drenched mountains of Caribbean Colón province where maize could never grow (Reyes 2012:79). The community leadership fought a long, hard battle for the right to return to El Salvador and start a more corn-congenial life in their Pacific birthplace after General Manuel Antonio Noriega seized power in 1983 and the UN aid on which they depended dried up. I lived in Panamá during the same time period as the Romereños effort to return in the early 1990s, and had seen their encampments outside the Salvadoran embassy in the capital city of Panamá, read about their hunger strikes in the press and watched their eventual joyful departure from the airport to an uncertain future at home on the evening news. I have therefore a fellow-feeling towards the subjects of the research based on an (incomplete) understanding of their hardships, but also a pragmatic need to move beyond nostalgic reconstructions of the past to the ever-present challenges of the day, what

Molly Todd (2010:10) ascribes to "the weight of the present". My knowledge of this group's Panamá experiences alone conferred instant approval and pledges of support for my dissertation work from the governing body (Directiva) of Asociación Mangle, most of whom were from Romero, when I sought permission in July 2011 to carry out research in the Lower Lempa. That I was in El Salvador, and wanted to learn about how they had conducted their affairs in the intervening time so that others might learn from their long journey was a bonus.

My second position was that of someone who appreciated mangroves. As a board member of five years with the Mangrove Action Project, a US-based non-profit that works with both mangrove forests and the people who depend on them for their livelihoods, I shared a vocabulary with the Directiva and employees at Mangle; with the participants in both the Mérida and El Salvador restoration workshops; and with the resource guards who carried out the mission of the UN's biosphere reserve program in the mangroves of the Lower Lempa and Bay of Jiquilisco. They were the frontline for conservation, education and livelihood protection.

My engagement with the resource guards was greater than with other segments of the communities. I participated in meetings, patrols and the restoration workshop with a number of resource guards, as well as sharing car rides, meals and the occasional beer at weekend roundtables with them. In May 2013 I also stayed with the only female guard in Usulután while I was carrying out surveys in her home community of Sisiguayo. I interviewed them, questioned them during two roundtables at Montecristo and was

rewarded by their unguarded views on the causes of, and solutions to, many problems that they faced in going about their business.

Although the guards were aware that I wore two hats – as a doctoral student and as MAP Board member in the Lower Lempa -- and that interviews, surveys and roundtables were a part of my student persona, they never missed an opportunity to appeal to my MAP identity for better equipment, more resources and respect for their work from the central government whenever I produced a microphone. In part this stemmed from the experience of all people in the region, particularly community leaders, who were well accustomed to aid agencies, faith-based tourists, government social scientists and students from the Monterey Institute for International Studies soliciting their opinions on needs and issues in the region. I was one in a multitude of potential contributors to well-being in the Lower Lempa. The ever-present threat of regional infiltration by the maras, the vicious Salvadoran gangs increasingly involved in the international drug trade (Ward 2013; Zilberg 2011), has worked to ensure that community needs are listened to, if not acted upon, by outsiders, and I was expected to respond no differently than any other well-meaning visitor. This threat, coupled with flooding from the hydroelectric dam on the Lempa during extreme weather events, and the infiltration of resource poachers from less-endowed communities, was capably articulated often to create an urgent impression of a region under siege. A researcher does not leave the Lower Lempa with the sense that simply writing about them is an adequate response to the insights proffered so generously. The point of belonging to organizations that express solidarity with the communities is to do something, and

therefore my research is perhaps biased towards representing the communities as they would like to be seen.

Thirdly, as a female researcher I had expected to experience some expression of machismo but in fact did not feel any particular gender-related awkwardness with either women or men, perhaps because the roles and actions of women in war-time El Salvador, particularly in the FMLN, has created gender parity as voters, candidates and office holders in the post-war democratization process (Luciak 2001). In the Lower Lempa women are household heads and hold positions of power and influence within La Coordinadora and on councils and committees; they are expected to be "strong". Since Estela Hernández was elected to the national legislature from Usulután in 2009, Asociación Mangle has had two female Directiva presidents. Her position at Mangle was taken by Carmen Argueta, a long-serving community activist. Most of the restoration workers from the Las Mesas complex were women, and the survey results showed that women's contributions were just as important as those of the men. As a younger woman working in wetland archaeological sites in Europe I had been in similarly challenging environments, although I never experienced the fear of sharks coming upriver at me as one respondent did (Survey 3-2013). In fact, of those who worked from the beginning to the end of the project, all but one were women. The men were equally at home in supposedly "female" roles. At the house where I met with my survey companions during the week in 2013 that I was in Las Mesas, the male head could be seen regularly washing out his grand-daughter's underwear before picking up his machete to go to work, and those who had them doted on their daughters. When asked about heads of

household during the survey questionnaires, most respondents who were living with someone indicated that they were joint heads who shared all the business of living equally. Marriage is not a common institution in rural El Salvador, where most people in couples refer to their partner as *acompañante*. These relationships are every bit as stable and long-lasting, or not, as anywhere where they are formalized through the institution of marriage. Despite this harmonious portrayal, Salvadoran women, as one Salvadoran-American woman put it to me, do not have many illusions about men, and often prefer to live in all-female households comprising several generations of the same family with their children. This was a pattern I observed in Las Mesas, Méndez, Romero, Sisiguayo and Salinas del Potrero. I was often asked about my own family situation, my age, and why I do not have children. As one who has passed the half-century mark, my future plans were seldom broached, but one other widow said rather wistfully about my student status and lack of grand-children "Now you are flying!" (Survey 11-2013). I was surprised, as this seemed to be the converse of women as the powerless, agentless, invisible jornaleras of prewar agrarian discourses on rural El Salvador (Williams 1986; Lauria-Santiago 1999) or potential labor to be mobilized for postwar economic restructuring (Boyce 1996; Sánchez-Ancochea 2008). Neither did it accord with the image of the gun-toting guerrilla broaching the security of the exclusive Sheraton Hotel in San Salvador in November 1989, a glamorous revolutionary figure of composure and power striding past the prostrate blonde "surprised hotel guest" lying on the ground, looking at the camera (Beasley-Murray 2010:148). (This was the hotel Rosa Chávez selected for the press performance in May 2013 described in Chapter VI.)

Finally, being a student was the most difficult position, as a middle-aged person is expected to be a mature worker supporting a family in the Lower Lempa, not someone still in the formal learning process searching for answers to hypothetical questions. Surely if you are still in school there is something unreliable about you? Or overprivileged? One of the resource guards had just completed a master's degree at the Lutheran University in San Salvador, a Herculean effort that required traveling to and from the capital during the night, either side of his day off, for over five years. He was perhaps the most questioning of what I was doing, as he had been through the same process himself, with considerably more effort and a growing family. Where we found common ground was that we had both experienced similar difficulties pinning down a research question. Another person who challenged my competence as a scholar was a senior member of an aid agency in San Salvador, well familiar with press interviews and microphones. He asked me briskly at the beginning of what I had proposed as a semistructured interview why there were so few questions, since for a questionnaire it seemed rather slight, and suggested that my committee was remiss in allowing me to go public with it! Yet he was also the person who saw applied value in my research, as a case study to inform potential donors for mangrove restoration projects (Interview 6-2012).

## Methodology

The methodology is divided into two sections, presenting the rationale for using a case study and utilizing a mixed-methods approach to data collection.

### Case Study

The research is presented methodologically as a mixed-methods case study, in the sense that it covers a topic (mangrove restoration for climate mitigation) that is bounded in time (2011-2013) and space (the Lower Lempa region of El Salvador) (Gerring 2007:73). Some of the research was phenomenological in approach: the shared phenomena of restoration work and climate events were explored through different individuals' experiences, and perceptions of the morality of local collective responses to global collective problems. These are discussed in Chapter VII. The research question was developed iteratively around the broad topic of "mangrove restoration" as political and climatological events in El Salvador unfolded and landscapes in "the new carbon economy" shifted unpredictably, in particular the collapse of carbon markets in Europe and North America (*The Economist: Finance & Economics*, April 20<sup>th</sup>, 2013).

Time and financial limits inherent in a doctoral program dictated the selection of a case study, reinforced by a rigorous advisor. Rich ethnographic potential in the Lower Lempa made a within-case study compelling rather than a comparative case study. In actual fact, since El Salvador was unique in Latin America at the time of topic selection for this dissertation (Fall 2011) in pursuing a national policy of mangrove ecosystem restoration for climate mitigation purposes, there was no other comparable situation in the hemisphere. Discussions with mangrove experts and participants at the restoration workshop at the Society for Ecological Restoration meeting in Mérida, MX in 2011 lead to this conclusion. Experimental work for climate mitigation in Mexico was limited to small scale plots run by the Mexican government in the Yucatán (Zaldívar-Jiménez et al.

2010) and mangrove planting efforts in Guyana subsidized by the European Union warranted a scholarly investigation, but could not be considered anything other than political greenwashing, despite official claims to the contrary. Mangroves have been restored elsewhere in the hemisphere, but not as national policy for climate mitigation purposes (Interview 3-2011). For this reason it is instructive for future restoration efforts, since this case reveals the complications inherent in mangrove restoration for climate mitigation, as different actors reconcile the processes ideologically, politically and materially with their own interests.

## Mixed Methods

A sustainable livelihoods framework best accommodated a need for basic demographic and socio-economic data in answering the research questions. A more open-ended interpretative framework covered perceptions of restoration processes, climate vulnerability, inter-generational equity, justice, identity and sense of place. Together they created an integrated, mixed methods strategy for answering the research questions. This has antecedents in the geographic literatures on Amazonian rubber tappers (Vadjunec et al. 2011) and in Tawahkan communities in Honduras (McSweeney & Coomes 2011), which integrate descriptive household statistics with individual perceptions.

Data collection involved human subjects and followed Texas A&M University IRB protocols throughout, paying attention to confidentiality and with concern for moral and ethical implications for the research subjects. Each interview and survey is identified

by a code accessible only to the researcher, thereby ensuring confidentiality. Recordings were deleted after transcription. All paperwork is stored in a secure place at Texas A&M under control of the Committee Chair, Dr. Christian Brannstrom.

## Methods

Data collection relied upon semi-structured interviews, household surveys, participant observation, and analysis of reports retrieved from government and NGO websites and social network sites (Table 3.1). The questions used to guide the interviews and the household survey can be found in Appendix B. Data processing involved handcoding of interview transcripts and other documents, and collation of descriptive statistics.

## Table 3.1. Data collected.

Household Surveys	Interviews	<b>Round Tables</b>	Workshops	Meetings
39	30	3	2	>10

## **Key Actor Interviews**

Key actor interviews are a staple in human-environment research (Brannstrom et al. 2012; Campbell 2002; Lansing 2012; Lave 2012; Mansfield 2011; Robbins 2006; Robertson 2000). Use of key actor interviews is well-described in a recent text aimed at guiding reflexive practice (Cloke et al. 2004). I used interviews because there was no "population" of mangrove experts from which to sample, nor did I expect there to be any consistency of experience either within the international community nor in El Salvador that could be captured using surveys. Key actors are those who participate in the formation of discourses, essential to the construction of governance networks, and often provide access to other actors and knowledges. Listening to perceptions of these individuals and drawing on their wealth of experience was the best way under the circumstances to understand the nascent phenomenon of mangrove "restoration".

The interview questions were first tested on a group of six international mangrove experts from four continents. The experts were participating in a special session on mangrove restoration at the annual Society for Ecological Restoration meeting in Mérida, Mexico in August 2011 that I moderated on behalf of the Mangrove Action Project. They considered the questions general enough to be used later in El Salvador without significant amendment. Their responses resulted in minor modifications to phrasing. Eight questions established the respondent's expertise, ascertained views on methods of restoration and thoughts on the future of mangroves, and explored the possibilities of using mangroves in mitigating climate change. These interviews inform a later discussion in Chapter VII on mangrove restoration methods and prospects.

I spent two weeks in August 2012 interviewing key actors (n=8) from aid agencies, the Environment Ministry, NGOs and educators in San Salvador, Lower Lempa and La Unión. All interviews took place in the workplaces of those individuals and were recorded with prior permission. The Environment Minister and the Vice-

Minister did not respond to a request for an interview, and only one other person declined due to time constraints. Further interviews with community leaders and resource guards (n=11) took place in Lower Lempa during August 2012 and January and April/May 2013.

#### Household Surveys

Household surveys seemed the most fitting way to capture the range of experiences of the same, shared phenomena. There are no street names in the Lower Lempa, still less house numbers; households are identified by the people who live in them. Although literacy levels are relatively high, there were a number of people, mostly female over 30, who were unable to do more than carefully initial consent forms. The only way to administer surveys, therefore, is in person, preferably with prior notice, in their own homes. This takes time and patience. A surprisingly high number of people out of the potential number responded in all communities except Romero and Sisiguayo, discussed below.

The survey instrument (n=39), the results of which are analyzed in Chapter VI, in addition to collecting basic demographic information, asked questions in five other areas (Appendix C). Four of these were based on five-point Likert responses, one on openended questions. The Likert responses were not audio-recorded, but some of the openended questions were, depending on the disposition of the respondent. Nothing was audio-recorded without prior consent. The first set of questions concerned income derived from mangroves and other natural resources. This took the form of respondents

identifying picture cards representing resources used by the household to generate money. This proved a useful way to open up conversations with survey respondents more generally, which led to a section on some of the expenses the money was expected to cover. This was by no means exhaustive and was not intended to cover all expenditures, but rather to determine some of the discretionary categories (cell phone, electricity) and ascertain whether a household invested in a *milpa* (a mixed plot of predominantly maize and other seasonal vegetables for household consumption). The second set concerned familiarity with mangroves and restoration; the third covered experiences and perceptions of risk and vulnerability. Relations with the government and non-government entities and possible future conflicts through land-use changes related to mangrove restoration were covered in the fourth set of questions. The fifth section of open-ended questions covered a diversity of topics, such as whether respondents believed that climate change mitigation was a good reason to restore ecosystems in the Lower Lempa; whether future generations would be able to enjoy mangrove resources; whether restoration was just work, or meant something more to the respondent; and whether gender made a difference in perceptions of the work carried out.

Household surveys were administered in four communities to individuals, and collectively at a roundtable in Salinas del Potrero. Circumstances differed for each. In Las Mesas, a full week in January 2013 was devoted to surveys, and at least an hour was given by each individual. The seventeen final surveys represented all but one of the people that the project overseer felt should be consulted, a young man who was away at the time. Despite higher numbers reported in the press, the rest were short-term

participants on the project and therefore were not considered members of the "team". In Isla de Méndez surveys were administered to potential participants (n=14) in a restoration project that was awaiting funding before commencement. Since no-one had officially been hired, the community leaders felt it would be fairer to survey participants if they were presented with the idea that I wanted to survey a representative sample of fishers, turtle egg collectors, and clam collectors in the community. Therefore I was given a list of six possible representatives of each of these groups and visited as many as possible. Some were unavailable, and substitutes were found. According to the project manager, most of the people hired in Ciudad Romero were male due to the onerous work which necessitated using chainsaws, and were day-laborers. The fact that only two people were able to participate the day that I was able to conduct surveys reflected, I was told, the fact that the rest were busy working on construction projects. In fact, in response to the question "Have you spent time in the past three months looking for work outside the community?" I was told that no-one had time! I was able to spend a little over 12 hours in Sisiguayo, and therefore the number of surveys was correspondingly small (n=6) and the time spent in each household fairly short. In Salinas del Potrero, time constraints were overcome by the community leader assembling three members from each participating community who had taken part in the restoration work for a roundtable meeting. I obtained some general characteristics, and some shows of hands as responses to sections on the survey, but the results were not complete. Other insights from the participants more than compensated for this deficit. These data will be presented in Chapter VI in the form of tables and discussed in the text. Descriptive data

from the open-ended questions appears in Chapters V, VI and VII. Additional comments by people surveyed appear as quotations throughout. For example the saying "all in the bed or all on the ground" to describe the imperative for local collective action was obtained during the survey of Las Mesas (Survey 7-2013).

## **Participant Observation**

During the research period I had the opportunity to participate in two mangrove restoration workshops, one in El Salvador in July 2011 and one in Mexico in August 2011. In El Salvador, following the forum in San Salvador, thirty people drawn from government, NGOs and local communities stayed in the dormitories of the shelter in Romero and went through a week-long workshop which involved field visits as well as lectures and classroom exercises. I was able to take extensive notes and photographs throughout because I took part in this workshop as one of the organizers for the NGO Mangrove Action Project.

The Society for Ecological Restoration held its 4<sup>th</sup> World Conference on Ecological Restoration in Mérida, Mexico in August 2011. MAP organized a special session, for which I was the moderator, attended by the experts from six countries who also granted me interviews. Two of them, including the Mexican host, led a mangrove restoration workshop which included a day-long site visit to the Biosphere Reserve at Celestún to look at ongoing restoration efforts undertaken by a Mexican government research institute. Thus I had the opportunity for participant observation of the multinational group, as I had for the national group in the Lower Lempa.

In San Salvador I attended the public forum "Mangrove Restoration: Challenge for Adapting to Climate Change" organized by FIAES and EcoViva on 8 July 2011, as a MAP representative, and a second similar-sized public meeting, "National Strategy on Climate Change" on 22 April 2013 organized by MARN as a graduate student.

Other activities in which I participated and took notes included public meetings in Puerto Parada (on blast fishing), Romero and Las Mesas (on Fomilenio II) and Montecristo (on radio frequencies). I also took extensive notes during meetings with cooperative leaders in the departments of San Vicente and Ahuachapán as part of the orientation for observing the 2 February, 2014 presidential elections. During my first visit in June 2011, after I had asked permission from Mangle's Directiva to conduct fieldwork as a geography graduate student at Texas A&M in the Lower Lempa, I was embedded in daily activities, coordinated by Nathan Weller of EcoViva. I accompanied the resource guards on patrol for a day at Las Mesas and observed their open-air meeting to discuss a troublesome infractor (Chapter VI). I was taken by members of the Directiva and a lawyer from the University to observe the process as they registered formal complaints for resource use violations in the MARN office in Usulután the following day. Much of the data collected in this way appears as background descriptive material, in vignettes or is used to triangulate claims made in the interviews. Since IRB approval was not sought to record these events, there are no transcriptions and verbatim quotes are minimal, as for example the succinct quote from Herman Rosa Chávez which gives Chapter V its title.

#### Roundtables

Mangle and the resource guards like to take visitors to Montecristo for informal gatherings. It has pleasant open-air facilities and a women's cooperative provides freshcaught fish platters to sustain meeting participants. The guards elected to hold two roundtables there, one on 6 January 2013 with me on my own, and one on 28 April 2013 with Dr. Christian Brannstrom. The general subject of the first roundtable was changes in the environment since the Peace Accords of 1992, and that of the second roundtable was, at Dr. Brannstrom's suggestion, *la técnica REM*.

What might have been a household survey project in Salinas del Potrero became effectively a roundtable based on questions in the survey. Another roundtable took place in August 2013 involving the Directiva, EcoViva, MAP and the Monterey Institute over possible mangrove research center in Isla de Méndez. The meetings with the resource guards in Montecristo and the *rescatistas* of Salinas were taped, transcribed and coded. The meeting over the research center resulted in extensive handwritten notes as the date for adding new interview subjects on my IRB protocol had passed.

## **Problems Encountered and Solutions Applied**

The greatest difficulty encountered was the protracted timeframe between the government announcing that a major restoration initiative was about to take place in El Salvador's wetlands in July 2012 and the actual granting of projects on Earth Day, 22 April 2013, following an unexpected and very lengthy proposal review period. I was unable to ascertain directly the reason for the delay, as I felt that I did not have IRB

approval to recruit subjects and ask political questions. Indirect questioning was met with indirect answers. It seemed unethical and inappropriate to use "hearsay", so I was unable until towards the end of planned fieldwork time to find out which projects had been approved. In the case of Isla de Méndez I knew in advance that the project was almost certainly going to be approved, so planned household surveys accordingly, but with people from a potential pool of *rescatistas*, not the final list. This probably did not detract from the overall findings as the likely pool of people involved was not apparently very large, and was distinct economically from, say, the few mendicants who hung around the retail outlets in Méndez at one extreme or the people who ran them at the other.

The greatest constraint was imposed by hewing strictly to the Institutional Review Board (IRB) protocol. This meant that impromptu revisions to the survey instrument in the field had to be carefully considered and in some cases opportunities for interviews not taken full advantage of in order to minimize after-the-fact negotiations with the Texas A&M IRB. This was not due to any problems I ever encountered with IRB staff, who were unfailingly helpful, courteous and patient with me, even when experiencing powercuts during a desparate revisions submission from El Salvador (brought about by a glitch in a new web-based procedure), but because of the salutary example of another student who failed to report changes in a timely manner and nearly did not graduate as a result (K. O'Reilly 2012, pers. comm.). The issue of limiting or changing research in order to assuage the concerns of IRBs has been explored by geographers recently, and strategies for graduate students operating within these

limitations discussed, none of which addressed my particular situation (Martin & Inwood 2012:11).

One problem, inherent in any field experience where the researcher appears to live less precariously than the researched, was raising expectations that not only the work might produce material benefits, but also that the researcher might become more fully engaged with philanthropy in the region. EcoViva has a policy of discouraging participants in its programs from becoming individually involved with any personal petitions for assistance. Mangle has a well-understood system of prioritization for dispensing aid in the Lower Lempa, so it was possible to a large extent to manage requests by invoking their authority on the matter.

In hindsight it would have been valuable to have conducted household surveys with people who were not involved in mangrove restoration, to find out why they chose to pass up an economic opportunity, since in theory application was open to anyone in the communities who fell within the age range generously described by "adult". This would have entailed a different research design, involving a sampling strategy to select households and statistical analysis that was beyond the time and financial limits of my proposal. More time spent in Sisiguayo and Salinas del Potrero would have been invaluable as well. In addition, it would have been instructive to have brought a wider skill set to the proposal in order to better understand the reasons for land use and cover change from the period of post-conflict settlement to the present day. If I had a background in geomorphology, biogeography, remote sensing and GIS I would be more confident in assessing whether mangrove restoration in the Lower Lempa has any

chance of long-term success, measured in terms of area covered in live mangroves after monitoring according to EMR protocols, at six months, one year and five years after initial restoration work. In this I was apparently joined by almost everyone else in the region, who would have liked more concrete and useful answers from me.

In addition, as fieldwork drew to a close, I became aware of the rich potential for a more cultural approach to the data I had collected. The proposal design did not allow for this, so that treatment of the extensive visual materials collected, which lend themselves to a more contextual analysis of communicating climate change, for example, as Brannstrom & Brandão (2012) demonstrated for an agricultural fair in Brazil, will have to be deferred to publication in a peer-reviewed journal.

#### **CHAPTER IV**

# EVOLVING LANDSCAPES: THE PROGRAM FOR RESTORATION OF ECOSYSTEMS AND LANDSCAPES (PREP)

## Introduction

This chapter describes the genealogy of the Salvadoran Environment Ministry's Program for the Restoration of Ecosystems and Landscapes (PREP), which has dual origins in the United Nations Framework Convention on Climate Change (UN-FCCC) REDD+ program and the Salvadoran Environmental Law (Ley del Medio Ambiente). Sources include documents provided online by MARN in the form of press releases, project proposals and reports prepared by Salvadoran environmental think-tank PRISMA covering over a decade of environmental policy research, and reports produced by international agencies. Key to bringing the two strands into alignment is the Environment Minister, Herman Rosa Chávez, who was the Director of PRISMA before joining the FMLN government in 2009.

## **Reducing Emissions from Deforestation and Degradation (REDD+)**

Since the mid-1990s the UN-FCCC has held annual Conferences of the Parties (COPs) named for the city in which they were held. The first of any significance was held in Kyoto, Japan, in 1997. Out of this meeting, COP3, came the *Kyoto Protocol*, which set up legally binding reductions by developed nations (Annex I signatories) of greenhouse gas (GHG) emissions at 5% below 1990 levels. The protocol introduced

emissions trading, a market-based mechanism to control GHG emissions, the Clean Development Mechanism (CDM), to make participation palatable to less-developed nations (Annex II signatories), and a Joint Implementation strategy to bring the two signatories together. The US, at the time the largest national emitter of CO<sub>2</sub>, declined to ratify it. A decade of contentious debate and delay followed until the *Bali Road Map* in 2007 at COP13 formally introduced Reduced Emissions from Degradation and Deforestation (REDD), a scheme to halt deforestation in the tropics as a means to reducing greenhouse gas emissions.

Expectations for greater US engagement in climate mitigation following the change of government in the US were high but stymied at COP15 Copenhagen in 2009 (Peet, Robbins & Watts 2011:5-6), where many factors conspired to bring the Chinese and US governments to an impasse in emissions-reduction efforts, winding up with the *Copenhagen Accord* (Christoff 2010). The following year, at COP16 in Mexico in 2010, an entirely voluntary Green Climate Fund was mooted, whereby REDD was enhanced with the additional consideration of indigenous forest dweller's rights to become REDD+, and mangroves were mentioned as "carbon forests" for the first time. The adoption of the market-based *Cancún Adaptation Framework* helped support a whole new sub-industry, "Blue Carbon", that came into being within "the new carbon economy" as an extension of carbon offsets into aquatic environments (Bridge 2010; Newell et al. 2012). These include mangrove forests.

Forests were not originally included within the UNFCCC, and in fact were rejected at Kyoto, as there were concerns about their permanence (forests can die from

natural causes due to fire, disease outbreaks, drought, etc.), their additionality (some standing forests are already afforded protection from human disturbance) and leakage (logging and other activities might be moved to other forested areas instead). However, The Stern Review (Stern 2007) and the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (2007) gave forested developing countries the necessary economic and scientific authority to pursue the inclusion of forests in the debate, which came to fruition with the inclusion of REDD and the inclusion of carbon forestry at the Bali COP in December 2007.

Herman Rosa Chávez, the Environment Minister, attended all the COPs since the FMLN government led by President Mauricio Funes came into power in 2009. An electrical engineer and economist by training, Rosa Chávez headed the regional environmental think-tank PRISMA for nearly two decades before joining the government. At PRISMA he co-authored a number of publications on Salvadoran environmental issues, ranging in subject from local water quality and payments for ecosystem services for water, to the effects of globalization on reforestation (Barry & Rosa 1996; Rosa et al. 2004; Hecht et al. 2006). His approach in national government was equally broad in scale, although his focus was on regional integration in Central America over climate change (*cambio climático* in Spanish), financing for REDD+ and technological transfer for climate monitoring. The Ministry was unstinting in its coverage of his speeches, posting press releases and YouTube links equally (<u>www.MARN.gob.sv</u>) (see Figure 4.1 for the apparent importance of social media to Rosa Chávez and Viceminister Lina Pohl).

The Foreward to the Third Globe *Climate Legislation Study* states that domestic legislation is the key that opens up political space for international climate agreements (Townshend et al. 2013:viii). In a nation of high adult illiteracy and commercial television, generating support for public programs necessarily comes from a number of sources, all of which have to have a compelling and consistent message. As Boyd (2009: 2392) observes in the context of the rhetoric surrounding implementation of the Clean Development Mechanism in Bolivia and Brazil, "managers, officials and NGOs are privy to the world of global negotiations and local implementation. Thus, they are important conduits of storylines." The creation of "*cambio climático*" as a storyline and the societalization of the Salvadoran public as climate citizens is developed more fully in Chapter VII. Eco-governmentality frames much of the analysis of the household surveys in that chapter, as the *rescatistas* appear to have adopted the language and thoughts appropriate to the government's project of ecosystem restoration without much effort on the part of the state (Bridge & Perrault 2009: 489).

Since the Funes government came into power in 2009, MARN has consistently staged public events around the theme of climate change, posted on social media sites (Facebook and Twitter) as much as in the traditional media, most of them referenced on the official MARN website. In 2010 MARN reported eight such events leading up to the Cancún COP16 meeting, listed in Table 4.1. These have included an early visit by a Cuban mission, a Central American summit on "Woods, Governance and Climate Change," a regional analysis of the UN study "The Economics of Climate Change in Central America: 2010," and several associated with the meeting itself. There have been

several large public meetings since then, including a large *"Cambio Climático"* event on 22 April 2013 described in Chapter VII. This event featured a video of a popular Salvadoran singer staged in front of iconic natural features -- a volcanic lake, a waterfall, the mangroves of Jiquilisco Bay -- encouraging his viewers to love and care for nature. The attempt to appeal to a younger demographic was evident.



**Figure 4.1.** Minister Rosa Chávez and Vice-Minister Lina Pohl at a public ceremony. (From MARN website, 2012).

The Minister concluded his remarks at COP15 in Copenhagen 2009 referring to abnormal recent rainfall events in El Salvador which caused destructive flooding and were attributed to climate change, with the not-so-veiled threat of human inundation: "We have been clear with our friends from the North, that if we don't take this situation seriously, waves of illegal immigrants will assemble and there will be no barrier sufficiently high to stop them" (Rosa Chávez 2010). The stakes were high at Cancún for El Salvador's minister politically, as much had been said in the Salvadoran press about REDD+ and climate adaptation, particularly funding streams and technology transfers from developed (Annex I countries) to assist with "mitigation based in adaptation". Constant reference in the media to cambio climático during the research period was

reflected unambiguously in the household surveys administered during 2013 (Chapter

VII).

**Table 4.1.** Two years of MARN climate change press releases. February 2010 – December 2012.

DATE	EVENT
5Feb2010	National Program for Risk Reduction: 2010-2014 (MARN with
	CIIMA, Cuba)
28Jun2010	Adaptation to Climate Change (HRC with Francisco Rodríguez, Kyoto
	Protocol point person; Fabiola Tábora, Global Water Program)
12Aug2010	PREP – National Planning Workshop for the REDD-CCAD-GTZ
	Program. (HRC)
8Sept2010	"Bosques, Gobernanza y Cambio Climático"
1	Adaptation post-2012.
23Nov2010	"La Economia del Cambio Climatico en Centroamerica" CEPAL
29Nov2010	Climate Change Committee arrives in Cancun
9Dec2010	Rosa Chávez at COP16, Cancún
8Feb2011	Government Cabinet with Bernaditas Muller, lead negotiator for G77 +
	China in CMNUCC.
8Feb2011	MARN Vice-Minister Lina Pohl in Brussels: Climate Change meeting
27Apr2011	Christiana Figueres, Executive Secretary of UN Climate Change in San
1	Salvador with Rosa Chávez
7Dec2011	Rosa Chávez at COP17, Durban
21Jun2012	Rosa Chávez at Rio+20
16Jul2012	Rosa Chávez on national policy on climate change: Environmental
	Law
13Oct2012	Legislative Assembly approves National Climate Change Plan
6Dec2012	Rosa Chávez at COP18, Doha

At COP17 in Durban, a clearly frustrated Rosa Chávez characterized the

positions of small countries vulnerable to climate change by saying, "We are paying for

the broken plates of a *fiesta* we weren't even invited to" (MARN website, accessed 7

December 2011). He reinforced this position at Rio+20 six months later when he said,

"the outcome we have is just a sterile gauze to control the hemorrhage from a bleeding wound" (MARN website, accessed 21 June 2012). By Doha, his domestic achievements permitted a less peevish tone, so that in 2012 he could talk about the recent Environmental Law that had been passed by the Legislative Assembly and the ambitious plan for ecosystem and landscape restoration, PREP. He said, "We are not remaining passive. We know what to do and we are forging ahead with our limited resources" (MARN website, accessed 6 December 2012).

