Chapter III

RESULTS OF THE ANALYSIS FOR VARIABLES CLOSELY RELATED TO LABOUR UTILIZATION

In each of the five villages, sampling biases on variables closely related to the utilization of labour were found. Usually these biases occurred on variables such as the size of the household and labour force, the distribution of occupations, the frequency of participation in employment and own-account non-farm work, and the use of hired labour. However, there was a large range of variation in the amount of bias in the five village samples. Each village must therefore be discussed separately, not only in order to permit understanding of the nature and origin of the biases in each village, but also so that the implications of these biases can be discussed for each set of labour utilization data.

BAN CHUNG

There were several discrepancies between sample and population data for Ban Chung. (See Table 3.1).

The mean number of persons in the labour force was greater in the intensive sample than in the village as a whole ($P < .02$). At the same time, the mean number of persons younger than eleven years was lower for the sample, but the probability for this was only $<.10$.

No significant differences appeared from the data on main and subsidiary occupations of household heads. However, in the intensively

Table 3.1 Ban Chung, Whole Village: Z and χ^2 Values, with Significance Levels for Quantitative Variables with Significant Z or χ^2 Values, and Some Other Closely Related Variables

Variable	P_z*	Z	P_{χ^2}**	χ^2
Number of household members	-	0.149	-	0.54
Number of persons in the labour force	.02	2.345	-	1.15
Number of persons younger than eleven years	.10	-1.891	-	0.55
Number of persons engaging in both agricultural and non-agricultural activities	.05	2.316	-	2.28
Number of persons taking full-time agricultural employment	-	1.171	.05	3.92
Number of persons taking part-time agricultural employment	-	1.097	.05	3.37
Number of persons taking full-time non-agricultural employment	.10	1.732	-	1.58
Number of persons taking employment in the same tambon	.05	2.232	-	2.85
Number of persons taking employment in the same region	.10	1.850	.10	5.27
Number of persons doing part-time own-account non-farm work	.02	2.330	-	1.98
Size of operational holding in rai	-	0.821	-	0.46(df=8)
Number of rai of agricultural land owned	-	0.079	-	1.15(df=8)
Total rice production last year (in 100 kilograms)	.01	2.773	.05	3.01(df=8)

For sample and population means and variances for these variables, see expanded Table 3.1 in Appendix D.

* Only probabilities of .10 or less are given

** Only probabilities of .05 or more are given

df = 9 unless otherwise indicated

studied sample, the mean number of persons engaged in both types of activities, agricultural and non-agricultural, was higher ($P < .05$). As Ban Chung is a village which is largely dependent on agriculture, and of that, on rice production, these facts indicate that the intensively studied sample was biased, in that more non-agricultural work was included in the labour utilization data. The mean number of persons working only in agriculture, and the mean number working only in non-agriculture were not significantly different for the sample and the population. The disproportionately larger labour force in the intensively studied households appears to be related to the higher number of persons engaged in both types of activities, agricultural and non-agricultural. In relation to this, the mean number working at full-time non-agricultural employment in the sample was greater than in the population, but the level of significance was only $< .10$. As well, there was a significantly greater ($P < .02$) mean number of persons doing part-time own-account non-farm work in the sample.

The picture is complicated slightly by the fact that the variances for the number of persons taking full-time agricultural employment, and for the number of persons taking part-time agricultural employment were higher in the sample than in the population, ($P > .05$) although the means for these variables were not significantly different.

The sample variance was also significantly higher for the number of persons taking employment in the same region, but outside the chang-

was ($P > .10$). These higher sample variances indicate that a very high rate of participation occurred in just a few households, making the sample distribution more extreme than that of the population.

When the proportions of "No Answers" were tested on all variables for which they occurred, no significant differences between the sample and population appeared.

The one remaining quantitative variable with a significant difference between sample and population means was total rice production in the year preceding the field-work. The sample had a higher mean rice production ($P < .01$.). This higher production cannot be explained by differences in the size of holding, for such differences were not found when sample and population were compared.

The distribution of categories for the "adequacy of last year's rice harvest for household consumption" (Table I-1 in Appendix A) provides additional evidence that the sample households had better rice yields. 70% of the sample households fell in the category "sufficient rice for household consumption all year, and surplus for sale". This is not significantly different from the 48% of the population for whom the same was true. (Note that the sample size was small, N= 10.) However, the two remaining households in the sample which produced rice fell in the category "enough for 10 to 12 months" which is significantly more than the proportion (5 %) in the population in this category ($P < .05$).

There were no differences in the numbers of buffalo owned by households in the sample as compared with those in the population at the time of the interviews, but there was a difference in the proportion of households selling buffalo, the sample having the higher proportion ($P < .10$). The number sold ranged from 1 to 2 (Table I-2 in Appendix A). It is a common practice in Ban Chung for the farmers to sell their buffalo at the end of the rice planting season one year, and re-buy the next, in order to save having to raise the buffalo all year, and consequently to save on labour.

The fact that the interviews were done during the rice growing season indicates that the number of buffalo used by sample and population households was approximately the same. However, the sample households appear to have been involved more in the selling and re-buying practice, consequently saving on labour for the care of buffalo.

The facts that the mean number of persons per household in the sample was higher than in the population, and that the mean number younger than 11 years was lower, are substantiated by Table I-3 (in Appendix A). On the variable "Work Status" the sample had disproportionately more people in the labour force ($P < .05$), and disproportionately fewer younger than eleven years ($P < .02$).

