



## DOES INCOME INFLUENCE NUTRITION?- AN ECONOMIC ANALYSIS

<sup>1</sup>Kavitha, V., <sup>2</sup>Shashekala, S.G., <sup>3</sup>Sumathi, M., <sup>1</sup>Kavitha, B.<sup>1</sup>Department of Agricultural Economics, Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu, 641003,<sup>2</sup>Manager Content, IFFCO Kisan Sanchar Ltd, Bangalore,<sup>3</sup>M.S.Swaminathan Research Foundation, Chennai-113.**ABSTRACT**

The study examined the influence of income on calorie consumption pattern across different occupational groups in rural areas of Erode District of Tamil Nadu. Based on proportionate random sampling procedure, households representing farmers, agricultural laborers and other occupational groups were selected. The respondents were enquired about their general description of the family, income particulars, expenditure and consumption pattern. The results showed that the calorie income elasticity was inelastic in the entire occupational group and comparatively higher in agricultural labourers group. It was very less in farmers group whose income was higher than the other two occupational groups. The present study adds to the growing evidence that increase in income need not result in increase in nutrition status.

**KEY WORDS :** Nutritional Status-Calorie availability- Consumption unit- Calorie- income elasticity

**INTRODUCTION**

With a population approaching almost 1.2 billion in 2010, India is likely to be the most populous country by 2030 with 1.6 billion people. It currently accounts for more than 17% of the global population and 456 million poor, or 41.6% living on less than \$1.25 a day (Chen and Ravallion 2008). Alongside the rising middle class in India steering the changes in consumption patterns and driving up demand for quality food, there is a large section of the population dwelling below the poverty line. Although the proportion of poor people has come down from 55% in 1973–1974 to 27.5% in 2004–2005, the rate of decline has somewhat slowed down in the post-reform period and more than 300 million people continue to live in poverty. Food accounts for more than 50% of the monthly per capita expenditure in India and even more for the low income groups. Hence, economic access to food is an issue for the poor and vulnerable groups. (Nanda kumar *et al.*, 2010). However, a dietary transformation is under way, with the consumption of cereals declining and that of high-value food increasing. Ensuring food and nutrition security is thus a challenge for India. Inadequate nutrition is perhaps the most important problem facing the poor. Being hungry lowers productivity, hinders learning and increases the risk of diseases. India is a home for about one third of the world's malnourished children. Besides, India has more persons suffering from endemic or chronic hunger. During the last few years, the Government of India as well as some state governments has initiated many programmes like *Sampoorn Gramin Rozgar Yojana*, *Annapoorna*, *Antyodaya Anna Yojana*, and Universal Noon Meal Programme to improve the nutrition status of the poor people. Despite subsequent improvements in health and well being since the country's independence in 1947, malnutrition remains a problem, where more than half of the children under the age of four are malnourished, 30 per cent

of new born are significantly under weight and 60 per cent of women are anemic. Micronutrient deficiencies alone may cost India \$2.5 billion annually (Gragnotati *et al.* 2005). Therefore, a key question for any policy aiming to improve human development is whether it improves nutrition? The orthodox view in development economics has been that policies, which increase the income of the poor, have beneficial effects on nutrition. However, in recent years a new literature has emerged suggesting that increase in income need not result in subsequent improvement in nutrient intakes (Behrman and Deolalikar, 1987). Moreover calorie response to income of the poor households can be considerably higher than that of average income households. Keeping these facts in view the study aimed to examine the relationship between income and the nutritional status among the rural households.

**MATERIALS & METHODS****Sampling Design**

The study was aimed to estimate the nutritional status of different occupational groups in a rural area. Such an attempt requires an area having all occupational groups viz., farmers, agricultural labourers and non farmers. Gobichettipalayam block in Erode district of Tamil Nadu has been selected for the study, because it has all the above said occupational groups. The block comprises of 32 revenue villages. Based on the total number of households, villages were first arranged in descending order. Then two villages in the top of the order, one in the middle and two in the bottom were selected so as to give equal representation to all the villages. Thus totally five villages were selected.

