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The Rice/Population Balance in a Northeast Thai Village

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I Introduction

Northeast Thailand, the Khorat plateau, accounts for about one third of Thailand in terms of area and population. Yet the region's per capita revenue is approximately one third of the national average. The poverty and hardship of peasants in the region are primarily due to its harsh environment; the scanty rainfall, poor, sandy soils and limited water resources.

Archaeological excavations show that the region is one of the earliest inhabited places in mainland Southeast Asia. But it was abandoned after the fall of Angkor in the fifteenth century and became a political as well as demographic vacuum. The vacuum was filled mainly by the Laotians who started migrating across the Mekong river in the eighteenth century [Keyes 1976]. Today, the region's largest ethnic group consists of Lao-speakers. They are called the 'Thai-Lao' in this article.

The staple food in the region is lowland rice of the glutinous type, which is grown mostly under rainfed conditions. In proportion to the population increase, a vast area has been reclaimed as paddyland since the nineteenth century. Today, the region's paddy acreage accounts for roughly one third of that of the whole country. The region is basically a rice-growing area, but it has barely produced surplus till today. The cash crops in the region are upland crops, which were introduced only after World War II.

It is well known that major deltas of mainland Southeast Asia were reclaimed in the nineteenth century. They quickly became the rice-bowls of Asia. The Chao Phraya delta of Thailand is no exception. Paddyland reclamation proceeded more or less concurrently in the delta and the Khorat plateau but in quite contrasting modes: highly commercialized in the former while largely for subsistence in the latter.

DD, a rice-growing village in Khon Kaen province, was first studied by K. Mizuno, a Japanese anthropologist.[1] For three years, in

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1) The late Koichi Mizuno's works were edited by N. Maeda and Y. Tsubouchi and published in Japanese after his demise in 1979; *Tai Noson no Shakai-Soshiki* [*Social Organization in Thai Villages*], Tokyo: Sobun-sha, 1981. His own papers on DD in English were as follows.
1968. Multihousehold Compounds in Northeastern Thailand. *Asian Survey* 8: 842–852.
1971. *Social System of Don Daeng Village: A Community Study in Northeast Thailand.* CSEAS Discussion Paper Nos. 12–22. Kyoto University.
1972. *Japanese Scholarship on Southeast Asian Villages—A Socio-Anthropological View.* CSEAS Discussion Paper No. 38. Kyoto University. (Also in *Foreign Values and Southeast Asian Scholarship*, edited by J. Fischer, pp. 211–236. ↗

1981–84, the same village was studied again, this time by an interdisciplinary team, of which the author was a member.[2] The team's agroecological findings are the basis of this article.

II Mortality and Fertility

Basic data on mortality and fertility of the village were collected through interviewing all ever-married women residing in the village during the latter half of 1983. There were in total 232 such women. They had given birth to 876 children, of whom 122 had passed away. The dates of birth, and death if applicable of the 876 children regardless of wherever they had been or were residing were used to construct a birth-cohort life-table, from which the mortality condition of the village was estimated. Similarly, the experiences of marriage and childbirth of the 232 women, regardless of where they took place, were analyzed in terms of cohorts, from which the fertility condition was estimated.[3]

The abbreviated cohort life-tables of the 876 children are shown in Table 1. The l_x values of the tables, representing the survivors to age x, were compared with those of the Coale-Demeny 'North' model [Coale and Demeny 1966] (Fig. 1). From this, it can be concluded that;

(a) it is most likely that during the period under discussion (the early 1930s to 1983), this village did not experience the sort of calamity that might have resulted in an unusual pattern of age-specific mortality rates, and

(b) the mortality condition certainly improved throughout the period, if not completely in parallel with the lapse of time. The life expectancy of the 1934–43 cohort is 50.8 years (the average of males and females) while that of those born after 1964 is 63.2.

The mortality of DD was compared with that of the 1970 national census. In terms of the infant mortality, the two agree reasonably well for the period of the late 1960s (q_0=ca. 0.05 for DD and ca. 0.06 for the country or region). For the period around 1960, however, the rate for DD (ca. 0.08) is somewhat lower than those

↘ Research Monograph No. 11. Center for South and Southeast Asian Studies, University of California)

1975. Thai Pattern of Social Organization: Note on a Comparative Study. *J. of Southeast Asian Studies* 6: 127–134. (Also in *Southeast Asia: Nature, Society and Development*, edited by S. Ichimura, pp. 13–23. University Press of Hawaii, 1976)

1977. Comparative Analysis of Rural Development: Rice-Growing Villages in Thailand and Malaysia. *Tonan Ajia Kenkyu* [Southeast Asian Studies] 15: 389–420.

1978. Change and Development of Two Rice-Growing Villages in Thailand—Don Daeng and Khok Chyak. *Tonan Ajia Kenkyu* [Southeast Asian Studies] 16: 353–377.

1978. Social Organization of Rice-Growing Villages. In *Thailand: A Rice-Growing Society*, edited by Y. Ishii, pp. 83–114. University Press of Hawaii.

2) The team was directed by Prof. Y. Ishii of CSEAS and consisted of about 20 researchers in different disciplines from Japan and Thailand. The project was financed by a grant from the Ministry of Education, Science and Culture of the Japanese Government. The team published three interim reports in English [Fukui *et al.* 1983, 1985 and 1988]: So far, two books in Japanese and numerous papers in Japanese and English have been published. This paper is a summary of one of the books in Japanese [Fukui 1988].

3) Drs. Y. Tsubouchi and T. Igarashi guided the author in the population study. In principle, the method used in the present study follows Howell [1979].