There were no differences in the proportions of persons engaged in different industries or having different statuses with respect to main occupation (Tables I-4 and I-5 in Appendix A). However,

proportionately more persons in the labour force of the sample had a subsidiary occupation (Table 1-6, Appendix A) than was true for the labour force of the village population ($P < .10$). Another more interesting difference is the fact that the two people engaged in manufacturing industry as industry of subsidiary occupation were included in the sample ($P < .002$). What the manufacturing industry consisted of is not known. The two persons pursued it as employees outside the village.

In Bang Chung, the majority of households (73%) had land holdings. Landless households were slightly under-represented in the sample (10% as compared with 27% in the population) but the difference in proportions was not significant. However, there were differences between households with land holdings and those without, especially on variables related to size and composition of households, and the use of the labour force. (Table 3.2) It was consequently felt advisable also to compare only land holding households in the population and sample to help determine whether the differences which appeared for some of the variables mentioned above were partly attributable to differences between households with, and without, land holdings.

Several of the variables which had formerly shown significant differences (including the number of household members, number of persons in the labour force, the number working in both agriculture and non-agriculture, the number taking full-time agricultural employment, the number taking employment in the same region, and the number engaged in part-time own-account non-farm work) ceased

Table 3.2 Ban Chung: Means and Variances of Some Variables Related to Employment and Rice Production, for the Population and Sample of Village Households and Land Holding Households

Variable	Village Household Population		Village Sample		Land Holding Household Population		Land Holding Sample	
	μ	σ^2	$\bar{X}$	s^2	μ	σ^2	$\bar{X}$	s^2
Number of persons in the labour force	2.99	1.47	3.90	1.69	3.24	1.21	3.78	1.73
Number of persons engaged in both agricultural and non-agricultural activities	0.81	1.16	1.60	2.64	0.97	1.08	1.33	2.22
Number of persons taking full-time agricultural employment	0.22	0.57	0.50	2.25	0.05	0.28	0.00	0.00
Number of persons taking employment in the same region	0.05	0.07	0.20	0.36	0.03	0.18	0.00	0.00
Number of persons doing part-time own-account non-farm work	0.51	0.65	1.10	1.29	0.54	0.81	0.89	0.98
Total rice production during the year preceding the fieldwork (in 100 k.g.)	123	87,676	210	267,905	123	87,742	210	267,890

to do so when only households with land holdings were considered. However, many differences still remained. The mean number of persons younger than eleven years was significantly less for the sample households ($P < .05$). As for the number of persons in the labour force, the mean was almost equal for the sample and population of households with land holdings, indicating that the previously mentioned significant difference was a result of the smaller labour force of households without land holdings in the population (which was not reflected by the 1 household without land in the sample). However, the mean number of persons per household taking part-time agricultural employment, taking full-time non-agricultural employment, and taking employment in the same tambon, were all significantly higher for the sample ($P < .10$, $< .10$, and $< .02$ respectively). The variances for the first variable, number taking part-time agricultural employment, also showed significant differences ($P > .20$). (See Table 3.3).

There was a significant difference in variances for one variable on which the means did not show a difference. This was the number of persons taking part-time non-agricultural employment ($P > .05$).

To summarize briefly, the differences which formerly appeared in size of labour force ceased to exist when only households with agricultural holdings were considered. However, the tendency for a greater diversity in types of occupations continued to exist, as shown by the variables mentioned above, namely: the number taking part-time agricultural employment, the number taking full-

Table 3.3 Ban Chung, Households with Land Holdings: Z and χ^2 Values, with Significance Levels, for Quantitative Variables with Significant Z or χ^2 Values

Variable	Pz*	Z	Pχ^2**	χ^2
Number of persons younger than eleven years	.05	-2.239	-	0.34
Number of persons taking part-time agricultural employment	.10	1.765	.20	4.92
Number of persons taking full-time non-agricultural employment	.10	1.655	-	1.96
Number of persons taking part-time non-agricultural employment	-	0.932	.05	3.03
Number of persons taking employment in the same tambon	.02	2.571	.05	3.08

For sample and population means and variances for these variables, see expanded Table 3.3 in Appendix D.

* Only probabilities of .10 or less are given

** Only probabilities of .05 or more are given

df for this table = 8

time non-agricultural employment, and the number taking part-time non-agricultural employment. Members of the sample households were engaged more in off-farm employment, both agricultural and non-agricultural.

The differences which existed between the sample and the population when all households were considered for total rice production did not exist when only households with land holdings were considered. This would indicate that the former significant difference was partly the result of the difference (not statistically significant) between the proportions of agricultural households in the population and sample.

KHAYAI

The choice of the sample in this village was made difficult by the fact that brick-making was as important an occupation as agriculture. This being the case, it was even more difficult to decide what socio-economic variables should be used as a basis for sampling, in order to assure that the sample drawn be unbiased.

It is, therefore, not surprising to find that there are significant differences between the sample and population means on several variables which will be discussed shortly. Fortunately, at this point it is possible to explore the relationships between some of these variables and the economic bases of the households. Consequently, the procedure here will be initially to discuss the

village as a whole only for variables that are applicable to the whole village, and then to break the village up into two sections, the first being those households with agricultural holdings, and the second, those without. In fact, 44% of population households had operational holdings, as had 60% of the sample households. The difference in proportions here is not significant, ($P < .20$) and this provides the opportunity to split the village population as mentioned above, and consider each section separately.

Considering the village first as a whole, the mean number of persons in the labour force, and the mean number of children younger than eleven years are both significantly greater ($P < .02$ for both variables) in the sample than in the population. (See Table 3.4.) However, the mean number of household members is not significantly different, nor are the other three variables related to household size, namely the number of persons too old to work, the number handicapped, and the number eleven years or older who are studying full-time.

