

COMPARATIVE ECO-ETHNOLOGY OF TWO VILLAGE POPULATIONS IN SOUTH BANKURA, WEST BENGAL, INDIA

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A B S T R A C T

Eco-ethnological study of an ethnic group (Santal), residing in two villages with slightly different ecological settings, has been taken up to assess the impact of forest environ in determining quality of physical life, as revealed from demographic characteristics, incidence of diseases, dietary intake, height and weight, haemoglobin per cent, and differential leucocyte count of the two survey villages, one is amid the perennial forest and far away from urban facilities, while the other is a road-side village with a Subsidiary Health Centre. The people of both the villages belong to the same endogamous group and, therefore, share a common gene pool. Overall geo-topography, economy and other secular parameters being similar for the groups, the difference in the physical quality of life between them is attributable to none but the forest environ, or influence of accessibility of urban facilities. The analysis of the surveyed data point towards a slightly better physical quality of life of forest-village dwellers than that of road-side village dwellers. The most interesting finding of the survey is high Eosinophil count among the villagers of both the settings, irrespective of age and sex.

INTRODUCTION

Studies on the effects of wide environmental variations physical, biological and cultural, and their possible interactions on human biological traits were rare in India till 1980s (Basu *et al.*, 1979). With a view to undertake development project, especially in health sector, it is a dire requirement to understand the relationship between human biological traits and the various components of environment. The biomedical traits such as fertility, mortality, adult body dimensions, child growth and disease prevalence is found to vary in different zones as well as in clusters within one ecozone (Basu *et al.*, 1979; Bhattacharya, 1980; Gupta 1980; Gupta & Basu, 1980). With regard to frequency of intestinal parasitic infestation,

genetically similar populations living in different ecozones show greater variation than genetically dissimilar populations living in the same ecozone (Bhattacharya *et al.*, 1981). Apart from the influences of the broad ecological parameters such as altitude, geographical distance, ethnicity and occupation, microcultural parameter, like religion which also plays a determining role on adult body dimensions, has been explored (Majumder *et al.*, 1986). All these works account for ecological influences on human biological traits, and therefore, may be considered under the umbrella-term, Eco-Ethnology.

Tribal culture and living pattern are fast changing, but there are certain core values and practices which are exclusively protected and remain almost unaffected (Hansda, 1980). Ethnomedicine is one such area. Each society possesses its own indigenous way of treatment of diseases (Opler, 1962) and various kinds of diseases are treated with locally available plant parts (Jain, 1981). A work on the Santals of Midnapore, West Bengal, shows a direct correlation of incidence of various diseases and availability of curative medicinal plants, indicating a close relationship between human biological state and ecological resources (Das *et al.*, 1986). A vast body of information on ethnobotany and ethnomedicine, including a compendium of Tribal Medicine (Pal, 1999) are currently available. The present authors explored ethnobotanical information of some plants in the ecological context of southernmost Bankura (D'Rozario *et al.*, 1998).

The theme of the present paper is to assess the role of forest ecology in determining physical quality of life. For that purpose the investigation was designed in such a way that genetic, geographic, socio-economic and cultural factors were eliminated, only differing in microenvironmental parameters like proximity to or distance from forest cover vis-a-vis less or more accessibility to urban traits, respectively. Physical quality of life has been assessed from (a) incidence of diseases, (b) haemoglobin level and differential leucocyte count of blood, (c) dietary intake (calorie and various nutrients) and (d) physical constitution as reflected from height and weight measurements.

The geographical area of investigation is the southernmost part of Bankura district in West Bengal, which is a semi-arid dry deciduous type of forest area. A metal road runs from Khatra (Subdivisional Head Quarter) to Jhilimili (Southern end of Bankura), via Ranibandh (PS). Perennial forest exists on both the sides of the metal road (Fig.1).

