

Land and leña: linking transnational migration, natural resources, and the environment in Guatemala

Michelle J. Moran-Taylor · Matthew J. Taylor

Published online: 21 September 2010
© Springer Science+Business Media, LLC 2010

Abstract This article examines the relationships between international migration, natural resources, and the environment. Rather than looking at environmental change as a cause of population movements, the article reveals how migration affects the environment in sending countries. Empirically, we rely on a case study in Guatemala. Although migrants and cash remittances make significant contributions to Guatemala's changing economy, little is known about the relationships between migration and the environment in this Central American country—a country, which continues to have a large rural population and that relies heavily on its natural resources. Drawing on ethnographic research and household surveys in a Maya community, we reveal how migrants and their earnings, as well as their ideas, behavior and attitudes, affect land use, land cover, and firewood use. We reveal, for example, how in addition to investments in land for home building and pick-up trucks to help improve agricultural production, some migrant households purchase more land and often dedicate it to the cultivation of vegetable crops for local and foreign markets. Cultural practices and beliefs directly linked to land and the environment, particularly maize cultivation, also alter due to migration processes. And, despite the ability of migrant households to transition to more efficient fuels like liquid propane gas (LPG), we show how they continue to use firewood. In all, the study contributes important insights into the environmental implications of migration.

Keywords Guatemala · Transnational migration · International migration · Environment · Natural resources · Firewood · Remittances

M. J. Moran-Taylor (✉) · M. J. Taylor
Department of Geography, University of Denver,
2050 East Iliff Avenue, Denver, CO, USA
e-mail: mmoranta@du.edu

M. J. Taylor
e-mail: m.j.taylor@du.edu

Introduction

This article examines the relationships between international migration and the environment. Rather than looking at environmental change as a fundamental cause of population movements, the article reveals how migration affects the environment in sending regions. We rely on a case study in Guatemala, a nation transforming from a “breakfast economy” that exports cash products such as coffee, bananas, and sugar to a remittance-based economy (Moran-Taylor 2009). Although migrants and their earnings make significant contributions to Guatemala’s changing economy, little is known about the relationships between migration and the environment in this country. When migrants return to their homeland, do they buy more land to plant subsistence crops or do they switch to export cash crops? Do economic remittances permit the purchase of land and the concentration of land in the hands of migrants? Do return migrants drift away completely from agriculture and land holdings? And, do they turn away from their long history of maize heritage and rituals? Do migrant households continue using traditional cooking fuels like *leña* (firewood)?

For heuristic purposes, we identify economic and social remittances as potential pathways through which migration processes may impact the environment. We employ the term “environment” to mean the natural environment, which includes natural resources, agriculture, and land use and land cover change (LUCC). For example, direct links to the environment develop if migrants switch from firewood to liquefied petroleum gas (LPG) for cooking because firewood often comes from non-sustainably managed forests and because wood-burning cooking stoves, with their emissions of CO₂, methane, and black carbon, among other substances, create indoor and outdoor air pollution and contribute to green house gases (GHGs). Moreover, the rise in wealth of migrants often leads to increased material consumption. In turn, this greater consumption intensifies migrants’ footprint on natural resources in multiple ways (Kitzes et al. 2008). This examination is relevant in a globalized world where more and more families must migrate to survive. Moreover, economic remittances alter household and national economies and help reduce the severity of poverty. In addition to economic remittances, this article considers the effects of social remittances on the environment. These include the beliefs, values, behavior, and ideas about life that flow from migrant receiving to sending areas (Levitt 2001).

In order to promulgate further debate, we provide examples that probe the relationships between migration and the environment in rural Guatemala. Specifically, we ask: How do the infusion of economic remittances and social remittances impact land ownership, land distribution, land use, and household dependence on natural resources like firewood. The emphasis on *leña* (firewood) arises because most rural Guatemalans survive relying on this particular natural resource. Our discussion begins with a literature review on migration and the environment. We also highlight the significance of firewood to Guatemala’s energy budget and environment. Next, a sketch of US-bound Guatemalan migratory trends is provided. After contextualizing our study, we move to a description of the methods used and then address the linkages between migration and the environment in Guatemala.

Such a focal point enhances our understanding of how increasing integration into a globalized economy shapes rural livelihoods and landscapes. While we provide examples from Guatemala, ultimately, we aim to contribute more generally to discussions of transnational migration and the environment.

Background and context

Transnational migration and the environment

The large body of research focusing on transnational migration examines social networks, social capital, communications, families, intergenerational relations, motherhood, fatherhood, childhoods, identity (e.g., gender, class, ethnicity, race), entrepreneurship, remittances, development, and the state. Studies on transnational migration stress how migrants have become part of enduring social networks that connect their places of origin and destination points, regardless of physical distance or mobility (e.g., Glick Schiller et al. 1992). Research examining the direct links between transnational migration and the environment is scant. A lack of emphasis on the environment is interesting, especially when considering the words of Bilborrow (2000) who echoes that it is problematic to strip away environmental processes from the social, economic, and political and institutional structures of which they form a part. Moreover, in an earlier review of the literature, Hugo (1996) addresses environmental concerns and international migration and notes that our knowledge of the relationship associated with environmental change as both a cause and consequence of migration remains little understood. And, more recently, he reminds us to further explore the intersection of migration, environment, and development (Hugo 2008). In particular, we lack information on how migration feeds back into the environment and land use in migrant sending regions and, if and how, such changes perpetuate or inhibit migration. Initial results on how international migration alters land use and ownership dynamics in Guatemala is only the beginning of scholarship in this area because, as National Research Council (NRC) researchers put it,

There is some agreement that, in the future migration, rather than changes in human fertility and mortality, will be the key demographic link between the two dynamic processes of land use and land cover changes. Causation and feedback will probably move in both directions: environmental changes will likely cause migration, and migration will likely change the environment...There is very little empirical documentation of the relationship between migration and the environment...data on migration and other social variables must be linked with biophysical data from remote and land-based sources on soils, climate, and other biophysical factors (1999: 349).

