

**Ecological Degradation,
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A Contextual Analysis**

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Abstract

The interrelationships between ecological degradation, poverty, and rural out-migration in Ethiopia are examined using data from a Household and Community Survey conducted in 1994–95. The survey, which covered a sample of 2,000 households, collected retrospective data on changes in household composition, including migration of household members, during the period 1984 to 1994. The study hypothesizes that the decision to out-migrate in the impoverished rural areas of northern Ethiopia is influenced by a combination of factors based on individual, household, and community characteristics. A multilevel analysis is applied to determine the role of these factors in the decision. The findings show that individuals belonging to economically poor households in ecologically vulnerable communities have a higher propensity to out-migrate for economic reasons, compared with those who belong to wealthier households in ecologically less vulnerable communities. The study provides information relevant to policy formulation in the interrelated areas of environmental planning, workers' mobility, poverty alleviation, and urban development.

Ethiopia is a country severely affected by chronic food insecurity and rural poverty. With a view to alleviating these problems, the present government, which took power in 1991, has embarked upon a policy that promotes farming and the development of rural infrastructure. In developing countries, government policies dealing with rural development often include migration-related components. In the case of Ethiopia, the government adopted a national population policy in July 1993. The policy focuses on five major objectives, two of which are directly related to migration: (1) “to reduce the rate of rural–urban migration” and (2) “to ensure a spatially balanced population distribution pattern” (NOP 1993).

Researchers in Ethiopia are under pressure to evaluate the merits of this policy, particularly in light of the growing problems of ecological degradation, drought, famine, and poverty that have ravaged the rural population in the last few decades. Indeed, policies aimed at reducing rural–urban migration and ensuring spatially balanced distribution are more important today than ever before. The question arises whether the political environment that has made ethnicity the basis for structuring federal constituencies is compatible with such policies. In the present political situation, can communities from the environmentally degraded areas of the north be resettled in the resource-rich areas of the southwest to produce a spatially balanced population distribution? Can rural–urban migration be reduced when the “push factors” in rural areas are becoming more pronounced every day as a result of environmental deterioration? Contrary to policy intentions, the current rate of rural–urban migration is accelerating because of continuing ecological destruction, drought, famine, and war. The major Ethiopian cities and towns are flooded with people seeking to protect themselves from these conditions.

Sample data collected from selected drought-prone areas in the northern regions are used in this study to demonstrate that rural out-migration is largely a consequence of environmental degradation and poverty, which are structural and institutional in origin, rather than a consequence of individual choice. The incompatibility between the government’s current population policy on the one hand and its political orientations and actions on the other are highlighted below in relation to policy recommendations.

The northern regions studied here include the Amhara and Tigray regional states; they cover 19 percent of the total area of the country and are home to 32 percent of

Ethiopia's population. These regions have supported human settlements for more than a millennium. Historical accounts indicate that some crops (for example, barley and wheat) have been under cultivation in these areas since before the beginning of the Christian era (Woldemariam 1991). Long and sustained human settlement in the absence of resource-management systems has led to an acute depletion of natural resources, particularly arable land and forests. The series of famines the inhabitants of these areas have endured for the last several decades (including four major famines since the 1970s) appear to be linked to the depletion of environmental resources.

Currently the population cannot be sustained in these regions by the natural resources available. For three decades, the Ethiopian population has endured severe stress from environmental degradation and political instability. Unprecedented waves of displacements are affecting the entire Horn of Africa region. The 1998–2000 border war between Eritrea and Ethiopia has, for example, caused insurmountable disruption of everyday life in several border communities. Tracking the demographic, health, and environmental consequences of these disruptions is a serious research challenge.

In the areas where ecological degradation is greatest, scarcity of arable land in combination with population growth has led to a surfeit of laborers on the smaller landholdings. Consequently, peasant households in these regions often send family members as laborers to areas with better employment opportunities. The clearest manifestations of ecological decline include drought, declining size of landholdings or landlessness, and a persistent decrease in food grain and livestock production and concomitant recurrence of famine. Such stressful conditions motivate adaptation mechanisms and survival strategies, including migration to other areas and diversification of occupational activities. As this study demonstrates, rural out-migration in northern Ethiopia has been a response to push factors related to ecological degradation and poverty in rural areas rather than a response to pull factors from urban areas. Prior research has indicated that landlessness, agricultural policy, land fragmentation, environmental degradation, population pressure, drought, famine, war, and political crises have all been responsible for spatial mobility in Ethiopia (RRC 1985; Woldemariam 1986; Abate 1989; Ezra 1997 and 2000; Berhanu and White 1998).

Although understanding the causes and contextual factors related to out-migration from rural areas is indispensable for policy formulation, our knowledge about migration in Ethiopia is limited. The scanty data available show that rural–rural migration was the most common pattern prior to the 1990s. Spatial patterns show that movement is generally from northeastern to central and southwestern regions and from densely populated highlands and midlands to the sparsely settled, hotter, and drier lowlands. Population movements in Tigray include seasonal as well as more permanent labor migration to Eritrea (that is, prior to the border war of 1998–2000). From the northern province of Wello, laborers migrate to the cotton and other commercial farms in the south.

For policymakers in Ethiopia, a knowledge of what types of agroecological areas and communities experienced substantial out-migration in the past decades is important, as is an understanding of which households are susceptible to losing members to out-migration and which individuals are most likely to leave in the future.

The objective here is to model the interaction of ecological degradation, rural poverty, and migration by examining how household and contextual factors affect migration decisions. The specific questions to be addressed include: (1) What type of agroecological areas and communities are susceptible to out-migration? (2) What are the characteristics of households whose members are out-migrating? (3) Which individuals are most likely to migrate in the next few years? and (4) What are the respondents' perceived reasons for moving?

