

# An Economic Analysis Of Demand For Minor Millets In Salem District Of Tamil Nadu

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**Abstract:** An attempt has been made to analyse the demand for different kinds of minor millets (samai, varagu and thenai) in Salem district. A pre-structured interview schedule was used and conducted face to face interview by selecting hundred households randomly. A linear Approximate Almost Ideal Demand System was utilized. According to the results, the average consumption expenditure was calculated as Rs. 4759.88 per month per household of which, cereals accounted for 19.91%. The sample households spent, 38.80 % of total expenditure on minor millets towards the purchase of samai followed by varagu, thenai. Marshallian and Hicksian elasticity calculated from the model were between -1 and 0 making the products less responsive to price changes. The results revealed that the purchase of samai was decreased by 0.04 % when its price increased by 10 %; whereas the demand for varagu was decreased by nearly two per cent and that of thenai was 3.7 %. The cross price elasticities were negative which indicated that the samai, varagu and thenai have complementary relationship. The Hicksian own price elasticities were similar to the Marshallian own price elasticities. The study concluded that samai was preferred by sample households and thenai was a luxury good for sample households.

**Index Terms :** Expenditure, Hicksian, Marshallian, consumption, marginal expenditure

## 1. INTRODUCTION

India is the largest producer of many kinds of millets, which are often referred as coarse cereals. Besides, it is an important producer of sorghum with increase in production from 4.4 million tonnes to 5.5 million tonnes in the year 2016-17 (World grain.com 2017). India is the largest global producer of millets with 41.01 per cent global market share. India ranks first and 11<sup>th</sup> place in top global consumption and per-capita consumption of millets respectively. In the year 2015, area under small millets in India recorded as 682.23 thousand ha, with production of 429.9 thousand tonnes and yield of 630 kg/ha. (Thakur, 2018). The year 2018 had been declared as the "National Year of Millets" in India. The government is promoting cultivation of millets by amending changes in cropping pattern of areas which are especially susceptible to climate change. In Tamil Nadu the minor millets such as samai, varagu, kooru, pannivaragu, kuthuraivali are mostly cultivated as rainfed crops. In the year 2014-15, area and production of samai was 22348 ha and 25445 tonnes respectively. Area and production of thenai was 1020 ha, 480 tonnes and that of varagu was 3570 ha, 6187 tonnes respectively. (Statistical Record – 2014-15). The global millet consumption has declined at a rate of 0.9 per cent and expected to witness positive movement during 2019-2024. Millets are popular in developing regions, like India and Africa where food and nutritional security are the major challenges and the Oceania is a least consumer of millets in world. The top ten millet consuming countries are shown in Figure -1

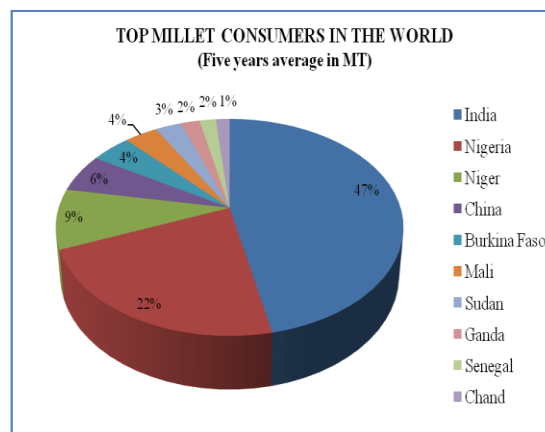


Fig. 1. Top ten millet consuming in the world

India is the top consumer of millets in the world. Next to India, African countries namely Niger, Mali, Nigeria, Burkina and Sudan people had millets in their daily consumption bundle. As staple food, minor millet varieties offer a broader range of macro and micro nutrients than those available in rice. The availability of selected nutrients in different millets for example, per 100g of cooked thenai grain contains almost twice the amount of protein, ragi contains over 38 times the amount of calcium, samai contains almost five times the total amount of fat, than cooked, mill – processed rice (Gopalan et.al 2004). Consumption pattern of small millets was analysed for rural and urban area of different states in India. Assam occupies first position in consumption (18.82 kg/hsh/m) followed by Bihar (18.69 kg/hsh/m) and Tamil Nadu occupies 11<sup>th</sup> position in small millets consumption (1.77 kg/hsh/m) (Anbukani-2018). The change in the land use pattern, cultural practices and food habits has led to the importance of undertaking active conservation measure for the millet landraces in Kolli hills (Prabhakaran, 2012). With the above discussed background the following research objectives are formulated. To analyse the existing level of consumption of minor millets in the study area, To estimate own price, cross price and expenditure elasticities.