The investigation was carried out in two villages, inhabited predominantly by the Santals, the dominant ethnic group in the entire South Bankura. The villages were so selected that one village (Ledapakur, JL No. 120) is situated on the metal road, possessing a Subsidiary Health Center and only 4 km away from the urban center of Ranibandh; while the other village (Ladhna-Singudi, JL No. 154) is situated amid the forest, about 15 km away from Ranibandh and the metal road. The purpose behind such selection of study villages is that the roadside village (Ledapakur) is more exposed to urban traits and less influenced by forest environment, while the forest village (Ladhna-Singudi) is less exposed to urban traits and is likely to be more influenced by forest environment i.e. vegetation (Fig.1).

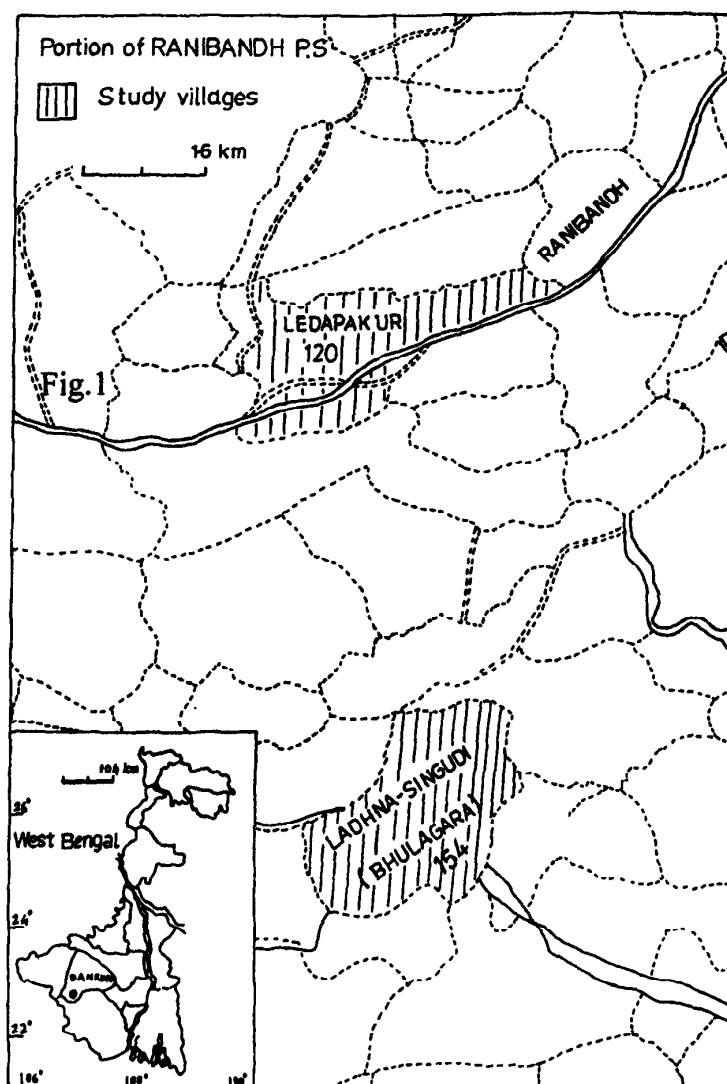


Fig. 1 Map of Ranibandh P.S. showing location of study villages

The population of two villages may be regarded as homogenous since they share the same gene pool, same culture and society and practicing same economy, depending on cultivation and forest resources. Broad physical environmental factors like altitude, climate, soil etc. are also identical for both the villages being situated in the same geographic locale. Therefore, any difference in physical quality of life between the two villages would be liable to the difference in the microenvironmental factor of proximity to or distance from forest environment, or in other words, in the degree of accessibility to urban traits and modern healthcare.

MATERIALS

Field work has been conducted during different seasons of the year in the two selected villages, during 1998-2000. The villages are predominantly inhabited by the Santals. All the information and data have been collected from this ethnic population. The data includes demography, disease record, diet, anthropometry, blood profile (Hb % and DC of leucocytes) and plant use.

METHODOLOGY

(A) Demography : Demographic data have been collected using case study method with the help of structured household census schedule. Different general statistics have been worked out for different items.

(B) Disease Record : Data on incidence of diseases have been collected seasonally viz., rainy (June August) and winter (December February). Prevalence of diseases during the 'Last 3-months' have been recorded with the help of a close-ended questionnaire, while the incidence of diseases during the 'Past 2-weeks' have been recorded by open interview. In case of incidence of diseases, mode of treatment was also recorded.