BACKGROUND

Economic and Political Problems

Ethiopia, with more than 62 million people, is the second most populous country in sub-Saharan Africa, with a population growth rate that is among the highest in the world. According to the 1994 census, about 85 percent of the population lives in rural areas (CSA 1998) and depends on subsistence farming. The country is one of the poorest on earth. The *Human Development Report 2000* ranks Ethiopia 171st out of 174 countries (UNDP 2000). Low socioeconomic status, poor weather conditions, massive land

degradation, and lack of basic infrastructure for intensive land use have undermined agricultural growth and reduced the labor-absorption potential of farming in Ethiopia.

Since the early 1970s, the country has suffered extreme economic and political turmoil. Catastrophic droughts and famines have occurred frequently, together with a protracted and devastating civil war. The recent civil war in the north caused large population displacement and cross-boundary migration. During the intensification of the civil war in the late 1980s and early 1990s, many people had to leave their villages for urban areas or other unaffected areas. After the change of government in 1991, politically induced mass migration occurred throughout the country. Two such movements resulted from the demobilization of hundreds of thousands of soldiers of the defunct regime who either went back to their villages or remained in urban centers and from the abandonment of resettlement sites in the southern regions by groups originating from the north for fear of ethnic reprisals. Large communities that belonged to the Amhara ethnic group abandoned their settlements in the south and returned to their places of origin in the north.

Because the last three to four decades in Ethiopian history brought so many disasters, the population situation of the country must be understood in the context of significant environmental degradation and social disruption. The country experienced a succession of governments, each of which had a radically different ideology from the previous one. Prior to 1974, the country was ruled by a traditional monarchy, infamous for its land-tenure policies. In the mid-1970s, the monarchy gave way to a socialist military dictatorship, notable for its disastrous economic development policies and human rights record. The present government proclaimed a sort of market-oriented economic policy and introduced a federal system. Each of these political transitions has triggered massive population movements within the country.

The Policy Environment

The identifying political feature of the traditional monarchy in power prior to 1974 was its land policy. Most rural land was owned in typical feudal fashion by absentee landlords. No clear-cut policy was formulated to benefit the rural poor. Governmental response to this group was virtually nonexistent, with the result that hundreds of thousands perished during the famine of 1972–73 for lack of a coordinated relief plan.

This negligence became a factor in the monarchy's demise in 1974. The monarchy had also neglected population and environmental issues. In the late 1960s and early 1970s, however, the government sought to move people from ecologically vulnerable areas in the north to the resource-rich areas in the south.

A group of noncommissioned military officers who called themselves the "Derg" overthrew the monarchy and ruled the country under a Soviet-style communist regime until 1991. During the Derg era, the country experienced the worst famine, the worst human rights abuses, the worst political turmoil, and the worst economic conditions in its recorded history. The 1980s was a decade of vast internal movement for the Ethiopian rural population. In an attempt to ameliorate the effects of the 1984–85 famine, estimated to have caused more than a million people to starve to death, the Derg formed a large-scale resettlement program to move people from the north to the west and southwest of the country. This compulsory program of mass migration was undertaken as a "resettlement of environmental refugees." Its consequences were disastrous both to the migrating communities and to the environment to which they were moved for resettlement.

In 1991, the Derg was overthrown in turn by the present government, led by the Tigray People's Liberation Front. This group voiced a new political ideology theoretically aimed at enhancing ethnic equality. To address problems of ethnic disruption inherited from previous administrations, the new government restructured the country's former provinces into new regional states according to their ethnic/linguistic compositions. A federation of these regional states forms the central government. This change has affected many resettled communities in the southern parts of the country. In the early 1990s, numerous rural communities of northern ethnic origin were compelled to leave their settlements involuntarily. Massive return migration took place from the south and southwest to the north and to urban centers, particularly during 1991–93. This transitional period was followed by widespread human rights abuses, including loss of lives. A great many of the victims were people of Amhara ethnicity, settlers in the southern part of the country.

Of interest for this research is the incompatibility between the current political policy and the population policy the government adopted in 1993. In effect, the ethnic base of regionalization impedes implementation of the population policy that advocates spatially

balanced distribution and prohibits interregional rural–rural migration flows, in spite of the absolute necessity for people to move south, away from the ecologically degraded areas of the north. The only alternative is to move to regional towns or the capital city, Addis Ababa, which is clearly contrary to the population policy aiming to reduce rural–urban migration.

A Macro-level Migration Profile

Reliable data on migration are difficult to obtain in Ethiopia, and carrying out analyses on trends and patterns of migration is, therefore, problematic. A safe assertion, however, is that the character, direction, and volume of migration in Ethiopia in the last two to three decades have been shaped by political instability as well as by steady decline in the agricultural sector and by government policies designed in response to drought and famine that hit the country several times. Before the mid-1970s, the pattern of migration was dominantly rural–rural, and the stream was toward the east and southeast in the rift valley where commercial farms (cotton and sugar) had been introduced. Significant movements occurred toward the coffee-growing areas of the south and southwest as well. The magnitude and tempo of these movements cannot be determined accurately, however.

During the Derg era, migration was again predominantly rural–rural. Rural–urban migration was discouraged by restrictions on population movements following the 1975 land-tenure reform. The land-reform law, which gave all rural citizens equal access to farmlands, required claimants to remain in rural areas if they wanted to own farm plots. Additional political reasons (not discussed here) lay behind the restrictive component of the policy governing rural–urban migration. Nevertheless, internal and international migrations reached their highest levels during the Derg era. The largest movement of people occurred in the form of the aforementioned resettlement scheme designed as response to the 1984–85 famine.

Agricultural specialists have long considered that resettlement of people from drought-prone and ecologically degraded areas in the north to the fertile lands in the southwest was a necessary aspect of Ethiopia’s economic and social development. The Ethiopian Highlands Reclamation Study (EHRS), conducted by the Ministry of Agri-

culture (MOA) and sponsored by Food and Agriculture Organization and the World Bank, recommended resettlement as an important part of a comprehensive agricultural and afforestation program (MOA 1986). (The World Bank had recommended such programs as early as 1971 on the basis of surveys undertaken by expatriate groups.)