Households were stratified based on the occupation viz., farmer, agricultural labourer and others. Other occupational group comprises of government employees,

businesspersons, weavers, watchman, building contractors, artisans, mill workers, those worked in workshops, barbers, washer men, etc. Total sample size was fixed as 180 with 60 in each occupational group. This total size in each group was allocated among the villages based on proportional random sampling. To fulfill the objectives, the respondents were enquired about family particulars, asset position of the family, employment details and income sources. Regarding consumption aspects, those items which are consumed regularly in daily diet were recorded either on monthly or annual basis. In case of purchased items, actual quantities purchased from retail as well as from Public Distribution System were recorded. In respect of homegrown items, especially for farming group, the quantities were recorded in local weights and measurements and then converted into metric units.

#### Analytical Framework

The data were analyzed for different occupational groups. The sample households of three different occupational groups were post stratified into four categories based on the annual household income. Households with income less than Rs 10,000 as category I, income ranging from Rs 10,001 to Rs 20,000 as category II, income ranging from Rs 21,000 to Rs 30,000 as category III and finally households with income of more than Rs 30,000 as category IV. The calorie availability was used as an indicator of nutritional status

(Haddad and Kennedy 1994) and as per the Planning Commission 1993 norms, 2400 calories per person per day for rural areas was taken into account for the study. In order to find out the total available calories, the quantity of each item consumed, was multiplied with the nutrition content of the respective food commodity, and finally all the values were summed up (Gopalan 1993). To overcome the age and sex difference, individuals constituting the family were converted into consumption unit and then per consumption unit per day was calculated. In the present study, Lusk coefficients were used for standardization of household into consumption units (Rao 1983).

#### Nutrient Distribution across Occupational Groups

##### Nutritional Status of Farmers

There was considerable variation in calorie consumption among households in various income categories (Table 1). The average calorie availability, per consumption unit, per day was 2476 Kcal. This was comparatively higher than the recommended level of 2400 Kcal. In terms of percentage calorie distribution, rice contributed the major share (61.02 percent), followed by edible oil (9.69 percent), and vegetables (8.44 per cent). Of the entire income categories, only category I consumed lesser calories than the recommended level. The per capita per day calorie availability varies from 2269 Kcal in category I to 2587 Kcal in category IV

**TABLE 1: Calorie Availability (Per capita per day) for Farmers (Kcal)**

S.No	Particulars	I	II	III	IV	Mean
1	Rice	1433 (63.15)	1487 (58.63)	1561 (62.11)	1564 (60.44)	1511 (61.02)
2	Other cereals	78 (3.43)	64 (2.52)	11 (0.43)	18 (0.69)	42 (1.69)
3	Pulses	92 (4.05)	148 (5.83)	113 (4.49)	127 (4.9)	120 (4.84)
4	Milk	62 (2.73)	140 (5.52)	209 (8.31)	218 (8.42)	157 (6.34)
5	Vegetables	204 (8.99)	246 (9.7)	191 (7.6)	195 (7.53)	209 (8.44)
6	Fruits	1.2 (0.05)	8.2 (0.32)	113 (4.49)	127 (4.9)	62 (2.5)
7	Animal products	7.7 (0.33)	9.3 (0.36)	12.6 (0.5)	12.8 (0.49)	10.6 (0.42)
8	Edible Oil	238 (10.48)	244 (9.62)	226 (8.99)	252 (9.74)	240 (9.69)
9	Sugar	146 (6.43)	180 (7.09)	175 (6.96)	181 (6.99)	170 (6.86)
10	Spices	7.7 (0.33)	10.2 (0.4)	9.1 (0.36)	10.3 (0.39)	9.3 (0.37)
	Total	2269 (100)	2536 (100)	2513 (100)	2587 (100)	2476 (100)

