

Environment, transnational labor migration, and gender: case studies from southern Yucatán, Mexico and Vermont, USA

Claudia Radel · Birgit Schmook ·
Susannah McCandless

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Abstract Gender shapes the migration–environment association in both origin and destination communities. Using quantitative and qualitative data, we juxtapose these gender dimensions for a labor migrant-sending location of Mexico’s southern Yucatán with those for a labor migrant-receiving location in Vermont (USA). We illustrate how in the southern Yucatán, circular transnational migration alters pasture, maize and chili production in a peasant field–forest system. Gender norms condition the land-use decisions of migratory households to keep women out of agricultural fields, but in turn may be modified in unexpected ways. With men’s migration, more women assume aspects of land management, including in decision-making and supervision of hired farm labor. In comparison, in Vermont a largely male migrant labor force helps maintain an idealized, pastoral landscape with gender deeply embedded in how that labor is constructed and managed.

Keywords Migration · Agriculture · Landscape · Gender · Vermont · Southern Yucatán · Environment

C. Radel (✉)
Ecology Center & Department of Environment and Society, Utah State University, 5215 Old Main Hill, 84322 Logan, UT, USA
e-mail: claudia.radel@usu.edu

B. Schmook
El Colegio de la Frontera Sur, Av del Centenario Km 5.5, Chetumal, Quintana Roo C.P. 77000, México

S. McCandless
Department of Geography, 200 Old Mill, University of Vermont, Burlington, VT 05405, USA

Introduction

Around the world, human migration across international borders is on the rise, with particularly large flows of people out of the global south (Ratha and Xu 2008; The Global Commission on International Migration 2005). In particular, for numerous decades circular labor migration from Mexico to the United States has figured prominently in globalized labor forces. According to the 2008 American Community Survey, 11.4 million Mexican-born people resided in the United States in 2008, and over seven and a half million of these were in the US civilian labor force (Batalova 2008). These estimates include both documented and undocumented migrants with stays in the United States of various durations, from short to long term. The Pew Hispanic Center estimates inflows of undocumented Mexican migrants averaging 800,000 a year from 2000 to 2004, dropping to 500,000 a year from 2005 to 2008 (Passel and Cohn 2008). In light of these dramatic human flows, numerous scholars have turned their attention to understanding the politics and socioeconomic processes of human migration (both circular and permanent), including the highly gendered nature of migration processes (Chant 1992; Pessar and Mahler 2003).

Less attention, however, has been given to understanding the processes of environmental change associated with transnational circular labor migration. These processes of environmental change may act as one of many drivers of labor out-migration from a region. Human efforts to maintain current environmental states may likewise function as push or pull factors in transnational labor migration through either curtailing or generating job opportunities. For example, both restrictions on forest harvesting and ecological restoration projects have implications for the availability of jobs in a given locale. In turn, the movements of people for livelihood and wage opportunities likely impact both sending and receiving environments. We can expect labor out-migration to generate impacts on the environments of rural sending locations throughout the global south—for example, through changes in agricultural land use. However, we can also expect labor in-migration to generate impacts in rural receiving locations throughout the global north through increased labor availability, often at lower wages. In the United States, some migrant laborers are employed to maintain the landscape in existing states—to keep farms productive, or former farmland open for their agricultural or esthetic value (Albers 2000). Further, the interaction of social systems (including gender) and specific migration patterns with either environmental change or maintenance has yet to be adequately addressed.

In this research brief, we consider two case studies of transnational labor migration and environmental change/maintenance. We draw one case from the rural southern Yucatán peninsular region of Mexico (a migrant-sending region) and one case from rural Vermont in the United States (a migrant-receiving region; see Fig. 1). We link these two cases together to conceptually explore the two-way relationship between changing environments and migrating people. Our analysis, while preliminary, demonstrates the sort of approach we advocate to further a larger systemic understanding of these linked processes. We theorize the relationship between human migration and environments as a complex two-way interaction that

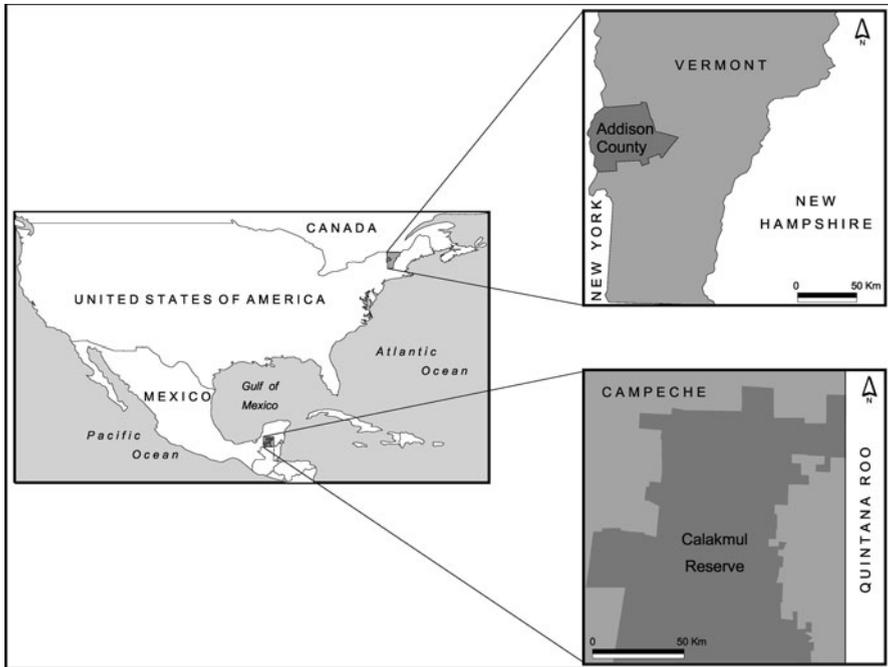


Fig. 1 Relative location of the two cases: The migrant-receiving location case is located in Vermont, USA (Addison County), while the migrant-sending location case is located in the southern Yucatán peninsular region of Mexico (part of Campeche state, surrounding the Calakmul Biosphere Reserve)

includes potential feedback mechanisms and numerous conditioning factors tied to human social systems. In this brief, we consider a key question that merits further research: *What is the role of gender in shaping the relationship between transnational labor migration and the transformation or maintenance of the landscapes of both migrant-sending and receiving regions?* And by gender, we refer to gender norms and ideologies that shape both individual and household decisions and state actions, as well as the specific and varying gendered migration patterns that can result from these norms and ideologies.

Literature review

The research question posed here intersects with several established fields of research that can provide an empirical and theoretical context for the study of gender in the migration–environment nexus. We first briefly consider the scholarship on the environment as a push or pull factor for migration. We then turn to the literature on the environmental impacts of transnational labor migration. Finally, we briefly review the research on the role of gender in agriculture and labor migration, highlighting the literature on the impact of male labor out-migration on gender in sending households and communities.

