HOUSEHOLD DEMAND FOR VEGETABLES IN RURAL AREA OF CUDDALORE DISTRICT, TAMILNADU, INDIA

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ABSTRACT

An attempt has been made in this paper to study the consumption of vegetables in rural areas by income groups and to identify the factors influencing the demand for vegetables in the study area. There were differences in consumption level of vegetables in rural families across income groups. The results showed that the vegetable consumption in the study area is far below the recommended level and income elasticities are positive and they are lower than price elasticities. Therefore, lower prices through enhanced vegetable supplies brought about by the adoption of cost reducing or production enhancing technologies play a stronger role in increasing vegetable consumption than induced consumption via enhanced income.

Key words : Consumption, Household demand, Vegetables, Income group, Own, Cross price elasticity, Expenditure elasticity

Food security is the physical, economical and environmental access to balanced diet, which enables the individual to live a healthy and productive life (Paroda,2003). The food security rests on the most efficient use of natural resources like land, water, energy and plant diversity. Further, food security may be determined at various levels, *viz.,* at the level of a family, a community or a country in terms of demand and supply indicators. It is best assured when food is available on a continuous and sustainable basis, preferably from local production, processing, storage and distribution regardless of climatic fluctuations and other variations. Therefore, it would be important to realize an even and a continuous availability of food in sufficient quantity and quality particularly in the developing countries to essentially safeguard the food and nutritional security of the mankind.

Optimal nutrition will demand the intake of a wide range of foods, which taken together and in judicious combination (in a well balanced diet) can provide the required essential nutrients. Ensuring good nutrition is not just equivalent to avoidance of hunger. While the latter can be achieved through the intake of a single staple cereal, the former will demand besides cereals, an adequate supply of other foods such as pulses, vegetables, fruits and milk. Therefore, while sustaining food grain production, the production of quality foods has to be significantly raised to ensure nutritionally adequate household diets. The policy makers need to fight at two ends of the spectrum, feeding the millions and ensuring adequate and nutritional food. In other words, need of the hour is not just food security but ensuring nutrition security to the hungry millions. Hence, an attempt was made in this paper to study the consumption of vegetables in rural areas by income groups and to identify the factors influencing the demand for vegetables in the study area.

METHODOLOGY

The Cuddalore district was selected purposively, and it forms the universe of the study. The growing human population, rising per capita income and urbanization are the major factors that influence the food consumption pattern. Hence, the villages nearby four municipalities were identified and a list of total number of households in these villages was prepared. After arranging these villages in the descending order of total number of households, the top five villages were selected in each municipal area to ensure adequate sample size. Thus, total number of sample villages was 20. A sample of 300 rural households was distributed in the selected villages in probability proportion to the total number of households in them.

Selected households were post stratified into two groups based on their annual gross income. These households were contacted individually for the collection of details on consumption of vegetables with the help of pretested questionnaire. The study was limited to five vegetables *viz.,* gourds, tomato, eggplant, lady's finger and beans (locally it is called as avarai) as they were accounting for nearly 30 per cent in production of

vegetables and more than 50 per cent in the consumption basket.

The Almost Ideal Demand System (AIDS) developed by Deaton and Muellbauer is a popular framework for estimating price and income elasticities when expenditure or budget data are available. The AIDS model satisfies the axioms of choice exactly and does not impose additive preferences, and under certain conditions, allows consistent aggregation of individual demands to market demands. Using the inverse of the expenditure function to express utility in terms of income and prices (indirect utility function), however, results in the following budget share equations:

$$Wi = \alpha_I + \varepsilon_j \delta_{ij} \ln p_j + \beta_i \ln(x/p)$$

where,

W_i = budget share of good i
P_j = price of good j (Rs./kg)
X = total expenditure (Rs.) and
P = price index

This is non linear equation and requires the estimation of a large number of parameters. Price index is defined by

$$\log P = \alpha_0 + \sum_j r_j \ln p + 1/2 \sum_i \sum_j u_{ij} \ln p_i$$

The theoretical properties of adding up, homogeneity in prices and income and symmetry of the cross effects of demand functions, imply the following parametric restrictions on original equation:

Adding up $\sum_{i-1}^{n} r_j = 1$ $\qquad \sum_{i-1}^{n} u_{ij} = 0$ $\sum_{i-1}^{n} s_i = 0$