Various studies consider population movements and its connection to the environment, particularly internal migration, and look at, for example, migration decision-making and the role that the environment plays in such decisions (e.g., Carr 2005), land cover change and land use changes (e.g., Carr et al. 2009),

coastal migration and resource management (e.g., Eder 2008), migration and coastal environmental outcomes (e.g., Curran and Agardy 2004), and conservation and development in frontier areas (e.g., Haenn 2005). Other work illustrates how the environment is the main driver for out-migration (Suhrike 1994). Recent research emphasizes how climate change and dramatic weather events (i.e., droughts, landslides, hurricanes) can contribute to the decision to migrate and how these events can create internal and international migrants and refugees (e.g., Bates 2002; Myers 2002; OIM 2008). Most studies that examine the relationships between climate change, the environment, and migration clearly acknowledge that it is extremely difficult to directly link migration decisions to changes in the environment because the decision to move involves many other cultural, political, and personal factors (e.g., Warner et al. 2009).

When exploring the relationship between migration and the environment in sending regions (that is, not looking at the environment as a driving factor for migration, but rather how migration and remittances may impact the environment), past research points out how returnees and cash remittances can play a central role back home. Bilsborrow (1992), in his study of Ecuador, illustrates how return migrants can be linked to lower levels of deforestation. The connection between migration and the environment is also shown in migrants returning to the Caribbean islands with professional training. These migrants return with distinct notions about ecosystem services and commitments toward environment preservation, and some even invest in the formation of non-profit organizations for that particular purpose (Conway and Lorah 1995). This is a clear example of the connections between social remittances and the environment.

With respect to migration and agricultural production, several perspectives and diverging outcomes emerge in the literature. Scholarship that examines migration and agriculture is not framed in terms of the environment per se, but the links to the environment are apparent. One group of researchers underscores that migration leads to labor shortages and that remittances do not get invested in productive ways (Binford 2003; Conway and Cohen 1998; Durand et al. 1996). Other studies show how cash remittances are used for purchasing land, livestock, and for increasing agricultural production (e.g., Massey et al. 1987). Investments in agriculture occur, however, only after consumer demands are met, where political economic incentives are found, and in areas where environmental conditions are favorable (Durand and Massey 1992). Migrant households may purchase land for agriculture, resulting in inflation of land value, but this land may be slated for pasture or withdrawn from production rather than improved or cultivated on a regular basis (e.g., Reichert 1981; Taylor et al. 2006). More recently, researchers emphasize how the role of gender and the receipt of cash remittances can promote investments in agriculture, particularly maize cultivation (e.g., Gray 2009). In another study, Jokish (2002) demonstrates how Ecuadorian transnational household cultivation patterns do not change significantly due to the infusion of cash remittances. He goes on to argue that because agricultural production is a cultural and risk averse activity, given the poor environmental quality, low returns on cultivated crops, and a lack of irrigation, cultivation is not a good option. Instead, migrants invest in a peri-urban landscape of cultivated real estate. Cohen and Rodriguez (2005), in a study of rural

Oaxaca, Mexico, observe that nearly one quarter of the cash remittances sent home is dedicated to agriculture or farm-related areas—investments that include the purchase of land and farm animals. While these migration studies do not examine the “environment” directly, nonetheless, they illuminate some of the tangible ties between migration and the environment.

Solving problems of human-environment interaction is complicated enough without considering the impact of external factors like return migrants transforming the dynamics of local life with their additional earnings and new ideas from their northward ventures. Migrants, along with their economic and social remittances, may gain social mobility, but also generate divisions in a community when migrants view themselves independent from community problems because they can afford their own solutions. Alternatively, migrants may be willing to invest in the community’s infrastructure. The interaction of transnational migration, local community dynamics, and the environment merits continued attention by social and natural scientists, particularly in light of the fixed nature of transnational migration (i.e., it is not a short-lived phenomenon, but a global one that makes up an integral part of culture and economies in both the developing and developed world).

Firewood in Guatemala

A number of reasons arise to study firewood. Quite simply, energy budgets from the developing world continue to reflect a heavy dependence on biomass (Ezzati and Kammen 2002; Heltberg 2005), yet little work captures local variations in the use of biomass fuels like firewood because government officials and ministries rarely regard it as a commercial fuel (Taylor 2005). At least a quarter of the world’s population, especially in the Global South, relies on biomass fuels to meet their energy needs, mainly for cooking. Typically, cooking stoves are inefficient and lack proper venting to remove harmful smoke. The combination of inefficient and “dirty” stoves results in unnecessary consumption of dwindling resources and indoor and outdoor air pollution. The indoor air pollution caused from the inefficient combustion of biomass materials is responsible for 1.5 million deaths per year globally, primarily among women and young children (Bailis et al. 2007).

In Guatemala biomass makes up more than 50% of the national energy budget (PNUD 2007). Overall, 66% of households in Guatemala employ this renewable fuel. In rural areas wood comprises the prime source of energy for the vast majority—about 88% of households employ wood for cooking and space heating (Elías et al. 1997; PNUD 2007; Taylor 2005). Despite the importance of firewood to the national energy budget and to the households who burn wood for cooking and space heating, it is not taken into account in national energy or forestry policy. Further, the size of the firewood economy in monetary terms remains unknown in Guatemala. Recently, the Guatemala National Institute of Forestry (INAB) suggested that the commercial value of firewood reached nearly US \$ 1.5 billion in 2006. This amount is calculated from the average cost of a *tarea* of firewood (one *tarea* of firewood measures 1 m high by 5 m long by 35 cm wide), multiplied by estimated households that use firewood in the country (Martínez 2009). With respect to annual consumption, INAB estimates that about 18 million square meters of *leña*

is used, particularly pine and oak (Prensa Libre 2010). It is apparent from the widespread nature of firewood use in Guatemala that changes in consumption patterns in migrant households can result in major implications for the environment in terms of a reduction in GHGs and simply by reducing impacts on forests. If, in developing countries like Guatemala, we are just beginning to understand and appreciate the value of traditional energy forms like firewood, it is crucial to question how other key issues such as large-scale population movements and the influx of money (i.e., cash remittances) may have the potential to alter firewood consumption patterns, especially when, as Heltberg (2005) observes, increases in household income can aid in the switch to cleaner and more efficient fuels.