Environmental change as a push/pull factor in migration

A number of scholars have posited the potential for “environmental refugees” (Bates 2002; Myers 2002), with out-migration resulting both from natural disasters and from deteriorating environmental conditions. Should the water available for rain-fed and irrigated agriculture in Mexico and Central America decrease and the effects of hurricanes become more severe, as is suggested for the region by climate change models (Alscher 2009; Warner et al. 2009), the environment may increase its role as a migration push factor. But although the role of environmental change as a driver of human migration is intuitively understood, only recently have researchers started to pursue empirical evidence for various regions around the world (Warner et al. 2009). Likewise, the impact of resource scarcity on out-migration has not been well studied, except in the case of land resources (de Sherbinin et al. 2008) where findings reveal that inability to access land (due to cost and availability) in particular rural areas can lead to household relocations to other rural areas (Carr 2008a) and to rural–urban migration for non-agricultural livelihood opportunities. One longitudinal study in the Ecuadorean Amazon has found that natural resource scarcities drive gendered patterns of out-migration (Barbieri and Carr 2005): daughters were more likely to move to cities, while sons extended the rural agricultural frontier, but only the migration of daughters was associated with natural resource scarcities. However, in a study in the highlands of Ecuador, Gray (2008) found that negative environmental conditions did *not* consistently increase out-migration.

The impacts of labor migration on agriculture, land use, and the environment

Over the last decade, a great deal of research has emerged seeking to better understand land-use change around the world. Population-environment scholars have examined the effect of human migration on environments as a component of demographic change. This literature has focused largely on the relationship between population *in-migration* and the clearing of forested regions for smallholder agriculture. Expanding road networks, the availability of jobs in extractive industries like timber and oil, and land distribution programs have all been implicated in studies around the world. Colonization of regions with low population density and high forest cover by peasant-farming households can lead to deforestation and forest fragmentation, as has been documented for the Ecuadorean Amazon (Sierra 2000; Pan et al. 2007), Mexico’s southern Yucatán (Turner et al. 2004), and Guatemala’s Petén (Carr 2005, 2008b). In some regions, such as parts of the Brazilian Amazon, this smallholder agriculture subsequently has given way to a pasture-based land use dominated by larger landholdings, in what has been described as a “hollowing out” of the agricultural frontier (Sloan 2007). These land-use change dynamics associated with the colonization of frontier regions are well documented and understood.

However, the impacts of demographic changes in these agricultural frontiers following initial colonization are less well documented and understood (Pan et al. 2007). In-migration to forested regions has been largely internal rural–rural

migration that translocates entire households. Here, however, we are focused on the emerging role of transnational labor migration in both sending and receiving sites—with households remaining embedded as environmental actors in sending locations. Carr (2004, 2009) asserts that internal migration is much more important in land-use/land-cover change than is transnational migration, but arguably the contemporary globalization of labor is in the process of radically transforming this situation. The increasing incorporation of transnational labor migration into household livelihood strategies in the rural global south is quickly becoming a key aspect of local demographic change for many regions.

This labor *out-migration* (which may be internal as well as transnational) is currently posited as leading to forest transitions and ecosystem recovery, particularly in Latin America (Aide and Grau 2004). Forest transition theory (Mather 1992), which was developed in the context of the global north, posits a long-term sequence, in which forest cover first decreases and then increases again as societies develop. Forest transition theory has been applied to the global south as well, with the processes described often linked to labor out-migration (Grau et al. 2003; Klooster 2003; Perz and Skole 2003; Rudel et al. 2002). Rudel (2005) identifies a trajectory for Central America and the Caribbean based on rural poverty, leading to labor out-migration, field abandonment, and forest recovery. However, the growing phenomenon of labor out-migration with households staying in rural places and receiving remittances remains under-examined. The work of Hecht et al. (2006) in El Salvador is one exception here, with research describing a positive association of forest recovery with remittance receipts.

At the same time, a number of landscapes have been described as remittance landscapes (Hostettler 2007), reflecting a process of land-use conversions as an outcome of migration earnings investment. In her work in the Philippines, McKay (2005) found women's migration to be both cause and result of a move from subsistence to intensive commercial agriculture, with remittances capitalizing the transition. In this regard, Gray's recent quantitative study in Ecuador is a helpful addition to the literature, as he separates migration's remittance effect from its labor effect and identifies differences based on the gender of the migrant (Gray 2009). Overall, Gray found that out-migration and remittances were not associated with large-scale agricultural change. Maize production significantly decreased with male out-migration, marginally increased with receipt of international remittances, and was unaffected by female migration or internal remittances.

In contrast to the under-examination of the impact of transnational households in the land-use change literature, there exists a vast literature on the impacts of labor migration on sending community development—including on agricultural development and land use—and much of this work has taken place in Mexico (e.g. Conway and Cohen 1998; Durand et al. 1996). Research on migration's impact on agricultural land use has addressed whether labor out-migration leads to disintensification and/or land abandonment, through the loss of labor (Rozelle et al. 1999), or to agricultural investment through the receipt and use of remittances. Various studies have found that the local development context is an important factor in whether remittances are invested in agriculture, with access to fertile land and markets key (de Haan 2006; Durand et al. 1996; Taylor et al. 1996). After

consumption needs are first met, investment in productive activities, including agriculture, may occur as well (Findley 1997; Jokisch 2002). Some case studies have reconciled these two possible outcomes through an identification of growth in pasturelands and cattle production, as low labor input investment opportunities (Jokisch and Lair 2002; Taylor et al. 2006). More broadly, household receipt of remittances can be hypothesized as having varying impacts on local environments and natural resources, both positive and negative. Remittances can substitute for local natural resources, can be invested in conservation activities, or can increase investment in activities with negative environmental impacts (de Sherbinin et al. 2008).

Recent research points to the critical roles of social systems and specific migration patterns in determining the impacts of transnational labor migration on landscapes, primarily in the global south (de Sherbinin et al. 2008; Massey et al. 2006). At the same time, the range of empirical study findings points to the potentially important roles played by other factors that vary among different geographic sending locations. Although circular or episodic transnational labor migration of a household member has emerged as a major component of poor rural households' diversifying livelihood strategies, the linked *social and environmental* change implications of these new and emerging patterns are not well understood. A particular dearth of scholarship exists on the impacts of transnational migrant streams on agro-environmental landscapes in the rural North.¹

Gender, labor migration, and agriculture

Research has revealed important gender differences in livelihood strategies (Oberhauser et al. 2004; Radel et al. 2010, forthcoming) and in access to and control over natural resources such as land, which are central to the formulation of rural livelihood strategies (Agarwal 2003; Razavi 2003), including in Latin America (Deere and León 2003). Yet, the role of gender in land use resulting from labor migration is not well understood. To date, there has been little to no connection made to a large body of literature on women in agriculture (Boserup 1970; Davison 1988; Sachs 1996) and to research on changes in gender relations resulting from and leading to environmental and natural resource-use changes (Rocheleau et al. 1996).

