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STUDY OF NUTRITION STATUS OF RURAL FAMILIES IN UNION TERRITORY OF DELHI

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Balanced intake of protein and calorie is very important for proper growth and development of human body. It is a well-known fact that large sections of population consume diets which are quantitatively and/or qualitatively deficient. Malnutrition affects the general health of population and the cost of malnutrition is of great concern for a country like ours. Nutrition being a complex phenomenon, the right quantity and quality of food are influenced by the consumers' frame of physical and environmental health. There are wide variations in the nutrition uptake. The present paper deals with the study of nutritional status of rural families in the Najafgarh block of Delhi. The calorie and protein intake has been studied for the farmers, agricultural labourers and traders in the study area. The relationship between calorie intake and variables, *e.g.*, family size, holding size and or income has been examined using multiple regression technique.

In the discussion that follows, a description of sampling design, review of literature and empirical results are presented.

SAMPLING DESIGN

The study was undertaken in the Najafgarh block of Union Territory of Delhi. Twelve villages were randomly selected for the purpose of collection of data. In these selected villages farmers were stratified into small, medium and large groups.

A total of 50 farmers from small and 35 farmers each from large and medium groups were selected at random. The small farmers owned holdings less than 2 hectares each while the medium and large group of farmers owned holdings from 2 to 4 hectares and above 4 hectares each respectively. To compare the nutritional status of farmers with that of agricultural labour and trader households, a sample of 50 agricultural labour households and of 50 trader households was taken. Agricultural labour was stratified into two groups. Thirty-seven agricultural labour households were selected from a group of labour households having Rs. 250 or less as monthly income while 13 households with income more than Rs. 250 per month were selected. The selected trader households were classified into three groups. From the first group having a monthly income of Rs. 250 or less, 11 households were selected. From the second category having a

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monthly income of Rs. 250 to 500, 29 households were selected. The third group of households had a monthly income of more than Rs. 500 and ten households were selected from it. The reference period of the enquiry is July, 1976 to June, 1977. The collection of data was made with the help of four enumerators and one supervisor.

REVIEW OF LITERATURE

According to the United Nations estimates (1968), approximately one-third of the children suffer from protein malnutrition and it is believed that if this situation should continue, the physical, economic and social development of the future generations may become completely arrested.[1] Professor Sukhatme concludes that "There is a very high correlation between energy intake and the protein intake. This correlation continues to be high even when both the energy intake and the protein intake are expressed relative to requirements based on actual body weight."[2] In another study, Professor Sukhatme was of the opinion that the protein deficiency is widespread. The major factor responsible for this deficiency is inadequate income.[3] The pattern of diet is influenced by the availability of food, population, their food habits, economic factors and the system of distribution. The nutritional status of rural population is generally directly related to the dietary patterns of the region. Diet based on wheat is prevalent in Uttar Pradesh, Punjab, Himachal Pradesh and Jammu & Kashmir. In this region the average calorie intake varied from 2265 to 2832.[4]

EMPIRICAL RESULTS

Of all the constituents, cereals occupy an important position by virtue of the fact that they supply more than 70 to 80 per cent of the total calorie requirements which vary according to the type of households. It is apparent from Table I that the agricultural labourers who are the poorest community take more than 80 per cent of their total energy from cereals only. Out of the three types of households, *i.e.*, farmers, agricultural labourers and traders, farmers get the recommended quantity of calorie intake. The energy intake is similar in the case of other two groups, but is however below the recommended quantity. The size of holding has positive relation with the calorie intake which indicates that the large farmers take more nutritious diet from different food constituents than the medium and small farmers. The calorie intake

1. United Nations: Feeding the Expanding World Population: International Action to Avert the Impending Protein Crisis, Report to the Economic and Social Council of the Advisory Committee on the Application of Science and Technology to Development, New York, 1968.
2. P. V. Sukhatme, "The Protein Problem, Its Size and Nature," *The Journal of the Royal Statistical Society*, Series A., Vol. 137, Part 2, 1974, pp. 166-191.
3. P. V. Sukhatme, "Presidential Address—Protein Strategy and Agricultural Development," *Indian Journal of Agricultural Economics*, January-March, 1972.
4. Government of India: Report of the National Commission on Agriculture, 1976, Part II—Policy and Strategy, Ministry of Agriculture and Irrigation, New Delhi, 1976.

TABLE I—CALORIE INTAKE BY DIFFERENT GROUPS OF HOUSEHOLDS

(per capita/day)

Types of households/ Size of holdings	Cereals	Others						Grand total
		Pulses	Sugar	Milk, milk products and meat	Edible oil	Vegetables and fruits	Total	
A. Farmer's holding size (hectare)								
Upto 2 ..	1958.5	77.2	238.0	220.4	70.20	39.4	645.2	2603.7
2—4	1922.4	83.5	293.2	272.0	81.00	51.8	781.5	2703.9
Above 4 ..	2111.4	90.4	270.2	282.4	52.5	48.2	743.7	2855.1
All farms ..	2001.9	83.6	265.2	257.4	66.6	46.0	718.8	2720.7
B. Agricultural labour income (Rs.)								
Upto 250 ..	1733.9	50.0	156.0	49.7	59.1	23.4	338.2	2072.1
250—500 ..	1736.1	45.4	182.8	116.6	57.9	26.1	428.8	2164.9
All households ..	1734.6	48.6	165.2	72.9	58.8	24.3	369.8	2104.4
C. Trader's income (Rs.)								
Upto 250 ..	1686.1	64.4	182.3	90.6	104.7	42.1	484.1	2170.2
250—500 ..	1540.2	56.8	187.1	182.9	95.1	48.7	570.6	2110.8
Above 500 ..	1571.3	67.3	165.7	219.3	91.2	39.5	583.0	2154.3
All households ..	1571.5	60.8	180.4	160.5	95.1	45.2	542.0	2113.5

of agricultural labourers and traders is also positively related with the size of income. The energy intake of traders from edible oils is higher than those of the other two types of households. On the contrary, farmers obtain more energy from cereals and milk. It is evident from the foregoing analysis

