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Migration and Agricultural Change: The Case of Smallholder Agriculture in Highland Ecuador

Brad D. Jokisch[1]

A large and growing number of agricultural households in less developed countries are also engaged in international migration. Thousands of farmers from the highland provinces of Cañar and Azuay, Ecuador, have immigrated to metropolitan New York, where they work in menial jobs and remit, as a group, millions of dollars annually. This paper examines the effects of international migration on agricultural production and land-use in two regions of Cañar Province. An agricultural survey was administered in two communities to determine land-use and agricultural production of migrant and nonmigrant households. Contrary to most reports on the subject, migration has neither led to agricultural abandonment nor have remittances been dedicated to agricultural improvements. Semisubsistence agriculture remains an important riskaverse economic and cultural activity, but cultivation is a poor investment. A large investment in housing and land has converted much of the region into a peri-urban landscape of cultivated real estate.

KEY WORDS: migration; agriculture; ecuador; land-use.

INTRODUCTION

As the scale and pace of international migration have increased in the past two decades (Castles and Miller, 1998), so has concern for the effects of this migration on agriculture and agrarian landscapes. Agriculture in less developed countries (LDCs) has long been influenced by extra-local processes (de Janvry, 1981; Grossman, 1993; Turner, 1989), but today, more so than ever, smallholder agriculturalists (hereon smallholders) are becoming integrated into the global economy by emigrating to more developed countries

[1]Department of Geography, Ohio University, Athens, Ohio 45701; e-mail: jokisch@ohio.edu.

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(MDCs) where even low-paying jobs in New York or Paris exceed what can be earned in Ecuador or Morocco.[2] Some of these rural emigrants lead transnational lives, dividing their time and labor between home community and host country; others remain primarily in the host country, sometimes for decades. Most emigrants, however, return a steady stream of remittances to their household of origin, and many return permanently to their home country at the end of their labor experience. The medium to long-term loss of labor and infusion of funds homeward carries significant implications for rural landscapes and agricultural change.

Two opposing conditions are typically postulated for the early phases of migration: (i) the removal of labor threatens the capacity of households to respond to labor demands, leading to a decline in cultivation and agricultural production and (ii) remittances overcome labor shortfalls and provide capital inputs to make agricultural improvements. A majority of studies support the former, concluding that migration undermines agricultural systems; labor loss deprives households of necessary labor, and remittances are seldom invested in landesque capital[3] or other improvements needed to maintain and improve the agricultural sector (Black, 1993; Mines and de Janvry, 1982).

This paper examines the impacts of migration—domestic and international—on agricultural production and the rural landscape in the Ecuadorian Andes. Contrary to what the literature predicts, two case studies in Cañar Province (2500–3500 m) demonstrate that considerable labor loss and capital infusion have not significantly altered household cultivation patterns. Land use and agricultural production of international migrant households is not significantly different from nonmigrant households or households engaged in domestic circulation. As has been reported elsewhere (Black, 1993; Durand and Massey, 1992; Fletcher, 1997; Mines and de Janvry, 1982) migrant households channel remittances into basic needs, education, luxury items, and multiple forms of conspicuous consumption—especially large, even ostentatious houses. But, contrary to most findings, cultivation has not entered a state of disintensification or abandonment. Nor are remittances dedicated to increasing output or landesque capital. Land has become valuable as an investment and hedge against inflation, and only marginally for what it produces. In other words, these case studies fit a "middle-path" between the polar positions argued by other researchers, raising the possibility that this situation is occuring in other Latin American countries and other LDCs. This argument of nonabandonment appears to be at odds with reports of international migration leading to agricultural abandonment in

[2]Smallholder agriculturalists refers to farmers who own a relatively small amount of land and typically engage in mixed subsistence-market strategies of production.

[3]Landesque capital is a term used by Blaikie and Brookfield to describe "any investment in land with an anticipated life well beyond that of the present crop, or crop cycle" (1987, p. 9).

the area (Harden, 1993, 1996). The argument does not necessarily contradict claims that previously cultivated fields have been converted to degraded pasture, fallen into disuse, or planted with eucalyptus trees. Rather, I argue that those instances are exceptional, geographically specific, and caused by more factors than international migration. Most households with international migrants are continuing to practice agriculture because it remains an important cultural and risk-averse activity, especially for women, but given poor environmental quality, low returns on cultivated crops, and a lack of irrigation, cultivation is not a good investment. Thus while cultivation remains in some sort of subsistence steady state, much of rural Cañar Province (and neighboring Azuay) has become a peri-urban, even gentrified, landscape of cultivated real estate.

MIGRATION AND AGRICULTURAL CHANGE: THE ARGUMENTS DETAILED

In general, studies are divided between those arguing that migration undermines agricultural systems and those arguing that it allows for agricultural improvements. The dominant thought has been that remittances, especially from MDCS, are dedicated to basic needs, education, family health, housing, debt repayment, and conspicuous consumption (Durand and Massey, 1992), but not used to improve agricultural systems. In most cases, migration causes labor scarcity which is the proximate cause of a series of problems. These include (i) inadequate attention to agriculture leading to environmental degradation; (ii) deleterious effects on the cultural and social organizations that sustain agriculture; (iii) poverty of agricultural innovation or a stagnant agricultural base; and (iv) an overburdening of those who remain (usually women) with labor, interfering with the performance of all necessary agricultural tasks. Gender biases that exclude women from technical training programs, credit, or deny them decision-making authority within the household may compound the situation because women may not respond to immediate needs, instead deferring to the male decision-maker in the household, or waiting until the male migrant returns.

Most research from the rural Andes (Bebbington, 1993a,b; Collins, 1987, 1988; Painter, 1984, 1986, 1991; Perez-Crespo, 1991a,b; Zimmerer, 1991, 1993) concurs with this pessimistic assessment of the impacts of migration. Collins (1988) found that seasonal migration from the Peruvian *altiplano* to lowland, subtropical ventures overtaxed household labor resources and forced migrants to take "ecological shortcuts" leading to land degradation. Painter (1986, 1991) also argues that circulation to lowland coca fields by Peruvian and Bolivian smallholders led to household labor

scarcity, which in turn led to declining productivity and the perception ofland scarcity. Similarly, Zimmerer (1993, p. 1666) found that male seasonal migration from the Calicanto Valley, Bolivia, created labor shortages and led farmers to abandon conservation measures and Bebbington (1993a,b) argues that male circulation in Chimborazo, Ecuador, reduces enthusiasm for agriculture improvement projects.

Research from elsewhere in Latin America similarly indicates that domestic migration damages agricultural systems. Garcia-Barrios and Garcia-Barrios (1990, pp. 1569–1570) assert that in San Andrés, Mexico, temporary migration undermined "sociotechnical institutions" that promoted conservation and productivity enhancing practices, leading farmers to abandon nearly 40% of the best land and nearly 100% of the lowest quality land in the area.