Research has also revealed that migration is a highly gendered process, both reflecting and potentially altering gender relations (Chant 1992, Hondagneu-Sotelo 1994; Pessar and Mahler 2003; Silvey 2004). When women migrate together with their male partners, some gender norms and relations may be altered, while others may be reinforced, as found by Parrado and Flippen (2005) in their research on changes in gender with the migration of women from Mexico to North Carolina. In contexts in which men are transnational labor migrants and women are “left behind,” as is the case in many Mexican communities, migration has been linked to various conflicting impacts on gender and on gender relations.

One important area of potential change of particular relevance here is the gendered relations of agriculture. A dominant hypothesis in the literature is that

¹ Though see Mitchell (1996) for California and Duncan and Duncan (2003) on suburban spaces.

male out-migration is leading to a “feminization of agriculture,” particularly in Latin America (Deere 2005; Katz 2003; Lastarria-Cornhiel 2006). Whether and how women’s labor and decision-making substitutes for men’s during their absences is critical to the agricultural and land-use impacts of labor out-migration. Deere (2005) has noted that when male out-migration occurs and the men remain absent for long periods of time, women in Mexico often become both the farm managers and the primary source of agricultural labor. In most of this literature, however, primary attention has been paid to the question of agricultural labor, as opposed to farm management.

Research on gender and migration in sending communities has also examined the impact of gendered patterns of migration on intra-household gender equity, with equivocal findings (Boehm 2008). Some research has argued that men’s migration may improve women’s position over the long term through their receipt of remittances, their increased participation or autonomy in day-to-day household decision-making, and the loosening of the gendered household division of labor in the absence of men (Hondagneu-Sotelo 1994). Other research has argued that despite the loosening of roles and responsibilities, gender ideology is unaffected by men’s migration as the gender hierarchy is defended (Dreby 2009) and women find themselves increasingly dependent upon remittances generated by their male partners (Bever 2002).

In addition, men’s migration carries implications for women’s mobility. Although increased household decision-making and labor responsibility may lead to increased mobility for women (Chant 1991), women may also curtail their own mobility in an attempt to protect their moral reputations (Chant 1997; Menjívar and Agadjanian 2007). Gendered mobility outcomes are likely to have direct implications for households’ and women’s decisions in agriculture—e.g. what to plant, how much, and with what inputs (and in particular, with what labor inputs). To summarize the state of current knowledge, in general the relationship between labor migration and environmental change is not well studied (Hugo 2008). Empirical findings have been mixed (de Sherbinin et al. 2008), and few studies have explicitly considered the role of gender in the migration–environment relationship. However, we know that gender plays a significant role in labor migration and that gender is itself potentially altered in the process. Our examination of the role played by gender in the migration–environment relationship both in the southern Yucatán peninsular region and in Vermont begins to address a significant gap in our understanding.

Methods

In our discussion below of the two cases, we bring together two sets of research carried out separately by the authors. Radel and Schmook have been examining the question of transnational labor out-migration and agricultural/land-use change in Mexico’s southern Yucatán (with forest cover impacts). Agricultural and land-use changes in the southern Yucatán are of considerable interest to the international conservation community, as the region contains the largest expanse of seasonal

tropical forests remaining in Mexico as well as the Calakmul Biosphere Reserve (Vester et al. 2007; see Fig. 1). McCandless (2010) has examined the role of Mexican labor in-migration in Vermont's dairy industry and pastoral landscapes. As such, the two cases represent both ends of a flow of labor from Mexico to the United States; although we cannot link the two existing cases through specific migrants or migrant households.

The southern Yucatán case draws largely on household surveys carried out within a variety of studies over the course of a decade, from 1997 through 2007.² The most recent survey in 2007 particularly informs this research brief. Interviews were carried out with 155 randomly selected households from six communities,³ with interview participation by both the male and female heads of households. The household sample was stratified to facilitate comparison of migrant households⁴ to non-migrant households. Data were collected on any migration events for all members of the household (including on motivations for migration), as well as on land use and tenure, recent crop successes and failures, agricultural investment, remittances and their use, and the gendered division of household labor and decision-making. To compare migrant and non-migrant households,⁵ data were analyzed with univariate statistical procedures including *t*-tests for differences in group means and cross-tabulations for categorical variables. We do not present here all the findings from the 2007 survey; instead, we focus on those most relevant to our aim in this research brief—to highlight the role played by gender norms and relations in mediating the migration–environment relationship.

The discussion of the Vermont case draws on McCandless's qualitative field research carried out between 2004 and 2008, primarily in Addison County. The larger aim of the research was to understand how Mexican⁶ undocumented migrant farm workers experienced the iconic pastoral Vermont landscape. The researcher carried out initial in-depth, semi-structured interviews with twelve Mexican migrants working primarily in dairying and followed up with these individuals over the course of several years. Ten of the interviewees were men, and two were women—with an oversampling of women relative to the local Mexican migrant population. Interviews were transcribed in full and then coded and analyzed in NVivo's QData (QSR International 2007) using techniques from grounded theory (Glaser and Strauss 1963) in category development. Additional interviews with farm

² Much of the research was carried out as part of the Southern Yucatán Peninsular Region Land Use/Cover Change project (see Turner et al 2004). See Schmook and Radel (2008) for full details on the 2003 survey and methods.

³ The ethnic composition of these communities was largely *mestizo* (mixed European and indigenous ancestry).

⁴ For migrant households, we distinguished between households in which the male head of household was the international migrant and those in which another household member (such as an adult son) was the international migrant. For analyses comparing households with male migrant heads to those without, we excluded six households with no male head (due to death or partnership dissolution).

⁵ Comparisons between households with and without male migrant heads were made, as well as comparisons between households with and without any migrant member.

⁶ Only a minute proportion (about 5%; E. Shea, pers comm. 7/14/09) of migrant farm workers from Latin America, working in the Vermont dairy industry, originate from countries other than Mexico.

owners and local service providers, as well as participation in public meetings, further inform the research findings and the understanding of the role transnational migrant labor plays in the Vermont dairy industry.⁷

We see our presentation of the two cases and the methods we outline here as a preliminary foray into the research question identified. We aim to illustrate the importance of the identified research question and to point to the need for integrated projects that can empirically demonstrate the role of social norms and relations within the larger human migration and environmental change/maintenance nexus. The strengths of the research reported here include the combination of qualitative and quantitative approaches and the inclusion of both migrant-sending and receiving locations.

The sending location case: Mexico's southern Yucatán

The following section details select relevant findings from the southern Yucatán case and then discusses these findings in the context of our broader body of work in the region over the last decade and the specific research question posed here. We focus here on an examination of (1) the environment as a migration push factor, through the mechanism of crop losses; (2) the impact of transnational labor migration on the environment, through the mechanism of household land-use change; and (3) the impact of this migration on gender in sending households and communities. The discussion then integrates these findings to discuss the environment–migration relationship in this particular region and what we know about how gender intervenes in this relationship.