Migration from Guatemala to the United States

Guatemala provides an opportunity to explore the linkages between migration and the environment for several reasons. For one, over ten percent of Guatemala's fourteen million inhabitants reside in the United States (Migration Policy Institute 2006). Second, Guatemala is considered one of the least urbanized places in Latin America. Nearly 52% of its population is still rural (see World Bank 2008) and the economy of the country is based on natural resources. Most Guatemalans struggle to meet their every day needs. Over 32% of rural Guatemalans live below the international poverty line of US \$2 per day (PNUD 2008). Further, Guatemala counts with the highest fertility rate of any country in Latin America, along with one of the highest infant mortality rates and lowest life expectancies at birth (Gragnotati and Marini 2003). It also has one of the most uneven distributions of land and wealth (e.g., 2% of Guatemalans own 60% of the arable land). Undoubtedly, such factors provide those without land or wealth with significant incentives for migration. Extremes in inequality led to a brutal civil war, which lasted almost four decades (early 1960s to 1996), laid waste to many rural communities and agricultural fields (Le Bot 1995), and pushed many rural and urban folk out of their homes and on to the road north.

According to US and Mexican census data and immigration records, Guatemalan migration to the United States gradually emerged in the 1960s, but escalated in the mid-1980s due to civil conflict (Castillo 1999; Palma 2005). By the 1990s, however, this steady stream of mainly undocumented migrants became a major concern for both Mexico and the United States. Economic conditions acutely deteriorated during the Neoliberal era and led to much restructuring and change in the composition and class structures in Latin America (Portes and Hoffman 2003). Consequently, migratory flows intensified during this period onward. Other macro-level determinants that strongly accelerated out-migration include the lack of adequate development strategies, steep unemployment rates, high inflation, devaluation of the national currency, a “dollarized” economy, and more recently, an escalation of social violence due to drug trafficking and gang activity (Moran-Taylor 2008, 2009).

As in other sending countries, economic remittances play a monumental role in Guatemala's economy. For instance, monetary remittances amounted to nearly 4 billion US dollars in 2008 (Banco de Guatemala 2008). The global economic crisis (late 2008 to the present), however, has resulted in significantly less work and lower earnings for migrants in the United States. Consequently, cash remittances to

Guatemala in 2009 declined by 11% when compared to the same period of the previous year (Banco de Guatemala 2009). Despite recent dips in the amount of money that migrants remit back home, these funds are key for the economies of migrants' countries of origin and much scholarly and policy work analysis their role in development (e.g., Adams 2004; Cohen 2004; de Haas 2010; Georges 1990; Jokish 2002; Moran-Taylor 2008; Rubenstein 1992).

Migration from Guatemala's western highlands: San Cristóbal Totonicapán

To capture the relationship between migration and the environment, we offer a case study from a Maya indigenous community in Guatemala's western highlands. Although some Ladinos (a social category, often fully loaded, that refers usually to the non-indigenous, Spanish-speaking population who wears Western clothing) reside in the community, this region is mostly Maya populated. Importantly, there is a long-standing ethnic divide in Guatemala between the Maya and Ladino groups—a division that prevails due to historical, geographic, cultural, linguistic, and socio-economic factors. The *municipio* of San Cristóbal Totonicapán (hereafter referred to as San Cristóbal), home to nearly 30,000 inhabitants, lies in the heartland of Maya K'iche' indigenous culture in Guatemala's western highlands. The K'iche' are numerically the largest indigenous group out of twenty-one different Maya-speaking indigenous groups in Guatemala. San Cristóbal is located in the department of Totonicapán, which is recognized for its forested areas and local control of those forested areas (Elías et al. 1997). Situated between the Sija and Salamá Rivers, the town sits squarely at the bustling intersection of *Cuatro Caminos* on the Panamerican highway, one of the most important road junctions in Guatemala. Over the last 30 years San Cristóbal experienced a gradual shift away from an economy principally based on traditional subsistence agriculture and weaving to a more diversified economic system that includes intensive vegetable production for local and international markets. Globalization, including transnational migration, is rapidly altering the physical landscape. Migrants' investment in housebuilding is clearly evident in town and outlying areas—houses are often used as a symbol of accomplishments abroad. Crucially, these monuments to US-bound migration do not tell us much about how migrant families think about and use land and natural resources. For most San Cristobaleños, the main migrant receiving sites in the last three decades have been Houston, Texas and Los Angeles, California. Most of these migrants remit part of their earnings back home on a regular basis and many return home after several years of work abroad (Moran-Taylor 2004, 2008, 2009; Taylor et al. 2006).

Methods

This article draws on survey data and ethnographic work conducted in San Cristóbal among male and female migrants, returnees, and non-migrants during 2001, 2006, and 2010. Of the non-migrants interviewed, half of them have at least one family member in the United States. The ethnographic material includes participant

observation, fieldnotes, multiple informal interviews, and 37 in-depth, tape-recorded, semi-structured interviews, lasting from 2 to 3 h each. The age of interviewees ranged from 20 to 82. Occupations of the study participants included weavers, artisans, seamstresses, tailors, food vendors, nurses, students, entrepreneurs, and NGO workers. Following a simple guide, interviews centered on return migration, the role of economic and social remittances, household economic strategies, migration-related changes (e.g., community, land, environment, firewood use), and how migration affects migrants' hopes and fears for the future. In addition to the ethnographic research, a small team made up of the primary author and two local Maya women completed 102 household surveys. Survey data supplemented the in-depth interviews and allowed for cross-checking of information collected during ethnographic research. Ethnographic data were selectively coded and organized thematically. Household surveys were compiled and analyzed in Excel to obtain basic descriptive statistics. In what follows we highlight our results and address the relationship between migration and the environment in Guatemala by paying attention to land use and land cover change, social remittances, and firewood use.

Migration and the environment in Guatemala

Land use and land cover change

Regardless of how migrants, their ideas, and their earnings transform community social dynamics, migration along with the attendant economic and social remittances make a palpable impact on land use and natural resources in Guatemala's western highlands. Prior research considers how migration turns distant dollars into "miga landscapes" (Moran-Taylor 2008), how migration slowly changes *other* aspects of Guatemalan life like gender and ethnicity (Taylor et al. 2006), and how traditional ethnobotanical knowledge erodes as agriculture is left in the hands of hired help (Steinberg and Taylor 2009). As historical and contemporary migration scholarship reveals elsewhere, most Guatemalans from San Cristóbal report that those who migrate, and who bring or send US dollars back home build new homes (Table 1, question 3). Migrants and their families change land use and land cover through the purchase of plots of land from neighbors for the construction of new residences. The soaring demand for land driven by migrant money encourages inflation of land prices. Whole neighborhoods that were previously one level and traditionally one room adobe homes surrounded by maize and bean fields have been transformed into densely packed zones of two and three-story, cinder-block structures which leaves little green space. This conversion of land, from *milpa* (maize fields) to *mansiones* (mansions) affects the environment locally and globally in many direct and indirect ways. First, land taken out of maize production for various reasons, including new house construction, means that maize imports to Guatemala are on the rise. Paradoxically, Guatemala is a hearth of maize origins and diversity (Steinberg and Taylor 2009). Here, again, the link to the environment is clear and can be taken as far as we can trace all the environmental impacts of exporting maize from one country to another. Further, an increased environmental footprint results, albeit distant and

