

## STUDY OF SOCIAL TROPHIC LEVEL IN RURAL HUMAN ECOSYSTEM IN SELECTED VILLAGES OF BOLPUR SRINIKETAN C. D. BLOCK, BIRBHUM DISTRICT, WEST BENGAL

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### Abstract

Rural human ecosystem is stratified into three social trophic levels corresponding to the three dominating social groups of population i.e. S.T., S.C. and other than S.T. and S.C. These three social groups may be respectively categorized as social trophic level-I, II and III. Then social trophic level-I and II may be designated as social autotrophs and social trophic level-III as social heterotrophs according to their homogeneity in occupational profile. Pattern and content of food intake by the social autotrophs and heterotrophs have been analyzed in this paper. Study reveals that with regard to energy obtained from vegetal origin like cereals, leafy vegetables, roots and tubers, there is an inverse relation between social trophic levels and total energy, but there is a direct relation between social trophic levels and energy obtained from pulses, other vegetables, oil, sugar & jaggery. Direct relation between social trophic levels and total energy obtained from animal origin is also seen. It is true especially in case of milk and milk products and not in the case of other food items of animal origin like fish, egg, meat, crabs, snails, oysters etc. Thus, hypothesis stands confirmed in case of food items of greater nutritive value. Since differences in the nutritive value of food items consumed by different social trophic levels does not have an adverse impact on their health as per the information of local health authorities, local respondents, study therefore concludes that the basic strategy to plan for food availability in the region should concentrate on maintaining a status quo in the economic pursuits so as to sustain the existing sustainable food supply situation.

**Keywords:** rural human ecosystem, social trophic level, social autotrophs, social heterotrophs

### Introduction

In rural India, social hierarchy and economic possessions are directly related and it is also true in case of position in the social hierarchy and nutritional status. In the present study, variations in the nutritional status of various social groups (in the caste hierarchy of rural India) are the main theme. The study has been done through the Human ecological approach as a conceptual framework because an energy relation in the social hierarchy is analogous to that of the trophic structure of a natural ecosystem.

Rural human ecosystem is analogous to the natural ecosystem in terms of the autotrophic and heterotrophic layer in terms of their functions and functional linkages. The natural autotrophs use solar energy to produce food while the social autotrophs in the rural human ecosystem carry out agricultural operations physically to produce food. Therefore, the social autotrophs like their counterparts in a natural ecosystem sustain the human ecosystem by sustaining the food production and supply system.

### Conceptual Background

Link between dietary patterns and social rank is discernible in everyday experience. Higher the position of a person in social hierarchy, higher is the level of intake of food items of greater nutritive value. This was true even during the early 15<sup>th</sup> and 16<sup>th</sup> centuries (of medieval Germany) when 43% of all expenditures on nutrition were spent on animal food products in families of wealthy citizens; 30% of all expenditures on nutrition were spent on animal food products in case of households of a simple craftsman and only 14% of all expenditures on nutrition were spent on animal food products in case of an orphanage (Dirlmeier, 1978 In: Schutkowski 2006:152). Schutkowski (2006:152) states that for the lower social classes, this picture can be further differentiated between those who had to dwell under conditions of pronounced deprivation and who had some semblance of access to food (lower middle class). People belonging to the former group spent 50% on bread or grain and 14% on animal derived products, while people belonging to the latter spent 26% on bread or grain and 23% on meat, eggs, milk and milk products. Also, food apportionments recorded in official documents (the benefice lists of the Holy Spirit Spital in the town of Constance are informative) reveals that ration for the priests, designated meat allocations of 1.5 kilograms/day on

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five days of a week and various supplementary food stuffs, while ration for those at the lower end of the social scale, only three days with 376 grams/ day of meat and less diversified supplements are specified. Status and social meaning are thus not only reflected in the possibilities of food procurement, but even in the official policy on apportionment of food.