Researchers operating from structural perspectives have argued that international migration is even worse than domestic migration because regions are denied valuable labor for extended periods and remittances are seldom dedicated to investment goods, productive ventures, or agricultural improvement (Black, 1993; Mines and de Janvry, 1982; Reichart, 1981; Rhoades, 1978). For example, Durand and Massey (1992, p. 26) report in their review of the literature on Mexico that most studies indicate that between 66% and 92% of remittances are spent on basic and luxury goods, house construction, family health and debt repayment. International migration spurs demand-led inflation in housing and land, but may not raise local food prices because migrant families purchase imported food products (Black, 1993).

Migrant households may purchase agricultural land—inflating land values beyond the reach of nonmigrant households—but this land may be dedicated to pasture or taken out of production rather than improved or cultivated regularly (Momsen, 1986; Pessar, 1991; Reichart, 1981). Also, agricultural production may suffer if a smaller pool of day-laborers inflates labor costs, or if the international migrant stream is predominantly male and women are unable to acquire substitutes for gender-specific labor requirements (Chaney, 1988; Flora, 1985; Pessar, 1991). Finally, migration may lower agricultural production if households substitute remittances for an agricultural income (Ferrán and Pessar, 1990) or if remittances are sufficiently large to permit households to divorce themselves from an agricultural livelihood (Momsen, 1986).

The conventional wisdom that migration undermines agricultural systems and that remittances are not directed toward productive land investment has been challenged by numerous counter-examples from Latin America and elsewhere (e.g., Conway and Cohen, 1998; Durand *et al.*, 1996; Jones, 1998). There is also evidence from Michoacán, Jalisco, and Zacatecas, Mexico (Durand *et al.*, 1996; Massey *et al.*, 1987; Taylor and Wyatt, 1996;

Trigueros and Rodriguez, 1988), the Dominican Republic (Pessar, 1991), Portugal (Black, 1993), Morocco (Steinmann, 1993), Turkey (Martin, 1991), the Philippines (Findley, 1987), and Indonesia (Leinbach and Watkins, 1998), that remittances are directed toward improving agriculture, allowing smallholders to purchase improved inputs, increase yields, grow market crops, expand irrigation, and/or to overcome capital and credit constraints. Also, if labor is plentiful, migration need not result in labor scarcity, and women can overcome gender barriers, use male relatives, reciprocal labor relations, or day-laborers to compensate for lost male labor (Georges, 1990; Oberai and Bilsborrow, 1984). Preston (1974) found that off-farm earnings from mostly male circulation and semipermanent migration in Cañar, Ecuador, were invested in business start-ups and used to demonstrate economic well-being with "ostentatious" house improvements, but migration also resulted in a release of cultivable land through renting and sales, thereby equalizing land holdings (Preston and Taveras, 1980).

The literature on Africa presents a similar set of findings. Hyden *et al.* (1993, p. 422) could find no general rule of agricultural change resulting from domestic migration. They concluded that although many households tend to experience "diminished agricultural production and display inadequate land improvements, largely owing to a lack of male labor," regional variation is substantial. Mazambani (1991) for Zimbabwe and Gould (1995, p. 135) for West Africa found that households with preferential land and access to markets invested migrant remittances in commodity crops. Similarly, Tiffen *et al.* (1994) provide an example of agricultural improvement resulting, in part, from off-farm earnings of migrants in East Africa.

In summary, the literature tends to be polarized between those arguing that migration leads to labor scarcity and damages agricultural systems and those arguing that labor scarcity can be overcome and remittances are dedicated to land purchases and agricultural improvements. Migrants (and migrant households) tend to invest in consumer items and other goods and services that immediately improve the family welfare and their social status. Cultivation and other productive investments tend not to be the first priority and, in most cases, agricultural systems are undermined and economic inequalities are aggravated. Productive (agricultural) investment tends to occur where political economic incentives and environmental conditions are favorable, but usually after consumption demands are met (Durand and Massey, 1992).

SOUTH-CENTRAL ECUADOR AND THE RESEARCH SITES

The highlands of south-central Ecuador (Fig. 1) are a particularly appropriate place to examine how migration affects agriculture and rural

Fig. 1. Traditional geographic regions of Ecuador and the location of research provinces.

landscapes because the region is one of the largest international migrant sending zones in South America. As many as 100,000 people from Cañar and Azuay Provinces (2500–3700 m) have emigrated, primarily to metropolitan New York and commonly without documentation (Borrero, 1992; Jokisch, 1997, 2001; Jokisch and Pribilsky, 2002; Kyle, 1996;). This region has a long history of minifundio (smallholder) agriculture, rural poverty, and migration. Circulation, rural to urban migration, and other forms of domestic migration have been eclipsed by the international migrant stream that began as a trickle in the 1950s and increased substantially during the 1980s and 1990s.[4] For thousands of households, remittances from Queens or Brooklyn

[4]Migration is used variously to refer to numerous types of human movements of patterns of spatial mobility. Although the distinction among some migration types is arbitrary, the

now constitute the largest source of income, sometimes exceeding by tenfold what can be earned domestically. Nationally, worker remittances have increased from less than $100 million in 1994 to an estimated $1.41 billion in 2001 (Central Bank of Ecuador, 2002).

Cuenca, located in the Tomebamba Valley at 2500 m, is Ecuador's third largest city (population 417,000 in 2001) and is the region's economic and population center. In 2000, however, the rural population of the region made up in excess of 50% of the region's total population (805,000). Rural land-use is heterogeneous, a result of Ecuador's long tradition of extreme land concentration (*latifundio-minifundio*), semifeudal land/labor system, and subsequent half-hearted land reforms. The case studies described here come from representative communities in two distinct subregions of Cañar Province—Upper and Lower Cañar (Fig. 2). Economically and socially, Lower Cañar has much in common with Azuay Province, where mestizo communities combine semisubsistence maize cultivation with weaving artisan goods ("Panama hats") and migration. The tradition of weaving Panama hats (Paja toquilla) for export has declined because the market never recovered after its collapse in the 1950s, yet it remains an important economic activity for many older women in the region. Throughout the twentieth century, smallholder households relied on seasonal or semipermanent migration to the coast to work in sugar, rice, and banana fields, and more recently on shrimp farms and to urban centers to work construction.

In the mid-1970s men from Lower Cañar joined a small, but steady stream of emigrants destined for the United States, mostly metropolitan New York. Emigration from the region grew rapidly during the early 1980s when Ecuador entered what has become a prolonged economic crisis and the economic fortunes of smallholders worsened. By the early 1980s smallholders were suffering from an increased cost of living, depressed markets, and a loss of part-time or seasonal migration income. The price of all basic necessities increased, interest rates were exorbitant, and state support and services contracted (Zamosc, 1994). Smallholders received less for their products, but due to currency devaluations, were paying more for imported chemical fertilizers, and pesticides. Off-farm employment impacts were similar. Wages declined through the 1980s; the real minimum income

distinction between international/transnational migration and circulation is important because the potential influence on agricultural systems can be expected to vary, in part, based on the duration and timing of labor absences and remittances generated at the work-site. Following Chapman and Prothero's typology (1985), circulation is short-term (1–6 months), often seasonal, labor migration that does not constitute a permanent change in residence. Circulation is distinct from permanent migration, which entails a complete change of residence, and international migration, which in the case of Ecuador, is long-term, although not necessarily permanent. Emigration is the act of migrating internationally and is distinct from local or regional movements, regardless of the time frame involved.