Table 1 Household survey outcomes related to migration and the environment

Select questions about the environment from the household survey ($n = 102$)	% of all respondents answering “yes” ^a
1 Do people migrate because their land parcels are too small?	44
2 Do migrants buy new land?	62
3 Do migrants build new houses?	100
4 Do return migrants work the land?	45
5 Are maize (<i>milpa</i>) rituals forsaken as a result of migration?	86
6 Do migrant families use more fertilizers?	62
7 Do migrant families use organic fertilizers?	3
8 Do migrant families start growing more non-traditional export cash crops?	83
9 Do return migrants think and act differently about the environment?	81
10 Do migrant families purchase gas stoves?	90 (100)
11 Do you cook primarily with firewood?	94 (92)
12 Do you purchase firewood?	88 (94)
13 Do migrants buy vehicles or bring them back from the North?	92
14 Do migrants take action to “clean” the environment like educating neighbors about trash collection or starting a program to collect trash	5

^a The number in parenthesis represents the percent of affirmative responses from respondents who are return migrants and respondents who have family members who are migrants

dispersed, from erecting larger houses made from energy-intensive manufactured materials such as concrete and glass.

In addition to investments in land for home building and monies spent on pick-up trucks to help improve agricultural production (Table 1, questions 3 and 13), some migrant households purchase more land and often dedicate it to the cultivation of vegetable crops for local and foreign markets (Table 1, questions 2 and 8). While in the past the vast majority of Maya farmers devoted their small plots of land to subsistence maize and bean cultivation, now some migrant families grow higher value cash crops like broccoli, radishes, cabbages, brussels sprouts, carrots, beets, and so forth (Table 1, question 8). Migrant remittances permit the purchase of inorganic fertilizers and pesticides, which results in increased yields of vegetables and allows small farmers to reap profits on less land. Importantly, Guatemala (and the Central American region in general) has been noted to use more pesticides on a per capita basis than any other area in the world—one half kilogram of pesticides per person per year (Population Reference Bureau 2001). In our surveys, for example, 62% of the study participants responded that migrant families indeed employ more fertilizers (Table 1, question 6).

In general, and as noted earlier, San Cristobaleños who migrate use their land as collateral and many more are forced to sell it to pay *coyotes* (people smugglers) for the journey north. For example, Lourdes, the ex-wife of a return migrant with seven children, explained one early morning as she sold in the town’s center her *atoles* and *tamales* (hot cereal-based drinks and compact maize cakes):

It was only about 5 months ago, in December of 2009 that my brother-in-law journeyed to Los Angeles. Although the economy is bad over there, he went and left behind his wife and two young children, a five-year old and two-year old. He only owned one *cuerta* of land (about 400 square meters) near the river and sold that for Q70,000 (\$8,750) to pay to get to Los Angeles. Because now they charge around Q40,000 to 50,000 (\$5000 to \$6250) to get to the States, he needed to come up with the money somehow. Now, his wife rents a little place on the outskirts of town and patiently waits for him to send her some money. The new owners of the land he sold originally come from Almolonga. They have already planted vegetables there.

Small plots of land known as *vegas*—flat, fertile stretches of floodplain along the river that meanders through town have seen rapid changes in land ownership and land use. In 2000, we observed that much of the *vegas* were leased to outsiders from Almolonga, a nearby K'iche' Maya town in the western highlands. Unlike the residents of San Cristóbal, Almolongueños have a much longer tradition of producing vegetables for local and export markets (Goldín 1996). Because land in their own community has become scarce due to subdivision over time as population increases, Almolongueños began to lease land on the floodplain in San Cristóbal for cash crop cultivation. By 2010, however, many of these renters, especially those with the help of cash remittances, purchased lots in San Cristóbal and continue growing their non-traditional export crops (i.e., *not* coffee, sugar or bananas). This example captures how economic remittances permit increased cultivation of non-traditional crops, which have become one of Guatemala's biggest export earners (Hamilton and Fisher 2003). This practice allows Almolongueños to carry on an agrarian-centered lifestyle, but the downside lies on the overuse and misuse of chemical fertilizers and pesticides. Undoubtedly, the increased use of inorganic fertilizers leads to disastrous consequences on the environment, which is clearly illustrated with the recent cyanobacteria bloom in Lake Atitlán in Guatemala's western highlands. The bloom is attributed to the entry of untreated sewage into the lake from surrounding Maya communities and to inorganic fertilizer runoff from agricultural fields in the lake's watershed (NASA 2009). In the case highlighted here, cash remittances permit outsiders to purchase land. The change in land use from maize to non-traditional export crops results in land cover change, intensive application of chemicals, and consequent pollution of local streams and remote bodies of water.

Transnational migration processes shape cultural practices and beliefs directly linked to land and the environment. In relation to maize cultivation, key rituals are carried out during the growing season (Tedlock 1992). San Cristobaleños say that just prior to the rainy season in the months of March and April, and before planting the corn, they like to place a plantain on the sack of unplanted maize seeds in hopes of a greater yield and bigger corn ears. Many of the Maya traditional *milpa* cultural practices and beliefs strongly associated with local environmental knowledge, however, are performed less today due to a decrease in maize cultivation and migration. Indeed, 86% of survey respondents agree that rituals associated with growing maize are lost because returnees and migrant families switch to cash crops

or because migrants and their families are less inclined to work the land themselves (Table 1, question 4 and 5). When migrants do purchase land for maize cultivation, however, many of them do not tend the fields themselves. Instead, they hire laborers to look after their agricultural fields.