### Objective

Objective of the study is to show the relationship between nutrition and position of people in the social hierarchy in rural India.

### Hypotheses

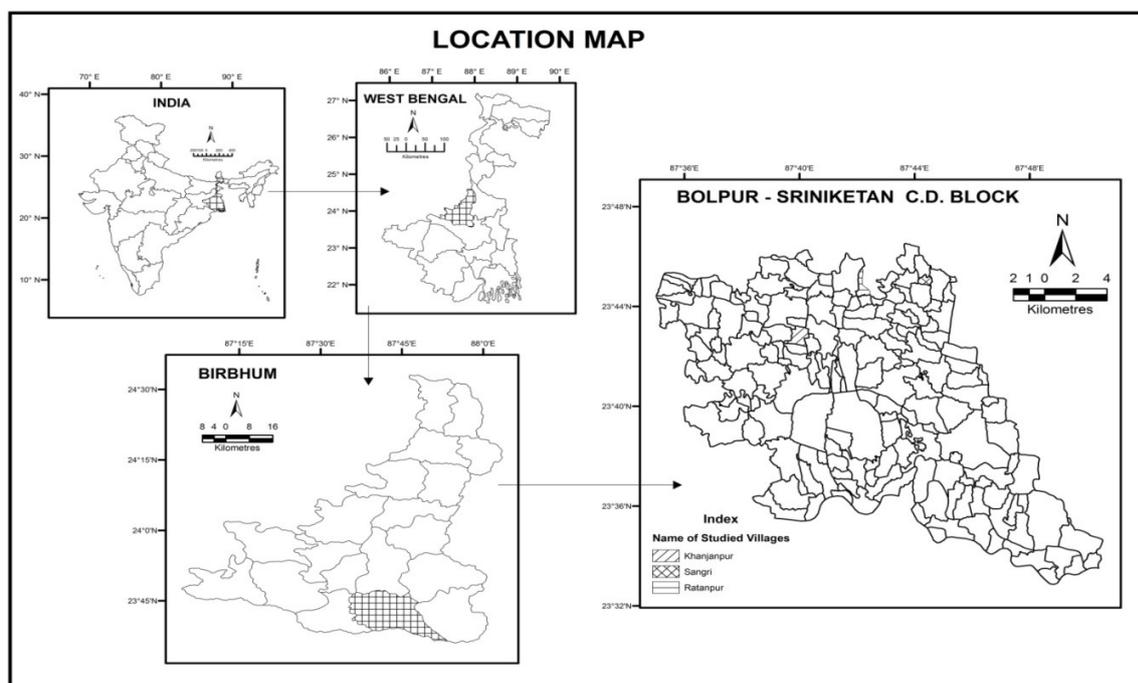
Against this background, the study deals with the pattern and content of food intake to test the applicability of the ecological principles pertaining to the direct relation between position in social hierarchy and level of nutrition.

### Area under Study

Villages under study (figure 1) fall under the administrative unit of Bolpur-Sriniketan C. D. Block of Birbhum District, West Bengal (India). These villages are located along Kopai River, a tributary to Mayurakshi River, which is a right bank tributary of Ganges River System.

### Rationale of the Study

Variation in nutritional pattern of various social groups reflects differential access to resource. The study therefore is relevant from the point of view of planning for equitable distribution or access to food and food procurement strategy which is the fundamental survival need of human being.



### Methodology

The basic indicator used in the study is the vertical cross-section (caste hierarchy) of the society because functionally it is analogous to the trophic structure of a natural ecosystem. The caste hierarchy in rural human ecosystem is characterized by three major social strata i.e. S.T., S.C. and other than S.T. and S.C. These three social groups are categorized as trophic levels-I, II and III respectively. On the basis of homogeneity in occupational profile, work participation rate, percentage of main and marginal workers to working population and non workers to total population. Trophic level-I and II are designated as social autotrophs and trophic level-III as social heterotrophs.