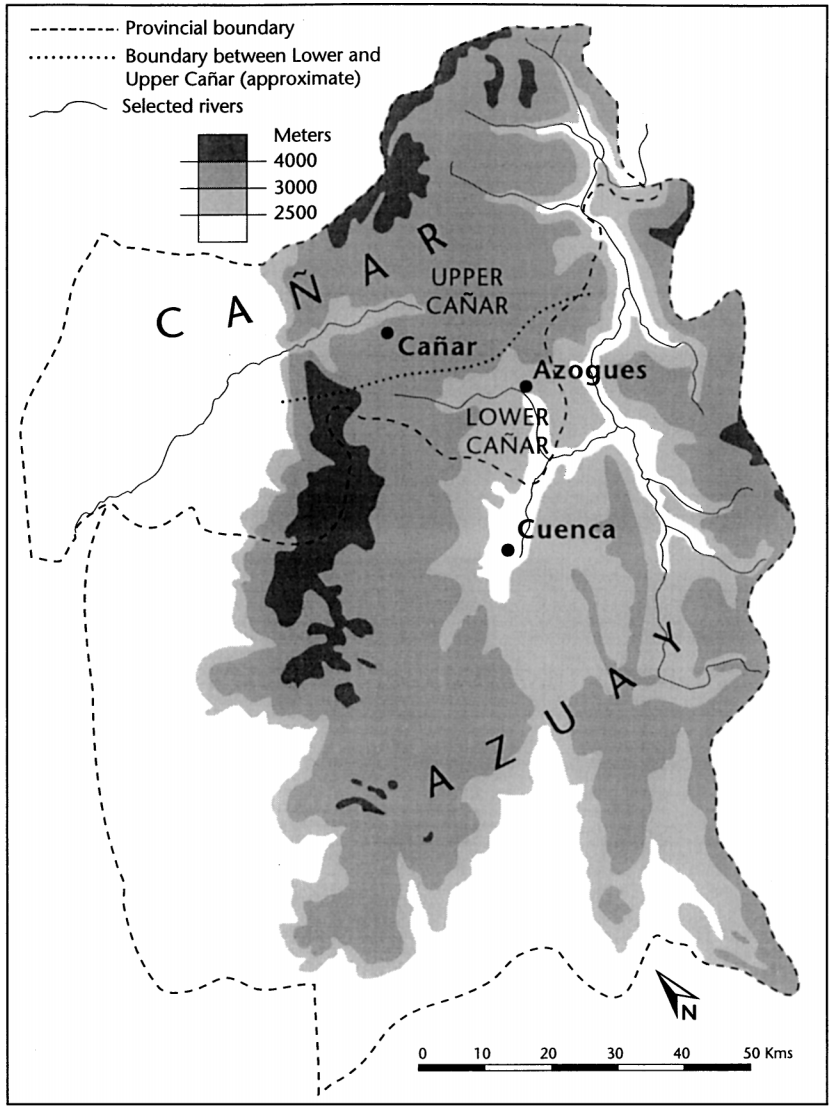

Fig. 2. Upper and Lower Canar.

fell an average of 7.6% annually from 1982 to 1991 (de Janvry *et al.*, 1994, p. 30), reaching a low of $65 per month in 1990 (Borrero, 1995, p. 54). Since networks linking Lower Cañar with New York had been established over the previous decade, international migration became a viable substitute

for poorly paid and inconsistent off-farm employment, and the "foot-in-the-door" made by early emigrants permitted thousands of emigrants to depart.

Early emigrants commonly flew legally to Mexico and crossed the U.S.–Mexico border, before flying to New York. By the late 1990s, Ecuadorian emigrants were taking $8000–$9000 (U.S.) loans to pay *pasadores* (smugglers) who would make arrangements for their trip to New York. The trip, fraught with numerous dangers, usually begins with a flight to Colombia or to a Central American location where migrants are handed off to another *pasador* and then "border-hop" to the U.S.-Mexico border.[5] Male immigrants usually work in service-sector jobs (restaurants and hotels in particular), while women commonly work in the garment industry or resturants (Borrero, 1995).[6] Immigrants are desperate to find employment because the $8000–$9000 loan usually carries a 5–8% interest rate, compounded monthly.[7] Migrants who are deported, either from the United States or from a country along the way, almost always emigrate again because they must pay off the debt or lose the family landholdings, or whatever else they used as collateral for their loan.

The majority of emigrants have been young men, although as the migrant stream has aged, the demographic characteristics have diversified to include men and women of all ages and families (Borrero, 1995; Jokisch, 1997). The preponderance of men emigrating, at least prior to the late 1990s, has left large sex ratio imbalances in south-central Ecuador, leaving some communities nearly lacking men between the ages of 18 and 35.

These were the conditions in Biblicay (2500–3000 m), a community of approximately 750 people near Azogues. Land has been owned privately since at least the 1940s, and the pressures of a land market, large families, and a tradition of equal inheritance among children have contributed to fragmentation of the landholdings into small parcels. The average landholding in Biblicay is only 1.4 ha. Land use is dominated by continuously cultivated (9 months), intercropped maize, which is planted in late September, and seldom with inputs other than manure from the few livestock (cattle and sheep) a household owns. Maize is planted with a variety of legumes and occasionally with rows of barley or beneath fruit trees. Irrigation is nonexistent. Yields are typically low and although part of the harvest is sold, most people purchase food to meet household food requirements. Farmers acquire labor through family members and wage labor; reciprocal labor relations are

[5] See Jokisch (1997, 2001) and Kyle (2000) for a larger description of the clandestine migration.
[6] A comprehensive survey of Ecuadorians in New York is lacking. Most data are derived from family and return migrants in Ecuador.
[7] Many migrants borrow at least part of the needed money from family, commonly from earlier emigrants who send a lump sum from the United States to pay for the trip.

limited to the extended family. Most households in Lower Cañar have at least one family member in the United States. Men who either have not have not emigrated, or have returned from the United States, work off the farm, usually in nearby Azogues or Cuenca. No one circulates to work on the coast largely because the work is difficult and pays poorly. Women with childcare and household responsibilities, earn wages from working agricultural day-labor jobs, and perform most agricultural tasks—with the important exceptions of plowing and applying agro-chemicals. Some women earn an income selling agricultural produce in local markets, or manage small general stores based in the home, but, with the exception of nearby Paute canton (county), where flower export greenhouses have developed, few work off the farm for wage-labor.

