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INTEGRATED SUMMARY REPORT: POPULATION PRESSURE AND MIGRATION: IMPLICATIONS FOR UPLAND DEVELOPMENT

by

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INTEGRATED SUMMARY REPORT: POPULATION PRESSURE AND MIGRATION: IMPLICATIONS FOR UPLAND DEVELOPMENT*

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I. INTRODUCTION

Project Background

The problem of over-exploitation of natural resources, specifically in forests and woodlands, is analyzed in terms of the four components that comprise the research agenda of the program "Economic Policy for Forest Resources Management" of the Center for Policy and Development Studies (CPDS) of the University of the Philippines at Los Banos (UPLB). The agenda focuses on four topics: (1) land use and commercial forest resource management, (2) macroeconomic policies affecting forestry, (3) soil erosion and watershed management, and (4) population and migration factors affecting upland development.

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**Assistant Professor and Chairperson, Graduate Program on Environmental Studies, UPLB. The other principal investigators of the project are Mrs. Imelda Zosa-Feranil of the Population Institute, U.P. Diliman, and Ms. Cristela L. Goce of the Department of Economics, College of Development Economics and Management (CDEM), UPLB.

This report contains the results of studies conducted under the fourth topic. The study areas and principal investigators are: (1) Upland Population and Migration -- Imelda Zosa-Feranil, Population Institute, University of the Philippines (U.P.) Diliman; (2) A Model of Upland Migration Using National Data -- Cristela L. Goce, Department of Economics, CDEM, UPLB; and (3) Case Studies of Upland Migration -- Ma. Concepcion J. Cruz, UPLB Graduate Program on Environmental Studies. The complete report may be obtained from CPDS or the Philippine Institute for Development Studies (PIDS).

Cooperating researchers for the other topics in the program come from the Department of Forest Resources Management (FRM) and the Forestry Development Center (FDC), College of Forestry, the Department of Economics, College of Development Economics and Management (CDEM), and the College of Engineering and Agro-Industrial Technology.

In the following sections, the general approach, methodology and data sources are described. Part II discusses the methodology for delineation of upland areas in relation to the existing allocation of forest land uses. A profile of upland population and migration is provided in Part III based on the 1980 Census of Population and Housing. In part IV, a model using macro-migration functions is presented using national census data. Part V summarizes the case study results. Lastly, policy implications and a research agenda are presented in Part VI.

Project Objectives and Description

The major goal of the project is to determine the population of the uplands in order to provide a basis for the development of social forestry related programs. The specific objectives are: (1) to arrive at a reliable estimate of current population in the uplands using available census data; (2) to determine the extent of migration to upland areas in terms of the actual number, distribution, and direction of population movements; (3) to analyze the socioeconomic and environmental determinants of upland migration; and (4) to evaluate the dynamics of migration behavior and the effects of socioeconomic and environmental factors influencing population movements.

The population estimates are used to assess the extent of demographic pressure on forest resources. These estimates include the number and distribution of persons currently residing in the uplands, the actual volume of migration, the migration patterns, and the socioeconomic and environmental determinants of movement.

Three reasons motivate this effort at undertaking a systematic study of upland population movements. The first has to do with the significance (in both absolute number and proportion) of the growing population of upland dwellers in the country. Our findings show that, as of 1980, over 14.4 million people reside in communities classified as upland, representing 30 percent of the total Philippine population of 48 million in 1980. The annual growth rate of upland population for the period 1948 to 1970 is 2.5 percent, which means that if such a rate were to continue, population in the uplands would double in 27 years.

The second reason is the urgency of resolving the critical problems associated with demographic stress on forest resources. A greater effort at enforcing effective conservation and forest protection policies is needed because of uncontrolled encroachment into easily erodable and critical watershed sites. In addition, migrants often use farming techniques different from those suited for upland cultivation, leading to increase soil erosion and downstream effects such as increased siltation and clogging of waterways.

The third reason is the need to address problems of low income and poverty especially since upland residents have been found to be among the "poorest of the poor" (Quisumbing and Cruz, 1986). A survey of three upland municipalities in Camarines Sur, Cebu, and Antique by Cruz, et al., (1985) indicates an average annual per capita income of ₱2,168, which is below the poverty cut-off defined for families belonging to the bottom 30 percent income bracket. A similar observation is noted in Gwyer (1977) and Luning (1976) with upland residents receiving an average per capita income of ₱2,100 per year. As of the third quarter, 1983, the poverty incidence rate in forestry and forest-based occupations was 46.8 percent, which is higher than the 43.3 percent poverty incidence rate for rice and corn farmers.

General Approach and Methodology

Three studies, using combined macro and micro modelling, comprise the project. The first study involves the identification of upland sites using available topographic maps and aerial photographs. Population data from the 1980 Census of Population and Housing are used in arriving at population estimates and descriptions of related demographic attributes like age and sex and population density measurements.

The second study focuses on a sample of different migration streams. Regression models at the municipal, provincial, and regional levels are constructed to evaluate macro level determinants of movement from selected upland areas.

In the third the macro level estimates are evaluated from the perspective of micro level data. The case study of three upland communities in Mount Makiling, Laguna, are used to analyze the circumstances of movement, frequency and mode of movement, and other socio-economic correlates like income, occupation, ownership status, education and others.

Data Sources

There are two major data sources for the macro analysis (levels 1 and 2). The first is the published set of figures provided by the National Census and Statistics Office (NCSO), Integrated Census of the Population and Its Economic Activities, for 1980, which is disaggregated by region, province, and municipality. The second data source is the unpublished series of migration movements at the provincial level, which was also provided by the NCSO.

Information on upland areas and forest cover were taken from official figures of the BFD, but these data were cross-checked with other available estimates. For land area, the 1980 NCSO publication on population density was used while for forest cover the data was cross-checked with figures in Revilla (1985).

In the three case study areas, a sample survey of upland residents was made using a semi-structured interview schedule. Site mapping was also completed for the three survey areas.

II. IDENTIFICATION OF UPLAND AREAS

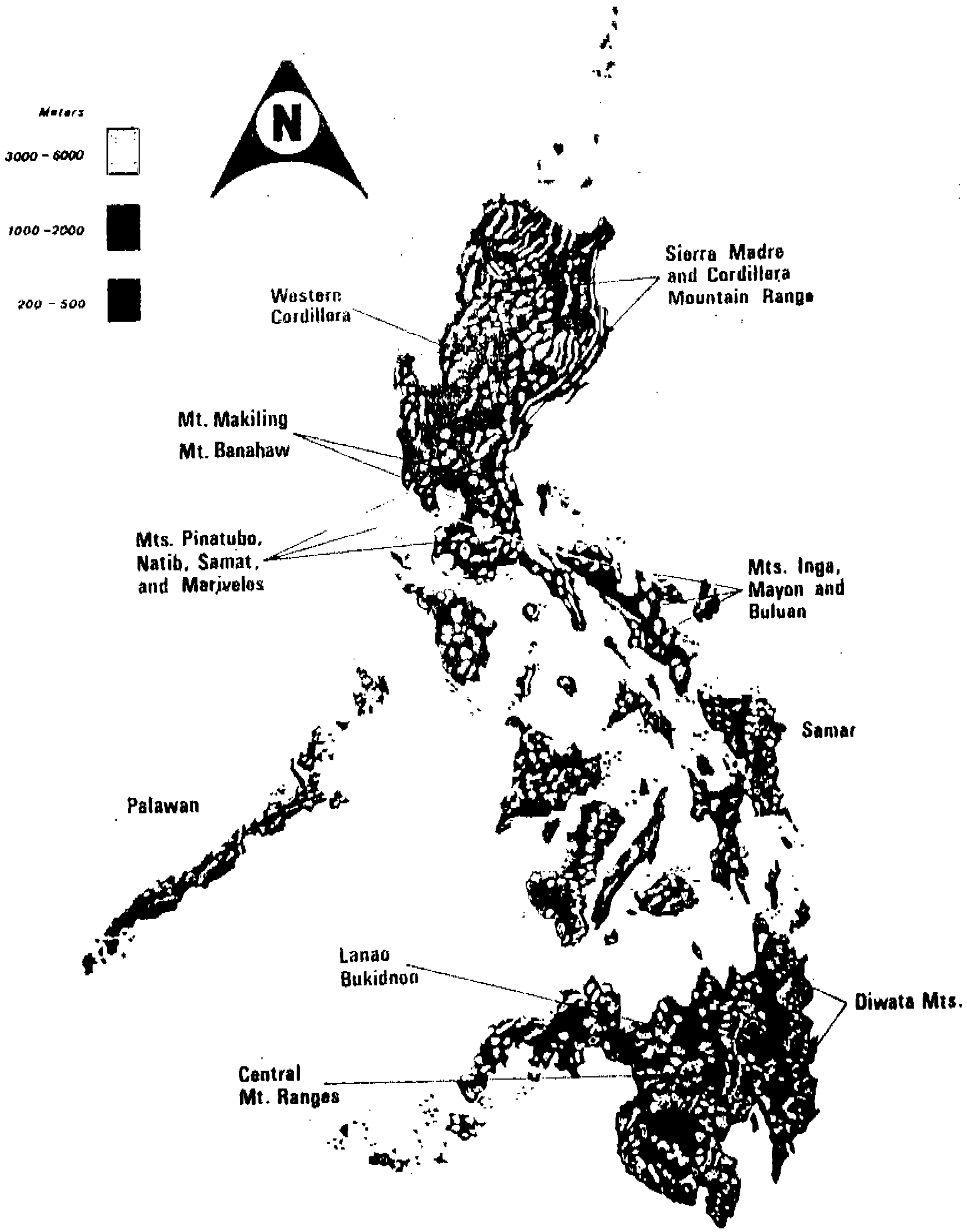
The project adopted the government's definition of upland as "marginal lands with 18 percent slope or higher, lying at high elevations with hilly to mountainous terrain" (BFD, 1982). Within such lands, upland agriculture takes place in altitudes of 500 to 2,000 meters above sea level and in slopes ranging from 20 to 45 percent (see Map 1).

An attempt was made in the project to adhere closely to the official definition of the uplands. However, since the unit from which population and migration figures were to be computed was the municipality, upland areas were then classified according to municipal boundaries.

The sources of information for the mapping activity include the most recent topographic maps available from the Bureau of Coast and Geodetic Surveys (BCGS) and aerial photographs taken in 1979. Municipal boundaries were taken from provincial administrative maps. To cross-check the mountain zones, relief and slope maps were used.

Figure 1.1 provides a summary of the procedure for delineation of upland municipalities. As shown in the figure, the procedure consists of five steps, with the last step involving the participation of many government and nongovernment agencies.

Step 1 involves the identification of major mountain zones from the relief map and topographic map at the scale of 1:50000. The mountain ranges and river systems in each municipality were listed and these comprised List No. 1.

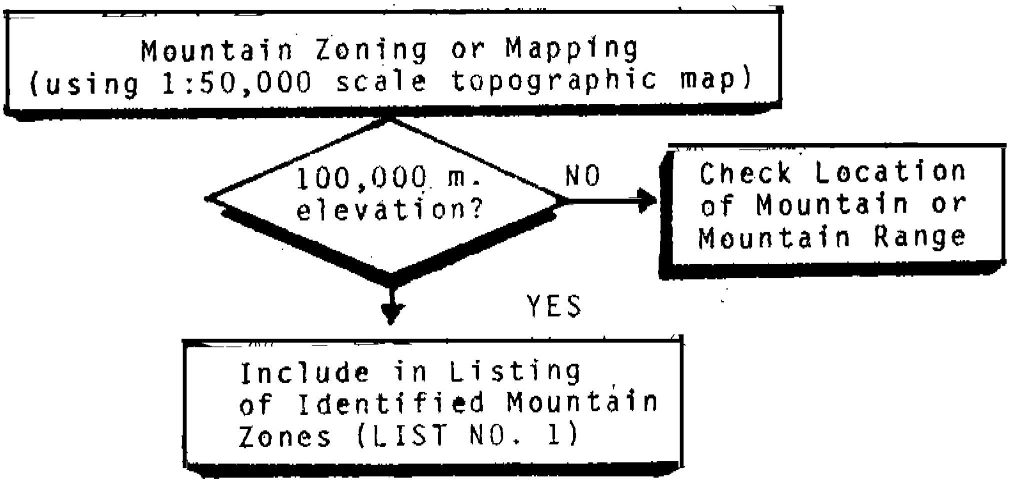


Map 1 Relief Map OF THE PHILIPPINES

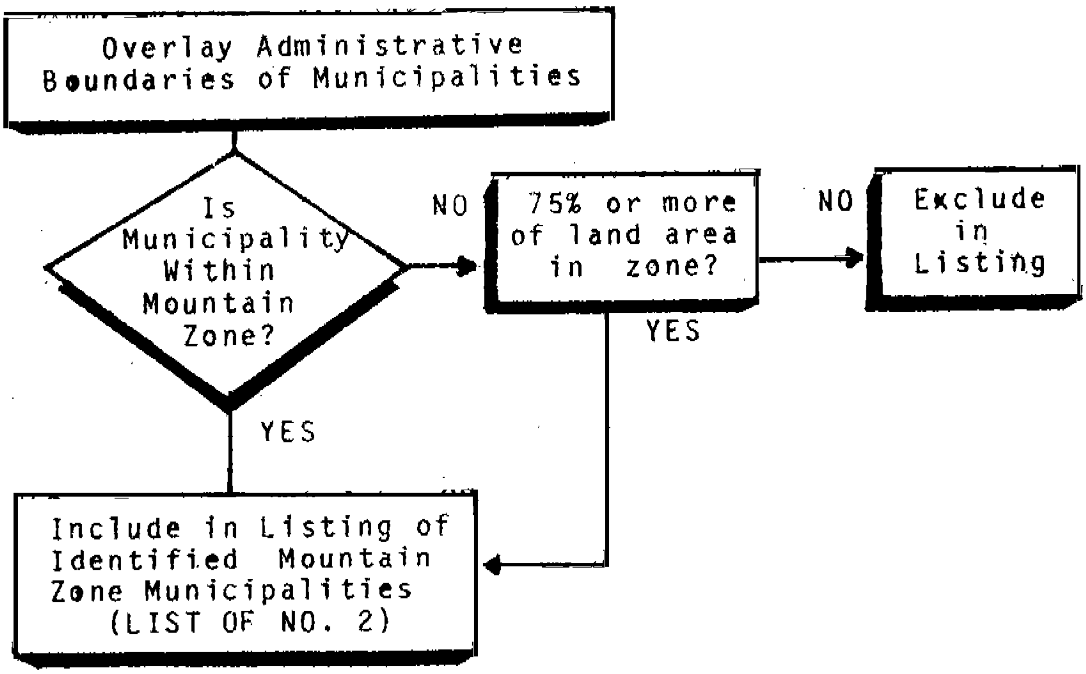
FIGURE 1.1

Identification Procedure for Delineating Upland Sites

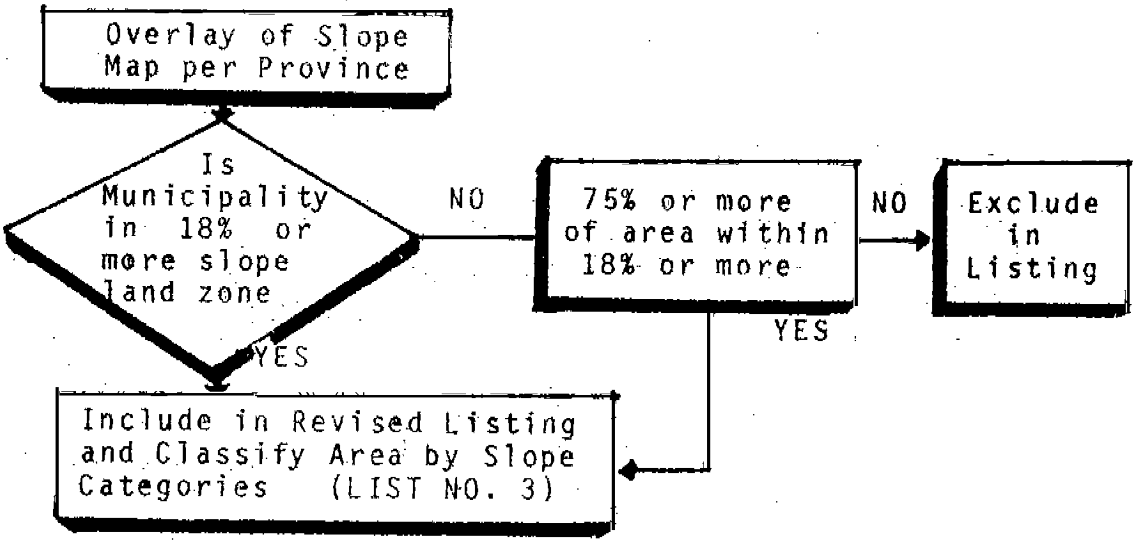
Step 1. DELINEATION OF MAJOR MOUNTAIN ZONES