Table 1　10-Year Cohort Life-Tables of the 876 Children

Exact age	Started interval	Currently in interval	Completed interval	Deaths	q_x	l_x	d_x
1934–43 cohort							
0	58	0	58	5	0.086	100,000	8,621
1	53	0	53	4	0.075	91,379	6,897
5	49	0	49	3	0.061	84,483	5,172
10	46	0	46	0	0.000	79,310	0
15	46	0	46	1	0.022	79,310	1,724
20	45	0	45	0	0.000	77,586	0
25	45	0	45	1	0.022	77,586	1,724
30	44	0	44	0	0.000	75,862	0
1944–53 cohort							
0	131	0	131	6	0.046	100,000	4,580
1	125	0	125	6	0.048	95,420	4,580
5	119	0	119	5	0.042	90,840	3,817
10	114	0	114	2	0.018	87,023	1,527
15	112	0	112	1	0.009	85,496	763
20	111	0	111	1	0.009	84,733	763
25	110	0	110	0	0.000	83,969	0
30	110	70	40	1	0.025	83.969	2,099
35	39	39	0	0	0.000	81.870	0
1954–63 cohort							
0	242	0	242	20	0.083	100,000	8,264
1	222	0	222	13	0.059	91,736	5,372
5	209	0	209	8	0.038	86,364	3,306
10	201	0	201	2	0.010	83,058	826
15	199	0	199	1	0.005	82,231	413
20	198	110	88	0	0.000	81,818	0
1964–73 cohort							
0	253	0	253	14	0.055	100,000	5,534
1	239	0	239	4	0.017	94,466	1,581
5	235	0	235	2	0.009	92,885	791
10	233	107	126	0	0.000	92,095	0
1974–83 cohort							
0	178	11	167	8	0.048	100,000	4,790
1	159	63	96	2	0.021	95,210	1,984
5	94	94	0	0	0.000	93,226	0

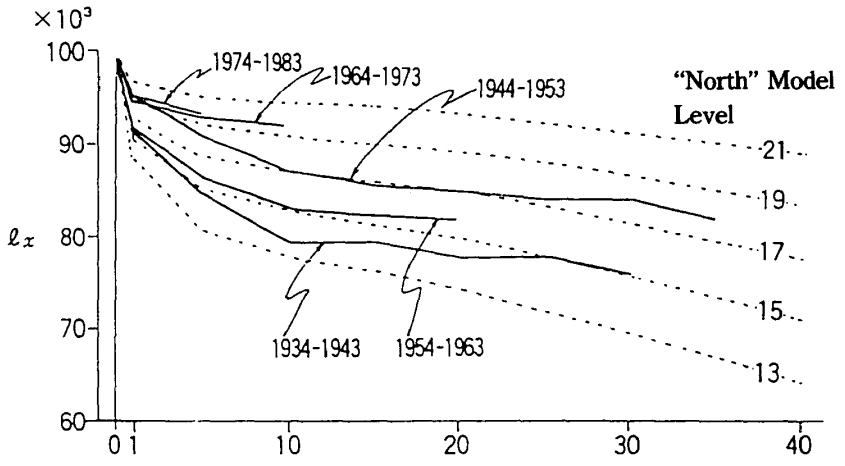


Fig. 1 l_x of 10-year Cohort Life-Tables

for the country or region (0.10–0.11).[4] The life expectancy based on the 1970 census is 56.5 years for males and 59.5 for females,[5] while that for the village (calculated by treating all the 876 children as a single cohort) is 56.3–58.8 for males and 62.5–65.0 for females.

It is difficult to judge whether or not the mortality condition of the village was really different from that of the country as a whole, because of large random errors inherent in statistical treatment of a small population and the possible missing of infant deaths. A further reservation should be added because of a fundamental difference in methodology; the life-table of the present study is based on cohorts (a cohort life-table) while that of the census is based on hypothetical or synthesized cohorts (a period life-table). When the mortality is changing in a short period, this difference in methodology would be significant. This problem, however, could be solved to some extent by estimating the age-specific mortality rates from the census data.

Based on the same 1970 census, Kobayashi [1984] attempted to estimate these rates in terms of the levels in the Coale-Demeny 'West' model for males. According to him, the 45–50, 5–30 and 0–1 year age groups correspond to levels 15, 16–17, and 17–18, respectively. Comparing them with Fig. 1, we can notice little difference between DD and the whole country for those born before 1960. It can be concluded that no evidence was found to believe that the mortality condition of the village differed substantially from that of the region or the whole country.

Among the 232 ever-married women, none married before reaching age 15, and the oldest age of childbirth was 49. No extramarital birth was reported. In addition, there were 96 never-married women over 15 years old at the time of the survey. The 'fertility rate' in the following discussions denotes the rate for the total of 328 adult women (232+96) unless otherwise stated.

The fertility rate is given by dividing the number of live births by the number of women-years of women at risk of giving birth. The age

4) According to Knodel *et al.* [1978] cited in Kobayashi [1984].

5) According to U.S. Bureau of the Census [United States 1978] cited in Kobayashi [1984].

of risk of giving birth was defined as over 15 and below 50 years throughout this analysis. For the within-marriage fertility, the 96 never-married women were discarded, and the periods of separaton by divorce or widowhood of the ever-married were excluded. All the women were divided into nine birth cohorts.