The resettlement program began in February 1976, although some small projects had been undertaken earlier. During the period 1976–79, roughly 48,000 households, mostly from the northern provinces, were resettled in some 80 locations in the southwestern provinces. In 1984, the resettled population totaled about 200,000. The program reached a new stage in November 1984 when the government decided to move nearly 600,000 people, mainly from the provinces of Wello, Shewa, and Tigray. Unpublished reports of the Relief and Rehabilitation Commission show that between 1980 and 1990, 343,000 households, or approximately 1.7 million individuals, were resettled in the western and southwestern areas of the country (Ezra 1997). The explicit purpose of the resettlement was to ease pressure on the northern and central highlands and to create a balanced population distribution.

Data from the censuses of 1984 and 1994 give evidence of the north–south and rural–rural flow of migration. The 1984 census figures show that the country experienced a relatively high level of internal migration. The level of migration refers to the number of migrants in relation to the total population enumerated. According to that census, 16 percent of the country’s enumerated population were reported as migrants. Migrants are defined as those who have moved at least once in their lifetime from a given geographical region or from the place in which they were born to any other part of the country, in order to make a living for a substantial period of time.

Analysis of migration patterns based on 1984 census data indicate substantial regional variation in net loss or gain of population through migration. As expected, the regions that had experienced a net loss through migration in the years before the 1984 census were Wello, followed by Tigray, Shewa, and Gonder. These constitute the northern provinces. The areas with major net gains were Addis Ababa, followed by Bale, Arsi, and Illubabor provinces. Table 1 presents the net gain or loss through migration for the administrative regions and provinces as constituted at the time of the census.

Table 1 Percentage distribution of in-, out-, and net migrants, by region, Ethiopia, 1984

Region	Provinces	In-migrants as a percent of census- registered population	Out-migrants as a percent of census- registered population	Net migrants as a percent of census- registered population	Total census- registered population
North	Tigray ^a	5.5	60.9	-55.5	191,097
	Wello	0.9	7.6	-6.7	3,090,670
	Gonder	3.1	5.0	-3.2	1,975,241
West and southwest	Gojjam	2.3	2.2	0.1	3,273,503
	Welega	3.0	2.3	0.9	2,477,813
	Illubabor	6.6	3.2	3.4	970,163
Central	Addis Ababa	45.2	5.1	40.2	1,422,439
	Arsi	8.6	4.9	3.7	1,662,300
	Shewa	2.9	7.8	-5.0	8,023,384
East and southeast	Hararge	3.1	2.4	1.0	2,689,445
	Bale	10.7	4.9	5.9	780,241
South	Keffa	3.8	1.8	2.0	2,464,924
	Gamo Gofa	2.2	3.2	-1.0	1,260,369
	Sidama	2.1	2.4	-0.4	3,806,268

^a The denominator for Tigray is the urban population only. Rural areas in the region were not covered by the census because of security problems that developed at the time of the civil war.

Source: CSA 1991.

The 1994 census was conducted after the creation of regional states along ethnic lines, a step that is believed to have impeded migration. The pattern of migration since the change of government in 1991 has gone from interregional to intraregional, although return migration from resettlement sites in the south to the north has been considerable. Rural-urban migration has also increased tremendously during this period. In Tigray, the proportion of rural-urban migration increased from about 9 percent of total migrants in the 1980s (CSA 1991) to 20 percent in the 1990s (CSA 1996b) and in the Amhara region from around 12 percent (CSA 1991) to 22 percent (CSA 1996a). Regional capitals and surrounding towns as well as Addis Ababa are growing rapidly. The population of the capital is estimated to have increased from 1.4 million in 1984 to more than 3.5 million by the year 2000.

THEORETICAL PERSPECTIVES ON MIGRATION

The detrimental effects of environmental deterioration on the productive capacity of the land, threatening food production and the livelihoods of both rural and urban populations, has become clear. Because the poor in developing countries reside primarily in rural areas and are dependent on agriculture, rural poverty and environmental degradation are obviously closely related (Todaro 1989).

Studies of the demographic consequences of environmental degradation and food insecurity have been conducted by several demographers. McNicoll (1989) discusses the link between social organization and ecological stability on the one hand and demographic stress on the other; he finds that where social organization and institutional factors are weak, demographic stress causes ecological instability. Lipton (1989) analyzes the response of rural populations to the increasing problem of land scarcity in terms of agricultural technology, employment, and demographic behavior and concludes that demographic behavioral change, although slow, contributes to the transition to lower fertility. These changes include postponement of marriages, reduction in fertility, and migration for change of occupation.

Migration is often a direct response to environmental degradation and rural poverty. In his study of the demographic responses to drought and food crisis in the Sahel in the mid-1980s, Hill (1989) asserts that the main individual, household, and community strategy for coping with drought was out-migration. Migration may be viewed as part of a household survival strategy even during nondrought years, whereby a family allocates part of its labor for nonfarm work (including seasonal out-migration). Labor time is thus allocated to diverse income-earning activities, including farming the family's own land and long-term or seasonal agricultural or nonagricultural employment elsewhere.

Human capital theory developed by Sjaastad (1962) and subsequently modified by Todaro (1976) is the starting point in discussing the determinants of migration. According to the theory, individual rational actors decide to migrate because a cost-benefit calculation leads them to expect a positive net return, usually measured by earnings and job mobility. A migrant moves to wherever the expected net objective and subjective returns to migration are greatest. Microeconomic models lead to several important gener-

alizations about the impact of migration on individuals (Massey et al. 1993). Individual characteristics (education, experience, and occupational skills) increase both the likelihood of migration and the probability of employment in the destination area relative to the area of origin. In short, the microeconomic theory suggests that people make decisions about where to live depending on where they can expect to maximize their future earnings.

Geographers (for example, DeJong and Gardner 1981) have emphasized the relevance of noneconomic factors such as “place utility” in migration decisions. Sociologists (see, for example, Lee 1966) use “push” and “pull” factors to refer to the negative aspects of the place of origin and the positive aspects of the destination, respectively. The prevailing theory of migration suggests that migration decisions are influenced both by individual/household and contextual/community factors (DeJong and Gardner 1981; Bilsborrow 1987; Massey 1990).