**Table 1: Social Composition**

Name of the Villages under study	Percentage to total population			Dominated Social Groups	Designated Social Trophic Level	
	S.T.	S.C.	Other than S. C. & S. T.			
<i>Khanjanpur</i>	95.4	0.0	4.6	S.T.	Trophic Level-I	Social Autotrophs
<i>Ratanpur</i>	0.3	91.1	8.6	S.C.	Trophic Level-II	
<i>Sangri</i>	0.0	0.0	100.0	Other than S.T. & S. C.	Trophic Level-III	Social Heterotrophs

Source: Census of India, 2001, Labpur C. D. Block, Birbhum District, West Bengal

Villages under study are *Khanjanpur*, comprises 95.4% of S.T. population; *Ratanpur*, comprises 91.1% of S.C. population and *Sangri*, comprises 100% of population other than S.T. & S. C. group of people to total population. These villages are respectively considered as social trophic level-I, II, and III (table 1). Among the social trophic levels-I and II, 20% to 54% of population are agricultural labourers and 41.1% to 65.9% are cultivators whereas among social trophic level-III, only 1.6% of population are agricultural labourers and 84% are cultivators (table 2). The work participation rates of social trophic level-I and II are 60.4% to 62.4% where as social trophic level-III denotes 34.6%. Percentage of non-workers to total population in social trophic level-I and II are 37.5% to 39.6% and it is 65.4% in social trophic level-III. From this account it is clear that social trophic level-I and II are earning their livelihood by physical labour i.e. they are directly engaged in production process unlike the social trophic level-III. Therefore social trophic level-I and II are designated as social autotroph and social trophic level-III as social heterotroph (table-3).

**Table 2: Occupational Profile**

Social Trophic Level		Percentage of workers to total working population			
		Cultivators	Agricultural Labourers	Workers in Household Industries	Other Workers
Social Autotrophs	Trophic Level-I	41.1	54.5	1.0	3.3
	Trophic Level-II	65.9	20.6	5.4	8.1
Social Heterotrophs	Trophic Level-III	84.1	1.6	1.6	12.7

Source: Census of India, 2001, Labpur C.D. Block, Birbhum District, West Bengal

Food is analyzed in terms of content (variety of items) and nature (nutritive values) of foodstuff consumed by different social trophic levels. Thereafter, energy content (calculated as heat) of each of the dietary items are computed to facilitate comparison of differential nutritive value of the individual food items. The energy equivalent of the different food items have been adopted from Gopalan (2007:47-59); Fox and Cameron (1995:7).

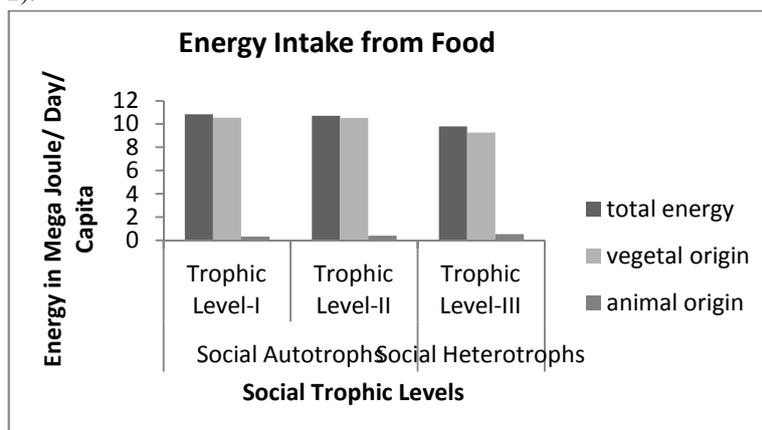
**Table 3: Status of Working Population**