The larger labour force in the sample households is probably related to the finding that the intensively studied sample had a higher mean number of persons doing own-account non-farm work than the population. Disproportionately more were engaged in full-time ($P < .001$) and part-time ($P < .02$) own-account non-farm work in the sample (see Table 3.4). Certainly the fact that there was a difference on these particular variables, and that the difference

Table 3.4 Khayai, Whole Village (Only Variables Applicable to the Whole Village): Z and χ^2 Values, with Significance Levels, for Quantitative Variables with Significant Z or χ^2 Values

Variable	Pz*	Z	Pχ^2**	χ^2
Number of household members	-	0.880	-	0.09
Number of persons in the labour force	.02	2.411	-	0.85
Number of persons younger than eleven years	.02	2.360	-	1.67
Percent unnecessary labour during the rice planting season	.02	2.402	.20	2.43(df=5)
Number of persons doing full-time own-account non-farm work	.001	3.411	-	1.21
Number of persons doing part-time own-account non-farm work	.02	2.330	-	1.88

For sample and population means and variances for variables, see expanded Table 3.4 in Appendix D.

* Only probabilities of .10 or less are given

** Only probabilities of .05 or more are given

df for this table = 9, unless otherwise indicated

for the former was as significant as it was indicates a very strong bias in the sample towards non-agricultural occupations which can be pursued own-account. The important one in Khayai is, of course, the home industry of brick-making. Trading is another own-account non-farm activity common in Khayai. Just what the sample households were doing will be discussed in more detail later.

There were no significant differences in the distribution of categories for industry of main occupation of household head (Table II-1 in Appendix A), but there were significant differences in the distributions for employment status of household head in main occupation. Proportionately fewer household heads in the sample than in the population said that they were employees ($P < .10$), and proportionately more answered that they were self-employed ($P < .05$). (See Table II-2 in Appendix A). These facts support the tendency in the sample toward own-account non-farm work, already mentioned above.

Of the two household heads in the population with trading as industry of subsidiary occupation, one was in the sample. This resulted in a significant Z value for this variable ($P < .05$), as shown in Table II-3 in Appendix A.

The distributions for status of household head in subsidiary occupation did not show any significant differences. (Table II-4 in Appendix A)

Looking at industry of subsidiary occupation for the labour force (Table II-5 in Appendix A), it can be seen that the bias towards trading as a subsidiary occupation was even more pronounced for the labour force as a whole than it was for household heads. The sample had proportionately more persons with trading as industry of subsidiary occupation than had the population ($P < .00001$).

There were no other significant differences in industry of main or subsidiary occupations or in employment status of the labour force in these occupations.

A significantly greater proportion of sample households hired permanent employees (that is, hired employees for 180 days or more) in the year preceding the fieldwork (Table II-6 in Appendix A), because the only household in the village with permanent employees was in the sample. The significance level in this case was $< .001$. The permanent employees hired were persons from within the village itself.

Proportionately more of the sample households also hired casual labourers (Table II-7 in Appendix A) during the year preceding the fieldwork, In this case the significance level was not as high, however ($P < .10$). These casual labourers were all people from within the village, with the exception of 6% of population households who did not give answers to the place of origin of their employees (Table II-8 in Appendix A). It is most likely that these 6% were from outside the village, or there would have been answers given.

Proportionately fewer answers were given by the sample households ($P < .10$).

Households which hired labour paid their employees in cash, with the exception of two households in the population (one of which was in the sample) which paid in cash and food (Table II-9 in Appendix A). Consequently, the sample proportion paying cash and food was significantly greater than that of the population($P < .05$).

There were no differences in the mean number of man-months spent working by hired labour, but significantly fewer of the sample households gave an answer for this variable ($P < .10$). See Table 3.5 following:

Table 3.5 Khayai, Whole Village: Frequencies of No Answers on Quantifative Variables

Variable	Pz*	Z	% Sample	% Population
Man-months spent working by hired labour	.10	-1.694	40	66

* Only probabilities of .10 or less are given.

Proportionately more sample households participated in labour exchange by giving labour ($P < .10$). (See Table II-10 in Appendix A). The sample households giving labour in labour exchange gave from 6 to 41 man-days. This contribution differed proportionately from that of the population for two categories, 21 to 30 man-days ($P < .10$) and 6 to 10 man-days ($P < .001$), in both cases the sample having the higher proportion. Answers to the question on labour exchange received were not significantly different for the sample and population.

Answers to the question on the percent of unnecessary labour during the rice planting season were only given by 6 of the sample households (out of 10) and by 63% of population households. These households answering in the sample had a higher mean ($P < .02$). At the same time, the test for differences between variances gave a probability $> .20$ that the sample was not drawn from the population, strongly indicating a bias in the sample. This significant difference between population and sample variances also throws some doubt on the validity of Z, as the Z-test assumes equal variances for sample and population. It can be concluded that the sample is not representative of the population for this variable (the percent of unnecessary labour during the rice planting season) which is relevant to labour utilization.

The significant differences between the population and the extensively studied sample discussed above for Khayai can be very quickly summarized. The sample households had a larger mean size of labour force, and hired more employees, but also gave more labour exchange.

More of the sample household heads were self-employed, and more of the sample labour force were engaged in own-account non-farm work. Trading occurred as industry of subsidiary occupation in the sample more than in the population. And finally, the sample experienced more unemployment during the rice planting season, but not during the remainder of the year.

