Opportunity for Natural Selection Among the Occupationally Different Groups of Gangte Tribe of Manipur, North-East India

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ABSTRACT Opportunity for natural selection is studied in the three occupationally different groups of Gangte tribe-shifting cultivators, settled agriculturists, and town dwellers of Manipur in North-East India. Reproductive histories of 184 post-reproductive women from the 11 settlements were utilized to compute the Crow's indices of selection. The results were interpreted in the light of economic and educational backgrounds of the couples, and the historical process of Christian missionary influence. The indices in general are found to be lowest among those observed in some 100 Indian populations so far studied. There is slight but a clear trend of decreasing mortality index with urbanization, although fertility index, as often been observed among the populations of developing countries, did not show any clear trend, increasing or decreasing. The reduced differences in the indices between the transitional categories and the overall low values of the indices could be interpreted as due to the long and uniform Christian missionary influence among them.

INTRODUCTION

The operation of natural selection is essentially through differential fertility and mortality which are know to be overwhelmingly influenced by, besides genetic, a wide variety of sociocultural factors that are characteristic of human societies. The index devised by Crow (1958, 1972) is therefore sets only an upper limit on the opportunity of natural selection in any particular population and the existing selection can be better envisaged only if the relevance of socio-economic and structural variability of populations is fully understood. A number of attempts have been made to assess the impact of changing sociocultural conditions on the Crow's indices. For example, Spuhler (1976), re-

viewing world-wide data, observed that the tribal populations are characterized by higher fertility, less individual variation and early mortality; I_t is observed to be generally <1. On the other hand, populations from the advanced technological levels generally display higher values of I_n with fertility component twice that of the mortality component. This has not been the case with the Indian populations. Analysing data on about 100 Indian populations Reddy and Chopra (1990) observed that the mortality component of the selection decreased consistently with the socioeconomic advancement, while the fertility component (I_f) showed no clear trend. This trend was even statistically significant when these populations were grouped into rural, semirural and urban categories.

Attempts have also been made to examine within population variation based on religion (Mukhopadhyay, 1982), altitude (Gupta, 1980), and habitat (Barrai and Fraccaro, 1964; Cruz-Coke et al., 1966; Padmanabham, 1985). A negative association between economic advancement of a population and prereproductive mortality is also observed in Sweden (Hed, 1986) and many other large scale studies (Yanakura, 1959; Frisancho et al., 1976; Mitra, 1978) suggesting the universality of this relationship.

The Indian populations, as those of many developing countries, are undergoing rapid socioeconomic transition, from traditional mode of subsistence to more urbanized life styles. The North-East populations, in general, and particularly the tribal populations are of special interest in this context. In general, the tribal populations of Manipur are in the process of rapid socioeconomic transition. At one extreme, there are tribal

villages which are completely isolated and solely dependent on shifting cultivation with little or no commercialization of agriculture and forest resources, and at the other extreme are the town dwellers engaged mostly in government jobs, trade and commerce. In between, some other villagers have adopted settled agriculture with commercial crop plantation. This may represent a local parallel to the process of urbanization at the state or national level. A pilot study in this area revealed that the Gangte tribe of Manipur, having a localized distribution, represents this transition most appropriately and hence we attempted to examine the impact of transition among them. The framework of this study will be appropriate for assessing the impact of socioeconomic transition on the reproductive differentials that is an artifact of exclusively non-genetic cultural factors, for the different sections of this tribe are assumed to be genetically homogeneous.

The Gangte and Historical Process of Socio-economic Transition

The mountainous terrain of Manipur is inhabited by 29 different tribes belonging to two larger groups, the Nagas and the Kukis. They constitute about 30 per cent of total population of the state. Historically these two groups have had exclusive territorial boundary, the Nagas occupying the northern portion and the Kukis occupying the southern portion of the state. In due course of time there has been intermixing of these two groups in the adjoining areas, but by and large they do still maintain their traditional territorial boundary.

The Gangte is one of the Kuki tribes who seemed to have migrated from a place called Gang in Burma (Mayanmar) and entered in the southern portion of Manipur sometime around late 18th or early 19th century. The total population of Gangte according to 1981 census is 7891 individuals. They are mostly concentrated in Manipur South District and very few villages are found in other neighbouring districts (Fig. 1). The Gangtes were a migratory tribe till late 19th century either because of persistent warfare or in pursuit of new shifting fields. The arrival of British and subsequent quelling of warfare along with permanent settlement of tribes

marked the beginning of change among the tribal populations of Manipur. Then came the Christian missionaries in late 19th century and brought them under the common fold of Christianity. This has resulted to change in their belief system, cultural practices, consumption pattern, and outlook. At the same time, interaction with outside people also increased many folds. Along with these changes there has been continuous migration of people from interior villages towards town or valley area.