The age-specific fertility rates calculated for each cohort are presented in Table 2 and Fig. 2. The values obtained by multiplying the sum of the age-specific fertility rates by 5, shown in the lines 'tt.' in the table for the first three cohorts, are the Total Fertility Rate (TFR). The TFR estimated from the census data is 6 to 7 for the 1960s and around 5 for the 1970s.[6)]

Table 2 The Cohort Age-Specific Fertility Rates of Adult Women

Age interval	Births	Women-years	Fertility rate	Corresponding period
1904–23 cohort				
15–19	7	135	0.052	1919–43
20–24	32	135	0.237	1924–48
25–29	36	135	0.267	1929–53
30–34	36	135	0.267	1934–58
35–39	30	135	0.222	1939–63
40–44	23	135	0.170	1944–68
45–49	6	135	0.044	1949–73
tt.	170	945	1.259×5=6.295	
1924–28 cohort				
15–19	4	95	0.042	1939–48
20–24	27	95	0.284	1944–53
25–29	34	95	0.358	1949–58
30–34	29	95	0.305	1954–63
35–39	25	95	0.263	1959–68
40–44	8	95	0.084	1964–73
45–49	0	95	0.000	1969–78
tt.	127	665	1.337×5=6.685	
1929–33 cohort				
15–19	7	120	0.058	1944–53
20–24	34	120	0.283	1949–58
25–29	42	120	0.350	1954–63
30–34	28	120	0.233	1959–68
35–39	26	120	0.217	1964–73
40–44	5	120	0.042	1969–78
45–49	2	120	0.017	1974–83
tt.	144	840	1.200×5=6.000	
1934–38 cohort				
15–19	5	110	0.045	1949–58
20–24	22	110	0.200	1954–63
25–29	30	110	0.273	1959–68
30–34	24	110	0.218	1964–73
35–39	11	110	0.100	1969–78
40–44	8	110	0.073	1974–83
tt.	100	660	0.999	
1939–43 cohort				
15–19	5	95	0.053	1954–63
20–24	25	95	0.263	1959–68
25–29	24	95	0.253	1964–73
30–34	12	95	0.120	1969–78
35–39	2	95	0.021	1974–83
tt.	63	475	0.716	
1944–48 cohort				
15–19	14	145	0.097	1959–68
20–24	44	145	0.303	1964–73
25–29	36	145	0.248	1969–78
30–34	14	145	0.097	1974–83
tt.	108	580	0.745	
1949–53 cohort				
15–19	4	180	0.022	1964–73
20–24	34	180	0.189	1969–78
25–29	26	180	0.144	1974–83
tt.	64	540	0.356	
1954–58 cohort				
15–19	16	230	0.070	1969–78
20–24	30	230	0.130	1974–83
tt.	46	460	0.200	
1959–63 cohort				
15–19	6	220	0.027	1974–83
tt.	6	220	0.027	

6) According to U.S. National Research Council Panel on Thailand [1980] reproduced in Kobayashi [1984].

As in the case of mortality, the cohort-based analysis employed in the present study should not be compared directly with the period-based one of the census. Nevertheless, use of the 'corresponding period' column of Table 2 allows us to make a rough comparison, which indicates that the fertility of the village women is not significantly different from that of the whole country.

Fig. 2 shows that the cohorts born before 1930 clearly have higher fertility than the younger ones, which is mainly attributable to the fact that the latter ceased giving birth at a younger age (at about age 30) than the former, while their fertility in their 20s does not differ much between them. Since there was no significant difference in the percentages of age-specific women-years in marriage between the cohorts, the changes in the within-marriage fertility are directly responsible for those in the fertility of adult women.

The interview included a question on contraceptives. The percentage of use was calculated by dividing the number of women-months of use by the total number of women-months for different age groups for each year after 1969. The result is summarized in Fig. 3. Contraceptives were already in use in the late 1960s, mainly by young wives, but were not common. Use became common from the mid-1970s, first among those in their early 30s and later among all age groups. The age groups of 25–29, 30–34 and 35–39 showed the highest percentage in the early 1970s, late 1970s and early 1980s, respectively. Most of them belong to one single cohort born in the 1940s. Thus, the use of contraceptives explains the fertility change in the village very well.

The mortality and fertility of the village discussed in this section suggest that the village should have seen a great rate of population increase from the 1930s through the 1960s, during which time the former declined steadily while the latter remained high. The actual village population, however, reflects only a part of the rate of potential population increase. It has been very much affected by migration.

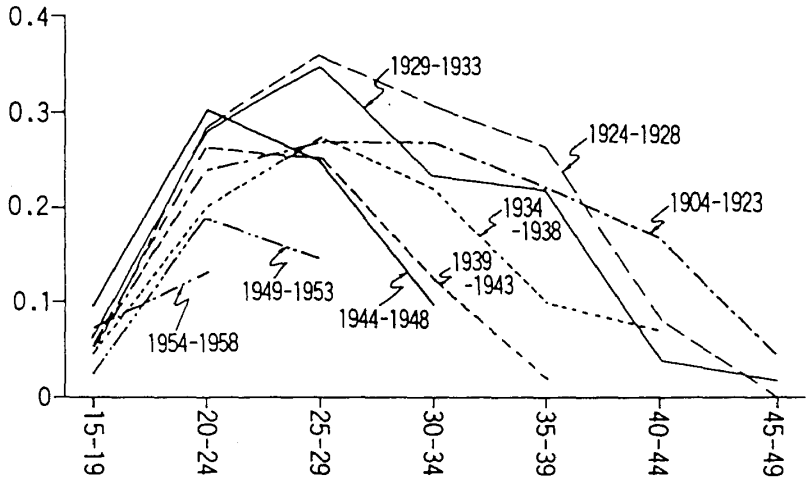


Fig. 2 Age-Specific Fertility of Eight Cohorts

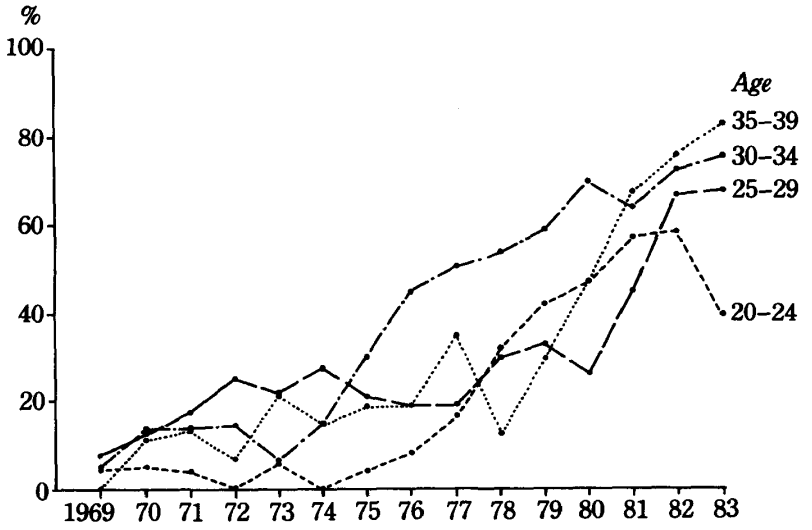


Fig. 3 The Use of Contraceptives by Married Women

III Migration

From the time of its establishment in the latter half of the nineteenth century, DD was a frontier village receiving immigrants. Later, many villagers left to make new frontiers and, more recently, to move to urban centers. Thus, the village's population is not closed.