When the population and sample for Khayai were divided into two parts, households with land holdings and those without land holdings, the origins of some of the previously mentioned biases became clearer. Biases appeared for some variables not discussed previously because they were not applicable to the total population and sample. This division into two parts is most important where there are biases on variables closely related to labour utilization.

KHAYAI, Land Holding Households:

In the group of households with land holdings, several quantitative variables had significant χ^2 values. While some of these variables also had significant Z values, there were no variables with significant Z's that did not have significant χ^2 values. The validity of all of the Z values for these variables is, of course, suspect. One of the assumptions underlying the use of Z is equal variances for sample and population, a condition not met for any of the quantitative variables which showed significant differences between the sample and the population. For all the significant variables, the means and variances of the sample were larger than those of the population.

Table 3.6 Khayai, Households with Land Holdings: Z and χ^2 Values, with Significance Levels, for Quantitative Variables with Significant Z or χ^2 Values

Variable	Pz**	Z	Pχ^2**	χ^2
Number of persons younger than eleven years	.002	3.244	.05	1.46
Number of persons taking part-time non-agricultural employment	.05	2.057	.70	6.06
Number of persons doing full-time own-account non-farm work	-	1.387	.05	1.63
Number of persons in the labour force	-	1.088	.05	1.37
Percent of last year's rice production bartered or sold	-	1.511	.20	2.63
Percent of unnecessary labour during the rice planting season	-	1.504	.10	1.88

For sample and population means and variances for these variables, see expanded Table 3.6 in Appendix D.

* Only probabilities of .10 or less are given

** Only probabilities of .05 or more are given

df for this table = 5

Chi-square (χ^2) values with $P > .05$ were obtained for three variables: the number of persons in the labour force, the number of persons younger than eleven years, and the number of persons doing full-time own-account non-farm work. One of these three (the number of persons younger than eleven years) had a significant Z value ($P < .002$). (See Table 3.6).

The percent of unncessary labour during the rice planting season had a significant χ^2 value ($P > .10$), as had the percent of the previous years' rice harvest bartered or sold ($P > .20$). The former may well be related to the distribution of the number of persons in the labour force, mentioned above.

A χ^2 value significant at $P > .70$ was found for the number of persons taking part-time non-agricultural employment, indicating a very strong sample bias for this variable.

Several of the above variables may be inter-related, particularly the size of the labour force, the percent unnecessary labour during the rice planting season, participation in full-time own-account non-farm work, and participation in part-time agricultural employment. These possible inter-relationships will be explored in the following chapter.

A few of the descriptive variables also showed significant differences between sample and population. Proportionately more of the sample households hired permanent employees (Table II-11 in Appendix

A). In fact, the only household in the population with permanent employees was in the sample. These employees were local villagers. The usual form of payment for hired labour (permanent and casual) was cash (Table II-12 in Appendix A). The sample had a slightly higher proportion paying in cash and food ($P < .10$).

Labour exchange was given (Table II-13 in Appendix A) by proportionately the same number of households in both the sample and the population. However, proportionately more sample households gave 6 to 10 man-days ($P < .10$). The differences between proportions for other categories were not significant.

No differences in the relative frequencies of categories appeared for any of the other descriptive variables for households with land holdings.

KHAYAI Households without Land Holdings

There were differences between the sample and population of households without land holdings on a few variables. The mean number of persons in the labour force was higher in the sample ($P < .10$), as were the mean number of persons engaged in only non-agricultural work ($P < .05$), and the mean number of persons doing full-time own-account non-farm work ($P < .02$), for which the value of the variance test (χ^2) was also significant ($P > .20$). The data on employment status of household heads in main occupation (Table II-14 in Appendix A) showed that proportionately more sample household heads were self-employed ($P < .10$). These data all tend to suggest that the sample

Table 3.7 Khayai, Households without Land Holdings: Z and χ^2 Values, with Significance Levels, for Quantitative Variables with Significant Z or χ^2 Values

Variable	P_z*	Z	P_{χ^2}**	χ^2
Number of persons in the labour force	.10	1.951	-	0.26
Number of persons engaged only in non-agricultural work	.05	2.224	-	0.22
Number of persons doing full-time own-account non-farm work	.02	2.360	.20	1.19
Number of children of household head	-	0.869	.05	0.45
Number of persons younger than eleven years	-	0.833	.40	1.92
Number of persons engaged in full-time study or training	-	0.231	.05	0.44

For sample and population means and variances for these variables, see expanded Table 3.7 in Appendix D.

* Only probabilities of .10 or less are given

** Only probabilities of .05 or more are given

df for this table = 3

households depended more on home industry, and possibly on other own-account non-farm work, than was true of the population of households without land holdings.

Significant values for the χ^2 test were found for a few other variables besides the one mentioned above (the number of persons doing full-time own-account non-farm work, $P > .20$). The number of children of household head, and the number of persons engaged in full-time study or training had χ^2 values both significant at $P > .05$. That for the number of persons younger than eleven years was $P > .40$, showing a strong bias in the sample.

There were also some descriptive variables with significantly different distributions for the sample and population of landless households. Table II-15 in Appendix A, Industry of Subsidiary Occupation of Household Heads shows that the only household head in the population with trading as a subsidiary occupation was in the sample ($P < .0001$). Only one population household hired casual employees (employees hired for less than 180 days of the year), and again it was in the sample ($P < .0001$). (Table II-16 in Appendix A). No answer was given for the place of origin of this casual labour, again producing a significance level of $P < .0001$ (Table II-17 in Appendix A).

The fact that so few of the descriptive variables showed significant differences was undoubtedly largely the result of the very small sample size ($N = 6$ and 4) once the village was split into the two sections, households with land holdings and those

without. With such small sample sizes, differences in proportions must be very large indeed to be statistically significant.