Select findings

- (1) *Crop loss as a migration push.* In 2007, we directly asked interviewed men whether or not they thought there was a relationship between crop loss and migration. Eighty-two percent of men who had migrated at least once responded “yes”, while only 41% of men who had never migrated did so. Interviewed farmers who had experienced crop losses most often attributed those losses to drought, heavy rain, or hurricane damage, and although many farmers reported having experienced crop losses, male household heads who were away from their homes in 2007 but had cultivated maize in 2005, on average reported higher crop losses for the year 2005 ($t = -1.69, p = 0.097$, with equal sample variances not assumed).⁸ These findings suggest that for migrants there can be a perceived and observable relationship between environmental conditions or changes leading to crop losses and the decision to engage in labor migration.

⁷ See McCandless (2010) for full details on interview methods.

⁸ We allowed for this lag time from 2005 to 2007, as it often takes migrants more than a year to make and realize the decision to travel north.

Table 1 Select findings from 2007 interviews

	Male head is migrant (%)	Male head is non-migrant (%)	Comparison of two groups: stat. sig. *	Household has a migrant member (%)	Household has no migrant member (%)	Comparison of two groups: stat. sig. *
<i>2007 land use: Percent of households in group that...</i>						
Cultivated maize	77	92	0.01	81	93	0.05
Cultivated chili	49	68	0.02	55	67	0.14
Had pasture	50	44	0.50	53	36	0.05
<i>Role of gender: Percent of households in group in which the woman...</i>						
Participates in field labor	68	70	0.79			
Holds formal ejidal land rights	24	10	0.02			
Participates in planting decisions	40	17	0.00			
Supervises hired male labor	24	1	0.00			

* Two-sided statistical significance for Pearson's chi-square

- (2) *Impact of migration on land use.* Our data indicate that migration was associated in 2007 with lower rates of maize and chili cultivation and higher rates of pasture (for cattle) establishment and maintenance (see Table 1). Rates of pasture establishment and maintenance are increasing now among non-migrant households as well, but the average land under pasture for the surveyed households with migrant male heads was 7 hectares, compared to an average of less than 4 hectares for surveyed households with non-migrant male heads ($t = -1.65$, $p = 0.102$).
- (3) *Impact of migration on gendered agricultural relations.* The 2007 data also indicate that local gender norms may be central to land-use outcomes of labor out-migration. We found that in 2007, husbands' labor migration was *not* associated with wives' increased participation in field labor, but it *was* associated with increased rates of women's formal rights to land and increased rates of their participation in farm management, including the supervision of male farm laborers and participation in land-use decision-making (see Table 1).

Case discussion

Our earlier research reveals that transnational labor out-migration from the southern Yucatán is primarily a result of a crisis in semi-subsistence, peasant agriculture

largely dependent on maize (and a local lack of wage opportunities outside of agriculture), combined with perceived greater opportunity for income generation across the border (Radel and Schmook 2008; Schmook and Radel 2008). Roughly a decade ago, men began leaving established households, often including agricultural land holdings, to seek wage labor opportunities in the United States (in the construction, agricultural, and service industries in particular). Other scholars have identified the crisis in semi-subsistence agriculture as a product of neoliberal economic policies resulting in farmers being squeezed from both sides: Subsidies of agricultural inputs have been removed at the same time that farmers no longer receive a guaranteed price for commodities such as maize and must compete with a low world market price (Appendini 2003; Echánove and Steffen 2004; Gravel 2007). Longer-standing processes of socioeconomic marginalization and inequalities in resource distributions are also identified as drivers of Mexican labor out-migration (Gravel 2007).

These sociopolitical–economic realities faced by the rural Mexican smallholder are intertwined with unpredictable local environmental conditions—in the southern Yucatán, variability of rainfall and a recent series of droughts have negatively impacted agricultural productivity. In addition, hurricanes frequently devastate crops in the region, primarily through flooding or wind damage. Global climate change is forecast to exacerbate these conditions, with decreased and changing rainfall patterns and increased hurricane severity resulting in escalating destruction to crops and fields (Warner et al. 2009). An environmental shock and the resultant loss of a crop can throw semi-subsistence farming households into debt. Debts accumulated through unsuccessful cultivation of chili peppers (whether due to crop loss or a farm gate price insufficient to cover input costs) have already propelled a number of households in the region into labor migration (Radel and Schmook 2008). Thus, although we do not have empirical evidence of local environmental change resulting in labor migration, we do know that increased rates of crop loss are a likely outcome of future environmental change for the region. We additionally know that farmers themselves perceive a link between crop loss (and accumulations of debt) and labor migration, and through the 2007 interviews we can also document a link between reported crop losses and the migration of male household heads.

To date, the southern Yucatán has experienced a highly gendered pattern of labor out-migration, reflecting local gendered divisions of labor in which women have primary responsibility in household reproduction.⁹ With a decision to engage in labor migration to the United States, men for the most part leave women behind in the rural communities, raising children and maintaining local claims to resources such as land. This pattern has also reflected the high cost of the journey, with most households only able to afford sending a single migrant from the nuclear family.¹⁰ In addition, gendered migration represents the relatively rigid gender norms around

⁹ We discuss some of the early gendered impacts of male out-migration in Radel and Schmook (2009), particularly with respect to women's agricultural labor and decision-making.

¹⁰ Many households borrow the money needed, which, if the migrant is undocumented, can be around \$2000 US.

the mobility of women and an idealized confinement of women to the home as housewives (Zapata 1996).

Findings from the 2007 data illustrate that the migration of these male heads of households affects land use and the gendered relations of agricultural production, with the migration of the male head associated with lower rates of maize and chili cultivation and with larger areas under pasture. Household member's migration also can affect land-use decisions. Households with any migrant member were more likely to not cultivate maize and to have some land in pasture. In earlier research, we compared the land use of a sample of households in 2003 to that of largely the same households in 1997 (Radel et al. 2010). We found evidence of a divergence in household agricultural strategies in the region. Some peasant households were moving out of agriculture, while others were investing in more extensive and commercial practices such as cattle raising. Commercial cultivation of chili peppers by peasant households appeared to be on the decline. We also found that this agricultural transition was associated with male labor out-migration. The 2007 findings provide further evidence that households engaging in labor migration exhibit a different pattern of land use.

Our 2007 findings also suggest that the gender system conditions the land-use decisions of migratory households, but in turn is itself modified in potentially unexpected ways, as women assume certain aspects of farm and land management (including some decision-making and the supervision of hired male labor). Due to gender norms and expectations around the proper "place" of women, women's labor does not simply replace that of absent male spouses in agricultural fields. In-depth ethnographic research associated with our larger project (McEvoy 2008) suggests that in at least some communities in southern Mexico, women's mobility is socially policed and curtailed in the absence of their husbands, with a tracking of where women do or do not go alone tied to local norms around women's sexual morality. However, neither are agricultural fields always abandoned with the absence of male household heads and their labor. Many women (often under the direction of their husbands) hire and supervise male daily wage labor, paid for with the remittances of their husbands. These gender processes influence the decisions negotiated between men and women at the household level and the resultant household agricultural and land-use decisions. In turn, changes in agricultural strategies and land use translate directly into changes in forest and secondary vegetation land cover as fields are abandoned, cultivated with hired male labor, and/or converted into pasture (requiring less labor input during male absences).