Migration was investigated by the method of historical demography. First, genealogical charts were produced, and second, family histories of those appearing in the charts reconstructed, which covered 2,214 persons. The village population in 1964 was reported by Mizuno. That in 1944 was estimated by reconstructing the village plan of the time with all houses and counting their occupants. The family history survey was found to cover 93 and 81 percent of the respective village populations of 1964 and 1944.

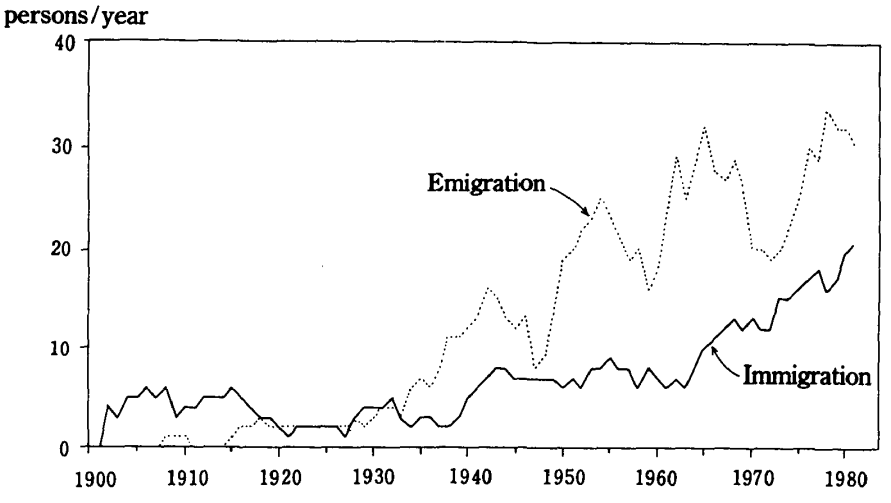


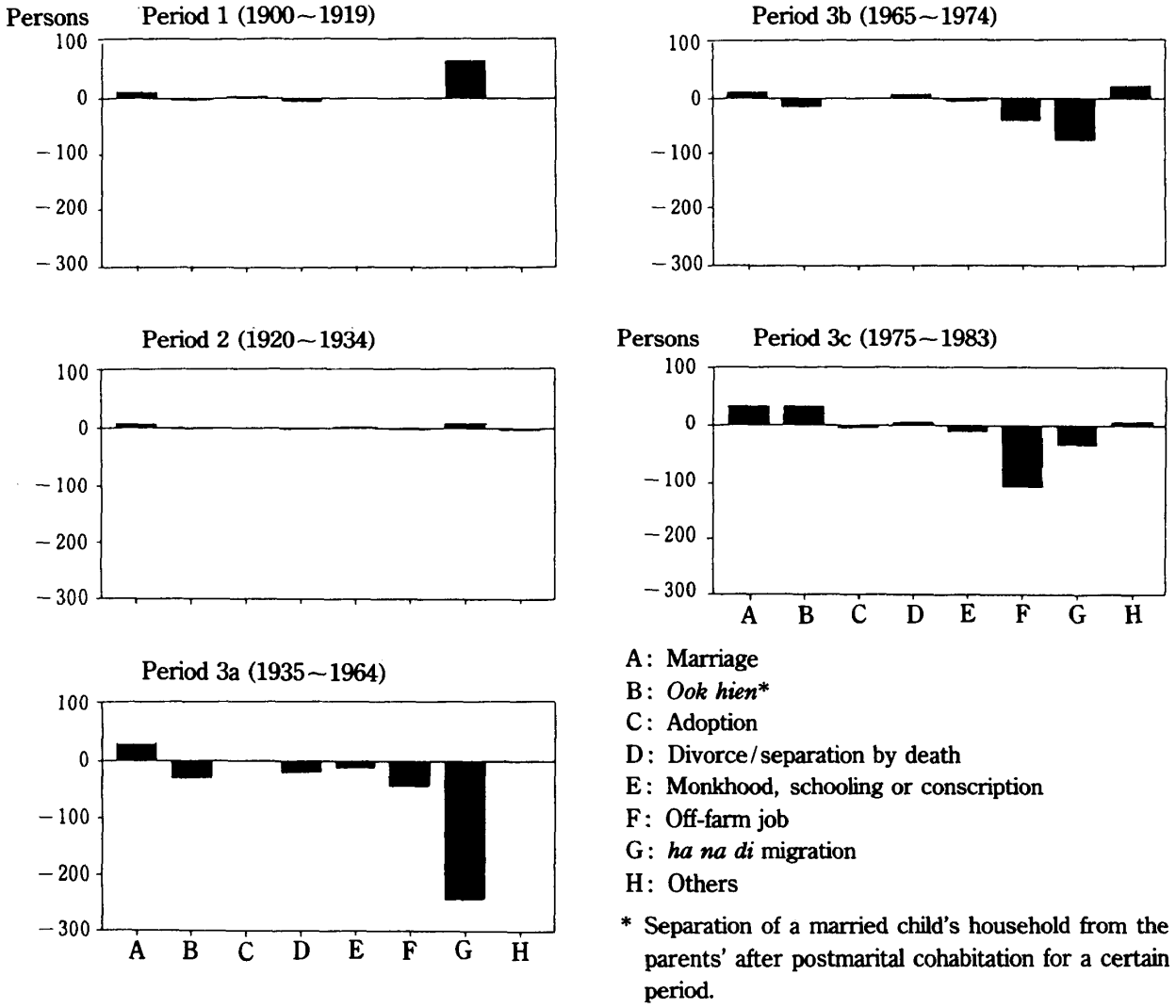
Fig. 4 Migration Based on the Family History Study
(Five-Year Moving Average)

The 5-year moving average of migration is shown in Fig. 4. From it, one can discern the following five demographic periods.

