CHAPTER XIII

FIELD SITE CENSUS AND ANALYSIS

A census covering every household in Aldea Koxila was carried out on ten days between October 20 and November 6 of 1969, using the form illustrated in Appendix D. The two parts of this census were intended to elicit complete information on demographic and economic characteristics by household, since a Q?eqči? household is definitely the basic entity in both spheres whether or not it is made up of one or several families or parts of families.

Analysis of the demographic section (the "human ecology" of the sample population, if one insists on that distinction) should be considered in the context of the rest of the Municipio and Departamento. Table 38 is provided for this purpose, though it is less informative than it might be had the Guatemalan Government allocated any priority to processing data from the 1964 census.[1] Some comments on the medical circumstances of the sample population are included since health conditions are an integral part of the demographic picture.

Analysis of the economic part of the census draws on nearly all of the preceding chapters in order to create an approximate accounting for the activities which sustained the sample population during the year before the census. These activities could not go on without

[1] The blame is not easy to place, and certainly does not lie with the helpful and hard-working staff of the Dirección General de Estadística.

some impact on the landscape, and this impact is assessed in terms of volumes of materials used and areas under differing land uses.

TABLE 38

1964 CENSUS STATISTICS FOR ALTA VERAPAZ*

Municipio	Population	% Indian	% Rural	%Rural Indian	%Econ. Active	Area (Km^2)	pop./ Km^2
Cobán	38,461	82.6	76.8	96.2	41.2	2,132	18.0
Sta. Cruz	5,866	91.6	86.7	95.3	39.4	48	122.2
Sn. Cristobal	19,259	84.4	77.1	90.5	41.0	192	100.3
Tactic	8,529	85.7	76.7	94.0	--	85	100.3
Tamahú	4,679	93.6	83.4	95.9	36.4	112	41.8
Tucurú	13,283	94.7	92.2	97.1	35.8	96	138.4
Panzós	17,252	91.7	95.6	93.1	41.8	733	23.5
Senahú	27,539	96.7	95.6	98.2	35.0	336	81.9
Sn. Pedro Carchá	69,749	96.5	94.5	98.2	40.9	1,082	64.5
Sn. Juan Chamelco	18,082	98.5	89.3	99.5	40.9	80	226.0
Lanquín	9,532	96.9	93.2	99.2	37.3	208	45.8
Cahabón	21,456	95.5	95.6	97.4	35.9	1,442	15.1
Chisec	2,925	93.4	76.2	92.9	39.0	1,488	2.0
Chahal	3,961	92.2	91.9	97.1	35.6	672	5.9
DEP.TTL.	260,572	92.6	88.7	96.8	39.8	8,686	30.0

*Based on manual tabulation by Gary S. Elbow and on figures published in Dirección General de Estadística, 1969: 25.

Demography and Health

The ecology of animal populations has traditionally focused on variations in numbers and on factors modifying those variations.[2] Human populations have demographers to study them rather than animal ecologists, although demography is logically a sub-topic of animal ecology. Since my purpose is to present a human population as seen from a culture-ecologic viewpoint, the treatment of population data is not strictly demographic.

Perspective in Time

Detailed information from censuses before 1964 is not available for Guatemala, even the 1950 materials having been destroyed for lack of storage space. Compilations to the *aldea* level exist for the latest census but must be hand-copied at the office of the Dirección General de Estadística (hereafter called the DGE). Some mimeographed comparisons of 1950 and 1964 data are included in Appendix D, and a specially compiled comparison for *Aldea Koxilá* comprises Table 39. One historical landmark is provided by Archbishop Cortés y Larráz: as of 1770 the population of San Juan (then a dependency of San Pedro Carchá) was estimated at 2,078, identical with that of Carchá.[3] Estimates of population for Alta Verapaz dating between the Eighteenth and Twentieth Centuries are not accessible and the early Guatemalan census figures are suspect, especially in numbers of rural Indians. The world-wide influenza epidemic of 1918 is said to

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[2] Alee, *et al.*, 1949; Andrewartha and Birch, 1954; Lotka, 1925; Slobodkin, 1961, etc.

[3] Cortés y Larráz, 1958, Vol. II: 16.

TABLE 39

CUADRO COMPARATIVO DE
LOS DOS CENSOS:
1950 y 1964
DE LA ALDEA COJILA DEL MUNICIPIO SAN JUAN CHAMELCO
DEPARTAMENTO DE ALTA VERAPAZ

		No: PERSONAS POR SEXO			No: PERSONAS POR SU EDAD:			GRUPO ÉTNICO		EDUCACION			
										ALFABETISMO		ASIST. ESCOLAR:	
LUGAR POBLADO:	No: Familias	TOTAL	Masc.	Fem.	menores de 1 año	de 1 a 6	de 7 y más	Ladino	Indíg.	Alfa- Betos	Analfa- betos	Asis- ten:	No Asis ten:
1950:													
ALDEA COJILA	68	305	133	172	13	49	243	5	300	19	224	8	235
1964:													
ALDEA COJILA	61	295	130	165	6	52	237	-	295	19	218	20	217
DECREMENTO:	10.3%	3.3%											

have killed a large number of Q?eqči?, especially the elders, but this has yet to be documented from Church burial records. Oral tradition throughout Chamelco *Municipio* speaks of isolated households surrounded by forest as of thirty or forty years ago; in rural *aldeas* which now include little or no uncut forest persons sixty years old remember their fathers felling forests of cloud forest trees now represented by solitary specimens.

The figures for population composition and rates of change in the whole of Alta Verapaz suggest that the overall rate of increase in the last fourteen years has been 2.4% per year (38% increase). The Indian part of that population and the rural part – which are practically the same thing – have decreased but remain close to 90% at the least. Other *Departamentos* in Guatemala have had greater rates of increase and lesser (from 5.3% for Izabal to 1.8% for Chiquimula), and both Sololá and Totonicapán have maintained a slightly greater proportion of Indian population though each has 100,000 fewer inhabitants than Alta Verapaz.

In order to provide a more precise representation of the latest phase of what appears to be a rapid increase in population density, the 1964 census sheets for the field site were copied by hand and compared with my own 1969 census.[4] Continuity with the 1964 census was provided by the fact that my principal informant had worked in the team which covered the rural part of San Juan Municipio.

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[4] Copying and some analysis was arranged through Sr. Sergio Solis and carried out by Sr. Cesar Augusto Marroquín R., both of the DGE.

Population Structure

The age composition of the field site population in 1964 and 1969 is shown in Figures 26 and 27. Changes are apparent mainly in the first eight age classes of females and the first age class of males; the former may be an artifact of the reporting or grouping of ages, but the latter seems to reflect a real (though temporary) exaggeration of the normal excess of male over female births.

However, while Q?eqči? culture definitely favors boy over girl children this favoritism is not carried to the point where it is reflected in the sex ratio of recorded deaths in the first five years as shown in Table 40. Although it happened that six males and seven females were born in 1969 while infant deaths (ages 0 to 4 years) were three and nine, respectively, that bias is either a chance occurrence or a hint at a future trend.