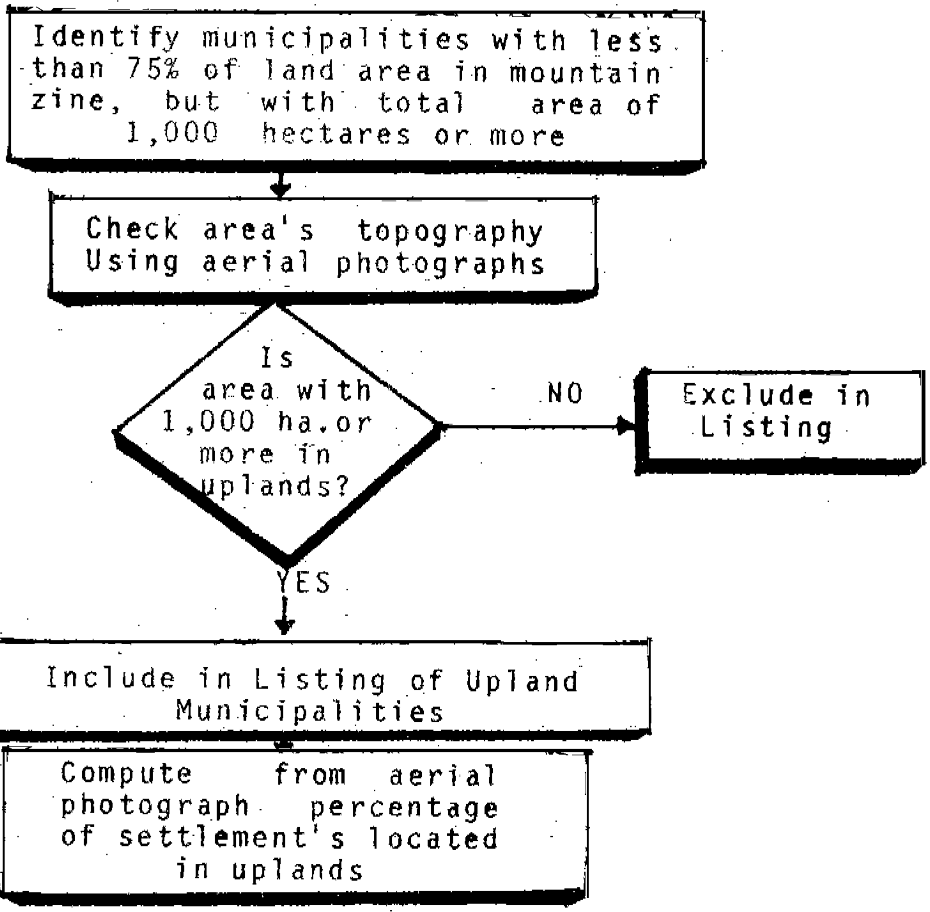
Step 2. CLASSIFICATION OF AREAS BY MUNICIPALITY

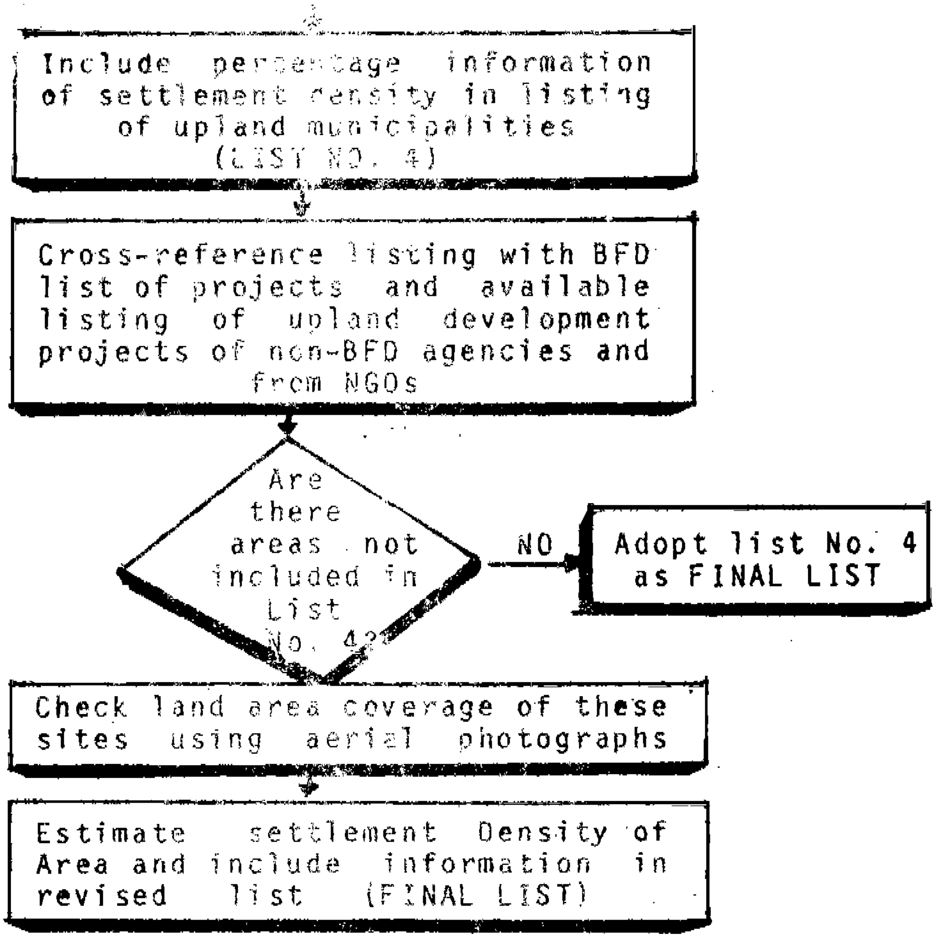


Step 3. CLASSIFICATION OF AREAS BY SLOPE

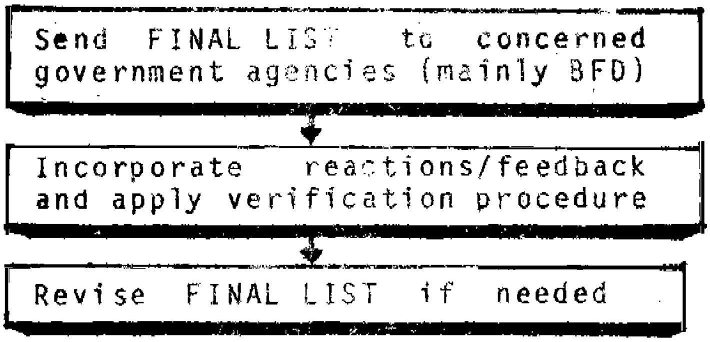


Step 4. TWO-STAGE VERIFICATION





Step 5. VALIDATION AND FEEDBACK



To determine what municipalities should be included, in Step 2 an overlay of administrative boundaries was made and the criterion for inclusion was set at 75 percent or more of land area within the mountain zone. The selection of 75 percent as cut-off presumed that since at least three-fourths of a municipality's land area is upland, then at least one-half of its population would be upland residents. This assumption is realistic since administrative boundaries are drawn based on political constituency and prevailing settlement trends, and since roads and other infrastructure already take up about 10 percent of land area.

In Step 3, the slope map is used to identify municipalities with 18 percent slope or higher. In considering the 18 percent slope criterion, care is taken to include within areas delineated as upland, lands which are flatlands or plateaus but wihin mountain zones. This new listing eliminated areas within the periphery of mountain ranges.

Verification of the upland municipalities identified in Steps 1 to 3 is made in Step 4 through the use of aerial photographs. Those municipalities that were excluded in List No. 3 were then cross-checked using the aerial photograph to ascertain if the municipality should be classified as upland.

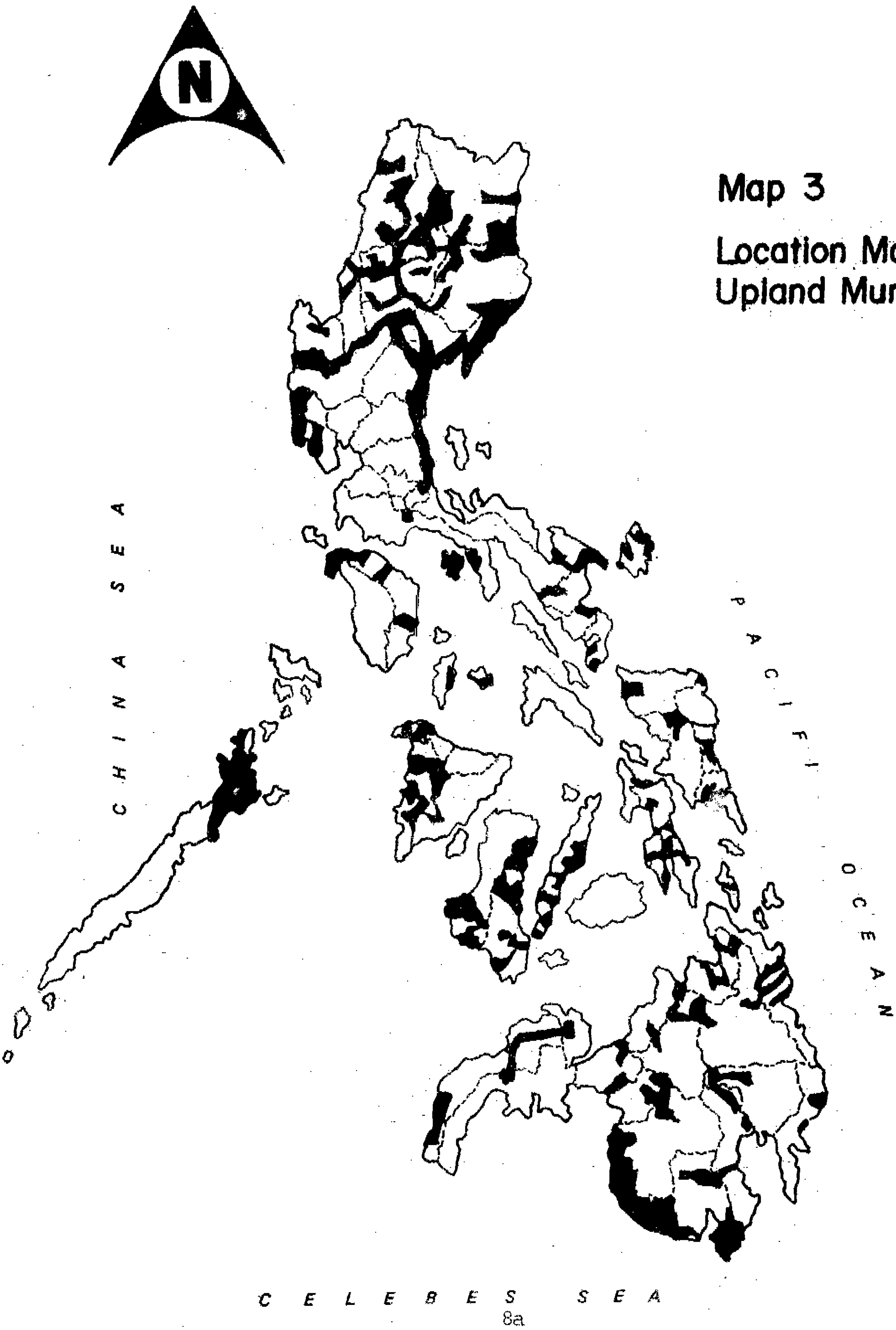
In areas with questionable classifications, the team made extensive use of aerial photographs in determining the actual boundaries of the upland portion of the municipality. Also, to approximate the percentage of the total population living in the uplands, a settlement density factor or SDF was devised, which is the ratio of the number of houses within the upland boundary relative to the total number of houses in the municipality.

Municipalities lying entirely within a mountain zone receive a settlement density factor (or SDF) of 1.0 while a municipality with only one-third of houses located in the uplands has an SDF of 0.33. The SDF figure is then used in adjusting the census population estimate for that portion of the municipality's population residing in the uplands.

The last step (Step 5) is the final verification of the municipalities included in the listing (a) based on available surveys conducted by the Bureau of Forest Development (BFD) and (b) taken from known nongovernment organizations (NGOs) working in the uplands. Two external project consultants were also hired to cross-check information generated from the procedure with other sources (e.g., LANDSAT photographs).

Profile of Upland Areas

Based on the procedure described above, a total of 302 municipalities in 60 provinces are classified as upland, representing 48 percent of the entire listing of municipalities for the country. The largest number of upland provinces are found in the Southern Tagalog, Ilocos, and Cagayan Valley regions. The highest concentration of upland municipalities is in Ilocos with 115 municipalities, followed by 72 municipalities in Southern Tagalog. The highest upland population concentrations are in Central Visayas and Southern Mindanao, followed by Western Visayas and Ilocos regions (refer to Map 3).



Map 3
Location Map of Upland Municipalities

With respect to population settlements, upland dwellers occupy about 40 percent of the total forest and woodlands with population densities closely approximating the national average of 100 persons per square kilometer. These occupied areas include newly opened areas covering 15 of the 39 proclaimed watershed sites in the country.

The total area of the uplands is about 55.3 percent or 16.6 million hectares. A distribution of the uplands according to land use is provided in Table 1.1, based on Bureau of Forest Development (BFD) cadastral surveys and recent LANDSAT photographs interpreted by Revilla (1985).

As the figures in Table 1.1 indicate, less than half or 45.8 percent of total forest lands in the country are classified as stable with respect to vegetative cover. The one million hectare old growth forests are expected to provide a harvest cut of 70 to 80 cu.m. per hectare per year up to year 2000 (Revilla, 1985). On the other hand, the 23 percent inadequately stocked forests have been found to experience an average annual erosion rate of 20 to 40 tons per hectare. However, openland or grasslands, which comprise 3.2 percent of total forest land area, have greater average erosion rates of about 100 tons per hectare per year (BFD, 1982).