This process of change has been accelerating since Indian independence with rapid expansion of communication network, introduction of formal education, and other plan developmental works of the Government. Apart from sociocultural changes, this process of change has also affected their traditional subsistence system, occupational pattern, sharing and control over natural resources, and management of natural resources. For instance, the customary maintenance of Village Reserve Forest is no more evident in town or nearby villages. Instead, private ownership of land, intensification of agriculture, commercial plantation of crops and commercial exploitation of forests are the major features. This commercialization process has penetrated far into interior villages along with rapid expansion of communication network. In many of those interior villages falling near the road, commercial exploitation of forest resources has become a major feature leading to rapid depletion of forest in the area. Even in those remote villages which have no direct road communication, highly valued species (*Agor*, cane, etc.) have long been disappeared not only from open forest area but also from strictly regulated Village Reserve Forests. The only barrier left to complete commercialization of forest resources is the prevailing inadequate road transport facility in the area. Thus, the Gangtes are in a process of transition from a traditional, subsistence oriented system of shifting cultivation to market oriented economy.

DATA AND METHODS

Through a pilot study we have first identified Gangte villages at different levels of subsistence in Manipur South District and chosen
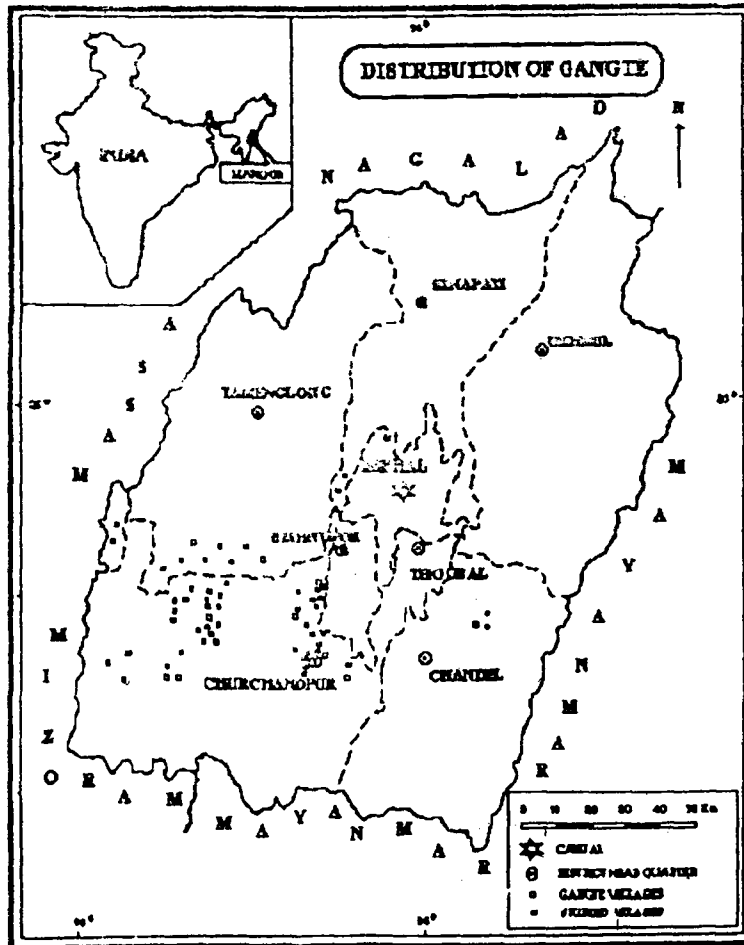
Fig. 1. Geographical map of Manipur state showing distribution of Gangte tribe and the location of studied villages

altogether 11 settlements, three representing the town dwellers, three foothill villages of settled agriculturists lying within a distance of 7 km from the nearest town, and five villages of shifting cultivators. Out of these five villages, four are situated between 90 and 102 km away from the nearest town, but connected by a recently constructed road upto about 90 kilometres. Another village is only 12 km away from the nearest town, but is not connected by road and has a difficult terrain to approach, otherwise. Data on age, sex marital status, literacy, occupation, income, and reproductive histories of women were gathered