(C) Diet survey : Diet survey was conducted by '24 hours recall' method and the collected information have been analysed for per capita intake of calorie and other nutrients using the schedule prescribed by National Institute of Nutrition (NIN) Hyderabad.

(D) Anthropometry : Anthropometric data on height and weight have been collected using standard anthropometric techniques. From the data, 3 constitutional indices have been worked viz., Wt/Ht, Wt/Ht² and Ponderal Index (PI) for understanding the physical constitution.

(E) Blood Profile : Levels of Haemoglobin and Differential Leucocyte counts have been determined using standard pathological methods.

(F) Plant use : Use of different parts of various plants for diverse purposes used in different seasons have been collected by direct interview.

ANALYSES OF THE DATA

A) Demography:

1. **Population**: Comparative analyses of population distribution by Age and Sex in the two villages shows higher percentage in Ladhna-Singudi than Ledapakur for Sex Ratio (SR), Child Woman Ratio (CWR), Child Dependency Ratio (CDR) and Aged Dependency Ratio (ADR). But in the 15-59 age group Ledapakur shows considerable higher percentage than Ladhna-Singudi. Such discrepancies in different parameters may be considered as small population size fluctuation in both the villages (Table 1).

2. **Literacy**: With respect to literacy the people of Ledapakur show slightly higher % in case of both males and females. When viewed category wise, none of the villages show any female with higher education (class XI +); and the frequency of male in that category are similar in both the villages (Table 2a, b & c).

Table 1: Distribution of population in the two villages by Sex and broad Age groups

Age	LEDAPAKUR						LADHNA-SINGUDI					
Group	M	%	F	%	T	%	M	%	F	%	T	%
0-4	6	5.5	8	8.6	14	6.9	25	12.4	15	7.8	40	10.2
5-14	25	22.9	26	28.0	51	25.2	72	35.6	64	33.5	136	34.6
15-59	82	75.2	59	63.4	141	69.8	116	57.4	110	57.6	226	57.5
60+	2	1.8	8	8.6	10	5.0	14	6.9	17	8.9	31	7.9
All	109	54.0	93	46.0	202	100.0	202	51.4	191	48.6	393	100.0

$$\text{Sex Ratio (SR)} = \frac{F}{M} \times 100 = 85.3 \quad 94.5$$

$$\text{Child Woman Ratio (CWR)} = \frac{P_{0-4}}{F_{15-59}} \times 100 = 26.4 \quad 40.4$$

$$\text{Child Dependency Ratio (CDR)} = \frac{P_{0-4}}{F_{15-59}} \times 100 = 36.2 \quad 60.2$$

$$\text{Aged Dependency Ratio (ADR)} = \frac{P_{60+}}{F_{15-59}} \times 100 = 7.1 \quad 14.6$$

Table 2a : Distribution of population in Ledapakur by Education

Age	LEDAPAKUR (MALE)					LEDAPAKUR (FEMALE)				
Group	NL	P	S	H	TOTAL	NL	P	S	H	TOTAL
All	49	36	20	4	109	66	18	9		93
%	45.0	33.0	18.3	3.7	100.0	71.0	19.3	9.7		100.0

Table 2b : Distribution of population in Ladhna- Singudi by Education

Age Group	LADHNA-SINGUDI (MALE)					LADHNA-SINGUDI (FEMALE)				
	NL	P	S	H	TOTAL	NL	P	S	H	TOTAL
All	101	62	32	7	202	139	47	5		191
%	50.0	30.7	15.8	3.5	100.0	72.8	24.6	2.6		100.0

Table 2c: Summary Table of Education

Edu.Cat.	LEDAPAKUR		LADHNA-SINGUDI	
	No.	%	No.	%
NL	240	61.1	115	56.9
P	109	27.7	54	26.7
S	37	9.4	29	14.4
H	7	1.8	4	2
All	393	100.0	202	100.0

NL=Non Literate; P=Primary education(up to IV); S=Secondary education (V to X); H=Higher (XI and above).