The second research community, Chuguin, is typical of eany communities in Upper Cañar, which is a distinctive area of indigenous, smallholder agriculture (Fig. 2).[8] Chuguin is a mixed indigenous-mestizo community of approximately 1200 people, situated between 3000 and 3,700 m (Fig. 3). The 1984 average landholding in Upper Cañar was approximately 4.2 ha. With large families and a cultural practice of equal inheritance, the average landholding size in the late 1990s is likely to be considerably lower.[9] A semifeudal agrarian structure was abolished in the early 1970s when the hacienda (estate) was dissolved, and the land was divided up into 3–5 ha parcels. A few families own considerably more land (7–20 ha) than others, obtained through marriage, land purchases, inheritance, and/or a preferential position during the dissolution of the hacienda. Most of the original recipients of land remain on it, while their married children sharecrop 1–3 ha of land with their parents and in-laws.

Farmers in Chuguin rotate potatoes, grains (barley and maize), and legumes with a short to medium length fallow cycle (3–7 years) of improved or unimproved pasture, which is grazed by sheep and cattle. Soils are moderately fertile for cultivation, but irrigation is usually available only during the rainy season. As elevation increases, the complexity of the agricultural system diminishes; maize and barley are seldom planted above 3200 m, and traditional Andean tubers, such as *oca, mashua*, and *melloco* are only rarely planted. Most households maintain pasture to improve soil fertility and to

[8]Much of the population in Upper Cañar is considered indigenous (Cañari), although there are no clear and acceptable criteria for the category and indigenous identity is often relative to who is making the description, and for what purpose. The Lower Cañar-mestizo/Upper Cañar-indigenous divide is somewhat arbitrary, but by self-description, outside identification, and extensive use of the Quichua language, the rural population of Upper Cañar is predominantly indigenous.

[9]Upper Cañar corresponds roughly to Cañar parish, although not precisely 1984 figures for average landholdings are derived for Cañar parish and are therefore relatively accurate for Upper Cañar (Chiriboga, 1988).

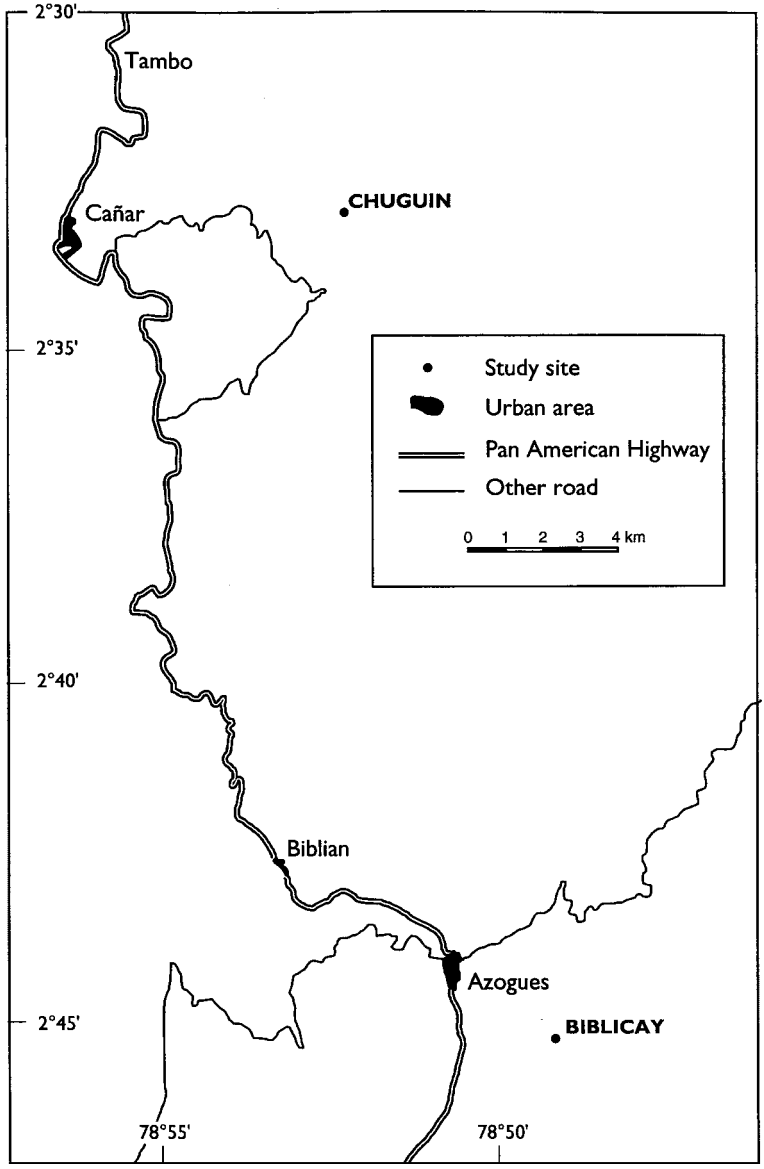

Fig. 3. Location of the two case studies, Chuguin and Biblicay.

support sheep and cattle. Milk cows have become increasingly important in recent years.

Potatoes are the most important cash-crop in Upper Cañar, but they also require more capital and labor inputs than other crops.[10] Men commonly apply several chemical treatments (pesticide, fungicide, and fertilizer) to potatoes during the cycle. That women are active managers and decision-makers in Andean agriculture—with or without migration—is well-known. The gendering of Andean agricultural labor is considered flexible by many researchers (Brush, 1977; Collins, 1988; Mitchell, 1991; Hamilton, 1998), but with few exceptions, women are excluded from plowing and chemical spraying (Deere and Leon de Leal, 1982).[11] The labor requirements to cultivate potatoes and the gender-specific nature of plowing and chemical spraying pose a particular challenge in a community with extensive male circulation and emigration.

Most households use extended family members and extra-familial reciprocal labor relations (*prestamanos*) to acquire agricultural labor, although sharecropping (*medias*) is also common. Contrary to sharecropping arrangements in other agricultural systems, some smallholders rely on relatively wealthy landowners to provide the necessary capital to plant and spray potatoes on the smallholder's land. Most labor is provided by the smallholders and the harvest is divided evenly. Agricultural wage labor is uncommon in Chouguin.

As opposed to Lower Cañar, male circulation to Guayaquil, Cuenca, or agricultural jobs on the coast remains an important component of reproducing the household, canceling debt, and maintaining agricultural production.[12] Circulation occurs primarily from August to January, months of relatively low agricultural labor demand. Men commonly return to Chuguin on the weekends when they work on the farm, doing uniquely male tasks such as plowing or spraying potatoes.

During the mid-1990s, international migration began ecliposing circulation and other forms of domestic migration. Farmers have joined their Lower Cañar counterparts by immigrating to metropolitan New York. The

[10]Potatoes require an average of 109.8 work days per hectare planted compared to 77.9 for maize and 56.9 for barley (PRONAREG-ORSTOM, 1978).

[11]Hamilton (1998, pp. 158–160) indicates that over two thirds of women interviewed in Chimborazo Province, Ecuador, report applying pesticides.