THAP NAM

Thap Nam, although it is a village dependent almost entirely on agriculture, does present the same sort of sampling problems as Khayai does with its combination of agriculture and home industry. In Thap Nam, livestock raising is at least as important an activity for labour utilization and as a source of income as is rice farming. Moreover, the kinds of livestock raised depend largely on the financial status of the household, as has already been stated in Chapter I.

It is not surprising, then, to find that the sample for Thap Nam does differ significantly from the population on many variables (See Table 3.8).

The mean household size in the sample was significantly greater than in the population, ($P < .002$). There were also significant differences between the means of other variables related to household size, the sample mean always being the higher. These variables are: the number of persons in the labour force ($P < .01$), the number older than 11 years studying full-time ($P < .05$), the number of children of household head (both at and away from home) ($P < .10$), and the number of persons younger than eleven years ($P < .10$). In conection with the larger labour force, the mean number engaged only in agriculture was also significantly higher ($P < .02$) while the mean numbers engaged only in non-agriculture, and in both agriculture and non-agriculture,

Table 3.8. Thap Nam, Whole Village: Z and χ^2 Values, with Significance Levels, for Quantitative Variables with Significant Z or χ^2 Values

Variable	Pz*	Z	P_{χ^2} **	χ^2
Number of household members	.002	3.202	-	1.20
Number of children of household head	.10	1.679	-	0.74
Number of persons in the labour force	.01	2.586	-	1.01
Number of persons younger than eleven years	.10	1.690	-	0.95
Number of persons older than eleven engaged in full-time study or training	.05	2.029	-	1.21
Number of persons working only in agriculture	.02	2.346	-	1.19
Size of operational holding in rai	.10	1.905	-	0.58 (df = 8)
Number of rai of land used in the rainy season	.10	1.905	-	0.58 (df = 8)
Number of plots of land farmed	.10	1.818	-	1.74 (df = 8)
Number of persons engaged in full-time non-agricultural employment	.10	1.696	-	1.34
Percent of crops other than rice bartered or sold	.02	-2.402	.20	0.47 (df = 2)

For sample and population means and variances for these variables, see expanded Table 3.8 in Appendix D.

*Only probabilities of .10 or less are given

**Only probabilities of .05 or more are given

df for this table = 9, unless otherwise indicated

were not significant.

As well as larger households in the sample, there was also a tendency towards larger land holdings, although the significance levels here were not as high. The size of operational holding and the amount of land used in the rainy season had higher means in the sample than in the population, but the significance levels were only $< .10$. In addition, the mean number of plots of land farmed in the sample households was greater than in the population ($P < .10$), although the mean size per plot of land was not different.

The sample households had a significantly lower mean for the percentage of crops other than rice bartered or sold ($P < .02$), and showed a difference between sample and population variances ($P > .20$) as well. However, only 3 (30%) of the sample households and 23 % of the population households gave an answer to the question. Thus, it appears that approximately the same proportion of households in sample and population had crops other than rice for sale, but that the sample data for households which sold crops cannot be considered representative of those in the population for quantity sold. At the same time, it must be understood that in Thap Nam the growing of crops other than rice, (corn, sesame, and watermelons), is undertaken by most households, but only for home consumption. Moreover, the yields from these crops are greatly affected by the vagaries of nature. Having produce for sale is more accidental than planned, and data for one year only are not necessarily indicative of general trends.

Full-time non-agricultural employment was pursued by more persons, on the average, in the sample households than in the population ($P < .10$). This employment in the sample households consisted mainly of sewing peasant hats for a trader from tambon Khayai who supplied the raw materials. There was also a school teacher in one the sample households.

There was no significant difference between the sample and the population on the mean number of man-months spent working by hired labour in those households which did hire labour. However, proportionately more of the sample households gave an answer to the question $P < .10$ (Table 3.9). In addition, proportionately more sample households hired casual labour ($P < .10$, Table III - 4 in Appendix A). This is possibly related to the larger holdings of the sample households, as larger holdings require more labour input during the harvesting season, and households with larger holdings are more likely to hire a tractor to do their ploughing. (Rice in Thap Nam is broadcast, so planting does not require nearly the amount of labour input needed in a village like Ban Chung, where rice is transplanted.)

The sample households gave proportionately more answers (Table 3.9) to the question on the average rice yield per rai over the past five years ($P < .02$). However, 31% of population households did not have land holdings, an additional 3% had land holdings but did not plant rice, and only 3% planted rice but did not answer the question. It is possible that some of the latter households had been growing rice for fewer than 5 years.

Table 3.9 Thap Nam, Whole Village: Frequency of No Answers on Quantitative Variables

Variable	Pz*	Z	% Sample	% Population
Man-months spent working by hired labour	.10	-1.850	10	38
Average rice yield per rai over the past five years (in 10 kilograms)	.05	-2.024	10	43

* Only probabilities of .10 or less are given

The distributions of descriptive variables also showed some sample biases. All household heads in the sample had farming as industry of main occupation (Table III-1 in Appendix A), and self-employed as employment status in main occupation, (Table III-2) despite the fact that one household did not have a land holding. (This household head raised livestock in his house-ground as main occupation, and worked as an agricultural labourer as subsidiary occupation). In the case of both of these variables, the proportion in the sample category mentioned (farming, and self-employed), was significantly greater than in the population ($P < .05$ and $P < .10$ respectively).