3. Fertility: Fertility performance of ever married women of the two study villages has been studied by recording the age specific fertility rate (ASFR) which reveals a slightly higher average of total fertility in Ladhna-Singudi compared to that of Ledapakur (Table 3). It would be unwise to draw any inference from this data on fertility since no information could be available for the women of Ledapakur aged 55 years and above, while that age range has contributed a considerable share in the case of Ladhna-Singudi.

4. Economy: Table 4 shows a similar picture in both the villages with respect to economic status, only the per cent of earner females is much higher in Ledapakur than Ladhna-Singudi and a reverse picture in case of earner dependant (ED) females. When different types of occupation of the earners are considered (Table 5), most of the male earners are engaged with occupations related to agriculture in higher frequency in Ledapakur than in Ladhna-Singudi. Accordingly, the percentage of day labour is much higher in Ladhna-Singudi. In case of females the highest percentage of earners is found in 'Day Labour' category in Ledapakur, while in Ladhna-Singudi it is in the 'Agricultural Labour' category.

This fact obviously implies a greater urban influence in Ledapakur than in Ladhna-Singudi, also less sustainability of agricultural economy in Ledapakur.

Table 3: Fertility of the ever married woman (LEDAPAKUR)

Present age of Mothers (No.)	15-19 (1)	20-24 (4)	25-29 (4)	30-34 (3)	35-39 (4)	40-44 (6)	45-49 (6)	50-54 (5)	55-59 —	60-64 —	65+ —	Total (33)
No of Births	1	6	12	9	11	22	28	13	—	—	—	102
No. per Mother :	1.0	1.5	3.0	3.0	2.7	3.7	4.7	2.6	—	—	—	3.09

LADHNA-SINGUDI

(No.)	(0)	(12)	(10)	(12)	(12)	(9)	(2)	(3)	(2)	(4)	(1)	(67)
No of Births:	—	24	23	35	38	30	9	13	9	25	2	253
No. per Mother:	—	2.0	2.3	2.9	3.2	3.3	4.5	4.3	4.5	6.25	2.0	3.77

Table 4: Distribution of population by Economic Status

	LEDAPAKUR								LADHNA-SINGUDI							
	MALE				FEMALE				MALE				FEMALE			
	D	ED	E	T	D	ED	E	T	D	ED	E	T	D	ED	E	T
Person:	43	7	59	109	57	14	22	93	90	12	110	202	103	55	33	191
% :	39.5	6.4	54.1	100	61.3	15.0	23.7	100	39.6	6.9	54.5	100	53.9	28.8	17.3	100

D = Dependent; ED = Earning Dependent; E = Earner; T = Total

Table 5: Distribution of the Earners by Primary Occupation

Occupation	LEDAPAKUR						LADHNA- SINGUDI					
	Male		Female		Total		Male		Female		Total	
	No	%	No	%	No	%	No	%	No	%	No	%
Owner Cultivator	40	67.8	2	9.1	42	51.9	43	39.9	—	—	43	30.1
Share Cropper	—	—	—	—	—	—	17	15.5	—	—	17	11.9
Ag.Labour	7	11.9	—	—	7	8.6	18	16.4	28	84.8	46	32.2
Day Labour	7	11.9	12	54.5	19	23.5	22	20.0	—	—	22	15.4
Service	3	5.1	—	—	3	3.7	1	0.9	—	—	1	0.7
Business	2	3.4	8	36.4	10	12.3	1	0.9	—	—	1	0.7
Others	—	—	—	—	—	—	8	7.3	5	15.2	13	9.1
ALL	59	100	22	100	81	100	110	100	33	100	143	100
%	72.8		27.2		100		76.9		23.1		100	

5. **Livestock:** The livestock resources of both the villages have been considered in Table 6, wherefrom it becomes evident that livestock per family, as well as per capita, is higher in Ladhna-Singudi than those of Ledapakur.