[12]Off-farm labor destinations are particular to each community. Some communities in Upper Cañar have a pattern of circulating to gold mines in El Oro Province, and men in other communities circulate to shrimp farms in Guayas and El Oro Provinces. Circulation is a volatile category because it is based both on household needs and job availability. A short-term job may become long-term if the terms of the work agreement change, or a member of a traditionally nonmigrant household may circulate if the household unexpectedly faces a cash shortage. When men obtain permanent or semipermanent jobs within the country, but prohibitively far from home for commuting, circulation can exceed 6 months and endure most of the year.

numbers are relatively small compared to Lower Cañar and Azuay Province, but increasing. In December 1994, approximately 15 men had immigrated to metropolitan New York; the number in December 1995 approached 60 and exceeded 120 by December 1999.

METHODOLOGY

The base period of research for this study was from December, 1994 to July 1995. To address the role of migration on agricultural production, a typology of migration for each community was developed from focus group interviews and initial household interviews. Although a typology simplifies, it permits a comparison of agricultural production and land-use by household migration type. The nuclear household (Parents and children) was chosen as the primary unit of analysis even though it is a problematic unit in migration studies (Lawson 1998; p. 42). In the Ecuadorian Andes intrahousehold gender differences are most noticeable in preferential male access to off-farm wage labor (Hamilton, 1998). Women in the Ecuadorian Andes, however, inherit land equally and smallholder couples manage land and make most agricultural decisions jointly, including on land a man inherits from his parents and land make most agricultural decisions jointly, including on land a man inherits from his parents purchased from remittances.[13] Therefore, even though men and women do not participate equally in migration and in many cases do not share equally in its rewards, joint management of household land and other agricultural resources makes the nuclear household an appropriate unit to understand agricultural land-use. Here, except where noted, "household" refers to the nuclear household.

Households with at least one immediate family member in the United States were classified as international migrant households. Households not participating in international migration, but with at least one person engaged in circular migration, were distinguished from nuclear households that did not participate in either circulation or international migration (nonmigrant households). In Chuguin (Upper Canar), most households have at least one male member of the immediate family engaged in circular migration, and by 1995, approximately 25 households had one immediate family member in the United States. In Biblicay (Lower Cañar) international migration networks are older and many households have at least one member of the immediate family in the United States, although some households participate only in daily wage labor (commuting). International

[13]Hamilton, in her 1998 ethnography, *The Two-Headed Household*, also reports that men and women in Chimborazo Province, Ecuador, share most agricultural and other economic decisions, that land is managed jointly, and women have equal access to income earned from all household lands.

migration has largely replaced circulation, which is now rarely practiced in Biblicay.

In each community a semistructured agricultural survey was employed, and data were collected on household characteristics, land tenure, agricultural characteristics (crop and seed choice, inputs, rotation, yield quantity, and disposition), labor allotment and acquisition, and pertinent information on migration (timing, destination, cost of emigrating, amount, timing, and expenditure of remittances). The interviews were mostly with "head of households" (patriarch/matriarch) who sharecropped land with their children. The survey was augmented with oral histories from elder residents and a semiethnographic approach. Agricultural production per hectare was grouped into one of three categories: (1) Below Average, (2) Average, and (3) Above Average. This discrete ranking was used because farmers mostly estimated their yield, harvests within intercropped fields are staggered, and no farmers mostly estimated their yield, harvests within intercropped fields are staggered, and no farmers kept formal records. Additional tests were devised for household differences in land-use (types of crops and trees planted, percent of land in pasture), livestock ownership, or agricultural inputs, especially fertilizer and agrochemicals which could raise yields. Data were derived from interviews and field measurements were taken when possible.

In both communities, interviews were stratified, but nonrandom. All geographic sectors of each community and all socioeconomic levels are represented, although there are few "wealthy" households in either community.[14] In addition, households with the most and least preferential soil quality were interviewed in order to test for a relationship between land quality and land use/agricultural intensity. Soil tests were performed by the author in both communities and a locally-derived land preference map was created to understand the variation in land quality within each community; in Biblicay there are no significant differences in soil quality, although Chuguin exhibits noticeable differences in soil quality, based on elevation extremes.

RELATIONSHIPS BETWEEN MIGRATION AND AGRICULTURE: RESULTS AND FINDINGS

Biblicay, Lower Cañar

The agricultural production of each "type" of migrant household was compared by using a Person's Chi-square test (Table I). The test revealed a significance level of 0.25, indicating no evidence of a relationship

[14]During interviews and focus groups households with the most land were considered to be the wealthiest. Even though a more sophisticated set of indicators could be developed to measure wealth, the amount of land owned covaried with subjective categories of wealth within the community.

Table I. Migrant Status and Household Agricultural Production: Biblicay, Lower Cañar

Agricultural production	Nonmigrant households	International migration households	Row total
Below average			
Count	5	1	6
Expected value	3.6	2.4	
Row percentage	83.3%	16.7%	
Column percentage	23.8%	7.1%	17.1%
Average			
Count	8	9	17
Expected value	10.2	6.8	
Row percentage	47.1%	52.9%	
Column percentage	38.1%	64.3%	48.6%
Above average			
Count	8	4	12
Expected value	7.2	4.8	
Row percentage	66.7%	33.3%	
Column percentage	38.1%	28.6%	34.3%
Column	21	14	35
Total	60.0%	40.0	100.0%

Note. Chi square (Pearson) = 2.770; df=2; signficance=0.250.

between migrant status and agricultural productivity. Migrant households demonstrated the same land-use as nonmigrant households—continuously cultivated intercropped maize. Migrant households did not dedicate more of their land to pasture, either from an inability to cultivate the land or from a desire to incorporate pasture into the crop rotation. Migrant households were equally capable of continuing agriculture as nonmigrant households. This finding also suggests that migrants are not investing in agriculture. Certainly no household in Biblicay had invested in major improvement projects such as terraces, irrigation, or other forms of landesque capital.[15] A Chi-square test revealed no relationship between migrant status and the likelihood of applying fertilizer (Significance = 0.22), the best way to increase yields without irrigation.

Although few, if any, households have invested in improving agricultural lands, most long-term migrants have used remittances to purchase land; seven of 11 (64%) households with emigrants who had lived in the United States for more than 2 years purchased agricultural land. Prior to emigration, international migrant households controlled an average of 1.61 ha, while nonmigrant households controlled only 0.80 ha. On average, migrant households have purchased 0.58 ha of land, increasing the average migrant household landholding to 2.19 ha and widening the gap between migrant and nonmigrant households. In most cases migrants (and his/her family)

[15] Biblicay has legal rights to water located 20 km to the north, but canals and pipes to deliver the water have been blocked by landslides and this irrigation source has never been developed.

have purchased land that was already cultivated, and after substituting part of the cultivated area with a new home, continued to cultivate the rest with intercropped maize.

International migration and remittances seem to play a minimal role in changing the agricultural landscape of Lower Cañar. Migrant and nonmigrant households of Biblicay demonstrate remarkably similar land-use patterns. International migrants have not used remittances to improve agricultural land, nor have they permitted their land to revert to pasture by failing to cultivate it regularly. The most significant difference in the two types of households is that nonmigrant households have not been able to increase their landholdings whereas most international migrant households were able to increase their landholdings by an average of 0.58 ha, or 36%.