1. 1900–19 The net immigration period
2. 1920–34 The equilibrium period
3. 1935–83 The net emigration period
   - 3a. 1935–64 The period of rapid growth of emigration
   - 3b. 1965–74 The period of rapid growth of both emigration and immigration
   - 3c. 1975–83 The period of slow growth of the village population[7]

The reasons for migration are shown in Fig. 5.

DD was first settled by small groups of farmers who migrated from the lower reach of the Chi river, one of the two major tributaries of



A: Marriage
B: *Ook hien**
C: Adoption
D: Divorce/separation by death
E: Monkhood, schooling or conscription
F: Off-farm job
G: *ha na di* migration
H: Others

* Separation of a married child's household from the parents' after postmarital cohabitation for a certain period.

Fig. 5 Reasons for Migration

7) The demographic periods were established based mainly on the migration pattern but other demographic features were also taken into account.

Table 3 Summary of The Demographic Features

Period	Population at the beginning of period	Rate of increase (% annum)		Migration (person/year)
		actual	potential	
Period 1 (1900–19)	152	3.78	2.21	+ 3.6
Period 2 (1920–34)	320	2.67	2.21	+ 0.1
Period 3a (1935–64)	475	1.80	3.20	−11.2
Period 3b (1965–74)	810	0.95	2.20	−10.8
Period 3c (1975–83)	890	0.32		

the Mekong river draining the Khorat plateau. The arrival of migrating farmers continued through the 1920s. After a rather brief period of equilibrium, however, the direction of migration reversed; and beginning in the 1940s, numerous villagers emigrated to new frontier lands mostly on the upper reach of the Chi river. The spontaneous migration of farmers in small groups in search of paddylands, into the village till the late 1920s and out of it after the early 1940s, is called '*ha na di*', literally, 'in search of good paddylands'. The rural-rural migration in the form of *ha na di* ceased toward the end of the 1970s. In its place, rural-urban migration became common, but its magnitude was not as significant in DD as elsewhere because the proximity of DD to Khon Kaen, where rapid growth was creating job opportunities, allowed villagers to commute to the city daily.

The change of DD from a purely rural village to a suburban one is also reflected in the rise in net immigration for reasons of marriage and *ook hien* since the mid-1970s.

IV The Village Population

Village population data is available for the years 1983, 1965 and 1944 as stated in the foregoing section. In 1911, there was a big fire in the village. It is said that 20 out of the total of 48 houses were destroyed. By assuming a likely number of persons per house, we could also guess the population then.

Combining this information with the analyses presented in the foregoing sections, the demographic features of the village can be summarized as in Table 3.

Throughout Periods 1 and 2, the high mortality suppressed the potential increase to ca. 2.2 percent per annum while the actual village population increased by a higher rate because of *ha na di* immigration. Thereafter the rate of potential increase rose due to the declining mortality rate, reaching over three percent during Period 3a. The actual population, however, did not increase at such a high rate because of extensive *ha na di* emigration. Since the 1970s, a declining birth rate and rural-urban emigration have helped stabilize the village population.

Throughout Period 3b and 3c, the observed rate of increase was less than one percent per annum.

V Rice Supply

The village is located at the rim of the Chi river floodplain. Its paddylands are mainly in the floodplain and vulnerable to flooding which recurs approximately once every decade. There is virtually no irrigation, and rice-farming is totally rainfed. The mean annual rainfall of ca. 1,200 mm in this part of the plateau is marginal for rainfed rice-farming [Mekong Committee 1974], and in such conditions, the year-to-year variability of rice production is extremely great (Table 4).

According to village elders, the occurrence of two flood years (1978 and 1980) within three years is very abnormal, while bumper years such as 1983 have come only a few times in their lives. A yield of less than one half of the potential appears to be 'normal' in this village. The variability is so great that even the mean of five or six years can not be taken as the long-term average. There is a saying in the village that 'with one bumper year, we can go for three years without a harvest'.

Table 4 Paddy Yield of DD

Year	Average yield (paddy ton/ha)	Remarks
Mizuno's study*		
1960	1.12	
1961	0.61	
1962	0.22	
1963	0.23	
1964	0.04	
The present study**		
1978	0	flood
1979	0.44	drought
1980	0	flood
1981	1.18	drought
1982	0.60	drought
1983	2.19	

* Yield per planted area
** Yield per total holding

The paddy area of the village consists of a dozen or so shallow, saucer-shaped swales called *nong*. The early immigrants reclaimed them one by one. In each *nong*, reclamation started from the better-watered and more fertile bottom lands and gradually crept up the peripheral slopes, which were more susceptible to drought and covered by less fertile sandy soils. By the 1930s, most of the former had been reclaimed. During the 1940s, the latter was also turned into paddylands, and the total acreage has remained unchanged since the early 1950s.

As of the early 1980s, no modern technology had been employed, with no improved varieties, chemical fertilizers or farm machines having been adopted. Presumably productivity had not been improved, and the yield of rice per unit area was still determined largely by the inherent land conditions. Thus, the average yield was probably higher before the 1930s, when only the good lands were under the plough, than since the 1950s, when nearly one half of all lands have consisted of the poor ones.