The destruction of the environment influences out-migration decisions either through decreased food production or through decline of an area’s desirability or attractiveness as a residence. The population being considered here is predominantly desperately poor, so that economic effects are the most relevant to their decisions to migrate. Some causal factors affect the individual household (for example, destructive farming practices among families lacking oxen), whereas others affect the whole community as a result of larger forces such as drought. In extreme cases of environmental disaster, dramatic forced out-migration occurs, as it has frequently in Ethiopia, and those compelled to move are termed “environmental refugees,” as noted above.

Under the prevailing conditions in Ethiopia, most of the migrations from rural areas are determined by factors affecting the entire community or region. According to Bilsborrow et al. (1987), the most appropriate way to model migration decisions is in the form of a multilevel model, in which individual, household, and community-level or contextual factors are all considered simultaneously. The multilevel approach is particularly useful for isolating the effects of policy-relevant contextual or community variables from those of the individual and household factors (Findley 1987 and 1992; Bilsborrow et al. 1987; Massey 1990; Hugo 1994).

DATA AND METHODOLOGY

The data used in this study are drawn from a survey conducted by the author from October 1994 to March 1995 in the drought-prone regions of northern Ethiopia. The main objective of the survey was to investigate responses of farming households to persistent ecological degradation and food scarcity in those areas. Conducted in selected localities in Tigray, Wello, and North-Shewa provinces, the survey covered a major portion of the ecologically degraded areas of the country and yielded data to permit analysis of migration trends.

The sample consists of 2,000 households selected from 40 village communities known as peasant associations. The peasant association, the smallest administrative entity in rural areas, contains about 500 households, on average. A combination of stratified sampling and simple random sampling methods was applied in selecting respondent households. Although stratified sampling was used to select the village communities, a simple random sampling method was used to select the farm households from an updated roster of households in each selected peasant association. Using stratified sampling, 20 “more vulnerable” and 20 “less vulnerable” peasant associations were selected for the study, and from each selected association 50 households were drawn using a method of simple random sampling, giving a total sample size of 2,000 households. The Ministry of Agriculture classifies the peasant associations into vulnerability categories on the basis of several environmental and climatic factors (see description below).

In the household questionnaire, respondents were asked to make an inventory of the members who had moved out of the family between 1984 and 1994. Data concerning age, sex, relationship to household head, and reason for migration were gathered for each migrant. Migration of one or more household members for any reason was reported to have occurred in 674 (34 percent) of the sampled households. Altogether, the survey registered 1,062 migrants of whom 52 were younger than age 10 and six were older than 34. The remaining 1,004 were aged 10 to 34 at the time of the survey. The present analysis is based on the migration patterns of these 1,004 individuals. Although the focus here is on investigating the economic status of households from which members migrated and the level of vulnerability of the communities that experienced higher

rates of migration, individual characteristics of migrants are also discussed in order to predict who might choose to migrate in the future.

Unlike fertility and mortality surveys, migration surveys are beset by serious methodological difficulties. For example, if they are conducted in destination areas, they can collect information only on in-migrants and nonmigrants in areas to which others have moved. If surveys are conducted in migrants' areas of origin, information about them can be collected only from nonmigrant family members or relatives who remained behind. The present survey is similar to the latter type in which the focus is on the effects of origin characteristics on out-migration. In surveys conducted in origin areas, members of two types of households are encountered: those having out-migrants and those without out-migrants. The data gathered are thus appropriate for investigating why some members of households have migrated whereas others have not. Obviously, when an entire household has migrated, the circumstances surrounding the departure cannot be learned. Several households from the vulnerable localities considered here left their villages during the 1984–85 famine, so that information about them is unobtainable.

Variables

The dependent variable in this analysis of the environment–poverty–migration relationship is the out-migration of one or more members of a given household during the reference period. It is a dummy variable coded as 1 if one or more of its members out-migrated and zero if no one migrated. The names and definitions of the independent variables used in the analysis are shown in Table 2. The explanatory variables considered in this study are a set of individual, household, and community characteristics believed to influence the decision to out-migrate.

A conceptual framework for modeling the interdependence between ecological degradation, rural poverty, and migration is applied with the goal of analyzing the determinants of rural out-migration. Ecological degradation is a contextual variable measured indirectly by a set of climatic, land resource, and agricultural production considerations. The major indicators used to determine the level of degradation include frequency of droughts, scarcity of arable land, soil fertility, soil erosion, and level of agricultural production during good, normal, and poor harvest seasons. On the basis of these indica-

Table 2 Specifications for independent variables used in the analysis of factors influencing migration, Ethiopia

Variable	Specification
Individual surveyed	
Age	Age in completed years
Sex	Coded as 0 = female, 1 = male
Relationship to head of household	Coded as 1 if son/daughter, 0 if other relative
Household	
Landholding size	The size in hectares of farm landholding
Means of ploughing plots	Households with two or more oxen plough their farm plots with their own oxen; household with only one ox plough their plots using an ox-pairing system; and households with no ox plough by other means such as human labor, exchange of labor for oxen, or by leasing land for crop sharing. The three categories are: households with no ox; one ox, and two or more oxen. Two dummy variables are created (Oxen 1 and Oxen 2) with households having no ox as the reference category.
Grain-production level	Respondents were asked about their annual grain requirements and their production during normal harvest seasons. Production level is the difference between production and requirement, a dummy variable coded 1 if the household is self-sufficient and 0 if it has a food deficit.
Roofing	Dummy variable coded as 1 if the respondent's house has a corrugated iron roof and 0 otherwise.
Modern items	Dummy variable coded as 1 if the household owns at least three modern items and 0 otherwise. Items include spring bed, radio, wristwatch, saddle, rifle, kerosene stove, hammer/hoes/saw, kerosene lamp, chair/table.
Moved to feeding camp	Dummy variable coded as 1 if the household had moved to feeding camp during the famine years and 0 otherwise.
Nonfarm work	Dummy variable coded as 1 if any household member worked off the household's farm and 0 otherwise.
Ethnicity/language	Two dummy variables (Oromo and Tigray) with Amhara as the reference category.
Religion	Coded 1 if Christian and 0 if Muslim
Community	
Vulnerability of area	Dummy variable coded as 1 if the household belongs to a peasant association that is "more vulnerable" and 0 otherwise (classification determined by Ministry of Agriculture)

tors, the Ethiopian Ministry of Agriculture classifies rural areas as “more or less vulnerable” in terms of their food-security status. In this analysis, the MOA classification of localities is used as a proxy measure for ecological degradation. Poverty is measured by a set of economic variables indicating the status of each farm family. Most of the household variables employed in the analysis are economic in nature and are meant to indicate the extent of the household’s poverty.