Chuguin, Upper Cañar

To test the main research question in Chuguin—whether or not migration influences agricultural production—it was necessary to control for environmental quality of household land holdings. Former *hacienda* land, which is flatter, has preferential access to irrigation, and is owned by the community's wealthiest families, is the most coveted land, while land above approximately 3300 m is least preferred. Most households, however, cultivate land between 3100 and 3400 m. Within this area, residents could not differentiate land quality, indicating that most households cultivate similar kinds of land. Largely due to this homogeneity of landholdings, a difference of means test shows that there is no statistically significant relationship between land quality and migrant status.[16]

A Pearson's Chi-square was used to test for a relationship between migrant status and agricultural production using Migrant (International and Circulator) and Nonmigrant categories; it is not possible to test for a relationship using all three categories of agricultural production and all three categories of migration and meet the requirements of a Pearson's Chi-square test. The test reveals no statistically significant relationship (Significance 0.116) between migrant status and agricultural production (Table II). Migrant households do not have a significantly higher or lower level of agricultural production than nonmigrant households. Similarly, a second

[16] A difference of means test using the three migrant household types (International, Circulation, No-Migration) and land preferences (Most Preferred, Acceptable, and Least Preferred) resulted in a significance level of 0.238. Comparing "Migrant" households (International and Circulation) and "Nonmigrant" households resulted in a significance level of 0.730.

Table II. Mirant Status and Household Agricultural Production, Chuguin, Upper Cañar. Migrant vs. Nonmigrant Households

Agricultural production	Nonmigrant	Migrant	Row total
Below average			
Count	1	12	13
Expected value	3.8	9.2	
Row percentage	7.7%	92.3%	
Column percentage	7.7%	38.7%	29.3%
Average			
Count	7	12	19
Expected value	5.6	13.4	
Row Percentage	36.8%	63.2%	
Column percentage	53.8%	38.7%	43.2%
Above average			
Count	5	7	12
Expected value	3.5	8.5	
Row percentage	41.7%	58.3%	
Column percentage	38.5%	22.6%	27.3%
Column	13	31	44
Total	29.5%	70.5%	100.0%

Note. Chi square (Person)= 4.315; df=2; significance= 0.116.

test using international migrant households and circulator households also revealed no statistically significant relationship (Significance 0.332) between type of migration and agricultural production (Table III). International migrant households do not have significantly higher or lower agricultural production than households that engage in circulation.

Table III. Type of Household Migration and Agricultural Production, Chuguin, Upper Cañar International Migrant vs. Circulation Households

Agricultural production	International migrant	Circulation	Row total
Below average			
Count	8	4	12
Expectd value	7.0	5.0	
Row percentage	66.7%	33.3%	
Column percentage	44.4%	30.8%	38.7%
Average Count	5	7	12
Expected value	7.0	5.0	
Row percentage	41.7%	41.7%	
Column percentage	27.8%	27.8%	38.7%
Above average			
Count	5	2	7
Expected value	4.1	2.9	
Row percentage	71.4%	28.6%	
Column percentage	27.8%	15.4%	22.6%
Column	18	13	31
Total	58.1%	41.9%	15.4%

Chi square (Pearson)=2.203; df=2; signficance=0.332.

Using farmer reports of yields is problematic for reasons already stated. One way to compensate for anticipated error is to test for inputs in addition to output. Knapp (1991, p. 45) has shown that potatoes respond positively to heavy fertilization, and therefore fertilizer can be considered an effective capital input for increasing yields. Chemical sprays are an expensive and dangerous way for farmers to improve their chances against late blight disease (*Phithptera infestans*) and other infestations. Heavy doses of chemicals can damage the quality of potatoes, but the best producers of potatoes in Ecuador (Carchi Province) apply at least five chemical sprays per plot (Crissman, 1996), indicating that more frequent sprays may reduce loss and improve yields.

International migrant households tend not to invest more in fertilizer (NPK 10-30-10), or in chemical sprays of potato crops. A difference of means test indicates that international migrant households apply slightly more fertilizer than nonmigrant households, but there was not a statistically significant difference.[17] Curiously, nonmigrant households, applied a slightly higher number of chemical sprays than either Circulator or International Migrant households, but again, the difference was not statistically significant.

In sum, international migrant households demonstrated remarkably similar land-use patterns as nonmigrant households and circulation households. As shown for Lower Cañar (Biblicay), migrant households, international or otherwise, do not invest their cash earnings in cultivation improvements, no matter the importance of subsistence production. Of the 18 international migrant households interviewed in Chuguin, only three had purchased pasture for grazing cattle in 1995. Subsequent research, however reveals an increase in this investment. After eliminating debt and improving the immediate conditions of their families, long-term migrants (>5 years) chose to purchase pasture land from local or regional *hacendados* (large landholders) and stock it with cattle. Land previously owned or managed by the migrant household remains in some steady state of cultivation.

DISCUSSION

These findings raise a series of questions about the importance of migration for agricultural systems because they do not fit what the literature predicts. Despite a large labor loss and significant inflow of remittances, agriculture does not appear to be affected. The work of Georges (1990) for the Dominican Republic most approximates these findings. She found

[17]International migrant households applied an average of 797.50 pounds of fertilizer while Circulator households used 758.33 pounds and nonmigrant households used 725.56 pounds.

that migrant and nonmigrant households had similar levels of agricultural production, but contrary to this study, she found that emigration hastened a decline in agriculture and a large-scale movement into cattle raising. So, why in Cañar is agriculture being sustained by migrant households, but not improved? Second, how are migrant and nonmigrant households continuing agriculture given such a labor loss and the gender norm prohibiting Andean women from plowing? Finally, why have migrants decided to build such large homes? The answers to these questions lie in household and intra-household dynamics within the regional political economy of agricultural production (e.g., land tenure, viability of agriculture and labor availability) and the aspirations of migrants. The history of agricultural change and migration of Biblicay and Chuguin are sufficiently different to require separate discussions.

In Biblicay and much of Lower Cañar, the agricultural landscape is best conceptualized as cultivated real estate. Land is valued as a safe investment, a hedge against inflation, and a place to demonstrate one's success with a large home, but not as an agricultural investment. Migrant demand and land scarcity have inflated land values so high that purchasing more than a small parcel is prohibitively expensive. Agriculture is not improved because soils are poor and yields are low. For most smallholders, agriculture is not a profitable enterprise, and in fact, has not been profitable for many years. Nevertheless, agriculture remains an important economic and cultural activity. Women (and remaining men) in international migrant households continue to cultivate their land because it allows them the security of procuring much of the household's food, reduces overall food costs, and provides them with a modicum of economic independence. Finally, there is a tradition of continuing agriculture while men are away from the community. Prior to international migration, when most men worked seasonally on the coast, remaining household members continued agriculture.