There are certain aspects of REDD that need elaboration for an understanding of its application to El Salvador. It is "incentive-based," which means that money is supposed to change hands in order to influence behavioral outcomes. In the case of REDD, it passes from developed country governments, corporations, NGOs and private individuals to national governments. In the case of El Salvador, the government of Germany through its overseas aid agency GIZ, has pledged €15 million. National, centralized governments were considered the essential stakeholders necessary to ensure permanence through enforcement, and for economies of scale, coordination and standardization which multiple local projects could not guarantee (Phelps, Webb & Agrawal 2010). Critical to the functioning of REDD is reliable monitoring, reporting and verification (MRV). It is at the point of verification that the carbon contained in trees and their subsoils becomes a commodity (Bumpus 2011). Verification is not a simple matter, as Lansing so carefully exposed in his series of papers on the complex assemblage of actors required to verify a plot of forest re-growth for a private company in Costa Rica in a non-REDD project (Lansing 2012a, 2012b, 2013). Scientists,

government bureaucrats, members of NGOs, company employees and indigenous leaders came together to map the trees using GPS units; maps which were then verified and reproduced for circulation among an even wider group before the carbon could be determined to exist properly enough for payment to the indigenous group on whose land they were growing (Lansing 2012b). The seemingly straightforward process was vulnerable to failure at almost every step. Carbon forestry is not embarked upon lightly.

In fact, there a number of safeguards for the money lenders for carbon forestry. First, there is the requirement that countries prove themselves capable of handling the business of carbon forestry, which they must do through a process called REDD-Readiness. To date, only a select number of countries (37) have signed up to participate in REDD, of whom 23 have submitted REDD-Readiness Project Proposals, and fewer still (5) have passed through to the stage of implementing actual projects. The World Bank administers a funding stream through its Forest Carbon Partnership Facility (FCPF) as does the UN Collaborative Program on REDD (UN-REDD). Participating countries must demonstrate "a robust foundation for a comprehensive and systematic approach to tackling critical governance challenges as readiness activities proceed" (Williams & Davis 2012). This in practice means taking into account two types of governance considerations identified by the international NGO, World Resources Institute (Table 4.2).

Good governance	Managing degradation and deforestation
Stakeholder participation	Clarity and security of land tenure
Cross-government coordination	Capacity-building for forest management
Transparent accounting	Strengthening law enforcement
Independent monitoring and oversight	Other governance issues

 Table 4.2. Governance considerations, following Williams & Davis 2012.

El Salvador received a World Bank GEF grant for \$5 million in 2005, which it administered through MARN, the Program for Areas of Conservation and Preservation (PACAP), to address the management of degradation and deforestation. PACAP money was used to fund part of the restoration work at El Llorón in 2012, just before its term expired. Engagement with Asociación Mangle and the resource guards who helped with the surveying, and *rescatistas* who carried out the work checked the "stakeholder" box in the *Good Governance* column, and the ministerial-level Committee on Climate Change of the National Environment System (SINAMA) fulfilled the obligation of cross-government coordination. The only element that appears still to be missing is a system and organizations for MRV, although in the REDD-Readiness proposal this function was to be fulfilled by qualified persons who had received the requisite diploma from CATIE, a Costa Rican research and training institution. The German Agency for International Cooperation, GIZ, was to provide funding for training a cadre of qualified persons from Central America in all aspects of managing forests for carbon certification. GIZ pledged an overall contribution of  $\notin$ 15 million to El Salvador for REDD+. The Salvadoran group was to be embedded within MARN. El Salvador submitted its REDD-Readiness Preparation Proposal (REDD-R-PP) on 31 May 2012. Before it was formally submitted, it was contested by the Salvadoran National Indigenous Coordination Council, whose Coordinator, Betty Pérez, sent a letter dated 24 May, 2012, to Benoît Bosquet, Head of the FCPF at the World Bank demanding its rejection on the grounds that the organization had not been consulted (posted on <u>www.redd-monitor.org</u>, retrieved 29 July, 2012). Although there is no evidence that the demand has been met, there are concerns in nations with larger indigenous communities, such as Panamá, where the indigenous coordinator, COONAPIP, has withdrawn from discussions with the Martinelli government over failure to consult and to disburse monies provided for preparations for REDD+ (Lang, www.redd-monitor.org 2012).

## Salvadoran Environmental Law

El Salvador's first environmental law was passed in 1998, under the ARENA government of President Armando Calderón Sol, with a provision that it be revised every five years. Subsequent ARENA governments did nothing. Funes' MARN, after considerable effort and public input, revised the Law of the Environment as part of the larger National Environmental Policy in June 2012, with public comment received in written and oral form as well as on its website. It was approved by the cabinet and passed by the Legislative Assembly later in the year.
The national environmental policy of 1998, re-authorized in 2012, is founded on the principle that:

All the inhabitants have the right to a healthy and ecologically balanced environment. It is the obligation of the titular State to promote and defend this right in an active and systematic fashion as a requisite to assure harmony between human beings and nature (Ley del Medio Ambiente, 2012: 16).

Some of El Salvador's environmental problems were described in Chapter II. They have roots going back to the early days of export agriculture in the twentieth century, and according to PRISMA have resulted in "near total deforestation, widespread soil erosion, sedimentation of rivers and lakes, and reservoirs, and unchecked contamination of surface water" (Barry & Rosa 1996).

The principles of the national policy and the actual environmental experiences of the inhabitants under the ARENA administrations were separated by a wide gulf. The Salvadoran research institute and think-tank, PRISMA, of which Herman Rosa Chávez was the director before moving to the Environment Ministry, had been producing policy proposals and research monographs for over two decades to inform national and regional environmental policy (mostly ignored by ARENA). Through Rosa Chávez and Deborah Barry, who became a MARN employee, it guided the REDD-Readiness proposal at MARN. It operates conceptually within the field of sustainability science and has produced documents on payments-for-ecosystems-services, REDD+, climate change adaptations and forestry governance in the Lempa watershed since the beginning of the

millennium (Rosa et al. 2004; PRISMA 2010; Cuéllar et al. 2012; PRISMA 2013). Throughout these documents the various authors stress the importance of broad participation to include small producers within an agroforestry matrix. They argue that "If given opportunities and technical resources to do so, the rural poor can not only reverse environmentally degrading impacts of past land-use practices but also invest in the enhancement of valuable environmental services" (Rosa et al. 2004:3). While the provision of water-related services at the landscape level dominates the PRISMA agenda, and thus the upper reaches of river watersheds, the *rescatistas* of the mangrove restoration projects in the Lower Lempa clearly answer the call for climate mitigation. The floods of 2005, 2010, and 2011, when the government permitted the managers of the "September 15" dam to release water which breached the levees put in place after the 1998 floods, released contaminated water into the fields and groundwater of the region, and thus violated the environmental policy for a healthy environment (Dávila 2011). Although the lack of scientific investigation into the immediate effects of the contaminated water might raise doubts of causality, the director of MAP Asia, Jim Enright, was fairly sure that prolonged periods of stagnant freshwater from these events was contributory to the death of the mangroves at El Quemado. Two experienced curileras from Méndez (Surveys 24-2013 and 29-2013) attributed the clam die-off after Tropical Depression 12E to contaminated freshwater inputs, a claim that was independently supported by the rescatistas from Salinas del Potrero (MR-III 2013). In fact, the mangrove restoration projects are intended to regulate freshwater as well as saltwater flows, as will become more evident in Chapter VI.

# Program for the Restoration of Ecosystems and Landscapes (PREP)

The Ministries of the Environment, Public Works and Agriculture in the Funes administration jointly launched PREP, their "ambitious national plan for adapting to climate change" at a press conference on 7 May 2012, after MARN had been discussing it publicly for three years, and had already carried out its first pilot project (MARN 2012). The timing of official announcements in El Salvador is sometimes a mystery to outsiders, as for example, the delay by several months to announce the awards of wetland restoration money until Earth Day in 2013, although the recipients knew well before that date.



**Figure 4.2.** Climate-induced damage since the Funes administration took office. Image from PowerPoint announcement of PREP, MARN 2012. The plan had four goals:

1. Improve water regulation in the river basins.

2. Retain soils and improve fertility.

3. Restore and conserve critical ecosystems (mangroves, gallery forests, wetlands).

4. Absorb and fix carbon dioxide in soils and vegetation.

The expected results would bring economic benefits, reduce climate vulnerability, conserve biodiversity and contribute to slowing down global climate change, the effects of which had already been experienced in El Salvador (Figure 4.2).

From February – March 2012, the PREP pilot project of mangrove restoration following the Ecological Mangrove Restoration technique brought to El Salvador by EcoViva was undertaken at the site of El Llorón in order to take advantage of dry season conditions, interestingly before PREP was officially launched. The project, as part of the REDD-Readiness proposal, was intended to meet the second two of the four goals given in PREP, which had its origins in the policy work of the environmental research group, PRISMA, as well as fulfil the goal of a "healthy and ecologically balanced environment" drawn from the environmental law.

# Summary

This chapter has described the evolution of the Salvadoran Program for Restoration of Ecosystems and Landscapes through the lenses of the UN-FCCC REDD program and the Salvadoran Environmental Law, focused together on landscape

restoration by the key policy figure of the Environment Minister, Herman Rosa Chávez. A concern within the REDD program, and PES schemes generally, is "good governance" as laid out in Table 4.2. Funding is conditional upon stakeholder participation (a condition met in the pilot project by engaging local *rescatistas*); crossgovernment coordination (the Climate Change Committee headed by Rosa Chávez); transparent accounting (MARN and FIAES make public the amounts they spend on each project). Independent monitoring at the time of the research was a paper proposal since there was no-one funded, or yet fully competent, to undertake it. PACAP was financed by GEF for five years to resolve clarity and security of land tenure, a situation that staffers felt had been mostly resolved within the buffer zone of the Biosphere Reserve of Xiriualtique-Jiquilisco since most of the land was divided into *parcelas*, although problems remained over management of the core areas. Mangle, with financial aid from FIAES, had held the mangrove restoration workshop to address the need for "capacitybuilding", although there are no known performance measures stipulated for that particular goal in the REDD-Readiness proposal. The resource guards clearly felt that law enforcement had not been strengthened on their watch, and that the state was derelict in its duties to protect publicly owned resources. The next chapter is concerned with the forging of alignments for the governance of mangrove restoration in El Salvador.

#### **CHAPTER V**

# NOTHING IS INNOCENT: ALIGNING RESTORATION GOVERNANCE, AUTHORIZING ECOLOGICAL RESTORATION

# Introduction

This chapter brings selected elements of Li's analytic of practices of assemblage, introduced in Chapter I, into conversation with Jordan's analytic of hybrid governance to explore the interplay between state and non-state actors as they worked together in a governance network to bring about the objective of ecosystem restoration for "mitigation based in adaptation" (Jordan et al. 2005; Li 2007a). Jordan was Professor of Environmental Politics at the University of East Anglia, UK in 2013.

The data I draw upon are ethnographic and textual. In the first section I begin with a public event that marks the moment when many of the key actors started to coalesce around the same problem. The event introduced the discourse of mangrove restoration to the Salvadoran public for the first time as part of a solution to the problem of climate change, effectively bringing them into the nascent "discourse coalition" of state and NGO actors formed through the event agenda (Hajer 1995). Next I turn to environmental scholars to define governance as it might apply to the practice of mangrove restoration in El Salvador. Then I introduce an analytic from political science and apply it to selected political ecology approaches to environmental governance. Building on this analytic I then describe and explain the hybrid governance network that includes the state (in the form of the Environment Ministry), and civil society actors that

coalesced around the performance of mangrove restoration at the site of El Llorón in the Lower Lempa. The protocol of Ecological Mangrove Restoration (*la técnica REM*) provided the discourse to this coalition (Hajer & Versteeg 2005). The work of bringing the discourse coalition into being is what Li describes as *forging alignments* between "both those who aspire to govern conduct and those whose conduct is to be conducted" (Li 2007a:265). Until international carbon financing becomes a reality, the market is a ghostly presence, informing the discourse without providing substantive inputs.

In the second section I describe two meetings held in the Environment Ministry and a mangrove restoration workshop held in the Lower Lempa which followed the public event, as these are key to understanding how the actors *authorized knowledge*. I develop this by analyzing the progress of an obscure restoration protocol deep into the heart of the Lower Lempa.

The Environment Ministry under the FMLN, apart from the PACAP program, was created afresh in 2009. The National Environmental Law had not been modified since it was written in 1995, and FIAES had carried out its own environmental programs without reference to the government since the Peace Accords, so there were no analogues on which to base the restoration network. In such a novel environment, where the actors are improvising in new, scriptless roles, behaviors have not had time to become ritualized, so that no action is innocent of intention or meaning, and understandings need to be negotiated. Institutional ambiguity is present, as are multiple meanings. "Network governance is performed", according to Hajer & Versteeg (2005:342).

#### **Performing Environmental Governance**

From a podium resplendent with Bird of Paradise flowers in the Grand Ballroom of San Salvador's Crowne Plaza, the flamboyant Environment Minister, Herman Rosa Chávez, rolled out the lynchpin of the nation's new environmental policy: the restoration of ecosystems and landscapes. The date, 8 July 2011, fell in the middle of the United Nation's International Year of the Forest, the significance of which was made clear by prominent use of the institutional logo on the agenda (Figure 5.1). The minister addressed a forum that a consortium of local and international environmental nongovernmental organizations had convened to consider mangroves, a particular kind of biome and landscape with which El Salvador was especially endowed. Entitled "Mangrove Restoration: The challenge for adapting to climate change", the forum preceded a week-long workshop dedicated to a particular method of restoration based on hydrology and ecological principles, Ecological Mangrove Restoration (EMR), in the Lower Lempa region where mangroves are iconic but heavily degraded. It was a happy coincidence that the minister was present. The day before, his assistant had scheduled him for a press photograph, planting mangrove seedlings in a swamp outside the city. He had agreed on one condition: "Only if it doesn't get my shoes dirty". Unable to meet his impossible demand, the resourceful assistant proffered a flyer for the forum. Rosa Chávez immediately seized the opportunity to make the moment his own. Less than 24 hours later, he inaugurated the forum and approved the new restoration policy. Thus, he set in train the opportunity for new governance arrangements, and the possibility of new landscapes; all in impeccable wingtips.



**Figure 5.1.** Rosa Chávez inaugurates the mangrove restoration forum. San Salvador, 8 July 2011.

Governance, a broad term covering a range of regulatory, decision-making and knowledge-circulating networks, is present in political and economic relationships at scales from the global to the local. It includes the state, markets, civil society, and individuals as self-regulating consumers. Several recent reviews emphasize the need to clarify which of several definitions of environmental governance is under consideration (Jordan et al. 2005; Jordan 2008; Lemos & Agrawal 2006; Bridge & Perrault 2009). Jordan et al. (2008:478) specifically identify governance as a change in the way that policy-makers achieve their goals, allowing non-state actors to "do more societal coordination for themselves". Bridge and Perrault (2009:476) consider "environmental governance" to be a carrier for disciplinary and ideological differences that reflect the disposition of the interlocutor as much as contribute analytical value to discussion of the organization of environmental actions. Lemos and Agrawal (2006:299) interpret environmental governance more expansively and propose "there is no escaping it for anyone concerned about environmental outcomes."

Environmental governance is, as Jordan (2005:492) suggests, one endpoint of a continuum of types of governing, but it can accomplish more than a static, twodimensional model permits when intermediate hybrid possibilities are included (Figure 5.2).

#### **HYBRIDS**



#### **HYBRIDS**

**Figure 5.2.** Hybrids along the government/governance continuum. From Jordan et al. 2005.

Lemos and Agrawal's more complex triad of state, market and community teases out a more structural dimension, but one which does not capture the dynamic nature of negotiating environmental governance, nor allow for different kinds of states, markets and communities (Lemos and Agrawal 2006:310). Li engages with this simplification in the context of community forest management schemes. Subjects who do not fit normative ideas of membership in idealized communities through their refractory practices or attitudes (cutting down trees, selling land) are excluded from the discussion (2007b:271). Bridge and Perrault's typology complicates the conversation, more in Li's direction, since nature's materiality, human psychology, and power relations, as well as

the classical institutions of state and market are important considerations in analyzing environmental governance (Bridge & Perrault 2009:491-2).

Hybrid governance networks involving state and non-state actors are therefore better suited to the problem-solving and crisis management called for by the complexities of climate change and environmental degradation in a way that the state, acting alone, is not. "Soff" or "hybrid" governance allows for novel semiotic strategies, or performances, that employ subtle coercive methods using symbolism and discourse to affect compliance outcomes rather than enforcement (Brannstrom et al. 2012). In this hybrid zone, subjectivities are manipulated into being, and individuals gradually assume identities consonant with messaging from outside their particular sphere of existence. The work of being a subject is done through the subject without coercion from a sovereign state (Foucault 2008).

In El Salvador decentralization through structural adjustment programs in the 1990s devolved *de facto* environmental management to local communities and the private sector, therefore resembling the governance end of the spectrum (Figure 5.2). As Wisner (2001) observed in an analysis of the conditions of disaster-preparedness in El Salvador following Hurricane Mitch, lack of central coordination, a disengaged legislature and weak municipal and regional government had opened space for local and international NGOs and a variety of social movements to develop networks of environmental governance. Hajer and Versteeg (2005:345) suggest that "the setting and staging of governance networks are key to understanding their dynamics". Actors adjust

to each other under initial conditions of improvisation with shared goals but not clearly defined rules.

As the 8 July 2011 moment involving the Environment Minister tells us, environmental governance is more improvisational than scripted and determined. The development of restoration governance in El Salvador came about through the serendipitous interplay between international experts with local civil society networks. The opportunistic endorsement of a restoration method, EMR, by the state came at a critical juncture in gaining political support for the national environment policy, with its promise of attracting global climate change financing. This method became the metonym around which a discourse coalition was formed for restoring, repairing and mitigating the damage that exploitation of natural resources under hierarchical, rightwing rule had inflicted on the people and environments of El Salvador (Hajer 1995:20).

Most recent scholars of global environmental governance including Biermann & Pattberg (2008) concur that there has been a shift in institutional arrangements, actors involved, and power flows since the Commission on Global Governance of 1995, where global governance was defined as "formal institutions and regimes empowered to enforce compliance, as well as the informal arrangements that people or institutions have agreed or perceive to be in their interest" (Duffy 2006:130). Although climate governance has earlier roots - Jordan's analysis begins in the 1970s - I prefer, with Hajer (1995:1) and Bumpus & Liverman (2011:203), to take the symbolic event of the United Nations Climate Change conference at Rio de Janeiro in 1992 as this marks the beginning of the UN Framework Convention on Climate Change (UNFCCC) and signals

the beginning of global efforts, continued in Kyoto in 1997, to negotiate the reduction of greenhouse gas emissions that have characterized UN Conferences of the Parties every year since. Rio was held in the spirit of beginning a new era of integrated effort to address ecological crises, and marks a substantive change in international organization around environmental issues.

There are pitfalls to be avoided that the broad terrain of governance encourages. Jessop (1995:318), for example, warns against "floating eclecticism". Therefore Jordan's binary will be used as a starting point to anchor the analysis of how the various actors, or to use Li's phrase, parties to the assemblage, coordinated themselves in pursuit of the goal of mangrove restoration for climate mitigation.

# **Applying Jordan's Typology**

Governance encompasses the networks of state, public, private and voluntary organizations engaged in processes of social steering towards realization of shared goals. In Jordan's typology government features visibly in three of the cells in Table 5.1. In actuality, since government regulations are necessary for the functioning of society, it is present in all four. Obituaries for state government are premature. Government has been shown in work on payments-for-ecosystem-services (PES) to be essential to the functioning of pioneer carbon forestry markets in Mexico and Costa Rica, and there is no reason to suppose that those modeled on them in the REDD-Readiness program would not follow the same pattern (McAfee & Shapiro 2010; Fletcher & Breitling 2012).

It is at the level of individuals where Jordan's analytic starts to look problematic. Where there is a revolving-door between government, industry and influence, as in the case of Herman Rosa Chávez and Deborah Barry between PRISMA and the

|--|

	Government determines societal <i>goals</i>	Society determines its own <i>goals</i>
Government selects policy <i>means</i>	GOVERNMENT is STRONG	HYBRID
Society selects policy means	HYBRID	SOCIETY is STRONG

Environment Ministry in El Salvador, the same individual can at different times be with the state, within a community, or take their expertise into the market. This blurs what is being represented by the terms. Similarly, at different moments aspects of a policy, for example that of EMR for REDD-Readiness, could go into either of the hybrid quadrants and at some points into the Strong Government or Strong Society quadrant depending on which key actors, for example government staffers or think-tank advisors, were working on it. The Salvadoran example offers an excellent opportunity to show how and why these hybrid governance networks develop, but also how unstable they are through time. As Hajer and Wagenaar (2003:1) observe "it is these often transient and informal arrangements that produce solutions; not conventions among states, directives or authoritarian decisions." An examination of the processes whereby EMR became incorporated into the Salvadoran PREP program, and then moved beyond into empirical practice, reveals just such an informal arrangement, and is discussed in the context of knowledge authorization and circulation in Chapter VII.

**Table 5.2.** Governance typology for El Salvador. Goals, and means of achieving them, in which EMR features, from Jordan 2005.

GOALS	STATE	SOCIETY
Restoration for climate	PREP launch	
mitigation goal	12 May 2012	
MEANS		
Funding	USAID/World Bank	
Technical protocols	EMR	
Vulnerability goals		Flood mitigation
MEANS		
Funding	MARN	EcoViva
	FIAES	
Technical protocols		EMR
Livelihood goals		PLES
MEANS		
Funding	PACAP (MARN)	EcoViva
Technical protocols	EMR	EMR

El Salvador provides an excellent opportunity to see the possible variations of governance that exist as the actors negotiate the terrains of goals and policy (Table 5.2). The work of other human geographers who have studied restoration from an environmental governance perspective is summarized in Table 5.3. The recent literature includes several categories of analysis that add to Jordan's simple binaries of state/non-state and policy means/ends. For example, all are bounded within a legal-legislative

framework; for Robertson and Lave the U.S. Clean Water Act forms the critical context, while for Lansing and Beymer-Farris the UN-FCCC frames the context. The kind of restoration activity introduces both materiality and territoriality into the discussion, which determine the kind of technical expertise called upon to conduct the restoration. In the case of wetland mitigation banking (Robertson) and streams (Lave) there is a considerable expert input from environmental engineers, whereas the more passive forest restoration strategies employed in Lansing's Costa Rica study and the fallowing schemes in Beymer-Farris's work in the Rufiji Delta of Tanzania require spatial auditing by GPS experts. In both cases natural regeneration following removal of human disturbances is the chosen method, requiring a different set of performance measures to evaluate effectiveness. All activities seem to be fraught with the dangers of over-simplification and errors in execution, particularly in the process of measurement, reporting and verification (Robertson 2006, 2011).

A comparison of political ecology approaches to environmental restoration is fruitful (Table 5.3). The Salvadoran case uses the same research methodologies of local informant interviews as Lansing in Costa Rica (2011, 2012) and Beymer-Farris in Tanzania (2012, 2013) Interviews also generated key data for Robertson (2006, 2013) and Lave (2011, 2012) in the United States. There is nothing in the research methodology that would bring about the diversity of conclusions regarding environmental restoration.

Both Lansing and Beymer-Farris use the UNFCCC legislative frameworks in their analyses, yet arrive at divergent conclusions from those I draw here on the social

Legislation	Robertson 2006, 2013 Clean Water Act CWA 1977	Lave 2011, 2012 Clean Water Act CWA	Lansing 2011, 2012 CDM/ UNFCCC	Beymer-Farris 2012, 2013 REDD/ UNFCCC
Activity	Wetland mitigation banking	Stream restoration	Carbon forestry offsets	Mangrove REDD- Readiness
Technical	Mitigation	Rosgen's	NGO auditors	WWF
Expertise	Bank Review Team (MBRTs)	Natural Channel Design (NCD)		
State Agencies	EPA, USACE, regulatory agencies	EPA, Forest Service	MINAE, FONAFIFO	Forestry & Beekeeping Division (FBD)
Funding	Public, Private:	Public, Private	World Bank, Govt. of Japan	Govt. of Norway
Civil society actors	Developers	Local groups	Women's coop, CATIE	WWF
Analytical	Political	Political	Political	Political economy;
Framing	economy;	economy; STS;	economy;	resilience ecology;
	STS; Regulation theory	Bourdieu, field theory	STS; Callon, performativity	Holling

 Table 5.3. Political ecology approaches to environmental restoration.

justice of REDD projects. Both Costa Rica and Tanzania have state systems that take pride in their progressive policies and regulate accordingly, and in the case of Tanzania, a long history of "high-modernist" social programs (Scott 1998) which foreshadow the proposed evictions from the Rufiji Delta for REDD-Readiness. The establishment of the Biosphere Reserve in 2008 would have been the moment, under the ARENA government, to raise the issue of evictions from the Lower Lempa to fulfill conservation goals, but these were never attempted, and would never be considered by an FMLN administration. The strength of the non-state actors in the form of the Coordinadora and Mangle, with financial backing from FIAES and by extension, the United States, suggests that the inhabitants of the Lower Lempa are territorially secure at the moment. It seems that it is not REDD *per se* that is the menace, but rather the kind of government putting REDD policies in place, and the relative strength of the non-state actors who fill the spaces not occupied by government, in ordering the lives of the rural poor.

The analytical framing of the different studies reveals a political economy approach in all of them, and a science and technology studies approach in all but Beymer-Farris' research. Different theorists inform all the analyses. Lave provides the most readily comparable restoration formula to the EMR used in El Salvador, as the Rosgen stream channel classification has been turned into a portable, numbered system. They differ in specificity. EMR has six protocols, none of which provides detailed instructions as to how to carry out mangrove restoration, whereas the Rosgen training method provides each individual taking the training courses with a standardized package of guidebook and rules. There is an unknown "success" rate, however defined, for either technique, but Lewis indicates that the majority of mangrove restoration efforts undertaken by participants in EMR training are unsuccessful, largely due to inadequate attention to one or other protocol. I took Lewis's EMR training in Mérida, in August 2011, and can offer the observation that it is case-specific, offers guidelines for how to proceed, but does not spell out how to approach a single case. Characterizing the "normal site hydrology of the region" (Table 5.4) is a massive endeavor, as is understanding the community ecology of a region, if scientific consensus could be

reached on either. Riparian streams in the American west provide the template for stream restoration throughout the continental US under the Rosgen system, a generalization Lave notes is troubling. EMR has not become hegemonic in the same way, because although Lewis is one of the few practitioners with international

**Table 5.4.** Principles of EMR. From PowerPoint presentation by Lewis at SER workshop in Mérida, MX, August 2011.

	Principles of Ecological Mangrove Restoration (EMR) for a region
1	Understand mangrove autecology and community ecology of region.
2	Understand normal site hydrology of region.
3	Assess modifications to hydrology or added stressors causing mangrove mortality in region.
4	Select the restoration site(s).
5	Restore or create normal hydrology, and/or remove or reduce stressors.
6	Plant mangroves only as needed after following steps 1-5.

experience, he has not made his expertise as reproducible as Rosgen. The collapse of the carbon markets has delayed the MRV process that would commodify restored mangroves, so to date there is nothing to compare with the wetland mitigation banking system that Robertson has criticized, but the burden imposed on ecology as a science will be the same. Although the resource guards of the Lower Lempa have retained all that they learned during the workshop in Romero in July 2011, the impreciseness of the

language and lack of a cookbook approach has meant that EMR became *la técnica REM* without any violation of its tenets, simply on a technicality of interpretation of the phrase "normal site hydrology of the region". This is addressed in more detail in Chapter VII.

The consequences for governance are not yet clear, but once the EMR six-point protocol is in the hands of a practitioner, there is no legal reason why it could not be modified, adapted and appropriated by others, at no cost, and certainly no financial benefit either to Lewis or MAP.

The market was a prospect rather than a funding reality for PREP in El Salvador between 2011 and 2013. The absence of functional regional government collapsed the distance between government at the state level, and governance at the local level, yet the number of elements unaccounted for in this simpler picture, particularly regarding finances, called for a more accommodating analytic to make sense of restoration governance than moving a point back-and-forth along a continuum. Li's analytic (Chapter I) for analyzing the practices involved in maintaining the heterogenous elements necessary for governing provides a useful way of approaching the way that PREP came into being in El Salvador.

# Li's Analytic

## **Rendering Technical**

The governance of climate change has been made into a global concern, quite often couched in language of a collective-action problem, even as the conceptual underpinnings are contested, ambivalent and regionally specific (Hajer 1995, Demeritt

2001, Liverman 2004, Ostrom 2010). The global institutional response to climate change has been ritualized through annual meetings arranged under the auspices of the United Nations Framework Convention on Climate Change (UN-FCCC). This body is predicated on membership by strong-nation states governed by formulaic rules. Climate change has been rendered by numerous UN-FCCC committees, conferences and consensuses into a problem of such universal import and impact that global interventions (mitigation) are necessary to combat the by-now unavoidable deleterious effects (adaptation). In the formulation of PREP, El Salvador embraced the canon of the UN-FCCC and framed (a) the many environmental problems accumulated over the years of slope deforestation, soil erosion, groundwater contamination and biodiversity loss through (b) ecosystem and landscape restoration into (c) local adaptation to the climatic extremes that were costing the nation so much (the figure found on p. 98, Chapter IV). This ambitious framing led to difficulties in funding and implementation, which were further complicated by the agendas of non-nation-state actors (NNSAs) (Okereke, Bulkeley & Schroeder 2008). In the search for funding for its "mitigation based in adaptation" program, El Salvador was compelled to return to the very sources it was trying to replace: USAID and the World Bank in order to ready itself for other funding streams, as we shall see in the next section.

## Authorizing Knowledge

The Asian tsunami of 2004 affected policies of the large international agencies towards the hitherto rather obscure formation of salt-tolerant trees and plants, known

individually and collectively as mangroves. Attributed erroneously with life-saving wave-attenuation properties, mangrove planting along exposed coastlines became the international agencies' favored response during post-tsunami reconstruction efforts (Feagin et al. 2010). The Food and Agriculture Organization (FAO) was particularly enthusiastic about planting legions of mangroves in front of fishing beaches (Braatz et al. 2007). Yet as the spotlight receded, so did the waves, washing away the mangrove plantings with them. A small US-based non-governmental organization with an office in Krabi, Thailand, the Mangrove Action Project (MAP), adopted a mangrove restoration technique developed by a botanist from Florida, Robin Lewis (Enright 2012). Lewis's technique, ecological mangrove restoration (EMR), follows six basic principles which favor hydrology, autecology and community involvement (Table 5.4). The third of these is to determine why, at a given location, there are no mangroves present. If the answer is that the location is basically unsuitable, the prospective planter is advised to proceed with caution (Lewis 2005). Another key point is that local communities must be the focal point of restoration in terms of need, labor and maintenance. It is a simple enough prescription, and is available in poster-form in a number of languages, including Thai, English and Spanish (Figure 5.3) at the MAP website

(www.mangroveactionproject.org). The program and policy director of another USbased non-profit, which works almost exclusively in El Salvador, Nathan Weller of EcoViva, attended one of Lewis's workshops on mangrove restoration in Florida. Weller contracted MAP to conduct a similar one in El Salvador with a local extension NGO,

Asociación Mangle. The workshop followed the July 2011 forum mentioned above, at which MAP's Thailand director, Jim Enright, was the keynote speaker.