The Multilevel Model

Migration of individuals is viewed here as influenced solely by household and community factors. This approach draws on the substantial body of sociological, economic, and demographic literature dealing with migration decisions. The focus is on the extent to which contextual factors, reflecting certain aspects of structural conditions in areas of origin, affect out-migration tendencies.

A multilevel regression model is used to predict the effects of ecological degradation and rural poverty on rural out-migration. The model focuses on reported reasons for migration and includes individual, household, and contextual variables simultaneously. Migration for economic reasons is considered as a response to perceived ecological or resource degradation in the area of origin. For the majority of farming households in Tigray and Wello, for example, seasonal migration is clearly a response to stress resulting from a low land-to-labor ratio and inadequate farm production. People migrate to regions where temporary employment opportunities exist.

The model presupposes that migration decisions are based on a process whereby an individual in household j in community k takes into account information at all three levels. The simplest form of a general multilevel model of individual migration is of the form (given in Bilborrow et al. 1987):

$$M_{ijk} = f(X_{ijk}, X_{jk}, X_k),$$

where M_{ijk} refers to the probability of migration of the individual i in household j in community k ; and X_{ijk} , X_{jk} and X_k refer to individual, household, and community characteristics, respectively. The model specifies the potential migrant’s decision as a function of variables measured at the three levels.

RESULTS AND DISCUSSION

Characteristics of the Sample Population

Table 3 presents descriptive statistics of some household and community variables by vulnerability of area. Out-migration occurred in 674 (34 percent) of the observed households. Of these, 371 (55 percent) were in areas classified as more vulnerable, whereas the remaining 303 were in the less vulnerable areas. A total of 1,062 persons had migrated during the period in question. A migrant is defined here as a person aged 10–34 who had left his or her rural residence (place of enumeration) permanently during the period between 1984 and 1994. Of the 1,062 migrants reported, 1,004 (95 percent) were aged 10–34.

Because the interest here is the extent to which migration is the result of economic hardship, the variable “reason for migration” is specified as economic or noneco-

Table 3 Percentage of selected household and community variables, by designation as more or less vulnerable areas, Ethiopia, 1984–94

Variable	More vulnerable areas	Less vulnerable areas
Households in which migration had occurred	55.0	45.0
Migrants in the age range 10–34	56.0	44.0

nomic. Noneconomic reasons may include marriage, schooling, and “whereabouts unknown,” whereas economic reasons include looking for work, landlessness, drought, and “joined the army.” The data show significant differences between the two MOA categories in terms of the reasons respondents gave for family members’ migration. In the less vulnerable communities, economic reasons accounted only for about 13 percent of the total, whereas the corresponding figure for the more vulnerable areas is 35 percent. The regression analysis focuses on this differential.

The average size of a landholding is 0.67 and 0.91 hectare, respectively, for the more vulnerable and the less vulnerable areas. The average for all sampled households is 0.75 hectare. In agrarian communities, arable land is the fundamental economic base of households, so that those having relatively larger and better-quality farms are considered to be better off economically. Theoretically, children born into these households are more likely to leave home for school and marriage than for economic reasons. Under the present land-tenure system in Ethiopia, however, every peasant household in a village community has the right to hold a plot of land to farm. Even newly formed households have the right to claim land for farm plots immediately after marriage. The village community, through its peasant association, redistributes land occasionally by fragmenting all of the area within its jurisdiction in order to provide plots for the new households. Today, more than at any time in the history of the country, a high degree of uniformity is found in the size of landholdings among peasant households. For that reason, landholding size is not used in the regression analysis model. The gap in average landholding sizes between more vulnerable and less vulnerable areas is an indication of inequality observed between localities rather than within localities. This indicator is incorporated in the measurement of the vulnerability of the area, which is a proxy for ecological degradation.

Similarly, the variables “working at off-farm activities,” “migrated to feeding camps or elsewhere during famine years,” and “sold assets during famine years” are responses to resource degradation and poverty. They are endogenous variables and have not been included in the right-hand side of the equation, but are included in the descriptive statistics to show the difference between the more vulnerable and the less vulnerable areas. Notably, 40 percent of respondents from the more vulnerable areas reported that some of their family members work at off-farm activities, compared with 28 per-

cent from the less vulnerable areas. In terms of selling assets such as jewelry, furniture, guns, and saddles during the worst months of the 1984–85 famine, some 50 percent of respondents from the more vulnerable areas, compared with 35 percent from the less vulnerable areas, said they sold such items as means of survival.

Method of ploughing farmland is an important indicator of well-being in rural Ethiopia. The difference between ploughing with the household's own oxen and ploughing by other means is often used to distinguish between poor and better-off households. Households with their own oxen have the advantage of being able to plough their plots intensively and at the appropriate time. In addition, they have the opportunity to help themselves and others by ploughing for households that do not own oxen, under a harvest-sharing arrangement. In the communities examined here, ownership of oxen, as expected, is far from universal. Only 42 percent of the households surveyed plough their land using their own pair of oxen, whereas 36 percent plough their land by pairing their single ox with an ox belonging to another household; the remaining 22 percent plough their land by other means. Households without oxen use human labor, exchange their labor for the use of oxen, or lease land in a crop-sharing arrangement. The households in the more vulnerable areas differ widely from those in less vulnerable areas in terms of ownership of oxen and use of substitutes, as shown in Table 3 and discussed in the regression analysis.