To assess quantitatively the production trend and its year-to-year variability, a model simulating the drought/flood damage was constructed by taking into account the variability of rainfall and the within-village variation in land conditions. The model was verified against the observed yield during the present study.

In this way, the long-term average and per capita supply of paddy were estimated to be

respectively 1.4 ton/ha and 520 kg/person for the 1930s and 1.1 ton/ha and 446 kg/person for the 1980s. These long-term averages imply that the village has always been self-sufficient in rice. But this does not fully reflect the reality. Informants told us that the village has suffered from acute shortage from time to time.

Rice has never become a commerical crop in this village. To minimize the adverse effect of production variability, the harvest is stored to the maximum capacity of the granaries. In assessing the variability of the rice balance, it was assumed that the maximum capacity was equivalent to three years' consumption, that no paddy was sold unless the maximum was exceeded, that per capita consumption was 400 kg of paddy per year, and that the storage loss was 5 percent per annum. The balance was then expressed in terms of the probability of recurrence of years of stock run-out.

VI Rice/Population Balance

Table 5 shows the rice/population balance in the 1930s and 1980s. In the 1930s, the rate of potential population increase began to rise to a three-percent level due to the declining mortality. The period of demographic equilibrium was nearly over and the rush of *ha na di* emigration was about to start. Most of the bottom lands had been reclaimed. The probability of stock run-out was then 6/100, which agrees well with village elders' experiences in their youth, that is, a few years of famine in one's life time.

Table 5 Rice/Population Balance in the 1930s and 1980s

	1930s	1980s
Population (persons)	500	900
Paddy acreage, total (ha)	196	360
per person (*rai*)*	2.44	2.51
Paddy yield (ton/ha)	1.4	1.1
Paddy supply (kg/person)	520	446
Probability of stock run-out	6/100	17/100

* 1 ha=6.25 *rai* or 1 *rai*=0.16 ha

Since then, the situation appears to have quickly deteriorated because of, firstly, the greater rate of potential increase of population, and, secondly, the fact that no more bottom lands are available. In the 1940s, there were two choices: reclaim the inferior lands or leave the village for *ha na di*. Because even the higher paddylands became saturated in the early 1950s, the only choice open since then has been *ha na di*. Because there has been no change in acreage since the 1950s, and the village population increased at a low rate throughout Period 3b and 3c, the probability of stock run-out in the early 1960s was probably already as high as it was in the 1980s.

Though the fertility began to decline in the 1970s, emigration continued at the similarly high rate throughout Period 3b and 3c. It appears that the village managed in this way to prevent further deterioration of the probability of stock run-out.

The probability of stock run-out of greater than 6/100 seems to have induced the *ha na di* emigration, and that of 17/100 to be the maximum tolerable level. If such a causal relationship between the village population and the rice/population balance really exists, the paradigm of 'carrying-capacity' appears to be applicable to the observed phenomenon. Closer examination, however, does not support this.

VII The village Economy

According to villagers, life is definitely better today than in the past. The paddy stock might run out more frequently these days, but they have enough cash income to purchase rice, while in the past stock run-out literally meant starvation. The elders told of having trekked from one village to another by ox-cart, travelling as far away as 200 km to seek a handful of rice. Stock run-out was felt quite differently then with the different economic structure of the village.

Untill the first commercial crop, cotton, was introduced during World War II, the village economy had been almost completely subsistence-oriented. Cotton was replaced by kenaf in the 1960s and the latter by cassava and vegetables in the 1970s. The most significant source of cash income since the late 1970s has been off-farm jobs.

Such cash income has contributed much to the improvement of living standards. Not only do the villagers themselves recognize the higher standard today than in the 1960s and before, a comparison of two village economic surveys, one by the late Mizuno in the mid-1960s and the other by our team in the early 1980s proves it (Table 6). For calculation of revenue, the long-term average yield of rice estimated by the simulation model was adopted. Subsistence economic activities other than rice-farming were not counted.

The net revenue per person of the village increased on average at an annual rate of 3.02 percent during the two decades, which was very close to the annual rate of GDP increase of the whole country during 1964/81, that is, 3.13 percent. The increase in DD was due exclusively to the increase of non-farm revenue. In terms not only of share but also absolute value, the revenue from farming decreased, particularly that from rice-farming. The share of rice-farming in the 1980s accounted for mere 16.9 percent of the total.

Table 6 The Per Capita Net Revenue in the 1960s and 1980s (1981 price in baht)

	1960s	1980s	Annual rate (%)
Farming	2,524 (78.7%)	2,244 (42.2%)	−0.69
Non-farming	683 (21.3%)	3,080 (57.8%)	+9.26
Total	3,210 (100%)	5,325 (100%)	+3.02
Rice-farming	314	899	−1.84
(% of farming)	(48.8)	(40.1)	
(% of total)	(38.4)	(16.9)	

Though no data are available on the village economy for the period preceding the 1960s, the followings can be said. First, under the largely subsistence economy before World War II, the rice balance might have directly affected the livelihood. Though the village produced more than enough rice in the long term, recurring famines once every ten to twenty years made livelihood harsh and might sometimes have threatened the very existence of the village. Second, the extensive *ha na di* emigration in the 1940s indicates that, despite the reclamation of inferior lands, the prospects of famine had increased.[8] Third, since the late

8) The ownership of inferior land on the periphery of a *nong* was recognized among the villagers before reclamation: it normally belonged to the owners of the adjacent bottom lands. Until the introduction around 1939 of the certification of land tax (*Bor Tor 6*), an individual's ownership was recognized only among kin and other villagers.

1940s, cash income from upland-crop farming had buffered the direct impact of the deteriorating rice balance.

VIII The Comparative Advantage Model

The carrying-capacity paradigm assumes that the ever-decreasing availability of resources per individual in an increasing population will eventually suppress the population increase. When this mechanism is functioning, the available resources per capita should decrease or remain constant after reaching the minimal for survival.