When the industry of main occupation of the labour force (Table III-3 in Appendix A) was considered, there were some very significant differences between the sample and the population. Proportionately more of the labour force in the sample were engaged in farming ($P < .002$), and proportionately fewer in trading ($P < .05$), and casual labour ($P < .05$). As well, proportionately more of the labour force were part of the household labour force working in the family enterprise, and proportionately fewer were employees. The probability for each of these latter categories was $< .05$. (See Table III - 11 in Appendix A.)

Casual labour was hired by proportionately more of the sample households (Table III-4 in Appendix A) during the year preceding the field work ($P < .10$). This was likely related to the larger land holdings of the sample households. The majority of households paid their hired labour in cash. (Table III-5 in Appendix A). This was true of 60 % of population households and 80 % of sample households. The only population household paying its hired labour in both cash and kind was in the sample ($P < .05$).

Buffalo (Table III-6 in Appendix A) were owned by proportionately more of the sample households ($P < .05$). However, there were no signi-

ficant differences for the proportions owning different numbers of buffalo. The same proportions of sample and population households sold buffalo during the year preceding the fieldwork (Table III-7 in Appendix A), but there was a tendency for the sample households to sell more head. More sample households sold 3 to 5 head ($P < .001$). When all categories from 3 to 25 head were combined the proportion for the sample was still larger than that for the population ($P < .10$).

Proportionately more sample households owned hogs ($P < .05$) than those in the population (Table III-8 in Appendix A). All sample households owned hogs, whereas only 69 % of population households did so. The distribution for the number of hogs sold during the year preceding the fieldwork (Table III-9 in Appendix A) is somwhat less clear. Only 50% of sample households and 39% of population households sold hogs (differences not significant). Proportionately more sample households sold 6 to 10 head ($P < .10$), and this difference remained for the collapsed category 3 to 10 head. Other categories and combinations of categories did not show significant differences between the sample and the population.

The sample households owned proportionately more poultry in the categories 11 to 20 ($P < .01$) and 31 to 40 ($P < .05$). (See Table III-10 in Appendix A). The redistribution of the data into 3 categories, (owned 1 to 20 , owned 21 to 40, and owned more than 40) showed that proportionately more households in the sample fell in the category 1 to 20 ($P < .02$), while there were no differences between sample

and population for the other categories. In short, more of the sample households raised small numbers of poultry. There were no differences in proportions for the sample and population raising larger numbers.

Whether the fact that more of the sample households owned hogs and small numbers of poultry means that the sample households devoted more time to livestock raising is not clear, however, as the picture is complicated by the raising of ducks. Most of the poultry raised in Thap Nam were ducks, and ducks were usually raised in greater quantities than 40. The fact that the interviews were done during the rice-growing season, when few, if any, ducks were being raised, means that the data do not reflect the true amount of poultry raised in the village. If the data had included ducks, it is almost certain that proportionately more of the population households (as compared with sample households) would have raised them, for the field reports indicate that households in Thap Nam which had larger land holdings and were better off raised hogs, while these which were poorer, and especially those without land holding, raised ducks. It is therefore, likely that while hog-raisers were over-represented in the sample households, duck-raisers were under-represented.

To briefly summarize, when applied to the full sample and population, the statistical tests show that the sample households were, on the average, larger, with a larger mean labour force, a larger mean number of persons younger than eleven, and a larger mean number of persons eleven and over engaged in full-time study and training. The mean

number of children of household head was also larger. Land holdings were, on the average, larger. This may be because 8 of the 9 sample households with holdings rented in at least some of their land. Farming was the industry of main occupation of proportionately more of the sample labour force, while fewer persons were engaged in trading and casual labour. More of the sample households raised buffalo and hogs, and in the case of hogs, raised more of them. As well, more household members in the sample, on the average, were engaged in full-time non-agricultural employment.

When households not having agricultural holdings were eliminated from both the population and sample data, some of the differences discussed above disappeared (See Table 3.10). Several persisted, however, indicating that the 9 agricultural households in the sample were not as representative of the 72% of households with land holdings in the village as would be desirable. The mean size of the labour force was still higher for the sample ($p < .05$), as was the mean number of persons engaged in full-time study or training ($P < .10$). In connection with the larger labour force, the sample households also had a higher mean number of persons engaged only in agriculture ($P < .10$), and a higher mean number taking full-time non-agricultural employment ($P < .10$). The mean size of operational holding was also larger for the sample than for the population of households with operational holdings ($P < .10$).

Table 3.10 Thap Nam, Households with Land Holdings: Z and χ^2 Values, with Significance Levels, for Quantitative Variables with Significant Z or χ^2 Values

Variable	Pz*	Z	Pχ^2**	χ^2
Number of persons in the labour force	.05	2.086	-	0.99
Number of persons eleven or older engaged in full-time study or training	.10	1.951	-	1.44
Number of persons engaged only in agriculture	.10	1.719	-	1.12
Size of operational holding in rai	.10	1.905	-	0.58
Number of persons taking full-time non-agricultural employment	.10	1.762	-	1.24

For sample and population means and variances for these variables, see the expanded Table 3.10 in Appendix D.

* Only probabilities of .10 or less are given

** Only probabilities or .05 or more are given

df for this table = 8

ON TAI

Of the five villages under study here, the village in On Tai is the one which showed the fewest differences between the population and the intensively studied sample on the Socio-Economic Profile Schedule. This is probably partly the result of the relatively greater homogeneity of this village. The village in On Tai was a village of 96 households, and was relatively more isolated than any of the other four villages studied. The principal occupation was agriculture. In fact, 92% of village households had land holdings, and 100% of the village labour force had farming as industry of either main or subsidiary occupation. Of the five villages, On Tai had the smallest variances on 23 out of 55 of the quantitative variables on the Socio-Economic Profile Schedule. Of the remaining variables, only on 6 did it have variances greater than those of any other village. These statistical data support the general observation that village households in On Tai were highly similar. Greater homegeneity increases the chances of selecting an unbiased sample, and the homogeneity of On Tai households is reflected in the small number of variables on which there were sample biases.