Such was the success of Enright's presentation on EMR in Thailand, in fact, that Rosa Chávez whisked him back to the Environment Ministry immediately after the forum to deliver it again to his staff in the presence of the head of FIAES, Jorge Oviedo, who had sponsored the forum and was originally slated to be the inaugural speaker until the Minister's surprise decision to participate. FIAES is a conduit for USAID and the main donor agency that had underwritten earlier mangrove restoration efforts in El Salvador, most of which had failed for the reasons that Lewis cautions against, namely



**Figure 5.3.** Spanish language version of EMR. Brochure produced by Mangrove Action Project.

planting where no mangroves could survive, or where local communities had no vested interest in their survival (Interviews 1-8 and 13, 2012). Countless hours and dollars of futile effort are amply documented in cheerful agency photo-ops of well-dressed volunteers and FIAES staffers planting mangrove propagules in serried rows along tidal mudflats (e.g. Weller 2012). The Minister took Oviedo publicly to task for his support of unscientific restoration techniques, and reminded him that Lina Pohl, the Viceminister of the Environment was the titular head of FIAES, from whom he should now take instruction on mangrove restoration. Surprised again by Rosa Chávez, Oviedo graciously acknowledged that "mangroves are at the heart of ecosystem restoration in our national territory" and ostentatiously penciled notes to himself, while the rest of the room fidgeted uncomfortably. At this point Rosa Chávez turned to his right and addressed me in English: "Nothing is innocent!" He elaborated in Spanish:

We are correcting the logic that USAID runs the country; they have veto power. Now we are formalized with a new logic. This particular program is where we chose to re-align.

This moment clearly signals a change in the governing structure, reflecting an attempt to move back towards the state the direction of policy goals, and thus relocates this study in the upper-left quadrant of Jordan's schematic – strong government, albeit temporarily. Absent other sources of funding, USAID and the NGO sector continued to provide financing for mangrove restoration during the course of this research.

The following week in mid-July 2011, MAP's Director, Alfredo Quarto, also in El Salvador for the workshop, was invited to deliver the same message of EMR and its successes in southeast Asia and elsewhere to a joint meeting with the Viceminister and newly crowned head of FIAES, Lina Pohl, the Minister for Agriculture and members of a regional environmental think-tank, PRISMA. Rosa Chávez headed PRISMA for years before joining the government, indicative of the porous boundary between state and nonstate actors.

The Viceminister, Lina Pohl, held an open-air press conference at the site of El El Llorón in May 2012, after the execution of the pilot mangrove project using ERM which Mangle had overseen. She cited the success of MAP's results in Indonesia, which she had learned of at the meeting in July 2011 at the Environment Ministry, to justify the use of the novel technique of mangrove restoration, la técnica REM in the Lower Lempa (Miranda, *El Diario*, 12 May 2012). It was an unusual visit, since she had not spoken publicly about mangroves before, and had not been visible in the Lower Lempa, although she had spent time higher up in the watershed talking about riparian canopies. She leant on the scientific authority implicit in the term "ecological" to show that the FMLN government was not engaged in false job creation, even though it provided paid work, but instead supported a political agenda for land use which had intrinsic ecological value. Under the Environmental Law (Chapter IV), each citizen has the right to an ecologically balanced environment. It seemed from her public endorsement and careful defense of the protocol that *la técnica REM* had become official policy. MARN's press releases are carefully scripted affairs; nothing is innocent.

The legitimating power of science was clearly invoked by Viceminister Lina Pohl, whether or not prevailing scientific opinion would have shared her seeming confidence in anticipated outcomes at El Llorón. The body of work from which she derived her legitimacy was generated by, amongst others, the eclectic group of international mangrove experts I interviewed at the Society for Ecological Restoration meeting in Mérida in August 2011. In the words of one expert:

The truth is we spend more time and money doing bad restoration than good restoration. And I would estimate, just my guess, that 50% of what we call mangrove restoration is totally wasted. (Interview 3-2011)

He would have endorsed the adoption of EMR as a restoration technique in El Salvador if the six steps in Table 5.4 were followed. Goldman (2011:203) asks whether the same rules of conduct apply when scientific knowledge constructed by experts for global consumption is circulated to non-scientific spaces where it is applied in local contexts. The mangroves of El Salvador are not completely non-scientific spaces, but they come close. US-backed government forces decimated the universities during the Civil War, and in 2011 the only staff member of the Marine Sciences and Limnology Department of the University of El Salvador was a lawyer, dedicated to the joyless task of denouncing environmental law infractions to overburdened authorities in all eight coastal departments (Wilmot fieldnotes 2011). The few scientists located during this research with expertise in marine or coastal ecology struggled to survive as consultants dependent on short-lived international programs (for example PACAP within MARN, and the

Central American Commission on Development, CCAD), or taught applied courses in regional technical colleges such as MEGATECH, Inc. The few documents which reflect their work are self-published and not peer-reviewed; none deals explicitly with mangrove restoration. Thus Viceminister Lina Pohl was compelled to use the authority of external experts in support of the policy of ecological mangrove restoration for climate mitigation, rather than academics from Salvadoran universities.

Both international and domestic experts, as revealed in interviews in Mérida in 2011 and El Salvador in 2012, shared with Pohl and Rosa Chávez support for strong environmental government. In the words of a mangrove scientist, educator and NGO activist from the Philippines:

NGOs represent a failure of government. These fisherfolk have needs which the government does not provide. If the government would meet their needs, NGOs would be out of business. (Interview 1-2011)

A government scientist and member of the International Scientific Working Group for the UNFCCC from Kenya offered these thoughts on the role of government for the future of mangroves:

Mangroves are very degraded. In the medium- and long-term, if there will not be change, if governments will not affect change, global change, the future is very bad. It comes from governments. Now – luckily mangroves have been included – initially they were not included, now there is REDD. (Interview 2-2011)

They felt that the state holds ultimate responsibility for setting the ends and means of environmental policy with regards to mangroves; that is, they represent a strong government-centric notion of environmental governance (per Jordan's definition), which includes enforcement of existing regulations. This is perhaps not surprising coming from the relatively structured world of government science and academia, dependent as they are on public funding and institutional support, but according to an independent consultant:

You don't get any place without politicians, not only supporting the passage of laws, but they also have to support passage of enforcement. (Interview 3-2011)

More concretely, from an NGO administrator in El Salvador:

I believe the government should, first of all, arrange conditions, management plans, lines of coordination, supervision, monitoring and concessions as well as administration. And the government should pay for the programs. It's political. (Interview 8-2012)

The theme of government shortfalls in the Salvadoran context resonated particularly with the resource guards who provided both local knowledge and expertise of mangroves and attempted to fill the void of law enforcement where resource use was concerned.

#### Aligning Government and Society

The government represented by the Environment Ministry was only able to fulfill a limited role in bringing EMR from the experts to the field due to the lack of manpower and finances, following the pattern for decentralized environmental governance summarized with brutal honesty by Lemos and Agrawal (2006: 302): "Many nation states no longer have the resources to manage their environments." This hiatus was filled in part by the aid agencies, for whom the biosphere triad of conservation, sustainable development and education were all compatible goals:

I see myself as a bridge for knowledge between the communities, the leaders, the processes to the places. I see myself being an instrument to carry understanding to others, to motivate others. And I believe in *la técnica REM* as a strategy to restore forests in El Salvador. And it can be done. And we've done it! We've done it! (Interview 5-2012)

Others recognized the contingent difficulties of decades of under-investment in education, but also saw their role as teachers and communicators of more complex issues to the people who lived from the mangroves, in particular young people:

It's our obligation as academics to talk of the subject of mangroves, of rehabilitation, of conservation of mangroves. Because it's the position of young people, who are the future that will make a change, a generation with a better attitude than the adults who aren't capable of making these changes. (Interview 7-2012)

The Environment Ministry contractor, a marine biologist with perhaps the most experience of anyone working in mangroves in El Salvador, saw his role in mangrove restoration as a member of the public, and reflected:

As a citizen, as a Salvadoran citizen, I've never seen it as different to any other impact on the ecosystem or at the species level. With respect to restoration, as a marine biologist, the impacts are positive, they bring benefits as much to biodiversity as to the communities that exist in the territory. (Interview 13-2012)

The funding organization connected the global with the local, seeming to bypass the government role, perhaps because the Environment Minister had changed the "logic" of direct dependence on USAID funding so publicly in the post-forum meeting:

The case that occupies us today, which is the Bay of Jiquilisco, it's a RAMSAR site, and a biosphere reserve. Because of that I believe it has all the international qualifications to capture external financing to strengthen its conservation processes. (Interview 6-2012)

The positions adopted by the actors indicated that they all had flexible boundaries that were open to individual interpretation, a situation more likely to occur under circumstances of "soft" governance than state-centric command-and-control. Brannstrom et al. (2012:357) advance the critique put forward by others that initiatives such as this "are short-term, ineffectual and strategically crafted...calculated to maintain existing power relations." It is worth noting that power relations between the state and the funding agency, as represented by money flows, remained the same during the research period due to shortcomings of the Kyoto process. What changed was the discourse coalition which developed around the anglicized term EMR, and expanded with the hispanic *la técnica REM*. This transition was facilitated by the legibility and reproducibility of the six-point pictorial Spanish language brochures distributed at the 2011 workshop (Table 5.3 and Figure 5.3).

#### **Reassembling EMR**

No-one can say definitively why there was a 70 hectare patch of dead mangroves at the end of the El Llorón channel in 2011. At the time of the workshop there were three feet of sulphurous-smelling water standing on the site with belly-up fish, indicative of a sudden recent change in water chemistry. The individual at Asociación Mangle most directly involved with mangrove restoration claimed that the mangrove die-off was a result of the 2001 earthquake which elevated parts of the area, coupled with sedimentation of the channels from the Lempa floods, causing freshwater to pond in the lower elevations and kill the mangroves (Carlos Barahona, personal communication, 2011). Another person with extensive experience of Salvadoran mangroves attributed the die-off to geomorphological changes resulting from Hurricane Mitch in 1998 (Interview 13-2013). Local people indicated that in the dry season it dried out, and individuals coming in to collect honey set fire to the trees, thus killing them and giving the area another name *El Quemado*, the burnt place (Figure 5.4) (Interviews 1, 3, 2012. MR-1-

2013). Previous attempts funded by FIAES to plant mangroves had resulted in failure, due primarily to insect infestations (Interviews 5-2012, 9-2012, 13-2012).

What was certain was that the local communities in Las Mesas regarded the loss of the mangrove area at El Quemado as detrimental to their livelihoods, since it had been a valuable source of crabs and shrimp both for household consumption and resale (Interviews 1-6- 2012, 9-13-2012). FIAES had tried to resuscitate it earlier, as noted, and not been successful. Mangle as the *de facto* extension agency heard regularly from the communities about the need to do something, so that the intervention through EcoViva



Figure 5.4. El Quemado. Dead mangroves in the dry season, July 2011. Photo: Mangle.

to bring the ERM workshop to El Salvador and train local people in mangrove restoration was viewed very favorably by both Mangle and FIAES. The Environment Ministry was just the final institution to line up behind the restoration of El Llorón.

Following the EMR workshop FIAES and PACAP coordinated through Mangle to implement their newly-gained knowledge, which they called *la técnica REM*, to clear out the El Llorón channel back to its juncture with Canal Izcanal, and thus the mouth of the Lempa River. The work was carried out in January-March 2012 by the 30 or so persons called *rescatistas* from the communities of Las Mesas (Chapter II), under the supervision of a contractor with construction experience gained in the United States, funded through FIAES for \$11,000 by the USAID debt-for-nature agreement.

In late 2012 the Environment Ministry, using knowledge of *la técnica REM* as a criterion for awarding contracts, opened a Request for Proposals (RFP) which was targeted at those who had participated in the mangrove restoration workshop in July 2011 and the restoration at El Llorón. The following quote from the RFP (undated, obtained from Asociación Mangle in January 2013 while projects were underway) for two different sites, Borbollón and Espino, shows in italics the determining language:

# PERFIL SOLICITADO

- Persona Jurídica legalmente registrada.
- Con experiencia en construcción de bordas artesanales, estanques acuícolas, apertura de canales en bosque salado y limpieza de canales.
- Experiencia de 2 años en acciones de la técnica de Restauración Ecológica de Manglares (REM), anexar comprobantes.
- Con presencia, trabajo en la zona y conocimiento de las comunidades.
- Referencias de trabajos anteriores con su respectivo finiquito en este tipo de servicios anexando comprobantes.

This translates as:

## DESIRED PROFILE

• legally registered person

This is a person or organization that has been officially sworn in by a high level government official or judge to represent the interests of others in a community. In this case either the Environment Minister or more typically the Viceminister conducts the ceremony. An official personal registration document, DUI, is needed to qualify.

• experience in hand-construction of levees, aquaculture tanks, digging canals in salty forests [mangroves] and cleaning canals.

These are all skills common in the communities of the Lower Lempa where repair of the levees along the River Lempa are annual events and shrimp aquaculture is a source of employment. Clearing canals refers specifically to work undertaken at El Llorón – this kind of work had not been carried out since the closing down of the cotton estates during the civil war.

• Two years of documented experience in REM

Thirty people participated in the workshop, over half of whom came from agencies based in the capital city. None of the agency staff would be considered 'legally registered persons'. This singled out the staff of Asociación Mangle while making the RFP seem competitive, a practice common in US government agency RFPs (personal experience).

- Presence and work in the region and knowledge of the communities.
   Self-explanatory, but reinforces other requirements.
- References from previous work, with final labor costs

This would require knowledge of the costs of the work at El Llorón (~ US \$11,000), which was publicized in the national press, *El Diario de Hoy*, 12 May 2012.

Mangle controlled *la técnica REM* by the end of 2013. It did this primarily as the conduit FIAES and MARN used to pay the workers (Figure 2.3, Chapter II), but also through the practice of performing what had been learnt at the EMR workshop held in Romero in July 2011 at El Llorón in 2012. It thus became the source of local expertise through its control of knowledge diffusion throughout the region, a phenomenon taken up in Chapter VII. It was also, as we know from its position as the extension agent of the Coordinadora, the place where people turned naturally for technical information and environmental advice. This control was inevitable: Mangle had overseen all the restoration projects in the Lower Lempa; staff had re-written the six-point brochure into a technical manual for local use; and one of its employees had presented the results at the 5<sup>th</sup> World Conference on Ecological Restoration held at Madison, WI in October 2013 (Argueta 2013). Funding continued through FIAES, EcoViva and other non-profits for restoration projects, including one in the newly formed Coordinadora of Puerto Parada in central Jiquilisco Bay, which modeled itself on Lower Lempa, including the use of resource guards to oversee community uses of mangroves. They are perhaps the only community group with as much passion for problem-solving and caring for the resources as the thinly-stretched employees of Mangle. The resource guards connect the

larger world of environmental governance with the communities that live in and near to the mangroves of Lower Lempa.

Eight men were employed at one time or another as resource guards to patrol the mangrove areas of the biosphere reserve in the Lower Lempa during 2011-2013. Employment was not continuous, and funding sources changed over time, so that at any given moment there might only be two people fully employed, with some others working voluntarily. The work was originally voluntary until funding for the guards at the RAMSAR sites and biosphere reserves was provided by FIAES in 2009 for MARN, after which there was "a change in the politics" (Interview 6-2012). Thereafter it was a mixture of funds paid through Mangle from MARN for two guards and a number of NGOs (EcoViva, Ayuda en Acción, MAP) for the rest when money was available (Roundtable MR-I-2013). Regardless of payment status, when on patrol all the guards wore khaki clothes with a mixture of logos representing the patchwork of funding institutions, and most importantly carried the long slender Salvadoran machetes in embossed and tasseled leather sheaths (corvos con vainas), a symbol of authority (Figure 5.5). One man cycled for an hour each way on the potholed road from Ciudad Romero to Las Mesas to join his companions on patrol (Interview 10-2012), but they were otherwise community leaders from Las Mesitas, Los Cálix, San Juan del Gozo and Montecristo.

Their work involved educating their communities about best harvesting practices and reminders about extraction limits, and more confrontationally dealing with outsiders from the other side of the river who regularly stole their personal property, took crabs
from closed areas and illegally fished with explosives in their creeks (Roundtable MR-I-2013, MR-II-2013). The community of Montecristo at the mouth of the Lempa River built a guard post on the water at the confluence of two creeks which is manned



**Figure 5.5.** Mangle logo and resource guards. The man second from the left was not actively patrolling at the time. (Photo on the left by Christian Brannstrom)

every night by two volunteers with two-way radios to contain the problem of theft from neighboring Jaltepeque Estuary. When the road was constructed from the coastal highway down to the Lower Lempa after the Peace Accords in 1992, outsiders from as far away as La Unión to the east came with pickup trucks and logged mangroves and poached the remaining deer and game from the area, a practice which provided the impetus for establishing the biosphere reserve (Roundtable MR-I-2013). The guards have no legal ability to make arrests or serve warrants. Their only recourse is to call the local police in Jiquilisco, nearly two hours away by road or file a complaint with the beleaguered employee in the MARN office in Usulután. A constant preoccupation is the lack of a court system to deal with environmental crimes (Interviews 3, 9-12, 2012; Roundtables MR-I and II, 2013). The laws exist, but as the international experts noted in the preceding section, enforcement is the sticking point. The guards are always hoping for more resources to help them out:

We, the resource guards, work in a very large area, because that's who we are. Patrolling in the afternoon from one until five, that's tough. We need more trained people so that we don't have more serious conflicts with the transgressors. When we're together they don't do anything to us. (MR-II 2013)

The transgressors are not always from outside the community either. One local grandee returned from the United States with enough money to make life so difficult that the guards feared to confront his cattle running through the mangroves, to the point that they held a meeting to discuss the matter in an open-air chapel, ostensibly while looking at a flipchart presentation on the (by then out-dated) management plan (Figure 5.6). If the larger law-breakers can buy their way out of trouble at the ministry level with lawyers in the capital and threaten community-based enforcement efforts with personal violence, it makes it difficult to keep the smaller offenders in order (Roundtable MR-II-2013). Mostly though, their authority comes from their position in the community as individuals who are knowledgeable, fair and dedicated to caring for the mangroves on which so many households depend.



Figure 5.6. Open-air meeting. Los Cálix, July 2011.

Their expertise comes from lived experience, as all are competent boatmen, fishers and crab catchers. They also have some experience as parabiologists and have collected plankton data for the University of El Salvador (Rivera & Cuéllar 2010). Given their age range (25-65), some have lived most of their lives in other places, in fact only one is a native of Lower Lempa (Interview 12-2012), and their educational opportunities reflect this. Two are unable to read or write beyond signing their initials, and one has a Master's Degree in sociology from the Lutheran University in San Salvador (Interview 9-2012). Their language reflects this variety of experiences, mixing local idiom with their enthusiastic embrace of EMR and the vocabulary of ecology – they live in the "mangrove ecosystem" of the Bay of Jiquilisco and Lower Lempa. Most importantly, they are the conduit of information and ideas between MARN, the world of scientists and technocrats, and the communities.

Their perspective reveals connectivity at many spatial scales, and the guards are fully aware of the geography and the politics of the region, as one of them put it:

About the ecosystem I mentioned, at the level of Jiquilisco and this sector, the problems aren't just local. I consider that different actors from the communities, the municipalities, the NGOs and the government should be involved. The Lempa River flows into the sea here with all the factory trash, black water, grey water from the capital, it's contaminated with a series of chemicals and other things damaging to health, to the species, to life itself. To save this ecosystem is an effort from everybody, not just the local communities. (Interview 9-2012)

This particular comment could have come from the Environment Minister, or indeed any landscape ecologist thinking at a watershed scale. Rosa Chávez would probably have nodded in agreement with the following suggestion tacitly in support of funding through REDD+:

There's a project. It ends. And then who maintains what they've done? We've given the Ministry permission to look for international funds. But the problem comes when there's another Minister. Another government comes, and what do they do? Things look bad. (Roundtable MR-I 2013)

Nor are the resource guards as phlegmatic about the "change in politics" mentioned above which sacrificed funding from USAID on the altar of nationalism. Their very boots and bicycles come from a Spanish wildlife NGO, and not their supposed employer,

the Salvadoran government. Yet they understand that despite the rhetoric from the Ministry about environmental problems and especially contaminated waterways ("all 360 rivers in the nation but one in La Unión are contaminated," according to MR-I 2013), there is nothing that the Environment Ministry can do without money:

The subject of climate change, when they put together the national budget, the Environment Ministry is the one that gets the least resources. It's the system. (MR-I 2013)

The lack of support was not just a difficulty encountered with the FMLN government:

The problem is with all the governments, with ARENA (the previous right-wing government that FMLN replaced in 2009), they weren't interested in the environment. There are some organizations that understand, and they're the only ones that invest in this place, they put money in. I worked for a whole year as a volunteer before one of them contracted me. (MR-II 2013)

Neoliberal projects of decentralization are everywhere. As the mangrove expert quoted above observed, where there are NGOs the government is largely absent. Wisner indicated that in the aftermath of the 2001 earthquakes there were around 3,000 NGOs operating in El Salvador (Wisner 2001:264), a figure likely to under-represent the true number as many organizations, such as Asociación Mangle, self-identify as social movements and do not register with the government. In common with other local groups in Latin America coping with the consequences of structural adjustment programs

(SAPs) (García Linera 2008), is the inclination towards action in the face of state indifference, a talent for taking a dismal situation and turning it eventually into a community good:

The truth is, in spite of it all, all the difficulties we're in, we always try to make the people aware, to inform them of what is going on, what they need to do. In spite of it all we make the effort, the good will that I have as an inhabitant in my community with a paycheck, we take the initiative to take care of what little we have. Our work is our deed. We make the effort. (MR-II 2013)

Five of the resource guards took part in the restoration workshop and all participated in the work at El Llorón as part of their duties, mostly in the survey work before the restoration that involved the *rescatistas* but also afterwards in monitoring and showing visitors what had been accomplished. Their recall of the principles of *la técnica REM* was faithful to the original two years after the workshop (MRII-2013) even though in application they tried to use it to secure funding for other purposes, such as channel-clearing to make boat passage easier. As Lansing's example from Costa Rica demonstrates, local community leaders are key to ensuring that private-social partnerships such as those involved in carbon sequestration projects are maintained (Lansing 2012), and community-state resource management strategies (so-called comanagement by Lemos & Agrawal) depend entirely on people such as the resource guards of Lower Lempa.

#### Discussion

As the Salvadoran example shows, the initial condition of restoration governance began when a key actor, Rosa Chávez, quite opportunistically attached himself and his theoretical policy to a very concrete program undertaken by non-state actors. Having contributed nothing other than its legitimating authority to the use of *la técnica REM*, the state then brought ecological mangrove restoration in the Lower Lempa into its pro-REDD positioning at the Doha COP, without having to pay for a single expert consultation. This shifted the restoration governance network far outside its US-rural El Salvador nexus, where the USAID-funded programs supported through FIAES tended to favor generating "social capital" through equal work opportunities for women planting propagules, into the world of carbon markets where verification, monitoring and reliability called for different accounting procedures.

The situation was novel, and all the actors were improvising to some degree, particularly in terms of boundary definition. The boundary between the state and nonstate actors (Rosa Chávez and Oviedo) moved in the space of one sentence, for example, opening up new funding possibilities, and the possibility of re-working foreign policy. Rosa Chávez reminded Oviedo that he no longer answered directly to the USAID office within the US Embassy, but to Viceminister Lina Pohl as head of FIAES, a Salvadoran firmly under the thumb of Rosa Chávez. His ambitions seemed to lie in seeking funding through REDD+ from governments other than the US, although this was not an actuality during 2011-2013. The implications for the critical claims of "carbon colonialism" (Bachram 2004; Bumpus & Liverman 2011) are not immediately apparent, since funding

through the Kyoto process has not played a part in El Salvador's REDD-readiness, despite pledges from the German governments overseas aid fund, GIZ, of  $\in$ 15 million. If and when the funding materializes, the possibilities exist for the German government to insist on greater involvement in measurement, reporting and verification (MRV) of carbon offsets, adding to the complexity of restoration governance.

In a state like El Salvador where the administration of the environment for any result other than resource exploitation is barely affordable, the potential for non-state actors to fill the breach left by the state is inevitable if complete anarchy is to be avoided, so the position occupied by Mangle and the Coordinadora after 20 years of ARENA neglect was well entrenched by the time Rosa Chávez entered the Environment Ministry. There is also the potential for other institutions and national governments, in the form of development and conservation aid, to push their political agendas, a practice exercised throughout the world by the World Bank (Goldman 2005). When the state pushes back and uses its powers to re-occupy space, overt conflict can be avoided by the deployment of a common goal, deliberately constructed around a mutually agreed-upon discourse (Hajer 1995). In this case it was mangrove ecosystem restoration, using the politically "neutral" EMR, or as it became naturalized, *la técnica REM*, which in the recall of the resource guards had not changed in substance since the 2011 workshop. This was not direct competition between the state and non-governmental organizations for funding, but more like a contest in the market-place of ideologies between the neoliberal USAID model and the firmly anti-capitalist sentiments in the social movements of the Lower Lempa. At any rate, it was brought about by the failure of

previous governments to act either through regulation, enforcement or management of mangroves. The question of lack of faith in government becomes more empirically a question of lack of funding. Without government funding for programs in El Salvador, the dial moves firmly along Jordan's continuum towards the governance end. At this end of the spectrum, the practices predicted by claims of neocolonialism, the rule of force rather than the rule of law, and denial of agency on the part of mangrove restoration practitioners, are notable for their absence.

### **CHAPTER VI**

# DOING SOMETHING: BALANCING LIVELIHOODS AND ENVIRONMENTAL RISKS WITH RESTORATION

I ask you all, dearest brothers, that we look at these things in the historical moment, with this hope, with this spirit of giving, of sacrifice, and we do what we can do. We can all do something.

Archbishop Oscar Romero, moments before his assassination. San Salvador, 24 March 1980.

We are not remaining passive. We know what to do and we are forging ahead with our limited resources. *Herman Rosa Chávez, COP 18, Doha, 6 December 2012.* 

## Introduction

This chapter explores the action and meaning of "doing something" with the agency of one's own limited resources in a pilot-project compatible with REDD+ protocols. From the perspective of the Lower Lempa, the people who are "doing something" are the *rescatistas*, the workers who "rescue" the mangrove systems from a deteriorated state. REDD+ is the United Nations-World Bank strategy for climate change mitigation which the Government of El Salvador has adopted as part of its overall sustainable development strategy (MARN R-PP, May 31 2012). Bebbington (2004:726) distinguishes between development as an immanent process and development as "the stuff of international aid: public and other agencies implementing 'development' projects, programs and policies with specific ends." The tension between the two kinds of development has attracted the attention of critical scholars (Chapter I),

and led to the charges of carbon colonialism, as REDD+ brings markets in the form of credits for carbon offsets full force into forest-dependent and indigenous communities without, in many instances, adequate consultation and preparation (Bachram 2004; Bumpus & Liverman 2008; Beymer-Farris & Bassett 2012; McAfee 2013). I suggest that by operating outside the market, through philanthropy from organizations such as EcoViva and unencumbered aid, such as that received through FIAES, individuals can have "voice, autonomy and agency" in the performance of restoration work even though it is undertaken in the name of "sustainable development" (Scott 1995:192). I argue that, within the context of a biosphere reserve, to the laborers the work would be the same, the benefits the same, and the environmental outcomes the same as though the funding source were market-derived; the main difference that would exist under REDD+ is the role of the evaluator, the person who determines that the restored mangroves have become a carbon-bearing commodity to be traded on the market (Bumpus 2011; Lansing 2012). Indeed, the fact that ecosystem restoration at the sites of Espino and Borbollón Rivers was also intended for flood control by MARN, and understood as such by the rescatistas from Romero and Salinas del Potrero, makes the question of "additionality" (a prerequisite for REDD+ projects) rather complicated, if not confused.

First I analyze the natural resource-based livelihoods of the people who did the physical labor of mangrove restoration (at a rate of \$10 per person, per day). This analysis includes some of the financial obligations and necessities that apply at a household level. It does not include clothing or other consumer goods, some of which are donated and shared or reused within families. This establishes the degree to which

the *rescatistas* depend on natural resources in order to meet their cash needs, with a focus on mangrove-dependence. Second, I review their perceptions of the workplace during mangrove restoration. This includes both the physical labor and the gender relations that structured the workforce. I attend to gender to see whether the development model of rural female invisibility which Escobar (1995:172) identifies, has undergone change in the ensuing 20 years in El Salvador. Are the women as "invisible" as the forests? Hecht (2004:75) remains silent on the planters of "hedgerows, fruit trees, and extensive domestic agro-forests", although house-lot gardens are primarily sustained by women (WinklerPrins 2006). The framers of the Peace Accords in 1992 marginalized women, including female combatants, widows and female FMLN supporters, from the Land Transfer Program, although this was later rectified after women's groups organized themselves. "After the war, when their new identities threatened traditional gender relations, an attempt was made to relegate them to the private sphere and disempower them" (Luciak 2001:49). The number of female heads of household (n=10) and selfidentified joint heads of household (n=17) represented among the *rescatistas* suggests that change has taken place The numbers for the communities surveyed are elaborated on p.149. Thirdly, I examine the experiences of risk and vulnerability (from weather extremes and tectonic action) to the rescatistas in the context of their livelihoods. I suggest that the presence of the "September 15" hydroelectric dam, upstream from the Lower Lempa, which causes widespread flooding during extreme weather events, constitutes a form of discipline on the part of the state which can be construed as coercive. It is certainly viewed that way by many in the flood path of the Lempa (for

example, Interviews 6-2011; 1-4, 2012; 1,6,9 and 11-2013), even though the current government is FMLN and therefore might show more concern for downstream effects on its supporters.

This chapter relies on data from the household surveys (n=39) administered in Las Mesas, Méndez, Romero and Sisiguayo, and the roundtable held with *rescatistas* in Salinas del Potrero (n=12). The number of surveys from the hamlets (*caserías*) of Las Mesitas (n=9), Los Cálix (n=6) and La Canoita (n=2) are small; however the households are physically so close together, and nothing distinguishes them from each other in terms of physical appearance, so I have collectively termed them "Las Mesas" (n=17). This is the unit by which they are represented in the Coordinadora of Lower Lempa, and the grouping that formed the *rescatistas* at El Llorón. In daily discourse, due to the lack of street names or house numbers, people refer to the communities by their separate names, so that, for example, someone is "Juan from Los Cálix" or "Juanita from Las Mesitas". The surveys are confidential, however, so there is no need for this degree of individual identification.

## **Charity Begins at Home**

Swinging towards the screen, microphone in hand, Shaka, a personable young man, followed by a youthful jeans-clad chorus gyrated down the street pointed to the viewer as he sang "Move your heart! Help the telethon!" (*¡Mueve tu corazón! ¡Ayuda al teletón!*). Shaka y Dres are an enormously popular musical duo in El Salvador. Every year one of the television stations holds a major fundraiser for disabled children and

plays the same commercial over and over and over for weeks, and in 2013 it was Shaka y Dres' reggaeton offering. Every man, woman and child in El Salvador could sing along to it. Irene, a *rescatista* from Los Cálix, was humming with her toddler in the hammock in front of the flatscreen TV as Shaka moved to move the audience one day when I came to visit. It was late morning and her two teenage daughters stood in the doorway, also watching as they patted tortillas to put on the griddle. The kitchen consisted of a zinc roof at the front of the house over a cinder block cube with an open fire on top, and a plastic water tub on the ground under a hand-pump. Another hammock hung from the roofbeam, supplemented by a log seat and plastic chair for entertaining visitors. The small yard was immaculately swept, with tiny pink and white flowers protected from the pecking chicks by pieces of rubber tire. Although this was one of the most meagerly furnished households I visited in the course of fieldwork, there was a television set to remind the viewers that there is always someone worse off in the world than you are: something you could be doing.

Irene and her two teenage daughters had participated in the restoration of El Llorón and therefore were part of the group of *rescatistas* I contacted to take part in the household survey designed to analyze variables which might have affected participation in restoration work. The daughters were under 18 and therefore off limits for the survey due to IRB protocols, but the household characteristics provided by Irene were shared by all three of them. It was not a wealthy household, and although I did not ask directly whether the television was the fruit of their joint labors at El Llorón, electrical appliances are not common household goods in this part of Lower Lempa. The

household well-being, or *buen vivir*, can only have been enhanced by the remuneration (approximately \$600 US) they received for their month's work. Their remuneration was provided through USAID and a World Bank GEF fund administered through MARN in the name of sustainable development (see the table on p. 63, Chapter II).