B) Disease Record:

Incidence of diseases was recorded at two levels, viz., for the Last 3- months and for the Past 2-weeks, with respect to the time of survey during two different seasons viz., rainy and winter. It has been noted that in the Last 3-months in the rainy as well as winter season, incidence of 'sore throat', 'running nose with fever' is highest in both the villages, being higher in Ladhna-Singudi (14.0%) than in Ledapakur (11.8%) during rainy season, while in the winter season it is 11.5% in Ladhna-Singudi and 19.5% in Ledapakur. The second dominant incidence is 'passed worm' (10.6%) in Ledapakur, whereas it is 'cough for more than a week' (10.00%) in Ladhna-Singudi during rainy season. But in winter season it is 'cough for more than a week' in both the villages being 7.2% in Ladhna-Singudi and 10.5% in Ledapakur.

Table 6: Live stock resources

Livestock	No.	LEDAPAKUR		No.	LADHNA SINGUDI	
		Number per family	Number per capita		Number per family	Number per capita
Cow	64	1.7	0.31	75	0.99	0.19
Bull	28	0.8	0.13	58	0.76	0.15
Buffalo	14	0.4	0.06	58	0.76	0.15
Goat	133	3.5	0.06	217	2.86	0.55
Pig	8	0.2	0.03	40	0.53	0.10
Fowl	159	4.2	0.78	498	6.55	1.26
Duck	5	0.1	0.02	29	0.38	0.07
Sheep				16	0.21	0.04
ALL	411	10.8	2.03	99	13.04	2.52

Incidence of disease in the past 2-weeks indicates highest of 'cough and cold' in both the villages in the rainy and winter seasons, being 49.3% in Ladhna-Singudi and 44.6% in Ledapakur in rainy season, and 45% in Ladhna-Singudi and 44% in Ledapakur in the winter season. Incidence of Malaria during rainy season has been recorded as 3.4% in Ladhna-Singudi and 14.3% Ledapakur.

Nature of treatment: All different forms of treatment such as traditional (including Ayurvedic, Allopathic, Homeopathic and Quack) are practiced in both the villages. It is evident from Table 7, that in Ledapakur, highest frequency of treatment in both the seasons is Allopathic, whereas in case of Ladhna-Singudi, Allopathic system is highest during rainy season, while by Quack during winter season. This indicates greater acceptance of modern system of disease treatment by the villagers of Ledapakur than those of Ladhna-Singudi. Dependence on traditional therapeutics is rather low in both the villages.

C) Dietary Status:

Diet survey was conducted following "24-hour recall" method. The dietary materials were analysed for various nutrients and calorific values with the help of standard tables designed by NIN, Hyderabad. Average per capita consumption of different nutrients and calorie generation for both the villages are presented in (Fig. 2). Although the "24-hour recall" method is far from a perfect method of diet survey, it is fairly used to reflect a general picture about dietary intake, in association with other objective parameters like anthropometry and blood profile. The comparative figures for the two villages, under present study, reveal that, with respect to all the nutrients, as well as calorie generation,

Table 7: Nature of Treatment of Diseases in the two villages

Nature of Treatment	LEDAPAKUR				LADHNA SINGUDI			
	Rainy Season		Winter Season		Rainy Season		Winter Season	
	No	%	No.	%	No	%	No.	%
Traditional (Including Ayurvedic)	2	4.0	2	13.3	6	12.8	7	19.4
Quack	3	6.0	2	13.3	4	8.5	15	41.7
Homoeopathic	1	2.0	1	6.7	7	14.9	4	11.1
Allopathic (Hospital)	44	88.0	10	66.7	30	63.8	10	27.8
All	50	100.0	15	100.0	47	100.0	36	100.0