The only two quantitative variables which produced significant Z values were concerned with place of employment. There was one individual in the village who took employment in the same region (in this case the Northern Region) but outside the same or a neighbouring changwat, and there was also one person who took employment in a different region. Both of these individuals were members of households in the intensively studied sample ($P < .01$ for both variables). Just as the Z values for these two variables were significant, so

Table 3.11. On Tai, Whole Village: Z and χ^2 Values, with Significance Levels, for Quantitative Variables with Significant Z or χ^2 Values

Variable	P_z*	Z	P_{χ^2}**	χ^2
Number of persons taking employment in the same region, but not in the same or a neighbouring changwat	.01	2.790	.50	8.73
Number of persons taking employment in a different region	.01	2.790	.50	8.73

For sample and population means and variances for these variables, see expanded Table 3.11 in Appendix D.

* Only probabilities of .10 or less are given

** Only probabilities of .05 or more are given

df for this table = 9

were those for Chi-square ($P > .50$; χ^2 for each variable was 8.73).

There were a few more variables with significantly different proportions of "No Answers". There were proportionately fewer answers in the population than in the sample to the questions on the amount of unnecessary labour in the household during the rice planting season, the rice harvesting season, and at other times ($P < .10$ for all three variables). The same was true for three more variables (each with $P < .05$), the average rice harvest per rai over the last 5 years, last year's total rice production, and the percent of last year's rice production bartered or sold. However, 8 households (8%) in the population did not have land holdings. Once those households without land holdings were eliminated, the number of "No Answers" no longer produced significant differences in proportions for any of these six variables. (See Table 3.12).

A significant difference occurred in the distribution for industry of subsidiary occupation of household head (Table IV - 1 in Appendix A). Proportionately more sample household heads fell into the category "farming" ($P < .10$). On closer inspection, it turns out that 3 of the 4 sample household heads with farming as industry of subsidiary occupation also had farming as industry of main occupation, indicating that these households both grew crops and raised livestock (which the villagers look upon as two different activities). The most important livestock in On Tai were bullocks. It is most likely that the household heads considered crop production as their main occupation, and livestock raising as subsidiary occupation,

Table 3.12 On Tai, Whole Village: Frequency of No Answers on Quantitative Variables

Variable	Pz*	Z	% Sample	% Population
Percent unnecessary labour during the rice planting season	.10	-1.934	0	27
Percent unnecessary labour during the rice harvesting season	.10	-1.934	0	27
Percent unnecessary labour during periods other than the rice planting and rice harvesting seasons	.10	-1.934	0	27
Average rice yield per rai over the past five years (in 10 kilograms)	.05	-2.184	0	32
Total rice production last year (in 100 kilograms)	.05	-1.978	0	28
Percent of last year's rice production bartered or sold	.05	-1.978	0	28

* Only probabilities of .10 or less are given

although the reverse might also be the case.

The only household in the population owning 6 to 10 buffalo (Table IV-2 in Appendix A) was in the sample. Although almost the same proportions of sample and population households owned buffalo (40% and 39% respectively), the sample households tended to own more. When the categories for the number owned were collapsed into two categories, one to five head, and 6 to 10 head, the difference in proportions between the sample and the population on the first category was not significant, but on the second it was at $P < .10$.

The distribution for the number of cattle owned (Table IV-3 in Appendix A) showed a bias towards more cattle owned by the sample households. First, proportionately more sample households owned cattle ($P < .05$). As well, proportionately more sample households owned 3 to 10 head ($P < .10$) and the only household in the population with 26 to 50 head was in the sample ($P < .01$). These differences in the number of buffalo and cattle owned imply a bias in the labour utilization data towards more time spent tending livestock.

When the households without land holdings were excluded in the population (there were no landless households in the sample), the differences mentioned above for the variables "number of persons taking employment outside the changwat but in the same region", and the "number of persons taking employment outside the region" decreased slightly in significance, while the proportion of household heads with farming as subsidiary occupation remained significant at the old level (Table

Table 3.13 On Tai, Households with Land Holdings: Z and χ^2 Values, with Significance Levels, for Quantitative Variables with Significant Z or χ^2 Values

Variable	Pz*	Z	Pχ^{2}**	χ^2
Number of persons taking employment in the same region, but not the same or a neighbouring changwat	.01	2.644	.40	8.01
Number of persons taking employment in a different region	.01	2.644	.40	8.01

For sample and population means and variances for these variables, see expanded Table 3.13 in Appendix D.

* Only probabilities of .10 or less are given

** Only probabilities of .05 or more are given

df for this table = 9

IV-4 in Appendix A). The proportions for the different numbers of buffalo and cattle owned were not recalculated without the 8 landless households.

BUAK KHANG

As has already been mentioned above, the "sample" in tambon Buak Khang was not drawn from the village used for the 100% enumeration, but from another nearby village in the same tambon. Consequently, this location is by far the most suspect of all of the samples of not being representative of the village covered by the Socio-Economic Profile Schedule. It is not surprising to discover that significant differences exist between the population and sample means and proportions on many variables. Moreover, many of these differences are at levels of significance higher than those found in the other villages under discussion.

