Population Mobility of Indigenous Peoples: An analysis of the multi-level determinants of off-farm employment in the Ecuadorian Amazon.

Jason Bremner[1] and Clark L. Gray[2]
[1]Department of City and Regional Planning and Carolina Population Center, University of North Carolina at Chapel Hill
[2]Department of Geography and Carolina Population Center, University of North Carolina at Chapel Hill

I. Introduction

Understanding the processes that drive population mobility is essential for assessing the past and future patterns of market integration of indigenous peoples and deforestation in the Amazon. While potentially significant in its effects on the Amazon, population mobility, other than the colonization process, has received scant attention. Empirical research on the mobility of indigenous populations in particular is underrepresented in the literature perhaps due to the difficulty of studying small remote populations.

Anthropologists have utilized cultural and political ecology perspectives to note changes in the market integration of indigenous populations and have identified market integration as a key component in changes in indigenous health, land clearing, knowledge preservation, and hunting practices (Godoy, 2001). The process of market integration itself suggests various forms of population mobility such as out-migration, temporary migration for off-farm employment, travel to markets, and commuting to job sites. Prior studies among indigenous populations, however, have neither acknowledged population mobility's diverse temporal and spatial dimensions (Bilsborrow, 1984) nor acknowledged that each type of population mobility may have a different relationship with environmental and social change in the origin and destination areas (Bilsborrow, 1998).

This paper focuses on one particular type of population mobility, off-farm employment, and uses a binomial logistic regression model to examine the household, and community factors that impact the mobility decision. The study utilizes data from a 2001 survey of 500 households in 36 communities representing 5 different indigenous groups to compare cross-culturally the demographic, geographic, socio-economic, and biophysical determinants of off-farm employment. The research is an advance in that it integrates existing conceptual frameworks of mobility and off farm employment determinants and applies the integrated framework in a new context. In addition, the paper explores a heretofore-neglected aspect of the debate on the role of indigenous peoples in forest management (Terborgh, 1999, Redford and Sanderson, 2000) and therefore can be used to inform policy in the conservation and development communities.

II. Background and Conceptual Foundations

The major tropical wilderness areas (MTWAs) and global hotspots of the world are estimated to contain nearly 60% of global plant biodiversity and over 40% of vertebrate diversity (Myers et al, 2000). Thus, the Ecuadorian Amazon, part of the Upper Amazonia MTWA is considered to be a global priority for conservation. Agricultural expansion by small landholders, however, is rapidly depleting the remaining forests of the Ecuadorian Amazon (FAO, 2001). Despite rapid colonization and subsequent deforestation large areas of contiguous tropical forest remain intact. The largest remaining tracts of forest are either under the control of indigenous populations in the form of communally held reserves or are under the control of the state in two large protected areas that have been inhabited by indigenous populations for centuries. Hence, future conservation outcomes for the MTWA depend greatly upon current and future patterns of indigenous resource management

Case studies intimate that indigenous populations are enduring a complex interaction of circumscription by colonists, market integration, demographic change, and changing livelihoods. Consequently, many question the future ability of indigenous groups to sustainably manage their resources. A significant body of previous work has investigated the process of market integration (e.g. Godoy, 2001, Gross et al., 1979; Behrens 1996), however the related change in population mobility that must accompany market integration has garnered little attention.

Population mobility is the least studied of the demographic processes due to the complexity of its temporal and spatial dimensions and the difficulties related to data collection (Bilsborrow et al, 1984). Research on the determinants of population mobility has tended to focus on rural-urban migration. Early theories related migration decisions to an individual's expected net returns given the probability of employment in the urban area (Todaro, 1969). More recently, proponents of the "New Economics of Labor Migration" have considered population mobility as one of a set of strategies of risk diversification available to rural households (Stark and Bloom, 1985). This approach suggests that mobility decisions may be a way for households to accumulate resources for agricultural investment or minimize risks to household subsistence. Other approaches have examined demographic determinants of population mobility including population growth (Davis, 1963; Bilsborrow, 1987) and life cycle (Leinbach and Smith, 1994).

Theoretical approaches to population mobility have not focused solely on individual and household determinants, but have also explicitly addressed the larger context in which migration decisions are made. Labor markets (Lewis, 1954) and regional environmental conditions (Findley, 1987; Henry et al., 2004) can serve as "push and pull" factors (Lee, 1996) in the areas of origin and destination. Finally, road accessibility and distance are important intervening variables that can condition "push and pull" factors and thus impact population mobility decisions.