The age at which a Q?eqči? child can approach an adult's contribution to his household's economy is fifteen or sixteen, but even at nine and ten most children are useful helpers. Since the aged are few and the very young not yet outrageously numerous, fully 65% of the population is economically active.

Population Size

The stability of the field site population over the last twenty years and the general congruence of the age structures in 1964 and 1969 allow one to assume that the age distribution is nearly stable, a very helpful assumption when using the formulae below. Definition

TABLE 40

COMPOSITION OF AGE COHORTS
1969 CENSUS

	Age Class	Living M	Living F	Dead M	Dead F	Recorded emigrants M	Recorded emigrants F	Totals M	Totals F	Cohort*
1930-49	35-39	13	12	8	5	1	0	22	17	39
	30-34	10	13	8	5	1	4	19	22	41
	25-29	9	16	6	9	2	0	17	25	42
	20-24	11	16	6	1	2	1	19	18	37
1950-69	15-19	18	18	6	4	1	3	25	25	50
	10-14	17	20	12	5	0	2	29	27	56
	5-9	17	25	15	18	4	2	36	45	81
	0-4	28	22	3	9	0	0	31	31	62

*Sums not corrected for in-migration, and decrease in probable accuracy with increasing time before the present.

FIGURE 26

POPULATION STRUCTURE
1964

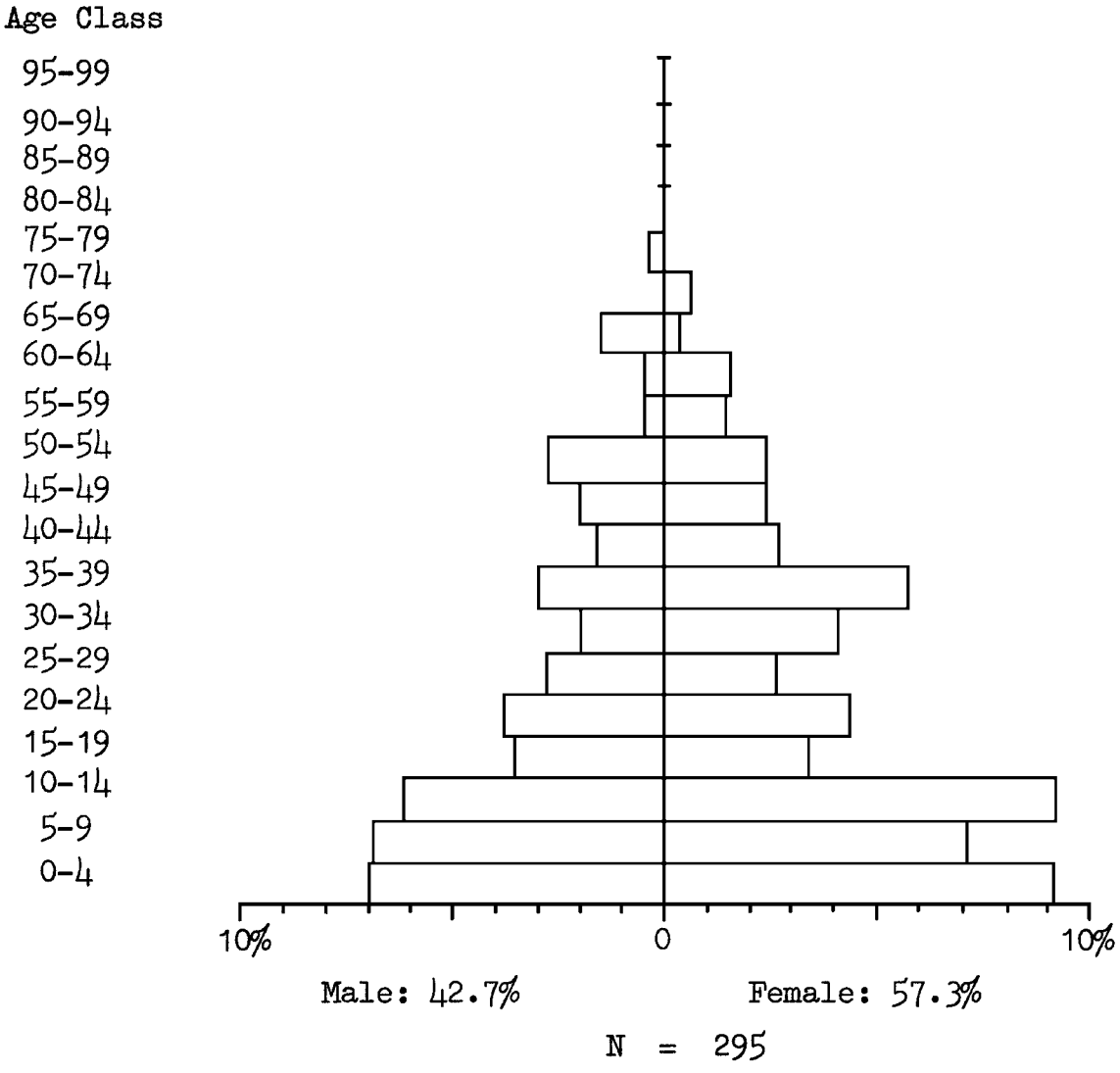
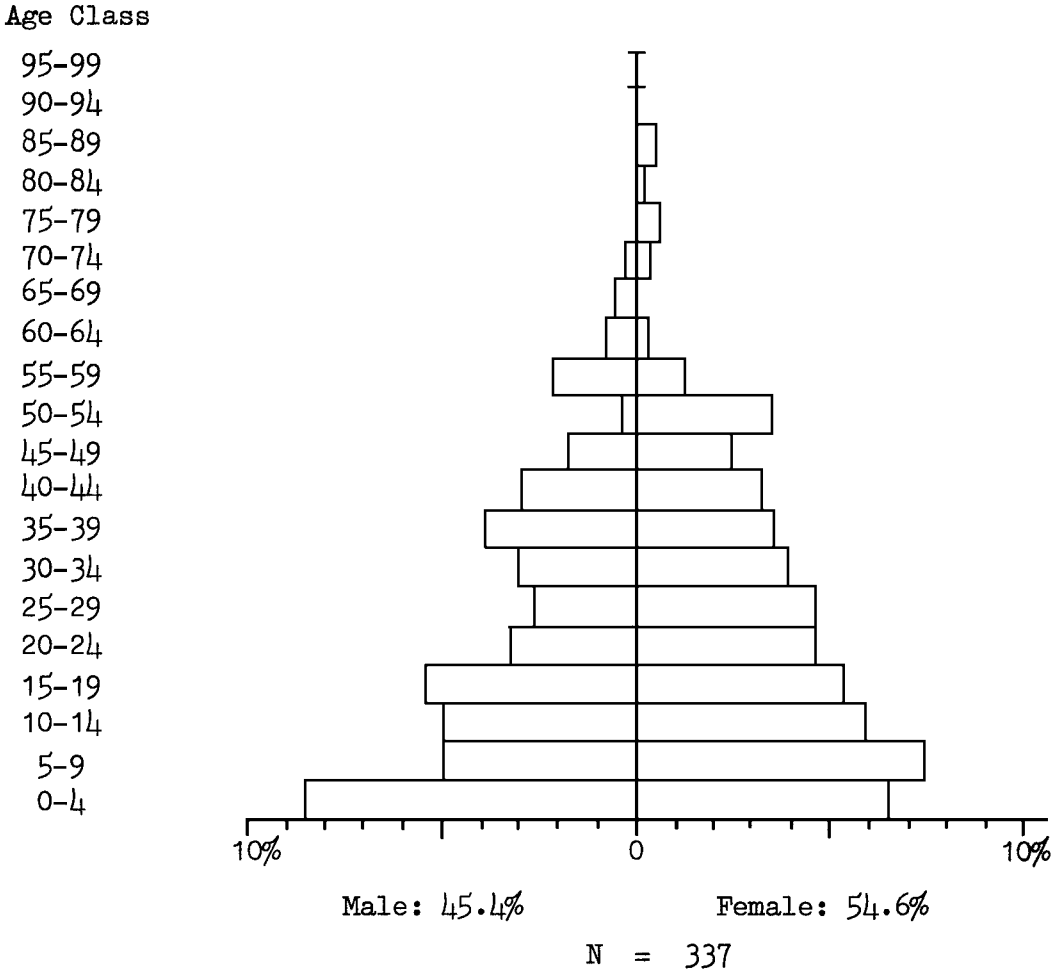