Table 1.2 provides figures on forest land uses and the distribution of such land uses relative to total forest lands and total land area in the country. Logs and lumber for export and fuelwood for local energy use come from the 8.3 million hectares production forests. This represents one-half of available forest lands and 27.7 percent of total land area in the country.

TABLE 1.1 Distribution of Forest Lands in the Philippines By Major Cover

Forest Land Cover	BFD ESTIMATES 1/	1980 LANDSAT 2/
	(in million hectares)	
Commercial Old-Growth Forest Lands	1.0	
Adequately Stocked Forest Lands	6.6	7.38
Inadequately Stocked Second Growth Forest Lands (Degraded)	3.8	4.18
Non-Commercial/Protection Forest Land and Reservation	2.7	
Openlands/Grasslands	5.3	5.04
Agroforestry Land (with Croplands)	1.1	
TOTAL	16.6	16.6

Sources: 1. Bureau of Forest Development, <u>1982 Philippine Forestry Statistics</u>.

2. Revilla, Adolfo V. (1985), <u>A 50-Year Forestry Development Program for the Philippines</u>. (Los Banos: Forestry Development Center), Table 1.

TABLE 1.2 Summary of Forest Land Uses in the Philippines

Forest Land Use	Land Area (in million hectares)	Percent of: Forest Lands	Percent of: Total Land Area
Production Forests 1/	8.3	50.0	27.7
Production Forests 2/	3.5	20.9	11.7
Agroforestry Lands	4.3	25.9	14.3
Openlands/Grasslands	0.5	3.2	1.6
TOTAL	16.6	100.0	55.3

NOTES:

1. includes forest lands for lumber, plywood, and fuelwood
2. includes non-commercial or special use forest lands for protection as reservations

SOURCE: Bureau of Forest Development, *1982 Philippine Forestry Statistics*

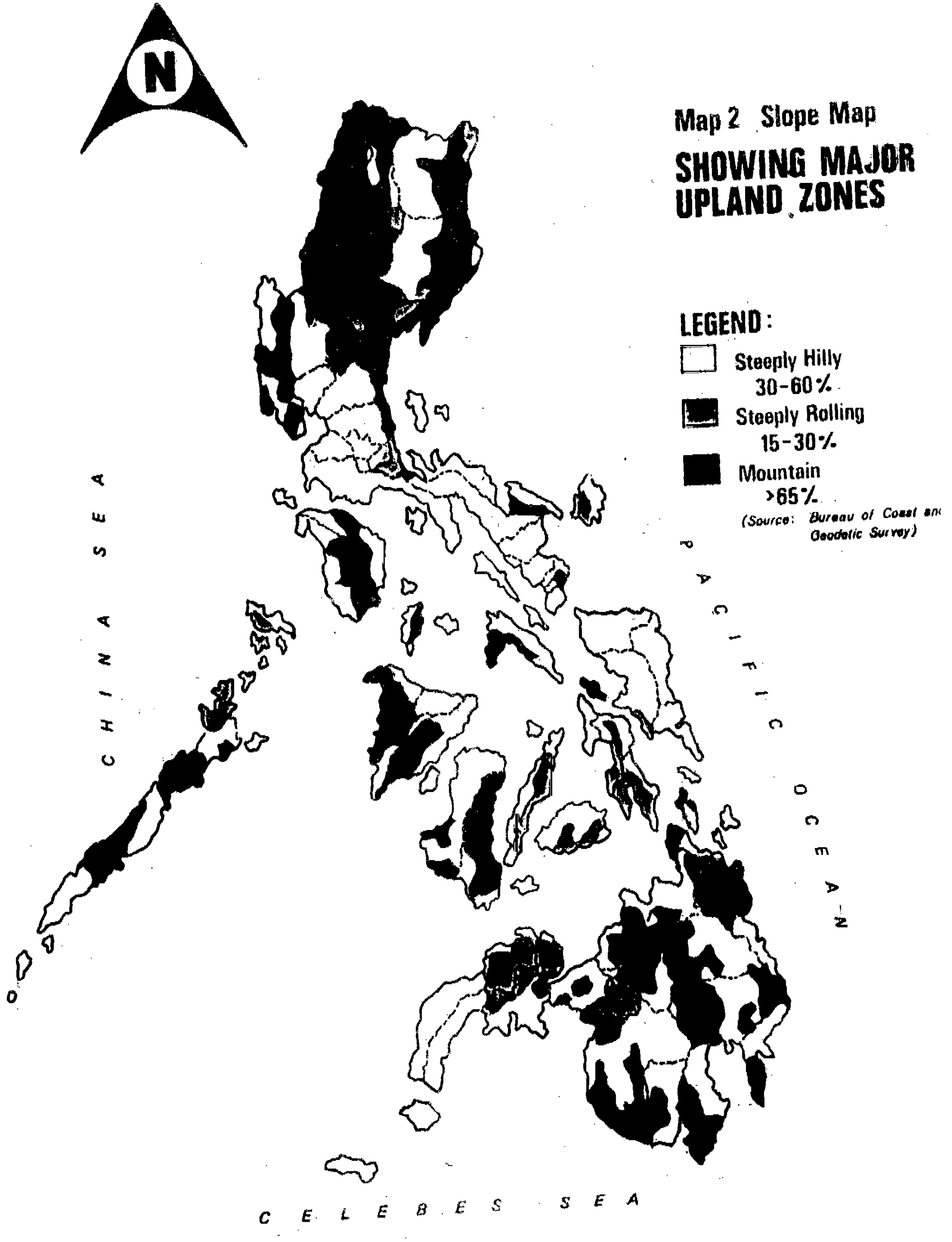
The large proportion of agroforestry land comprises 25.9 percent of total forest lands. In the period 1972 to 1981, about 379,000 hectares per year of forest lands were converted to agricultural land uses (Revilla, 1985).

Potentials for Agriculture in the Uplands

The slope map (refer to Map 2) provides a rough indication of potential land uses. The ratio of net cultivated land to total population in 1960 was 0.18, but this ratio declined to 0.13 in 1970, and was further reduced to 0.11 in 1975 (World Bank, 1979). Using the 18 percent slope cut-off to define the limits of agriculture, only 12 percent of total arable land still remains to be cultivated. If such trends persist, by 1991, the extensive margin for lowland agriculture would have been reached (World Bank, 1979).

If land with slopes greater than 18 percent were included as potentially arable lands, another 25 percent of total land area can be opened up for agriculture as shown in Map 2. Of these lands, 14.3 percent are moderately sloping lands, with slopes within 15 to 30 percent. However, agriculture in these lands has been observed to have characteristics different from that of lowland areas.

Cruz et al. (1985) found that upland agriculture is mostly: (1) rainfed with very little capacity for large-scale drainage, (2) mixed cropping in orientation, with a staple (or grain) crop interplanted or sequentially planted with a legume or root crop, and (3) rolling in terrain, alternating between hills and flatlands on sideslopes between 200 to 1,000 meters above sea level elevation. In addition, in upland agriculture systems numerous minor patches of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Map 2 Slope Map
SHOWING MAJOR UPLAND ZONES
LEGEND:
Steeply Hilly 30-60%
Steeply Rolling 15-30%
Mountain >65%
(Source: Bureau of Coast an
Geodetic Survey)
CHINA SEA
PACIFIC OCEAN
CELEBES SEA

uncut forests are allowed to remain in the more distant upper slopes.

Limitations of the Procedure

The non-correspondence of municipality boundaries with the government's definition of what constitutes the upland has made estimates of upland population extremely difficult to undertake. The first limitation has to do with the uneven distribution of population at the municipality level. Even if 75 percent of a municipality's land area were upland, there may in fact be cases where more than half of the population reside in the lowland sections. This problem is compounded by the difficulty of relying solely on census data since the remoteness of most upland areas make data collection extremely hard.

The second limitation has to do with municipalities that have very large land areas under its jurisdiction. In these cases, even if less than 75 percent of the municipalities' land is upland, in absolute terms these municipalities may have large patches of upland areas. Exclusion of such municipalities will tend to bias the upland population estimate downwards.

Third, the official definition of uplands based on 18 percent slope or higher remains vague even for purposes of population counts. Indeed a combined slope-elevation criterion is needed to permit a more systematic delineation.

Lastly, the population estimate is done on a one-time basis so that movements between intercensal years and season flows within a year are not sufficiently captured.

III. PROFILE OF UPLAND POPULATION AND MIGRATION

The "benchmark" estimates of population and migration in the identified upland areas are derived using three levels of analysis.[1] First, a description of the size, growth, distribution, and composition of the upland population is made using available census data, disaggregated by region, province, and municipality. Population growth is evaluated since 1948, although indicative population movements prior to this period are also discussed.

The second level of analysis uses different indicators of "population pressure," mainly population density and dependency ratios. These indicators are examined with respect to forest cover, land availability, slope, and other physical characteristics of upland sites, such as accessibility and distance.

At the third level, migration patterns are analyzed in terms of volume (actual number of migrants) using the unpublished province-to-province matrix of the NCSO. Areas of origin include both urban and rural population while destination areas are limited only to the identified upland areas.

Demographic Profile of Upland Population

As of 1980, the estimated population in areas classified as upland was 14.4 million, representing 30 percent of the country's total population. The largest upland population concentrations are in the Central Visayas and Southern Mindanao regions, with these two regions accounting for one-fourth of the total upland population of the entire country (see Table 1.1).[2]

The 6 million upland population in 1948 nearly doubled in 1970 with the highest population growth rates occurring during 1948 to 1960 (see Table 3.4). In Mindanao, for example, the rapid growth of upland population during this period exceeded 7 percent per year in the Southern and Central Mindanao regions. Such high growth rates are consistent with Pascual's (1965) earlier description of "frontier settlement" migration as being largely an early postwar movement. Aside from Mindanao, the other high growth regions are Southern Tagalog (4.09%), Bicol (3.58%), and Cagayan (3.46%).

After 1970, a gradual but steady decline in the growth of upland population can be observed, except in Northern and Southern Mindanao, Southern Tagalog, and Cagayan where population still grew at rates higher than 3 percent throughout the 1948 to 1980 period. Central Luzon's growth rate was higher than 3 percent up to 1975, but this rate dropped to 2.6 percent in 1975 to 1980. On the whole, the average annual growth rate of upland population is about 2.5 to 2.8 percent. If such growth rates continue in the succeeding years, the population will double in 27 years (see Table 3.4).

Age Distribution. In terms of age distribution, the uplands follow the national pattern. Over 43 percent are in the young, dependent age bracket of 0-14 years, 54 percent are in the working age of 15-64 years, and 3 percent are non-working or elderly, being 65 years and over (see Table 3.15). The youngest populations are in

Table 3.4 Annual Growth Rates of the Upland Population

REGION	1948-1960	1960-1970	1970-1975	1975-1980
PHILIPPINES	2.98	3.03	2.73	2.55
I. Ilocos	2.24	2.11	1.8	1.88
II. Cagayan	3.46	3.39	3.14	3.06
III. Central Luzon	3.23	4.37	3.24	2.60
IV. Southern Tagalog	4.09	3.63	3.36	3.11
V. Bicol	3.58	2.10	1.52	1.41
VI. Western Visayas	1.92	0.96	2.95	0.97
VII. Central Visayas	1.43	1.81	2.33	2.33
VIII. Eastern Visayas	1.34	1.84	1.69	1.82
IX. Western Mindanao	2.88	4.29	1.77	4.34
X. Northern Mindanao	3.27	4.58	3.66	3.68
XI. Southern Mindanao	7.31	5.80	4.20	4.05
XII. Central Mindanao	7.53	5.60	2.26	1.84

Source : Values were derived by the CPDS-PIDS Project Team from National Census and Statistics Office 1980.

Table 3.15 Upland Population by Age Group and Dependency Ratio by Region, 1980

Region	Numbers Total	Numbers 0 - 14	Numbers 15 - 64	Numbers 65+	Percent Total	Percent 0 - 14	Percent 15 - 64	Percent 65+	Levi's Dependency Ratio
PHILIPPINES	14410570	6227451	7700869	482250	100	43	54	3	187
I. Ilocos	1445455	574544	795500	75411	100	40	55	5	182
II. Cagayan	1129253	489212	605526	34508	100	43	54	3	206
III. Central Luzon	843772	351951	465576	26245	100	42	55	3	181
IV. Southern Tagalog	1299180	572025	687022	40133	100	44	53	3	189
V. Bicol	1059399	495096	525127	39176	100	47	49	4	202
VI. Western Visayas	1459762	632299	776110	51353	100	43	53	4	190
VII. Central Visayas	1839839	743650	1012619	83570	100	40	55	5	182
VIII. Eastern Visayas	944796	420295	486709	37792	100	44	52	4	194
IX. Western Mindanao	557967	249287	296573	12107	100	45	53	2	185
X. Northern Mindanao	1254394	535253	688377	30764	100	43	55	2	180
XI. Southern Mindanao	1838708	818687	976509	38512	100	45	53	2	188
XII. Central Mindanao	743052	342152	388221	12679	100	46	52	2	191

Source : Values were derived by the CPDS-PIDS Project Team from National Census and Statistics Office 1980.

Bicol and Central Mindanao, Central Visayas, Central Luzon, and Ilocos. Bicol has the smallest percentage of working age population.

Age distribution indicates the proportion of the total population that needs to be supported as shown in the dependency ratio measure (Levi, 1976).[3] This ratio may be used as an indicator of population pressure: the greater the dependency burden of an area, the higher the need to exploit resources in order to provide for the consumption requirements of the population. Table 3.16 contains a summary of dependency ratios, forest cover, and density levels.

Three regions have high dependency ratios and density levels -- Bicol, Eastern Visayas, and Western Visayas. Forest lands in Bicol and Western Visayas are relatively small in size with respect to total forest land area in the country. With limited forest resources and relatively dense settlements, population pressure has reached critical levels for these regions. In contrast, Central Visayas and Central Luzon have low dependency ratios but comparatively high density levels.

Sex Ratio. Table 3.20 contains the distribution of upland population by sex for the 12 administrative regions of the country. The distribution shows a clear selectivity for males in the uplands, with Southern Tagalog, Bicol, Western Visayas, Southern and Central Mindanao having a comparatively higher proportion of male population.

The dominance of males in the upland is consistent with observations presented in case studies of upland migration where males are the ones who make the first move before the entire family is

Table 3.16 Dependency Ratios and Forest Cover (in sq. km.) Variables

Dependency Level 1980	Percent Age 15 - 64 Years	Density Level 1975	1975 Total Forest Land	1975 Alienable & Disposable Land	Density Level 1980	1984 Total Forest Land	1984 Alienable & Disposable Land
High Dependency (190 or more)							
Bicol	49	137	5,561 (32)	12,071 (68)	147	5,500 (31)	12,100(69)
Eastern Visayas	52	101	11,929 (56)	9,502 (44)	111	10,600 (50)	10,800(50)
Central Mindanao	52	70	18,310 (63)	10,696 (37)	77	14,000 (60)	9,400(40)
Western Visayas	53	135	7,032 (35)	12,190 (65)	147	6,500 (32)	12,700(68)
Moderate Dependency (185-189)							
Southern Tagalog	53	49	28,890 (61)	18,623 (39)	56	27,900 (59)	19,600(41)
Southern Mindanao	53	70	16,356 (60)	10,970 (40)	86	20,100 (64)	11,500(36)
Cagayan	54	41	26,253 (72)	10,150 (28)	48	26,200 (72)	10,300(28)
Western Mindanao	54	83	10,108 (54)	8,578 (46)	103	9,900 (53)	8,700(47)
Low Dependency (<185)							
Ilocos	55	87	12,507 (57)	9,620 (43)	96	12,400 (58)	9,100(42)
Central Visayas	55	208	6,903 (46)	8,049 (54)	233	6,700 (45)	8,200(55)
Central Luzon	55	121	8,102 (44)	10,175 (56)	138	8,100 (44)	10,300(56)
Northern Mindanao	56	89	18,344 (65)	9,983 (35)	107	18,100 (64)	10,300(36)

Sources: Values were derived by the CPDS-PIDS Project Team from National Census and Statistics Office 1980 and Bureau of Forest Development Statistics 1975.