For each household, the difference between its grain production during normal harvest seasons and its annual grain requirement for consumption was obtained from the survey. Only 25 percent of the households surveyed acknowledged that their production exceeds their consumption requirements during normal harvest seasons. The remaining 75 percent reported a food deficit even during normal harvest seasons, an important indication of the prevalence of food insecurity in these areas and a factor used to indicate the economic status of a household. A breakdown according to vulnerability shows that compared with the 35 percent of households in the less vulnerable areas reporting that their production exceeds their requirements in a good harvest year, only 15 percent of households in the more vulnerable areas reported producing adequate food.

Two additional variables used as indicators of household economic status are “possesses modern items” (see Table 2 for examples of items) and “dwelling made with

corrugated iron roof.” Dwellings in rural Ethiopia are primarily constructed of wood, grass, and mud, the thatched hut being the predominant type of housing. Recently, peasants have been constructing corrugated iron-roofed houses in addition to their thatched huts. Ownership of such a house is a symbol of prestige and an indicator of economic strength; but more important, it is a symbol of exposure to external influences beyond the village. For the overall sample, 22 percent of respondents reported that they possess modern items, and 18 percent said that they have a dwelling with a corrugated iron roof (not shown). Exposure to externalities implies access to market-oriented sources of income either through remittances or through involvement in cash-crop production. Such households are economically strong, yet migration of family members for economic reasons is observed in considerable numbers. Their migration may not be a consequence of poverty but of greater levels of exposure to externalities. In an earlier study of the reasons young adults leave home (Ezra 2000), migration for economic reasons was found to be positively associated with the possession of dwellings having corrugated iron roofs.

Ethnicity and religion are included in the analysis in order to assess their influences on migration. The ethnic distribution of the study population is 59 percent Amhara, 8 percent Oromo, and 33 percent Tigray, while the distribution by religion is 56 percent Christian and 44 percent Muslim.

Table 4 presents data for the variables used in the regression models. At the time of the survey, 4,937 individuals surveyed were aged 10–34. One-fifth of this target population were reported to have migrated permanently from their areas of origin. The remaining 3,933 individuals stayed at home and are referred to here as nonmigrants. The sex distribution of the total population is 52 percent males and 48 percent females.

When reasons for migration are taken into account, however, the picture changes substantially. For those who migrated for economic reasons, the sex distribution is 71 percent males and 29 percent females, whereas for those who left home for other reasons, it is 32 percent males and 68 percent females. The variable “relationship of migrant to head of household” also has important implications for the decision to migrate. In the population included in the regression analysis, household heads who can read and write constitute 20 percent, compared with 22 percent of the total household heads surveyed (shown in Table 3). Similarly, households having two or more oxen, one ox, or no

Table 4 Percentage distribution of migrants and nonmigrants aged 10–34, by selected variables used in the regression model, Ethiopia, 1984–94

Variable	Reasons for migration		Nonmigrants	Total	(N)
	Economic	Noneconomic			
Mean age at time of migration (years)	23.2	18.6	16.1	17.2	(4,937)
Sex of persons aged 10–34					
Male	71.0	32.0	58.1	52.0	(2,567)
Female	29.0	68.0	41.9	48.0	(2,370)
Migrant's relationship to household head					
Son/daughter	66.4	76.7	79.7	78.5	(3,876)
Other relative	33.6	23.3	20.3	21.5	(1,061)
Education of household head					
Literate	21.6	20.1	20.1	20.3	(1,004)
Illiterate	78.4	79.9	79.9	79.7	(3,933)
Means of ploughing					
Using own oxen	32.2	43.1	37.9	38.6	(1,904)
Pairing of oxen	39.0	37.6	46.7	45.1	(2,228)
Other means	28.8	19.3	15.4	16.3	(805)
Dwelling has					
Corrugated iron roof	22.3	20.9	20.5	20.9	(1,030)
Other	77.7	79.1	79.5	79.1	(3,907)
Grain-production level					
Deficient	71.1	63.8	70.8	70.9	(3,498)
Sufficient	28.9	36.2	29.2	29.2	(1,439)
Owns modern items					
Yes	22.3	31.5	25.6	25.7	(1,271)
No	76.7	68.5	74.4	74.3	(3,666)
Ethnicity					
Amhara	44.9	57.3	55.5	55.9	(2,758)
Oromo	0.8	8.1	12.0	11.4	(561)
Tigray	54.3	34.6	32.5	32.7	(1,618)
Religion					
Muslim	21.8	42.7	43.9	43.4	(2,143)
Christian	78.2	57.3	56.1	56.6	(2,794)
Area's vulnerability					
Less vulnerable	35.2	48.1	50.9	51.2	(2,526)
More vulnerable	64.6	51.9	49.1	48.8	(2,411)
Total	25.4	74.6	79.7	100.0	
(N)		(1,004)	(3,933)	(4,937)	

oxen, constituted 39 percent, 45 percent, and 16 percent of the population included in Table 4, respectively, compared with 42 percent, 37 percent, and 21 percent, respectively, for the population included in Table 3. Other variables for which considerable differences between the two groups of migrants are observed in Table 4 include grain-production level, possession of modern items, ethnicity, religion, and vulnerability of area. For example, 54 percent of migrants leaving home for economic reasons are from Tigray, although respondents from Tigray constitute only 33 percent of the total population. Christians comprise 78 percent of those leaving home for economic reasons, whereas the proportion of this group in the total sample included in Table 4 is 57 percent. Sixty-five percent of the migrants left the more vulnerable areas for economic betterment; the share of these areas in the sample is 49 percent. The causal relations of such differentials are investigated below using multivariate analysis.