The reduction in maize cultivation and accompanying rituals impacts the environment in significant ways, including changes in the ecological context in relation to agricultural diversity that has evolved over thousands of years. If intimate knowledge of maize varieties fades away, future generations may be at loss (and at the mercy of transnational corporations who supply genetically engineered seeds) as to which seeds and cultivation methods are appropriate for the local climates and soils of the region (Steinberg and Taylor 2002). This loss of contact with the land and traditional cultural values associated with maize cultivation also results in larger political and environmental ramifications because, as Lovell (1995) aptly observes, three factors characterize Maya culture—land, community, and affinity to place. Similarly, Montejo (1999) echoes that for Maya migrants living in the United States, land, community, and affinity to place form a legacy intimately tied to Maya culture. Certainly, if for San Cristobaleños a distancing from land is emerging, how will it then impinge on future constructions of their Maya ethnic identity and relationships to the environment? If land continues to be vital to the Maya and the invigorated Pan-Maya Movement, as Daniel Pascual, leader of the *Comité de Unidad Campesina* (CUC) tells us (personal communication on 7 November 2009), how will the Maya (both migrant and non-migrant) continue their intimate attachments to the land and the natural environment in the face of land accumulation in the hands of migrants and the shift to non-traditional export crops?

Social remittances and the environment

Migratory experiences while living and working abroad can lead to new perceptions about human relationships with the natural environment. Our data reveal that some returnees develop a distinct set of values and outlook concerning the environment. Most returnees in this study, for instance, come back thinking and acting differently toward the environment (Table 1, question 9). Some locals say that returnees acquire improved demeanors with respect to how they view, negotiate, and change the environment. While some returnees bring back “improved” attitudes, notions, and practices about the environment, (i.e., social remittances), at the same time, San Cristobaleños comment that these emergent outcomes generally erode after a year or two back home. The erosion of attitudes oriented toward the environment may well alter as Guatemalan US-bound emigration matures and migrants can organize community groups that coalesce around environmental issues and concerns. Even though Guatemalan migrants abroad, like many other large immigrant populations in the United States (e.g., Mexicans, Salvadorans, Dominicans, Ecuadorians) have formed migrant-sponsored organizations or hometown associations linking together their communities of origin and settlement to alleviate some need or concern in the homeland, not much action is taken to address environmental issues (Moran-Taylor 2004; Popkin 1999). Past studies show how Mexican migrants organize and fundraise for social spending in the community of origin, particularly in the realm of

infrastructure ventures like potable water, schools, roads, and health clinics (Cohen 2004; Smith 2005). Indeed, we argue, it is in countries and communities where migrant streams are more mature and generations of migrant families have already met consumer demands and educational goals that folks can begin to be the new arbiters for change as they dedicate part of their monies, labor, and time toward community infrastructure projects.

In the Guatemalan case, we make the observation that migrants certainly seem to think differently about the environment, but this distinct set of knowledge and attitudes rarely translates to action that benefits the environment. Given current environmental crises and awareness of those calamities by the Guatemalan government and the population in general, the state could rely on return migrants as a catalyst group for positive economic and environmental change. This is not to suggest that non-migrants cannot effect positive changes at home, but only points to the funds and innovative ideas that migrants often bring back with them that can be mobilized for the community good. Alternatively, if the state could convince migrants and migrant families that the process would be transparent and corruption-free, a small tax could be levied on economic remittances. In turn, this tax could be employed toward environmental education programs deployed across the country. Such is the case in Mexico, where, since 2002, the government provides three US dollars for every US dollar that migrant hometown associations invest in community development projects like sewage, water, roads, and education (Migration News 2009). This type of tax, however, is unlikely given corruption and tax evasion in Guatemala. Any sort of collection of funds from migrants would have to emerge as a community initiative.

Migration and firewood use

“Whether it is wood fuel, electricity, or gas, in the end, it all originates from mother earth,” replied Enrique, a male non-migrant Maya in his late thirties with three siblings in Houston, Texas, when we asked about his usage of firewood. This response aptly summarizes a growing awareness of the environment in Guatemala and the ultimate source of cooking fuels in the country. Despite a greater awareness of alternative cooking fuels, the majority of respondents to our questions reported that they continue to rely on firewood for cooking (Table 1, question 11). An overwhelming majority of migrant households continue to use firewood regardless of their ability to purchase liquid propane gas (LPG) stoves. Yet, these responses mask the complexity of the energy mix that households employ. Many households utilize a combination of firewood and LPG. The amount of each fuel used depends on many individual household factors that include economy, time, and cultural preferences.

Recently, LPG and electricity prices, along with most staples (i.e., the *canasta básica*—the basic amount of food required for survival), dramatically increased in Guatemala, leading to nationwide protests and blockages of main arteries throughout the country during the month of May 2010. Currently, LPG is readily available in San Cristóbal and a 25-lb tank sells for \$13 and a 100-lb tank costs \$57. In contrast, one *tarea* of firewood costs around \$23–30 (the price varies according to the type of wood, how well it burns, and delivery options). Because most folks in

rural Guatemala live from paycheck to paycheck, in San Cristóbal residents usually purchase the smaller LPG tank and/or one *tarea* of firewood. Although LPG turns out, on paper, to be a more economical option for cooking than one *tarea* of firewood (for an average family of eight, both fuels last about 2 weeks), most migrant households continue to rely on conventional wood-burning stoves and improved wood-burning stoves. While LPG may appear cheaper, certain foods require longer cooking times, which means that they will cook those foods using firewood. Likewise, food prepared for special family gatherings, business, and for festive occasions is generally cooked using firewood because gas stoves cannot reach the required heat needed for greater volumes of food. Thus, migrant households continue to burn firewood, regardless of their ability to purchase gas stoves and pay for the LPG cylinders (100% of migrants, returnees, and households with a family member abroad acquired gas stoves). This outcome can also be explained by the fact that firewood is now a traded commodity (Heltberg 2005). Since firewood in San Cristóbal can be easily purchased, numerous migrant households do so because they can easily absorb the cost (Table 1, question 12).

Migrants, for the most part, continue to depend on firewood for cooking and space heating. The contribution of firewood to deforestation is not a debate we engage here, rather we note that relying on firewood can be harmful to the environment if usage is not regulated and sustainable forestry is not practiced to replace trees felled for fuel purposes. Moreover, many residents, particularly migrants of San Cristóbal purchase their firewood from distant locations (mainly from vendors in the neighboring department of Huehuetenango where less control of forests exists than in San Cristóbal's jurisdiction), and thus become removed from direct feedback from the environment in terms of increased collection time due to diminishing supplies. By collecting their own wood, non-migrant families tend to absorb some of the cost of firewood. Generally, they engage in such chores on a day "off" from their formal employment or toiling the fields. Zoila, a petite and cheerful Maya female in her late twenties, points to the use of LPG and firewood in her non-migrant household of nine members:

The LPG stove is mostly employed in our household during an emergency: If we need to boil water quickly or if we run out of *leña*. Firewood is also commonly used when we need to prepare large batches of [corn] tamales, *paches* (potatoe tamales), or other traditional foods that require lots of cooking time.