#### Rescatista Resources

Irene had spent a little over half her life in Las Mesas, arriving after the first wave of colonists from the Peace Accords in 1992 (Chapter II). She described herself as a farmer and homemaker, along with many others in the survey (see the table on p.148). MARN described the project objectives for mangrove restoration in the Biosphere Reserve of Xiriualtique-Jiquilisco as "strengthening the processes of restoration of marine-coastal ecosystems...to reduce socio-economic and environmental vulnerability and against adverse climate damage" (MARN PowerPoint, August 2012). This objective was closely aligned with that of FIAES for the project to "strengthen the management capacities of communities for the protection, restoration and sustainable use of natural resources", consistent with their Mission Statement "to provide a better quality of life to present and future generations of Salvadorans" (Figure 6.1).

"Farmer" is used here as a translation of *agricultor* which means that an individual had access to land for growing a *milpa*, either on a *parcela* of their own or rented land. The term *parcela* is used in Mexico and throughout Central America to refer to a piece of land that is titled to an individual or household. It may have many uses,

including agriculture, forestry and pasture, and be located at various distances from the household, but is within the lands normally associated with the community to which



Figure 6.1. FIAES mission statement. San Salvador July 2011.

the household or individual normally belongs. Size is not directly indicated by the term, but the general understanding is that a *parcela* is not owned by a large landholder. Once a *parcela* is sold to a larger landholder, it ceases to be a *parcela*. A *milpa*, which is a Mayan term in use in El Salvador, signifies growing corn with other vegetables, such as squashes and the vine *loroco*, the flower buds of which are used in the evening staple, *pupusas*. This can take place on a *parcela*, or on rented land or on common land. It is land used to produce subsistence for the household or individual (Herlihy, pers. comm. January 2014). In daily discourse, an individual in Lower Lempa may say, "I am going to my *parcela*" or "I am going to my *milpa*". In the surveys I asked a question about whether households spent money for fertilizer and pesticides on their *milpas* (p.162 for further discussion). "Farmer" also refers to a person, one per household, registered with the Ministry of Agriculture in Usulután in order to receive the free annual government handout of a bag of seed corn and a bag of fertilizer in January, which has to be collected in person from the central deposit. (This was an initiative of the Funes government and widely appreciated.) The term does not cover "day laborer" or *jornalero* who work for a daily wage on someone else's *parcela*. There were three men (IDs 14, 32 and 35, Table 6.1) who had the energy to work both as a farmer on their own *parcela* and as a day laborer on another's land. "Homemaker" covers both *ama de casa* and the more common *doméstica*, and does not carry any extra weight as the term might for a stay-at-home wife north of the border. Irene was raising her children on her own as a

ID	Community:	Head	Occupations	Age	Sex	Years in
	Las Mesas			_		community
1	La Canoíta	No	Student	18	F	17
2	Las Mesitas	No	Student	22	F	3
3	Los Cálix	Joint	Homemaker	40	F	14
4	Las Mesitas	FH	Homemaker	51	F	18
5	Las Mesitas	Joint	Homemaker	37	F	18
6	Las Mesitas	FH	Homemaker, Food vendor	27	F	10
7	Las Mesitas	Joint	Farmer, Carpenter,	35	М	35
			Chainsaw operator			
8	Las Mesitas	Joint	Farmer	42	Μ	20
9	Las Mesitas	Joint	Homemaker	22	F	20
10	Las Mesitas	No	Farmer	25	Μ	20
11	Las Mesitas	FH	Homemaker	44	F	7
12	Los Cálix	FH	Homemaker	24	F	10
13	La Canoíta	MH	Farmer, Barber	24	Μ	8
14	Los Cálix	MH	Farmer, Fisher, Day laborer	27	М	10
15	Los Cálix	FH	Homemaker, Farmer	33	F	18
16	Los Cálix	FH	Homemaker, Watchman	51	F	30
17	Los Cálix	FH	Homemaker, Farmer	26	F	13

Table 6.1. Householder characteristics.	Survey responses	from	rescatistas,	participants
in mangrove restoration.				

FH = Female head of household

MH = Male head of household

Table	6.1.	Continu	ied
		Continue	

ID	Community:	Head	Occupations	Age	Sex	Years in
	Méndez					community
18	Méndez	Joint	Turtler, Clammer	47	М	47
19	Méndez	MH	Turtler, Turtle Co-op Manager	52	М	42
20	Méndez	Joint	Fisher	25	М	25
21	Méndez	MH	Fisher, Clammer. Turtler	21	М	21
22	Méndez	FH	Clammer, Fisher, Turtler	34	F	34
23	Méndez	FH	Clammer, Fisher	30	F	30
24	Méndez	No	Clammer, Fisher, Tourism	38	F	24
25	Méndez	Joint	Clammer, Turtler, Fisher Co-op	43	F	43
26	Méndez	MH	Fisher, Turtler	45	М	45
27	Méndez	Joint	Fisher, Clammer, Farmer,	36	М	36
			Turtler			
28	Méndez	Joint	Fisher	29	М	29
29	Méndez	FH	Clammer, Tourism	42	F	24
30	Méndez	Joint	Fisher, Fisher Co-op President	45	М	45
31	Méndez	MH	Clammer, Turtler, Turtle Co-op	52	М	46

ID	Community: Romero & Sisiguayo	Head	Occupations	Age	Sex	Years in community
32	Romero	MH	Day laborer, Farmer	39	М	15
33	Romero	Joint	Shrimp co-op, Farmer	51	М	26
34	Sisiguayo	No	Student	19	F	19
35	Sisiguayo	Joint	Farmer, Day laborer	55	Μ	3
36	Sisiguayo	Joint	Farmer, Fisher	22	Μ	17
37	Sisiguayo	Joint	Farmer, Homemaker, Shrimp	24	F	16
			Со-ор			
38	Sisiguayo	Joint	Farmer, Fisher, Shrimp Co-op	22	М	17
39	Sisiguayo	Joint	Farmer, Cattleman, Mechanic,	26	М	21
			Cabinet-maker			

*doméstica*. "Without a doubt", she said, "we have done all the work that a man can do" (Survey 15-2013). They had forged their way by doing what they could with their limited resources to this rather ordinary domestic scene.

It has become almost a truism to speak of the Salvadoran economy, outmigration and remittances in the same breath (Hecht & Saatchi 2007). Indeed, Hecht based her argument for poverty reduction and forest resurgence on that triad, citing a 2002 PRISMA report that indicated 25% of rural households nationwide received remittances (in the department of Usulután the figure was 24%) (Hecht 2010:165). This phenomenon had yet to reach the Lower Lempa. Out of 39 households surveyed, and the 12 households which formed part of the Salinas del Potrero roundtable, only four received remittances at that time (>8%), and only two others had received remittances in the past, a money source that dried up following the financial crisis of 2008. As mentioned in Chapter II, houses built with remittance money look quite different architecturally from non-remittance households, typically being constructed of concrete with decorative arches framing the front porch (Figure 6.2). One atypical household receiving money from abroad was headed by a turtle-egg collector from Méndez paralyzed by the tsunami of 2012, a recent response to a critical situation and not a normal pattern for that family.



**Figure 6.2.** Remittance money house. Ahuachapán, 2014. Note the non-traditional perimeter fence and lawn in addition to the concrete arches.

An aerial view of the land surrounding the communities shows a mosaic of small plots within the buffer zone of the biosphere reserve, and large cane fields on the edges

to the north (Appendix B). These small plots are the *parcelas* used by the households for a variety of livelihood needs, including fruit trees and cattle pasture, but primarily for growing corn. Although the survey did not directly ask each person if they maintained a *milpa*, questions asking if a person self-identified as a farmer, or if the individual's household incurred any *milpa*-related expenses, for example for fertilizer or pesticides, or livelihood losses incurred due to Lempa floods, or drought acted as surrogates. By this calculation, most households in all communities except Méndez maintained milpas, a fact corroborated by community leaders (Interviews 6-2013, 9-2013, 11-2013). The Hacienda Limón on which Méndez was situated was broken up at the time of the first agrarian reforms (1980-82) into cooperative holdings which were then, for various reasons, sold back to large land-holders and not held at the household level. Most of the parcelas in the other communities are too small to create a surplus of corn for sale, so that the residents of Méndez are obliged to buy their cornmeal on the open market, mostly from foreign companies like the Mexican conglomerate Maseca. (There was a large Maseca plant visible from the coastal road to the San Salvador airport in 2012.) Mangle has invested considerable resources to introduce seed self-sufficiency and organic farming into the region. High levels of chronic kidney disease in the region are attributed to the use of agrochemicals (Interview 6-2011). These chemicals are mostly associated with sugarcane and cotton production, but also used widely on *milpas* (Figure 6.3).



Figure 6.3. Vendor of agrochemicals. El Norteño in Jiquilisco, July 2011.

The surveys did not address other activities that contributed to household income that were not natural-resource based or from remittances, but from observation of the households and from comments made by survey respondents, there were few occupations represented, the most common being agricultor and doméstica. It was difficult, therefore, to gauge how the rescatistas made a living other than from piecework and from the resources described in the section on *rescatista* livelihood options. Other members of the community earned cash from services like mending bicycles, selling small items, such as cell phone cards, or personal grooming like hair cutting. Irene perhaps charged her neighbors a quarter to watch her television in the evening, a practice mentioned by Reyes (2012:169) from Romero to cover the cost of recharging the car battery which ran the TV set in the early days. The *rescatistas* appeared to be taking the restoration work as part of a larger patchwork of strategies, or *bricolage*, which they employed to stay alive over the course of the year (Batterbury 2001). Those that identified themselves as joint heads of household (n=18) had the potential of bringing in income with another adult, although the data on the other partner were not

systematically provided in the surveys. The female household heads were all single. The six male-headed households had partners who did not bring in income.

The main source of outside funding comes not to households directly, but through donations to Mangle from organizations like EcoViva, which depend on carefully worded campaigns to raise funds from ethically-minded donors (MR-IV 2013). Some people in the United States give money directly to organizations such as EcoViva and MAP for local projects, while others contribute to the local economy through EcoViva's volunteer tourism (voluntourism) programs. These bring school and religious congregation groups to stay for visits of a week or more to work on community-based projects while staying with participating families or in the Coordinadora dormitory in Romero, and take ecotours in the Bay of Jiquilisco with boat owners in Méndez, but the practice has not spread to other communities. The ecotourism trail to El Llorón from Las



**Figure 6.4.** Interpretive sign. Sponsored by Mangle, the Coordinadora, FIAES and MARN, between Las Mesitas and El Llorón.

Mesas, despite FIAES financial investment in the pathway, signage, and an information center, has yet to realize its potential for the community (Figure 6.4). There had been fewer than a dozen visitors to it by January 2013 who had not been brought by Mangle either to look at the restoration work or to look at the agroforestry projects growing alternative fuelwood trees to take the burden off the mangroves.

People in the Lower Lempa are expected to contribute several days a year towards community projects organized by the Coordinadora, as well as participating in activities for the benefit of the community through the ADESCOs. This self-help aspect of community life is considered one of the attractions for volunteers from abroad.

## **Rescatista Obligations**

During the three years before the survey, Irene contributed work voluntarily to civic associations which included keeping the schoolyard and roadside vegetation of Las Mesas cut short with a machete, and to community disaster preparedness which the Red Cross organizes locally to respond rapidly to flooding (Table 6.2). Irene is a remarkably hardworking, civic-minded and outgoing community member. Of interest in passing is the discrepancy between the communities in terms of church volunteerism; the communities of Las Mesas and Isla de Méndez have high proportions of evangelical Christian adherents compared to those of Romero, Salinas and Sisiguayo which have prominent Roman Catholic chapels. The Lempa River pays no respect to religious belief and floods everyone in its path, hence the high degree of involvement in disaster preparedness. This proved its worth during and after tropical depression 12E in October

2011, in which there was no loss of human life despite the absence of national-level assistance. One of the survey questions asked if any aid had been received from outside the communities after natural disasters and almost unanimously the response was "No" but for those that replied in the affirmative, it was along the lines of "Just a bag of rice and beans once." These were provided by private donors and faith-based relief agencies, discussed in greater detail below.

**Table 6.2.** Voluntary work performed by *rescatistas* during 2012 by organization type. The figures represent individuals reporting volunteer work, not hours.

Community	<b>Civic associations</b>	Disaster preparedness	Church
Las Mesas (n=17)	16	15	14
Méndez (n=14)	13	7	5
Romero (n=2)	2	1	0
Sisiguayo (n=6)	4	3	0

There is a social expectation of unpaid community service in the Lower Lempa, which can amount to considerable individual time and effort, although those explicit data are not available; individual attempts to quantify them proved time-consuming and effortful and were dropped early from the surveys. All but one survey respondent in Las Mesas volunteered time for activities either organized by the ADESCO or through the Coordinadora. This could have been clearing the roadsides of vegetation with a machete, keeping the school clean, attending meetings concerning Fomilenio II and passing on the information to neighbors, or taking visitors to the interpretive trail on the way to El Llorón (MR-IV 2013). There was a similarly high level of engagement with civic activities in all the other communities, including Salinas del Potrero, where 12 members came together for an afternoon roundtable to share their experiences of working on mangrove restoration. They had no expectations of payment for their hours of time given up for this purpose. The following day many of them took the three-hour ride in the back of a pick-up truck to participate in the re-opening of Radio Mangle (Figure 6.5) and to hear about development plans for the region coming out of Fomilenio II, a public-private development initiative for coastal El Salvador funded by the US Congress through FUSAL, a private Salvadoran foundation for health and human development. The founder of FUSAL, Luis Poma, of the G20 Grupo Poma, was also a founder member of the ARENA party. Fomilenio I, which was implemented in the mountainous regions north of San Salvador to facilitate mineral mining, has been criticized for providing benefits to the construction industry, and also facilitating drug-running as the road system through northern El Salvador makes travel between Honduras and Guatemala much easier (Argueta pers. comm. 2013). This failure to meet intended targets has caused concerns over Fomilenio II, and thus necessitated programs to inform the members of the Coordinadora and solicit their input on the proposal.

Other volunteer effort goes towards diverse causes. At least two individuals (not surveyed) put their community hours towards working at El Llorón (Interview 1-2013) and all the community leaders in the Lower Lempa give generously of their time to the ADESCOs, Asociación Mangle and the Coordinadora, a characteristic which began



**Figure 6.5.** *Rescatistas* from Salinas del Potrero ADESCO attending the re-opening of Radio Mangle in Romero, May 2013.

early in the establishment of Ciudad Romero in Panamá. The resource guards gave up to a year's worth of effort patrolling their community mangroves before MARN started to pay them:

I came up with the idea of promoting resource guards (in Montecristo) with some friends who were interested in the idea, to volunteer as guards. We began to patrol the zone, then we went to Mangle for training and the equipment you need in the mangroves, in the creeks, in the same communities. From there we were capable of the doing the work of resource guards...Seven years have passed since then. We don't have the same problems we had at the beginning. But we still mount guard at night, two people from the community keeping watch. (Interview 3-2013). They still volunteer effort in order to protect their livelihoods, but feel that the government should pay them to protect biodiversity in the biosphere reserve (MR-1 and -II, 2013):

Yesterday we had a meeting to stop people selling parrots. But people don't have money for food, so they sell them in the market for pets, for money. There's nothing here. We don't have enough equipment or resource guards to counter these predators. There are people who don't have alternatives to the bush. (MR-I, 2013).

Without the unpaid effort of the resource guards and community members, the conservation aspect of the biosphere reserve would be unfulfilled. Li records the same phenomenon of imposing the burden of unpaid resource protection on local communities for the Lore Lindu National Park in Sulawesi (Li 2007b:217).

## **Rescatista Necessities**

Irene was one of a handful of those surveyed who paid for electricity but not water. She had opted to use groundwater drawn up from a well rather than pay the \$400 lifetime usufruct fee to the state for piped water. Another individual in Salinas del Potrero was able to turn his payment from the restoration project into a standpipe, as the groundwater in his well was causing serious health problems for his children (Figure 6.6). Water costs a few dollars per month for those that receive a regular salary, but is free for the unemployed once the hook-up is paid for. One other household in Las Mesas

paid for neither electricity nor water and retired early to the sound of the batterypowered radio. Electricity costs between \$6-30 per household per month (MR-III 2013). Radios were present in most houses, hence the importance to Mangle to have their radio station on the air. They are not turned on all the time, as they are in commercial locations like San Marcos Lempa or Jiquilisco, and communities are almost music-less during the day.



Figure 6.6. New standpipe (L) to replace well (R), Salinas del Potrero, August 2013.

Although education is technically free and the Funes administration has a program to provide school supplies and free milk to each child, parents have to pay for uniforms where needed, and snacks. Transport is not an issue for schoolchildren as all the communities have at least a one-room school. Classes are split between the morning and afternoon sessions where teachers are available. Dávila (2012) notes that it is very difficult for rural schools to retain qualified teachers, a preoccupation that has exercised

the Lower Lempa since the early days of Romero (Reyes 2012). Only Méndez provided free schooling through the ADESCO for deaf students, under the carport of the restaurant once a week. (My observation was that there were a surprising number of deaf mutes in the population of the Lower Lempa, and no single cause seemed to be offered to casual questioning.)

Almost all the participants in the survey had cell phones, or access to one through a family member or neighbor. Each community had at least one small store that could re-charge SIM cards. Coverage is reasonable in the Lower Lempa, possibly as a result of the plans for tourism development contemplated under the US-sponsored public-private partnership Fomilenio II.

There is no public transportation and although itinerant vendors and metal recyclers visit all the communities, some services, such as hospitals, were only available in the towns outside until the Romero hospital opened in late 2013. The horn of the privately-owned 6.00 a.m. bus from Méndez to Usulután is a wake-up call for anyone who has missed the pre-dawn rooster chorus. Most vehicular traffic is for business purposes. Private cars are not common and have to rise to the challenges of the pot-holed road between Romero and Amando Lopez. Many households have at least one bicycle and a few livestock owners keep horses for herding cattle and portage. Occasionally an oxcart can be seen on the road.

A large landowner with interests in developing the Peninsula of San Gozo under Fomilenio II has seen to it that the road from Amando Lopez to the Corral de Mulas is impeccably paved. (This is used to dry corn and fish; Figure 6.7).



Figure 6.7. Corn drying on the road. Méndez, April 2013.

As mentioned in an earlier section of this chapter, a popular service provided by the Funes government was the disbursement in January of a bag of seed corn and a bag of fertilizer to each person with a *parcela* who had registered as a farmer, which required travel to the government depot in Usulután, at least 3 hours from Méndez by road, provided it is not *la hora vacuna*, when the traffic is slowed by cattle going to and from pasture. During 2011 the first crop failed due to unseasonal early rains followed by drought. The second planting, which had to be paid for either out of pocket or with a loan, was washed away by 12E in October 2011. 2012 was also a drought year, so that any income from other sources, such as mangrove restoration, was welcomed by the farmers, although it came too early for the El Llorón *rescatistas* to recoup their losses that year. All pesticides and herbicides have to be paid for by the farmer (Table 6.3). Actual expenditures were not recorded, just a Yes or No to register that they were incurred in 2012. **Table 6.3.** Pesticide and herbicide payments. Number of *rescatistas* (n=16) who paid for pesticides and herbicide in 2012.

Las Mesas	Méndez	Romero	Sisiguayo
9	1	2	4

Mangle is engaged in a plant-breeding program to provide locally produced seeds better suited to local conditions than those that the government has distributed since 2010 from a company owned by a former (ARENA) president's family with monopoly distribution rights to Monsanto products in El Salvador. In 2013 it finally achieved its goal of providing corn seed to the government for distribution. Anyone who had not registered in a timely fashion was not eligible for the handout, as happened to one of the resource guards who lost funding mid-year and asked Mangle for a loan worth over \$1000 to start up his *milpa* (MR-I, 2013). It was unclear whether this included rent for the land and hired labor to clear and plant, but is still a substantial sum for someone whose annual salary was \$3000. For comparison, a single *pupusa*, the stuffed corn cake sold at stands with cabbage pickle and tomato sauce as an evening staple, costs between 15 and 25 cents, depending on the filling; the pork-based *chicharrón* or mixed filling *revuelto* can cost a little more than the staple filling of beans and cheese. An adult male can easily eat three at a sitting. Thick tortillas are eaten at every other meal.



**Figure 6.8.** Selected expenditures reported by *rescatistas*. They do not represent dollar amounts, but frequencies amongst respondents.

The figures in the table for household expenses in Figure 6.8 reflect the number of *rescatistas* who reported expenditures for each category. They do not represent any actual expenditure as those data were not available. In order to arrive at those figures a much greater amount of time would have had to have been spent with each respondent, which might not necessarily have provided answers to the questions being asked in this research. For example, 15 of the 17 survey respondents in Las Mesas paid for cell phone minutes during the year of the survey, but could not recall how much they paid. Two people had access to family members' cell phones for free. All respondents from Las Mesas paid for transportation out of the community. Only 8 paid for school-related items, such as books, pencils, snacks. This was indicative that they had school-age children to provide for. Not all the households had school-age children, and therefore did not pay for those items. Electricity and water are considered essential luxuries in the

Lower Lempa, in the sense that people can survive without them. Most elect to have piped water for health reasons at a once-a-lifetime fee of \$400 paid to the government and many choose to have electricity. It is not condoned to create illegal connections to water or light in the Lower Lempa. Basic healthcare is free to poor Salvadorans, but access is the major problem. When one of the *rescatistas* at El Llorón collapsed from heatstroke, it took over 6 hours for her companions to carry her out and get her to a medical facility in Jiquilisco. Even there, the project manager had to pay out of his own pocket for the attention she received as it was not covered under the Salvadoran health program (Interview 1-2013). The clinic in Méndez often runs out of basic medicines, which are for sale in the small stores (*tiendas*) (Noémi Barrera pers. comm. January 2013). When a freak 30-foot wave hit the beach at Méndez as the turtle egg collectors (around 100) were walking the shore the night of 11 September 2012, several people were severely injured, including two who were still paralyzed in April 2013. The head of the Méndez ADESCO personally ferried the dozens of injured collectors out to the hospital at Jiquilisco for treatment (Interview 6-2013). Lina Pohl, the Vice Minister of MARN, went on television to explain that the phenomenon that had afflicted the community, wiped out the entire turtle egg vivero of 2,000 eggs at a cost of \$20,000 and wrapped the accountant inside the hut in the zinc roof "like a human taco" was not a tsunami, but just a big wave of 6-9 feet (Barrera pers. comm. January 2013). No followup healthcare was provided for any of them, least of all post-trauma counseling. One of the paralyzed collectors was obliged to ask for financial assistance from family members in the United States, as described under the section on remittances.

#### **Rescatista Livelihood Options**

In October 2012, in common with others in the Lower Lempa, Irene lost her *milpa* during the floods of 12E, but unlike many others, managed to save her household effects. During the three years before the mangrove restoration opportunity presented itself, she had looked for work in Usulután, San Salvador and other departments in El Salvador (Table 6.4). Although the participant numbers from each community are hardly comparable from the surveys, Las Mesas and Sisiguayo appeared to be less reliable in terms of work availability than Méndez or Romero. Reasons for this are not addressed here, but could be a combination of factors ranging from initial conditions at settlement to community size and structure. Both communities are part of the Coordinadora and have received considerable previous investments from FIAES, but lack the strong community leadership evident in Romero, Méndez and Salinas del Potrero. Montecristo, the fishing and hatchery community at the mouth of the Lempa which was not included in this survey, is at the heart of PLES to which Las Mesas also belongs. One of the three to seek work outside El Salvador was a young mother who was also one of the four still working to the very end of the project at El Llorón. She had taken a bus to Panamá to work as a private maid, but returned after less than a year as the trade-off between working conditions and pay became unbearable (Survey 17-2013). The other two were journeymen seeking work on construction sites in Guatemala and the US. The group from Salinas del Potrero were very sanguine:

Work. There's none here or out there. That's the single detail. Neither here nor there. Just one job from EcoViva in the past three years (with the World

Food Program). (MR-III 2013)

The pre-civil war pattern of seeking seasonal work on plantations far from the home community has been interrupted, not least by the tendency for sugar plantations to hire from outside El Salvador, particularly from Honduras and Nicaragua (MR-I 2013). Mangle and the FMLN in the legislature are also vocal critics of the prevalence of acute renal failure in cane workers, and this predisposes plantations to opt for foreign hires.

**Table 6.4.** Numbers of times that *rescatistas* sought work outside the community in the years 2010-2013, the majority in urban centers. Salinas is included as the question was asked at the roundtable MR-III, May 2013.

Community	Usulután	Other departments	San Salvador	Other countries
Las Mesas (n=17)	6	4	4	1
Méndez (n=14)	1	0	3	1
Romero (n=2)	0	0	0	0
Sisiguayo (n=6)	2	2	4	1
Salinas (n=12)	0	0	0	0

Furthermore, although this is flagrantly violated in some communities due to bribes passing hands to community leaders (Interview 9-2013), cane-growing is forbidden in the buffer zone of the Biosphere Reserve on account of the use of chemicals which may contaminate groundwater.

## **Rescatista Choices**

Out of the array of natural resources available to the communities, Irene chose to farm her *parcela* and harvest shrimp from the community ponds constructed at the edge

of the mangroves. The ponds are filled by the canal El Llorón at high tides after the restoration work, and with brackish water during the rainy season. Shrimp larvae and small fish from open water settle in the ponds and grow out during the rainy season. Residents of Las Mesas can purchase a license to harvest them for a lifetime fee of \$400.



**Figure 6.9.** Harvesting shrimp near Las Mesas. August 2012 was in a drought year, hence the low water level and meager catch.

This is easily the most common form of mangrove related livelihood among the El Llorón *rescatistas* (Figures 6.9, 6.10 and 6.11). In Mendéz the preferred livelihood is gained from the turtle-hatchery, but most people out of egg-laying season fall back on collecting clams, or *curiles*, which can bring in around \$10 a day depending on the market, and fin-fishing (Figure 6.12). All these activities are organized by cooperatives.


**Figure 6.10.** Quarterly availability of important aquatic resources and mangrove restoration.

The troubled shrimp aquaculture industry had been anticipated as a major employer in Sisiguayo, but rising water temperatures in the Bay of Jiquilisco had contributed to disease problems even though the rearing method was extensive rather than intensive (Hernández Rauda et al. 2005), and maintenance of the berms and reconstruction after flood events became a costly enterprise which the government and aid agencies bore reluctantly (Interview 7-2012).



Figure 6.11. Non-mangrove sources of income, all communities.



Figure 6.12. Mangrove sources of income, all communities.

Dávila, (2011) in her livelihood survey of the eight Local Groups of the Coordinadora (including those away from the river and bay) found that the majority of households (>1700) kept chickens, followed by *milpas* (> 1300). Nearly 500 households described themselves as fishers, with 400 primarily from Méndez reliant on turtle-egg

**Table 6.5.** Non-mangrove, non-service sources of income. Numbers represent *rescatistas* engaged in the livelihood activity.

Income	Las Mesas	Méndez	Romero	Sisiguayo	Salinas
Sources	(n=17)	(n=14)	(n=2)	(n=6)	(n=12)
Cashews	3	8	0	0	Unknown
Sugarcane	1	0	0	4	Yes
Shrimp	12	8	1	3	Yes
Salt	0	0	0	0	Yes
Corn	3	2	0	0	Unknown
Fish	0	10	0	3	2
Cattle	7	1	2	3	4
Turtles	0	11	0	0	0
Crab culture	0	9	0	0	0

Table 6.6. Mangrove-derived sources of income.

Income	Las Mesas	Méndez	Romero	Sisiguayo	Sisiguayo
Sources	(n=17)	(n=14)	(n=2)	(n=6)	(n=12)
Thatch	0	2	0	0	Unknown
Fuelwood	4	2	0	0	Unknown
Crabs	7	2	0	1	1
Honey	2	3	0	0	Unknown
Tourism	0	4	0	0	0
Clams	1	10	0	1	1

collecting. Slightly fewer combined collected *curiles* and crabs. Even less had their own businesses or worked for other people. "It's hard to know what people live on. It worries me", said one community leader (Interview 1-2013). The data I show here for wild-

caught protein sources (shrimp, fish, clams, crabs) match Dávila's ordering and reflect the same level of importance in the *bricolage* of livelihood activities (Tables 6.5, 6.6). This suggests that the sample of *rescatistas* is representative of the populations as a whole.

The main wild-caught mangrove-derived sources of income, clams (*curiles*), crabs and shrimp are all harvested to some degree for private consumption, in the same way that almost every able-bodied person fetches fuelwood for cooking. Fishers need access to a boat as the areas near the settlements have been heavily fished over the years and shoreline fishing using handlines calls for such a high catch-per-unit-effort that few people attempt it outside the Rivers Borbollón and Lempa where it is more for recreation than sustenance (Interview 11-2013). Since this research was not specifically about environmental impacts of natural resource extraction, the surveys did not address sustainability in greater depth, but future work in this area would be appropriate.

#### **Dirty Work**

The actual labor of clearing creeks and creating drainage ditches – the work of *rescatistas* in mangrove restoration - would have been familiar to anyone who worked on the cotton plantations that ringed the Bay of Jiquilisco prior to the civil war. Indeed, some of the older people interviewed referred to the practice of keeping ditches clean from this epoch and likened it to mangrove restoration work (MR-I 2013; I-12 2012; I-13-2012; 9-2013; 11-2013). Mangrove restoration following EMR involves getting muddy and spending hours every day immersed often up to the waist in brackish water.

The water is rich in aquatic life, adding, for some *rescatistas*, to the challenges. The communities from Salinas del Potrero, for example, encountered leeches in one stretch of the river that brought work to a close at that location (MR-III 2013). One *rescatista* from Las Mesas was afraid that once the creek was cleared, sharks would come in from the sea, up Izcanal to El Llorón. Her companions eased her fears eventually (Survey 4-2013). Mostly though the problems were microscopic. Almost all the workers at some point or another contracted fungal skin infections and suffered cuts and bruises because they did not have work boots or gloves. Although the majority of *rescatistas* surveyed (n=25) did not make suggestions, and were happy with the way the project had been conducted, the most frequent recommendations to improve future restoration work were to provide a First Aid kit and protective gear (Figure 6.13).



Figure 6.13. Recommended improvements for future restoration projects

The work from Romero involved heavy labor moving dead trees, some over 30ft tall, and digging out dirt and removing it away from the edge of the creek up step banks (Interview 11-2013). Before work could even begin, the workers from all the

communities had to walk to the work site. This was nearly two kilometers along a cart track at El Llorón (Figure 6.14). The distance is not known for the other sites but probably comparable. At Sisiguayo the first few days were through uncleared brush, so that the workers arrived tired from hacking their way with machetes (Survey 34-2013). The distances of drainage ditch cleared were 4 kilometers at both Espino and Borbollón Rivers, and 8 kilometers at El Llorón (see table on p. 63, Chapter II). In the dry season air temperatures during the day can rise to over  $90^{0}$ F.