Note: All numbers in parenthesis are percentages.

Table 3.20 Upland Population by Sex and Sex Ratios by Region, 1980

Region	Male	Female	Sex Ratio (all ages)
	(all ages)		
PHILIPPINES	7,318,386	7,121,563	103
I. Ilocos	723,681	721,824	100
II. Cagayan	575,513	553,747	104
III. Central Luzon	421,131	422,470	100
IV. Southern Tagalog	675,468	644,298	105
V. Bicol	543,064	516,345	105
VI. Western Visayas	745,724	731,777	102
VII. Central Visayas	915,438	924,362	99
VIII. Eastern Visayas	481,327	463,481	104
IX. Western Mindanao	289,157	280,434	103
X. Northern Mindanao	637,226	617,193	103
XI. Southern Mindanao	941,573	892,150	106
XII. Eastern Mindanao	379,264	363,808	104

Sources: Values were derived by the CPDS-PIDS Project Team from National Census and Statistics Office, 1980 transferred. For single male adults, the attraction of frontier lands is greater than females who prefer to live in the lowlands.

Education. In 1980, the national literacy rate reached 83 percent, which is higher than the 79 percent literacy rate for upland populations. Higher literacy rates are found in Central Luzon, Southern Tagalog, and Ilocos. The lowest literacy rates are in Western and Central Mindanao.

Measures of Population Pressure

The important demographic factors influencing population pressure in upland communities are outlined in Figure 1.1. Population growth occurs as a result of the natural processes of fertility and mortality and through migration. The age-sex structure then defines a dependency level that is closely correlated with density and other land-related factors. As population increases beyond the limits of the resource base, new and more intensive techniques of resource use emerge. Within this context, migration can be viewed as an immediate response to relieving the pressure caused by high dependency or density levels.

Population Density. The upland areas of the regions of Cagayan, Southern Tagalog, and Southern Mindanao comprise 45 percent of the total area classified as upland. However, their combined population accounts for only 20 to 30 percent of the entire population in the period 1948 to 1980. Meanwhile, the regions of Central and Western Visayas, which account for 10 percent of the total population, occupy only 5 percent of the total land area.

The average density figure for all regions is 39 persons/sq. km. in 1948. This increased markedly to 74 persons/sq. km. in 1970 and rose sharply to 96 persons/sq. km. in 1980. Upland density levels in Mindanao are lower than the other regions for all years between 1948 and 1980 although density levels doubled in the years 1975 to 1980.

When disaggregated by province, the population density figures show that some provinces have exceeded the 200 persons/sq. km. upland density limit proposed by Conklin (1961) for pioneer, shifting cultivation systems. The province with the highest average density of 500 persons/sq. km. is Laguna. In 1960, Laguna has approached the upland density limit with a density of 197 persons/sq. km. The density figure doubled in Laguna between 1960 to 1975.

Aside from Laguna the other high density provinces are Rizal (277) and Marinduque (203) in Southern Tagalog, Cebu (424) in Central Visayas, and Pampanga (402) in Central Luzon. On the other hand, some regions like Cagayan have uniformly low density levels (less than 200 persons/sq. km.).

Density and Land Quality. An attempt is made to relate density measurements with land quality, or its proxy, slope. The steep upland sites have slopes of 30 percent or higher. Density levels in this category vary from a low of less than 50 persons/sq. km. to a high of 250 persons/sq.km. Out of the 709 municipalities, 43 have high population density levels in the steep, mountain areas.

The critical upland municipalities, based on a combined density and slope criterion are listed in Table 3.14. Densities exceeding 500 persons/ sq. km. are in Pakil (Laguna), Bacolod Grande (Lanao del

Table 3.14 Most Critical Areas Using Population Density and Slope as Criteria: A Listing of Upland Municipalities with Very High Slope and Density Levels

Municipality	Province	Upland Population Density*
Pakil	Laguna	696
Bacolod Grande	Lanao del Sur	608
Tubod	Lanao del Norte	593
Minglanilla	Cebu	586
Naga	Cebu	573
Madalum	Lanao del Sur	571
Orani	Bataan	560
Cagayan de Oro	Misamis Oriental	550
Danao City	Cebu	530
Paete	Laguna	505
La Trinidad	Benguet	467
Pangil	Laguna	457
San Fernando	Cebu	453
Malilipot	Albay	433
Itogon	Benguet	423
Catigbian	Bohol	378
Siasi	Sulu	372
Porac	Pampanga	370
Carmen	Cebu	364
Digos	Davao del Sur	364
Carigara	Leyte	362
Salcedo	Ilocos Sur	354
Miag-ao	Iloilo	344
Plaridel	Misamis Occidental	325
Kinogitan	Misamis Oriental	325
Sorsogon	Sorsogon	321
Tugaya	Lanao del Sur	308
Laur	Nueva Ecija	308
Maasin	Southern Leyte	301
Toboso	Negros Occidental	295
Nasipit	Agusan del Norte	283
Salay	Misamis Oriental	276
Davao City	Davao del Sur	276
Sierra Bullones	Bohol	267
Binalbagan	Negros Occidental	266
Samboan	Cebu	264
Cabucgayan	Leyte	263
Solano	Nueva Vizcaya	262
Lila	Bohol	257
Gitagum	Misamis Oriental	257
Virac	Catanduanes	254
Tagaloan	Misamis Oriental	252

* Measured in terms of number of person per square kilometer.

Sur), Tabod (Lanao del Norte), Minglanilla (Cebu), Naga (Cebu), Madalum (Lanao del Sur), Orani (Bataan), Cagayan de Oro (Misamis Oriental), Danao City (Cebu), and Paete (Laguna).

Migration Profile

Population pressure in many of the upland municipalities is due to the heavy influx of migrants resulting in the rapid growth of population density and dependency levels. Table 3.22 provides some estimates of intraregional and interregional migration for upland populations 5 years old and above.

Migrants to upland areas from another province within the same region reached 114,262 in the period 1975 to 1980. Two out of every five intraregional migrants to upland, frontier areas are in the Northern and Southern Mindanao regions. A large number of migrants into the uplands of Ilocos come from other provinces in the same region.

Interregional migration throughout the country amounted to 271,212 in 1975 to 1980. The largest inflows are in Northern and Southern Mindanao and Southern Tagalog with a migration stream of 40,000 people.

For out-migration, the estimates include the natonal capital region (NCR), including Metro Manila. Outflows from NCR numbered 47,000 which is the largest number of migrants from one region. This high out-migration rate is attributed to the government's planned resettlement scheme and a number of studies have actually documented such movements (see, for example, Aguilar, 1982, for Dasmarinas, Cavite; Floro, 1980, for Pantabangan; and Calanog, 1977, for Angat).

Table 3.22 Migration to Upland Areas
1975-1980

Region	Intra-Regional	Inter-Regional		
	Migrants to Upland Areas from other Provinces of the same region	In-Migrants to Upland Areas from other regions	Total Out-migrants Lost to Upland Areas in other regions	**Net Migration**
I. Ilocos	14,657	14,204	18,017	-3,813
II. Cagayan	8,680	17,670	8,912	8,758
III. Central Luzon	5,855	17,792	15,775	2,017
IV. Southern Tagalog	11,361	40,216	12,101	28,115
V. Bicol	5,684	11,094	13,487	-2,393
VI. Western Visayas	6,644	9,951	23,934	-13,983
VII. Central Visayas	4,959	20,332	39,950	-19,618
VIII. Eastern Visayas	2,860	10,056	18,985	-8,929
IX. Western Mindanao	2,881	8,354	14,668	-6,314
X. Northern Mindanao	21,781	48,228	23,088	25,140
XI. Southern Mindanao	23,653	47,120	21,863	25,257
XII. Central Mindanao	5,247	26,195	16,147	10,048

Sources: Values were derived by the CPDS-PIDS Project Team from National Census and Statistics Office, 1980

Approximately 40,000 migrants from Central Visayas moved to other upland regions. The large outflows range from 20,000 to 25,000 persons. These outflows are mostly from Western Visayas, Northern Mindanao, and Southern Mindanao.

As a whole, interregional migration during the 5-year period is much larger than intraregional movements. This reflects the predominance of long-distance movements.

Interregional Migration. Estimates of the number of migrants by region of origin and destination are contained in Table 3.23. The largest inflow of 14,757 to Southern Tagalog came from Metro Manila (NCR). Another large flow is the 14,261 migrants settling in Northern Mindanao and the 11,134 persons moving into Southern Mindanao.

In general, the largest positive net migration to the uplands occurred in areas with comparatively low upland density levels in 1975. The low density figure is a sign of land availability. Southern Tagalog and Southern Mindanao, for example, received the largest net gain of upland migrants (from 25,000 to 27,500) in 1975 to 1980 but these regions were among the least dense. These regions also have moderate dependency levels which indicate their high potential for continued influx of new migrants in the future.

There are some regions with sparsely settled areas like Central Mindanao and Cagayan but their net in-migration streams are less than half the migrant populations of Southern Tagalog and Southern Mindanao. Peace and order conditions may account for the low attractiveness of these regions.

Table 3.23 Upland Inter-Regional Migrants, 1975 - 1980.

Region of Destination	Region of Origin												
	NCR	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
I. Ilocos	5,804	-	4,275	3,075	1,424	481	405	405	460	116	223	359	252
II. Cagayan	2,560	7,283	-	4,404	973	658	430	298	352	136	217	249	110
III. Central Luzon	4,975	3,636	709	-	2,610	1,195	950	819	1,993	226	271	282	126
IV. Southern Tagalog	14,757	2,920	1,254	4,408	-	7,522	3,571	1,533	2,152	671	535	608	285
V. Bicol	5,480	341	180	1,064	2,734	-	198	196	547	41	108	157	48
VI. Western Visayas	3,271	206	107	411	1,025	352	-	2,452	249	253	355	851	419
VII. Central Visayas	1,380	464	499	325	824	1,056	2,211	-	3,411	1,829	3,653	3,814	866
VIII. Eastern Visayas	3,455	173	94	323	551	526	282	2,068	-	205	997	1,181	201
IX. Western Mindanao	344	161	196	117	190	106	866	2,722	262	-	2163	620	697
X. Northern Mindanao	2,349	721	530	531	627	724	4,484	14,261	3,860	5,264	-	8,140	6,737
XI. Southern Mindanao	2,162	1,131	732	631	890	643	6,011	11,134	5,177	2,954	9,249	-	6,406
XII. Central Mindanao	823	981	336	486	343	224	4,526	4,062	522	2,973	5,317	5,602	-

Sources: Values were derived by the CPOS-PIDS Project Team from National Census and Statistics Office, 1980

Central Luzon is a high net migration region but it also has a significantly large counter stream resulting in a net gain of only 2,114 persons. The small land area of the uplands in Central Luzon was not able to absorb the new migrants. The Visayas regions are characteristically sending areas with a larger proportion of its population moving to other upland regions.

In general, the migration trends indicate the need for evaluating factors influencing migration. For example, development of upland areas (e.g. opening up of trails) may in fact encourage more in-migration and may result in accelerating the rate of degradation of the forest. There is also the immediate need to alleviate population pressure in the critical high density areas.

IV. UPLAND MIGRATION USING NATIONAL DATA

Three types of macro-migration functions are applied in the analysis of factors affecting migration using available national census data.[4] The three functions are: (1) the modified gravity model which evaluates the determinants of interregional migration flows, (2) the quasi push-pull model which explains the interprovincial movements, and (3) the pull model which analyzes population movements across municipal boundaries. The adoption of three types of econometric models, follows from the observation that different factors emerge as significant depending on the administrative boundaries from which movements occur. Some factors which may be important at the provincial level are less significant for the shorter intermunicipality movements. Also, since physical boundaries change over time (e.g., through annexation or separation), using different administrative levels of analysis would be more appropriate for policy making.

Sampling Procedure

sample size of 160 municipalities was selected from the 709 municipalities classified as upland, representing 22 percent of the total number of upland municipalities in the country. The sample municipalities were taken from regions with the five highest rural migrant populations. Southern Mindanao accounted for 32 percent of the sample municipalities, followed by Southern Tagalog (16 %), Northern Mindanao (15 %), Central Mindanao (15 %), and Western Visayas (15 %).

Factors Influencing Migration

Inter-area migration flows are analyzed in terms of the principal factors affecting actual population movements with respect to particular correlates. These factors can be classified into variables associated with the place of origin and place of destination. Population in the area of origin, for example, is expected to influence migration through its effect on transportation costs and marginal product of labor. Population in the area of destination, on the other hand, serves as a proxy for the size of the labor market where large populations tend to have a greater number and type of job opportunities.

Distance between origin and destination areas have normally been associated with variable costs of transfer. Distance also has a strong deterrent effect on migration -- with longer distance migration having higher physical and pyschic costs of movement. For the specific case of upland migration, and in the absence of middlemen who specialize in population transfers, stage migration is utilized to dampen the effect of distance on the decision to migrate. In the initial stage, an adult male or set of brothers makes the first move before the entire family is transferred. Since travelling is mostly by sea, the availability of ports of disembarkation and accessible transportation will have a close interaction with distance.

Correlates of origin and destination-related factors are divided into the personal characteristics of migrants and land-related factors. The usual variables associated with personal characteristics of migrants are education and nature of employment (occupation). Education is measured in terms of literacy rate and is treated as an "amenity" variable -- the more literate population tend to be highly mobile. Employment is measured as the ratio of gainful workers aged 15 years and above and number of workers in agriculture, fishery, and forestry.

The important land-related factors are availability of arable land and forest cover. Land availability is adjusted to reflect the average size of landholdings, site quality (productivity), and land tenure (ownership). Landsize and land quality are measurable, the latter being a function of general agroclimatic features, slope, and altitude. Such data are taken from topographic and slope maps. However, prior information on land tenure is difficult to obtain although it is expected that lands under BFD jurisdiction are more stable since they can be covered by long-term stewardship contracts. Non-BFD lands have a variety of tenure arrangements and can be less secure in land rights.

Forest cover includes all forested land and is sometimes interpreted as a substitute indicator for land suitability. Areas with dense forest cover tend to be more productive and stable compared to areas such as grasslands or inadequately stocked forest lands which have high erosion rates. Forest cover is also correlated with population density -- the high density areas having less forest cover due to increasing demands for conversion of forests into agricultural lands.