FIGURE 27

POPULATION STRUCTURE
1969



of the intrinsic rate of natural increase, **r**, in terms either of the ratio of populations a generation apart (N_T/N_0) or in terms of the ratio of female births in two generations (corrected for mortality to give the net reproductive ratio, R_0) is given by equation (1).[5]

$$(1)\quad \frac{N_T}{N_0} = e^{rT} = R_0$$

If we calculate **r** from R by supposing that T, the length of a generation, is approximated by the mean age of mothers at birth of their first female child and that R is the ratio of female births in 1950-69 vs. 1930-49 (from Table 40), then

$$T = 20$$

$$R_0 = \frac{85}{65} = 1.309$$

and solving equation (1) for **r** gives

$$(2)\quad \mathbf{r} = \frac{\ln R_0}{T} = \frac{0.27003}{20} = 0.0135$$

a rate of increase which would double the population in a little over 51 years.

Comparison of figures for the whole population at the three available points in time shows nothing more drastic than a fluctuation of some six per cent about a mean of 312, and substitution of numbers spaced a generation apart into the left identity in equation (1) gives

$$(3)\quad \frac{337}{305} = e^{rT} = 1.104$$

from which **r** = 0.00477 and the doubling time is on the order of 150 years. Use of the general exponential growth formula on figures from

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[5] Andrewartha and Birch, 1954: 40-41.

adjacent censuses would make it appear that population was on its way down by half in twenty-one years or doubling in twenty-six, depending on whether 1950 was compared to 1964 or 1964 to 1969.

Marriage, Maternity and Female Mortality

In Q?eqči? culture, where equal inheritance is the ideal and where family lands must provide as large a part of family needs as possible, one symptom of land scarcity appears to be a drop in the age at marriage and hence in the age at birth of the first child. Unfortunately, ridding a household of marriageable girls as fast as possible tends to aggravate the rate of population increase and with it the dearth of land. That there has been such a change in age can be seen in Table 41, and the bare sufficiency of agricultural land in the field site will be apparent from discussion of the economic part of the census. Since the women most recently married have yet to bear all their children, the number of children per mother may

TABLE 41

CHILDREN PER MOTHER AND AGE AT FIRST BIRTH

Census	age group	children per mother	age at first birth
1964	15-30	--	17.7 (N=16)
	30-35	4.54 (N=13)	19.2 (N=13)
	35+	6.29 (N=35)	22.8 (N=35)
1969	15-30	--	17.9 (N=25)
	30-35	3.27 (N=11)	21.1 (N=11)
	35+	5.05 (N=43)	22.2 (N=40)
	deceased	2.25 (N= 8)	20.4 (N= 8)

or may not change. With an earlier start an increase could be expected, though the number surviving to reproduce need not change. Certainly the shortening of generation length can only increase the potential for rapid population increase,[6] and that increase will become real as soon as food supply and medical care are increased.

The deaths of 32 out of the 103 girls born in the last fifteen years imply an annual death rate of 2.5% prior to child bearing. The presence of roughly 86 females aged 15 to 44 throughout these fifteen years suggests no dramatic change in numbers entering or leaving the years of fertility, although in the last five years eighteen girls came of age while nineteen potential mothers died and twelve aged beyond child bearing – at least for statistical assumptions. If this situation continued an end to population increase would rapidly arrive, but in the cruelest way possible.

Migration

Even should the native population of the field site begin an absolute decline, immigration would keep the total number nearly constant and would replace the missing mothers. The 1964 census lists origin only by *municipio*, but by recording *aldea* of origin in 1969 I found that 37% of the population was born outside the field site, mainly in adjacent *aldeas* or the town of San Juan. Of the 123 in-migrants, 52% were female and nearly all of these came as brides or young mothers. Considering the proportion of immigrants and the slight change in total population over the last three census figures

[6] Slobodkin, 1961: 54.

there must be a substantial rate of emigration: the net reproductive ratio mentioned above would otherwise lead to a much more rapid population increase than has occurred, even though many girls in the latter generation are daughters of immigrant mothers.

Emigration is very difficult to assess from oral records alone. There appear to be only 32 out-migrants who have left any kin behind, plus the former occupants of three vacant houses. Only one of those houses is totally abandoned, the owners having gone to Seból in the northern lowlands. In terms of destinations, nearly half of the recorded emigrants did not leave the *Municipio*, 22% went to the northern lowlands, 16% to the Polochíc Valley, and 13% to Guatemala City or the South Coast.

Health

Persons over sixty-five years of age make up only 2.7% of the population, whether one uses data from 1964 or 1969. The forms that death takes differ from those which are familiar to North Americans, and it comes often enough to every family that children of ten or twelve years' age say, matter-of-factly, "*ma-re tin-kamq*" (I may be about to die) when told of pleasures that must wait for next year.