**Figure 6.14.** *Rescatistas* working at El Llorón, 2012. Photo: Carlos Barahona, Asociación Mangle.

# Working Together

One of the open-ended questions on the survey asked whether the respondent thought that restoration work was a different experience for women than for men. This was considered important to know, because much mangrove restoration work in the developing world has been carried out by women and children, often with scant pay on demonstration projects, and normally planting *Rhizophora* propagules which *la técnica REM* sought to replace (for example, Spalding, Kainuma & Collins 2010:38). If women received less pay for equal work, this would be cause to consider the colonialism claim by Escobar that women in development projects are invisible (Escobar 1995). The results are presented in Table 6.7. Although the restoration project in the CFP for Méndez had not taken place at the time of the surveys (Chapter III), a previous

	Thought the genders equal	Thought females were different	Thought males were different
Women (n=20)	15	4	1
<b>Men</b> (n=18)	14	3	1

**Table 6.7** Perceptions of gender equality in the mangrove restoration workplace.

mangrove restoration project had taken place a few years earlier at *Palacio de las Aves* (Bird Palace), and so a number of respondents felt confident sharing their experiences there. One female had also been nominated as the Méndez community representative of a Salvadoran-led workshop in Honduras to assist with restoration efforts in the Gulf of Fonseca (Survey 29-2013). As can be seen in Figure 6.15, the gender division of a typical *curile* cooperative is even. Observations of the turtle-egg cooperative on the beach at night also showed about an equal gender division of labor, so that limited observations bear out the perception that men and women work equally hard. Some of the responses that diverged from the "equal" perception bear examination in more detail, in order to understand why it was felt that men or women differed from each other in some way in this particular kind of work. A visual inspection from El Llorón (see the

figure p.173) does not indicate much difference other than that between the project overseer (in the straw hat) and the workers.



**Figure 6.15.** Cooperative returning from a morning collecting *curiles*. A basket of *curiles* worth \$6, January 2013, Isla de Méndez (right side).

Of the women who felt that there was a difference between the way females and

males experienced the work, two felt that women were superior workers to men:

There were more women - out of 40 that started, 30 were women. We

had contests. The women always won. (Survey 11-2013) (female)

Women are much more hard-working than men. (Survey 6-2013) (male)

Both the man and the woman who felt that men were different attributed the difference to the physical strength necessary to pull heavy tree trunks out of the river bottoms (Surveys 9, 33-2013). A man and a woman both commented on the lesser freedoms from home enjoyed by women: The women had never been out to work before – it was scary because it was new, different and the smell was strange. (Survey 3-2013)

It's different for women fishers. They stay at home. When we go out to fish at night they stay in the house. (Survey 27-2013)

These differences did not square with the majority perceptions that women and men work equally in the field, and therefore that it is commonplace for women to work outside the home. The survey was not broad enough to deal with this anomaly, nor was it designed to investigate rural labor from feminist perspectives. The only real indicator of what might be termed "inequality" came from a woman separated from the father of her son:

It's very different. When you come back from work you have to work in the house – prepare the food, wash the clothes. You can't rest. (Survey 29-2013)

The discrepancy between the majority perception that men and women work equally alongside each other in the field and the limited number of individuals who saw gender differences will have to be left unexplained as individual perceptions. Everyone who worked, regardless of age or gender, was paid at the same rate unless they operated their own chainsaw or held a position of oversight and responsibility (Interviews 1, 9, 10 and 11-2013). There was therefore nothing particularly discriminatory about payment (\$10 per hour for ordinary workers, \$15 per hour for supervisors) that might raise concerns

about labor exploitation of disadvantaged groups. In that sense, everyone was equally privileged and equally disadvantaged.

#### **Doing it Differently**

All respondents to the survey indicated that they would do mangrove restoration work again. The pay was particularly attractive, as at \$10 per day it paid above the minimum daily wage for an agricultural laborer (\$4-6 in the cane fields, Interview 5-2012), and above the price for a morning's work collecting clams (Figure 6.15). It was also at a time during the year when there was little income for those without access to fishing or clams. It did not conflict with the agricultural cycle, as it took place during the dry season before corn planting and just after Christmas when most of the domestic poultry and pigs are consumed. Most *rescatistas* from Las Mesas and Salinas were hopeful that at least there would be some follow-up maintenance work that would recur every year to keep up with the growth and sedimentation in the mangroves. Responses to questions about how to do the work differently in the future varied from site to site (none from Méndez, as the question was not posed there because the work had not yet started), and with the exception of Sisiguayo, where there were unexplained difficulties with the management, all responses were constructive and came from lived experience. As can be seen from Table 6.8, they fall into four categories: health and safety, seasonality, permanent maintenance and overall management beyond the control of the project overseer. The two responses from Romero are not included here as one declined to

answer that question and the other talked about mangrove management in general, specifically the importance of not cutting trees.

The working groups at Salinas had a system whereby the day started with a discussion of how to resolve problems, the role of facilitator played by an individual with the use of only one hand. This form of inclusive adaptive management contrasted with the management styles at Romero and Sisiguayo, for example, where the workforce

	Health &	Seasonality	Future	Overall
	Safety		mainenance	management
Las Mesas	Gloves, boots, First Aid kits, drinking water, hot food, emergency preparedness	Dry season, after Christmas	Every year	Better equipment, more workers, planting along canal banks, more outside interest
Salinas		Dry season	Every year	Transportation to work site
Sisiguayo				Planting, worker decision- making oversight from outside, logistics, machinery

**Table 6.8.** Recommendations by *rescatistas* (n=14) for future mangrove restoration projects.

was considered as "labor" and not primarily as community members (Interviews 10 and 11-2013), as the *rescatistas* from Las Mesas clearly felt themselves to be (Interview 1-2013), or the cooperative form of work organization that obtained in Méndez (Interview 6-2013). Although the type of work done, the working conditions and the terms of work at each site were practically identical, -- the pay was the same, the mud was the same, the mangroves were the same -- the forms of organizing labor and getting the work done were different from community to community, raising many interesting questions. The study design did not permit for further iterations of the survey, nor did funding allow me to probe into how communities and leaders shape each other. For the same reasons, I was unable to obtain the detailed oral histories that would have explained the contingencies which gave rise to those particular leaders and communities in that "historical moment" when they came together to carry out mangrove restoration.

## **Livelihood Threats**

A reason other than financial self-interest or social expectations which provided a motive to participate in mangrove restoration came from the annual fear of flooding. The "September 15" hydroelectric dam managers, without adequate advance warning, release huge volumes of water after prolonged rainfall threatens dam infrastructure integrity. A selection of keywords from two recent papers by geographers writing on El Salvador encapsulate some of the difficulties faced by rural Salvadorans: earthquakes, volcanos, hurricanes, floods, landslides, drought, deforestation, vulnerability, disaster, to which should be added, in the case of Méndez, tsunamis. Optimistically, they also include:

prevention, mitigation, recovery and adaptation, restoring a sense of agency to a rather formidable list of determining factors. Wisner describes El Salvador as being in "a permanent state of emergency" (Wisner 2001:252), while Hecht calls the country the "former poster child for Malthusian environmental destruction" (Hecht 2010:161), referring to the exacerbating conditions of deforestation in an already dynamic environment.

The government of El Salvador presented international donors a reconstruction budget after Hurricane Mitch in 1998 totaling \$1.46 billion, but due to ongoing controversies of land tenure unresolved by the Peace Accords "little was done to resettle vulnerable people on safer land. Instead, emphasis was laid on building new dams and levies, and on attempts to develop flood warning and evacuation systems" (Wisner 2001: 257-8). Over half the respondents to the household surveys (26 out of 39) participated in the disaster preparedness networks organized by the Red Cross and other nongovernmental organizations (Table 6.9). They did so in order to prevent loss of human life and excessive losses to livelihoods due to the breaching of the levees on the Lempa every time the "September 15" dam managers released significant volumes of water during extreme rain events. For example, during 12E in October 2011 there was no loss of human life in the Lower Lempa although the flood waters rose high enough to enter the dormitories in the flood shelter in Romero. This happy outcome took place in spite of the lack of advance radio warning, which might have enabled people to save more livestock and personal belongings.

Community	Disaster preparedness	
Las Mesas (n=17)	15	
Méndez (n=14)	7	
Romero (n=2)	1	
Sisiguayo (n=6)	3	

**Table 6.9.** Number of *rescatistas* reporting that they participated in disaster preparedness projects.

## Flooding and Drought

Chapters II and IV discussed flooding of the River Lempa and the added impacts of climate change on the river system. Table 6.10 gives the numbers of respondents who had been affected by floods and drought in the three years from 2010 to 2013, which included the major flooding from 12E in 2011 and the drought years of 2011 and 2012. Numbers for Salinas reflect a show of hands to three questions; exact figures for drought are unknown as the question posed was answered by the community leader in response to a question about flooding losses: "Just about everyone. Just about everyone has *milpas*. The same with the drought in 2012" (MR-III 2013). All the communities around are self-described as agriculturalists, so it is probable that they suffered along with everyone else along the eastern coastal plain of El Salvador.

Respondents distinguished between immediate losses to their own property and to the environment as a whole. Fishermen and *curileros/as* described the longer-term impacts of drought and lack of freshwater in the bay during dry years as contributing to losses, as well as the losses caused by massive influxes of freshwater during flooding

**Table 6.10.** Number of *rescatistas* whose livelihoods were affected by climate extremes, 2010-2013.

Community	Flood losses	Drought losses
Las Mesas (n=17)	17	16
Méndez (n=14)	14	9
Romero (n=2)	2	1
Sisiguayo (n=6)	6	5
Salinas (n=12)	12	most

events. Many organisms do not have the osmoregulatory capacity to deal with the salinity extremes they experience. The decimation of invertebrate populations by the flooding first emerged in an interview in Méndez (Interview 6-2013), since one of the *curile* cooperatives used to collect in Salinas's grounds (without permission) before 12E and was finding that the loss caused them to over-use their own grounds:

Yes, that's correct. We lost them, and there was a study to show that we had lost 50% of the *curiles*, and we lost 100% of the crabs. Nobody collects crabs now. (MR-III 2013)

The long-term economic, health and psychological effects of living at the end of a destroyed road, with no public water transportation out of a region that floods annually are hard to calculate. In an exceptional year, the impacts are magnified:

12E had the most impact. It was really drastic. Total losses. When there's copious rain in winter it's like a lake, there's standing water and no movement. This happens even if there's no phenomenon. People lose their crops. (MR-III 2013.



**Figure 6.16.** Pasture in Salinas del Potrero during a normal rainy season, after canal clearance, August 2013.

The risk of livelihood loss from flooding is almost uniform in the Lower Lempa, whether directly through drowning of field crops in standing water or loss of domestic animals, or indirectly through alterations in the aquatic systems on which people depend (Figure 6.16). In this light, the different responses in different communities to what the work meant to individuals when asked whether it was just a job, or something more, was instructive, which is considered in greater detail below. Coupled with the dismal figures of outside aid received after these devastating events, it is easy to understand why flood prevention as a reason for clearing out creeks and rivers motivated so many people to work on projects blessed with the moniker of *la técnica REM*.

# Vulnerability

Respondents (n=6) said that after 12E they received a one-off disbursement of bags of dried goods and a bottle of cooking oil, but otherwise nothing material (Table 6.11). These were in all likelihood provided by private initiatives from churches and

NGOs working in the region. One respondent from Méndez said "We're at the end of the road, no-one could come in or out, so No." (Survey 27-2013). I was solicited for

Community		Outside relief aid received	
Las Mesas	(n=17)	3	
Méndez	(n=14)	3	
Romero	(n=2)	0	
Sisiguayo	(n=6)	0	
Salinas	(n=12)	0	

**Table 6.11.** Number of *rescatistas* who received outside aid after floods or droughts.

donations, within days of the extent of the destruction becoming apparent, by the director of a turtle conservation NGO (a Texas A&M graduate student) who worked in the Peninsula of San Juan del Gozo. He and his wife bought supplies in the capital and personally drove them in a rented truck to the affected communities where he worked (Liles, pers. comm. 2011). In all the footage and stills I have scrutinized of the flooding in the Lower Lempa that were taken with cell phones at the time, I have not seen one image of a policeman or any uniformed member of the Salvadoran armed services aiding or assisting flood victims. Again from Salinas:

Only Mangle, for example, made any effort at the time, when in the aftermath we were left with nothing. There was no potable water. We went several days without water. Only Mangle came with bottled water. (MR-III 2013).

Wisner (2001:257) quoted a government of El Salvador report from 1999 in the aftermath of Hurricane Mitch that there was a need to "strengthen a modern national system for prevention and immediate response to disasters based on an adequate cooperation between the local and central levels." The change of ruling political party from ARENA to FMLN had not brought any noticeable change in official disaster response in time for 12E. Since that time, the Funes government, following a lengthy petition period, has reinstated the radio frequency for Radio Mangle which broadcasts out of the shelter in Romero, lost after Tropical Storm Agatha in 2010. Advance warning of weather events can now be broadcast across the Lempa floodplain. This is a clear instance, as discussed in Chapter V, of the contested territory between government and governance, showing how a small gesture of legality can make a great deal of difference in a community's vulnerability to generalized risk.

Many of the older residents of the Lower Lempa listen to radio for information rather than television, which is not as common in the region. Radio was key in transmitting Archbishop Oscar Romero's broadcast homilies to the masses in the years before, and up to the moment of, his assassination, and Radio Venceremos was crucial to the guerillas during the civil war in countering claims made by the government on its radio stations. It is the main source of news and weather for 6,000 followers. Radio Mangle can be heard in the neighboring Departments of La Paz, San Vicente and La Unión, reaching an estimated 25,000 listeners in total (Mario Martínez, pers. comm. January 2014). Younger people are beginning to spend more time listening to Radio

Mangle as there is a youth program which involves young presenters broadcasting their own productions to their own age group.

#### Discussion

Thirty-nine households were represented in the surveys. Of those households, a quarter were female-headed, like Irene's, and nearly a half were jointly headed by a couple. This runs counter to prevailing views of machismo for the rest of El Salvador, where men are less likely to acknowledge gender equality in a domestic relationship, and also reflects the acceptance in the Lower Lempa that women can live without male patronage (Luciak 2001; Silber 2011). The absence of a welfare system means that to survive alone, women need to have access to resources and the technology to enable them to do so. They also need to be able to survive the challenges of living in a physically dynamic environment. This analysis of the livelihoods of the rescatistas, people who worked on mangrove restoration projects, has covered salient aspects of their working conditions against a background of the generalized situation of environmental risk and political vulnerability under which they live their lives. It identified times of the year when they are financially most in need of cash (early dry season), and also moments when they are in need of aid (post-flooding and during droughts). The longer-term consequences of flooding due to environmental impacts were evident from interviews, and should be addressed in future studies on resource management and use.

The livelihood data demonstrate through analysis of the natural resources on which the households depend, the complexity of the environments that the *rescatistas* draw upon for their annual support. Shrimp provide more people in the survey with income than any other resource, yet the fee of \$400 shows that the cost of access limits participation by some in a dependable and low-technology activity. The importance of keeping the canal El Llorón clear was of great significance to Las Mesas shrimpers, as shrimp larvae can only reach their ponds through that route. The viability of aquatic resources depends on the quantity, quality, timing and distribution of freshwater. The surveys indicate how vulnerable aquatic resource-dependent Lower Lempa households are to drought and flooding, in a way that cattle owners are not.

The underlying question asked throughout this research is "Does mangrove restoration for climate mitigation constitute a form of colonialism?" The simple answer, derived from the data presented here, would seem to be to the contrary, unless it is internal colonization on the part of the state to which we refer. Responses to questions about how *rescatistas* felt towards the government after the restoration work, compared to their attitudes before it, indicated that they were almost unanimously more favorably inclined afterwards, indicative that they did not feel unduly burdened by the government policy of ecosystem restoration.

The restoration work itself paid above the daily minimum for an unskilled agricultural laborer according to the official statistics (Chapter II). This wage may be compared to the cost of the Salvadoran staple, the *pupusa*. The number of *pupusas* that a daily wage restoring mangroves can buy is quite reasonable – at an average of 25 cents,

say, a worker might be able to purchase 40 per day, enough for a family of four. In terms of timing, all restoration took place during the dry season, in the early months of the year when home-grown corn supplies are running down, pigs and poultry have been consumed at Christmas and the turtles have not come ashore to lay. Fish and *curiles* are the only abundant sources of wild-caught protein in the Lower Lempa at that time and few poor people are fishers. Therefore cash labor is most welcome, however hard the work is. If we temporarily accept the premise that landscape restoration for climate mitigation in the Salvadoran context is "sustainable development" by another name and we accept the Environment Minister's reassurance that it was not false job creation, then we must ask whether development has advanced since Escobar cautioned so long ago, citing Ruth Behar, against seeing poor Latin American women as "beasts of burden, mothers and wives, staunch traditionalists or guerilla fighters" but as visible people of cultural agency, able to create their own worlds (Escobar 1995:177). Deysi Piche, the leader of the Salvadoran Women's Movement, asserted in her presentation at the workshop in San Salvador in July 2011 that mangrove restoration is paid work which also generates "social capital", supports a political agenda for land use, has intrinsic ecological value and provides equal opportunities for women (Piche PowerPoint 2011). The results from the survey indicate that the unpleasant work of ditch-digging is indeed an equal opportunity shared by both genders, and that a certain degree of communal spirit pervaded the work undertaken by the people of Las Mesas and Salinas del Potrero, who took pleasure in each other's company during their labors. (I do not address whether or not it supported a political agenda for land use in the sense intended by Piche, as it

was unclear what she meant, or whether it had intrinsic ecological value.) The recruitment process certainly favored the hiring of female heads of household in Las Mesas, Méndez, Salinas del Potrero and Sisiguayo, and those that wanted to participate in restoration were hired. Most importantly, it contributed an amount of money that was welcome in each household that worked on mangrove restoration during the cash-poor dry season months after Christmas.

The people of the Lower Lempa conducted their daily affairs on models drawn from the FMLN, which included participative democracy and self-management, so the top-down style of the project overseer in Sisiguayo rankled with the workers, although it was not seemingly problematic in Romero. This is perhaps due to the small number interviewed, but a home-stay with the overseer there in August 2013 revealed his managerial style with the hired journeymen (*mozos*) who worked on his *parcela* (he has degenerative kidney disease and cannot work in the heat). His instructions were clear, his style firm and the pay clearly adequate as the workers returned daily to plant corn for the entire week. Again, within the context of rural El Salvador, the dirty work conditions did not seem to be particularly exploitative of women.

People who live and work in the Lower Lempa are up to the challenges of the demanding physical environment, with a little help in difficult times, for the short term. The fact that people have moved there in significant numbers after the 1992 Peace Accords and stayed on in the past quarter of a century is testament to that. Survey and interview respondents wanted to respect and obey the laws of the country, not violate them, nor do they like to seem them violated by others. Illegal land-invasions are mostly

incremental increases of *parcelas* on the margins of the mangroves, and not wholesale seizure of the more elevated sugarcane fields. The most troubling land acquisitions and conversions have come through large landowners taking advantage of indebtedness on the part of *parcela* owners to acquire larger and larger parcels. Desire to own a *parcela* and operate within the law means that people continue in livelihood practices that keep them tied to the flood-prone, earthquake prone Lower Lempa. They feel that the government has some degree of responsibility towards the safety and well-being of its citizens, so that faith in the FMLN persists in the face of experience. It is through their own voices and agency that they survive, persisting in their belief in the rule of law and justice. It would seem that the people of the Lower Lempa are caught forever in a theater of the absurd, waiting for the modern equivalent of the gentleman with the red cape to take up government.

#### **CHAPTER VII**

# CHANGING THE WORLD: REASSEMBLING, CLIMATE SUBJECTS, AND LA TÉCNICA REM

"Para cambiar el mundo, se necesitan metas. Juntos lo podemos lograr." To change the world we need goals. Together we can achieve them. Shaka y Dres, *Cambio Climático*. 2010

# Introduction

This chapter draws on Li's practice of *reassembling*, "grafting on new elements and reworking old ones; deploying existing discourses to new ends; transposing the meanings of key terms" (Li 2007a:265). It is this process which best describes the transformation of the Salvadoran public through the media campaigns of the Environment Ministry into climate subjects. Through these campaigns between 2011 and 2013 some members of the public developed a sense that they had new global environmental identities as climate subjects, and actionable projects, such as ecosystem restoration, suggested in the lyrics of Shaka y Dres' 2010 song, *Cambio Climático* (quote above). Other members of the public seemed to have become numb to the climate messages on television everywhere.

Mangle, community leaders from the Coordinadora and the resource guards assumed the challenge of the goal of "climate mitigation based in adaptation" through mangrove restoration work. They used Ecological Mangrove Restoration (EMR) as the metonym for restoring, repairing and mitigating the damage that export agriculture and industrial development had inflicted on the people and environments of El Salvador. Reassemblage describes the transformation of EMR to *la técnica REM*, a change which involved more than the Hispanicization of the term. *Rescatistas* went to work every morning; through their labor and their conversations, they re-shaped the technique and made their own meaning of it; they appropriated it. They worked to supplement the meager resources available with the hope that their livelihoods would improve if the mangroves were restored, but also with a vision for a better future for all the world. In this chapter I examine how three different sectors of Salvadoran society respond to environmental knowledge and how the "authorized knowledge" of EMR is reassembled into *la técnica REM* as it circulates and people make it their own (Li 2007b:265).

I use ethnographic data from participant observation to see how the public responds to a climate change event staged by the Environment Ministry on 22 April 2013 in San Salvador. Next I analyze those sections of the household surveys exploring beliefs and perceptions on restoration for climate mitigation. Then I draw on three roundtables; two held on 6 January and 28 April 2013 with the resource guards in Montecristo, and one held on 1 May 2013 with the *rescatistas* from Salinas del Potrero. Finally I turn back in time to a not-so-public meeting held in Isla de Montecristo on 23 June 2011 between Mangle and a non-Coordinadora community from northern Usulután.

## **Changing the Subjects**

Herman Rosa Chávez, the environment minister whom we met at the beginning of Chapter V, was in a ballroom with Shaka y Dres, the pop group we met at the beginning of Chapter VI. This time it was in the Sheraton Hotel, site of the FMLN siege in 1989. There were no flowers in April 2013, just two huge screens, either side of the stage where the Minister stood at a podium, on which Shaka can be seen wearing a gas mask, yet in familiar exhortatory poses from the telethon video: beckoning from the edge of a volcano, waving at the bottom of a waterfall, advancing along a street and pointing, and in Jiquilisco Bay embracing the air in front of a screen of mangroves. He is singing the hit single of 2010, *Cambio Climático*, at the government roll-out of Section Four of the Environmental Plan, the National Strategy for Climate Change (Figure 7.1). My neighbor at the event was surprised that I had to ask who he was, and how I had missed such a popular song.



**Figure 7.1.** The stage and the "climate subjects" leaving after perfomances by Shaka y Dres and Herman Rosa Chávez, San Salvador, April 2013.

Shaka y Dres, Cambio Climático, 2010

Greenhouse gases are still being emitted.

In Central America the environment has begun to show damage.

The poles are melting and sea-level is rising.

The temperature of the planet is increasing.

Violent rains are destroying the crops.

Diseases and poverty are increasing.

CHORUS

To change the world, to change the planet and so that

The ozone layer recovers

To change the world we need goals.

Together we can achieve them.

Join the goal. Break barriers. Fly your flag.

The world is waiting for change, don't wait, join the goal.

As one force against global warming.

(Translation by Fiona Wilmot of the first verse and chorus of *Cambio Climático* downloaded from <u>www.musica.com</u>, 23 January 2014.)

The audience was less spontaneous than the one in July 2011. Many members were dressed in logowear representing one of several local organizations; chunks of color with the same acronyms were repeated across a row like genetic codes, heads hunched over hand-held devices, twittering and messaging amongst themselves. Rosa

Chávez's PowerPoint presentation was full of familiar old slides; the message had not changed in two years, but had been intensified by the addition of the impact of Tropical Depression12E in October 2011 to Hurricanes Mitch, Stan and Agatha. One joke Rosa Chávez made was new to me, but not to MARN aficionados – that the best adaptation Salvadorans could make to climate change would be to keep ducks and not chickens. The twittering and messaging and slide-changing continued for an hour and a half until the flood of lights and smattering of applause from the front row indicated that it was time for the real event - coffee, pastries and exchange of news at the back of the room, for which the "climate subjects" purposefully queued in single file. Development geographer Anthony Bebbington, a long-time advisor of PRISMA and Herman Rosa Chávez, said of MARN' s national climate change strategy "They seem to have missed their moment", meaning that they had not achieved their objectives of wholesale landscape restoration with REDD funding (pers. comm., January, 2014). In terms of creating climate subjects they had been extraordinarily successful in the space of two years in making natural, even boring, the whole matter of climate subjectivity, at least in the city. In the countryside matters are rather different.

# **Rescatista** Environmental Perceptions

Communication is a bricolage of patchily-distributed systems in the Lower Lempa. Conspiracy theorists suggest that the failure to restore Radio Mangle's frequency, after storm damage from Hurricane Agatha in 2010 disabled radio equipment, was a result of the broadcasters' known political support for FMLN in the run-up to

legislative elections in 2012. A sensitive member of President Funes' staff was concerned that the radio would be used for political propaganda, and his office declined to renew it until after the elections. Both candidates returned by Usulután to the legislature in 2012, as it turned out, were FMLN and former Presidents of the Mangle Board of Directors: Arístides Valencia, the founder of Mangle, and Estela Hernández, the first woman director. President Funes authorized a new frequency during 2013. All the ADESCOs of the Lower Lempa celebrated the re-launch of Radio Mangle at a ceremony in the Coordinadora shelter in Ciudad Romero on 3 May 2013 (Figure 7.2).



**Figure 7.2.** Relaunching Radio Mangle. Romero, May 2013. Note the mangroves in the upper right-hand corner of the banner.

Radio and television are used extensively for disseminating messages in El Salvador, both by the government and the private sector, as we saw from the telethon example in Chapter Five. All of the *rescatistas* except two had heard of climate change either through radio, television or from someone else in their community. Neither was typical of the overall *rescatista* profile - one was a fairly recent arrival from Guatemala working as a day laborer in Romero, and the other a very poor squatter in Salinas del Potrero who could not afford the \$400 connection fee to obtain piped water until he became involved with the restoration work. Even households that did not pay for electricity had battery-operated radios (Radio Mangle broadcasts to about 6,000 households in Lower Lempa), and almost everyone had a cell phone (33 out of 39 survey respondents, Table 7.1). On a later visit (August 2013) I observed one of the *rescatistas* who had dismissed cell phone ownership as unnecessary during the survey in January 2013 absorbed in conversation on one as she swept her front yard.

 Table 7.1. Cell phone ownership among rescatistas.

Community	Cell phone	
Las Mesas n=17	15	
Méndez n=14	11	
Romero n=2	2	
Sisiguayo n=6	5	

The internet is not commonplace. There is one cyber-café in San Nikolas Lempa to serve the needs of the general public in Lower Lempa and internet connection is available intermittently in the offices at Mangle and at the ADESCO office in Méndez for staff and visitors who bring their own devices. To most people at the moment it is not a natural medium for obtaining information, although it would be welcomed. Newspapers and magazines are not widely available outside the capital. Yet the penetration of the concept of climate change is deep in the population, as apparently is the idea of climate mitigation, suggesting that the Environment Ministry's proposal for large-scale ecosystem and landscape restoration was circulated widely in Lower Lempa. The question "Have you heard of climate change?" on the survey instrument received an almost overwhelmingly positive response (38 out of 39 respondents said "Yes"). Almost the same number responded to a question about climate mitigation without any apparent need for clarification in January and April 2013 (n=36/39), suggesting that the concept was already familiar, even though it is hardly the subject of normal domestic discourse, but more common in the context of scientific debates about "what to do about climate?"

The different physical environments of the restoration projects made for different experiences for all of the *rescatistas* involved. The daily walk to El Llorón would begin at the house of one of the community leaders, a resource guard who lived on the edge of Las Mesitas. It was familiar to many, as the track led to the community shrimp ponds where many earned much of their cash during a good rainy season. It passed cattle pastures and an agroforestry project for fuelwood to replace mangrove use. FIAES had installed a number of interpretive signs along the route in the hopes that it would attract ecotourists, so one or two people would have been familiar with the occasional tourist asking for directions, and led them along . The few people from Las Mesas who collected mangrove crabs (*punches*) would know to time their visits with the tides so that they were not stranded in the mud upstream as the tide swirled out. Travel through mangroves is much easier in a canoe than on foot. Everyone knew where the mangroves were, and had opinions about what they were good for, and what should be done about them. But before the restoration, no-one in their right minds would willingly have

immersed themselves in the pungent-smelling mud. Many of the *rescatistas* had come from somewhere else, had not grown up in the environment, and probably had had to acquire the vocabulary to describe and live in it from someone other than a parent. Apart from the two older individuals, only one of whom had lived his whole life in the community, all had come into the area after the Peace Accords of 1992, one group fairly soon after the Romereños had facilitated the road improvement, and another group about 10 years later, some as dependents. Their thoughts on mangroves and the environment were varied, as their responses to questions analyzed below show: some were managerial, some aesthetic, some expressed in the language of ecologists. It is tempting to see this diversity in terms of their varied backgrounds and personalities, but there is no particular pattern, and with such a small sample it would be imprudent to search for either correlation or causation. The history of Romero was described in Chapter II, so the date when the community was established is known to be 1990, just before the Peace Accords. Romero is not particularly close to extensive tracts of mangroves now, and those that exist are gallery forests along the rivers. The two workers who completed the surveys had surprisingly detailed thoughts, mostly political, about mangrove management, even though the work comprised mostly cutting up dead trees and hauling them up steep banks out of the river bottom. Their thoughts on law enforcement (more was required), upstream agrochemical use (using less was better) and silviculture (essential) were in line with those that an employee of Mangle (Interviews 1-3-2012) might have expressed. Both men had come to Romero after its foundation. One was 51 and had spent 26 years of his life there, the other was 39 and had lived in Romero for 15

years after marrying a Romereña. Their environmental attitudes were distinctly managerial.

One *rescatista* from Sisiguayo had lived in the community all her life. Her mother had lost her husband when the army dragged him from their house in Morazán in the middle of the night, and the young family had fled south from the mountains. They were a bookish family, and she, like her older sister (the only female resource guard in the Lower Lempa) was an avid reader of natural history. The other *rescatistas* were all more production-minded. Sisiguayo was formerly the salt-producing community for a large estate. The European Community funded the conversion of many of the salt-ponds to shrimp aquaculture after 1992, as it did at Salinas del Potrero so that when the shrimp ponds were functioning, many people from Sisiguayo earned a living there. Apart from a 55 year-old man who had only moved there in the past 3 years, they were all in their early twenties and had arrived as young children. As in Las Mesas, these young people had come with their parents from other departments in El Salvador and had had no previous contact with mangroves, let alone a working relationship with them.

Méndez, on the other hand, was completely the opposite. Almost all the *rescatistas* had grown up on the shores of Jiquilisco Bay, attached to the great Hacienda Limón, and had been involved in extractive activities in the mangroves since they were very young (Interview 6-2013). The oldest *curilera* in Méndez was over 70 years old (although no longer collecting clams, and not part of this survey) and had taken her fair share of children out to show them the best places and ways to fill a basket (Figure 7.3).



Figure 7.3. The oldest *curilera* in Méndez. April 2013.

One of her sons was included in the survey, although she was sure he did not know enough to participate.

Méndez residents had participated in a series of mangrove planting projects with Mangle for over a decade. The largest was carried out on an offshore island that served as a rookery for migrant waterfowl, the Bird Palace, or *Palacio de las Aves*. In the early years of the new millennium, an extraordinarily large flock of whistling ducks (*Dendrocygna autumnalis*) settled on it and within a short space of time had decimated the mangroves due to their weight and the acidity of their faeces (according to the people of Méndez, Interviews 2-2012 and 6-2013). MARN was called in to cull the population. Soon after Mangle helped with a replanting effort that was not based on EMR, but which has flourished in the sense that the trees are now over head-height (Figure 7.4). Attitudes Figura 1. Siembra de candela de mangle en Isla de Méndez



Fuente: Asociación Mangle, 2002.

Figure 7.4. Planting *Rhizophora* propagules at Bird Palace. From Weller 2012.

towards the environment in Méndez tend towards the utilitarian and the managerial, in fact no-one really felt that their experience replanting had changed their attitudes in the same way that those at Las Mesas felt more positive towards it following restoration

(Table 7.2).