Homogeneity $\sum_j u_{ij} = 0$

Symmetry $u_{ij} = u_{ji}$

The fourth restriction involves concavity of the expenditure function. This restriction has however no obvious parametric representation. Demographic effects are incorporated in the model by allowing the intercept in original equation to be a function of demographic variables,

or : $r_i = p_{io} + \sum_{j=1}^{s} p_{ij} d_j$ where, d_j is the jth demographic variable and 'S' denotes total number of demographic variables. The new model including the demographic variables and an error term (v_i) is then defined as;

$$w_i = p_{io} + \sum_{j=1}^{s} p_{ij} d_j + \sum_j u_{ij} p_j + s_i \ln\left(\frac{x}{p}\right) + v_i$$

The adding up requirement under the specification with the demographic variables now requires that; $\sum_{i=1}^{n} p_{io} = 1$ and

$\sum_{i=1}^{n} p_{ij} = 0 (j = 1,2,.....s)$ The AIDS model using general price index ($\ln p = \sum w_i \ln p_i$) is termed as Linear Approximate Almost Ideal Demand System (AL/AIDS). Marshallian price elasticity of commodity i with respect to commodity j's price in the AIDS model conditional on food expenditures can be computed as;

$e_{ij}^m = \dfrac{u_{ij}}{w_i} - \dfrac{s_i w_j}{w_i} - \partial_{ij}$ where, ∂_{ij} is equal to one when i=j otherwise $\partial_{ij} = o$. Expenditure elasticities are obtained from, $ei = 1 + \dfrac{s_i}{w_i}$ Hicksian price elasticities, e_{ij}^h can be computed as; $e_{ij}^h = e_{ij}^m + w_j e_i$

Hence, the AIDS was used in the present study to estimate the system of demand functions for the eight commodities viz., gourds, tomato, eggplant, lady's finger, beans, other vegetables, fruits and milk. The LA/AIDS model used in the study is written as:

$$w_i = r_{ik} + \sum s_{ijk} \ln p_{jk} + u_i \ln\left(\frac{x_k}{p}\right) + a_i fs_k + v_i$$

where,

W_{ik} = Average budget share of the ith commodity in household k
P_{jk} = Price of jth commodity (Rs per kg) in household k
X_k = Per capita household expenditure (Rs) in household k
P = General price index
fs_k = Family size (standard consumption units) of family k
v_i = error term
$i, j = 1, 2,……… 8$
$k = 1, 2,……….n$ households

The demand elasticities corresponding to linear version of the AIDS model were worked and out subjected to Engel aggregation, homogeneity and

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symmetry restrictions. The elasticities were estimated for two income groups separately.

RESULTS AND DISCUSSION

Despite, dietary pattern remains cereal based, the expenditure share of vegetables, which are rich in different nutrients, are trivial. The intake of vegetables is highly responsive to income changes and income augmentation may help to overcome the nutritional deficiencies. Besides, choice of vegetable and consequently the level of nutrient intake are also influenced by a variety of other economic, social, cultural, psychological and climatic factors.

It could be seen from Table1 that high proportion of total expenditure has been spent to meet out basic requirements in rural families. Hence, they were in a position to spend small proportion of their income on non-food items such as clothing, recreation etc. Thus, the empirical results of the present study support the Engel's law of consumption, which states that as the income increases, the percentage expenditure on food items

Table 2: Share of selected vegetables in total expenditure on vegetables

(Rs./month/household)

S.No.	Vegetables	Rural	
		Group I	Group II
1.	Gourds	22.82 (15.21)	15.18 (19.04)
2.	Tomato	19.61 (13.07)	8.61 (10.80)
3.	Eggplant	20.90 (13.93)	12.13 (15.22)
4.	Lady's finger	18.38 (12.25)	9.38 (11.77)
5.	Beans	21.30 (14.20)	12.38 (15.53)
6.	Other vegetables (excluding above five vegetables)	46.99 (31.34)	22.03 (27.64)
	Total vegetables	150 (100)	79.71 (100)

Figures in parentheses indicate percentage to total expenditure

Table 1: Annual consumption expenditure of sample households   (Rs./household)