As mentioned, prior research has tended to focus on rural-urban migration and has not focused explicitly on indigenous populations. This paper will look at a different aspect of population mobility, off-farm employment, defined as the participation of individuals in a remunerative activity away from their usual agricultural and forest resources. Off-farm employment is an important demographic process for indigenous groups. By participating in off-farm employment, individuals are able to experiment with markets and gain income while maintaining their permanent home and keeping investment costs low. Thus off-farm employment can be seen as an easily reversible and low cost way to interact with markets in comparison with commercialized agriculture or permanent out-migration.

III. Study Area

The study area is located in Northeastern Ecuador, an area that has experienced rapid population growth due to spontaneous colonization by migrants from the highlands and coastal Ecuador (Walsh et al, 2002). The beginning of oil production in the early 1970s led to road development and provided colonists with access to new lands. The government further encouraged in-migration and deforestation by adopting policies that promoted land clearing and facilitated land titling in order to ease land pressures in the densely populated regions of the highlands and coastal plains.

As a result there are now vast colonization areas and several urban population centers that encroach upon the remaining areas of intact low land tropical forest and two large and remote protected conservation areas. Indigenous populations inhabit the largest remaining forested areas and increasingly interact with colonist populations and urban population centers.

Previous work at the University of North Carolina has focused on colonist populations and land use in the Ecuadorian Amazon. In order to complement the work on colonists, an interdisciplinary research project was developed to focus specifically on the complex changes that the indigenous populations are experiencing. The research project incorporated both quantitative and qualitative methods. Data collection, carried out in 2001, involved two phases of fieldwork:

(1) an intensive ethnographic study in eight indigenous communities, and (2) household and community surveys in 36 communities. A two-stage sample of 36 communities and 554 indigenous households was selected to be representative of the largest groups of the region including the Quichua, Shuar, Cofán, Siona-Secoya, and Huaorani. The five groups have diverse histories of interaction with outside groups and manifest a spectrum of different strategies of land use, market integration, and population mobility.

In each household interviews were conducted separately with the head of household and spouse. The male survey contained information on migration experience, land use, and off-farm employment for the household. The female questionnaire included data on household composition; out migration of household members; access to the nearest road; infrastructure; health; fertility and mortality; and household assets. In addition, Global Positioning System (GPS) receivers were used in the field to obtain geographic coordinates of urban centers, markets, communities, households, and agricultural plots.

IV. Analysis and Measurement:

The determinants of off-farm employment will be analyzed using a binomial logistic regression model. Off-farm employment was measured as the participation of an individual in remunerative labor in the 12 months prior to the survey. The location and type of employment were recorded. Off-farm employment was measured as the participation of an individual in the household in wage labor in the 12 months prior to the survey. The location, type, and duration of employment were recorded. A dependent variable was created that categorizes households according to participation or non-participation in off-farm employment. While off farm employment can have multiple spatial and temporal dimensions, such as commuting for work vs. temporarily migrating, these dimensions cannot be addressed through analysis at the household level since households may have multiple off-farm employment bouts with variable characteristics.

Off-farm employment is a prevalent livelihood strategy for many households in the study population. Nearly 25% of households reported temporary labor migration and another 50% of households reported a labor commute. There are a diversity of types of labor, however, the majority of off-farm employment is for oil companies that require menial labor for road clearing, road repairs, and forest clearing for seismic testing. These models will not distinguish the types of labor, however this is a topic for future analysis.

Independent variables assess the importance of individual characteristics such as age, gender, education, language ability, and ethnicity. Household level variables will include household size, household assets, life cycle stage, relationship to existing migration networks, land use characteristics, biophysical conditions, and access to credit and technical assistance. The importance of community context will examine the significance of geographic accessibility, community infrastructure, community population size, and common property regimes.

It should be noted that off-farm employment is frequently used as an explanatory variable in models of several of the determinants to be assessed including: household size and land use. This problem of endogeneity reflects the complexity of demographic and environmental change and cautions against conclusions of causality in cross-sectional models of population-environment relationships. Regardless, this research is a necessary examination of population mobility in an under-studied population and provides insight into the rapidly changing lives of indigenous peoples of the Amazon. As indigenous peoples throughout the world face circumscription and market integration a thorough understanding of the population mobility process is essential for both cultural survival and resource management.

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