**Table 7.2.** Change in *rescatistas* attitudes towards the environment after restoration work.

Community		<b>More Positive</b>	Same	More Negative
Las Mesas (	(n=17)	16	1	0
Méndez (	(n=14)	2	12	0
Romero (	(n=2)	0	2	0
Sisiguayo	(n=6)	3	3	0

All these responses were conceptually far removed from the abstract visualization of the participants at the COP-16 in Cancún, who thought in terms of

metric tonnes of carbon dioxide that could be sequestered in the anoxic soils beneath undisturbed mangrove forests. Yet the *rescatistas* were also capable of conceptualizing mangroves in the abstract as part of a mitigation response to climate change (Table 7.3).

**Table 7.3.** Responses by *rescatistas* to the question "Is climate mitigation a good reason to restore ecosystems in the Lower Lempa?"

Community	Yes	Don't know/depends	No
Las Mesas (n=17)	15	1	1
Méndez (n=14)	14	0	0
Romero (n=2)	2	0	0
Sisiguayo (n=6)	5	1	0

The negative response came from someone who felt that livelihoods were a more important reason to restore mangroves than climate mitigation, and the "depends" responses were qualified by similar concerns. They all seemed quite comfortable with the concept of an ecosystem.

Language drawn from discourses of ecosystem services was also apparent in responses to open-ended questions about feelings towards the environment. Respondents said "Trees purify the air – we shouldn't cut them down" and "One manzana of mangroves produces a lot of oxygen" which represent the Regulating Services of the MEA almost to the letter, yet could hardly be thought of as originating from personal observations or locally-produced knowledge. As we know, the environment and landscapes of the Lower Lempa before the Peace Accords were monocultures of cotton, cattle and rice, with very few of the current inhabitants living in them full-time. Mention
of "species" and "extinction" was also surprising in an answer to the question of whether natural resources had a future:

Some species will survive. Others are in danger of extinction. We need to abstain from consuming something that is in danger. (Survey 36-2013)

Biology is not taught at that level in the public schools of the Lower Lempa, yet seemed quite unselfconscious coming from the speaker, a young farmer and fisher from Sisiguayo, perhaps indicative that he watched natural history programs on television.

Respondents expressed concern for the future, but the majority were optimistic, dependent upon the behavior of those living in the present (Table 7.4). Uncertainty about whether people living in the future would have the same level of enjoyment of mangrove

**Table 7.4.** Responses by *rescatistas* to the question "Will future generations be able to enjoy mangrove resources like now?

Community		Yes	Don't know/depends	No
Las Mesas	(n=17)	15	1	1
Méndez	(n=14)	8	4	0
Romero	(n=2)	0	1	1
Sisiguayo	(n=6)	4	2	0

resources, such as fish, crabs and clams, was based almost entirely on consideration of extractive behavior in the present. At least three respondents suggested that current levels of use guided their cautious views. Most felt that caution in use and care of

resources in the present would guarantee at least current levels of crabs and fish, as would increasing the numbers of mangroves, but there were doubts expressed as well:

If we take care of them. (Survey 11-2013)

The crabs will increase. (Survey 3-2013)

It depends. If we carry on destroying them like we are, there will be less. (Survey 34-2013)

The resource guards in the next section, and the communities involved in the local plan for sustainable management, PLES, described below, were motivated by similar views.

We're living in the mangroves, making use of the mangroves, but if we don't support them and protect them, one day they're going to come to an end. (Interview 3-2012)

People value children highly in rural El Salvador. They occupy a central place in the home and in public spaces so there was almost unanimous agreement among the survey respondents, not all of whom were parents, that sacrificing use of natural resources in the present was important for children, even if their future likes were unknowable (Table 7.5). "Don't extinguish their aspirations!" exhorted a materially comfortable mother as a litter of piglets raced around the substantial wood pile near her kitchen (Survey 5-2013). Throughout the surveys and the interviews, one word ocurred over and over again - *cuidar* – to take care.

**Table 7.5.** Responses by *rescatistas* to the question "Does it make sense to sacrifice using resources now so that future generations can enjoy them?"

Community		Yes	Don't know	No
Las Mesas	(n=17)	16	1	0
Méndez	(n=14)	13	1	0
Romero	(n=2)	2	0	0
Sisiguayo	(n=6)	6	0	0

Taking care of the mangroves through their efforts and sacrifice for as-yet unborn children made sense, and informed the local plan for sustainable use – the *Plan Local para Extracción Sostenible* (PLES). "We hold the view that natural areas should be used responsibly, moderately and in a regulated manner," explained the President of PLES, giving dwindling returns of crabs and fish as the motivation for self-limitation (Wilmot fieldnotes, 9 July 2011). PLES was a matter of considerable pride to the participating communities, as it had emerged from within them and been developed through their own efforts, only needing legal authority from MARN (Interviews 1-4, 2012).

The sense of altruism carried over to a certain degree to outsiders. Although poaching was a problem locally and there was a general sense (perhaps derived from Herman Rosa Chávez's press releases) that climate change was not something that El Salvador had contributed much towards, people in the Lower Lempa were mostly inclined to continue with what they considered right, even in the presence of freeloaders. The response to the question of whether it made sense for people to be good citizens when all around were breaking the rules was far less positive overall than to other questions (Table 7.6), yet the majority were still inclined to believe so. Ironically,

it is the residents of Méndez, who habitually took *curiles* from Salinas del Potrero's territory, who were more ambivalent about local care-taking than their neighbors across the bay in Sisiguayo, or from Las Mesas.

**Table 7.6.** Responses by *rescatistas* to the question "Does it make sense for people to be good citizens locally if other people are not taking responsibility for their actions somewhere else?"

Community		Yes	Don't know/depends	No
Las Mesas	(n=17)	10	6	1
Méndez	(n=14)	9	4	1
Romero	(n=2)	1	0	1
Sisiguayo	(n=6)	6	0	0

The majority (n=26) thought that it was worthwhile to be good environmental stewards for the benefit, not just of their own communities, but other communities as well, as an example for others to follow:

We should invite them to take care of the environment! (Survey 3-2013)

It's honorable and wise. (Survey 7-2013)

It brings benefits to all communities. (Survey 19-2013)

One held up the example of nearby communities that did not participate in La Coordinadora as environmental horror stories that would benefit from a change in behavior (Survey 35-2013). The negative respondents felt that property violators should be dealt with by the law, and that it should apply equally throughout the whole country. The question was not extrapolated to a supra-national level, but could well have been applied to responsibility for climate change.

The experience of restoring mangroves on the whole was positive for the participants, and for some meant more than just a job, although all who were surveyed were grateful for the work (Table 7.7). Several responded that it was more than simply a way to earn money, without elaborating further. I mentioned in Chapter II that it would have been instructive to have interviewed more people, and here those that did not work for the whole length of the project might have contributed some interesting insights to the question.

Table 7.7. Responses by rescatistas to the question	"Is restoration just work,	or is it
something more to you?"		

Community		Work	Something
			more
Las Mesas	(n=17)	8	9
Méndez	(n=14)	5	9
Romero	(n=2)	0	2
Sisiguayo	(n=6)	0	6

The responses for those that felt working on mangrove restoration was more than just a salary fell into three distinct groups. The first was aesthetic, and consisted of comments about the beauty of nature, the joy of being outside, the pleasures of meditating on natural scenes:

It's pleasant – you can meditate. It's peaceful. (Survey 11-2013)

Makes you think. (Survey 12-2013)

It's so beautiful! There's everything here! (Survey 26-2013)

The second was utilitarian and saw the value in making the water flow better, or provide better habitat for shellfish, or livelihoods for poor people in the community:

It makes the water flow so that we don't get inundated. (Survey 37-2013)

It's important for poor people. (Survey 30-2013)

The water flows better. It's a benefit for the whole community (Survey 32-2013)

The third related to the future, and the thought that even though the benefits were intangible in the present, restoring mangroves might have positive results at a later date:

In the short term it's work, but you never know what mitigation will do in the wet season. (Survey 35-2013) It's for tomorrow. (Survey 29-2013)

Unforeseen consequences. (Survey 38-2013)

The PLES communities (Las Mesas and Montecristo foremost among them) were the first to propose to Mangle and EcoViva that the mangroves near El Llorón should be restored for the future, and thus were instrumental in introducing EMR and thereafter *la técnica REM* to the Lower Lempa.

### Authorizing La Técnica REM

The mangrove restoration workshop that took place in Ciudad Romero between 11-15 July 2011 had four main goals: to discuss with the 30 participants the problem of mangrove degradation and loss; to discuss ways to restore mangroves, primarily the sixstep Ecological Mangrove Restoration protocol presented in Table 5.4, Chapter V (that promotes site characterization, autecology, restored hydrology and community involvement before considering planting); to familiarize the participants with a real problem in the field (El Llorón), and to devise solutions to the problem which could be implemented under MARN authorization. The workshop was opened by Jorge Oviedo, the Director of FIAES. Estela Hernández of the Mangle Directiva in her welcoming remarks stressed the importance of mangroves to the people of the Lower Lempa. Jim Enright of MAP-Asia led the workshop. Since he did not speak Spanish, simultaneous translation was provided through headsets throughout the meeting in Romero (Figure 7.5). Field translations were provided by Nathan Weller of EcoViva. There was no



Figure 7.5. Jim Enright of MAP. Leading the workshop in Romero, July 2011.

official from MARN present. A contractor with PACAP, the World Bank project on protected areas embedded within MARN, took part. Oscar Molina was the scientific expert on mangroves in El Salvador, having spent over 20 years working in all of the major mangrove areas in the country: Barra de Santiago, the Gulf of Fonseca, Jaltepeque Estuary, Lower Lempa and Jiquilisco Bay. By August 2012, as PACAP came to the end of its term, he was obliged to enter the MARN building using a temporary pass, but during the workshop his knowledge contributed greatly to the understanding of the state of mangroves in El Salvador on the part of the other participants, who included five of the resource guards. These are among the resource guards who gave interviews in August 2012 (n=5) and participated in the roundtables at Montecristo in January (n=7) and April (n=8) 2013. Of those resource guards that gave interviews, four of the five (including one guard who had not participated in the workshop) mentioned *la técnica REM*.

The second-oldest resource guard who had spent the war years in Las Mesas had this to say about *la técnica REM*:

When REM came, we here were in the counter-current. We were planting propagules, and we saw that they didn't survive flooding from the Lempa. We lost them all in standing water, nothing survived. When REM came they applied the method to let the mangroves restore themselves. I'm aware of all these things. Now the sediment has been removed and the mangroves are back because now the freshwater is mixed with the saltwater from the sea. (Interview 12-2012).

His understanding of hydrology as it affected mangrove physiology was clear. The idea of removing sediment in order to let water flow freely is an important concept in irrigation and flood control, and has strong historical roots in the area. As the project manager from Romero had said, the entire area from San Marcos Lempa to Sisiguayo had been covered in cotton plantations before the war belonging to the family Dueñas y Regalado (Interview 11-2013). Elisabeth Wood (2003:1) corroborates this landscape with a description of the pre-war situation for the area of Salinas del Potrero further east: "almost everyone in Tierra Blanca worked on the Hacienda California, a giant farm stretching from the edge of town across the fertile coastal plain to the Bay of Jiquilisco ten kilometers to the south…tending cotton and cattle and processing salt on the Palomo family's vast and well-guarded estate." Workers like the oldest resource guard had experience tending to these vast estates and considered the abandonment of the drainage ditches and lack of maintenance to be the principal cause of the problem of the standing water that was drowning the mangrove plantings (MR I-2013).

The youngest resource guard also mentioned hydrology in his interview comments on restoration techniques:

There's a technique, called the ecological restoration of mangroves, *la técnica REM*, which we have used on a pilot project here in Las Mesas, on a canal called El Llorón. It consists of opening up secondary canals so that with the flow of water seeds from the different mangrove species are carried to places where they sprout. The results are so good that two projects in other zones have been approved using this technique. (Interview 3-2012)

During the April roundtable, the same guard mentioned that he had tried to use the logic of facilitating seed transport in order to obtain funding to clear logs that impeded boat traffic out of a primary canal, but the project gatekeeper at FIAES, the funding agency, had told him that this did not constitute *la técnica REM* (MR II-2013). (She had also participated in the workshop and knew that mangrove seeds could float past submerged logs.) The technique was not only open to interpretation, as the simplified language of "characterization" did not spell out the vast amount of expert knowledge that lay behind it, with ample potential for uneven application, but even contestation among workshop participants over the translations from English to Spanish. The guards amongst themselves were quite consistent in their recounting of what they had learned about *la técnica REM* at the workshop. The guard who had not mentioned *REM* in his interview (Interview 10-2012) in August 2012 had this to say:

The institutions (MARN and FIAES) had been spending a lot of money on planting trees where they were not going to grow. With *la técnica REM* the same tide that brings sediment into the creeks brings seeds, and they stay and grow. Lots of people had been very enthusiastic about mangrove-planting projects, but they never grew because the salt-water never reached them. (MR II-2013)

The cost of restoration by planting was mentioned by several of the guards (although no figures were given), as was the need to find a less wasteful method in terms of money and human effort to restore such a special place:

It is natural restoration, which doesn't need the human hand to plant trees. And why is that important? Because Jiquilisco Bay is a biosphere reserve and a RAMSAR site, and the Bay has the capacity to restore itself. We just have to give it a chance. (MR II-2013)

That chance would be possible, added the youngest guard, if all the steps of *la técnica REM* that they had learned in the workshop were followed. His memory was impressive:

First we have to identify the area. We have to know the history and previous environmental characteristics of the area. After the first steps of identification and characterization of the area, we need to learn to identify what actions we can take, where the seeds are going to come from, so that mangrove restoration works. *La técnica REM*, apart from being an action that benefits the mangroves also has to benefit the community, bring economic benefits in. (MR II-2013)

Raising community awareness through the labor of restoration was another of the benefits and as we saw above in the testimony of the *rescatistas* in Table 7.6, the work was more than just physical effort for a salary, even though the \$10 per day was most welcome. It was also something that could be copied at sites other than El Llorón, and in other parts of the bay, for example in Puerto Parada which is located down a different access road off the coastal highway and therefore quite a long travel distance from Lower Lempa, but with similar stands of degraded mangroves. One of the guards joined the discussion with these thoughts on the mobility of the technique:

I would change the expression from "awareness" to "appropriation". It (*REM*) is an instrument that is in practice in our country. It's worked in other countries, and in ours for a year and a half. We don't have many measurable results. But we do not have to be paid to do the work. We have had meetings where we have said we could do it a bit differently. It is mangrove, I live here, and it is the same mangrove, but I am going to make *la técnica REM* my own. (MR II-2013)

The speaker went on to distinguish between appropriating the techniques (means) of production, and appropriating, or making one's own, the ends (goals) of production. This is an important distinction, as the means can be reproduced from community to community and from place to place, but the ends of re-establishing mangroves are territorialized locally. Appropriation can be discursive or material. One of the local particularities, which distinguished the Lower Lempa expression of EMR from say, Thailand (Enright 2012), was the extensive use of women to carry out the physical work, revealed through the household surveys in Chapter VI. The means of producing mangroves were further gendered distinctly within the Lower Lempa, since female participation was much higher in Las Mesas than Romero, for example. The goals of production also differed significantly among communities, as each one interpreted EMR in their own localized version of *la técnica REM*.

Economic principles were apparent in MARN's call for proposals for the clearing of the rivers Borbollón and Espino (Table 2.1, Chapter II), where mention was made about distributing wood removed from the rivers to the local communities, but flood

control and shrimp larval transport were the major drivers for these projects according to the document (MARN 2012). No reason for the difference in focus was offered, but this was confirmed by a PowerPoint presentation I was shown in the MARN office being vacated by PACAP contractors during a visit in August 2012. It was a view echoed by workers and managers from Romero and Salinas del Potrero. So, for example, some of the comments that were made in response to the question about work in Table 7.6 as "It makes the water flow, so that we don't get inundated", "The river isn't going to clean itself" and "The water flows better" suggest that flood control is an important reason for undertaking "mangrove restoration" (Surveys 2013). Asociación Mangle was responsible for oversight of all these projects and yet somehow, since El Llorón, the emphasis had shifted from the ends (mangrove restoration) to the means (water control). The project manager from the communities of Salinas del Potrero, which took part in the clearing of the river Borbollón during March-May 2012 was even more explicit during the roundtable on 1 May, 2013 about how the rescatistas had made the project their own:

We're going to talk about the way we saw the project. It was a project to benefit the communities. That's the way we understood how to live with the work that affected our communities. It was totally appropriated by us. That is to say, there was no-one from outside who appropriated the project, it was us who made it our own (*nosotros que apropiarnos del proyecto*). And that matters. (MR III-2013)

One of the workers, who summarized the speakers at the roundtable before him almost verbatim, said how much he had enjoyed the fellowship of his work companions, and how valuable the work had been for his household, but also:

The benefit this will bring to all the communities of Salinas del Potrero, with this drain cleaning, because the water will flow much more rapidly, and we won't suffer the consequences of a discharge. It would be better to do more, because the scale of the work is not large enough (MR III-2013)

All the participants at the roundtable agreed that the work was vital for the community because flood control was for them, not for an ADESCO, or for Mangle or for the Environment Ministry. They reported that the workers conferred and made decisions every morning about how to proceed before starting work, and in the evening they reviewed the day's efforts. Their hope was that they would avoid floods in their cattle pastures and that their cattle would not suffer from the sicknesses that prolonged flooding brought to them. All of these desired outcomes were to be achieved through the application of *la técnica REM*. The extension agent from Mangle had little to say about the conduct of the project, and whether this daily on-site modification was acceptable practice according to the MARN proposal guidelines, since it gave the workers ample opportunity over the course of two months to change the means, if not the goals, of restoration. He accompanied Dr. Brannstrom and myself to Salinas del Potrero to meet the project manager, so presumably the work had met the immediate performance

measures. How were results to be measured? What of the longer-term results that each worker hoped for besides the salary?

El Llorón in August 2012, during the wet season, was a place where the timing of the tides needed to be considered before planning a visit (Figure 7.6). It was not a dry walk to El Quemado, as it had been during the workshop in July 2011. EcoViva asked me to describe what I had seen when I visited it with the resource guards so that their supporters could get a sense of how the restoration work had turned out, and reproduced my e-mail to Nathan Weller in their 28 August, 2012 Newsletter under the heading "Now That Is Restoration!":

There are still a couple of patches that get snarled up when the tide is flowing out. But otherwise, it's a tidal creek, restored. A couple of *martin pescadores* (kingfishers) and a *raptor tigre* (bare-throated tiger heron (*Tigrisoma mexicanum*) later, and we were getting out in a fizz of jumping shrimp at the place where we held the workshop last year. We'd seen a few pairs of Great White Egrets in the shrimp ponds earlier, but this was a white-out. Needless to say, as we approached we flushed a lot of them way into the distance. But still, sitting up a tree were two pairs of roseate spoonbills and a pair of woodstorks. Not just one random, lost bird, but three pairs of very picky waterbirds right at the edge. The water was clear, odorless, and full of life. That is restoration!

In August 2013, the tide was in at El Llorón and the area of El Quemado was underwater at the time of my visit. There were two species of year-old mangrove saplings emergent from the water around the fringes of what had been an expanse of baked mud covered



**Figure 7.6.** Resource guards at El Llorón. Photograph by Tricia Johnson, EcoViva, August 2012.

in fallen trees during the drought, but no waterbirds this time. There has been no severe climatic event since 12E in October 2011 to test whether the drainage efforts at the other sites have served their purpose. A visit to Salinas del Potrero in August 2013 revealed flooded pastures and a road that was impassable to any vehicle other than a 4-wheel drive (see the figure on p.157, Chapter VI). I was informed that the rainfall and flooding were normal for that time of year. A week of daily rain had brought the level of the Lempa up to the highest that I have seen in three years, but no-one in Romero was concerned.

#### **Circulation of Ideas**

Rebecca Lave is the geographer who has paid most attention to stream restoration and her pioneering work bringing political ecology into conversation with science and technology studies (STS) has established the importance of revealing the production, circulation and application of the science that underpins nature-society studies (Lave 2011, 2012; Lave, Doyle & Robertson 2010). Lave's work shows that standardization of approach is the key to structuring the restoration field in a bureaucratic system such as the highly regulated world of the Environmental Protection Agency (EPA) in the United States. As we have seen, the Salvadoran Environment Ministry lacks the regulatory force of the US EPA, and in fact lacks permanent staff to oversee mangrove restoration in the country. How, then, is the necessary knowledge to carry out mangrove restoration circulated beyond the limited group of participants at the July 2011 workshop?

In order to understand how ideas circulate between communities in rural El Salvador, we turn to a meeting I attended in 2011 between Mangle and a non-Coordinadora community from northern Usulután department, where perceptions of Shaka y Dres' lyrics "Violent rains are destroying the crops" meant more than a stirring line in a popular song. This community has the potential to participate in projects calling for application of *la técnica REM* as appropriated by Salinas del Potrero, if need for flood control is the qualifying factor for a MARN-sponsored restoration project.

At 8.00 a.m. on the morning of Saturday, 9 July 2011, a minibus with 23 men, women and children pulled into the driveway of Mangle's offices in San Nikolas Lempa. They had come on an exchange visit from Nueva Granada, a community of excombatants who had spent time in camps in Honduras during the civil war before being demobilized in eastern Usulután. The community started small with 33 families, not unlike the communities in the Lower Lempa, and had been settled in the San Miguel river floodplain where, according to one community leader, after a heavy rain "the streets are canyons for that water" which then flows into Jiquilisco Bay. Many of them were illiterate, as it turned out, when the sign-in sheet was passed around, so even the boat title was not legible to them when the minibus pulled up on the banks of the Lempa to transfer them to the Mangle Rojo for the ride across the river to Isla de Montecristo (Figure 7.7). Most could not swim and had never been in a boat before. Their fear of water was profound and threatened to jeopardize the whole meeting as some of the women were reluctant to take the risk of getting into the boat at all. It took considerable reassurance, not least that there was a woman (me) with them who had survived several boat trips and professed to enjoy them. There was much to be learned about water that day.

We learned from Mangle, for example, after arranging ourselves in a circle around the community ranch house when we arrived in Montecristo, how people in the Lower Lempa had formed a Peace Committee in a floodshelter in 1995. A small group had organized themselves, as the Lempa flood water spread through their hamlets



Figure 7.7. Visitors from Nueva Granada setting out for Montecristo, July 2011

outside, into a decentralized, community-based decision-making body, La Coordinadora del Bajo Lempa, most of whose members were women. Their aim was to improve the living conditions of the community. "We were born to serve," he said, "but because of our limited resources we make alliances, we make a symphony" (Wilmot field notes 2011). Others spoke, from Lower Lempa and from Nueva Granada, of challenges and successes in establishing order in their new life, and securing services (potable water, electricity, streets). "It has been hard work," they all agreed. Important to all was the struggle for a radio frequency to facilitate communication during floods. Mangle's transmission equipment, provided by the Norwegian Government, had burnt out in 2010 during Hurricane Agatha. Mangle was hoping to share frequencies with other communities that were still on the air, as they are the first responders in the Lower Lempa during natural disasters. All spoke of the lack of government help, which, like the gentleman with the red cape in the nineteenth century who Stephens passed with a bow in Chapter I, was spread thinly across the territory. "How do we get them to listen to us? What can we do?" questioned someone from Mangle.

### Reassembling

Before the FMLN government, choosing political candidates in the department of Usulután was a balancing act in a world of clientilism. In order to garner support for their initiatives, the people of the Lower Lempa had had to take to the coastal highway to attract the attention of international observers, travel to San Salvador to engage the federal government, or deal with the fickleness of the municipalities (Reyes 2012). Even though, as someone from Lower Lempa said with respect to local government, "We are all the Lempa River, but always the question comes up 'Who was with the army and who was with the FMLN?' Which candidate did we choose – the one the municipalities liked or the one we wanted?" The practice of embedding pro-elite factions within local communities as a divide-and-rule strategy during the war still continues to affect local politics, particularly in the urban centers of Usulután where *remesas* are common and FMLN partisanship cannot be taken for granted (Wood 2003). The importance of circulating ideas informally between communities in order to achieve collective goals despite municipal indifference is reinforced by the example of blast fishing.

During the three years of fieldwork (2011-2013) I observed only one significant instance of cooperation on the part of the municipalities with the rural communities on environmental issues. This concerned an agreement between the municipality of Usulután, the National Police, and the fishing cooperatives of a sister organization of Bajo Lempa, La Coordinadora de Puerto Parada. They agreed to work towards enforcement of a prohibition on blast-fishing in Jiquilisco Bay which was in any case a national policy. (Blast fishing causes considerable damage to every organism in the

vicinity of the explosion, including mangroves, which are cut down and stacked in the water near the tree edge-line to provide fish-attracting devices (FADS). Bombs made out of fertilizer in bottles are tossed into the FADS, instantly killing everything in the water, sometimes maiming the bomb thrower, and causing damage to mangrove roots in the impact zone.) The agreement took three years of effort, facilitated by Nathan Weller of EcoViva (EcoViva Blog, Facebook, 12 June 2013). Although outside the scope of this dissertation, the work in creating that assemblage has mirrored that of mangrove restoration, and intersected with it at various points. Many of the staff at Mangle and community leaders in the ADESCOs, as well as fishermen and *curileros/as* are involved in both and see them as part of the same problem of natural resource management in Jiquilisco Bay.

## Discussion

In common with government bureaucracies elsewhere, the Environment Ministry relies on staff-level employees to develop the content of policy documents. The REDD-Readiness Preparation Proposal document of November 2012, for example, lists five authors and 13 data collectors under the contact name, Herman Rosa Chávez. But Rosa Chávez is the political appointee responsible for shaping, approving and conveying the administration's message to the targeted audiences identified by his communications staff. His political imagination enables him to work on the non-economic spheres of human rationality; to borrow Judith Butler's expression, he understands the performative in the political, where identity, ethics, community and global belonging intersect (Butler

& Athanasiou 2013). Yet he has to present dour numbers and charts, relying on the cumulative effects of more and more dire statistics, in order to sustain the scientific credibility on which his message depends. Climate change is not a whim on the part of donor-seeking indigents from the developing world. It is real, happening, now, and there are reams of data to show it. At the COPs he can be more dramatic. The ministers from Tuvalu (at Copenhagen in 2009) and most recently the Philippines (at Warsaw in 2013) have upstaged him, but he is still, as we saw in Chapter V, a master of the rhetorical flourish.

The introduction of Shaka y Dres' dramatic music video into his meetings in April 2013 was a break with the past. Images of a young man in a gas mask singing from behind piles of burning trash and hanging off the side of a smoke-belching city bus going past the familiar statue of the Savior of the World (*Salvador del Mundo*) in San Salvador's city center brought the concept of climate change into conversation with the lives and quotidian activities of the ordinary people we met in Chapter VI. People in the Lower Lempa have no trash collection services and regularly burn their solid waste in the streets, and in their forays into urban centers take poorly maintained buses to get around. The images must have resonated with familiarity. As we know from the telethon, Shaka y Dres are familiar sights and sounds to almost anyone who has spent time in front of a television screen in the last few years in El Salvador (I may not have known their names, but I instantly recognized their style in the Sheraton in April 2012). They have the authority of modernity to address the huge, young, post-war population. Rosa Chávez was clever to screen the video to an audience that was becoming tired of

the same over-used meteorological mantra, although they were probably inured to that message as well. The urban audience had already become reducing, re-using, recycling climate subjects.

The *rescatistas* already live on the front-line of climate change and are predisposed to "do something", even though their wished-for relationship with the state would allocate a greater role to it than at present. Other studies of vulnerability and risk following Hurricane Mitch in the region suggest that they might be better-off as they are now, working out their own solutions with Mangle through trial-and-error. McSweeney & Coomes (2011) offer a counter-example to the view that resource-reliant poor people are acutely vulnerable to extreme weather events and therefore need development assistance to cope with future shocks. Their longitudinal studies in northeastern Honduras indicate, much as the Coordinadora of the Lower Lempa has shown, that out of the disaster of Hurricane Mitch new institutions came into being that contributed to resilience during later extreme weather shocks. In the language of Li's analytic, citizens are capable of reassembling elements after the failures of old arrangements.

The future is important in the *rescatista's* calculus of living in the present, as the level of support for restoration of livelihoods attests in the survey sections analyzed in this chapter. They are prepared to sacrifice in the present to make the future livable for the next generation, otherwise they would not have instituted their own management strategy for dealing with poachers and over-harvest of crabs through PLES, and organized other bay communities around the discourse of preserving fish and mangroves for the future, through the blast-fishing control initiatives.

Through the appropriation of *la técnica REM* for flood control, Mangle and the communities deployed existing discourses of mangrove restoration, loosely interpreting hydrologic restoration to become "storm drain construction along rivers with mangroves present" and thus took advantage of the ambiguities present in materials prepared by MARN. As Robertson noted in the context of the US EPA, sometimes implementation of an initiative requires the "savvy and skill" of a staffer (in this case the project manager from MARN who grafted EMR onto an earlier project for flood control and shrimp larvae transport) to present an idea in language that would appear to anyone higher in the hierarchy, or indeed a casual observer, as nothing other than a straightforward project following department policy (Robertson 2010).

Beyond their immediate circles, though, they are prepared to take action so that others may benefit from their work, even if they are complete strangers. As we saw from the example of the visitors from Nueva Granada, Mangle's vision of resilience extends to sharing in a wider network than the communities of the Coordinadora, both for their own benefit and for that of others. This is implied in their responses to the question about restoration for climate mitigation, even though they might not have considered themselves quite such global citizens. There is something that motivates this high degree of cooperation, collaboration and accompaniment, exemplified by the expression "All in the bed or all on the ground" (Interview 5-2013) that escapes rational choice explanations. Perhaps Romero's homilies, broadcast live years ago but still available on bootleg discs on market stalls around the country, are still shaping landscapes.

# CHAPTER VIII

#### DISCUSSION AND CONCLUSIONS

#### Discussion

The exclusionary discourses associated with colonialism suggest that for it to be present as a project of subjugation of one people by another, certain conditions need to be met: colonized people must be denied voice, autonomy and agency; their activities must be regulated by coercion, sometimes under the guise of the rule of law; territorial control of their lands must limit access to their means of living; and women must be invisible as economic agents to the colonizers (Escobar 1995; Scott 1995). Colonialism thus conceived is a violent practice of power intruded upon people and inserted into their lives. Allegations of colonialism need to be investigated. The under-theorized use of the term by critical environmental scholars perhaps indicates more the frustration of the authors with global climate policies than their intention to use the term as historians and political theorists have done. At any rate, the huge literature on colonialism extends beyond the idea of tributary extraction implied in Bachram's original piece and later citations (Bachram 2004; Bumpus & Liverman 2011; Newell et al. 2012). However, since those authors did not clarify this point, I tested the wider claims made above in Chapters V, VI and VII.

In my analysis of the livelihoods of the *rescatistas*, and of their attitudes towards the restoration work (Chapter VI) I found that although they are materially not as welloff as other members of Salvadoran society and they were not limited in their access to

their means of livelihood by the work of restoration. Neither did they anticipate that this would happen, as they knew from previous projects by FIAES and the Movimiento Salvadoreño de las Mujeres (MSM) in the Lower Lempa that improved resources and a better standard of living are goals of those organizations. In fact, the language in which all the earlier projects were couched indicated that "sustainable development" as a utopian goal underpinned all the project designs, as Deysi Piche made clear at the July 2011 forum (Chapter V). Therefore, those results alone lead me to conclude that on one important count the colonialism argument was refuted. The large number of articulate women engaged in resource-extraction in the Lower Lempa who were contracted to undertake the same work as male labor for restoration further supports that conclusion. Again, employing female-headed households has been a part of the mission that FIAES promotes in its environmental programs. Asked how the projects might be conducted differently in the future brought forth practical suggestions for material improvements from the rescatistas. The opportunity to talk about coercive practices was offered, but never taken up by respondents. Most of them would willingly participate in such projects again, they said. The disabled squatter from Salinas del Potrero, arguably the least advantaged person I met during the household surveys, who was able to provide his family with clean drinking water after participating on restoration, was happy with the outcome (Figure 6.6, Chapter VI). So I conclude that they were not forced to work on mangrove restoration by anything other than poverty, and a desire to do something about the devastating effects of flooding on their health, property and livelihoods.