TABLE II—PROTEIN INTAKE BY DIFFERENT GROUPS OF HOUSEHOLDS

(per capita/day)

Types of households/ Size of holdings	Cereals	Others						Grand total
		Pulses	Sugar	Milk, milk products and meat	Edible oil	Vegetables and fruits	Total	
A. Farmer's holding size (hectare)								
Upto 2 ..	66.27	3.81	0.13	8.18	—	1.52	14.27	80.54
2—4 ..	64.68	4.09	0.14	12.46	—	1.97	18.66	83.34
Above 4 ..	71.51	4.54	0.13	12.40	—	1.76	18.83	90.34
All farms ..	67.66	4.14	0.13	11.13	—	1.74	17.14	84.80
B. Agricultural labour income (Rs.)								
Upto 250 ..	58.64	2.44	0.05	2.33	—	1.01	5.83	64.47
250—500 ..	59.12	2.32	0.05	4.86	—	1.04	8.27	67.39
All households ..	58.81	2.40	0.05	3.21	—	1.03	6.69	65.50
Trader's income (Rs.)								
Upto 250 ..	56.72	3.10	0.06	3.27	—	1.99	8.42	65.14
250—500 ..	52.06	2.79	0.05	7.62	—	1.93	12.39	64.45
Above 500 ..	53.06	3.28	0.06	9.55	—	1.75	14.64	67.70
All households ..	53.07	2.97	0.05	6.60	—	1.89	11.51	64.58

that the farming community consumes relatively more of cereals and milk which are produced at the farm level. Likewise, the traders who deal with edible oils either by way of processing or in the trade, consume more of the commodity.

Similar to the calorie intake, the major portion of protein intake also comes from cereals. The protein intake is very high in the farmer's diet

while it is comparatively low in the other two groups, *i.e.*, agricultural labourers and traders. On the other hand, animal protein, which is considered to be nutritionally superior because of its favourable amino-acid profile, is as high as 12 per cent in the farmer's diet while it is very low in the diets of labourers as well as traders (less than 5 and 10 per cent respectively). Out of the two groups of agricultural labourers and traders, the latter takes relatively more balanced diet than the former. On the whole, the protein intake other than from cereals is only 6.69 grams out of 65.50 grams in the case of agricultural labourers' group while it is 11.51 grams out of 64.58 grams in the traders' group. The protein intake in different categories of households/types of holdings has similar positive relation with the size of holding/income.

Factors affecting Energy Intake

To study the relationship between calorie intake, farm size and family size a linear regression model is used. The analysis is divided into two parts, firstly, the households are distinguished by farm size and income and secondly, by the number of family members. The regression model used in the study is as follows:

$$y = a + b_1 x_1 + b_2 x_2 + e$$

where

y = calorie intake per capita per day,

x_1 = number of family members,

x_2 = farm size in hectare/monthly income (Rs.),

a = constant term,

b_1 and b_2 are coefficients and

e = error term.

Only statistically significant results are presented in Table III. According to the farm size and income, the regression coefficient are significant in a single group of each type of household mentioned in this study. The relation between calorie intake and size of family is negative as expected in all the three types of households; however, it is significant in the second size-group of farmers and labourers, which shows that as the size of family increases the calorie intake declines. On the other hand, the calorie intake has positive effect with the size of income in the second group of labourers and traders.

TABLE III—ESTIMATED EQUATIONS FOR CALORIE INTAKE

Types of households	Pure intercept	Regression coefficients		R^2
		x_1	x_2	
1. *According to Farm Size and Income*				
A. Farmer's holding size (hectare)				
2- 4	2915.14	—54.88** (13.94)	58.15 (44.66)	0.35
B. Agricultural labour income (Rs.)				
250- -500	2044.44	—77.58** (24.99)	2.51* (1.06)	0.62
C. Trader's income (Rs.)				
250- -500	1033.64	—72.21 (55.40)	4.17* (1.80)	0.18
2. *According to Family Size (Number)*				
A. Farmers				
Upto 5	2308.76	8.69 (81.35)	99.53* (31.84)	0.25
B. Agricultural labour				
Upto 5	2485.07	—201.10* (81.32)	2.48 (2.13)	0.29
5—10	1912.83	—31.17 (68.90)	1.91* (0.90)	0.15
Above 10	4582.58	—245.69** (61.47)	2.00 (0.73)	0.97
C. Traders				
Above 10	6086.75	—277.79* (100.44)	—0.81 (0.36)	0.88

** Significant at 1 per cent probability level.
* Significant at 5 per cent probability level.

According to given family size, the calorie intake increases with an increase in the size of farm in the case of small families. In the case of agricultural labourers and traders the size of income has not relatively much effect on the calorie intake but the size of family plays a major role except the second size-group of agricultural labourers. The estimate of calorie intake with the size of family is highly significant in the groups having ten or more members in the two types of households, *i.e.*, agricultural labourers and traders, indicating that calorie intake will decline with the increase of size of family.

The study shows that there is a large scope for the improvement in the diet of agricultural labourers and small traders. Though the study is confined to one block, the results presented here may be representative for the rural areas of Delhi.