To understand why few fields in the area have been taken out of production, the precariousness of a remittance economy must be understood. During the first few years of male "head-of-household" emigration, the family faces labor and capital scarcity, putting them in a vulnerable situation. An undocumented migrant usually leaves with a $7000–9000 debt and a high interest rate. His family can expect to pay a minimum of $11000–12000 to cancel the debt. Depending on his ability to arrive safely, gain employment, and willingness to remit, his family may not receive enough money to improve their livelihood or even sustain it adequately. Anecdotally, it appears that between one-third and one-half of clandestine migrants are caught along the way, in Nicaragua, Guatemala, Mexico or at the U.S. border. Many of these migrants are forced to emigrate again with another loan. Until the migrant arrives in New York and sends remittances consistently, the household sinks deeper into poverty and runs the risk of having to liquidate family

landholdings to escape the debt. Even if a migrant arrives safely he/she may not get decent or consistent employment for many months.

Even when a migrant obtains relatively well-paid, consistent work, his/her remittances are usually earmarked for specific debts or purchases, father than cultivation. After canceling the debt acquired to emigrate, most migrants remit money to build modern, concrete block or brick homes, costing anywhere from $10000–70000 (U.S., 1999). Many migrants purchase land with the purpose of building a home first and cultivating whatever remains. While migrants are paying down the debt and making substantial purchases, remittances commonly range between $250 and $1,000 per month. After money is dedicated to these priorities, remittances may provide only $50–125 monthly for daily expenses. Numerous women reported that migrant remittances decline after major purchases have been made, dwindling to a mere subsistence remittance. If the migrant does not send a minimum of $100 per month, then the value of his labor in Ecuador has not been replaced, and his family will continue to lead meager lives. In other words, international migrant households may not receive many of the expected benefits of having someone working in an MDC. Notably, hundreds of women in the region have been abandoned by their husbands living in the United States; some women have not heard from their spouses for years, or receive only annual holiday gifts.

It is within this unsteady remittance economy that agriculture is continued. Cultivating, especially prior to canceling the debt, allows those who remain to procure food for their family. Even while substantial money is being remitted, agriculture allows the woman in charge of the land a source of income and perhaps just as importantly, cultural continuity. I asked numerous women why they continued farming if their husband and children were in the United States. Their reaction showed that they had never really considered halting cultivation. One woman in her early 60s, "Maria," whose husband and children were in Queens, asked me "What would I do for money? I need money to take care of daily needs. Besides, we need to eat *choclo* (corn on the cob) young man." She explained that her sons send money to their wives, who spend it on their house and children. Maria's husband sends money occasionally, but it was clear that he sends her very little discretionary money. Agriculture allowed her to grow the foods to which she was accustomed and provided her with a small amount of spending money. Not cultivating would have been culturally foreign, perhaps just as foreign as having her husband in the United States. Maria was accustomed to being in charge of agriculture because her husband had spent months away from the community prior to immigrating to New York. He worked on banana plantations on the coast in the 1960s and in the Amazonian frontier in the early 1970s. Continuing agriculture was not new, but what was new was the large home and extra hectare of land that migration afforded her family. International migration

left her with very little family, but it provided her with a comfortable home and land to cultivate with her extended family members.

Yet, migrant households like Maria's are not investing in agricultural improvements. They are not experimenting with new crops, adding more fertilizer, constructing terraces, or doing any other improvements to the land. Land serves the economic and cultural roles mentioned earlier, but only marginally as an agricultural investment. With depleted and eroded soils, and without irrigation, agriculture is not a good investment. Land scarcity combined with migrant purchases had inflated land costs to between $5000 and 15,000 per hectare, depending on location and quality. If a farmer sold everything harvested from a hectare of intercropped maize, it would gross less than $400, making cultivation unprofitable. Raising cattle is not economically viable either because purchasing the several hectares required would make it prohibitively expensive. Agriculture is not a way to climb economically; emigration is. The maize, beans, barley, and fruit produced on the land will be an important source of food for nonmigrants, but the land's real value lies in its resale value, as a symbol of migrant success, and as a possible retirement home. Land has held its value, in part because migration continues and the demand for land and housing remains high. Large, brick and cement homes have largely replaced traditional, small, adobe homes, creating a landscape of conspicuous consumption. This transformation has occurred elsewhere in migrant sending zones, sparking a discussion about the role of migrant houses in reshaping identity and whether or not they indicate migrants' commitment to their home community (Colloredo-Mansfield, 1998, Fletcher, 1997). Consistent with Fletcher's description of a Mexican community, houses in Cañar link migrants in New York with Cañar and retain "great symbolic and material significance" (1997, p. 188). One returned migrant in Lower Cañar, "Jorge," told me emphatically "una casa es la basica para tener una familia, la basica"—a house is required to have a family, it is the base. After nearly 9 years of working in New Jersey and Manhattan he was able to achieve all that he wanted; he purchased 2 ha of land, built a large house, and paid for the undocumented emigration of three of his children, but most of all, he wanted me to appreciate his house. Building a modern, three story brick home for his family was honorable and showed that he was a good provider. But the conspicuous house was not simply about providing, rather it demonstrated new-found wealth, migrant success, and provided him with a retirement home. Some of Jorge's neighbor's houses sit empty while their owners work in metropolitan New York. The investment and on-going linkages suggest they too will return to what will become a landscape of conspicuous retirement.

Left unanswered so far is *how* cultivation is continued despite such a significant labor loss. Both migrant and nonmigrant households are able to cultivate their fields because of two phenomena, severe land scarcity and

minimally inflated wages. Nuclear households, through ownership or familial sharecropping, have, on average, access to only 1.39 ha of land. These small landholdings minimize the amount of labor required to maintain agriculture. Both migrant and nonmigrant households rely primarily on the extended family for daily agricultural tasks, thereby avoiding wage labor for most agricultural chores. For bottlenecks that commonly occur during the planting, weeding, and harvesting phases of the agricultural cycle, however, most households must rely on wage labor. Women make up the majority of agricultural wage labor in Biblicay, earning an average of 85–100% of men's wages. These earnings, what little can be earned from weaving handicraft items, and selling part of the previous year's harvest or a pig (or some other farm animal) are used to pay day-laborers. The most onerous task is to acquire a plow-team for field preparation; relatively few households have enough pasture to keep bulls and the gender norm prohibiting women from plowing endures. Nonmigrant households must either save for weeks to afford a plow team, or alternatively, barter, trading part of the harvest or grazing rights for the plow team. Migrant households usually have the luxury of using remittances to hire laborers; in fact some migrants remit money specifically for the planting season. Some migrant households, however, do not receive sufficient remittances and must use extended family and barter arrangements to get a plow team. One widowed woman, whose children remitted to their wives instead of to her, traded her labor and the stubble on her field to get a plow team. She weeded the owner of the plow team's field and reserved the corn stubble (stalks) from her fields for his cattle.

Agricultural wages in Cañar are not significantly higher than other provinces with lower rates of international migration. Such wages in Chimborazo and Imbabura Provinces are only slightly less than the going rate in Cañar—$2.25–3.00 (U.S., 1999) per day plus lunch and drink. Labor acquisition has become more difficult because of the exodus and because some return migrants refuse to work in the fields or simply have built their home in Cuenca, or nearby Azogues, effectively cutting their ties to their home community. Yet, there are enough women, children, and elderly to continue agriculture without significant wage inflation. The lack of wage inflation also likely reflects the fact that the remaining workers—women, children, and the elderly—have few off-farm employment opportunities.