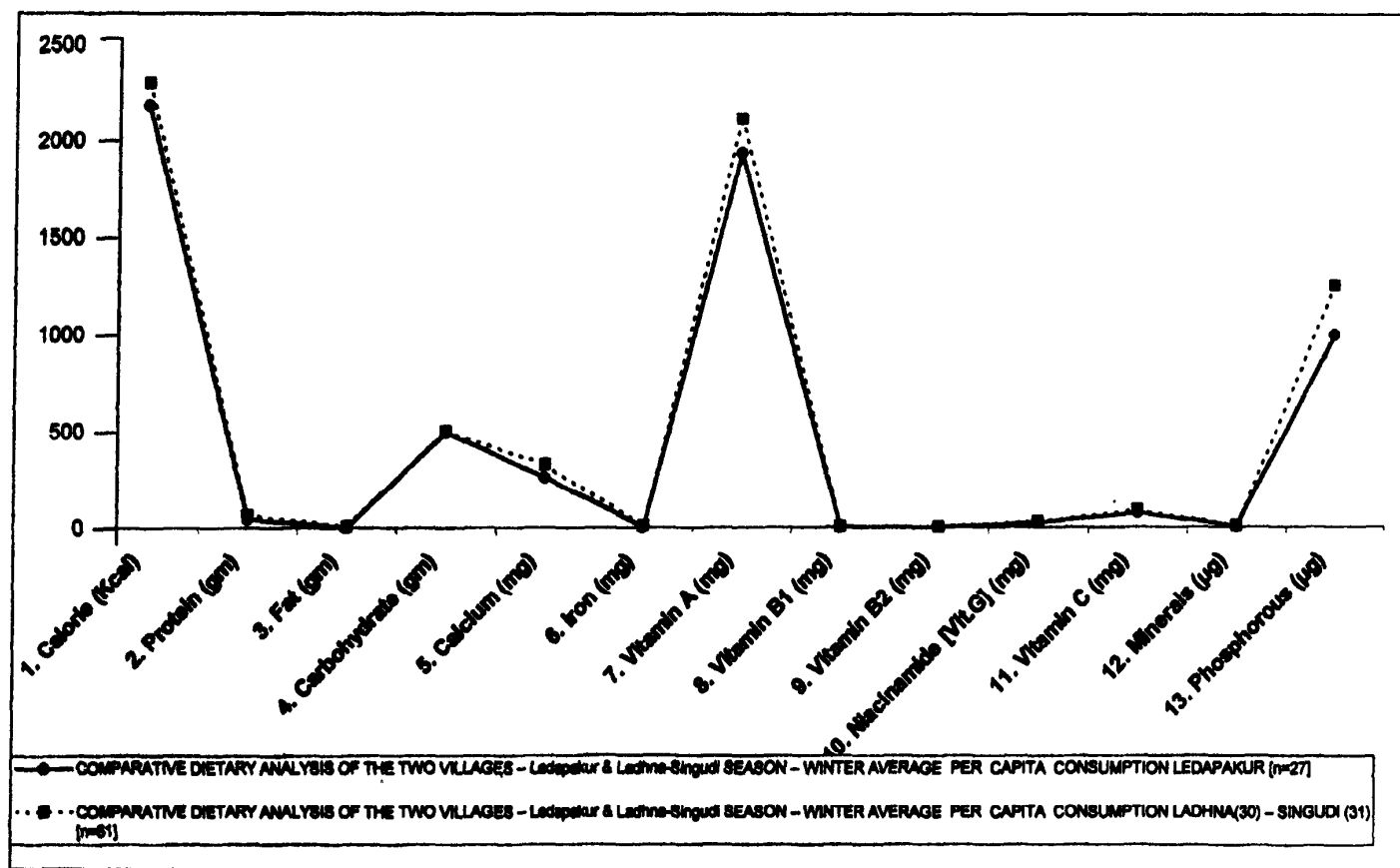


Fig. 2 Average per capita consumption of different nutrients and calorie generation of the two villages

the Forest village (Ladhna-Singudi) has higher values than those for the Roadside village (Ledapakur). Exact reason for higher per capita consumption by the Forest villagers needs further probe, but it is not unlikely that higher consumption of plants and plant parts may be one of the reasons.

D) Anthropometry :

Body height, weight and 3 constitutional indices *viz.*, Wt /Ht, Wt /Ht² and Ponderal Index (PI) of males and females of different ages of Ladhna-Singudi and Ledapakur villages are presented in Tables 8a & b for understanding the physical constitution. Average adult height and weight for males and females reflects a slightly higher value for both height and weight of the Forest village (Ladhna-Singudi) compared to the Roadside village (Ledapakur). The constitutional indices, Wt /Ht, Wt/Ht² and Ponderal Index (PI) for males and females also confirm higher averages for Forest villages, except among the females.