The receiving location case: Vermont, USA

Findings

Three key findings from the Vermont research are particularly relevant to this research brief. First, undocumented Mexican laborers provide an increasing percentage of the labor on working dairy farms, as Vermont struggles to maintain a small-farm based agricultural economy that is the most dairy-dependent in the

nation. Second, as open land for production or tourism and tax revenue-generating views has become scarcer in the state, public and private working land conservation programs in Vermont have invested heavily in keeping working farms going, and undocumented migrants have become essential to sustaining the day-to-day operation of a critical component of the iconic Vermont landscape. To persist undisrupted under current immigration policy and practice, Vermont's prized rural image appears to depend in part on the continuing invisibility of Mexican migrant farmworkers. Third, resources are channeled in the contemporary dairy industry in ways that select for the participation of laborers with limited mobility and access to the broader landscape. Mexican workers' undocumented status and gendered position make them attractive workers while strongly shaping their experience and use of this global north rural space.

Over the past 150 years, Vermont has largely followed the trajectory proposed by Mather's (1992) forest transition theory: nearly 80% deforested in the mid-1800s, the state now features only 20% open land (Klyza and Trombulak 1999). The Vermont dairy industry intervenes in the process of afforestation and is the primary agent in the creation and maintenance of the state's present iconic patchwork of forests and open fields. This landscape was created through the actions of numerous households operating small-scale dairy farms over the last century.

Starting in the 1950s, the local dairy industry initiated a process of consolidation and intensification, in response to technological and organizational changes at the national scale. As farming households fought to stay competitive, more marginal lands (especially hillsides) were abandoned, contributing to the current landscape mosaic. Continued market pressures have shaped a trend over the last half-century of increasing herd sizes and fewer farms. Dairy farm households experience considerable sunk capital costs, reflecting the current industrial approach to milk production and the associated equipment requirements.

In recent years, local and national conservation organizations have targeted this iconic dairying landscape for protection. As of 2008, 660 working farms (over 100,000 acres total) had been conserved under easement by the Vermont Land Trust (VLT 2008), including two-thirds of farms in Addison and Franklin, Vermont's most dairy-intensive counties. The farm landscape is essential to Vermont's tourism industry (Albers 2000; Harrison 2006) and is idealized both locally and nationally in aesthetic terms. However, in order to lower costs and maintain operations, and the resultant agricultural landscape, Vermont dairy farms have increasingly turned to hiring undocumented wage labor (Vermont Farm Bureau 2005; Kessel and Bolduc 2008). This shift to dependence on transnational migrant labor parallels similar processes documented for dairy farms in other states where the industry plays an important economic role, such as Wisconsin (Valentine 2005) and upstate New York (Maloney and Grusenmeyer 2005). With higher herd sizes and increasingly small profit margins, dairy farm households experience labor shortages¹¹ combined with the need to keep labor costs as low as possible.

¹¹ Based on the field research, McCandless estimates that hired farm hands are required for the operation of farms with more than 70 cattle, with one additional worker per 100 milking cattle.

The year-round¹² presence of undocumented Mexican migrant labor, often at lower hourly wages than citizen workers,¹³ facilitates the ability of the dairy farms to continue operations and therefore directly enables the maintenance of the pastoral Vermont landscape. These farmworkers' contribution to landscape maintenance is all the more striking because it occurs primarily from indoors. Their labor is focused on the barn and milking parlors, feeding and milking the cows, and mucking out the barn. Migrants are housed on-farm and this, together with their work within the enclosed spaces of farm buildings, hides their presence as undocumented workers from legal authorities. Farmers, who invest in training migrant workers, are vested in keeping the migrants invisible to outsiders.

According to service provider estimates,¹⁴ Mexicans, more than 90% of whom lacked legal documents, were present on roughly two-thirds of active dairy farms in 2005. The Vermont Farm Bureau conducted a survey of farmers in 2005 as well and found 30% of reported dairy farm workers in the state were Mexican. The Farm Bureau did not inquire about laborers' documentation status (Vermont Farm Bureau 2005); the lower percentage reported in their survey relative to service provider estimates may reflect farm employers' discomfort with reporting possibly illegal employment practices. The survey results also indicated that 47% of farm owners experience labor shortage, and 28% wanted "more information on how to find Mexican workers for their farms" (Vermont Farm Bureau 2005). Since 2005, these estimates have increased, with Mexican migrants outnumbering US migrants on the Vermont Migrant Education Program's rolls by 2008 (see Fig. 2).

The Mexican migrant stream in Vermont is largely male. As the flow has become established, most workers move via kin and place networks directly between Vermont and Mexico. Some also report having worked in California, and US southeastern and southwestern states; initial farm labor agency recruiting was from dairying areas in upstate New York. If migrants do not arrive to join or replace departing kin or friends, hired by word-of-mouth, they are dependent on labor placement intermediaries with farm contacts, who, unless they are social service providers, charge hundreds of dollars to workers and sometimes farmers for placements. In upstate New York, 98% of the migrant dairy farm workers are men, and most are relatively young (Maloney and Grusenmeyer 2005). McCandless estimates that in Addison County, less than 10% of the several hundred Latin American migrants are women. Certainly, gender norms and relations like those described earlier for the southern Yucatán case contribute to the outcome of a primarily male migrant workforce in Vermont. When women do accompany their male partners, they may selectively carry gender norms with them on their journey (Parrado and Flippen 2005), shaping their participation in destination spaces.

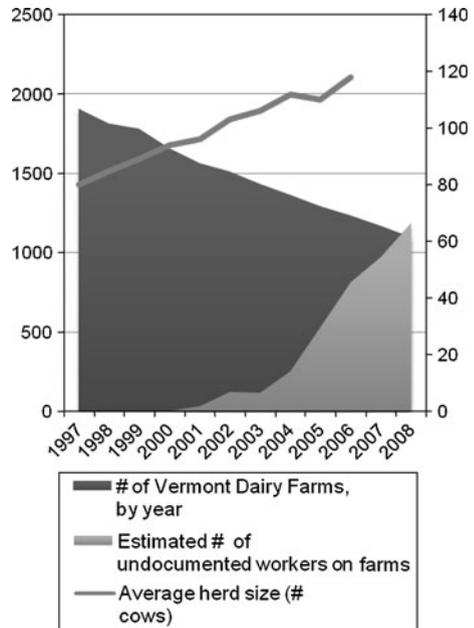
The requirements of the dairy industry and gender expectations in Vermont also shape gendered migration outcomes. Migrant women's presence on Vermont dairy farms as partners of male laborers, or as potential laborers themselves, is

¹² The year-round nature of the work makes dairy labor ineligible for H2A visas available to seasonal agricultural workers.

¹³ The Vermont Migrant Education Program reports an average wage of \$6.00 to \$7.50 an hour.

¹⁴ Vermont Migrant Education Program staff member.