Left-leaning members of Salvadoran society had waited for nearly twenty years since the Peace Accords of 1992, to manage the state through the ballot box. When this finally became reality with the election of the FMLN in 2009, many intellectuals had had time to prepare for the moment. The Program for the Restoration of Ecosystems and Landscapes (PREP) was the product of considerable thought on the part of Rosa Chávez and other thinkers at PRISMA. PREP was the platform on which the environmental policies of the Funes administration in El Salvador were to be constructed. It was an ambitious policy, designed to restore 50% of the nation's land area to productive soils, clean groundwater and carbon-storing vegetation. It thus required the collaboration of many industrialists, developers, landowners and peasants in order to achieve its goals, something a cash-strapped government with an awkward relationship, to say the least, with the military, could not do through the exertion of force. The need for a subjectconstituting political rationality, climate change, to achieve its aims under these circumstances does not exonerate the government of colonial impulses, but also does not indicate a full-fledged attempt at internal colonialism on the part of the Funes administration over the agroforestry mosaics of El Salvador through REDD+. The FMLN platform is premised on fostering voice, autonomy and agency in the people of El Salvador. Although recent left-leaning governments in Latin America have not always consistently followed their own rhetoric since election, it is still too early to judge whether solicitation of funding through UN sources constitutes a radical change in ideology or policy direction for the FMLN (Yates & Bakker 2013).

What is clear in the analysis is that the role and characterisics of the state make a difference to the way that carbon mitigation schemes are territorialized. Beymer-Farris and Shapiro reached very different conclusions on the social justice aspects of REDD than those offered here, because of the authoritarian nature of the bureaucratic Tanzanian and Mexican states, respectively. Allegations of state corruption in Tanzania, Kenya, Panamá and Indonesia have surfaced repeatedly on the REDD-monitor.org website, while concerns have been raised in Brazil over elite capture of REDD funds by large landholders (Simões et al. 2011). There is work to be done on ensuring that payments are enacted according to the principles of the program. In the Salvadoran pilot project, the number of people involved was small, the sum of money was made public in the media, and transparency was theoretically guaranteed by using Mangle's accounting procedures to make payments to the *rescatistas*. The use of appropriate technology, discussed below, ensured that larger players in the construction industry, potential fund-skimmers, were not involved in restoration work in El Salvador.

The proposed funding mechanisms through REDD+ were still concepts on paper at the time of this research, so other than my research on the pilot projects of mangrove restoration in the Lower Lempa, nothing in print supports or refutes the claim that outside funding for PREP has affected the well-being of the *rescatistas*. REDD+ has been scrutinized by scholars elsewhere and considered to deepen socioeconomic inequalities in rural communities as well as promote poverty (McAfee 2012), but poverty is not exclusive to colonialism. The exclusionary nature of carbon offsets under REDD+ further raised concerns about potential territorial displacements of resource-

reliant poor people to secure forest carbon for financiers, or disciplinary procedures to restrict their use of timber and other forest products, and gave rise to allegations of "carbon colonialism". In all of the 39 household surveys I administered, there was no indication that anyone felt that the state was intending to remove them from their homes and fields, and in fact they felt quite the opposite. The presence of a governmentsponsored program to improve their environment led them to believe that their requests had finally fallen on sympathetic ears, and their opinion of the government had improved. The management plan known as PLES, which the communities around Las Mesas had organized to self-regulate their extractive behaviors, had been given juridical authority and its officers sworn in by none other than Viceminister Lina Pohl in 2012. I conclude from my results, therefore, that the Lower Lempa is no more territorially compromised by mangrove restoration than it was before the work was undertaken. REDD+ is revised annually at the COPs, and now McAfee's recent statement that funding for "PES and REDD programmes is hotly debated, but under currently leading proposals, large-scale REDD would ultimately be financed through global, for-profit carbon markets" (McAfee 2012:106) already seems out-of-date, as the rhetoric is calmer following the collapse of carbon markets. It is difficult for the peer-reviewed literature to keep pace with policy changes in the international climate regime. One possible way that scholars might avoid seeming prematurely anachronistic is by framing theoretical questions so that the burden of argument does not rest on ephemeral data, unless the research is part of a longitudinal project designed to capture events and moments.

The most serious claim for colonialism comes in the creation of "climate subjects". David Scott (1995:205) suggests that colonial power does not simply depend upon control over territory or resource allocation, but over the moral conditions and moral character of the colonized, through actions consciously directed at society. Agrawal (2005:xiii) identified colonial processes of controlling society through decentralized environmental regulation, which led to the constitution of environmental subjects belonging to small, local, regulatory communities. A key process in constituting subjects is the creation of consciousness, a term much used in the Lower Lempa (consentización) by the resource guards, and a clear intention by Shaka y Dres through their music video, Cambio Climático. The formation of self-regulating climate subjects, individuals who respond to moral calls to change their relationships to the environment through perceptions of climate-induced risks, has echoes in El Salvador in the Christian base communities of liberation theology that took root in the 1970s and 1980s. There is nothing inherently strange in responding to a call to do something, particularly if there is rational self-interest involved as well as a moral imperative.

However, environmental identity change is a subtle process taking place within each individual. There is no event or historical moment that marks the point at which climate subjectivity comes into being, nor, if it proves unfulfilling, when it ceases to exist. Li's work in Sulawesi indicated that environmental subjectivity can be ephemeral if circumstances do not reinforce its continued existence (Li 2007b:217). There is no guarantee in the Lower Lempa, if the recent climate anomalies cease and patterns resume to those that existed before, that *cambio climático* will be more than a disturbing

memory and a catchy song. In order for REDD+ to succeed in its goals of reducing forest degradation, biodiversity conservation, and delivery of ecosystem services, it has to attend to continued participation by local communities under conditions of decentralized regulation. The experience of mangrove restoration in the Lower Lempa during the Environment Ministry's pilot project for PREP offers the opportunity to generalize on practices that might foster such continued participation.

#### Lower Lempa Analytic

Drawing on Li, I advance an analytic of six practices which captures the actionable lessons that can be drawn from the Lower Lempa, in order to avoid neocolonial relationships. Keeping this assemblage of practices together requires work on the part of the recipients, as with all development projects, but the opportunity costs, if the projects are carried out at the right time of the year and under appropriate conditions for the workers, are less in sum than the benefits which accrue to them.

## Coordinating

McAfee & Shapiro (2010) and Shapiro-Garza (2013) emphasize the capability of rural social movements in contesting the market orientation of PES programs in Mexico, which caused them to be hybridized into a federal subsidy program for poverty alleviation. In the Lower Lempa, a different process is apparent; this process suggests that neocolonial relationships are more likely to be avoided in situations with high degrees of social mobilization and coordination. The group of six foresighted individuals

that formed the Coordinadora, while waiting out Hurricane Mitch in 1998 (Chapter VII), anticipated the livelihood damage, waterborne diseases and social dislocations that would follow the massive flooding of the Lempa River. Some of them were from Romero and had considerable experience in community organization from their exodus to Panamá, establishment of a viable community there, and subsequent return to Lower Lempa. They had already formed ideas of how to divide tasks fairly, distribute land, and share property, without the support of a functional state justice system. They knew how much work it took for leaders to persuade the majority to participate in communal projects and avoid the wastefulness of internal conflict, in the face of external unfairness and exploitation. The fact that the Coordinadora numbers 86 communities organized in eight local groups, with their own extension agency, the NGO Asociación Mangle, is indicative that the coordinating skills of the original six members are reproducible. The people of the Lower Lempa have their own particular way of coordinating their efforts, as the spokesperson for Mangle said, "we make alliances, we make a symphony" (Chapter VII). Therefore, it is likely that the Coordinadora would have contested or refuted neolocolonial practices associated with mangrove restoration.

# Appropriating

The experience of Mexican social movements organizing against austerity projects of structural adjustment programs early in this millennium enabled them to rally against the neoliberal policies of payments-for-ecosystem-services (PES) by co-opting the language and ideas of market-efficiency towards their own ends. This is remarkably

similar to the move made by Mangle to adopt the ecological mitigation strategy of EMR and make it into the hydrological adaptive strategy of REM. An early review of PES from Rosa Chávez cautioned that combining the goals of watershed management, biodiversity conservation and carbon sequestration into projects was not an automatic guarantee of success if they were not designed with strengthening livelihoods in poor rural communities "firmly in mind" (Rosa et al. 2004:i).

EMR has community involvement as one of its six protocols (Table 5.4, Chapter V), which made it an acceptable technique to the Environment Minister. He also managed to appropriate EMR as policy for his PREP program without having to pay any cost. EMR also recommended the use of appropriate technology, which in the case of the Lower Lempa meant labor-intensive, non-capitalized means of achieving restoration goals. Unlike Rosgen's stream channel classification, however, there is no attempt in EMR to produce replicable results nor to determine a standardized outcome, although EMR requires monitoring, revision and if necessary, adaptation, after several months, then at five-yearly intervals, recognizing that each restoration situation is unique. EMR anticipates outcomes which do not "trend towards success", and its adaptability makes it possible to correct constantly until desired conditions prevail. This chronic uncertainty renders an EMR project hard to monetize in the first few years, which is perhaps why the silviculture approach to mangrove restoration (planting in rows) is more widely pursued around the world, despite its high failure rate. Companies wishing to appear sustainable for their shareholders are prone to favor brochures of brightly-dressed women and children firmly planting mangroves in visible rows for legibility reasons. A webcam of

tides randomly washing seedlings in and out, which would convey the processes involved in EMR, does not have the same immediate, visual appeal. EcoViva and Mangle, in other projects not addressed by this study, adopt a similar visual strategy to attract participants to the hybrid volunteer-tourism program. Through this they are able to appropriate practices and technologies suitable for climate adaptation that are at minimal cost and significant benefit to the communities of the Coordinadora. This lesson, perhaps, is the one the Environment Minister should heed, rather than seeking financing and technology transfer through the COPs to mitigate climate change.

### **Circulating Ideas**

To survive in the Lower Lempa, people need to be in touch, to exchange ideas, and to check on each other. Government propaganda is important, as the ubiquity of the concept of *cambio climático* demonstrated, but it is necessary for people to share knowledge, information and expertise generously with each other in a novel environment. There is little "traditional ecological knowledge" in the Lower Lempa. Returning exiles from Panamá brought with them knowledge that they had acquired from their Guaymí neighbors on the uniformly wet Caribbean coast, but that did not translate completely into the seasonally dry Lower Lempa. Without the checks and balances that long-term knowledge of resources provides, heavy initial use of desirable natural resources resulted, particularly timber and game animals. The conversion of almost all non-mangrove woodland into *milpas* and pastures changed the landscape. This contrasts with the Tanzanian case that Beymer-Farris describes, where at least three

centuries of recorded adaptation have resulted in the Warufiji sustaining and producing biodiversity through their livelihood practices (Beymer-Farris 2013:102). Presumably they had to learn from experience without the benefit of government extension agents. Mangle, in the absence of input from the Ministry of Agriculture, has had to develop its own knowledge base and facilitates the exchange of information among the communities, through its meetings, radio broadcasts and administration of projects. It therefore has control of the ideas that are disseminated and provides safeguards against exploitative practices from outside. The Directiva of Mangle is elected from the communities, so there is a system to manage neocolonial relationships based on the support of the communities. Members of the ADESCOs and Coordinadora committees provide guidance to the Directiva about community needs and wants, as well as voting for it as individuals. Therefore, the Lempa case indicates the importance of local decision-making in reducing the likelihood of neocolonial practices dominating REDD+ practices.

## **Doing Something**

The PLES communities actively solicited input from the Environment Ministry to give them legal status to carry out their self-devised management plan. They put into place the system of volunteer resource guards on their own initiative before the ministry provided salaries. Before the Peace Accords, the members of Ciudad Romero had joined forces with the Cooperative of Nancuchiname in order to gain the legal standing necessary to make a land claim under the agrarian reforms. They were active in

soliciting the road from the coastal highway to link the communities of the Lower Lempa to the outside world. The Coordinadora established Mangle to resolve its problems. Community leaders of the Lower Lempa are always doing something to improve well-being. In common with the social movements in Mexico, and the Warufiji of Tanzania, when events turn particularly troublesome politically in their relations with the state, they are inclined to involve the outside world. They use the press, academics and religious organizations to bring their plight to the public sphere. So access to publicity is necessary. If the outside world is unaware, or indifferent, they have lost a useful ally in the pursuit of fairness and justice. The evictions and social dislocations by the state associated with REDD in Tanzania, Kenya and Panamá, and problems with elite capture of REDD funds by larger land-holders in Brazil, have come to light because the affected people did something to make the rest of the world aware. They did not come to light through an internal REDD audit, or World Bank report on social justice. If the *rescatistas* of the Lower Lempa or the staff at Mangle had felt that there was something inherently unfair about inadequate remuneration or working conditions on the mangrove restoration projects, they would have done something to let a sympathetic outside researcher know their concerns. The chances of neocolonial practices becoming entrenched are reduced in pro-active communities that can communicate injustices with agents who can act in their interests.
### Aspiring

Four of the *rescatistas* were female students, looking to improve lives for themselves and their families in non-traditional ways (Chapter VI). Three of them were preparing for work in business and tourism, in anticipation of the opportunities that development might bring to the area. The fear of the Salvadoran street gangs spreading drug trafficking through the unemployed youth of the Lower Lempa is real. Additionally there is widespread concern to provide ways for all young people, including girls, to find a way to live near home and not migrate out in search of a living. Older single women also have aspirations to live beyond their immediate necessities, as was born out by the number of *rescatistas* in that category. Irene's television set kept her daughters safe and entertained at home, but also gave them a sense of other kinds of life beyond tortillamaking in Las Mesas, even if it was the specter of climate change personified by Shaka in a gas mask, exhorting everyone to change the world. Poor rural women need opportunities and choices to have agency, but above all they need the imaginative freedom to aspire to something more than their stereotypical subordinate role if neocolonial practices of exploitation and unfair treatment are to be avoided.

# **Staying Small**

Liberal and neoliberal governments in El Salvador have tended, like the *parcelas* in the Lower Lempa, towards the Lilliputian in size. The absence of government in the presence of need has created space for organizations like the Coordinadora and Mangle to thrive, close to their constituencies. Unlike the Mexican and Tanzanian states, the

240

cash-strapped Salvadoran state, as distinct from the oligarchy or the military, is unable to regulate or enforce many of its own legal requirements for environmental management. Since REDD is a national-level strategy, the role of the state in creating the architecture necessary for its implementation is crucial. For example, there is no-one currently on the Environment Ministry's payroll capable of the technical work of measuring, reporting and verifying carbon in mangrove forests to REDD+ standards. The crucial work involved in commodifying the mangroves has not taken place, and therefore the thread that might bind the *rescatistas* to the world of derivatives does not yet exist. The neoliberal policies which make the colonial claim a possibility also deny that possibility in the case of El Salvador. The large environmental NGOs that support REDD as a conservation strategy have been largely absent from the region, due to the Malthusian picture painted by conservation biologists. There are no charismatic species endangered, since they are all presumed locally extinct. This absence has been a saving grace for the Lower Lempa, who have managed with their own meager resources, on their small scale, to work on their own conservation plans in their own time. This suggests that where government is weak, but governance is strong, neocolonial practices are more likely to emerge where the larger-scale conservation organizations are involved. These have been more inclined to support exclusionary conservation practices than local nongovernmental organizations.

241

#### Conclusions

The goal of this research has been circumscribed: to refute or support a particular claim made at a particular time using unremarkable methods in a small and obscure part of the world. I have not engaged explicitly with grand theories, or challenged the status quo on environmental governance. Given the constant changes in the outside world against which processes in the Lower Lempa unfold, the fickleness of politicians, and uncertainties of electoral politics, it would be presumptuous to suppose that PREP or any observations on it might last beyond the lifespan of a mangrove tree. On the subject of adaptation, I would like to offer these thoughts from an intellectual who understood only too well what state coercion, deprivation and theft of agency could mean:

# Aleksandr Solzhenitsyn (1991): One Day in the Life of Ivan Denisovich

Shukhov felt pleased with life as he went to sleep. A lot of good things had happened that day. He hadn't been thrown in the hole. The gang hadn't been dragged off to Sotsgorodok. He'd swiped the extra gruel at dinnertime. The foreman had got a good rate for the job. He'd enjoyed working on the wall. He hadn't been caught with the blade at the search point. He'd earned a bit from Tsezar that evening. He'd bought his tobacco. And he hadn't taken sick, had got over it.

The end of an unclouded day. Almost a happy one.

I conclude that mangrove restoration for climate mitigation based in adaptation was not a manifestation of "carbon colonialism". Through an analysis of the governance processes around mangrove restoration in the Lower Lempa I found that they were too diffuse, informal and uncertain for such a developed, and sinister, project to take hold. The self-organization of the communities in the Coordinadora limits the possibility for elite capture of restoration project resources other than through Mangle. Mangle controls environmental knowledge in the Lower Lempa, as well as providing oversight and project management. The Directiva is an elected body in a community where there is not widespread inequality. From the livelihood analysis it was obvious that most people are poor, but resourceful, and participate in their own governance with a strong sense of individual and community responsibility. Besides, the ideology of the FMLN administration, the personality of Rosa Chávez, and the historical memories of the people would not consciously have permitted further exploitation of the excombatants through free riders if there were not recognizable benefits to be had from restoration. There was a reason in 1840 that the federal government in El Salvador was hard to find that seems to persist to this day: people cope quite adequately without it.



#### REFERENCES

- Adger, W. N., Paavola, J., Huq, S., and Mace, M.J. eds. 2006. *Fairness in Adaptation to Climate Change*. Cambridge, MA: The MIT Press.
- Agrawal, A., Nepstad, D. and Chhatre, A. 2011. Reducing emissions from deforestation and degradation. *Annual Review of Environment and Resources* 36:373-396.
- Alexander, S., Nelson, C.R., Aronson, J., Lamb, D., Cliquet, A., Erwin, K.L., Finlayson, C.M., de Groot, R.S., Harris, J.A., Higgs, E.S., Hobbs, R.J., Lewis, R.R., Martinez, D., and Murcia, C. 2011. Opportunities and challenges for ecological restoration within REDD+. *Restoration Ecology* 19 (6):683-689.
- Alix-Garcia, J., de Janvry, A., and Sadoulet, E. 2008. The role of calibrated compensation and risk in designing payments for environmental services. *Environment and Development Economics* 13 (3):375-394.
- Alongi, D. M. 2002. Present state and future of the world's mangrove forests. *Environmental Conservation* 29 (3):331-349.
- Anderson, B., and McFarlane, C. 2011. Assemblage and geography. *Area* 43 (2):124-127.
- Anderson, T. P. 1971. Matanza. Lincoln, NB: University of Nebraska Press.
- Angelsen, A., Larsen, H.E., Lund, J.F., Smith-Hall, C., and Wunder, S. eds. 2011. Measuring Livelihoods and Environmental Dependence: Methods for Research and Fieldwork. London: Routledge.
- Asher, K., and Ojeda, D. 2009. Producing nature and making the state: Ordenamiento territorial in the Pacific lowlands of Colombia. *Geoforum* 40:292-302.
- Bachram, H. 2004. Climate fraud and carbon colonialism: the new trade in greenhouse gases. *Capitalism Nature Socialism* 15 (4):5-20.
- Bäckstrand, K. and Lövbrand, E. 2006. Planting trees to mitigate climate change: contested discourses of ecological modernization, green governmentality and civic environmentalism. *Global Environmental Politics* 6 (1):50-75.
- Badola, R., and Hussain, S.A. 2005. Valuing ecosystem functions: an empirical study on the storm protection function of Bhitarkanika ecosystem, India. *Environmental Conservation* 32 (1):85-92.

- Bakker, K., and Bridge, G. 2006. Material worlds? Resource geographies and the 'matter of nature'. *Progress in Human Geography* 30 (1):5-27.
- Basl, J. 2010. Restitutive restoration: new motivations for ecological restoration. *Environmental Ethics* 32:135-147.
- Batterbury, S. 2001. Landscapes of diversity: a local political ecology of livelihood diversification in south-western Niger. *Ecumene* 8 (4):437-464.
- Bayon, R., Hawn, A., and Hamilton, K. 2007. *Voluntary Carbon Markets*. London: Earthscan.
- Bebbington, A. 2004. NGOs and uneven development: geographies of development intervention. *Progress in Human Geography* 28 (6):725-745.
- Bebbington, A. J. and Batterbury, S. P. J. 2001. Transnational livelihoods and landscapes: political ecologies of globalization. *Ecumene* 8 (4):370-380.
- Beymer-Farris, B. A. and Bassett, T. J. 2011. The REDD menace: resurgent protectionism in Tanzania's mangrove forests. *Global Environmental Change* 22(2):332-341.
- Biermann, F. and Pattberg, P. 2008. Global environmental governance: taking stock, moving forward. *Annual Review of Environment and Resources* 33:277-294.
- Böhm, S., and S. Dabhi (eds.). 2009. Upsetting the Offset. London: MayFly.
- Bosire, J. O., Dahdoug-Guebas, F., Walton, M., Crona, B.I., Lewis III, R.R., Field, C., Kairo, J.G., and Koedam, N. 2008. Functionality of restored mangroves: a review. *Aquatic Botany* 89:251-259.
- Boyce, J. K. (ed.) 1996. *Economic Policy for Building Peace: The Lessons of El Salvador*. Boulder, CO: Lynne Rienner Publishers.
- Boyd, E., Boykoff, M. and Newell, P. 2012. The "New" Carbon Economy: What's New? In *The New Carbon Economy*, ed. P. Newell, Boykoff, M., and E. Boyd. Chichester, UK: Wiley-Blackwell.
- Boykoff, M. T., Bumpus, A., Liverman, D., and Randalls, S. 2009. Theorizing the carbon economy: introduction to the special issue. *Environment and Planning A* 41:2299-2304.

- Brannstrom, C., Rausch, L., Brown, J.C., Marson Texeira de Andrade, R. and Miccolis, A. 2012. Compliance and market exclusion in Brazilian agriculture: analysis and implications for "soft" governance. *Land Use Policy* 29:357-366.
- Brannstrom, C. and Brandão, P.R.B. 2012. Two hundred acres of good business: Brazilian agriculture in a themed space. *The Geographical Review* 102 (4):465-485.
- Bridge, G. 2010. Resource geographies 1: making carbon economies, old and new. *Progress in Human Geography* 35 (6):820-834.
- Bridge, G., and Perrault, T. 2009. Environmental governance. In A Companion to Environmental Geography, ed. D. D. N. Castree, D. Liverman and B. Rhoads, 475-497. Malden: Wiley-Blackwell.
- Brown, K. and Corbera, E. 2003. Exploring equity and sustainable development in the new carbon economy. *Climate Policy* 3S1:44-56.
- Brundtland, G. 1987. *Our common future: The World Commission on environment and development*. Oxford, UK: Oxford University Press.
- Bumpus, A. G. 2011a. The matter of carbon: understanding the materiality of tCO2e in carbon offsets. *Antipode* 43 (3):612-638.
- ———. 2011b. Realizing local development in the carbon commodity chain: political economy, value and connecting carbon commodities at multiple scales. In *Social Dimensions of Green Economy and Sustainable Development*. Geneva: United Nations Research Institute for Social Development.
- Bumpus, A. G. and Liverman, D. M. 2008. Accumulation by decarbonization and the governance of carbon offsets. *Economic Geography* 84 (2):127-155.
- Bumpus, A. G. and Liverman, D.M. 2011. Carbon colonialism? Offsets, greenhouse gas reductions, and sustainable development. In *Global Political Ecology*, ed. R. Peet, P. Robbins and M.J. Watts. London: Routledge.
- Butler, J., and Athanasiou, A. 2013. *Dispossession: The Performative in the Political*. Cambridge, UK: Polity Press.
- Calderón, F. 2008. Escenarios Políticos en América Latina: Cuadernos de gobernabilidad democráticas: Trabajos de observación regional. Buenos Aires: Siglo XXI Editions.

- Campbell, L. M. 2002. Science and sustainable use: views of marine turtle conservation experts. *Ecological Applications* 12 (4):1229-1246.
- Castree, N. 2008a. "Neoliberalising Nature: The Logics of Deregulation and Reregulation." *Environment and Planning A* 40: 131-52.
- ———. 2008b. "Neoliberalising Nature: Processes, Effects, and Evaluations." Environment and Planning A 40: 153-73.
- Chávez, J. M. 2011. Revolutionary Power, Divided State, ed. J. Dym and K. Offen Chicago, IL: The University of Chicago Press.
- Christoff, P. 2010. Cold climate in Copenhagen: China and the US at COP15. *Environmental Politics* 19 (4):637-656.
- Clewell, A. F. and Aronson, J. eds. 2007. *Ecological Restoration: Principles, Values, and Structure of an Emerging Profession*. Washington D.C.: Island Press.
- Cloke, P., Cook, I., Crang, P., Goodwin, M., Painter, J., and Philo, C. 2004. *Practising Human Geography*. London: Sage Publications.
- Comín, F. A. ed. 2010. *Ecological Restoration: A Global Challenge*. Cambridge, UK: Cambridge University Press.
- Cuéllar, N., Luna, F., Díaz, O., and Kandel, S. 2013. *Gobernanza ambiental-territorial y desarollo en El Salvador: El caso del Bajo Lempa*. San Salvador: PRISMA.
- Cupples, J. 2004. Rural development in El Hatillo, Nicaragua: gender, neoliberalism and environmental risk. *Singapore Journal of Tropical Geography* 25 (3):343-357.
- Danner, M. 1993. The Massacre at El Mozote. New York: Vintage Books.
- Dávila, M. I. 2011. *La Coordinadora del Bajo Lempa como Agente del Desarrollo Local Sostenible. Estudio de Caso.* Faculty of General Studies, University of El Salvador, San Vicente.
- Dean, M. 2010. *Governmentality: Power and Rule in Modern Society, 2nd Edition*. Los Angeles: Sage.
- Díaz, O. 2011. *La evolución del rol territorial de la Bahía de Jiquilisco*. San Salvador, El Salvador: Fundación PRISMA.
- Didion, J. 1983. Salvador. New York: Vintage International.

- Donato, D. C., Kauffman, J.B., Murdiyarso, D., Kurnianto, S., Stidham, M. and Kanninen, M. 2011. Mangroves among the most carbon-rich forests in the tropics. *Nature Geosciences*.
- Duffy, R. 2006. Global environmental governance and the politics of ecotourism in Madagascar. *Journal of Ecotourism* 5 (1):128-144.
- Duke, N. C. 1992. Mangrove floristics and biogeography. In *Tropical Mangrove Ecosystems*, ed. A. I. Robertson and D. M. Alongi, 63-100. Washington, D.C.: American Geophysical Union.
- Duke, N. C., Meynecke, J.O., Dittmann, S., Ellison, A.M., Anger, K., Berger, U., Cannicci, S., Diele, K., Ewel, K.C., Field, C.D., Koedam, N., Lee, S.Y., Marchand, C., Nordhaus, I., and Dahdouh-Guebas, F. 2007. A world without mangroves? *Science* 317 (July 6):41-42.
- Ellison, A. M. 2008. Mangrove ecology applications in forestry and coastal zone management. *Aquatic Botany* 89:1.
- Enright, J. 2012. Ecological Mangrove Restoration (EMR) Training Report, Krabi, March 2012. Krabi, Thailand: MAP.
- Escobar, A. 1995. *Encountering Development: The Making and Unmaking of the Third World*. Princeton, NJ: Princeton University Press.

——. 2008. *Territories of Difference: place, movements, life, redes*. Durham, NC: Duke University Press.

- Fairhead, J., Leach, M., and Scoones, I. 2012. Green Grabbing: A new appropriation of nature. *The Journal of Peasant StudieS* 39 (2):237-261.
- Falk, D. A., Palmer, M.A., and Zedler, J.B. eds. 2006. *Foundations of Restoration Ecology*. Washington, D.C.: Island Press.
- Farah, D. 2012. Central American Gangs: Changes in Nature and New Partners. *Journal* of International Affairs 66 (1):53-67.
- Feagin, R. A., Mukherjee, N., Shanker, K., Baird, A.H., Cinner, J., Kerr, A.M., Koedam, N., Sridhar, A., Arthur, R., Jayatissa, L.P., Lo Seen, D., Menon, M., Rodriguez, S., Shamsuddoha, Md., and Dahdouh-Guebas, F. 2010. Shelter from the storm? Use and misuse of coastal vegetation bioshields for managing natural disasters. *Conservation Letters* 3:1-11.

- FIAES. 2011. Restauración de manglares: desafio para la adaptación al cambio climático. San Salvador: FIAES.
- Fieseler. A. 2010. "In Cancún, Everyone's Talking About Blue Carbon." Climate Shifts.
- Fletcher, R. and Breitling, J. 2012. Market mechanism or subsidy in disguise? Governing payment for environmental services in Costa Rica. *Geoforum* 43:402-411.
- Foucault, M. 2008. *The Birth of Biopolitics: Lectures at the Collège de France 1978-1979.* New York: Picador.
- García-Linera, A. 2008. La Potencia Plebeya. Buenos Aires: CLACSO coediciones.
- Gerring, J. 2007. *Case Study Research: Principles and Practices*. Cambridge, UK: Cambridge University Press.
- Giri, C., Ochieng, E., Tieszen, L.L., Zhu, Z., Singh, A., Loveland, T., Masek, J., and Duke, N. 2010. Status and distribution of mangrove forests of the world using earth observation satellite dataq. *Global Ecology and Biogeography*.
- Goldman, M. 2005. *Imperial Nature: The World Bank and struggles for social justice in the age of globalization*. New Haven, CT: Yale University Press.
- Goldman, M. J., Nadasdy, P. and Turner, M.D. eds. 2011. *Knowing Nature: Conversations at the Intersection of Political Ecology and Science Studies.* Chicago: The University of Chicago Press.
- Golley, F. B. 1993. A History of the Ecosystem Concept in Ecology: More Than the Sum of the Parts. New Haven, CT: Yale University Press.
- Gramsci, A. 1971. Selections from The Prison Notebooks. New York: International Publishers.
- Gutiérrez, M. 2012. Making markets out of thin air. In *The New Carbon Economy*, ed. P. Newell, M. Boykoff and E. Boyd, 41-64. Chichester, UK: Wiley-Blackwell.
- Gutiérrez, M. A. 2004. The tax system in El Salvador. Santiago, Chile: Centro Internacional de Globalización y Desarollo.
- Hajer, M. A. 1995. *The Politics of Environmental Discourse: Ecological Modernization and the Policy Process*. Oxford, UK: Clarendon Press.