The Multivariate Analysis

Multilevel models are commonly considered the most appropriate way to show determinants of migration (Bilsborrow et al. 1987; Findley 1987; Zhu 1998), where individual-, household-, and community-level contextual variables are considered simultaneously. The multilevel approach is particularly useful for isolating the net effects of important contextual factors.

Table 5 presents the odds ratios of three multinomial logistic regression models of determinants of migration. Model 1 includes only individual-level variables: age, sex, and the migrant's relationship to head of household. Model 2, in addition to the individual-level variables, includes those concerning the household: education of household head, means of ploughing farm plots, grain-production level, possession of modern items, dwelling roofs, ethnicity, and religion. In Model 3, the contextual variable "vulnerability of area" is added.

The individual-level variables are found to be important determinants of migration. As expected and consistent with the life-course perspective, age has a statistically significant relationship with migration. Age squared is included to describe the quadratic nature of the relationship between age and migration. Earlier studies have shown that the age-specific migration rate usually increases with age, reaching its peak be-

Table 5 Odds ratios of multinomial logistic regression models of migration, Ethiopia, 1984–94

Variable	Model 1		Model 2		Model 3	
	Odds	Standard error	Odds	Standard error	Odds	Standard error
Age at migration	2.217**	0.133	2.211**	0.109	2.212**	0.118
Age squared	0.988**	0.001	0.988**	0.001	0.988**	0.001
Sex						
Female (r)	1.00		1.00		1.00	
Male	0.561**	0.035	0.543**	0.036	0.560*	0.035
Relation to head						
Son/daughter (r)	1.00		1.00		1.00	
Other relative	3.214*	0.632	3.117*	0.638	3.118*	0.635
Education of head						
Illiterate (r)			1.00		1.00	
Literate			0.828	0.076	0.823	0.089
Means of ploughing						
No ox (r)			1.00		1.00	
Pairing (1 ox)			1.561	0.183	1.422	0.191
Using own oxen (≥ 2 oxen)			0.935	0.167	0.911	0.178
Grain-production level						
Deficient (r)			1.00		1.00	
Self-sufficient			0.876	0.658	0.871	0.776
Owns modern items						
Yes (r)			1.00		1.00	
No			0.770	0.554	0.778	0.651
Roofing						
Corrugated iron			1.081	0.174	1.011	0.176
Other (r)			1.00		1.00	
Ethnicity						
Amhara (r)			1.00		1.00	
Tigray			1.016	0.097	1.0211	0.092
Oromo			0.704	0.112	0.571	0.099
Religion						
Muslim (r)			1.00		1.00	
Christian			1.007	0.970	1.031	0.776
Vulnerability of area						
Less vulnerable (r)					1.00	
More vulnerable					2.168*	0.085
Model Chi-square (df)	725.34 (4)*		756.24 (13)*		765.18 (14)*	

* Significant at $p < 0.05$; ** $p < 0.01$.

(r) = Reference category.

tween the ages of 30 and 35, and then declines. Likewise, sex is an important predictor of migration: the odds of migration are 0.56 for males compared with 1.00 for females. The migrant's relationship to household head also has a statistically significant impact on migration. Household members other than sons and daughters of the head are more likely to migrate at higher rates.

When household variables are added to the equation in Model 2, the importance of the individual variables is still strong. Less migration occurs (odds = 0.83) in households where the heads are literate than in those where they are not. This finding may be the result of higher age at marriage of female siblings who belong to families with literate heads. The most important indicators of wealth—means of ploughing farm plots, grain-production level, and possession of modern items—do not show a statistically significant relationship with migration when the analysis considers all migrants, regardless of the reported reasons for migrating. Neither ethnicity nor religion is found to be an important determinant of migration when reason for migration is not taken into account.

At the community level, vulnerability of area has a statistically significant effect on migration: Clearly, as expected, the odds of migration for economic reasons are found to be higher in the vulnerable areas.

Table 6 presents results of the multinomial logistic regression model that takes reasons for migration into account. The dependent variable in this case has three categories: stayed at home (reference category), migrated for economic reasons, and migrated for noneconomic reasons. Net effects of specific individual, household, or community factors on motives for migration are estimated. Age has a statistically significant effect on the likelihood of migration, whatever reason for migration is reported. Similarly, sex is an important determinant of migration: Although the probability of migrating is significantly higher for females than males when the reason for doing so is noneconomic (marriage being the predominate noneconomic reason), it is statistically significantly lower when migration is undertaken for economic reasons.

Among household-level variables, education of the household head has a statistically significant effect on migration of household members. A member of a household headed by a literate man or woman is less likely to migrate than one whose household head is illiterate, regardless of the reason for migrating.

Table 6 Odds ratios of multinomial logistic regression model for reasons for migration, Ethiopia, 1984–94

Variable	Economic reasons		Noneconomic reasons	
	Odds	Standard error	Odds	Standard error
Age at migration	2.233**	0.236	2.875**	0.169
Sex				
Female (r)	1.00		1.00	
Male	1.137**	0.037	0.361**	0.033
Relation to head				
Son/daughter (r)	1.00		1.00	
Other relative	3.262**	0.632	2.679**	0.687
Education of head				
Illiterate (r)	1.00		1.00	
Literate	0.831*	0.076	0.753*	0.087
Means of ploughing				
No ox (r)	1.00		1.00	
Pairing (1 ox)	0.979	0.089	1.142	0.102
Using own oxen (≥ 2 oxen)	0.835	0.067	1.528*	0.098
Grain-production level				
Deficient (r)	1.00		1.00	
Self-sufficient	0.876	0.658	1.176	0.096
Owns modern items				
Yes (r)	1.00		1.00	
No	1.077	0.554	0.990	0.223
Roofing				
Corrugated iron	1.103*	0.074	1.113**	0.096
Other (r)	1.00		1.00	
Ethnicity				
Amhara (r)	1.00		1.00	
Tigray	2.016*	0.097	0.793*	0.092
Oromo	0.704	0.112	0.571	0.099
Religion				
Muslim (r)	1.00		1.00	
Christian	1.227	0.097	1.031	0.113
Vulnerability of area				
Less vulnerable (r)	1.00		1.00	
More vulnerable	3.368**	0.085	0.998	0.093
Model Chi-square (df)	875.56 (26)*			

* Significant at $p < 0.05$; ** $p < 0.01$.