Fig. 2 Number of Vermont dairy farms (*left axis*), estimated number of undocumented Mexican migrants (*left axis*), and average herd size (*right axis*) over a decade (based on Shea’s estimated ratio of 5 adult migrants (over age 22) for every Vermont Migrant Education Program service recipient, aged 0–22). *Sources:* Shea, E. (n.d.) unpublished data file of the Vermont Migrant Education Program and Stephenson (2007)



constructed as highly problematic for several reasons. Barracks-style housing, often in shared trailers provided by farmers (with occupation required as a condition of hire) is seen as inimical to women’s presence. Additionally, with labor tied to the operation of industrial dairy machinery, male farm owners often do not view women as proper laborers, relegating them when present to “lighter” work (such as calf care and milking), and sometimes offering women lesser pay. Finally, the presence of women can cause “problems.” As stated by one paid labor placement intermediary: “She’ll just get pregnant, and the farmer will have to deal with it.” Once pregnant, women who seek pre- and post-natal care risk exposure, detention, and deportation and make men’s hidden presence visible to service providers.

As a result of strong farm owner preferences, and based on the delineation of farm housing as limited space reserved for proper (male) workers, labor recruiters focus on recruiting unaccompanied men. According to one local farmer, “If one of them gets to bring his wife or his girlfriend, they’ll all want to.” As an illustration of the extent to which women are not welcomed on many dairy farms, one migrant hid his wife in a closet, leaving her with a cousin after a labor recruiter threatened not to place him if he had brought a female partner.

Case discussion

These findings demonstrate there are concerted efforts in a receiving location like Vermont to shape the gendered migration patterns in ways seen to be more amenable to the comfortable utilization of migrant labor and the maintenance of the dairy farm landscape. Farm owners and labor recruiters see men as better workers and women as both a threat to undocumented labor’s invisibility and a constraint on

their ability to discipline male labor. The subordinate role of migrant men and their confinement to private spaces in Vermont also reflects an interesting paradox in gender norms and relations, illustrating how gender intersects with race in the Vermont dairy landscape. In order to fulfill socially prescribed, male “breadwinner” roles in the generation of livelihoods for households in Mexico, Mexican men continue to shape agro-environmental landscapes, but accept subordination, lack of participation in local agricultural decision-making, and curtailed mobility in Vermont, roles and relations which echo those of female family members in Mexico.

Conclusions

Climate change is predicted to negatively impact some local environments, including those in the southern Yucatán, in terms of semi-subsistence farming potential. Increased rainfall variability and hurricane severity will exacerbate an already challenging livelihood context. Farming households already adapt their livelihood strategies to difficult local farming conditions by incorporating labor migration, with a resultant impact on land use and land cover. What happens with these feedback effects in the coming decades has implications for climate change itself, in terms of the ecosystem services provided by these rural areas (e.g. for carbon sequestration—see Eaton and Lawrence 2009). Even apart from potentially worsening local environmental conditions for peasant agriculture, global markets for agricultural commodities such as maize and economic liberalization in the global south are already linked to flows of temporary migrants out of rural areas in search of jobs, as illustrated by the southern Yucatán case.

As we have demonstrated here, environmental factors, including both biophysical conditions (e.g. in the southern Yucatán case) and the human efforts to maintain or change those conditions (e.g. in the Vermont case), can act (together with economic processes) as migration pushes and pulls through human livelihoods. In turn, labor migration can transform agro-environmental landscapes (e.g. in the southern Yucatán case) or can enable their maintenance (e.g. in the Vermont case). Exactly how this plays out in terms of the resultant stream of labor migrants and its impact on environments depends in part on gender constructions, norms, and relations in both sending and receiving communities.

Although there is a need for additional empirical work, we can draw some preliminary conclusions specific to the two case studies discussed. Radel and Schmoock’s research in the southern Yucatán specifies the nature and extent of a feminization of agriculture as a result of male labor out-migration, as local households and communities negotiate gender norms against women’s agricultural labor participation. The outcomes of these household and community negotiations in turn accumulate into empirically measurable land-use outcomes. The Vermont research carried out by McCandless has been qualitatively distinct, highlighting different aspects of how receiving location landscape outcomes associated with transnational labor migration are likewise highly gendered. The Vermont case also highlights the role of transnational labor in maintaining landscapes that remain or

become aesthetically valuable even as their productive value declines (see also Duncan and Duncan 2003). We find the simultaneous presentation of these two cases both informative and promising. In the future, we are interested in establishing a research project that explicitly links in its design social, migration, and environmental processes in sending and receiving locations and that also integrates both environmental factors as drivers of migration and the impacts of transnational labor migration on land use and environments.

The juxtaposition here of the Vermont and southern Yucatán cases illustrates the role of gendered transnational migrant labor in the simultaneous maintenance of idealized, aesthetic landscapes in the global north that otherwise follow Mather's (1992) forest transition theory, and the transformation of sending location landscapes in the global south. We do not conclude, however, a mapping of transnational labor migration onto landscape maintenance in the global north and onto landscape transformation in the global south. Whether given landscapes in the north and south are maintained or transformed depends on a variety of social processes, of which gendered labor construction and availability are just one important aspect. What we do suggest is that transnational migrant labor is increasingly a part of the processes by which landscapes throughout the world are shaped (whether for change or maintenance) and that the gendered nature of this labor is significant to our understanding of the processes.

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References

- Agarwal, B. (2003). Gender and land rights revisited: Exploring new prospects via the state, family and market. *Journal of Agrarian Change*, 3(1, 2), 184–224.
- Aide, T., & Grau, H. (2004). Globalization, migration, and Latin American ecosystems. *Science*, 305(5692), 1915–1916.
- Albers, J. (2000). *Hands on the land: A history of the Vermont landscape*. Cambridge, MA: MIT Press.
- Alscher, S. (2009). *Mexico: Case study report*. Environmental Change and Forced Migration Scenarios (EACH-FOR) Project. Available via http://www.each-for.eu/documents/CSR_Mexico_090126.pdf. Cited 18 May 2010.
- Appendini, K. (2003). The challenges to rural Mexico in an open economy. In J. Tulchin & A. Selee (Eds.), *Mexico's politics and society in transition* (pp. 255–275). Boulder: Lynne Rienner Publishers.