Social Trophic Level		Work participation rate	Percentage to total working population		Percentage of non workers to total population
			Main workers	Marginal workers	
Social Autotrophs	Trophic Level-I	62.4	28.3	34.2	37.5
	Trophic Level-II	60.4	37.4	23.0	39.6
Social Heterotrophs	Trophic Level-III	34.6	23.6	11.0	65.4

Source: Census of India, 2001, Labpur C.D. Block, Birbhum District, West Bengal

### Discussion and Analysis

Three major parameters of food are taken into consideration. Firstly, total energy obtained from food; Secondly, energy obtained from vegetal origin and lastly, energy obtained from animal origin. The results of the study reveal an inverse relation between social trophic levels and total energy intake. It is also true for energy obtained from vegetal origin. On the other hand, there is a direct relation between social trophic levels and energy intake from animal origin (figure-2).



**Figure 1**

Among food items of vegetal origin, social autotrophs obtain a large proportion of energy from cereals, leafy vegetables, roots and tubers in contrast to the social heterotrophs who obtain greater portion of energy from pulses, other vegetables, oil, sugar and jiggery (figure-3). Thus there is a direct relation between social trophic levels and energy intake from pulses, other vegetables, oil, sugar and jiggery. There is an inverse relation between social trophic levels and energy obtained from cereals, leafy vegetables, roots and tubers (figure 3). Pulses are the major sources of protein from food of vegetal origin. The direct relation between the energy intakes from it proves the stated hypothesis of the study.

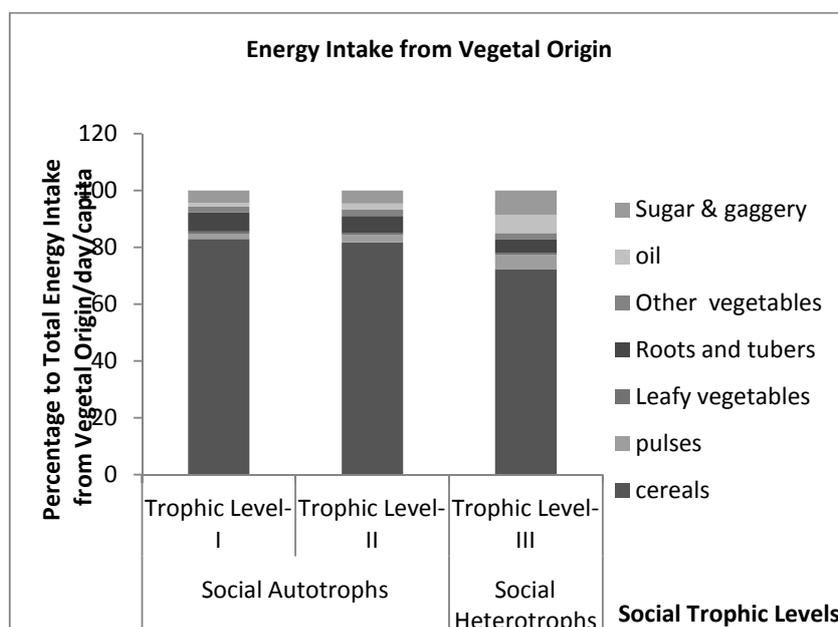


Figure 2

However, as far as food of animal origin is concerned, there is a direct relation between social trophic levels and energy intake from animal product (figure-4). Hypothesis thus stands confirmed. Further, these differences are attributed to differential consumption of milk and milk products and reveal a direct relation between social trophic levels and energy intake from milk and milk products. But there is an inverse relation between social trophic levels and energy intake from non-vegetarian items i.e. fish, egg, meat, crabs, snails, oysters etc. (figure-4). This is because these are obtained locally through collection and are appropriate substitutes of commercially available chicken and meat.