from a sample of 444 couples from the 11 settlements. The details on the number of women studied in each of the three transitional categories are furnished in table 1. We have computed selection indices according to Crow's (1958) original formula in which prenatal losses are excluded, due to lack of reliability of such information. In view of the relatively early decline of fertility and early menopausal age of the rural Indian women, women aged 40 years and above were considered to have completed reproductive period, and the information on such women only were utilized for computing the indices. The

computational procedure is given below:

$$I_t = I_m + I_f/P_s$$

where I_t = Index of opportunity for total selection per generation,

I_m = Index of mortality = P_d/P_s

and I_f = Index of fertility = Variance in live births $(V_f)/$ Square of mean live births $(\overline{X}^2) = (V_f/\overline{X}^2)$.

RESULTS AND DISCUSSION

Mean and variance of live births, prereproductive mortality and the Crow's indices of selection are furnished in table 1, for each of the three transitional groups and for the total Gangte tribe. In comparison to the Indian populations (Reddy and Chopra, 1990), the Gangte tribe as a whole and each of its occupational subgroups are characterized by high fertility, and relatively low individual variation. However, the settled agriculturists (7.11) on an average had one child more than those in towns (6.15) as well as the shifting cultivators (6.45). The average prereproductive mortality of about 5.6 per cent is about the lowest observed among the 100 odd Indian populations so far investigated; only a section of Yanadis from southern India shows similarly low mortality rate. Otherwise, the Indian tribes are generally characterized by high

Table 1: Mean and variance of live births, prereproductive mortality and Crow's indices of selection in the Gangte tribe and its transitional groups

Particulars	Town	Settled	Shifting	Total
Total no. of women studied	227	77	140	444
No. of women aged 40+ years	82	37	65	184
Total no. of live births	504	265	419	1186
Total no. of deaths, <15 years	23	13	31	67
Mean live births $(\overline{X})$	6.15	7.11	6.45	6.45
Variance of live births (V_f)	5.90	5.26	6.72	6.02
Proportion of surviving to the age of 15 years (P_s)	0.954	0.951	0.926	0.944
Proportion of prereproductive deaths (P_d)	0.046	0.049	0.074	0.057
Index of fertility (I_f)	0.156	0.104	0.162	0.145
Index of mortality (I_m)	0.048	0.052	0.080	0.060
Total selection (I_t)	0.211	0.161	0.0256	0.213
% contribution of I_f to I_t	77	68	69	72

mortality and relatively larger indices of selection when compared to the caste populations. However, there is a trend of slight decline in the percentage of child mortality and consequently the I_m from the shifting cultivator Gangtes (0.0801) to the Town dwelling Gangtes (0.0478), a reduction of about 50%. The I_f does not show any trend. Nevertheless, a marginally (about 8%) greater contribution of I_f to the total index is observed from the shifting cultivators to the town dwelling Gangtes. Yet the total index and its components are by far the lowest of the Indian populations so far studied.

How then can we explain low values among a tribal population of India? As has already been described the tribal populations of North-East India can be considered unique in terms of their exposure to Christian missionary influence, since the middle of 19th century, and this certainly had its impact not only in bringing awareness about the health care practices, but also in molding their attitudes in accepting them. It may be relevant to note that such an impact of Christianity on selection indices is earlier observed among some other Indian populations. Comparing about 55 populations belonging to the three religious groups-the Hindus, Muslims and Christians-Reddy and Chopra (1990) observed that Christians on an average show 50% lower magnitude of I_m and 20 per cent of I_f when compared to the other religious groups. That the impact of missionaries is much greater and prolonged among the North-East tribes may explain drastically lower values of indices among the Gangte. It is, however, difficult to interpret such a high fertility with a low individual variation, consistently in all the occupational groups. The high fertility level observed in all the groups supports the general proposition that during the early phase of demographic transition, high fertility remains unchanged (Verma, 1977; Mitra, 1978; Nag, 1981). A relatively higher fertility of settled agriculturist women compared to shifting cultivators and town-dwelling women conforms to Spuhler's (1976) observation that settled agriculturists tend to have higher fertility than hunter-gatherers or primitive societies with low level of income and technology (Verma, 1977) and to Nag's (1981) finding of higher fertility in the initial stage of modernization. However,

there is a slight decline in fertility among the town dwellers, and this reduction is more pronounced in the younger age groups. This may be mainly due to their higher level of education and greater exposure and accessibility to modern health care practices and family planning devices. It may be pertinent to note that even in the town area only about 10% of the youngest age group has adopted family planning measures, whereas none have used contraception so far in the other two subsistence groups. However, conforming to the generally observed pattern, there is a marginally increasing contribution of I_f to the I_r.