Dead as well as living members of households were recorded in the 1969 census, with age at death and cause recorded in most cases. Table 42 shows the pattern of mortality which appeared, using the Q?eqči? names for ailments (refer to Appendix G for clarification). As with migration, the record is not complete for the whole of its

TABLE 42

AGE-SPECIFIC CAUSES OF DEATH

Age class	tiq		si:po:k		sa?ex, ša?wak, ra sa?		oxb		kik? sa?		mučˇ kex		raš kihob		šoš qawa?		yaxel šul		(long illness)		(stillbirth)		awas		Xiq?		Pu:ba hiš	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
60+	0	2	1	0	0	1	2	1	0	0	0	2	1	0	0	0	0	0	3	0								
55-59	0	1	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	2	0								
50-54	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0								
45-49	0	1	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0								
40-44	0	0	1	0	1	0	1	0	0	0	1	0	1	0	0	0	0	0	0	0								
35-39	0	1	0	2	3	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0								
30-34	2	2	0	1	2	1	0	0	0	0	0	0	0	0	0	0	1	1	0	1								
25-29	2	0	0	1	1	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0								
20-24	0	1	1	0	3	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0								
15-19	0	2	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0								
10-14	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0								
5-9	2	0	1	1	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	-	-	-	-	2	0	-	-
0-4	10	4	5	9	5	9	0	1	2	2	0	0	0	0	5	2	1	1	1	0	3	5	3	1	7	5	2	1
Sub-Totals	18	15	11	14	16	15	5	2	5	2	2	2	5	0	5	5	2	2	6	1	3	5	3	1	7	5	2	1
	33		25		31		7		7		4		5		10		4		7		8		4		12		3	

TOTAL: 160

Miscellaneous causes	Sex	Age class
kušbex	M	0-4
šoš saqixox	M	40-44
kok? šoš	M	0-4
čaqi iš	M	0-4
ok či ha?	M	30-34
Xolombex	F	10-14
Yok?ol	M	25-29
(Broken back)	M	20-24
(Old age)	F	100+
" "	M	80+

GRAND TOTAL: 170

time depth and some significant trends may have been lost. For example, infant deaths from whooping cough are said to have decreased noticeably when immunization became available around three years ago. My principal informant lost two out of ten children to that disease, and all of the first four to various illnesses. The miscarriages recorded in Table 42 were contributed by only a few women in this *aldea*, though the problem is said to be common throughout the highland Maya populations. No birth-deformed individuals happen to appear in the list but a number of birth defects are common enough to be named and, here as elsewhere in Maya and Aztec territory, credited to the mother's sight of an eclipse during her pregnancy.[7]

With all the remedies documented in Appendix G and others known only to professional healers (*e:b ax ilonel*: those who look), many cases of illness which might be cured still lead to death. However, given the total absence of traditional or modern means for birth control (apart from ritual abstinence), any project to provide more effective health care should not lean too heavily on the apparent inability of the population of *Aldea Cojilá* to cope with the grim reaper. The potential for explosive increase is equally real, and may even be increasing.

Education

There is a school in the *aldea*, built with assistance from U.S.A.

[7] Madsen, 1965: 129; Paul & Paul, 1952: 174-192; for names of specific deformities refer to Appendix G.

I.D. and a Lions' Club Chapter. Although school attendance increased from 20 to 28 in the five years following 1964 a decrease in the school-age population converts this to an increase from 29% to 46% of that age group. This is a change with greater economic and cultural than intellectual implications. Even though the resident schoolmistress is perhaps above the average in intelligence and sympathy for children she, like most other schoolteachers in the *municipio*, is Ladino and the curriculum in use provides no skills that might be immediately useful in a Q?eqči? context – except how to wash tile floors for Ladinos. The aim and essence of education in Alta Verapaz is to promote Ladino culture at the expense of Q?eqči? culture and language, completely without regard for the probable consequence.[8]

Economy

Sketches of the habitat-related knowledge and activities of Q?eqči? culture can now be combined with the profile of age and sex structure and total numbers through time for a sample population in order to produce a tableau which will illustrate the concrete amounts, proportions and costs relating to that population's continued existence. The reckoning will be made in terms of cash values and prices, and these are quite appropriate since Maya involvement in a petty-cash kind of capitalism probably predates the Conquest by

[8] These consequences are predicted and an alternative policy promoted in the prologue in Haeserijn, 1966.

several centuries at least. Kilocalorie and grain equivalents have been calculated, but only to gain a synthetic comparability with studies of traditional economies world-wide.[9]

The cash values on which calculation of costs and incomes has been based, as well as the conversion factors from local to metric measures, are given in Table 43. Most of the entries come directly from the tables and accounting summaries in previous chapters; the remainder is from informants in the *aldea*. Comparison of 1969 values with those for 1944 shows remarkably little overall increase in the intervening twenty-five years.[10] Allowance was made for illness, inebriation, housework, religious and civil obligations, etc., by assuming the year of economic activity to include only ten months or forty weeks, according to which unit was mentioned in reporting a given activity. This estimate cannot be valid for every household so the resulting estimates of annual income from craft activities include a substantial margin for error.

In order to make allowance for the numerous but relatively "cheap" population below the age of economic activity, children under sixteen were computed as fractions of an adult in linear proportion to their age. The result is an "adult-equivalent" population for each household, a number which gives a more realistic collection of indices than simple calculation per capita. However, the real

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[9] The following works are among the best to consult: Schultz, 1964; Boserup, 1965; Clayton, 1963; Clark, 1967; and Clark and Haswell, 1964.

[10] Goubaud C., 1944: 129, 134.

TABLE 43

CONVERSION FACTORS

Unit or Commodity	Equivalent	Sex-typing of activity
cuerda (cda.)	440 m^2 at 25 *varas*/linear cda.	
quintál (qq.)	45.4 Kg (100 lbs.)	
maize	(all weights at ambient humidity)	
net output	~ 20 Kg (44 lb.)/cda.	
consumption	~ 285 Kg/adult-equivalent/year	
cash price	Q0.0827/Kg (Q3.75/qq.)	
harvest value	Q0.0769/Kg (Q3.50/qq.) or ~ Q1.54/cda.	
wood		(M)
hearth	~ 2,897 Kg/adult-eq./year	
lime oven	70 kg./qq. finished lime	
planks	Q1.76 net/doz.	
2" X 4"	Q1.20 net/doz.	
table	Q1.50 net ea.	
lime		
consumption	~ 8.85 Kg/adult-eq./year	
at-oven value	Q1.00/qq. net	(M)
basket retail	Q0.25 net ea.	(F)
maguey		
crude fiber	Q8.00/qq. at San Juan Chamelco	(M)
twine	Q0.10/lb. net (average)	(M/F)
rope	Q0.15 net ea. (at 2 lb.)	(M/F)
hammock	Q0.40 net ea. (at 3 lb.)	(M/F)
cargo net	Q0.12 net ea.	(M/F)
soap	Q0.83/batch at 3 lb.	(F)
tailoring	Q1.20/doz. pants	(M)

TABLE 43 (Continued)

Unit or Commodity	Equivalent	Sex-typing of activity
weaving & needlework		
embroidery	Q1.00/blouse net	(F)
woven blouse	Q0.75 net ea.	(F)
woven bag	Q0.25 net ea.	(F)
plaited mat	Q1.50/doz.	(M/F)
migratory labor*		(M)
Polochíc Valley	Q 0.50 daily (Q15/mo.)	
Seból	Q 0.50 daily (Q15/mo.)	
Esquintla	Q 0.70 daily (Q30/mo.)	
Petén	Q 1.00 daily (Q30/mo.)	