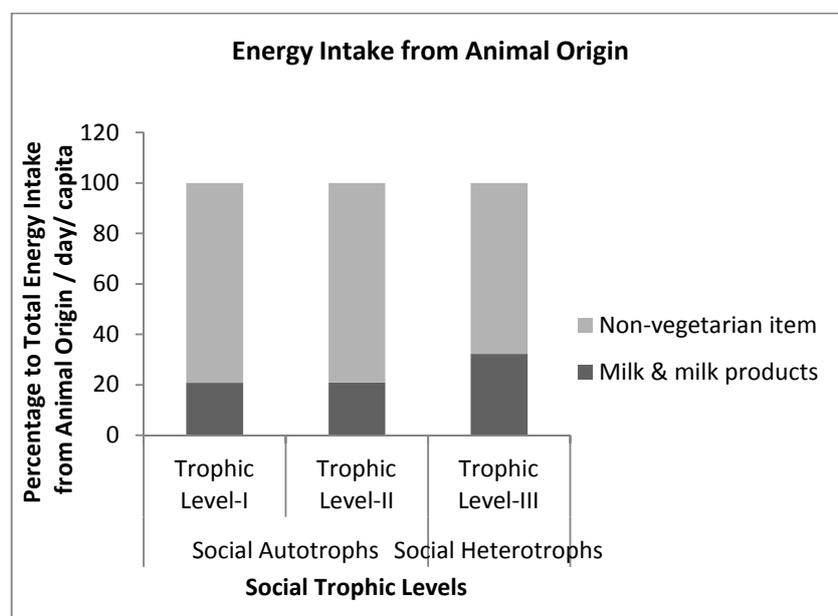


Figure 3

Table-4 shows the nutritional status of the social trophic levels under study in terms of the Indian and International recommendations of dietary requirements. According to the recommendations, study groups fall in the category of 'moderate type work' (include fisherman, basket-maker, potter, goldsmith, carpenter, mason, rickshaw-puller, electrician, fitter, turner, welder, weaver, driver, industrial labourer, agricultural labourer, sales worker, domestic helper, transport worker, light construction worker etc.).

**Table 4: Energy Intake by Social Trophic Levels and Human Energy Requirement**

Gender	Nature of work done	Body Weight (Kg.)	Energy in Kilocalories/day/capita				
			Recommended Dietary Allowances for Indians by ICMR*	Average Human Energy Requirement Recommended by FAO/ WHO**	Social Trophic Levels***		
					I	II	III
Male	Sedentary	60	2425	2400			
	Moderate		2875	2888	3377	3425	3165
	Heavy		3800	3350			
female	Sedentary	50	1875	1888			
	Moderate		2225	2275	2893	2902	2427
	Heavy		2925	2600			

Source:\* Gopalan, G. et al. (2007): Nutritive Value of Indian Foods. National Institute of Nutrition, Indian Council of Medical Research, Hyderabad, p.99, \*\* Human Energy Requirements (2001): FAO Food and Nutrition Technical Report Series-1, FAO/WHO/UNU, Rome, pp.41-46, \*\*\* Primary Survey

### Summary and Conclusion

Study reveals that there is an inverse relation between social trophic levels and total energy obtained from food. With regard to energy obtained from vegetal origin the same pattern is found. Further, it is true in case of energy obtained from cereals, leafy vegetables, roots and tubers among food of vegetal origin but there is a direct relation between social trophic levels and energy obtained from pulses, other vegetables, oil, sugar and jiggery. There is also a direct relation between social trophic levels and total energy obtained from animal origin. This is true especially in case milk and milk products and not in the case of other food items of animal origin like fish, egg, meat, crabs, snails, oysters etc. This is attributed due to collection of crabs, snails, oysters (appropriate substitutes of commercially available chicken and meat). Thus hypothesis stands confirmed in case of food items of greater nutritive value.

Since differences in the nutritive value of food items consumed by different social trophic levels does not have an adverse impact on their health as per the information of local health authorities, local respondents, the study therefore concludes that the basic strategy to plan for food availability in the region should concentrate on maintaining a status quo in the economic pursuits so as to sustain the existing sustainable food supply situation.

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