- Barbieri, A., & Carr, D. (2005). Gender-specific out-migration, deforestation and urbanization in the Ecuadorian Amazon. *Global and Planetary Change*, 47(2–4), 99–110.
- Batalova, J. (2008). *Mexican immigrants in the United States*. Migration Policy Institute. Available via Migration Information Source, US in Focus. <http://www.migrationinformation.org/USFocus/display.cfm?ID=679>. Cited 13 May 2010.
- Bates, D. (2002). Environmental refugees? Classifying human migrations caused by environmental change. *Population and Environment*, 23(5), 465–477.
- Bever, S. W. (2002). Migration and the transformation of gender roles and hierarchies in Yucatan. *Urban Anthropology and Studies of Cultural Systems and World Economic Development*, 31(2), 199–230.
- Boehm, D. (2008). “Now I am a man and a woman!” Gendered moves and migrations in a transnational Mexican community. *Latin American Perspectives*, 35(1), 16–30.
- Boserup, E. (1970). *Women’s role in economic development*. London: Earthscan.
- Carr, D. (2004). Proximate population factors and deforestation in tropical agricultural frontiers. *Population and Environment*, 25(6), 585–612.
- Carr, D. (2005). Forest clearing among farm households in the Maya Biosphere Reserve. *The Professional Geographer*, 57(2), 157–168.
- Carr, D. (2008a). Migration to the Maya Biosphere Reserve, Guatemala: Why place matters. *Human Organization*, 67(1), 37–48.
- Carr, D. (2008b). Farm households and land use in a core conservation zone of the Maya Biosphere Reserve, Guatemala. *Human Ecology*, 36(2), 1–12.
- Carr, D. (2009). Population and deforestation: Why rural migration matters. *Progress in Human Geography*, 33(3), 355–378.
- Chant, S. (1991). Gender, migration and urban development in Costa Rica: The case of Guanacaste. *Geoforum*, 22(3), 237–253.
- Chant, S. (Ed.). (1992). *Gender and migration in developing countries*. New York: Belhaven Press.
- Chant, S. (1997). *Women-headed households: Diversity and dynamics in the developing world*. London: MacMillan Press, Ltd.
- Conway, D., & Cohen, J. (1998). Consequences of migration and remittances for Mexican transnational communities. *Economic Geography*, 74(1), 26–44.
- Davison, J. (Ed.). (1988). *Agriculture, women, and land: The African experience*. Boulder: Westview Press.
- de Haan, A. (2006). *Migration in the development studies literature: Has it come out of marginality?* Research Paper No. 2006/19, World Institute for Development Economics Research, United Nations University. Available at http://www.wider.unu.edu/publications/working-papers/research-papers/2006/en_GB/rp2006-19/. Cited 18 May 2010.
- de Sherbinin, A., VanWey, L., McSweeney, K., Aggarwal, R., Barbieri, A., Henry, S., et al. (2008). Rural household demographics, livelihoods and the environment. *Global Environmental Change*, 18, 38–53.
- Deere, C. D. (2005). *The feminization of agriculture? Economic restructuring in rural Latin America*. Geneva: Occasional Paper 1, United Nations Research Institute for Social Development (UNRISD).
- Deere, C. D., & León, M. (2003). The gender asset gap: Land in Latin America. *World Development*, 31(6), 925–947.
- Dreby, J. (2009). Gender and transnational gossip. *Qualitative Sociology*, 32, 33–52.
- Duncan, J., & Duncan, N. (2003). Can’t live with them; can’t landscape without them: Racism and the pastoral aesthetic in suburban New York. *Landscape Journal*, 22(2), 88–98.
- Durand, J., Kandel, W., Parrado, E., & Massey, D. (1996). International migration and development in Mexican communities. *Demography*, 33(2), 249–264.
- Eaton, J. M., & Lawrence, D. (2009). Loss of carbon sequestration potential after several decades of shifting cultivation in the southern Yucatán. *Forest Ecology and Management*, 258(6), 949–958.
- Echánove, F., & Steffen, C. (2004). Coping with trade liberalization: The case of Mexican grain producers. *Culture and Agriculture*, 25(2), 31–42.
- Findley, S. (1997). Migration and family interactions in Africa. In A. Adepaju (Ed.), *Family, population and development in Africa* (pp. 109–138). London: Zed Books.
- Glaser, B., & Strauss, A. (1963). *The discovery of grounded theory: Strategies for qualitative research*. Chicago: Aldine.
- Grau, H., Aide, T., Zimmerman, J., Thomlinson, J., Helmer, E., & Zou, X. (2003). The ecological consequences of socioeconomic and land-use changes in postagriculture Puerto Rico. *BioScience*, 53(12), 1159–1168.

- Gravel, N. (2007). Mexican smallholders adrift: The urgent needs for a new social contract in rural Mexico. *Journal of Latin American Geography*, 6(2), 77–98.
- Gray, C. (2008). Environment, land, and rural out-migration in the southern Ecuadorian Andes. *World Development*, 37(2), 457–468.
- Gray, C. (2009). Rural out-migration and smallholder agriculture in the southern Ecuadorian Andes. *Population and Environment*, 30(4, 5), 193–217.
- Harrison, B. A. (2006). *The view from Vermont: Tourism and the making of an American rural landscape*. Hanover: University Press of New England.
- Hecht, S. B., Kandel, S., Gomes, I., Cuellar, N., & Rosa, H. (2006). Globalization, forest resurgence, and environmental politics in El Salvador. *World Development*, 34(2), 308–323.
- Hondagneu-Sotelo, P. (1994). *Gendered transitions: Mexican experiences of immigration*. Berkeley: University of California Press.
- Hostettler, S. (2007). *Land use changes and transnational migration: The impact of remittances in western Mexico*. Ph.D. thesis, École Polytechnique Fédérale de Lausanne.
- Hugo, G. (2008). *Migration, development and environment*. SSRC Migration and Development Conference Paper No. 9. Brooklyn, NY: Social Science Research Council.
- International, Q. S. R. (2007). *NVivo 16: QData*. Chicago: QSR International.
- Jokisch, B. (2002). Migration and agricultural change: The case of smallholder agriculture in highland Ecuador. *Human Ecology*, 30(4), 523–550.
- Jokisch, B., & Lair, B. (2002). One last stand? Forests and change on Ecuador's eastern Cordillera. *The Geographical Review*, 92(2), 235–256.
- Katz, E. (2003). The changing role of women in the rural economies of Latin America. In B. Davis (Ed.), *Food, agriculture, and rural development. Volume I: Latin America and the Caribbean* (pp. 31–65). Rome: FAO.
- Kessel, H., & Bolduc, V. L. (2008). *Vermont in transition: A summary of social, economic, and environmental trends*. Paper prepared for the Council on the Future of Vermont. http://futureofvermont.org/files/ul/VTTransitions_Full_noAppen.pdf (Last accessed Feb 19, 2008).
- Klooster, D. (2003). Forest transitions in Mexico: Institutions and forests in a globalized countryside. *The Professional Geographer*, 55(2), 227–238.
- Klyza, C. M., & Trombulak, S. C. (Eds.). (1999). *The story of Vermont: A natural and cultural history*. Hanover: University Press of New England and Middlebury College Press.
- Lastarria-Cornhiel, S. (2006). Feminization of agriculture: Trends and driving forces. Background Paper for the *World Development Report 2008*. Available from <http://www.rimisp.org/getdoc.php?docid=6489>. Cited 18 May 2010.
- Maloney, T. R., & Grusenmeyer, D. C. (2005). *Survey of Hispanic dairy workers in New York State. Research Bulletin 05-02*. Ithaca, NY: Cornell University, Department of Applied Economics and Management.
- Massey, D., Capoferro, C., & Fischer, M. (2006). International migration and gender in Latin America: A comparative analysis. *International Migration*, 44(5), 63–91.
- Mather, A. (1992). The forest transition. *Area*, 24(4), 367–379.
- McCandless, S. (2010). *Conserving the landscapes of Vermont: Shifting terms of access and visibility*. Ph.D. thesis, Clark University.
- McEvoy, J. (2008). *Male out-migration and the women left behind: A case study of a small farming community in southeastern Mexico*. M.S. thesis, Utah State University.
- McKay, D. (2005). Reading remittance landscapes: Female migration and agricultural transition in the Philippines. *Geografisk Tidsskrift, Danish Journal of Geography*, 105(1), 89–99.
- Menjívar, C., & Agadjanian, V. (2007). Men's migration and women's lives: Views from rural Armenia and Guatemala. *Social Science Quarterly*, 88(5), 1243–1262.
- Mitchell, D. (1996). *The lie of the land: Migrant workers and the California landscape*. Minneapolis: University of Minnesota Press.
- Myers, N. (2002). Environmental refugees: A growing phenomenon of the 21st century. *Philosophical Transactions of the Royal Society of London B*, 357(1420), 609–613.
- Oberhauser, A., Mandel, J., & Hapke, H. (2004). Gendered livelihoods in diverse global contexts: An introduction. *Gender, Place and Culture*, 11(2), 205–208.
- Pan, W., Carr, D., Barbieri, A., Bilsborrow, R., & Suchindran, C. (2007). Forest clearing in the Ecuadorian Amazon: A study of patterns over space and time. *Population Research and Policy Review*, 26, 635–659.