Overall, the greater ease with which migrant households can purchase firewood does not explain why folks do not make a complete switch to LPG. This outcome of migrant families' continued use of firewood for cooking, San Cristobaleños emphasize, is principally due to cultural traditions. Many offer comments like "the food tastes better when cooked on *leña* (firewood) and for longer periods slowly," or they say "you can always keep hot water boiling/warm" when using *leña*. Additionally, because black beans are a staple in Guatemala, like maize, cooking them on a gas stove can take about 2 h. Of course, if a pressure cooker is used, as several families reported, it only takes about 30 min to cook beans. But if you have a fire already going for the day, beans can cook for 10–12 h along with other foods (e.g., corn needs to be cooked twice, once for boiling to soften it, and then again,

after it has been ground to make tortillas or *tamalitos*). Locals also say that using LPG for these long cooking preparations is too expensive and thus prefer to rely on *leña*. Recently, women who eke out a living from selling corn tortillas *los tres tiempos* (three times a day for the main meals) have switched to using LPG-heated metal griddles to cook. Many Maya women comment that doing so is easier than setting up their stalls with firewood and clay griddles. Carlota and her mother Lupe, both non-migrants but with a brother (and son) in Houston 3 years now, specified, as they cooked and hovered over a dozen tortillas on their grill, shaded by their bright red umbrella on a sunny early afternoon:

Even though we live in the outskirts of town, we come everyday into town to sell our tortillas next to the market. We usually do OK, especially on Wednesdays and Saturdays when it's the real market day. We make the blue tortillas and sell four for one quetzal (about \$0.10). Instead of hauling all of our stuff, we leave our gas stove *encargado* (someone caring for and watching it). We also do all right because we sell ready made meals like beans and different stews. Tono, my son in the States, sent us a bit of money to buy this stove. Now, we don't burn our hands as much or get the tortillas smokey.

The maize meal that Carlota and Lupe employ to make the corn tortillas at home, however, is still cooked in large pots over wood fires. And while they purchase corn (for about \$0.20 cents per pound) to make the tortillas sold in town, the maize used for their own consumption is cultivated in their small parcels of land on a nearby steep hill.

As in other remittance-receiving countries, Guatemalan migrant households use economic remittances to sustain their everyday expenses, consumer goods, clothing, education for children left behind, paying off debts, healthcare, utilities (electricity and water), and, in this case, firewood. Purchasing firewood grants household members more time for other activities. Regardless of how Guatemalan households become integrated into the global economy or migrants continue to send cash remittances, firewood will continue to be a fuel staple in many homes. Importantly, demand for firewood rises each year in Guatemala (because the overall number of households and the amount of firewood employed each year *increases*). Clearly, as demand for fuel intensifies, and as it becomes more of a traded commodity, the potential detrimental ramifications on the environment expand in terms of resource depletion and increased amounts of GHGs. Migrant households at this stage are not making significant switches in their cooking habits and fuel use to ameliorate the impacts of firewood use on the environment.

Conclusions

Transnational migration engenders big changes at home. Examining migration, the environment, and natural resources in sending regions reveals important transformations in livelihoods and local landscapes. In the Guatemalan case explored here land ties Maya migrants abroad and those at home in complex ways to an intimate and significant heritage. Human relationships with the land, however, alter (and even fragment) due to economic-related migration, population pressure, and

political and economic factors that unfold at different scales from local to macro (Taylor et al. 2006; Taylor 2007). To flee grinding poverty, the rigid hierarchical structures that govern the country, and limited access to resources thousands of Guatemalans migrate north. Accelerated wage-labor migration to the United States and the uneven land distribution that envelops Guatemala prompts us to interrogate the environmental consequences that unfold at home. The findings highlighted here help us to better grasp the impact of economic and social remittances on land and the environment. Our survey results and in-depth interviews suggest that migrants, their ideas and behavior, along with their earnings effect the environment in several direct and indirect ways.

Future migration scholarship that looks at the environment must take into account the recent global recession. To reiterate, economic remittances dwindled at least 10% in Guatemala for 2009 and the projection for 2010 is similar. The big question then becomes: what are the ramifications of this economic reduction? Additionally, as more migrants decide to go back to Guatemala, forced by a weaker US economy and restrictive immigration laws, we must consider what these folks will do upon their return. Guatemala's economy has also followed the global downturn and provides little opportunities for return migrants. Will these folks go back to the land that previous migrants spurned upon their return? Further, in an economy that is cash-strapped, will even more people turn to "free" or cheaper cooking fuels like firewood (although in San Cristóbal the majority of residents already use firewood). But, will more households begin to collect their own wood and put pressure on locally managed forests?

As migration matures in Guatemala, the government must ensure that the extra capital that migrants generate be put to productive purposes. This endeavor, though, requires a crucial investment on behalf of the state and a greater recognition of the role that migrants play in Guatemala's evolving economy. The state must also recognize that because cash remittances are decreasing, government programs may now have to step in and fill the gap created by the decline in economic remittances. Development cannot be left to migrants alone (or to NGOs—see Moran-Taylor 2008). Now is the time that the state can work closely with migrants to match migrant funds for investment in community infrastructure and local environmental protection. These key questions remain even more relevant today given recent analyses using global circulation models that estimate that precipitation in Guatemala will wane by up to 20% (Neelin et al. 2006). Indeed, the United Nations at the December 2009 Copenhagen meetings placed Guatemala among the top ten countries most at risk to environmental hazards related to global environmental change like global warming (Ramírez 2009). As such, in-depth studies of migration and the environment are imperative in Guatemala as natural resources become increasingly scarce and variable.

References

- Adams, R. H. (2004). *Remittances and poverty in Guatemala*. Development Research Group (DECRG), World Bank Policy Research Working Paper. Washington: World Bank. Available via <http://ideas.repec.org/p/wbk/wbrwps/3418.html>. Cited 1 December 2009.