Although the overall values are smaller, the indices among the occupational groups match the qualitative pattern observed on the basis of all India data, categorized into rural, semi-rural and urban populations, both in the reduction of I_m and I_r, and in the increased contribution of I_f

to the total index, from shifting cultivators to the urban dwellers. The overall reduction in the I_m and I_r, and the reduced differences between different occupational groups could be due to uniformly prolonged influence of Christian missionaries, and the accompanying literacy level of modern health care systems (Table 2). Furthermore, there is also a decline in infant mortality from shifting cultivators to settled agriculturists to town dwellers. Decline in infant mortality is also seen with an increase in income. Thus the observed differences in child mortality within and between the three occupational groups of Gangte can be attributed to differences in economic conditions and the awareness of an accessibility to health care systems and modern amenities. There has also been active interaction between the town dwellers and the shifting cultivators in the interior areas. This feedback mechanism might have helped partly to reduce infant mortality in the interior villages. This reduction in child mortality without a corresponding decline in fertility seems to be one of the main reasons of rapid population growth among tribal populations of Manipur.

Table 2: Literacy Rate, and Level of Literacy of household heads of the Gangte at different subsistence categories

Subsistence categories		Literacy Rate		Literacy Level*				
		No.	%	0	1	2	3	4
Town Dwellers	Husband	161	79.50	33	4	53	37	34
	Wife	153	60.78	60	9	45	34	5
	Total	314	70.36	93	13	98	71	39
Settled Agriculturists	Husband	66	48.48	34	2	14	14	2
	Wife	65	35.38	42	-	15	8	-
	Total	131	41.98	76	2	29	22	2
Shifting Cultivators	Husband	92	55.43	41	9	24	8	10
	Wife	82	20.00	72	2	8	-	-
	Total	174	62.15	133	11	32	8	10
Total	Husband	319	66.14	108	15	91	59	46
	Wife	300	42.00	174	11	68	42	5
	Total	619	54.44	282	26	159	101	51

* 0 = Illiterate; 1 = Primary; 2 = Under Matric; 3 = Under Graduate; 4 = Graduate and above

Table 3: Household income and mean number of live births for women aged above 40 years

	Low ($<Rs$ 20,000)			High ($>Rs$ 20,000)			Total		
	N	Mean	S.D.	N	Mean	S.D.	N	Mean	S.D.
TD	29	6.90	2.75	53	5.73	1.95	82	6.15	2.33
SA	19	6.89	2.55	18	7.33	1.89	37	7.11	2.25
SC	53	6.23	2.59	12	7.41	2.22	65	6.45	2.57
Total	101	6.54	2.65	83	6.33	2.13	184	6.45	2.43

TD = Town Dwellers; SA = Settle Agriculturalists; SC = Shifting Cultivators

Table 4: Percentage of child mortality (<5 years) for women aged above 40 years, in relation to household income

	Low ($<Rs$ 20,000)		High ($>Rs$ 20,000)		Total	
	No. of Live births	% of Dead	No. of Live births	% of Dead	No. of Live births	% of Dead
TD	200	6.00	304	3.62	504	4.56
SA	131	5.34	132	4.55	263	4.94
SC	330	8.18	89	4.49	419	7.40
Total	661	6.96	525	4.00	1186	5.64

TD = Town Dwellers; SA = Settle Agriculturalists; SC = Shifting Cultivators

The observed association of the indices with the socioeconomic disparities, rural - urban differences, and literacy can all be perceived in terms of improved living conditions, better awareness and access to public health amenities of the economically better off sections (Table 3 and 4); although the overall mortality is low, there are perceptible differences between the high and low economic groups of the Gangte in the towns as well as in the traditional habitats. On the other hand, while the economically better of couples had smaller number of children in the towns, the settled agriculturists and shifting cultivators, conforming to the traditional pattern of tribes, had an increased number of children with increasing wealth. In conclusion we may say that there is small but consistent effect of socioeconomic transition, especially on mortality component of the selection.

ACKNOWLEDGMENTS

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