- Parrado, E., & Flippen, C. (2005). Migration and gender among Mexican women. *American Sociological Review*, 70(4), 606–632.
- Passel, J., & Cohn, D. (2008). Trends in unauthorized immigration: Undocumented inflow now trails legal inflow. Pew Hispanic Center. Available from http://www.ime.gov.mx/investigaciones/2008/phc_trends_unauthorized_immigration_undocumented_inflow_now_trails_legal_inflow.pdf. Cited 18 May 2010.
- Perz, S., & Skole, D. (2003). Secondary forest expansion in the Brazilian Amazon and the refinement of forest transition theory. *Society & Natural Resources*, 16(4), 277–294.
- Pessar, P., & Mahler, S. (2003). Transnational migration: Bringing gender in. *International Migration Review*, 37, 812–846.
- Radel, C., & Schmook, B. (2008). Male transnational migration and its linkages to land use change in a southern Campeche ejido. *Journal of Latin American Geography*, 7(2), 59–84.
- Radel, C., & Schmook, B. (2009). Migration and gender: The case of a farming ejido in Calakmul, Mexico. *The Yearbook of the Association of Pacific Coast Geographers*, 71, 144–163.
- Radel, C., Schmook, B., & Roy Chowdhury, R. (2010). Agricultural livelihood transition in the southern Yucatán region: Diverging paths and their accompanying land changes. *Regional Environmental Change*, 10(3), 205–218.
- Ratha, D., & Xu, Z. (2008). *Migration and remittances factbook*. Washington, DC: World Bank.
- Razavi, S. (Ed.). (2003). *Journal of Agrarian Change*, Special Issue on Agrarian Change, Gender and Land Rights 3(1, 2).
- Rocheleau, D., Thomas-Slayter, B., & Wangari, E. (Eds.). (1996). *Feminist political ecology: Global issues and local experiences*. New York: Routledge.
- Rozelle, S., Taylor, J., & DeBrauw, A. (1999). Migration, remittances, and agricultural productivity in China. *American Economic Review*, 89(2), 287–291.
- Rudel, T. (2005). *Tropical forests: Regional paths of destruction and regeneration in the late twentieth century*. New York: Columbia University Press.
- Rudel, T., Bates, D., & Machinguiashi, R. (2002). A tropical forest transition? Agricultural change, out-migration, secondary forests in the Ecuadorian Amazon. *Annals of the Association of American Geographers*, 92(1), 87–102.
- Sachs, C. (1996). *Gendered fields: Rural women, agriculture and environment*. Boulder, CO: Westview Press.
- Schmook, B., & Radel, C. (2008). International labor migration from a tropical development frontier: Globalizing households and an incipient forest transition—the southern Yucatán case. *Human Ecology*, 36(6), 891–908.
- Sierra, R. (2000). Dynamics and patterns of deforestation in the western Amazon: The Napo deforestation front, 1986–1996. *Applied Geography*, 20, 1–16.
- Silvey, R. (2004). Power, difference, and mobility: Feminist advances in migration studies. *Progress in Human Geography*, 28(4), 490–506.
- Sloan, S. (2007). Fewer people may not mean more forest for Latin American forest frontiers. *Biotropica*, 39(4), 443–446.
- Stephenson, M. (2007). *A northeast dairy benchmark*. Cornell Program on Dairy and Markets Policy. Available from http://www.centerfordairyexcellence.org/tl_files/cde/pdf/Stephenson. Industry Study Paper 4-2-07.pdf. Cited 7 Aug 2009.
- Taylor, E., Arrango, J., Hugo, G., Kouaouci, A., Massey, D., & Pellegrino, A. (1996). International migration and community development. *Population Index*, 62(3), 397–418.
- Taylor, M. J., Moran-Taylor, M. J., & Ruiz, D. R. (2006). Land, ethnic, and gender change: Transnational migration and its effects on Guatemalan lives and landscapes. *Geoforum*, 37(1), 41–61.
- The Global Commission on International Migration. (2005). *Migration in an interconnected world: New directions for action*. Geneva: The Global Commission on International Migration, The United Nations.
- Turner, B. L., I. I., Geoghegan, J., & Foster, D. (Eds.). (2004). *Integrated land-change science and tropical deforestation in the southern Yucatán: Final frontiers*. New York: Oxford University Press.
- Valentine, B. E. (2005). *Uniting two cultures: Latino immigrants in the Wisconsin dairy industry*. Working Paper 121, Center for Comparative Immigration Studies, University of California-San Diego. San Diego: University of California.
- Vermont Farm Bureau. (2005). *Dairy industry labor survey*. Unpublished survey. Montpelier, VT: Vermont Farm Bureau.

- Vermont Land Trust. (2008). *Vermont land trust 2007–2008 annual report*. Montpelier, VT: Vermont Land Trust.
- Vester, H. F. M., Lawrence, D., Eastman, J. R., Turner, B. L., Calmé, S., Dickson, R., et al. (2007). Land change in the southern Yucatán and Calakmul Biosphere Reserve: Effects on habitat and biodiversity. *Ecological Applications*, *17*(4), 989–1003.
- Warner, K., Ehrhart, C., de Sherbinin, A., Adamo, S., & Chai-Onn, T. (2009). *In search of shelter: Mapping the effects of climate change on human migration and displacement*. Report published by CARE. Available from http://www.ciesin.columbia.edu/documents/clim-migr-report-june09_final.pdf. Cited 18 May 2010.
- Zapata, E. (1996). Modernization, adjustment, and peasant production: A gender analysis. *Latin American Perspectives*, *23*(1), 118–130.