- Bailis, R., Ezzati, M., & Kammen, D. (2007). Health and greenhouse gas impacts of biomass and fossil fuel energy futures in Africa. *Boiling Point*, 54, 3–8.
- Bates, D. (2002). Environmental refugees? Classifying human migrations caused by environmental change. *Population and Environment*, 23(5), 465–477.
- Banco de Guatemala. (2008). *Estadísticas de Remesas Familiares*. Available via <http://www.banguat.gob.gt/inc/ver.asp?id=estaeco/remesas/remfam2008.htm&e=51802>. Cited 28 January 2009.
- Banco de Guatemala. (2009). *Estadísticas de Remesas Familiares*. Available via <http://www.banguat.gob.gt/inc/ver.asp?id=estaeco/remesas/remfam2008.htm&e=51802>. Cited 10 December 2009.
- Bilsborrow, R. (1992). *Rural poverty, migration and the environment in developing countries: Three case studies*. Background paper for world development report. Ed. Washington, D.C.: The World Bank.
- Bilsborrow, R. (2000). Population, agricultural land use, and the environment in Latin America. In D. R. Lee & C. Barrett (Eds.), *Agricultural intensification, economic development and the environment*. UK: CAB International.
- Binford, L. (2003). Migrant remittances and (under) development in Mexico. *Journal of Critique Anthropology*, 23(3), 305–336.
- Carr, E. (2005). Placing the environment in migration: Environment, economy, and power in Ghana's central region. *Environment and Planning A*, 37(5), 925–946.
- Carr, D., Lopez, A., & Bilsborrow, R. (2009). The population, agriculture, and environment nexus in Latin America: Country-level evidence from the latter half of the twentieth century. *Population and Environment*, 30, 222–246.
- Castillo, M. A. (1999). Exodus and return with a changing migration system. In L. L. North & A. Simmons (Eds.), *Journeys of fear: Refuge return and national transformation in Guatemala* (pp. 130–154). Montreal: McGill-Queen's University Press.
- Cohen, J. (2004). *The culture of migration in southern Mexico*. Austin: University of Texas Press.
- Cohen, J., & Rodriguez, L. (2005). Remittance outcomes in rural Oaxaca, Mexico: Challenges, options, opportunities for migrant households. *Journal of Population Space and Place*, 11(1), 49–63.
- Conway, D., & Cohen, J. (1998). Consequences of migration and remittances for Mexican transnational communities. *Journal of Economic Geography*, 74(1), 26–44.
- Conway, D., & Lorah, P. (1995). Environmental protection policies in Caribbean small islands: Some St. Lucian examples. *Journal of Caribbean Geography*, 6(1), 16–27.
- Curran, S., & Agardy, T. (2004). Considering migration and its effects on coastal ecosystems. In J. D. Unrun, M. Krol, & N. Kliot (Eds.), *Advances in global change research, environmental change and its implications for population migration* (Vol. 20, pp. 201–229). Dordrecht (The Netherlands) and Boston: Kluwer Academic Publishers.
- De Haas, H. (2010). Migration and development: A theoretical perspective. *International Migration Review*, 44(1), 227–264.
- Durand, J., Parrado, E., Massey, D., et al. (1996). Migradollars and development: A reconsideration of the Mexican case. *Journal of International Migration Review*, 30, 423–444.
- Eder, J. (2008). *Migrants to the coasts: Livelihood, resource management, and global change in the Philippines*. Wadsworth: Cengage.
- Elías, S., Gellert, G., Pape, E., Reyes, E., et al. (1997). *Evaluación de la Sostenibilidad en Guatemala*. Guatemala City: FLACSO.
- Ezzati, M., & Kammen, D. (2002). Household energy, indoor air pollution, and health in developing countries: Knowledge base for effective interventions. *Journal of Annual Review of Energy and the Environment*, 27, 233–270.
- Georges, E. (1990). *The making of a transnational community: Migration, development, and cultural change in the Dominican Republic*. New York: Columbia University Press.
- Glick Schiller, N., Basch, L., Szanton Blanc, C., et al. (1992). Transnationalism: A new analytic framework for understanding migration. In N. Glick Schiller, L. Basch, C. Szanton Blanc, et al. (Eds.), *Towards a transnational perspective on migration: Race, class, ethnicity, nationalism reconsidered* (Vol. 45, pp. 1–24). New York: Annals of the New York Academy of Sciences.
- Goldín, L. (1996). Economic mobility strategies among Guatemalan peasants. Prospects and limits of nontraditional vegetable cash crops. *Human Organization*, 55(1), 99–107.
- Gragnotati, M., & Marini, A. (2003). *Health and poverty in Guatemala*. World Bank Policy Research Working Paper No. 2966. Available via http://papers.ssrn.com/sol3/papers.cfm?abstract_id=636328. Cited 15 May 2010.
- Gray, C. (2009). Rural out-migration and stallholder agriculture in the southern Ecuadorian Andes. *Journal of Population & Environment*, 30, 193–197.