At least since the 1960s, the living standard of DD has certainly risen substantially, and the per capita food supply has also probably increased. In the 1950s, cash income had already began to supplement rice-farming, though probably not to such an extent as to raise the living standard. The possibility of declining food supply can not be ruled out, but it would have been much less than the declining rice balance would imply. For the period of largely subsistence economy, food supply was directly linked to the rice balance. The deterioration of the latter from the 1930s to early 1950s might have depressed the supply even though production was increased by opening inferior lands. It should be noted that declining supply means that famine is experienced more frequently by a greater number of villagers. Famine itself had been a built-in characteristic of this village even before the 1930s.

Thus, the carrying-capacity model does not appear to be of much help in interpreting the observed phenomenon in DD, at least for the period since the 1950s. Yet, at the same time, it is true that migration appears to be closely related to the balance between self-supplied rice and population in the village with limited cash income.

Cotton-growing was a temporary boom caused by the halt of imports during the war. The price of kenaf, an inferior substitute for jute, declined substantially with the restoration of political stability and the recovery of jute production in Bangladesh, then East Pakistan. The price of cassava also fluctuated wildly depending on the international market and the trade policy of the EC. Vegetable-gardening, especially of chilli, has become a more stable source of cash income since the 1970s, but its share is still limited. The majority of off-farm jobs are temporary unskilled labor and often seasonal.

The uncertainty of cash income taught villagers that they should be self-sufficient in rice. Without this, there is little incentive to stay on in the village because off-farm job opportunities are better in urban areas. As a result, only those self-sufficient in rice have remained in the village. Thus, the increased cash income that they earned was not nullified by the increased population. Their strong desire for self-sufficiency in rice together with the increased job opportunities in urban centers prevented the 'shared poverty' [Geertz 1963] from being realized in DD.

In an alternative theoretical model (Fig. 6), it is assumed that the population pressure has negative feedback effect on the actual village population, not through the mortality or fertility rate, but only through migration. Next, it is also assumed that the individual villagers decide whether to stay on or leave the village by comparing the advantages of expected livelihood in and outside the village. Various factors are taken into account in comparing the advan-

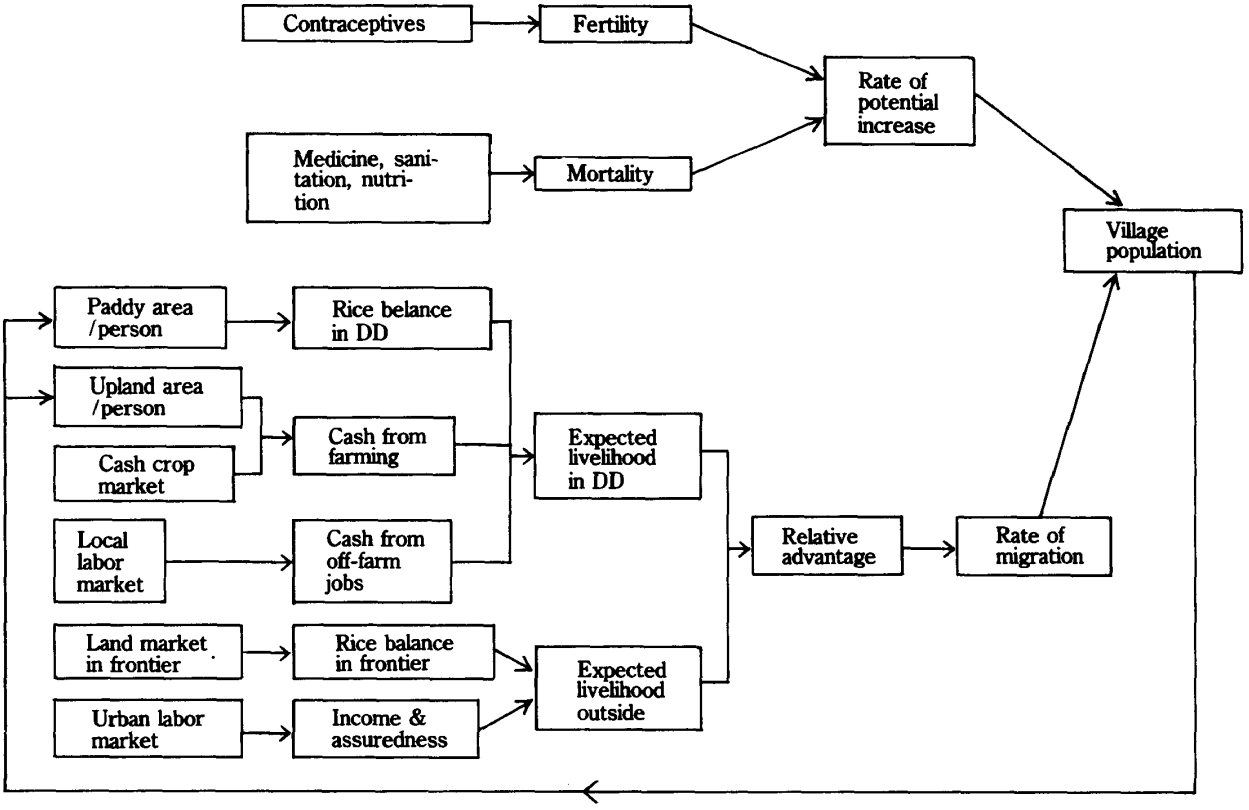


Fig. 6 The Relative Advantage Model

tages, that is, the rice/population balance, the cash income from cash crops and off-farm jobs while residing in DD, and the stability and income of wage earners in cities. The feedback effect works through the rice balance and the income from cash crops. These factors are weighed differently according to the village economic structure, the market for cash crops, and the local and metropolitan labor market. This model is here called the 'comparative advantage model'.