Emigration from Biblicay had occurred for long enough for numerous migrants to have acquired United States residency or citizenship. Some migrants have used their status to sponsor their wife's and children's immigration to the United States. Rather than leading to land abandonment, however, their departure has freed up land which is cultivated by extended family members and/or neighbors. If the family's departure leaves a house,

then whoever was cultivating the family land usually watches after the house as well.

In the mid-1990s Chuguin was in the early phases of migration, and therefore had not experienced the same magnitude of impacts as Biblicay. The first emigrants from Chuguin were in their 20s and were sharecropping 1–3 ha of land with their parents and in-laws, who had taken possession of the land during the agrarian reform of the early 1970s. Migrating to the coast or Cuenca, as their parents had done, offers inconsistent employment and low wages. Immigrating to New York, however, allows young migrants to escape the vicissitudes of the Ecuadorian economy and to start their own household. As opposed to Biblicay, most Chuguin emigrants could plan to build their home on their *herencia* (land the migrant will inherit upon the death of both parents), thereby reducing the cost of an initial land purchase. Agriculture is continued in this phase of migration because most emigrants are nearly landless and agriculture is an important part of the household economy. Most land in the community belongs to the parents of migrants, who have no incentive to abandon agriculture simply because a child emigrates. A married emigrants' sharecropped land is cultivated by his wife and his parents. She has many of the same motives for continuing agriculture as her counterparts in Lower Canar; agriculture may not be very profitable, but it does provide food for the household and a modicum of economic independence.

Acquiring labor for continuing cultivation was not difficult in Chuguin because relatively few men had emigrated and most labor is acquired through labor exchanges (*prestamanos*) with the extended family and neighbors. Migrant households, who had little land to cultivate, used the *prestamanos* system and had male relatives to perform male tasks such as plowing and applying agrochemicals.

As in to Lower Cañar, migrants were remitting sizeable sums of money to pay down the debt and to finance the undocumented emigration of their close relatives—sons, brothers, and, in several cases, the migrant's wife. Those who had emigrated earlier (5–8 years) had successfully paid off their debts, paid for the emigration of at least one relative, built a home on their *herencia*, and in three cases, purchased pasture and cattle, a trend that has become more pronounced with the aging of the migrant stream. Migrants have purchased pasture in the higher reaches of the region (above 3300 m) from relatively wealthy landholders. The availability and close proximity of pasture is a notable difference between Upper and Lower Canar. Acquiring 5–10 ha of pasture for cattle is possible near Chuguin because the region is more remote, less densely populated, at a higher elevation, and in the early stages of international migration. Pasture at these elevations is not very attractive for housing, and there is less overall pressure on land, which minimizes land inflation compared to Lower Cañar. Due in part to Ecuador's

policy of imposing tariffs and other restrictions on dairy imports, raising cattle, as opposed to cultivation, is a good investment because the labor demand is small and not gender specific, and returns are stable and relatively high. Urbanization and rising consumption of milk and cheese encourage pasture and milk production among smallholders (Wunder, 1996).

As migration theory predicts, once migrant networks were established in Chuguin, emigration increased throughout the 1990s. Most young men and a considerable number of young women now live in New York while their parents maintain the family land and build their children's homes. Frustration with agriculture and the Ecuadorian economy continues, prompting some fathers to join their sons in New York. "Juan," a relatively wealthy mestizo man in his late 40s, is one of the few men who have decided not to emigrate even though two siblings and two sons live in New Jersey. As previously poor households reap the benefits of emigration, his relative standing in the community declines, but he refuses to leave his younger children or elderly parents. He knows that his economic fortunes will not improve from cultivating 10 ha; now he simply hopes that his children will not be imprisoned or deported and that someday they will return to live on their *herencia*.

CONCLUSION

The change in the regional political economy of south-central Ecuador mimics that experienced throughout various parts of the developing world; agricultural communities once largely self-sufficient and/or closely linked to the national economy have become increasingly dependent on an international economy through international migration. The case studies show similarities with other migrant sending communities. Remittances have been used for education, health, to pay off debts, perpetuate emigration, and for conspicuous consumption, including large homes. The agricultural impacts of this change, however, are not consistent with those described elsewhere for locales with high levels of migration. In south-central Ecuador international migration has not significantly changed the overall character of smallholder cultivation practices, although it has permitted some migrants to start their own household. This finding is a "middle path" between the generally opposing positions that migration leads either to (a) greater investment and agricultural improvement, or conversely that it (b) leads to labor scarcity and degradation of agricultural systems. This finding reinforces arguments made elsewhere (Durand and Massey, 1992) that the impacts of international/transnational migration are mediated by conditions in home communities. Even though transnational migration establishes links between apparently disparate places, understanding agricultural change in the sending region must begin with understanding the political economic and environmental context from which migrants leave and to which they remit money.

Only then can we understand how labor loss and remittances transform the agricultural landscape.

In Lower Cañar, the impacts on the agricultural landscape are understood as a result of the apparent "poverty" of cultivation that makes investments in cultivation unwarranted and by the long history of circulation as a means of sustaining the household. From the latter half of the twentieth century (and decades earlier in some palces) rural households in Azuay and Lower Cañar have become accustomed to combining mixed subsistence-market agriculture with off-farm employment. For decades women have continued agriculture (and woven Panama hats) during extended male absence because it serves an important cultural and risk-averse economic activity, not because it constitutes the long-term economic investment of the household. International migrants seek to purchase land, not to improve cultivation, but rather to construct housing as symbols of their success. Again, this pattern builds upon, and intensifies, the pattern established under circulation. This resulting "rural gentrification" that has occurred in many rural communities in south-central Ecuador demonstrates how international migration has permitted a "qualitative leap" in household wealth, thereby raising the region's economic and cultural expectations and promoting more migration. In these conditions, cultivation remains an important cultural and promoting more migration. In these conditions, cultivation remains an important cultural and risk-averse activity, but given the poor soil quality, small landholdings (deterring economies of scale), low commodity prices, and a lack of access to irrigation, investment in cultivation is simply not a wise economic decision. So far, the real landscape change of transational migration has been the conversion of much of Azuay and Lower Cañar Provinces into a peri-urban landscape of cultivated real estate supporting nonmigrants, children, the elderly and return migrants seeking rest and possibly retirement from hard work in New York.

Ostentatious homes have replaced adobe homes is much of Upper Cañar, but it is not certain that this region will follow a similar course to Lower Cañar. Because Upper Cañar has a lowe population density, less land scarcity, and is more isolated, it may not face the same magnitude of land inflation as Lower Cañar. In addition, if emigration continues to grow and migrants continue to purchase pasture (or other land), then they may become the new "*hacendados*" and labor scacity may become acute enough for pasture to slowly replace much of what is currently cultivated.

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