The sample in Ban Buak Khang had higher means for the number of household members ($P < .05$), the number of persons younger than eleven ($P < .01$), and the number of persons eleven and over,but studying full-time ($P < .10$) than had Ban Roi Phrom (Table 3.14). Although the labour force was the same size on the average for households in the sample in Ban Buak Khang and in Ban Roi Phrom, the use of that labour force was different. The sample in Ban Buak Khang had more people doing full-time own-account non-farm work ($P < .05$), hired more man-months of labour ($P < .01$), and yet said that they had a

Table 3.14. Buak Khang, Whole Village: Z and χ^2 Values, with Significance Levels, for Quantitative Variables with Significant Z and χ^2 Values

Variable	Pz*	Z	Pχ^2**	χ^2
Number of household members	.05	2.142		0.98
Number of persons younger than eleven years	.01	2.745		0.69
Number of persons engaged in full-time study or training	.10	1.950		1.04
Number of rai of land owned	.05	2.285		1.15
Size of operational holding in rai	.10	1.712		0.90
Amount of land used in the rainy season (in rai)	.10	1.723		0.91
Amount of land used in the dry season (in rai)	.02	2.507		2.10
Number of rai of land rented in	.05	-2.318		0.10
Number of plots of land farmed	.05	2.098		0.90
Percent unnecessary labour at times other than the rice planting and rice harvesting seasons	.00001	5.755		3.14
Number of persons doing full-time own-account non-farm work	.05	2.250		1.90
Man-months worked by hired labour	.01	2.838		0.45 (df=8)
Percent of arable land under two-season cropping	.10	1.790	.05	3.91
Average rice yield per rai over the past five years (in 10 kilograms)	.10	1.672		0.77 (df=8)
Total rice production last year (in 100 kilograms)	.02	2.339		0.49
Percent of last year's rice production bartered or sold	.05	2.322		0.33
Percent of arable land farmed in the wet season only	-	-1.436	.05	3.54

For sample and population means and variances for these variables, see expanded Table 3.14 in Appendix D

* Only probabilities of .10 or less are given

** Only probabilities of .05 or more are given

df for this table = 9, unless otherwise indicated

higher percent of unnecessary labour at times other than the rice planting and rice harvesting seasons. ($P < .00001$.)

There was also a definite difference in the land tenure situation between the sample households in Ban Buak Khang and the village of Ban Roi Phrom. The sample in Ban Buak Khang , on the average, owned more land ($P < .05$), had larger operational holdings ($P < .10$), all of which were used in the rainy season, used more land in the dry season ($P < .02$), and rented in less land ($P < .05$). The number of plots of land farmed per household was also greater in the sample than in Ban Roi Phrom ($P < .05$). In addition, the average rice yield per rai over the past five years was slightly higher ($P < .10$), and the average rice production in the past year was higher ($P < .02$) for the sample. Of course, the higher rice production could be expected because of the larger operational holdings, The sample households were also able to barter or sell a higher percent of their rice harvest in the year preceding the field-work ($P < .05$).

Not only were the means of these variables for the sample households which gave answers higher than for those of the population, but the proportions of answers in the sample were higher for most of the variables. Fewer of the households in the population in Ban Roi Phrom had land holdings ($P < .05$). (Note: Landless households were not included in the calculations for the variables related to amounts of farm land discussed above). There were also proportionately fewer answers to the questions on percent of unnecessary labour at times other than the rice planting and rice harvesting seasons ($P < .10$,

the number of man-months spent by hired labour ($P < .00001$), the average rice yield per rai over the past five years ($P < .10$), and the percent of crops other than rice bartered or sold ($P < .00001$).

From the distributions of work status for all members of the sample and population (Table V-1 in Appendix A), it can be seen that proportionately fewer of the persons of the sample were in the labour force ($P < .01$), while proportionately more were younger than eleven years ($P < .05$).

The distribution of categories for industry of main occupation (Table V - 2 in Appendix A) was somewhat different for the sample in Ban Buak Khang and the village of the socio-economic study, Ban Roi Phrom. Proportionately fewer members of the labour force in the sample were in farming ($P < .10$), and proportionately more were in the civil service ($P < .10$). In addition, one individual in the sample was in the transportation industry, while no one in Ban Roi Phrom was. This is, of course, impossible, in a sample drawn from the population it is meant to represent.

There were two significant differences in proportions in the categories of employment status in main occupation (Table V-3 in Appendix A), but the significance level for each was only $< .10$. The sample had proportionately more self-employed, and proportionately fewer working in the household labour force. Proportionately more of the sample labour force had farming as industry of subsidiary occupation (Table V - 4 in Appendix A, $P < .05$).

For employment status in subsidiary occupation (Table V-5 in Appendix A), again there were differences in the distribution of categories. Proportionately fewer in the sample in Ban Buak Khang were employees ($P < .05$) and proportionately more were part of the household labour force. ($P < .01$).

These trends are further substantiated by the data on occupations of household heads (Tables V-6, V-7 and V-8 in Appendix A). Proportionately more of the Ban Buak Khang household heads had farming as industry of main occupation ($P < .05$), and home industry as industry of subsidiary occupation ($P < .001$). Proportionately fewer persons were employees ($P < .10$) and proportionately more were self-employed ($P < .02$) in their main occupations. There were no significant differences in employment statuses for subsidiary occupations.

In summary, the sample in Ban Buak Khang had a proportionately smaller labour force, and a larger group younger than eleven years. It also had larger land holdings, which were used more intensively than those in the extensively studied village, Ban Roi Phrom. The distributions of industries of occupation were somewhat different. The sample also appeared to have more self-employed persons and fewer employees, when both main and subsidiary occupations were considered.