Results of Macro-Migration Models

In general, the results of all three types of macro-migration functions indicate that the availability of land in the uplands is a stronger determinant of migration than factors associated with the area of origin (e.g. economic hardship). Different factors emerge as significant depending on the administrative level in which inter-area movements are made. At the municipal level, land-related variables appeared more significant than demographic factors. In contrast, at the interprovincial level, demographic factors such as population and literacy rate at the area of destination were the significant explanatory variables. As expected, in the longer, interregional flows distance was the most important factor. In 1975 to 1980 the amount of interregional flows was higher at 2.9 percent than intraregional migration which was only 1.1 percent (Perez, 1985).

Interregional Migration. The migration function for interregional flows is linear in form and follows the specification of variables adopted in the gravity model. Two factors -- distance (DIST) and demographic size (POPi and POPj) -- account for a large proportion of the variability in migration behavior. It is based on the assumption that migrants move to the nearest place of destination given the least cost and effort (Lowry, 1966). The population in the potential destination area is correlated with the number of job opportunities and the expected income at destination. Knowledge about the conditions at the place of destination is highly correlated with population size and inversely with distance. In applying the gravity model to upland migration, adjustments are made to reflect population at destination figures only for the identified upland areas.

The results of the different measurements of the gravity model are contained in Table 4.5 in both linear and log-linear forms. Equation (1) is the standard specification of the gravity model. The close association of the three factors -- population at origin and destination and distance --with migration indicates the importance of these factors in determining migrant behavior. More than one-half (59 %) of the variation is explained by these 3 variables, with distance being negatively correlated with migration.

In Equations (2) to (4) variants of the gravity model are introduced. Equation (2) adds forest cover to test its interaction with the demographic variables. As the results in Appendix Table 15 indicate, forest cover is insignificant compared to the demographic variables but its inclusion improved the explanatory power of the

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Table 4.5 Regression Results of Gravity Model

Independent Variable	Dependent Variable MIG (1)	(2)	(3)	(4)	LMIG (1)	(2)	(3)
Constant Term	-1217.96	-1551.06	-1490.55	-706.377	-6.9834	-9.3377	-17.0510
POPi (origin '75)	0.0023**	0.0024**	0.0024**	0.0024**	0.2621	0.2746	0.3382
	(2.5214)	(2.4970)	(2.3214)	(2.5615)	(0.7383)	(0.8733)	
POPj (destination '80)	0.0026**	0.002**	0.0021**	0.0026**	0.9300**	0.6236	0.5678
	(2.5518)	(2.1183)	(2.1301)	(2.5616)	(2.2261)	(1.3371)	(1.1867)
DIST	-3.1339**	-3.2883**	-3.2888**	-3.0700**	-.3459	-0.4529*	-0.4658*
	(-2.6833)	(-2.6977)	(-2.6416)	(-2.5375)	(-1.4043)	(-1.7824)	(-1.8087)
Forest Cover		0.0200	0.0200	0.0273		0.6921	0.7443
		(0.5236)	(0.5236)	(0.7336)		(1.3853)	(1.4573)
Dependency Ratio			-0.6630				1.6021
			-(.0098)				(0.6837)
Percent Urban				-61.6976			
				(1.3548)			
R^2	0.59989	0.60591	0.60591	0.64194	0.43913	0.50038	0.51449
N	30	30	30	30	30	30	30
F	4.87228	3.62554	2.7844	3.3645	2.07048	2.08753	1.7280

Figures in parenthesis are T-values

* significant at 10% level

** significant at 5% level

equation to more than 60 percent of the variation in migration. Equation (3) includes dependency ratio but this did not contribute significantly to improving the estimates. In Equation (4) percent urban population is added and this turned out to be significant and negatively correlated with migration. This means that upland destination centers which have a larger percentage of its population classified as urban attract less migrants due to its effects on land availability: the more "urbanized" (or commercialized) the population, the less land available for occupation by new migrants.

The three log-linear functions hold less explanatory power than the linear form as shown in Table 4.3A&B. In the logarithmic form, population-at-origin variables are insignificant compared to the destination-related factors. This appears reasonable since the conditions at destination tend to be more important than factors associated with characteristics at the place of origin. Forest cover emerges as significant in equations (2) and (3). However, it is the distance variable which is consistently significant for all equations indicating the tremendous effects of distance on migration.

Interprovincial Migration Among the sample areas selected in this study, a majority of the out-migration provinces are in Central Visayas -- Cebu, Bohol, and Leyte. Destination areas are in the frontier provinces of Northern and Southern Mindanao, in particular, Misamis Oriental, Davao del Norte, Surigao del Sur, Lanao del Norte, and Bukidnon which have large tracts of its uplands still unoccupied.

Economic conditions at the place of destination have a greater influence on migration than the combined origin-related variables. Demographic measures of economic conditions relate to population size; the larger and heavily populated destination provinces having more livelihood opportunities and social amenities than the less populated areas.

Tables 4.3A&B presents the results of the estimates of the quasi push-pull models. The results of the equations indicate less explanatory power (at 45 %) than the gravity models, but more variables are included in the push-pull model. Education (EDUCj) and population density (PDj), for example, are significant with education having a stronger effect on migration. Higher educational levels (literacy rate) at the places of destination attract more migrants while higher population densities tend to attract less migrants.

Intermunicipality Migration. Population movements at the municipal level are sensitive to three factors -- population at the place of destination, land availability, and slope. The majority (61 %) of intermunicipal migration are long-distance movements. Information flows are thus important in reducing the risks associated with long distance transfers. Population in the area of destination (POPj) appeared as a strong determinant of inter-municipality migration -- that is, the greater the population at the place of destination, the higher the probability of establishing contacts and getting a job which are in turn direct inducements for migration.

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Table 4.3A Regression Results of Push-Pull Model

Independent Variable	Dependent Variable MIGST	
Constant Term	(1) 3517.72	(2) -3475.37
POPi	0.0001 (0.1129)	
POPj	0.00123 (1.3447(	.0011 (1.5966)
PDi	0.8208 (0.3842)	
PDj	-2.9136 (-1.6680)	-2.7063 (-1.9056)
EDUCj	57.0743 (2.5244)	56.8459 (2.8255)
ALj	-.0812 -(0.0974)	
DIST	-0.6488 (0.5152)	
EMPj	6.09269 (0.2770)	4.6497 (0.2456)
R^2	0.4586	.4492
N	50	50
F	1.3651	2.8440

Table 4.3B Regression Results of Push-Pull Model

Independent Variable	Dependent Variable MIGST			
	(3)	(4)	(5)	(6)
Constant Term	-2934.26	-2392.84	-3150.08	-3823.55
EDUCj	53.7846 (2.7187)	55.8935 (2.5203)	48.8449** (2.2711)	72.3441** (10.3364)
ALj		0.5305 (0.8111)	0.7586 (1.1229)	1.8485** (6.7143)
EMPj		-13.8767 -(0.7242)	-20.5612 -1.0117)	-6.4112 -(.7599)
Ltj			2.1606 (.2688)	
RINCj				6.45-07** (3.0370)
RINCi	8.99-07 (-0.8146)	7.305-07 (0.6450)		
EMPi	-16.2128 (-0.5810)			
EMPj			-20.5612 (1.0117)	
R^2	.3845	.4018	.4135	.9064
N	50	50	50	50
F	2.6600	2.1653	1.8151	51.8178

Figure in parenthesis are T-Values

* significant at 10 percent level

** significant at 5 percent level

Population at destination is the only demographic variable which is significant in the models. All other significant factors are land-related -- land area (LA), non-farm opportunities (NFOP), and slope (DSLP). The appearance of the land area variable is as expected. The availabity of non-farm employment, such as logging concessions (lumberjacks, haulers, logging operators), provide additional incentives for migration. The environmental factor, measured in terms of average slope, underscores the strong effect of environmental considerations in the choice of destination areas. The negative sign of the slope variable indicates the preference of migrants for less steep slopes in their selection of sites for homelots. The coefficient shows that a one percent increase in steepness (slope) results in a 3 percent decline in migrant population. (see table 4.1)

Limitations of Macro-Migration Models

The varying results of the macro-migration models are indicative of the complexity of deriving a complete model for migrant behavior using national data. The lack of previous national level estimates of upland migration does not allow meaningful camparison in the specification of variables. Also, by using national data, measurements of variables become extremely dependent on unadjusted secondary information (although its value lies in depicting the broad volume and direction of migration). Thus, the macro-migration extimates have to be supported by more detailed micro-level case studies.

Table 4.1 Regression Results of Pull Model

Independent Variable	Dependent Variable MIG			
	(1)	(2)	(3)	(4)
Constant Term	722.4860	442.7180	1587.2900	1485.90
POPJ	.0040 (10.2841)	-		
LA	.8949** (2.7453)	-	2.0687** (5.2334)	2.3739** (6.1737)
LUIA	1.6690 (0.5439)	-	7.3945* (1.8979)	-
DSLP	-320.9210** (3.1096)	-256.3260** (-2.5347)	-510.6590** (-3.8968)	-499.5890* (-3.4054)
DIST	-23.1108 (0.1286)	-	-	-
NFOP	-220.880* (-1.1111)	-	-537.7720** (-2.1192)	-
AL	-	1.9564** (12.1754)	-	-
R^2	.7467	.7022	.4986	.4550
n	160	160	60	60
F	32.1369	76.3735	12.8222	20.4978

Figures in parenthesis are T-values

* significant at 10 percent level

** significant at 5 percent level

V. MOUNT MAKILING CASE STUDY OF UPLAND MIGRATION

The case study presented in this project focuses on information that are not obtained in the national census -- migrant characteristics and profile, circumstances of movement, history of land settlement, production patterns, and methods of resource use. The case study site covers three villages in the Mount Makiling watershed surrounding the municipalities of Los Banos, Calamba, and Bay in Laguna province and the municipality of Sto. Tomas in nearby Batangas province. The total forested area is about 4,244 hectares, with elevations varying from 200 to 2,000 meters above sea level (Lantican, 1974).

Two of the villages selected in the case study -- Putho-Tuntungin and Lalakay -- are located in the northeast sections of the watershed where the terrain alternates between flat to rolling lands with a series of broad, radiating ridges at the sides. The other village, Putinglupa, is located in the opposite, western sections of the watershed. It is a quarry site of Supreme Aggregates, a construction firm that is presently inactive. The rich limestone and andesitic rock formations in the village had been lucrative resources for the firm since 1932. The village is accessible and can be reached by jeepney through a second-class road that is passable even in the wet season.

Settlement Pattern

The pattern of settlement in Mount Makiling can generally be described as a continuing upsurge of population. The crest of in-migration was reached in the period 1960 to 1970 with a yearly increase in population of 8.4 percent in Los Baños and 7.5 percent in Calamba. The extraordinarily large influx of migrants occurred in the years 1960 to 1963 where the prospect of owning rich, fertile lands was the primary motivation for moving.

When the Makiling watershed was declared a forest reserve for the College of Forestry in 1960, a resettlement program was enforced resulting in the rapid decline of population, and possibly, substantial reductions in the rate of in-migration into the area (Lantican, 1974). The influx of new migrants picked up only in 1978 to 1980, with resettled families returning to their old homelots in Mount Makiling and with a new group of migrants coming in as farm laborers.

A significantly large proportion of migrants in the case study areas were born in the Southern Tagalog region, with a majority (42 %) coming from the towns of Malvar, Sto. Tomas, and Tanauan in nearby Batangas province. Over one-half of migrants originated from other towns of Batangas, and from the provinces of Cavite and Rizal

Migrants from northern Luzon are mostly from the provinces of La Union and Pangasinan. Migrants from Bicol represent 15 percent of the sample surveyed, with birthplaces in Albay and Camarines Sur. Those migrants coming from the Visayas (15 %) originated from Cebu, Samar, and Leyte.

Demographic Characteristics

Age-Sex. The average age of migrants interviewed is 48 years, with at least three male members per household and the average household size being six. At the time of departure, migrants were young adults, the median age being 20 years (see Table 5.5). The population above 55 years old is less than 5 percent of the total population, while the number of persons less than 2 years comprised 15 to 20 percent.

At the time of the survey, there was an almost even sex ratio of 103 males for every 100 females. The sex ratio was a little skewed in Putinglupa being slightly female dominant (97 males for every 100 females).

Marriage and Kinship Ties. Approximately one-half of all migrants who moved into Mount Makiling in the period 1960 to 1970 were married, the rest being young male adults. As movements progressed through the years, the proportion of unmarried migrants declined substantially from 31.5 percent in 1960 to 27.8 percent in 1980.

Among single migrants who moved into the Mount Makiling area and married after a few years, about 18 percent were married to persons living in the same municipality. A higher proportion of 54 percent married persons living in another municipality while a small number of two migrants (4 %) returned to their places of origin to get married. However, in the selection of marriage partners, an overwhelming 83 percent of respondents chose spouses from their own villages.

The Migration Process

In the late 19th and early 20th centuries, Laguna, Batangas, and Quezon were "frontier" provinces much as Davao and Cotabato were in the early 1960s. Even as early as 1918, individuals and households from Northern Luzon, Visayas, and Bicol have been constantly alerted to new job opportunities in the Mount Makiling area. The migrants who came to Mount Makiling arrived in groups of 2 to 4 families and were highly mobile.

About 3 or 4 residence shifts in the domestic cycle of migrant families in Mount Makiling were not uncommon, especially in the early years of pioneer settlement. These shifts involved a change in residence from one village to another, even to neighboring barrios, or to neighboring towns where close relatives reside. Over 42 percent of the sample respondents reported changing residence within the municipality over a period of 5 to 10 years after arrival, and a significant 17.5 percent moved residence outside of the municipality but returned after a few years.

Ease of Migration Household transfers are facilitated by the help of many relatives and friends. The forms of help include: (1) financial assistance to cover part of the costs of transfer, (2) labor services during the actual transfer itself, and (3) support services at the time of arrival. A significant 21 percent of the sample received financial assistance from relatives in their places of origin although a good 12 percent received subsidies from the firm (quarry) recruiting their services.

A majority (59 %) of the movements to Mount Makiling are done in batches of 2 to 4 families, although a significant 38 percent engaged in a two-stage movement, with husbands or sets of brothers making the initial move before the entire family is transferred. Cooperative labor is sought in the dismantling of houses and resources are pooled so that a bullcart can be purchased. At the time of arrival, relatives and friends are expected to provide full-time support, and the labor services last until the house is finally built. Aside from these services, relatives make available a piece of land to be cultivated on a temporary basis until the new migrant can stake out land for his own use. In most cases the search for open lands takes up to a year, but the arrangement is extended to help the new migrant family survive.

With respect to the time of movement, Table 5.14 provides a classification of migrants by distance travelled and year of transfer. The near-distance migrants are from the towns of Tanauan and Sto. Tomas, which is less than 50 kms. from the centers of settlement in Mount Makiling. The majority of population movements from these nearby towns occurred in the early pre-war years of 1940 to 1941, although some accounts of families moving to the area in the early 1900s have been documented. A significant 22 percent of the sample transferred residence before the war.

Long-distance migrants increased in the postwar years and accelerated after 1960. The influx of migrants progressively grew in the period 1970 to 1975 at an average of about 100 families per

Table 5.14 Sample Migrant Population in Makiling Classified By Distance of Movement and Period of Migration (n = 40)

Distance of Movement *	Total	Period of Migration			
		Pre-War	1941-45	1948-59	1960-1980
Near	22	4	6	3	5
Medium Distance	9	1		6	2
Far	13	1	1	8	3
Total	40	6	7	17	10

* defined in terms of travel time, near = less than one day; medium = 1-3 days; far = more than 3 days.

year. These later-period migrants originated largely from the Bicol region.