S.No.	Particulars	Rural	
		Group I	Group II
1.	Cereals	8190.51 (24.25)	10888.78 (45.60)
2.	Pulses	1595.60 (4.72)	877.24 (3.67)
3.	Sugar	261.93 (0.78)	110.42 (0.46)
4.	Edible oil	399.27 (1.18)	213.09 (0.90)
5.	Fruits	114.58 (0.34)	51.01 (0.21)
6.	Milk and milk products	836.37 (2.48)	509.25 (2.13)
7.	Vegetables	1800.00 (5.33)	956.54 (4.01)
8.	Miscellaneous	350.75 (1.04)	127.42 (0.53)
9.	Sub total	13549.01 (40.12)	13733.75 (57.51)
10.	Non food items	20224.38 (59.88)	10146.11 (42.49)
11.	Grand total	33773.39 (100)	23879.86 (100)

Figures in parentheses indicate percentage to total expenditure

Table 3: Matrix of elasticities based on aids model in rural families

Particulars	Group	Gourds	Tomato	Eggplant	Lady's finger	Beans	Other vegetables	Fruits	Milk	Expenditure	Family size
Gourds	I	-0.1104	0.2176	0.1532	0.0713	0.1314	0.3207	-0.1518	-0.0783	0.5200	-0.1900
	II	-0.0839	0.11353	0.04719	0.03326	0.06234	0.19498	0.12697	0.6257	0.70528	-0.11534
Tomato	I	0.1208	-0.0213	0.0971	0.1749	0.0883	0.4128	0.0253	0.2076	-0.6200	0.4500
	II	0.07343	-0.09177	0.03603	0.10122	0.04154	0.28901	0.20547	-0.7218	1.0727	0.02460
Eggplant	I	0.0483	0.0902	-0.8504	0.4617	0.2216	0.5146	0.2717	0.1622	0.8600	0.3000
	II	0.05147	0.10480	-0.1479	0.15596	0.04019	0.30264	0.44092	0.8424	0.49375	-0.09377
Lady's finger	I	0.0621	0.1005	0.0723	-0.2710	0.1145	0.0671	0.1286	0.1769	0.9500	-0.6100
	II	0.03115	0.21530	0.15826	-0.1252	0.04050	0.02884	0.82089	0.4008	0.46895	0.09412
Beans	I	0.1518	0.0754	0.1206	0.0263	-0.9705	0.1805	0.1588	0.1432	0.7900	0.5600
	II	0.10467	0.03991	0.03856	0.05286	-0.94783	0.21674	0.05431	0.3667	0.63181	0.16796
Other vegetables	I	0.0492	0.0384	0.0779	0.1104	0.0374	-0.0718	-0.0114	-0.0287	0.0514	-1.0172
	II	0.03765	0.01623	0.01642	0.06939	0.02313	-0.5934	0.10846	0.8216	-0.9894	0.95934
Fruits	I	-0.1510	-0.1611	0.1117	0.0254	-0.0834	-0.0268	-0.2305	-0.1594	1.1670	1.6774
	II	0.04469	0.06975	0.16303	0.30341	0.00662	0.20581	-0.33581	0.1923	2.36636	-0.4287
Milk	I	-0.0439	-0.1272	-0.1129	0.1166	-0.0465	-0.0251	-0.4402	-0.5641	0.9073	1.1670
	II	0.0779	-0.1696	0.2316	0.1311	0.1034	0.0681	0.1172	-0.0285	1.2493	-1.3241

decreases and that on non-food items increases.

It could be observed from Table 2 that selected vegetables altogether occupied nearly 70 per cent of total expenditure on vegetables in rural families since these vegetables were easily available in the study villages. Though the percentage share in total expenditure was less, the actual amount spent was more in rural families. Awareness about nutritive value of vegetables among families was the main reason for high relative share of selected vegetables in total expenditure.

It could further be seen from Table3 that except for tomato, the expenditure elasticities for all other commodities were positive in rural families. Fruits had positive expenditure elasticity, which was greater than one and that of milk was nearing unity. This result implied that fruits are luxury commodity for rural families. The own price elasticities and cross price elasticities in rural families were seen with expected signs and it confirmed that the substitute relationship among the vegetables.

It could also be observed from the Table 3, that the expenditure elasticities were positive for all commodities except tomato, other vegetables and beans. Among these three, beans had very high negative elasticity coefficient, indicating that beans was least preferred. The own price elasticities had expected sign for all commodities and they were nearly unity for eggplant and fruits. Though, the price elasticity for other commodities were less, they had some influence. The cross price elasticities for most of the commodities were positive and less than unity indicated substitute relationship with other. The second group in rural area showed that the families increased their consumption as real income increased but rate of change in consumption of vegetables was low.

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