The changes in the demographic features, the rice balance and the village economy are summarized in Table 7. They can be understood in terms of the proposed model as below.

Under the subsistence economy, comparative advantage was almost exclusively judged by the availability of paddylands. Before the 1930s, immigrants to DD came after comparing the prospect of paddyland availability in their home village downstream on the Chi river and in DD, then a frontier village. For those already in DD, there was no incentive to leave it because the expected life further upstream was identical to that in DD where the good bottom lands were still to be reclaimed.

In the 1940s, the choise was to fight against more frequent famines by reclaiming the inferior lands or to risk *ha na di*. The latter choice was open only to those with a healthy family, enough money to buy land, and courage. In the 1950s and 1960s, livelihood under the further deteriorating rice balance supplemented by cash from upland crop-farming in DD was compared with that in a remote village in frontier lands with a favorable rice balance but little

Table 7 A Summary of the Changes in Population, Land and Food in DD

	1900	10	20	30	40	50	60	70	80
Period		1		2		3a		3b	3c
Population	150		320		500		810		900
%/year actual		3.8		2.7		1.8		1.0	0.3
potential		2.2		2.2		3.2			2.2
Migration		+3.8		+0.1		−11.0		−10.8	
[*ha na di*]		[+3.8]		[+0.1]		[−8]		[−8]	[−4]
(person/year)									
Paddylands	to be reclaimed						Inferior land		
					Superior land				
Probability of stock run-out		≦6/100			6/100		17/100 ·····›		
Village economy				Subsistence sector		Cash crops		Off-farm	

cash income.

Since the late 1970s, off-farm job opportunities have increased both inside and outside the village. The destination of the emigrants gradually shifted from frontier lands to urban centers partly because of the increasing difficulty of acquiring lands in the former and partly because of the attractiveness of the latter for the younger generation. In the village, the increased cash income became more than enough to buy rice in the years of stock run-out and, in some years and some households, even allowed them to buy consumer goods and send their children to a school outside the village. Such village life was compared with that of wage laborers in cities with different degrees of assuredness.

IX Conclusion

The last two hundred years has seen the resettlement of a large part of the Khorat plateau by the Thai-Lao people. Today, their population exceeds that of the Laotians in Laos. They are rice-growers but produce little surplus of rice. This paper has described the passage of the wave of these migrating subsistence peasants at a fixed point. The wave reached the point in the 1860s and proceeded beyond.

Unlike shifting cultivators, they were sedentary peasants and neither shifted land nor abandoned their villages, but they maintained the vigor of seeking new frontier lands. Such a process was facilitated by the *ha na di* migration, one of the social institutions built into their peasant society. It can be said that the whole of Thai-Lao society was never static, even long before the rural-urban migration started.

Non-surplus-producing rice-farming is primarily a result of the environmental marginality of the Khorat plateau rather than the absence of a market economy. Even if a family cultivated as much land as its labor force allowed, little surplus would be produced. Though the long-term average yield indicates self-sufficiency in rice, the extremely great year-to-year variability of production often caused run-out of paddy stock even when the harvest was stored to the maximum capacity of the granaries.

The same marginality made any effort to intensify rice-farming futile. Areal expansion was the only means to overcome the increasing population pressure under the subsistence economy. Even now that the village has become involved in the market economy, no intensification had yet taken place.

The case of DD requires that at least three reservations be added to the common understanding of 'traditional' Southeast Asian rice-growing village societies. First, they could be highly open and dynamic. Second, the sustainability of the 'traditional' village is not a given. Third, the intensification of farming is not always a common countermeasure to mounting population pressure; in other words, 'agricultural involution' [Geertz 1963] is not always the case.

It appears that the villagers perceive two different accounts: the rice account and the cash one. In the past when the latter was insignificant, the former was the major determinant of migration. Increasing importance of the cash account enabled the villagers to tolerate a less favorable rice account, but the cash account remained supplementary. Those who went bankrupt in the rice account found no reason to stay in the village. Thus, the balance of the rice account of those who stayed on was kept in the black while their cash account became progressively more favorable thanks to increased opportunities for off-farm jobs. Today, the income disparity within the village is largely determined by the cash account. If the cash account should increase further in relative importance, that of the rice account will diminish, and, finally, households will appear that rely on the former alone. Such was actually found in the villages closer to Khon Kaen than DD in the early 1980s, and in DD, too, in the late 1980s.

In this paper, the village was always treated as a whole. Neither stratification nor income disparity within it was discussed. Certainly, more detailed studies are needed on these aspects, but I believe that the intravillage variation is not so great as to make the above discussion meaningless. A major reason for this relative homogeneity is that the productivity of rice-farming is so low that no commercialization has taken place. Landless households were often those recently separated from their parents, and they shared labor and a granary with the households of one spouse's parents, often the wife's. Such an arrangement is called *'het nam kan, kin nam kan'*, literally, 'work together and eat together'. Share-cropping was also found, but it was mostly between close kin and more of the nature of mutual help than an economic contract in the modern sense. Cash rent was found for the non-paddylands only. These customary insititutions for mutual help among kin allow the whole village to be treated as an apparently single organization. I do not, however, necessarily advocate the idea of a 'community' inherently sharing a common destiny. Rather, my approach is close to the 'actor-based model' in which the arithmetic

summation of decision-making of individuals is assumed to determine the behavior of a society as a whole [Orlove 1977].

The importance attached to the rice account is the consequence of the physical and economic environment of the region. The life-style of the landed-peasants, self-sufficient in rice and supplemented by cash income, appears to be ideal. In principle, there is no proletariat in the village, however low a household's income might be. Therefore, to the villagers of DD, rural-urban migration means the change of life-style from landed-peasant to urban proletariat, while to tenant and landless farmers in commercialized rice-farming villages elsewhere, it means a change from rural to urban proletariat. This may explain the reluctance of the Thai-Lao to emigrate permanently, if not seasonally, to metropolitan areas.

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