Note: Figures in parenthesis indicates percentage to the total

#### Nutritional Status of Agricultural labourers Group

The average calorie availability for an agricultural labourer was estimated as 2420 Kcal (Table 2). This was equal to the recommended level, but comparatively lesser than the calorie availability of farmers. Of the total calories, more calories was supplied from rice (58.38 per cent) followed by edible oil (9.87 per cent), sugar (8.09 per cent) and pulses (7.75 per cent). Compared to farmers

group, agricultural labourers derived more calories from animal products (22.3 Kcal). Surprisingly comparison of income categories revealed that the contribution of calories from cereals, vegetables, pulses, milk, sugar and spices were higher in first income category than the fourth income category. Thus this clearly indicated that there was diversification in the food items consumed by the

labourers if the income increased. The results of the analysis also indicated that the calorie consumption

increased with increase in income (ranging from 2172 Kcal in first category to 2592 Kcal in fourth category).

**TABLE 2:** Calorie Availability (Per capita per day) for Agricultural labourers (K cal)

S.No	Particulars	I	II	III	IV	Mean
1.	Rice	1235 (56.86)	1350 (56.55)	1554 (61.30)	1525 (58.8)	1416 (58.38)
2.	Other cereals	75 (3.45)	133.5 (5.59)	85.5 (3.37)	15.5 (0.59)	77.3 (3.19)
3.	Pulses	175 (8.06)	174 (7.28)	193 (7.61)	208 (8.02)	187.6 (7.75)
4.	Vegetables	127.7 (5.87)	156.4 (6.55)	225 (8.87)	120 (4.62)	157 (6.48)
5.	Milk	44.4 (2.04)	117.9 (4.9)	75.9 (2.99)	149.7 (5.77)	96.9 (4.00)
6.	Fruits	15.3 (0.70)	18.4 (0.77)	17 (0.67)	32 (1.23)	20.6 (0.85)
7.	Animal Products	13.2 (0.60)	32.4 (0.34)	24 (0.94)	20 (0.80)	22.3 (0.92)
8.	Sugar	253 (11.64)	170 (7.13)	132 (5.20)	229 (8.83)	196 (8.09)
9.	Edible Oil	223 (10.26)	228 (9.55)	223 (8.79)	283 (10.91)	239 (9.87)
10.	Spices	10.5 (0.48)	6.25 (0.26)	6.7 (0.26)	7.2 (0.27)	7.6 (0.31)
	Total	2172 (100)	2387 (100)	2535 (100)	2592 (100)	2420 (100)

Note: Figures in parenthesis indicates percentage to the total

**TABLE 3:** Calorie Availability (Per capita per day) for Other Occupational Groups (Kcal)

S.No	Particulars	I	II	III	IV	Mean
1.	Rice	1251 (59.82)	1255 (57.83)	1070 (48.70)	1047 (41.09)	1155 (51.3)
2.	Other cereals	40 (1.91)	56 (2.58)	100 (4.55)	148 (5.80)	86 (3.82)
3.	Pulses	180 (8.60)	204 (9.40)	315 (14.33)	396 (15.54)	273 (12.12)
4.	Vegetables	120 (5.73)	90 (4.14)	96 (4.36)	113 (4.36)	104 (4.62)
5.	Milk	91 (4.35)	90 (4.14)	174 (7.91)	251 (9.85)	106 (4.70)
6.	Fruits	30 (1.43)	61 (2.81)	34.9 (1.58)	39 (1.77)	41 (1.82)
7.	Animal Products	12 (0.57)	21 (0.96)	12.2 (0.55)	24 (0.94)	17.3 (0.76)
8.	Sugar	173 (8.72)	122 (5.62)	143 (6.50)	236 (9.26)	168 (7.46)
9.	Edible Oil	185 (8.84)	263 (12.11)	241 (10.96)	284 (11.14)	243 (10.79)
10.	Spices	9 (0.43)	7.4 (0.34)	8.4 (0.38)	9.1 (0.35)	8.4 (0.37)
	Total	2091 (100)	2170 (100)	2197 (100)	2548 (100)	2251 (100)

Note: Figures in parenthesis indicates percentage to the total

#### Nutritional Status of Other Occupational Groups

The average per capita per day calorie availability for other occupational groups was 2251 Kcal, which was lesser than the minimum requirement of 2400 Kcal (Table