More than half (55 %) of the respondents used land transportation for making their move, such as jeepneys and buses. A significant 27.5 percent, however, travelled on foot or on horse-drawn wagons or bullcarts. Average duration of travel was 2 to 3 days.

The least cost method of travel, of course, is walking or the use of non-motorized bullcarts and wagons. A significant 22.5 percent reported having zero expenses except the food that they had stored for the trip. Another 17.5 percent report spending from ₱1.00 to ₱ 30.00 for the transfer. Such low costs are in contrast to those using multiple modes of travel, averaging about ₱ 80.00 per move.

In general households migrated an average of 3.5 times, the mean distance travelled being 56 kilometers per move. A respondent was found to have moved 13 times since birth, covering 7 provinces and 3 regions in the country.

An overwhelming 65 percent of respondents learned about the area of destination from relatives and friends, although a significant 30 percent relied solely on personal knowledge. A small 5 percent learned about Mount Makiling from the radio (media).

Socio-economic Characteristics

For the three survey sites, there were marked changes observed in the socio-economic status of migrants after movement as shown in the different livelihood, ownership, and other income sources of migrants. Changes in social status have been significant as a result of acquiring larger landholdings upon transfer.

Livelihood and Income. A majority of the respondents surveyed (74 %) engage in both susbsistence and cash crop farming as their major sources of income. A significant 25 percent of respondents, however, depend solely on cash and contract crop farming arrangements. The supplementary income sources are logging and wood gathering (8 %) although a good 45 percent have household members who engage in non-farm work.

Average household income for all occupations is ₱ 7,428.87 per year, and with an average household size of 5 per capita annual income becomes ₱1,485.77. This level of per capita income is slightly higher than the ₱1,420 average annual income for families belonging to the bottom 30 percent income bracket, but it is definitely below the poverty threshold based on minimum food and nutritional requirements (Abrera, 1976; Tan and Holazo, 1978; Quisumbing and Cruz, 1986).

Tenure. In general, there are four dominant tenurial arrangements as perceived by respondents. These are owner, tenant, lessee, and free user. Owners are those with legitimate claims to the land. The claim may be in the form of a certificate of Land Title, or in some cases, as receipts from payment of land taxes. A small proportion of 7.5 percent of respondents are classified as owners.

There are two types of tenancy arrangements that resemble conditions of share tenancy in the lowlands. The first case involves an equal sharing of harvest between so-called owners and permanently hired workers, now considered tenants. These permanent workers are new migrants given a piece of homelot in exchange for long-term service and 50 percent share of harvest.

The second type of tenurial arrangement is composed of new migrant relatives who are given parcels of land to cultivate on a temporary basis, and on an equal sharing scheme. The 30 percent classified as lessees are of two types -- those with or without contracts. In general, lessees pay a fixed rental for the use of the land, which is normally between 15 to 25 percent of a normal harvest. In a majority (53 %) of the lease arrangements reported rent payments are non-monetized.

One-half of respondents are "free users" of the land. Because they have no rights, legal or otherwise, to own the land, an informal hierarchy of "use" has emerged locally.

The hierarchy of use is based on three interpretations of "free use." The first equates use with number of years occupying the land as the sole criterion for establishing a right to claim the land. Migrants who have stayed in the land prior to 1960 are considered "owners," while those who came after 1960 are merely called "claimants or occupants." Migrants who have recently arrived (1980s) are labelled "squatters."

The second type of "free user" follows the government's stewardship concept, with the user having a "legal right" to the land for a long-term period (25 years). The third interpretation is to treat the land as a "common" resource that can be used freely by a group of families. One is entitled to the fruits of the land if one provides labor and shares in the cost of inputs.

Table 5.10 presents a distribution of land size and income by tenure classification. Note that a majority of "free users" tend to occupy large landholdings, while tenants and lessees have comparatively smaller lands. In terms of income earned, however, the opposite trend can be observed where owners tended to have higher incomes than free users. Tenants and lessees have the smallest incomes, with 80 percent and 50 percent having incomes less than ₱5,000 per year, respectively, for both groups.

Tenure and Land Distribution. An examination of equitability of land distribution is provided by comparing the Lorenz curves for two sets of landholdings -- (1) lands in the entire sample villages and (2) lands found only within the forest zone. Lands in the second category (forest zone) are landholdings where the predominant tenure arrangement is "free use," and where access to land is less restricted than in the foothills. The results of the estimates of land ditribution are presented in Table 5.17 and Figure 5.11.

The Lorenz curves indicate the proportion of the population holding a corresponding percentage of land area. The diagonal line shows perfect equality of ownership so that along the line, a given percent of the population owns the same percent of the land.

Land distribution for the entire area is generally unequal, with a relatively high Gini ratio of 0.697. As shown in Table 5.17, around 12.5 percent of households own 66.7 percent of the land while

Table 5.10 Distribution of Income and Landsize By Tenure Status (n = 40)

	Tenure Status				
	Owner	Tenant	Rent/ Lease	Free Use	Total
Landsize (hectares)		Percentage Distribution			
Less than 1 ha.		40.0	58.3	25.0	35.0
1.0 - 1.9		20.0	25.0	20.0	20.0
2.0 - 2.9	33.3	20.0	16.7		10.0
3.0 - 3.9	33.3			5.0	5.0
4.0 - 4.9	33.3	20.0		20.0	15.0
5.0 and above				30.0	15.0
Total	99.9	100.0	100.0	100.0	100.0
Average Annual Income (₱)		Percentage Distribution			
Less than ₱ 5,000	33.3	80.0	41.7	50.0	50.0
₱ 5,000 - 7,999			33.3	30.0	25.0
₱ 8,000 - 10,999		20.0	8.3	5.0	7.5
₱ 11,000 - 20,999			8.3	10.0	7.5
₱ 21,000 - 30,000	66.6		8.3		7.5
More than ₱30,000				5.0	2.5
Total	99.9	100.0	99.9	100.0	100.0
Number of Observations	3 (7.5%)	5 (12.5%)	12 (30.0%)	20 (50.0%)	40 (100%)

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CORRECTIONS:

1.	page 5	paragraph 2	-	In the third study
2.	page 7	paragraph 2	-	within
3.	page 15	paragraph 2	-	in Figure 1.1 erase then put below
4.	page 17	paragraph 5	-	national
5.	page 21	paragraph 1	-	psychic
6.	page 23	paragraph 3	-	Appendix Table 4.5 erase then put Table 4.5
7.	page 29	paragraph 1	-	see Table 5.5 erase
8.	page 37	paragraph 2	-	synchronized
9.	page 41	paragraph 2	-	project
10.	page 45	paragraph 1	-	realistic
11.	page 47	paragraph 1	-	of communally
12.	page 5b Step 1		-	100 m.
13.	page 6c Step 4		-	zone
14.	page 17a		-	Ilocos Region In-Migrants - 17,279 Total Out-Migrants - -738

Table 5.17 Gini Ratio of Concentration Based on Number of Households and Size of Landholdings (n = 40)

Farm Size (ha.)	Number of Households	Distribution of Households	Cumulative Percentage Distribution of Households	Total Land Area	Percent Distribution of Land Area	Cumulative Percent Distribution of Land Area
Less than 1.0	14.0	35.0	35.0	23.8	2.20	2.20
1.0 - 1.9	8.0	20.0	55.0	58.7	5.44	7.64
2.0 - 2.9	7.0	17.5	72.5	67.0	6.21	13.85
3.0 - 4.9	60	15.0	87.5	209.5	19.42	33.27
More than 5.0	50	12.5	100.0	720.0	66.73	100.0
TOTAL	400			1,079.01		

Gini Ratio:

Entire Area = 0.697
Forest Area = 0.244

Ratio of Highest to Lowest Fifth = 30.33

Note: Format of table adopted from Ledesma (1982)

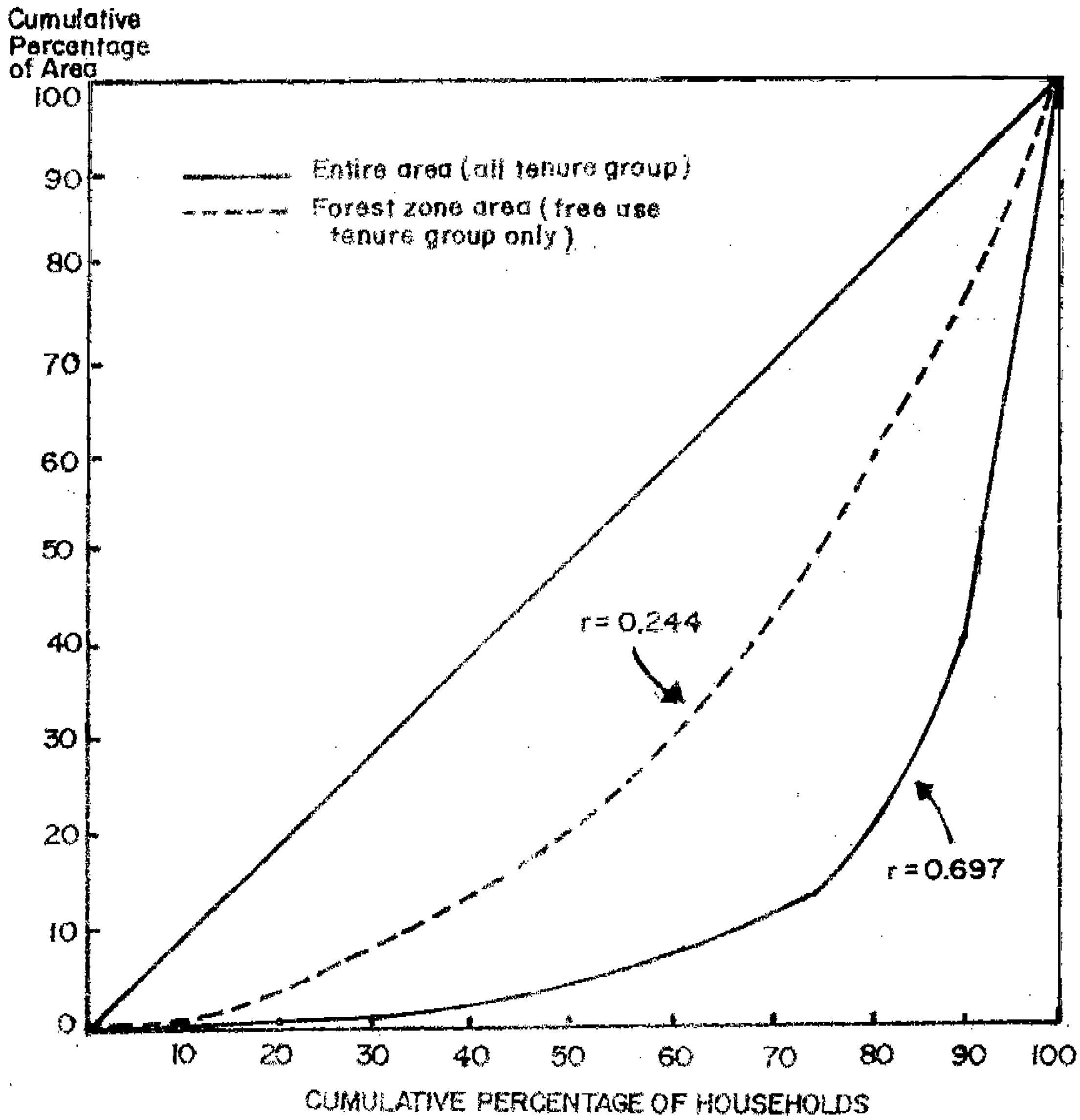

Figure 5.11 Lorenz Curves Indicating Distribution of Landholdings for Entire Area and for Forest Zone Area.

55 percent of the population occupy only 7.6 percent of total land area.

In contrast, land distribution in the forest zone is more equitable. The dominant tenurial arrangement in this area is "free use," but not open access, as informal rules of controlling membership in the community exist. The distribution improves with 50 percent of the population occupying 37 percent of lands in the forest zone. The Gini ratio of 0.244 is now comparable to Ledesma's (1982). Curve A which represents the pattern of landownership in lowland rice-growing villages if full-scale land reform were implemented.

The implications of these findings do not lead us to suggest that all tenure in the uplands be converted to "free use." Rather, the process of land acquisition and control must first be analyzed.

<u>Upland Crop Production</u>.

Agriculture in the uplands of Mount Makiling is characterized by a diverse cropping pattern. There are 42 observed crop mixes with an average of 4 types of crops planted in a piece of land.

Figure 5.5 indicates the four major annuals and perennials planted. In Putho-Tuntungin, the planting of rice in 30 percent of fields is second only to sweet potato (37 %). Gabi is grown in 28 percent of fields. Lalakay and Putinglupa grow sweet potato in 30 percent and 42 percent, respectively, of lands. Perennials are found mostly in the upper slopes but many fruit trees such as lanzones and jackfruit are already grown in the nearby hilly sideslopes.

Normally fields are cleared and burned in the months of March to May when the lands are relatively dry. Cutting of grass and other

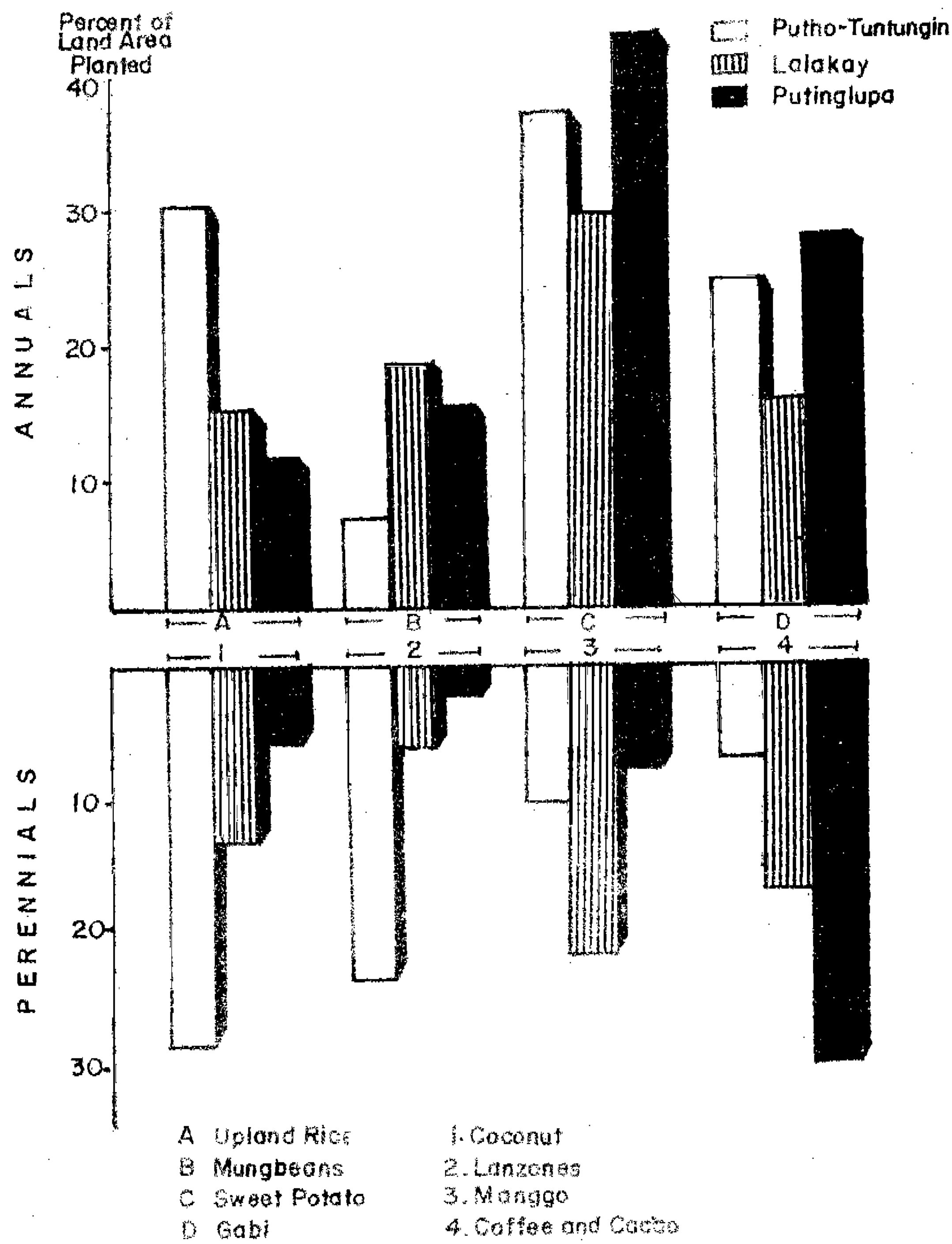

Figure 55. Major Crops Grown in the Case-Study Sites (n = 40)

excess vegetation is done twice or thrice before a burn and this takes about 2 to 3 weeks to complete if the standing vegetation is dense. In general, however, fields are never completely cleared of trees or grass.