- Hajer, M. and Versteeg, W. 2005. Performing governance through networks. *European Political Science* 4:340-347.
- Hecht, S. B. 2004. Invisible forests: the political ecology of forest resurgence in El Salvador. In *Liberation Ecologies, 2nd edition*, ed. R. Peet, P. Robbins and M.J. Watts. London: Routledge.
- ———. 2010. The new rurality: Globalization, peasants and the paradoxes of landscape. *Land Use Policy* 27:161-169.
- Hecht, S. B., and Saatchi, S.S. 2007. Globalization and forest resurgences: changes in forest cover in El Salvador. *BioScience* 57 (8):663-672.
- Hecht, S. B., Kandel, S., Gomes, I., Cuellar, N., and Rosa, H. 2006. Globalization, forest resurgence and environmental politics in El Salvador. *World Development* 34 (2):308-323.
- Hernández, J. R., López, W.A. and Vásquez, M. 2005. *El cultivo de camarón marino en la Bahía de Jiquilisco, Usulután, El Salvador*. San Salvador: Universidad de El Salvador.
- Hobbs, R. J., and Harris, J.A. 2001. Restoration ecology: repairing the Earth's ecosystems in the new millennium. *Restoration Ecology* 9 (2):239-246.
- Hobbs, R. J., and Cramer, V.A. 2008. Interventionist approaches for restoring and maintaining ecosystem function in the face of rapid environmental change. *Annual Review of Environment and Resources* 33.
- Hobbs, R. J., Arico, S., Aronson, J., and Baron, J.S. 2006. Novel ecosystems: theoretical and management aspects of the new world order. *Global Ecology and Biogeography* 15:1-7.
- Hobbs, R. J., Hallett, L.M., Ehrlich, P.R. and Mooney, H.A. 2011. Intervention ecology: applying ecological science in the twenty-first century. *BioScience* 61 (6):442-450.
- IPCC. 2007. *Climate Change 2007: the physical science basis*. Cambridge, UK: Cambridge University Press.
- Jessop, B. 2002. Liberalism, neoliberalism and urban governance: A state-theoretical approach. *Antipode* 34 (3):452-472.
- Jordan, A. 2008. The governance of sustainable development: taking stock and looking forwards. *Environment and Planning C: Government and Policy* 26:17-33.

- Jordan, A., Wurzel, R.K.W., and Zito, A. 2005. The rise of 'new' policy instruments in comparative perspective: has governance eclipsed government? *Political Studies* 53:477-496.
- Jordan, W. R., Gilpin, M.E. & Aber, J.D. eds. 1987. *Restoration ecology: A synthetic approach to ecological restoration*. Cambridge, UK: Cambridge University Press.
- Kampwirth, K. 2002. *Women and Guerilla Movements: Nicaragua, El Salvador, Chiapas, Cuba.* University Park, PA: The Pennsylvania State University Press.
- Klooster, D. 2003. Forest Transitions in Mexico: Institutions and Forests in a Globalized Countryside. *The Professional Geographer* 55 (2):227-237.
- Lansing, D. M. 2012a. Realizing carbon's value: Discourse and calculation in the production of carbon forestry offsets in Costa Rica. In *The New Carbon Economy*, (ed.) P. Newell, M. Boykoff and E. Boyd. 135-158. Chichester, UK: Wiley-Blackwell.
  - ------. 2012b. Performing carbon's materiality: the production of carbon offsets and the framing of exchange. *Environment and Planning A* 44:204-220.
- ———. 2013. Not all baselines are created equal: A Q methodology analysis of stakeholder perspectives of additionality in a carbon forestry offset project in Costa Rica. *Global Environmental Change* 23:654-663.
- Lauria-Santiago, A. A. 1999. An Agrarian Republic: Commercial Agriculture and the Politics of Peasant Communities in El Salvador, 1823-1914. Pittsburgh, PA: University of Pittsburgh Press.
- Lave, R. 2011. Circulating knowledge, constructing expertise. In *Knowing Nature: Conversations at the Intersection of Political Ecology and Science Studies*, (eds.)
   M.J. Goldman, P. Nadasdy and M.D. Turner, 263-279. Chicago: The University of Chicago Press.
- ------. 2012. Bridging political ecology and STS: a field analysis of the Rosgen Wars. Annals of the Association of American Geographers 102 (2):366-382.
- Lave, R., Doyle, M. and Robertson, M. 2010. Privatizing stream restoration in the US. *Social Studies of Science* 40 (5):677-703.
- Lawlor, K., Weinthal, E., and Olander, L. 2010. Institutions and policies to protect rural livelihoods in REDD+ regimes. *Global Environmental Politics* 10 (4):1-11.

- Lemos, M. C. and Agrawal, A. 2006. Environmental Governance. *Annual Review of Environment and Resources* 31:297-325.
- Lewis, R. R. 2005. Ecological engineering for successful management and restoration of mangrove forests. *Ecological Engineering* 24:403-418.
- Li, T. M. 2007a. Practices of assemblage and community forest management. *Economy and Society* 36 (2):263-293.

———. 2007b. *The Will to Improve: Governmentality, Development and teh Practice of Politics*. Durham, NC: Duke University Press.

- Liss, S. B. 1991. Radical Thought in Central America. Boulder, CO: Westview Press.
- Liverman, D.M. 2004. Who governs, at what scale and at what price? Geography, environmental governance and the commodification of nature. *Annals of the Association of American Geographers* 94 (4):734-738.
- Liverman, D.M. 2009. Conventions of climate change: constructions of danger and the dispossession of the atmosphere. *Journal of Historical Geography* 35:279-296.
- Luciak, I. A. 2001. *After the Revolution: Gender and Democracy in El Salvador, Nicaragua and Guatemala*. Baltimore, MD: The Johns Hopkins University Press.
- Mansfield, B. 2004. Rules of privatization: Contradictions in neoliberal regulation of North Pacific fisheries. *Annals of the Association of American Geographers* 94 (3):565-584.
- MARN. 1998. *Ley del Medio Ambiente*. San Salvador, El Salvador: Ministerio de Medio Ambiente y Recursos Naturales.
- Martínez, J. M. 2014. El Salvador: Neoliberalismo y Desigualdad. San Salvador: UCA.
- McAfee, K. 1999. Selling nature to save it? Biodiversity and the rise of green developmentalism. *Environment and Planning D* 17 (2):133-154.
- McAfee, K. 2012. The contradictory logic of global ecosystem services markets. *Development and Change* 43 (1):105-131.
- McSweeney, K. 2004. Forest product sale as natural insurance: the effects of household characteristics and the nature of shocks in eastern Honduras. *Society & Natural Resources* 17 (1):39-56.

- McSweeney, K., and Coomes, O.T. 2011. Climate-related disaster opens a window of opportunity for rural poor in northeastern Honduras. *PNAS* 108 (13):5203-5208.
- MEA. 2005. Millenium Ecosystem Assessment: Ecosystems and Human Wellbeing. Washington, D.C.: World Resources Institute.
- Mitsch, W. J. and Gosselink. J. G. 2007. *Wetlands, Fourth edition*. Hoboken, NJ: John Wiley & Sons, Inc.
- Murray, B.C., Watt, C.E., Cooley, D.M., and Pendleton, L.H. 2012. Coastal Blue Carbon and the United Nations Framework Convention on Climate Change: Current status and future directions. Nicholas Institute for Environmental Policy Solutions, Durham, N.C.
- Mustafa, D. 2005. The production of an urban hazardscape in Pakistan: modernity, vulnerability and the range of choice. *Annals of the Association of American Geographers* 95 (3):566-586.
- ———. 2009. Natural Hazards. In A Companion to Environmental Geography, ed. N. Castree, Demeritt, D., Liverman, D., and Rhoads, B. Chichester, UK: Wiley-Blackwell.
- Mustafa, D., Ahmed, S., Saroch, E., and Bell, H. 2011. Pinning down vulnerability: from narratives to numbers. *Disasters* 35 (1):62-86.
- Newell, P., Boykoff, M., and Boyd, E. eds. 2012. *The New Carbon Economy: Constitution, Governance and Contestation*. Chichester, UK: Wiley-Blackwell.
- Okereke, C., Bulkeley, H., and Schroeder, H. 2009. Conceptualizing climate governance beyond the international regime. *Global Environmental Politics* 9 (1):58-78.
- Ostrom, O. 2009. A general framework for analyzing sustainability of social-ecological systems. *Science* 325 (419):419-422.
- Peet, R., Robbins, R. and Watts, M.J. eds. 2011. *Global Political Ecology*. London: Routledge.
- Pendleton, L. 2013. Estimating Global "Blue Carbon" emissions from conversion and degradation of vegetated coastal ecosystems *PloS ONE* 7 (9):1-7.
- Perfecto, Y., Vandermeer, J. and Wright, A. 2009. *Nature's Matrix: Linking Agriculture, Conservation and Food Sovereignty*. London: earthscan.

- Perrow, M. R. and Davy, A.J. eds. 2002. *Handbook of Ecological Restoration, Volumes 1 & 2*. Cambridge, UK: Cambridge University Press.
- Phelps, J., Webb, E.L., and Agrawal, A. 2010. Does REDD+ threaten to recentralize forest governance? *Science* 328:312-13.
- Polidoro, B. A., Carpenter, K.E., Collins, L., Duke, N.C., Ellison, A.M., Ellison, J.C., Farnsworth, E.J., Fernando, E.S., Kathiresan, K., Koedam, N.E., Livingstone, S.R., Miyagi, T., Moore, G.E., Ngoc Nam, V., Ong, J.E., Primavera, J.H., Salmo, S.G., Sanciangco, J.C., Sukardjo, S., Wang, Y., and Yong, J.W.H. 2010. The loss of species: mangrove extinction risk and geographic areas of global concern. *PloS ONE* 5 (4):e10095.
- PRISMA. 2010. Designing a REDD+ Program that Benefits Forestry Communities in Mesoamerica: Sythesis Report. San Salvador, El Salvador: PRISMA.
- ———. 2013. Mesoamerica at the forefront of community forest rights: lessons for making REDD work. San Salvador: PRISMA.
- Reyes, N. 2012. Llenos de Vida. San Salvador: Self published.
- Rivera, C. G. and Cuéllar, T. C. 2010. *El Ecosistema de Manglar de la Bahía de Jiquilisco: Sector Occidental*. San Salvador, El Salvador: Martínez.
- Robbins, P. 2006. The politics of barstool biology: environmental knowledge and power in greater Northern Yellowston. *Geoforum* 37:185-199.
- Robertson, M. M. 2000. No Net Loss: wetland restoration and the incomplete capitalization of nature. *Antipode* 32 (4):463-493.
- . 2004. The neoliberalization of ecosystem services: wetland mitigation banking and problems in environmental governance. *Geoforum* 35:361-373.
- ———. 2006. The nature that capital can see: science, state, and market in the commodificaton of ecosystem services. *Environment and Planning D* 24 (367-387).
- ------. 2010. Performing environmental governance. *Geoforum* 41:7-10.
- ------. 2012. Measurement and alienation: Making a world of ecoystem services. *Transactions of the Institute of British Geographers* 37 (3):386-401.
- Robertson, M. M. and Wainwright, J. 2013. The Value of Nature to the State. *Annals of the Association of American Geographers* 103 (4):890-905.

Rosa Chávez, H. 2010. Copenhagen Climate Conference: www.youtube.com.

- . 2012. Doha Climate Conference: www.youtube.com.
- Rosa, H., Barry, D., Kandel, S., and Dimas, L. 2004. Compensation for Environmental Services and Rural Communities: Lessons from the Americas. In *Political Economy Research Institute*. Amherst, MA: University of Massachusetts.
- Sánchez-Ancochea, D., and Shadlen, K.C. eds. 2008. *The Political Economy of Hemispheric Integration: Responding to globalization in the Americas* New York: Palgrave Macmillan.
- Scott, D. 1995. Colonial governmentality. Social Text 43:191-220.
- Scott, J. C. 1976. *The Moral Economy of the Peasant: Rebellion and Subsistence in Southeast Asia* New Haven, CT: Yale University Press.
- ------. 2009. The Art of Not Being Governed. New Haven, CT: Yale University Press.
- Seelke, C. R. 2012. El Salvador: Political and Economic Conditions and U.S. Relations. Washington D.C.: Congressional Research Service.
- Segovia, A. 1996. Macroeconomic policies and performance since 1989. In *Economic Policy for Building Peace: The Lesson of El Salvador*, ed. J. K. Boyce. Boulder, CO: Lynne Rienner Publishers.
- SER. 2004. The SER International Primer on Ecological Restoration. Tucson, AZ: Society for Ecological Restoration International.
- Shapiro-Garza, E. 2013. Contesting the market-based nature of Mexico's national payments for ecosystem services program: Four sites of articulation and hybridization. *Geoforum* 46:5-15.
- Sheets, P. D. 2008. Armageddon to the Garden of Eden: Explosive volcanic eruptions and societal resilience in ancient Middle America. In *Central America and Mesoamerica*, ed. D. Sendweiss. Washington, D.C.: Dunbarton Oaks.
- Shrader-Frechette, K. S. and McCoy, E. D. 1993. *Method in Ecology*. Cambridge, UK: Cambridge University Press.
- Simões, C.G., Poruschi, L. & Misa, M. 2011. Compensations for avoided deforestation in the Brazilian Amazon: Implications from direct payments. *Journal of Sustainable Development* 4, no. 1: 119-29.

Smith, N. 2010. The revolutionary imperative. Antipode 41 (1):50-65.

- Solzhenitsyn, A. 1991. *One Day in the Life of Ivan Denisovich*. Translated by H.T. Willetts. New York: Farrar, Straus & Giroux.
- Spalding, M., Kainuma, M., and Collins, L. 2010. *World Atlas of Mangroves*. Washington, D.C.: Earthscan LLC.
- Steffen, W. 2004. The Anthropocene Era: How humans are changing the earth system. In *Global Change and the Earth System: A planet under pressure*, ed. Steffen, W., 81-141. Berlin: Springer.
- Stephens, J. L. 1969. *Incidents of Travel in Central America, Chiapas and Yucatan*. New York: Dover Publications, Inc.
- Todd, M. 2010. Beyond Displacement: Campesinos, Refugees and Collective Action in the Salvadoran Civil War. Madison, WI: University of Wisconsin Press.
- Townshend, T., S. Fankhauser, R. Aybar, M. Collins, T. Landesman, M. Nachmany and Pavese, C. 2013. "Climate Legislation Study: A Review of Climate Change Legislation in 33 Countries. Third Edition.". Chippenham: GLOBE International.
- UNODC. 2012. World Drug Report. Vienna, Austria: United Nations.
- Vadjunec, J. M., Schmink, M., and Gomes, C.V.A. 2011. Rubber tapper citizens: emerging places, policies, and shifting rural-urban identities in Acre, Brazil. *Journal of Cultural Geography* 28 (1):73-98.
- Ward, T. W. 2013. *Gangsters Without Borders: An ethnography of a Salvadoran Street Gang*. Oxford, UK: Oxford University Press.
- Weller, N. 2012. *Restauración Ecológica de Manglares en el cauce El Llorón de la Bahía de Jiquilisco: hace un manejo comunitario de los bosques de manglar*. San Salvador, El Salvador: Asociación Mangle, EcoViva.
- Wickham-Crowley, T. P. 1992. *Guerillas & Revolution in Latin America: A Comparative Study of Insurgents and Regimes Since 1956.* Princeton, NJ: Princeton University Press.
- Williams, G. 2002. *The Other Side of the Popular: Neoliberalism and Subalternity in Latin America*. Durham, NC: Duke University Press.

- WinklerPrins, A. M. G. A. 2006. Urban house-lot gardens and agrodiversity in Santarém, Pará, Brazil: Spaces of conservation that link urban with rural. In *Globalization & New Geographies of Conservation*, ed. K. S. Zimmerer, 121-140. Chicago: The University of Chicago Press.
- Wisner, B. 2001. Risk and the neoliberal state: Why post-Mitch lessons didn't reduce El Salvador's earthquake losses. *Disasters* 25 (3):251-268.
- Wood, E. J. 2003. *Insurgent Collective Action and Civil War in El Salvador*. Cambridge, UK: Cambridge University Press.
- Woolley, J. T., and M.V. McGinnis. 2000. The conflicting discourses of restoration. Society and Natural Resources 13:339-357.
- Yates, J. S. and Bakker, K. 2013. Debating the 'post-neoliberal turn' in Latin America. *Progress in Human Geography*:1-29.
- Zaldívar-Jimenéz, M. A., Herrera-Silveira, J.A., Teutli-Hernández, C., Comn, F.A., Andrada, J.L., Coronado Molino, C., and Pérez Ceballos, R. 2010. Conceptual framework for mangrove restoration in the Yucatán Peninsual. *Ecological Restoration* 28 (3):333-342.
- Zilberg, E. 2011. Space of Detention: The Making of a Transnational Gang Crisis Between Los Angeles and San Salvador. Durham, NC: Duke University Press.
- Zimmerer, K. S. ed. 2006. *Gobalization and New Geographies of Conservation*. Chicago: The University of Chicago Press.

# **APPENDIX A**

Departments of El Salvador. The red circle shows the location of the "September 15" hydroelectricity dam on the Lempa River, visible from the Pan-American highway.



The cantonal divisions of the Lower Lempa, in the municipality of Jiquilisco. From Dávila 2011. The following cantons are mentioned in the text, from north to south: San Marcos Lempa; Zamoran, where Jiquilisco and Romero are located: Salinas El Potrero; Salinas de Sisiguayo; La Canoa, where Las Mesas is located; Montecristo; and Isla de Mendez.



Fuente: Elaborado con base a mapas digitales del MARN (1995), División administrativa cantonal.

The communities mentioned in the text. From Dávila 2011. Zamoran-Limonera is the name of the local group to which Ciudad Romero belongs. Sisiguayo (not marked) is immediately south on the Bay of Jiquilisco. Montecristo is at the mouth of the Lempa River.



Fuente: Elaborado con base a mapas digitales del MARN (1995), División administrativa cantonal y Coordinadora del Bajo Lempa.

# **APPENDIX B**

Aerial view of agroforestry mosaic of northern Lower Lempa showing restoration sites of the Espino and Borbollón Rivers identified with yellow lettering. The closed yellow circle represents Sisiguayo. MARN PowerPoint slide, undated, but from 2012.



# **APPENDIX C**

# Household Survey Instrument

I. CARACTERÍSTICAS HOGAREÑAS DE LAS 'RESCATISTAS' QUE											
PARTICIPAN EN LOS PROYECTOS DE RESTAURACIÓN EN BAJO LEMPA Y											
BAHÍA DE JIQUILISCO											
Bajo Lem	ipa, Usu	lután, E	El Salv	vador, 201	13.	0			LUG		7
ID #	ID # LOCALI			DAD Y	DATO		HORA		LUGAR DE		
	COMMU		MMU	NIDAD			-		ENCU	UESI	A
Nombre de		Н	H Ocupación		Eda	Se	Otros Miembros del Hogar				
'Rescatist	ta'	H			d	X	Eda S	Sexo	Contribuye Co		Contribuye al
							d		al ingre	eso	sustento
								ł			
INGRESO	OS BAS	ADOS	EN L	A MANO	DE OE	RA	(QUE	NO SC	N DE I	MAN	(GLARES)
Por favor organizar estas tarietas de izavierda a derecha, con las ave dan mas ingresos al											
Por favor	organize	ar estas	tarjet	as de izqui	ierda a	derec	cha, co	n las qı	ıe dan n	nas in	igresos al
Por favor izquierda.	organize	ar estas	tarjet	as de izqui	ierda a	derec	sha, co	n las qı	ie dan n	nas in	ngresos al
Por favor izquierda. Marañon	Azúcar	ar estas Camaron	tarjet Sal	as de izqui Remesas	ierda a Comida	derec Pe	scado	n las qu Ganado	ve dan n	nas in	Vivero de
Por favor izquierda. Marañon	Azúcar	<i>ar estas</i> Camaron	Sal	as de izqui Remesas	ierda a Comida	derec Pe	eha, co scado	n las qu Ganado	ve dan n Viver tortuş	nas in <sup>.</sup> o de gas	vivero de cangrejos
Por favor izquierda. Marañon	Azúcar	ar estas Camaron	Sal	as de izqui Remesas	ierda a Comida	derec Pe	cha, co scado	n las qı Ganado	ue dan n Viver tortuş	nas in <sup>.</sup> o de gas	Vivero de cangrejos
Por favor izquierda. Marañon	Azúcar	ar estas Camaron	Sal	Remesas	ierda a d	derec Pe	eha, co scado	n las qı Ganado	viver Viver tortuş	nas in ro de gas	Vivero de cangrejos
Por favor izquierda. Marañon INGRESC	Azúcar OS DER	Camaron	Sal	Remesas	Comida	Pe RES	scado	n las qı Ganado	ve dan n Viver tortuş	nas in <sup>.</sup> o de gas	Vivero de cangrejos
Por favor izquierda. Marañon INGRESC Por favor	Azúcar OS DER organiza	Camaron Camaron RIVADC ar estas	Sal Sal DS DE tarjeta	Remesas Remesas C LOS MA as de izqui	Comida	Pe Pe RES derec	scado	n las qu Ganado n los qu	e dan n Viver tortug e dan m	nas in ro de gas	gresos al gresos al
Por favor         izquierda.         Marañon         INGRESC         Por favor         izquierda.	Azúcar OS DER organiza	ar estas Camaron RIVADC ar estas	Sal Sal DS DE tarjeta	Remesas Remesas C LOS MA as de izqui	Comida	Pe Pe RES derec	scado	n las qu Ganado n los qu	e dan m	nas in <sup>ro de</sup> gas nas inț	gresos al gresos al
Por favor izquierda. Marañon INGRESC Por favor izquierda. Maderabl	Azúcar OS DER organiza les	Camaron Camaron RIVADC ar estas	Sal Sal DS DE tarjeta	Remesas Remesas E LOS MA as de izqui Producto	Comida Comida NGLA ierda a os Fores	Pe Pe RES derec	scado scado cha cor	n las qu Ganado 1 los qu Madera	e dan m ables	nas in <sup>ro de</sup> gas nas ing	gresos al gresos al
Por favorizquierda.MarañonINGRESCPor favorizquierda.MaderablMadera	Azúcar OS DER organiza les Palma	Camaron Camaron RIVADC ar estas Leña	Sal	Remesas Remesas C LOS MA as de izqui Producto Punches	Comida Comida NGLA ierda a os Fores Miel	Pe Pe RES derec stales	scado scado ha cor Non-	n las qu Ganado 1 los qu Madera	e dan m ables uriles	nas in o de gas nas ins	yivero de cangrejos gresos al -tradicionales
Por favor         izquierda.         Marañon         INGRESC         Por favor         izquierda.         Maderabl         Madera	Azúcar OS DER organiza les Palma	Camaron Camaron RIVADC ar estas Leña	Sal Sal Sal Sal	Remesas Remesas C LOS MA as de izqui Producto Punches	Comida Comida ANGLA ierda a bs Fores Miel	Pe Pe RES derec stales	kha, co scado kha cor Non-	n las qu Ganado n los qu Madera	e dan m ables	nas in o de gas nas ing Non-	gresos al gresos al
Por favor izquierda. Marañon INGRESC Por favor izquierda. Maderabl Madera	Azúcar OS DER organiza les Palma	Camaron Camaron RIVADC ar estas Leña	Sal Sal DS DE tarjet	Remesas Remesas C LOS MA as de izqui Producto Punches	Comida Comida NGLA ierda a S Fores Miel	Pe RES derec stales	scado scado cha con Non- iurismo	n las qu Ganado n los qu Madera	e dan m ables uriles	nas in o de gas nas ins	gresos al gresos al
Por favor izquierda. Marañon INGRESC Por favor izquierda. Maderabl Madera	Azúcar OS DER organiza les Palma	Camaron Camaron RIVADC ar estas Leña RES	Sal Sal DS DE tarjeta	Remesas Remesas C LOS MA as de izqui Producto Punches	Comida Comida NGLA ierda a os Fores Miel	Pe RES derec stales	scado scado cha con Non-	n las qu Ganado n los qu Mader:	e dan m ables	nas in o de gas nas ing Non-	gresos al gresos al
Por favor izquierda. Marañon INGRESC Por favor izquierda. Maderabl Madera	Azúcar OS DER organiza les Palma	Camaron Camaron RIVADC ar estas Leña RES	Sal Sal DS DE tarjet	Remesas Remesas E LOS MA as de izqui Producto Punches	Comida Comida ANGLA ierda a os Fores Miel	Pe Pe RES derec stales	scado scado ha cor urismo	n las qu Ganado n los qu Madera	e dan m ables	nas in o de gas nas ing Non-	gresos al gresos al
Por favor         izquierda.         Marañon         INGRESC         Por favor         izquierda.         Maderabl         Madera         OTROS F         Investigad	Azúcar OS DER organiza les Palma FACTO dora: Fi	Camaron Camaron RIVADC ar estas Leña RES fona Wi	Sal Sal DS DF tarjet	Remesas Remesas C LOS MA as de izqui Producto Punches	Comida Comida NGLA ierda a os Fores Miel	Pe RES derec stales ado	scado scado ha con urismo	n las qu Ganado n los qu Madera Cu	e dan m ables uriles ado/a:	nas in o de gas nas ins	gresos al gresos al

GASTOS DEL HOGAR POR MES								
Celular	Transporte	Escuela Luz y Agua			Comida		Salud	Milpa
<b>TRABAJO VOLUNTARIO POR MES</b> Sírvase indicar si usted dedica horas de trabajo a las siguientes organizaciónes.								
La Coordinadora de Bajo Lempa		ADESCO		Cruz Roja		Iglesia		La Escuela
OTROS FACTORES								
TIEMPO PASADO FUERA DE BAJO LEMPA EN LOS ULTIMOS 3 AÑOS BUSCANDO TRABAJO								
Usulután	Usulután		Otros departamentos		San Salvador		Afuera del	país
OTROS FACTORES								

II. CONCIENCIA/CONOCIMIENTO							
1. Yo no sabía mucho acerca de los manglares antes de participar en el proyecto de							
restauración		·	8 I				
Fuerte +	Débil +	0	Débil -	Fuerte -			
2. Ahora sé n	nucho acerca d	e los mangla	res.				
Fuerte +	Débil +	0	Débil -	Fuerte -			
3. Despues de mis experiencias con la restauración yo puedo enseñar a otras personas.							
Fuerte +	Débil +	0	Débil -	Fuerte -			
4. En El Salv	vador existen of	tras comunic	lades que viven cerca	de los manglares quienes			
pueden beneficiar de nuestras experiencias.							
Fuerte +	Débil -	0	Débil -	Fuerte -			
5. Nuestras experiencias serían útiles en todas partes del mundo.							
Fuerte +	Débil +	0	Débil -	Fuerte -			
6. La próxima vez, haremos la restauración de manera diferente.							
Fuerte +	Débil +	0	Débil -	Fuerte -			
7. Si está de acuerdo con Pregunta 6, indica como lo van a hacerlo en el futuro.							
1							

III. RIESGO Y VULNERABILIDAD									
1 :Has oído h	ablar de cambio	climático? Si/No	<u>,</u>						
1. GIIII Oluo II			•						
2. Si 'No', ade	lante a Pregunta	4.							
3. Si 'Si', con (	que frecuencia se	escucha a alguie	n hablar de cambio	o climático?					
Diariamente	Dos veces la semana	Una vez la semana	Una vez el mes	Muy poco					
4 En los ultim	as 3 años ustad	ha cufwida da llur	vias tormonoiolos?						
Más que 5 veces	4-5 veces	2-3 veces	Una vez	Nunca					
5. En los ultim Lempa?	5. En los ultimos 3 años ¿usted ha sufrido las consecuencias de inundaciones del río Lemna?								
Más que 5 veces	4-5 veces	2-3 veces	Una vez	Nunca					
6. En los ultim	os 3 años ‡usted	ha sufrido las coi	nsecuencias de seo	uia a sus fuentes de					
sustento?									
Perdida total	>50% perdidas	20-50% perdidas	10% perdidas	Ningun perdida					
7. En los ultim tsunamis?	os 3 años ¿hizo s	u propiedad sufr	e daños por parte (	de terremotos ò					
Destruido	Graves daños	Daños	Ligeros daños	Nada					
8. En los ultimos 3 años, aparte de las quemas despues de la zafra de caña de azúcar, ¿usted ha experimentado algunos incendios de vegetación cerca de su casa? Perdidas Cenizas Humo Olor Nada									
9. Aparte de los terremotos y tsunamis, esos cambios estan debidos a cambio climático.									
Totalmente	Algo de	Ningun	Algo de	Totalmented de					
de acuerdo	acuerdo	opinión	desacuerdo	desacuerdo					
10. He recibid	o anovo suficiente	e afuera de la con	nunidad a nesar do	e estas dificultades.					
Totalmente	Algo de	Ningun	Algo de	Totalmente de					
de acuerdo	acuerdo	opinión	desacuerdo	desacuerdo					
UIKUSTAU	IUKES								

# IV. RELACIONES ENTRE EL ESTADO Y LAS ENTIDADES NON-GUBERNAMENTALES

MARN tiene jurisdicción sobre todos los manglares del país y sobre permissos para extracción de recursos naturales en areas de manglares, bajo el Ley Forestal de 1992.

1. La gente de las comunidades que viven cerca de las manglares entienden sus problemas mejor que los politicos a nivel nacional.								
Fuerte +	Débil+	0	Débil -	Fuerte -				
2. La experiencia de mano de obra en proyectos de restauración crea expertos de los participantes.								
Fuerte +	Débil +	0	Débil -	Fuerte -				
3. Quien paga por de los manglares.	3. Quien paga por la restauración debe tomar todas las decisiones relativas a la restauración de los manglares							
Fuerte +	Débil +	0	Débil -	Fuerte -				
5. La restauración autoridades.	de los manglares ha	a reforzado los lazo	s entre las commun	idades y las				
Fuerte +	Débil +	0	Débil -	Fuerte -				
6. Si el gobierno de climático, el gobern	cide restaurar man 110 debe reclamar la	glares cómo mitiga a tierra convertida	ción ò adaptación j para el cultivo de c	oara cambio aña de azúcar.				
Fuerte +	Débil +	0	Débil -	Fuerte -				
7.Si el gobierno decide restaurar manglares cómo mitigación ò adaptación para cambio climático, el gobierno debe reclamar la tierra convertida para la acuicultura de camarones								
Fuerte +	Débil +	0	Débil -	Fuerte -				
8. Si el gobierno decide restaurar manglares cómo mitigación ò adaptación para cambio climático, debe hacer cumplir las leves existentes sobre el uso de la tierra.								
Fuerte +	Débil +	0	Débil -	Fuerte -				
9. No sabemos lo suficiente acerca de restauración de manglares para tomar riesgos en cambio del uso y de la cubierta de la tierra.								
Fuerte+	Débil +	0	Débil -	Fuerte -				

## V. SIGNIFICADOS Y CREENCIAS ACERCA DE RESTAURACIÓN: PREGUNTAS ABIERTAS (PREGUNTAS QUE NO LLEVAN A UNA RESPUESTA DE 'SÍ' Ò 'NO')

1. ¿Cree usted que mitigación para el cambio climático es una buena razón para restaurar ecosistemas en Bajo Lempa?

2. ¿Cree usted que las generaciones futuras tendrán la oportunidad de disfrutar los recursos naturales provienen de las manglares como la gente de hoy?

3. Si no sabemos que van a gustar ¿tiene sentido para nosotros de sacrificar el uso de estos recursos para que las generaciones futuras podrian disfrutarles en el futuro?

4. ¿Tiene sentido para las personas a ser buenos ciudadanos acá en Bajo Lempa si los demas no estan tomando responsabilidad para sus acciones en otros lugares?

5. Cuantos años usted ha vivido en esta comunidad? Dónde usted vive al final de la Guerra?

6. ¿Es restauración del ecosistema de manglares algo más que un trabajo por sustento? ¿Os algo que tiene un sentido mas grande?

7. ¿Cómo es que el proceso de restauración ha cambiado sus sentimientos hacia el medio ambiente? ¿Tiene usted un sentido más positivo ò negativo al medio ambiente?

8. . ¿Cómo cree usted que la experiencia ha sido diferente para las mujeres y los hombres? ¿Porque?.

# Picture cards and keys for mangrove and non-mangrove sources of income in survey instrument