- Haenn, N. (2005). *Fields of power, forests of discontent*. Tucson: University of Arizona Press.
- Heltberg, R. (2005). Factors determining household fuel use in Guatemala. *Journal of Environment and Development Economics*, 10, 2337–2361.
- Hugo, G. (1996). Environmental concerns and international migration. *Journal of International Migration Review*, 30(1), 105–131.
- Hugo, G. (2008). *Migration, development and environment*. International Organization for Migration. IOM Migration Research Series No. 35.
- Jokish, B. D. (2002). Migration and agricultural change: The case of smallholder agriculture in highland Ecuador. *Journal of Human Ecology*, 30(4), 523–550.
- Kitzes, J., Wackernagel, M., Loh, J., Peller, A., Goldfinger, S., Cheng, D., et al. (2008). Shrink and share: Humanity's present and future ecological footprint. *Philosophical Transactions of the Royal Society of London. Series B*, 363, 467–475.
- Le Bot, Y. (1995). *La Guerra en Tierras Mayas: Comunidad, violencia y modernidad en Guatemala (1970–1992)*. México: Fondo de Cultura Económica.
- Levitt, P. (2001). *The transnational villagers*. Berkeley: University of California Press.
- Lovell, G. (1995). *A beauty that hurts: Life and death in Guatemala*. Toronto: Between the Lines Press.
- Martínez, F. M. (2009). *Fuente de Energía* (p. d-19). Guatemala: Prensa Libre.
- Massey, D., Alarcón, R., Durand, J., González, H., et al. (1987). *Return to Aztlán: The social process on international migration from western Mexico*. Berkeley: University of California Press.
- Migration Policy Institute. (2006). *Guatemala: Economic migrants replace political refugees*. Smith, J., Available via <http://www.migrationinformation.org/Profiles/display.cfm?ID=392>. Cited 1 December 2009.
- Migration News. (2009). Mexico: Migrants, remittances, 3x1. October 2009, 15 (4). Available via <http://migration.ucdavis.edu/MNcomments.php?id=3548>. Cited 1 December 2009.
- Montejo, V. (1999). Tied to the Land: Maya Migration, Exile, and Transnationalism. In L. Goldin (Ed.), *Identities on the move, transnational process in North American and the Caribbean Basin* (Vol. 7, pp. 185–202). Albany: Institute for Mesoamerican Studies, University at Albany.
- Moran-Taylor, M. J. (2004). Crafting Connections: Maya Linkages between Guatemala's Altiplano and el Norte. *Estudios Fronterizos, Revista del Instituto de Investigaciones Sociales, Universidad Autónoma de Baja California, Nueva época*, 5(10), 91–115.
- Moran-Taylor, M. J. (2008). Guatemala's Ladino and Maya Migra landscapes: The tangible and intangible outcomes of migration. *Journal of Human Organization*, 67(2), 111–124.
- Moran-Taylor, M. J. (2009). Going north, coming south: Guatemalan migratory flows. *Journal of Migration Letters*, 6(2), 175–182.
- Myers, N. (2002). Environmental refugees: A growing phenomenon of the 21st century. *Philosophical Transactions: Biology Sciences*, 357(1420), 609–613.
- NASA. (2009). *Harmful bloom in lake Atitlán, Guatemala*. Available via <http://earthobservatory.nasa.gov/IOTD/view.php?id=41385>. Cited 1 December 2009.
- Neelin, J. D., Munich, M., Su, H., Meyerson, J. E., & Holloway, C. E., et al. (2006). Tropical drying trends in global warming models and observations. *Proceedings*, 103(16), 6110–6115. USA: National Academy Sciences.
- NRC (National Research Council). (1999). *The human dimensions of global environmental change. In Global environmental change: Research pathways for the next decade*. (pp. 293–376). New York: National Academy Press.
- Organización Internacional para las Migraciones (OIM). (2008). *Encuesta sobre Remesas 2008 y Medio Ambiente. Cuadernos de Trabajo sobre Migración*, 26. Guatemala: OIM. Available via <http://www.oim.org.gt>. Cited 1 December 2009.
- Palma, S. I. (2005). *Después de Nuestro Señor, Estados Unidos: Perspectivas de análisis del comportamiento e implicaciones de la migración internacional en Guatemala*. Guatemala: FLACSO.
- Pascual, D. (2009). *Personal communication in Guatemala*. 7 November 2009.
- PNUD. (2007). *La Lucha Contra el Cambio Climático: Solidaridad Frente a un Mundo Dividido. Informe Nacional del desarrollo Humano 2006–2007*. Guatemala: Programa de Las Naciones Unidas para el Desarrollo.
- PNUD. (2008). *Guatemala: Una Economía al Servicio del Desarrollo Humano? Informe Nacional del desarrollo Humano 2007–2008*. Guatemala: Programa de Las Naciones Unidas para el Desarrollo.
- Popkin, Eric. (1999). Guatemalan Mayan migration to Los Angeles: Constructing Transnational Linkages in the Context of the Resettlement Process. *Ethnic and Racial Studies*, 22(2), 217–237.

- Population Reference Bureau. (2001). Available via <http://www.prb.org/Articles/2001/PesticidesAThreattoCentralAmericasChildrenandtheRegionsFuture.aspx>. Cited 15 May 2010.
- Portes, A., & Hoffman, K. (2003). Latin American class structures: Their composition and change during the neoliberal era. *Journal of Latin American Research Review*, 38(1), 41–82.
- Prensa Libre. (2010). Deforestación en América Latina está controlada, según estudio de la FAO. 28 March 2010. Available via http://www.prensalibre.com/noticias/comunitario/Deforestacion-America-Latina-controlada-FAO_0_233376663.html. Cited 15 May 2010.
- Ramírez, A. (2009). *Guatemala sufrirá fuerte impacto por el cambio climático: Informe de la ONU presentada en Copenhague destaca que el país está entre las diez naciones de más alto riesgo* (pp. 1–3). Guatemala: Prensa Libre.
- Reichert, J. (1981). The migrant syndrome: Seasonal US wage labor and rural development in Central Mexico. *Journal of Human Organization*, 40, 56–67.
- Rubenstein, H. (1992). Migration, development and remittances in rural Mexico. *Journal of International Migration*, 30, 127–153.
- Smith, R. C. (2005). *Mexican New York: Transnational lives of new immigrants*. Berkeley: University of California Press.
- Steinberg, M. K., & Taylor, M. J. (2002). The impact of cultural change and political turmoil on maize culture and diversity in highland Guatemala. *Mountain Research and Development*, 22(4), 344–351.
- Steinberg, M. K., & Taylor, M. J. (2009). The direct and indirect impacts of population growth and economic development on maize (*Zea Mays* L.) diversity in highland Guatemala. *Journal of Area*, 41(1), 72–81.
- Suhrke, A. (1994). Environmental degradation and population flows. *Journal of International Affairs*, 47(2), 473–496.
- Taylor, M. J. (2005). Electrifying rural Guatemala: central policy and local reality. *Journal of Environment and Planning C*, 23(2), 173–189.
- Taylor, M. J. (2007). Militarism and the environment in Guatemala. *Journal of GeoJournal*, 69(3), 181–198.
- Taylor, M. J., Moran-Taylor, M. J., Rodman, D., et al. (2006). Land, ethnic, and gender change: Transnational migration and its effects on Guatemalan lives and landscapes. *Journal of Geoforum*, 37(1), 41–61.
- Tedlock, B. (1992). *Time and the highland Maya. Revised*. Albuquerque: University of New Mexico Press.
- Warner, K., Stal, M., Dun, O., Afifi, T., et al. (2009). Researching Environmental Change and Migration: Evaluation of EACH-FOR Methodology and Application in 23 Case Studies Worldwide. In F. Laczko & C. Aghazarm (Eds.), *Migration, environment and climate change: Assessing the evidence* (pp. 197–244). IOM: Geneva.
- World Bank. (2008). *Rural population statistics*. Available via <http://data.worldbank.org/indicator/SP.RUR.TOTL>. Cited May 15 2010.