Figure 5.6 shows a syncronized cropping calendar. The peak labor periods coincide with the dry months which are suitable for clearing and burning in March and April and at the start of the early rains in April till May. Labor peaks occur around this period, but there is a rise in labor activity around November where some fields cultivate a second rice or corn crop. As the crop calendars indicate, when the full area to be covered by the crop is reached, labor use also peaks. Hired labor appears to be the dominant type of labor for all three sites.

Labor Allocation. Farm work is essentially household labor but some hired and exchange labor are used in some fields. Farming activities constitute 86 percent of the total labor allocation of the working population in the three sites and 74 percent of family labor. Of the 25 hours per week spent in the cultivation of a variety of crops, about two-thirds (or 17 hours) are done on their fields. The other third (8 hours) is spent for work in other farms or in off-farm work (4 hours).

Table 5.12 provides a breakdown of labor allocation by farming operation for family, hired, and exchange labor. The most time consuming activities are harvesting, land preparation, and clearing. Overall, an average of 266 mandays per year for each worker is spent for farming operations.

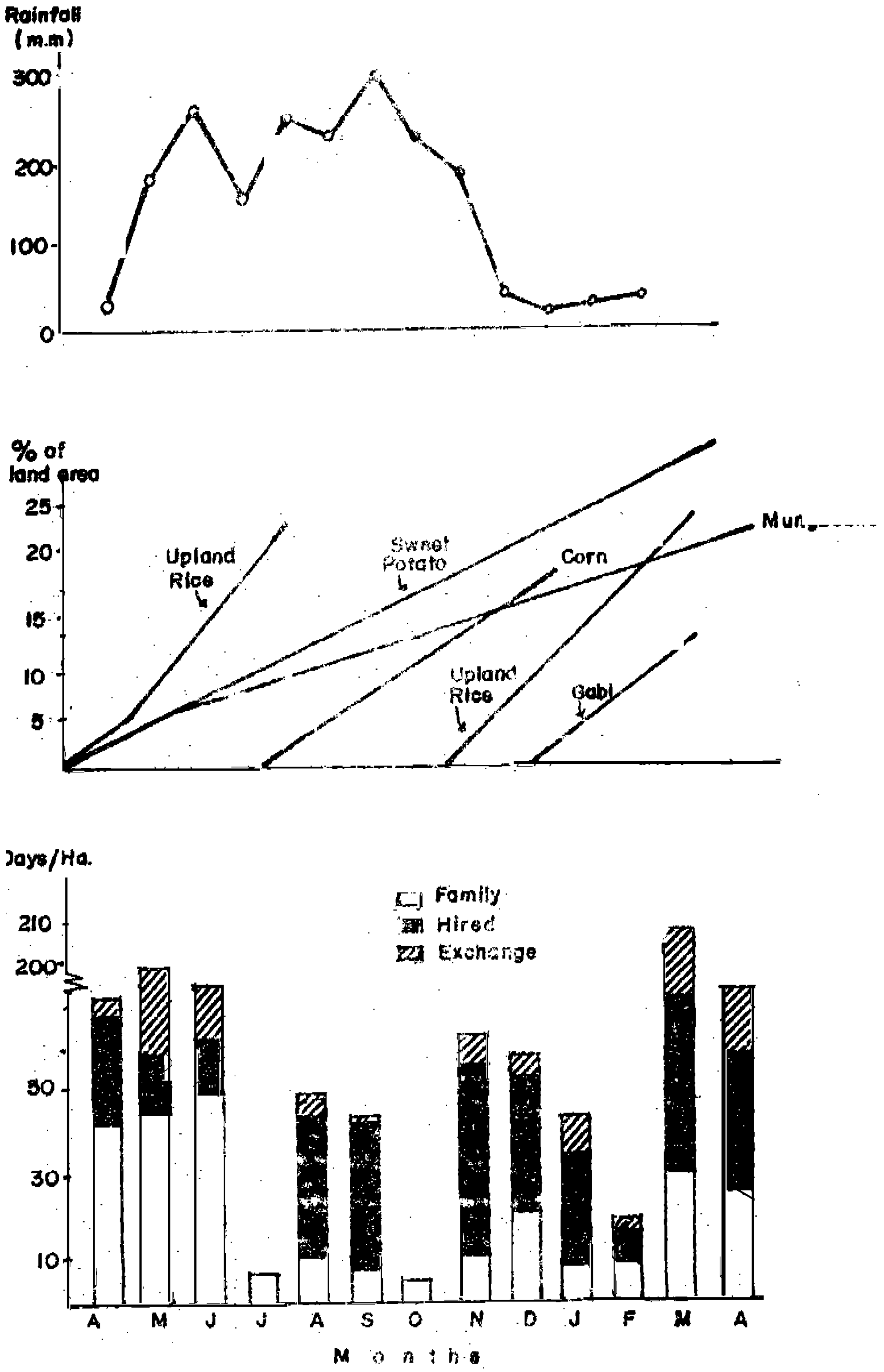

Figure 5.6 Synchronized Cropping Calendar, 1985-86 L., Season (n=40)

Table 5.12 Labor Allocation Per Hectare By Farming Operation and Type of Labor 1985-86 Dry Season (n = 40)

Farming Operation	Family Labor		Hired: Wage or Share		Hired: Contrata		Exchange Labor		TOTAL
	Days/ ha.	%	Days/ ha.	%	Days/ ha.	%	Days/ ha.	%	Days/ ha.
Land clearing (Cutting and Burning)	40.6	20 (44)	31.0	36 (34)	12.0	5 (13)	8.0	5 (9)	91.6 (100)
Land and Seedbed Preparation									
Plowing	71.1	35 (39)	8.5	10 (5)	36.0	15 (20)	65.0	40 (36)	180.6 (100)
Seedbed Preparation	4.0	2 (100)	-	-	-	-	-	-	4.0 (100)
Plant Care									
Planting/ Broadcasting	13.1	6 (21)	-	-	48.3	20 (79)	-	-	61.4 (100)
Fertilizing/ Water Control	4.0	2 (100)	-	-	-	-	-	-	4.0 (100)
Weeding	6.0	3 (100)	-	-	-	-	-	-	6.0 (100)
Harvest/Post Harvest									
Harvesting	30.4	15 (15)	43.0	50 (20)	72.5	30 (34)	65.0	40 (31)	210.9 (100)
Threshing/ Cleaning	30.0	15 (41)	-	-	25.0 (35)	10	17.4	10 (24)	72.4 (100)
Hauling	4.0	2 (6)	3.4	4 (5)	48.0	20 (76)	8.0	5 (13)	63.4 (100)
TOTAL	203.2	100	85.9	100	241.8	100	163.4	100	694.3

NOTE: Numbers in parenthesis are row percentages

Production-Income Model

The earlier work of Cruz, et al. (1985) on upland corn production indicates that landsize was insignificant relative to site quality factors and that diversification tended to reduce output but was beneficial for soil conservation. Production is primarily household labor activity, with labor availability becoming more constraining than land.

Figure 5.10 contains a summary of the factors included in the model. Table 5.16 presents the results of the regression estimates using three sets of equations. The first set excludes all the land-based variables (V2, V8, V10). In Equation (2), the land variables are included but the credit (V3) and percent output sold (V7) variables were removed. Equation (3) deletes the variables presence of relatives (V4) and presence of supplementary income (V6). The last equation merely deletes some of the binary (dummy) variables.

In general, the coefficients of all three equations are different from zero significant at the 5 percent level. The results indicate that economic dependency is significant, reinforcing the belief that labor, rather than land, is the constraining factor in the uplands. The land variable appeared significant at 10 percent in Equation (3) but it contributes less than 30 percent of variations in income.

Site quality is statistically significant in equations (1) and (3), but the values of the coefficients are much lower than anticipated. In the estimates of Cruz, et al. (1985), site

Figure 5.10 An Exploratory Model for Migration Consequences

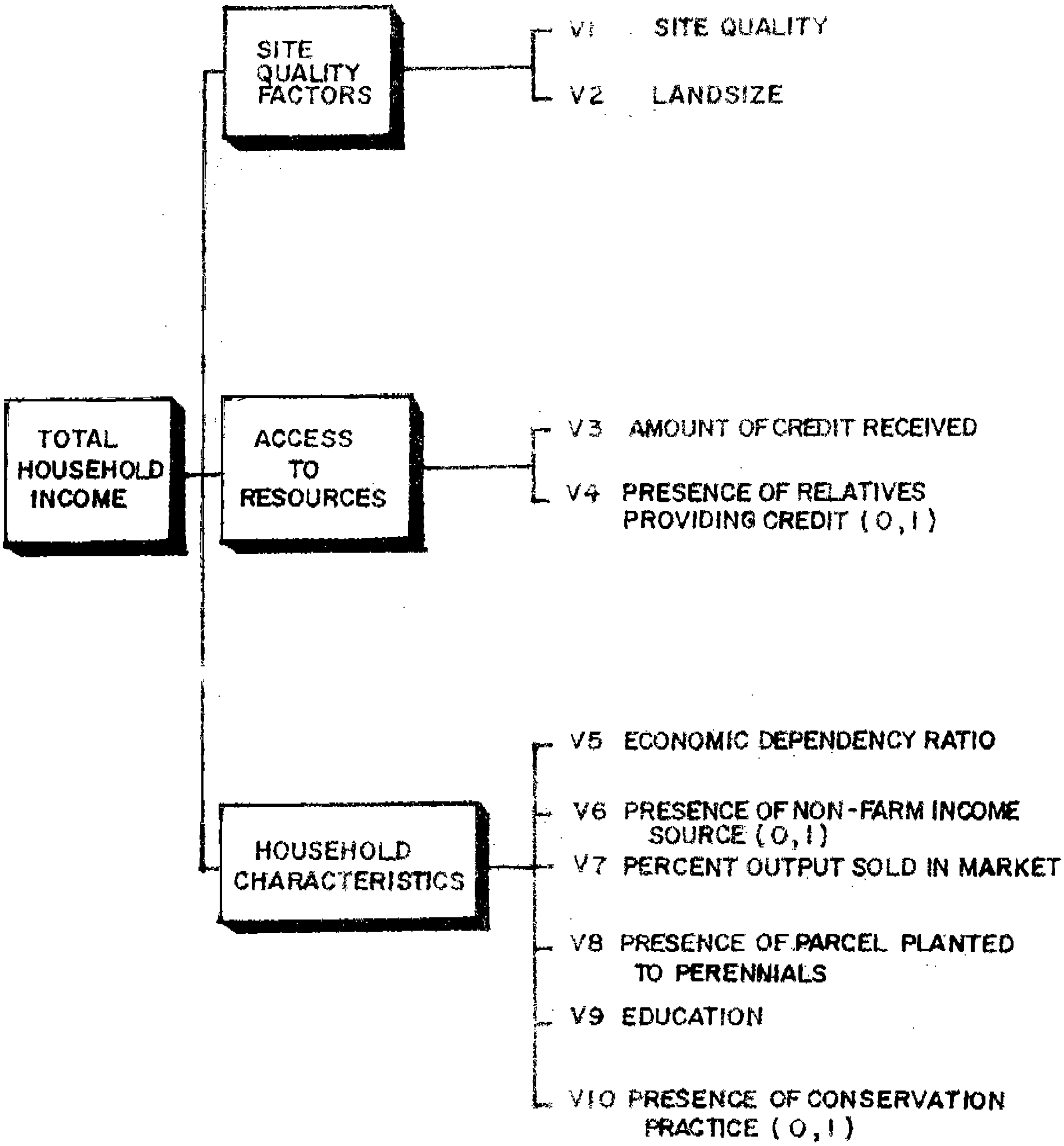

Table 5.16 Results of Exploratory Model on Migration Consequences on Income

Independent Variables	Coefficient (t-values) 1/ 1	2	3	Mean (Standard Deviation)
CONSTANT	756.036	803.975	793.137	7,429 (7,286)
V 1 Site Quality 2/	0.2043 (2.0713)*	0.4056 (1.3771)	0.0924 (1.9370)**	
V 2 Landsize		0.6952 (0.3579)	0.2713 (1.9768)**	3.22 (5.66)
V 3 Amount of Credit Received	-0.1965 (-1.9745)**		-0.0111 (1.9765)**	3,388 (648)
V 4 Presence of Relatives Providing Credit 3/	0.5536 (0.2263)	0.1275 (2.6749)*		
V 5 Economic Dependency Ratio	0.0161 (2.0299)*	0.1355 (2.2333)*	0.0098 (2.8607)*	2.57 (0.82)
V 6 Presence of Non-Farm Income Source 3/	0.1862 (1.9834)**	0.5919 (2.7109)*		
V 7 Percent Output Sold in Market	0.1866 (2.6241)*		0.1352 (2.1765)*	17.21 (6.21)
V 8 Presence of Parcel Planted to Perennials 3/		0.029 (0.5713)	0.2744 (1.9449)**	
V 9 Education	0.0756 (0.6243)	0.1654 (1.9678)**	0.0937 (1.1765)	5.40 (3.69)
V10 Presence of Conservation Practice 3/		-0.0128 (-2.0136)*	-0.1398 (-2.0807)**	
R-square value	0.614	0.532	0.669	
F-value	7.11	6.38	7.63	

1. sample size n = 40; asterisks indicate significant at 0.05 (*) an 0.10 (**) level
2. site quality is measured by scores 1 = Lalakay, 2 = Putho-Tuntungin 3 = Putinglupa
3. binary (dummy) variables taking values of zero or one.

quality differences explained 30 to 40 percent of the variations in yield.