*The gross wage has been used in calculation of income since deductions for food and lodging at the labor site, albeit inflated, approximate the drain on household resources which is relieved by a member’s absence.

increase in both productivity and consumption with age is not absolutely linear so yet another increment of error is introduced.

Given these somewhat arbitrary but still justifiable approximations, answers to the root questions of ecology and economy can be attempted. How have the several socioeconomic units (i.e. households) making *up* the population fared in the year of study? What is the pattern of availability and allocation of resources, both human and material, for the population and its component units? And finally, what is the total use of resources in comparison to the available quantities?

Households and Their Economic Equilibrium

The majority of households in *Aldea* Cojilá appear just to have managed to break even in 1969. Only a few of them did not have a maize deficit; however, households with the largest deficits tended to be those with a comfortable margin of cash income from handicrafts and migratory labor. The frequency distribution of net income per adult-equivalent, by household, is given in Figure 28 and compares quite closely with the frequency distribution of claimed area in milpa as shown in Figure 29. The crude per capita income index, though not worth illustrating, happens to preserve the form of Figure 30 almost exactly. When the net income figures are put in a spatial rather than a scalar context, those few households nearest the west and south boundaries of the *aldea* are above the means of area claimed in milpa and of net income per adult-equivalent (Maps 9 and 10). The pocket of households below both means located in the

FIGURE 28

FREQUENCY DIAGRAM OF HOUSEHOLDS' NET INCOME
PER ADULT-EQUIVALENT

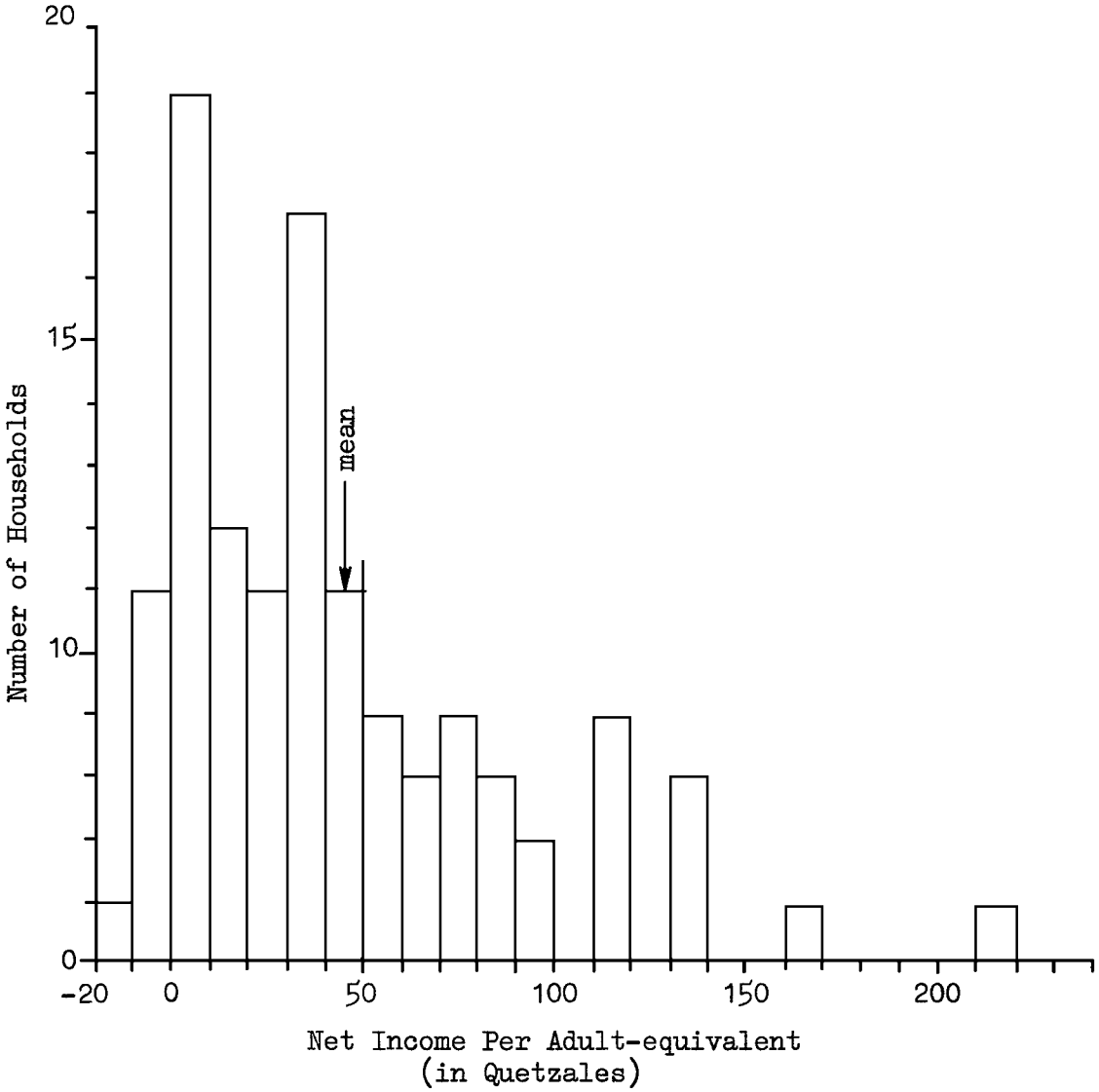
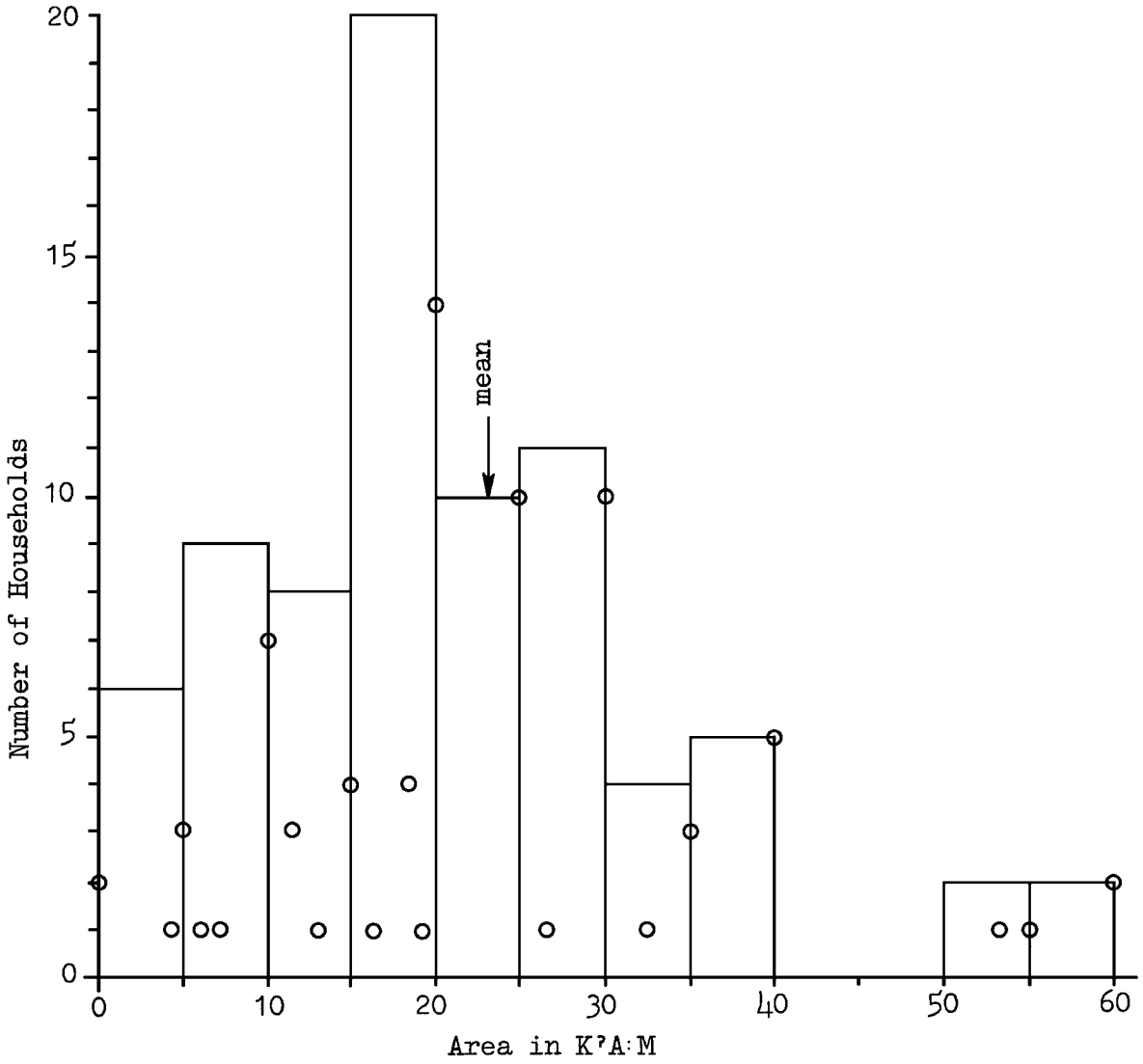