E) Blood profile:

Levels of Haemoglobin and Differential Leucocyte counts have been determined for the villagers of both the study villages. A total of 40 males and 34 females of various

Table 8a: Average adult Height and Weight for males and females in the two villages

Trait	Ledapakur		Ladhna Singudi	
	Male (n=18)	Female (n=17)	Male (n=62)	Female (n=59)
Height (cm)	159.7	147.6	160.4	148.1
Weight(Kg)	47.7	39.1	48.7	40.9

Table 8b : Constitutional indices in the two villages

Indices	Ledapakur		Ladhna Singudi	
	Male (n=40)	Female (n=33)	Male (n=114)	Female (n=109)
Wt/Ht	255.7	241.0	260.2	235.7
Wt/Ht ²	1.8	1.7	1.8	1.7
PI	22.5	23.2	23.1	23.2

ages of Ledapakur, and 63 males and 60 females of Ladhna-Singudi villages could be surveyed and the findings are presented in the tables 9 a & b. The age-group wise distribution of various parameters does not reflect any association, therefore a consolidated table has been presented here.

The most important finding of the blood survey is the presence of very high percentage of Eosinophil in both the villages, irrespective of age and sex. The range of Eosinophil varies between 2% and 33%. Average percentage of Eosinophil in Ledapakur is slightly less than that in Ladhna-Singudi (Table 9b).

Such a high incidence of Eosinophil in both the villages leads to further inquiry. It is not unlikely that the overall environment is rich in certain allergen (may be pollens), and high Eosinophil affords an adaptive mechanism in that particular allergen-stressed environment.

F) Plant use:

Information on the use of different plants and plant parts was collected from the two villages during rainy and winter seasons. Plant parts are used for various purposes like food, fuel, fodder, household material and medicine. Frequency of plant use in two seasons by the two villagers has been presented in Table 10. It is apparent from the table that during Rainy season more plants are used as food in both the villages, with a higher frequency in Ladhna-Singudi. The picture is reverse in Winter, when most of the plants have been used as medicine with a higher frequency in Ledapakur. It may be noted that during Rainy

Table 9a: Average Haemoglobin Percentage of all ages in the two villages (Number of individuals in parenthesis)

Hb%	Ledapakur	Ladhna Singudi
Male	10.9(40)	10.9(63)
Female	9.8(34)	9.8(60)

Table 9b: Percentage of Eosinophil of all age and sexes in the two villages(Number of individuals in parenthesis)

Eosinophil(%)	Ledapakur	Ladhna Singudi
Male	8.65 (40)	9.62(63)
Female	8.65 (34)	10.24(60)

season also the frequency of plants used as medicine is higher in Ledapakur than that for Ladhna-Singudi. However, the data on Plant Use do not reveal any indicative feature relevant for the present study. That may be achieved through a pointed and intensive study in future.

CONCLUSION

This small-scale comparative account on the role of forest environ in influencing physical quality of life indicates, though very slightly, that in almost all the parameters the villagers of the Forest village are better off than those of the Road-side village. It has however, not been possible to identify precisely the particular factor (s) of the environ that contributes positively to the Forest villagers, neither the deterring factor (s) responsible for the Road-

Table 10: Frequency of Plant Use in two seasons

Use	Rainy		Winter	
	Ledapakur	Ladhna-Singudi	Ledapakur	Ladhna-Singudi
Food	56.3	68.8	10.7	21.0
Medicine	38.0	27.5	89.3	72.6
Food & Medicine	5.7	3.7	—	6.4
Total	100(87)	100(109)	100(28)	100(62)

side villagers. This would require a well designed and intensive research in future.

As a bye-product of the present investigation came up the fact of high Eosinophil(%) of both the study villagers, irrespective of age and sex. Since Eosinophil type of leucocyte regulates our body system against allergies, it may be surmised that the overall environment of the geographical area, embracing both the villages, is infested with different seasonal allergen pollens and high Eosinophil level is a kind of adaptive mechanism to guard against this stress condition. This can be assessed only by further research work.

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