An explanation is needed regarding credit (V3), which is significant at 10 percent for equations (1) and (3). First, the sign is negative, when in fact the expectation was that having credit reflected high access positions. On the other hand, the presence of a large amount of loans may in fact serve to reduce overall income itself. The second observation has to do with the very low values of its coefficients, indicating that having credit may not actually be as critical as expected. The wide range of kinship and other social ties may more than offset the non-availability of credit sources.

Most of the binary (dummy) variables are significant. The presence of relatives (V4) is positive and significant as expected. Presence of perennials (V8) and presence of conservation practices (V10) are both significant in equation (3), indicating the strong effects of land-related variables. The negative sign of V10 shows that the adoption of conservation may be too costly for a household to shoulder alone so that some form of subsidy is needed to augment the household's loss of income. Lastly, education (V9) appeared significant but with a low coefficient of 0.1654, indicating the pr'iarily neutral effect of education on income.

To summarize, the important determinants of income of migrants are: (1) acquisition of lands of good quality, (2) access to credit for purchase of inputs, (3) increased commercialization of farming activities, (4) promotion of diversified cropping patterns, and (5) planting of perennials. The presence of relatives and friends in the area has a positive effect on income. The negative sign for presence of conservation practices (V10) supports the argument for increased government subsidy for soil conservation.

VI. SUMMARY AND POLICY IMPLICATIONS

Our analysis of the 1980 census of population show what we have suspected all the while -- that substantial demographic stress exists in our forest resources. Around 30 percent of the total Philippine population, or 14.4 million people in 1980, reside in communities classified as upland. The annual growth rate of upland population is 2.5 percent. If such rates continue, The upland population will double in a span of only 27 years.

Migration accounts for the bulk of population growth. From 1975 to 1980, a total of 114,262 migrants moved to upland municipalities within the same region while 271,212 moved outside the region. The largest migration streams of more than 40,000 persons are found in the regions of northern and southern Mindanao and Southern Tagalog. A significantly large number of migrants (greater than 47,000) also originated from Metro Manila with planned colonization and resettlement schemes accounting for the majority of these movements.

These population estimates are based on the definition of upland as adopted by the BFD -- that is, marginal lands with 18 percent slope or higher, lying at high elevations, and with lands having hilly to mountainous terrain (BFD, 1982). Using this definition, a total of 302 municipalities in 60 provinces were classified as upland, representing 48 percent of the entire listing of municipalities in the country.

With respect to land area, 55.3 percent or 16.6 million hectares of the total land area of the country are classified as upland, 13.4 million hectares or 80.7 percent of which are alienable and disposable (A and D). Of the remaining 3.2 million hectares forest reserve, only 1.0 million or 31.2 percent are commercial old growth forest. The 4.2 million hectares inadequately stocked, degraded forest lands experience an annual erosion rate of 20 to 40 tons/hectare (Revilla, 1985).

Determinants of Upland Movements

Two approaches were adopted in this proojeet to describe the relevant environmental and socio-economic correlates of upland migration. The first approach (presented in Part IV) uses macro-migration functions based on national level data and disaggregated by region, province, and municipality.

In general, the macro-migration regression estimates indicate the importance of land-related factors motivating migration at the municipality level and the dominance of demographic factors such as population density and education at the interprovincial level. For all macro-migration models, the characteristics at destination turned out to be more significant determinants of migration than conditions at the place of origin.

The second approach (in Part V) focuses on conditions of migration at the micro, village level. A case study of 3 villages in Mount Makiling, Laguna, provided information on migrants' motives for moving, circumstances of migration, and socio-economic characteristics of migrants. A micro model using production-income as the dependent variable on a set of ecological and socio-economic determinants was tested. The results indicate crop diversification and site quality as important factors behind income. Social ties and education were also significant but with much lower effects on household income compared to the land-related variables.

A profile of production arrangements was presented to illustrate the migrant's adjustment process. In general, production sharing systems were reinforced by the presence of a kinship network and by the enforcement of informal rules on access to resources. Land with tenure classified as "free use," for example, tended to have greater social ties and more equitable land distribution than the lands in the lower areas where arrangements are mostly of the owner or tenant types.

Policy Implications

The population estimates show that even if the Program for Forest Ecosystem Management (PROFEM) phases I and II and the PROFEM-Forests for Livelihood (PROFEM-FL) were expanded and fully implemented, its impact would have been limited to those areas which were surveyed by the BFD. In 1980, these areas covered a total population of only 800,000 persons, or 5.6 percent of the entire population in the uplands. Such a small coverage becomes even more restricted when viewed in the light of total area affected by the program. For 1980, land area program covered in the Integrated Social Forestry (ISF) program, for example, was 100,783 sq. km. or less than 2 percent of the total land area in the uplands. Surprisingly, a significant 23 percent of the ISF project areas are in alienable and disposable (A and D) lands which are administratively not directly under BFD control.

The pervasive presence of migrants in both A and D and interior forest lands has also served to erase the myth of forest lands as being occupied only by tribal, shifting cultivators. Major changes have, in fact, occured in the character of forest communities, from relatively, homogenous tribes of swiddeners, hunters and gatherers to widespread diversification of population. This is partly a consequence of the large influx of lowland migrants and partly of policies dealing with forest occupancy and management. Programs for reforestation and development have been accompanied by a growing demand for more secure land rights among the new migrants, which may be in the form of longer term stewardship with the government . This has also led to the need for greater access to conservation technologies that improve productivity.

However, given the vast land area to be protected, coupled with the difficulty of moving from one area to another, the problems of forest protection are more in the nature of enforcement and regulation rather than policy. The laws governing forest lands, for example, are clear -- P.D.705 section 15 stipulates that lands in the public domain, 18 percent slope or over, cannot be classified as alienable or disposable (A and D). While the law is explicit, there remains 7.025 million hectares of unclassified land, and it may take at least

20 years before these land are finally surveyed and classified (BFD, 1982; Revilla, 1985).

This brings us to the problem of dealing with the growing population of upland dwellers. A simplified framework for dealing with these problems is provided in Figure 6.1 in terms of the interaction of four components in upland development. These components are: (1) granting of land rights, (2) subsidizing sustainable production technologies, (3) decentralizing enforcement of forest protection policies, and (4) encouraging local participation in decision-making. Several alternative courses of action are presented below as suggestive of possible areas for improvement in both planning and implementation of upland development.

Land Rights. The evidence presented in this report indicates that not all groups in the uplands have benefitted equally from government programs for upland development. Indeed, the basis for unequal distribution of benefits lie in the stratification of the population and the resulting lack of access of the lower sub-groups in upland society (e.g., the illegal occupants). Forest occupancy policies have not addressed the existing differences between the so-called "legal" vs. "illegal" occupants of the forest.

Land rights in the forest environment cannot be categorized either as public or private. The nature of the resource itself makes its ownership one of common property -- that is, forest land occupancy requires tha users follow existing rules of access to resources. Thus, rather than using a public vs. private dichotomy,

UPLAND DEVELOPMENT GOAL	STRATEGY FOR POLICY	INSTRUMENTS FOR IMPLEMENTATION
Increase Productivity Land Security Reduce Land Conflicts	GRANTING OF LAND RIGHTS	Longer-term Lease Contracts Enforcement of Exclusion Privileges
Reduce Forest Degradation Encourage local initiatives for soil conservation	SUBSIDIZING SUSTAINABLE PRODUCTION TECHNOLOGIES	Granting of Conservation Related Subsidies Providing Credit for soil conservation
Improve Monitoring of Forest Use	DECENTRALIZING ENFORCEMENT OF FOREST PROTECTION	Creation of Village Forestry Program Units
Make Upland Dwellers more responsive to development programs	ENCOURAGING LOCAL PARTICIPATION	Develop Local Institutions Use Existing NGOs in the area

Figure 6.1 Factors in Upland Development

it may be more realistice to distinguish occupants in terms of location -- occupants within the forest zone vs. occupants of A and D lands. In the former case, it is the direct administrative responsibility of BFD to control the activities of forest dwellers. On the other hand, occupants of uplands classified as A and D should be the concern of the Ministry of Agriculture and Food (MAF).

The heavy influx of migrants into forest reserves support a common property tenurial framework where lands now cease to be purely public domain. Even in A and D lands, private property arrangements have become unatenable given the compelling need to cooperate in cutting and burning of trees, and in the building of trails and water wells.

The continuing problems of low agricultural productivity and destructive farming, despite the issuance of exclusive lease arrangements, indicate that property rights must be extremely secure to encourage higher productivity and more sustainable cultivation practices. It is possible the continuing insecurity of tenure may lie in the duration granted by the lease (normally 25 years) or in the nature of the lease contract itself (e.g., its non-transferrability).

Sustainable Production. The forest produces private goods in the form of fuelwood, fodder, logs, and timber. On the other hand, the entire forest itself is a public good with off-site effects so that it needs to be protected The dilemma for policy is how to place a value on the public nature of forest use and how to arrive at some measure of "protection cost" which needs to be shared by loggers, fuelwood users, and upland farmers.

The standard solution to the public goods problem is for government to intervene through imposition of taxes and quotas on forest use and to channel income earned from such regulation to support public investments in reforestation and erosion control. Government's role will be critical as individuals tend to over-exploit the forest (W. Cruz, 1984).

Apart from these macroeconomic instruments, farm level estimates of subsidies for soil conservation can be made as no clear-cut short-term benefit to the upland farmer is gained by using soil conservation techniques. In fact our figures indicate that farms register net losses in income of up to 12 percent if expensive techniques such as terracing are used.

Decentralized Enforcement. Aside from the fact that it would be physically impossible to sufficiently monitor activities in forested lands, problems of enforcement of forest policies are compounded by the rapid rate of in-migration into uncolonized forest areas. In many upland communities however, local rules governing access to forest resources have emerged as a natural response to increasing population, and these informal rules can be used effectively in controlling further in-migration.

In the Mount Makiling, Laguna, case study, for example, the informal rules of access have been efficient in controlling indiscriminate "squatting." Indigenous forms of sanctions were introduced ranging from exclusion of certain labor activities to violent methods of enforcing one's property right.

It may thus be worthwhile to decentralize enforcement by granting village-level organizations legitimacy in "policing their own ranks." Part of the legitimizing process involves the granting of awards or subsidies for programs that serve to control the influx of new migrants. Such programs may include building ofcommunally-managed road trails and water wells.

Local Participation. The formation of village-level forestry units is crucial in promoting local participation. As noted above, the cooperation of the entire community is needed in controlling the use of forest resources. This type of control can be achieved by encouraging local systems of sharing resources through creation of viable institutions.

In addition, many instances of local labor mobilization schemes have been used -- e.g., in the building of community chapels or meeting places -- and these can be used in implementing reforestation. Soliciting the support of the local village officers and elders will be necessary and additional skills related to community organizing and conflict management will have to be developed.

Alternative Course of Action.

The discussion of alternative policy frameworks for upland development in themselves remain ineffective without the requisite political will for implementation. The following are recommendations for carrying our the required reforms, broadly outlined above. It should be noted that these recommendations need to viewed as a packages and that a mere subset of them will probably not make any impact in controlling upland population growth.

1. Review of existing tenure policies in the uplands, specifically, the long-term impacts of using a common property framework.

Although a classic goal of most upland farmers, the ideal or ownership or exclusive lease rights is not feasible in the uplands especially with the rapid decline in man-land ratios. Private property land rights may not even be desirable as the new legal "owners or stewards" may simply repeat the pattern of landlordism in the lowlands by bringing in landless laborers and subtenants. Alternative models of tenure such as the community or municipal forest will be worth evaluating, where the entire forest becomes a common resource that is shared by a community of users.

2. Expansion of coverage of upland development programs, by first examining the low population figure of 800,000 officially adopted by BFD, and then stratifying the population into classes or sectors of beneficiaries.

Conducting regular, systematic population counts, using available census data can be done on a regular basis using the same method adopted in this report. This baseline population figure will have to be supported, however, by a classification of the population with respect to (1) location -- forest zone vs. A and D occupants; (2) tenure -- legal vs. illegal occupants, owners vs. tenants; and (3) ethnic grouping.

3. Develop a program for direct subsidy or credit for adoption of soil conservation techniques

This can be achieve by first conduting an assessment of the costs of on- and off-site erosion effects. Costs and return estimates of various soil conservation techniques will be needed in the computation of the level of farm subsidy. The results of the regression estimates in Chapters IV and V and in the work of Segura-de los Angeles (1985) and Cruz et al. (1985) also provide some preliminary figures of the effects of soil conservation technologies on farm productivity.

4. <u>Creation of community forestry program units which are legitimate (and recognized).</u>

The recognition of the role of community forestry will entail a reorganization of the BFD as this will mean incorporation of community forestry units into the government structure. As deputized agents of BFD, the community forestry units can be given police powers which can then be regulated through an appeals system. Details of how such decentralization can be achieved will have to be devised only after careful examination of specific conditions at the municipal or village levels.

5. <u>Develop local institutions by actively engaging in community organizing activities.</u>

Local initiatives are enhanced through effective community organizing and conflict management work. These are also numerous non-government organizations (NGOs) who have done work in the uplands, and they should be tapped for local institution-building. The experiences of the BFD Upland Development Working Group (UDWG) will be very important as a learning tool for developing community organizing approaches on a wider scale.

Research Agenda

There are numerous topic which need further research, but the following clearly stand out based on the results presented in this report. These topics are outlined below.

1. Review of Upland Delineation Procedure

Alternative schemes for identifying upland communities will be useful especially when other methods like LANDSAT records or actual field verification surveys are made. The importance of field surveys, instead of maps, should be stressed as most of the problems regarding the boundaries of upland sites are best resolved in the field.

2. Migration Estimates for Interprovincial Flows

Lack of time and resources prevented the project team from looking into the interprovincial migration flows. This will be important when profiles of migrants are made for the entire country. Interprovincial migration flows also provide information on the dominant province-to-province population movements which may be significantly different from the regional streams presented in this report.

3. Differentiated Population Density

There is also a need to estimate population density as differentiated by land quality. Since land in forested areas are extremely heterogeneous the gross density figure does not truly depict the system's carrying capacity. The differentiation can be achieved by first stratifying areas into slope or crop-mix zones, then estimating population or settlement densities in each zone.

4. Expanded Macro-Migration Function

Inclusion of more realistic per capita income data, apart from those provided in the Census, will help improve estimates in the macro-migration functions. Another variable which needs re-examination is forest cover, which will be needed at the provincial or municipal level. Alternative economic models such as the probabilistic models using logit or probit estimates can also be tried using the interprovincial migration data.

5. Long-term Observations of Population Change

Case studies are useful for describing in greater detail circumstances of movement and patterns of adjustment. However, it will be important to document population changes and pattern of land distribution over time. Such long-term observations will be useful for policy-makers since community processes can then be documented as the upland population increases.

NOTES

1. This section is based on Chapter III of the Main Report written by Ms. Imelda Zosa-Feranil.

2. The numbering of tables, figures, and maps is not sequential. It follows the same numbering used in the Main Report.

3. Dependency ratio as used by Levi is computed as follows:

$$\left[\left(\frac{\text{Ages 15-64}}{\text{Ages 0-14 + 65 above}}\right) \div 1\right] \times 100$$

4. This section is based on Chapter IV of the Main Report written by Ms. Cristela L. Goce.

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