FIGURE 29

FREQUENCY DIAGRAM OF AREA IN MILPA CLAIMED BY HOUSEHOLDS

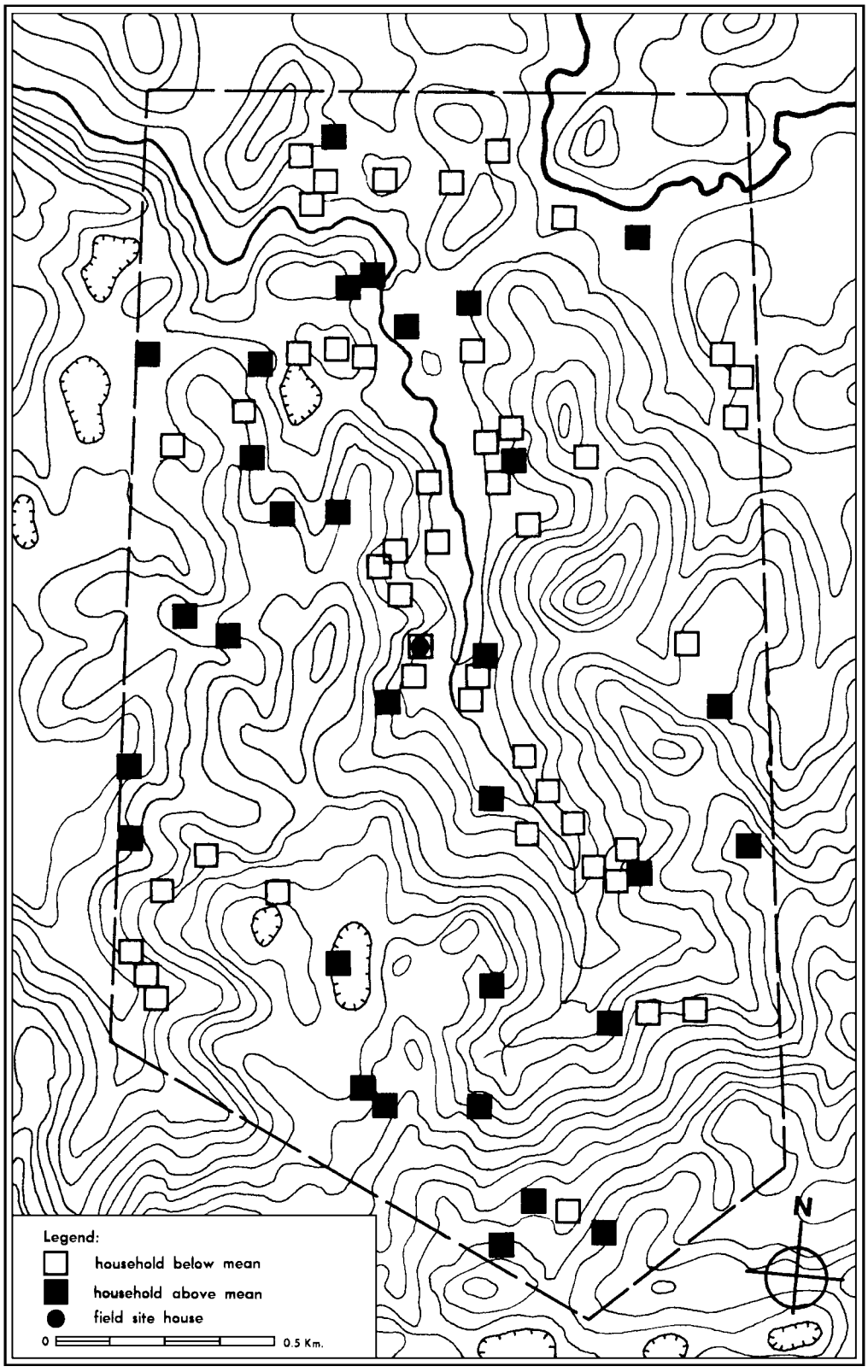


Notes:

1 K'A:M (Sp.: cuerda) ≐ 0.044 hectares
o actual claims as recorded in census

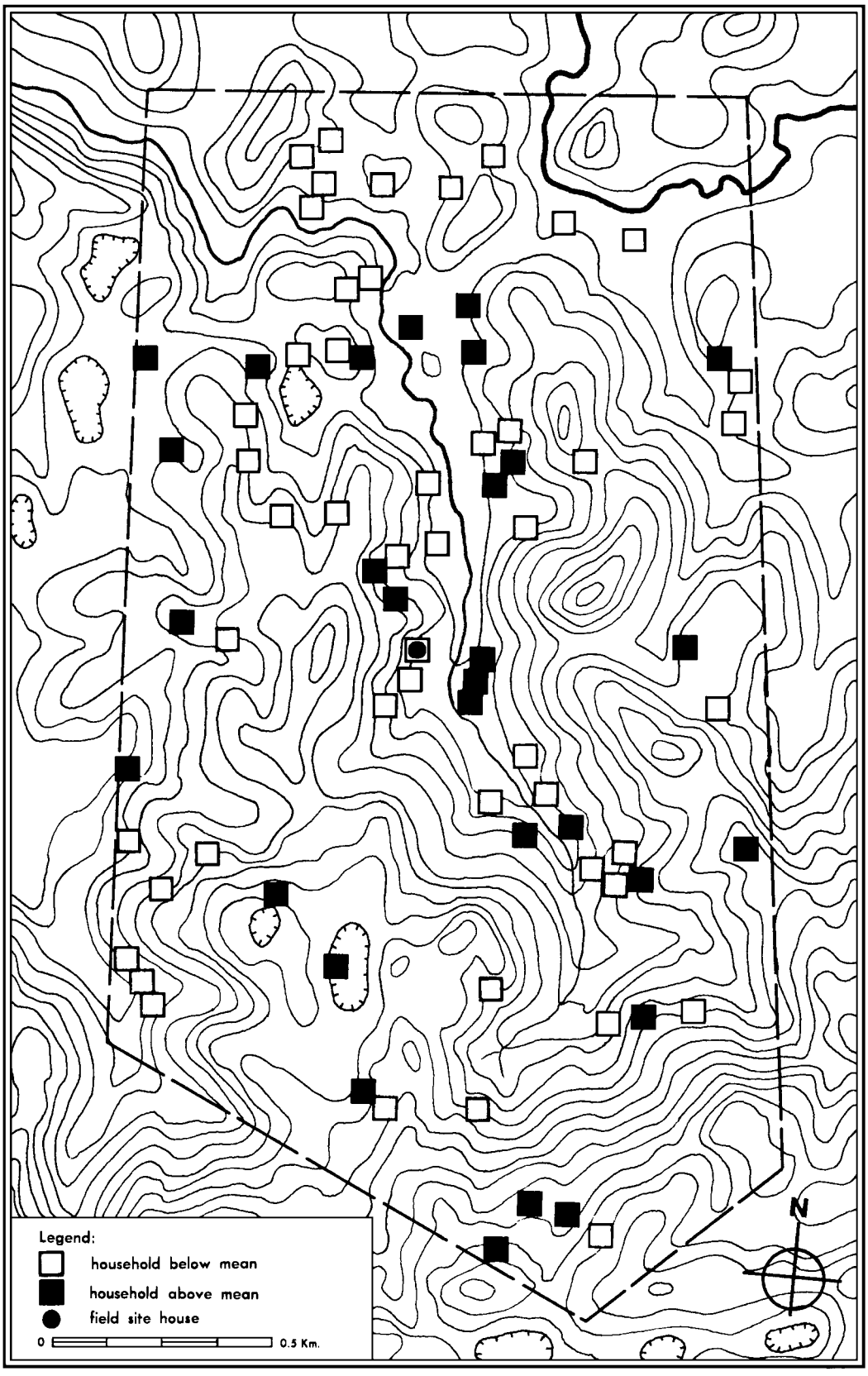
Map 9

HOUSEHOLDS' CLAIMED AREA IN MILPA



Map 10

HOUSEHOLDS' NET INCOME PER ADULT-EQUIVALENT



southwest corner shows that peripheral location is not invariably related to prosperity, and the key to whatever clustering of households there is appears to be by family surnames rather than topography or other features of habitat.

Of the several traditional crafts described or mentioned in earlier chapters, *Aldea* Koxila is best known for production and retailing of lime. Forty-eight households (62%) engage in one or the other or both activities and thus gain the largest single contribution (48%) to the whole craft income of the *aldea*. However, the next most significant contribution is provided by migratory labor and peddling in the lowlands, even though members of only thirty-two households (42%) engage in these "extramural" activities. Comparisons among these and other craft activities can be made from Table 44, while mapping of households by primary occupations of male and female members is provided in Map 11. Lime ovens are concentrated along the main axis of the *aldea's* valley all the way from mouth to headwaters though there are ovens to east and west as well; workers in maguey are scattered nearly at random; woodworkers are located where lime ovens are not; and migratory workers seem to live all around the main valley but not in it, with one exception.

Implications for Landscape and Ecology

There remain a few steeply-sloping places in *Aldea* Koxila where the vegetation shows no evidence of past clearing or present woodcutting but there are other spots, equally steep, in milpa. No

TABLE 44

OCCUPATIONS AND INCOMES

occupation	lime	maguey	wood	weaving	twine	tailor	mig. labor & pedlar**
households Engaged	48	46	12*	30	6	3	32
net cash income Q	6,400	721	619	1,484	508	216	3,500