3). When compare to farmers (61.02 per cent) and labourers (58.38 per cent) other occupational group derive less amount of calories from rice (51.3 per cent). Besides rice more calories was also obtained from Pulses (12.12 per cent), oil

(10.79 per cent) and sugar (7.46 per cent). Only a least amount of calories was derived from vegetables (4.62 percent). Rice contributed the major share ranging from 59.82 per cent in first category to 41.09 percent in fourth category. A reduction in calorie availability from rice in the fourth category was due to the preference given for other food items like milk, sugar, edible oil and pulses. The calorie

consumption from other cereals, pulses, milk, and sugar increased with increase in income. This was in accordance with Musebe *et al.*, (2002). The total calorie availability ranges from 2091 Kcal in first category to 2251 Kcal in fourth category. The availability of calories for different occupational groups across the income categories are summarised in the Table 4.

**TABLE 4:** Per capita per day calorie availability for various occupational groups (K.cal)

S.No	Income Category	Farmers	Agricultural Labourers	Others
1.	I	2269	2172	2091
2.	II	2536	2387	2170
3.	III	2513	2535	2197
4.	IV	2587	2592	2548
	Mean	2476	2420	2251

### Calorie Income Elasticity

The income elasticities for calorie of farmers, agricultural labourers, and other occupational group were estimated by using a log linear function with nutrient availability per capita per day as dependant variable and income per capita per day as independent variable. The function is specified as follows.

$$\log \text{CAL} = a + b \log \text{YPC}$$

Where

CAL - Calorie availability per capita per day.

YPC - Income per capita per day

a - Intercept

b - Coefficient.

The analysis showed that income elasticity of farmers was very low (0.07) and it was also non significant, because

perhaps many of the farmers had already consuming sufficient amount of calories (Table 5). This elasticity range can be compared to the elasticity range of 0.05 for households in Nicaragua studied by Wolfe and Behrman (1984). For agricultural labourers, the income elasticity was positive and significant (0.4) but still it was less than one. Jain and Sharma (2000) in their study in India also derived the same conclusions. For other occupational group, though the elasticity was positive and significant (0.1), the size of the coefficient was very small. The smaller size of elasticity might be due to the fact that the other occupational group spent more on non food items. So any increase in the income would be devoted towards non food expenditure. Thus when compared to farmers and other occupational groups, calorie availability for agricultural labourers was more responsive to increase in income.

**TABLE 5:** Calorie Income Elasticity across Occupational Groups

S.No	Particulars	Coefficient	T stat	P value
1.	Farmers	0.070	1.04	0.300
2.	Agricultural labourers	0.400**	4.57	0.000
3.	Others	0.100*	2.96	0.004

Note: \*(Significant at five per cent level.) \*\* (Significant at one per cent level)

### Research findings

1. Estimates add to the growing evidence that the calorie income elasticities are much lower than previously thought. The calorie income elasticity was inelastic in the entire occupational groups and comparatively higher in agricultural labourers group. The overall calorie income elasticity was maximum for agricultural labourer (0.4) and least for farmers (0.07). Thus the study adds to the growing evidence that increase in income need not result in increase in nutrition status.
2. The diet in the rural area was predominantly rice based. Cereals such as jowar and Bajra, which are the cheap source of calories, could not find a significant place in the diet of rural people.
3. The calorie availability of farmers was greater than that of agricultural labourers and other occupational

groups. Calorie deficit was not limited to lower income category alone. In all the occupational groups even in higher income category, there existed a certain percentage of calorie deficit population.

4. This shows that increase in income need not result in subsequent improvement in nutrient intakes. Perhaps this may be due to the increasing concern for non nutritional characteristics of food like taste, convenience and status.

### CONCLUSION

From the results of the study, following conclusions were made

1. Since coarse cereals were not mostly found in the consumption basket of any occupational group, efforts must be made to restore the consumption of these

cereals. Perhaps supplying through Public Distribution System may encourage its consumption.

2. The calorie deficit population even in higher income group emphasized the need for massive community nutrition education or perhaps introducing nutrient education even in elementary school level.

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