(r) = Reference category.

The parameter estimates of the association between “means of ploughing farm land” and reasons for migration show results in the expected direction. The odds of migration for economic reasons (0.84) are less among households having two or more oxen compared with those having none. Indeed, the odds of migration resulting from noneconomic reasons are almost twice as high (1.53) among those with two or more oxen than among those with none. Households with two or more oxen are considered wealthy, and daughters in such households traditionally marry earlier than their counterparts in poor households. A related variable is grain-production level, described as either deficient or sufficient. The results show that self-sufficiency of households is related to the lower occurrence of migration for economic reasons and to higher rates of migration for noneconomic reasons.

The variable “owns modern items” shows that migration for noneconomic reasons is less likely in households that do not possess such assets. On the contrary, the likelihood of migrating for economic reasons is higher among members of households that reportedly do not possess modern items. As noted above, the modern goods chosen as indicators included items that do not necessarily suggest exposure to externalities.

The odds ratio of the variable “own corrugated iron-roofed house” suggests that siblings in such households are more likely to move for economic reasons than are those coming from households where the dwelling has another sort of roof. As noted above, households with corrugated iron roofs generally have access to income in addition to their basic subsistence, either through remittances or from their involvement in cash-crop production. In some areas covered by this study, cash crops such as *chat* (a plant whose leaves are used as a stimulant), coffee, sugar cane, fruits, and vegetables have been widely introduced.

Households with a relatively better economic base, by virtue of their exposure to externalities (modern or market-related goods and influences), appear to be in a better position to respond to declining resources. For example, several households in one of the survey sites (near Adigrat in Tigray province) that own dwellings with corrugated iron roofs reported that family members had migrated to urban areas for employment. The economic status of these households is among the best in their communities. Nevertheless, respondents reported that household members are migrating because of the stress induced by rapidly diminishing resources.

Ethnicity and religion may be contextual factors, but are considered here as household-level variables. The table shows that Tigrians have a statistically significantly higher probability of migrating for economic reasons compared with Amharas, whereas the odds of Oromos migrating for economic reason are lower compared with those of Amharas. The results also show that Tigrians are less likely to move for noneconomic reasons (that is, predominantly because of marriage) compared with Amharas. This finding is consistent with the Amharas' having the lowest age at first marriage (14 years for females) in Ethiopia (CSA 1996a). Similarly, Christians migrate for economic reasons more often than do Muslims.

Finally, the analysis shows that migration for economic reasons is strongly associated with the vulnerability of an area as determined by the Ministry of Agriculture. The odds ratio of migrating for economic reasons for people living in the more vulnerable communities is statistically significantly higher (3.37) than for those residing in the less vulnerable areas.

CONCLUSION

Roughly 85 percent of Ethiopia's 62 million people live in rural areas. Traditional crop and livestock farming methods are still practiced at higher proportions than are modern techniques. Land and forest resources, particularly in the northern regions that are the focus of this study, are reaching the limits of their usefulness as a result of environmental destruction. Young people in these areas are looking outward for opportunities other than agricultural occupations. Because farming the marginal lands has turned unprofitable, the main alternative for the young has become migration to urban areas.

The multilevel approach shows that, overall, males tend to migrate less often than females, but when reasons for migrating are considered, males tend to move more often than females for economic reasons. Females migrate mainly for reasons pertaining to marriage.

The household-level indicators of wealth and poverty and the contextual variable of ecological vulnerability clearly are important determinants of migration decisions. Most of the parameter estimates of the multinomial logistic regression models indicated that migration for economic reasons is strongly associated with impoverished house-

holds and with communities that are environmentally more vulnerable. Therefore, rural out-migration in northern Ethiopia may be seen as closely linked to environmental degradation and rural poverty. If left unabated, the environmental conditions in the north will continue to threaten living standards, exacerbate rural poverty, and stimulate further out-migration.

As mentioned at the outset, Ethiopia's national population policy has two aims related to this predicament. One is to reduce the rate of rural–urban migration; the other is to ensure a spatially balanced population distribution. Although the policy was crafted in response to the conditions described above, implementation remains problematic. Rural–urban migration has not been reduced, nor has a spatially balanced population distribution been effected. On the contrary, rural out-migration is increasing rapidly, not only because of environmental degradation and poverty but also as a result of additional aggravating factors such as the war with neighboring Eritrea and a number of internal conflicts. The destination of such migration is principally Addis Ababa and a few other regional towns. Its impact is felt in most of the major urban centers of the country, where migrants place increasing pressure on social services and amenities.

More important, the policy, which allowed for the formation of regional states based on ethnic identity, has made the aim of ensuring spatially balanced population distribution unattainable. The purpose behind the population policy was to allow people in the environmentally degraded areas of northern Ethiopia to resettle in the resource-rich areas of the southwest.

A policy that promotes a spatially balanced population distribution is vital for Ethiopia. Rural development experts have long recommended that Ethiopia should seriously consider adopting such a policy as a component of its rural development program. This particular aspect of the population policy has two important aims. The first and primary aim is to tackle the problem of chronic poverty in the ecologically degraded famine-prone areas. These areas have reached the limits of their ability to sustain livelihood. Resettling people from these communities within resource-rich areas is important in order to meet their basic needs for sustenance. The second aim is to alleviate population pressure on extremely degraded areas.

Although such a policy is desirable in many aspects, putting it into practice has not been possible. The main hindrance to its implementation has been the political policy that restructured Ethiopia into ethnically delineated regional states. This policy gave regions full autonomy to administer their internal affairs including land-use planning, making transfer or resettling of communities impossible. An enlightened population distribution policy is, therefore, unattainable under the present regional structure that impedes interethnic configuration of rural settlements.

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