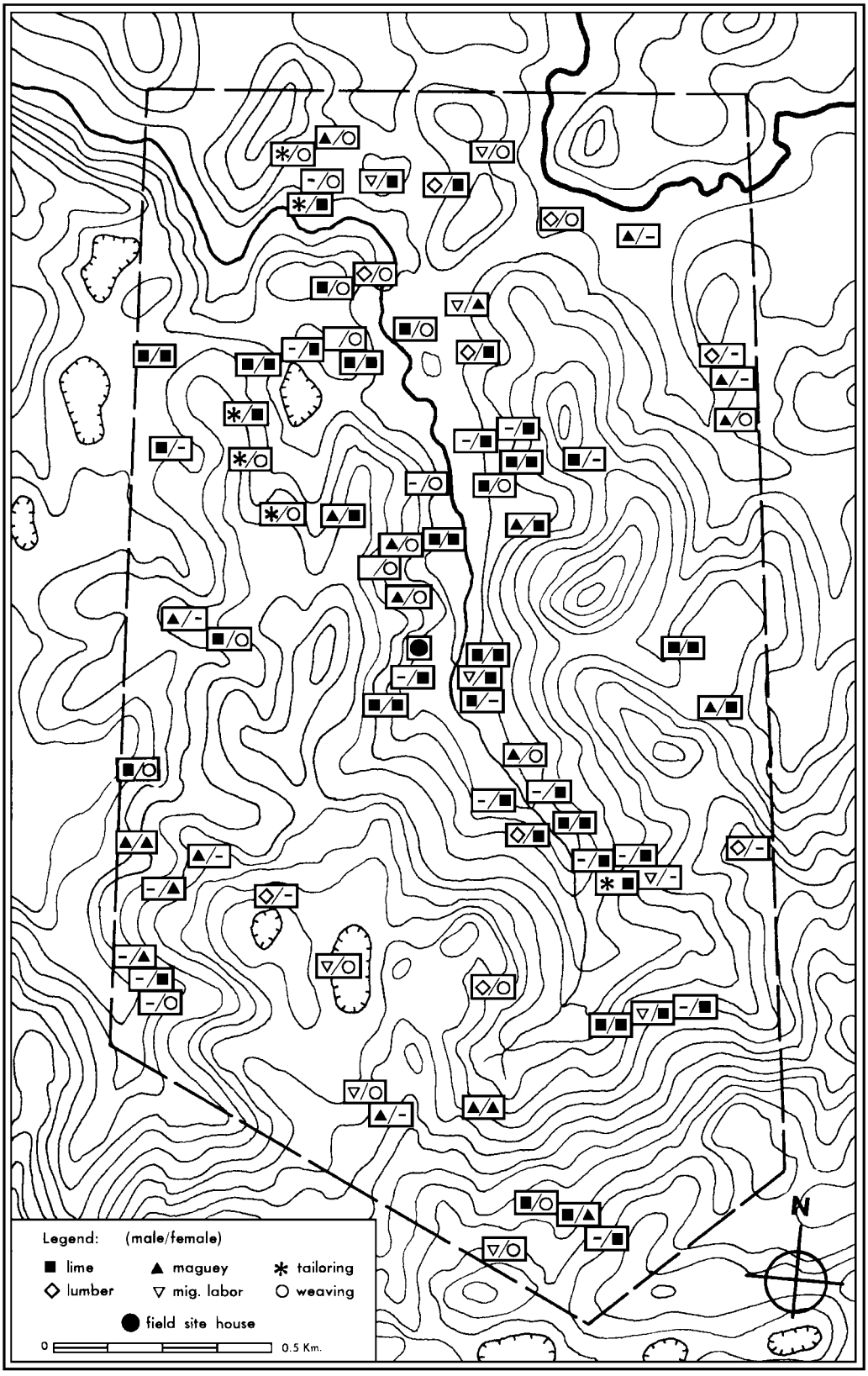
aldea total: Q13,448

*Plus 3 professional carpenters, salaries not known

**Pedlars' profit estimated at Q 1.00/day but may be higher, judging by housing and standard of living

Map 11

HOUSEHOLDS' PRIMARY ECONOMIC ACTIVITIES



more than 25% of the whole area is flat enough to retain a soil that might withstand perennial planting and the one-in-five years rotation in swidden on the remaining slopes mayor may not be above the critical minimum for stability. However, the population appears to have stabilized for the moment at a size short of that which would oblige use of all soils to their absolute limit. The total area claimed in milpa for 1969 (including an insignificant 2.2% in adjacent *aldeas*) came to only 21% of the *aldea's* surface. Not all of the level land is in perennial use and some of the sloping land gets two or three times the minimum resting period, to judge by the height of shrubs and trees being cut in 1969. I would estimate that no more than 10% of the level land was not cultivated in 1969. However, the portion of the total area which was cultivated by and for families residing outside the *aldea* itself was not ascertained and could account for as much as 10% to 20% of the cultivated area. To use the 2.2% mentioned above as an estimate of the holdings of outsiders, since that is what residents of the *aldea* cultivate outside it, would not be valid. Some of the largest Indian landholders (and especially those who have accumulated land by usury and foreclosure) live in San Juan Chamelco itself but own land in several *aldeas*.

In one densely settled *aldea* a few kilometers to the east an obvious and much-lamented scarcity of firewood has arrived, but *Aldea* Koxila still has plenty. However, if my consumption rate estimate is correct then seventy-seven hearths are accounting for

742.5 metric tons of woody material per year, or roughly 370 metric tons dry weight taken out of net productivity in the local forests. Unfortunately, no measurement of that productivity has been made or was made in 1969 so that the only way to assess the impact of fire-wood extraction is to note that, despite a rate of extraction about half that for hearth wood, cutting of pines for use in firing lime ovens has yet to eliminate all cull trees. And there are still numbers of straight, mature trees although census data indicate that *aldea* sawyers account for roughly 36 trees in a year (extrapolated from sawyers' claims combined with figures in Table 31, Chapter IX).

The main economic activity of *Aldea* Koxila depends on a mineral resource, bituminous dolomite. The nature and something of the extent of that resource can be found in Chapter III, but the variation in lime-making quality of outcrops is too minute and erratic for mapping so that no accurate estimate of the per cent of total outcrops now being exploited can be made. All that can be said is that extraction per year alone is on the order of 242 metric tons while the finished lime production is about half that weight or 121 metric tons. Diversion to (or purchase for) local consumption needs in the field site amounts to only 2.3 metric tons annually, or 1.9% of production.[11]

The maize deficit encountered in comparing calculations of yields

[11] This is an estimate based on a pro-rating of my informant's wife's use of 1½ lbs/week; this total was in fact made up of three ½-lb. purchases spaced through the week, possibly because lime keeps poorly in the humid atmosphere of Alta Verapaz.

and consumption is probably real. Certainly it is common opinion among Municipal officials and Ladino storekeepers that there was local self-sufficiency in maize until five or ten years ago, and that the trade in maize imported from Sebo1, the Polochic Valley, and even the South Coast is becoming larger every year.[12] Yet no simple meaning can be read from this transition, nor from the de-forestation of Alta Verapaz or the documented flow of Q?eqči? migrants into the northern and western lowland frontiers.[13] Aldea Koxila is a poor base for conclusions about the broad and rapidly changing relationship of Ladinos and Indians to land precisely because it is a good base for observation of relatively autonomous Indians. However, within San Juan *Municipio* the diversion of good, level land into pasture by its Ladino owners gives one clue to an explanation for both deforestation and Indian emigration.

The difference in productivity between bottomland and slope land has been pointed out several times above, and can be quantified approximately by comparing maize yields in the low part of the Saša?an cultivation site with the general harvest from Koxila. The ratio is 2.3:1 or worse, depending on which part of the superior (though unfertilized) Saša?an site one uses for comparison. This ratio suggests that if a given number of Q?eqči? were forced to subsist on sloping rather than level land then they would have to clear not just twice as much milpa, but rather ten times as much or

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[12] Cf. Church, 1970: 110-111.

[13] Adams, 1965; Carter, 1969.

more in order to allow for the minimum fallow period. Thus a population of Indians which might be comfortably maintained by the potholes and valleys of Alta Verapaz takes on the appearance of an overbreeding horde if ever it is forced upward into the slopes and ridges.

From the discussion of demography in the field site it is clear that a potential for rapid increase in the Q?eqči? population is present and may itself be increasing. However, the available health care and food supply would have to be increased considerably before that potentiality would become a *Departamento*-wide actuality. The national census figures given in App. D, Table 1, do show an increase in Indian population of 36.4% over the last two censuses or 2.6% per year (in Alta Verapaz alone). Supposing that most of this increase is real and not just an artifact of more thorough census work in 1969 than 1950, combining that increase with the apparent decrease in availability of prime land for milpa, and combining both factors with the policy of Ladino-izing Indian children in the schools produces a frightening collage. Do the people who administer Guatemala really desire what they are helping to create: masses of new Ladinos with the knowledge and numbers to clamor for more land and better health care and generating yet more masses of little Ladinos?