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**2 MATERIAL AND METHODS**

Salem district in Tamil Nadu was selected purposively for the study. A sample of 100 households was selected randomly for the study. The information related to income, consumption pattern and consumption expenditure were collected from selected households using face to face interview method. The gathered data were analysed using AIDS model. The Almost Ideal Demand System (AIDS) developed by Deaton and Muellauer is a popular work 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, result in the following budget share equation.

$$W_i = \alpha_i + \epsilon_j \delta_{ij} \ln P_j + \beta_i \ln(X/P) \dots \dots \dots (1)$$

where

- W<sub>i</sub> = budget share of good i
- P<sub>j</sub> = price of good j (Rs. /Kg)
- X = total expenditure (Rs) and
- P = price index

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

$$\ln P = \alpha_0 + \sum_j \alpha_j \ln p_j + \frac{1}{2} \sum_i \sum_j \delta_{ij} \ln p_i \dots \dots \dots (2)$$

The theoretical properties of adding up, homogeneity in price and income and symmetry of the cross effects of demand function, imply the following parametric restriction on original equation.

a) Adding up

$$\sum_{i=0}^n \alpha_i = 1 \quad \sum_{i=0}^n \delta_{ij} = 0 \quad \sum_{i=0}^n \beta_i = 0 \quad \dots \dots \dots (3)$$

b) Homogeneity

$$\sum_j \delta_{ij} = 0 \quad \dots \dots \dots (4)$$

c) Symmetry

$$\delta_{ij} = \delta_{ji} \quad \dots \dots \dots (5)$$

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:  $a_i = P_{ij} + \sum_{j=1}^S P_{ij} d_j$  where, d<sub>j</sub> is the j<sup>th</sup> demographic variable and "S" denotes total number of demographic variables. The new model including the demographic variables and an error term (V<sub>i</sub>) is defined as;

$$W_i = P_{i0} + \sum_{j=1}^S P_{ij} d_j + \sum_j \delta_{ij} P_j + \beta_i \ln(X/P) + V_i \dots \dots \dots (6)$$

The adding up requirement under the specification with the demographic variables now requires that;  $\sum_{i=0}^n P_{i0} = 1$  and  $\sum_{i=0}^n P_{ij} = 0$  (j = 1,2, ... .. S). The AIDS model using general price index ( $\ln P = \sum W_i \ln P_i$ ) in 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 expenditure can be computed as;

$$e_{ij}^m = \frac{\delta_{ij}}{w_i} - \frac{\beta_i w_i}{w_j} - \delta_{ij} \text{ where } \delta_{ij} \text{ equal to one when } i=j \text{ otherwise } \delta_{ij} = 0.$$

Expenditure elasticities are of obtained from,  $e_i = 1 + \frac{\beta_i}{w_i}$  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 function for the three minor millets viz., thenai, samai and varagu. The LA/AIDS model was,

$$W_i = a_i K + \sum \beta_{ijk} \ln P_{jk} + \delta_i \ln(X_k/P) + a_i f_{sk} + V_i \dots \dots \dots (7)$$

Where,

- W<sub>ik</sub> = Average budget share of the i<sup>th</sup> commodity in household K
- P<sub>jk</sub> = Price of j<sup>th</sup> commodity (Rs per Kg) in the household K
- X<sub>k</sub> = Per capita household expenditure (Rs) in household K
- P = General Price Index
- f<sub>sk</sub> = Family size (standard consumption units) of family K
- V<sub>i</sub> = error term

i, j = 1,2,.....∞  
K = 1,2,.....n household

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

**3. Results and Discussion**

The results of the study were presented and discussed in two sections i.e., consumption pattern and demand analysis.

**3.1 Consumption pattern**

In the present study, consumption expenditure is classified into nine food items and one non-food item. The details of the average monthly expenditure on individual items are furnished in table – 1.

Table – 1  
Average Monthly Consumption Expenditure of Sample households (Rs/household/month)

S.No	Particulars	Amount	Percentage to total
1	Cereals	948.07	19.91
2	Pulses	656.08	13.78
3	Oilseeds	283.08	5.94
4	Minor millets	347.48	7.30
5	Major millets	488.68	10.26
6	Fruits and vegetables	280.36	5.89
7	Milk and Milk products	621.57	13.05
8	Non – Vegetarian items	871.46	18.30
	Subtotal	4496.78	94.73
9	Non food items	263.10	5.27
	Total consumption of expenditure	4759.88	100.00

The average consumption expenditure was calculated as Rs. 4759.88 per month, of which, cereals accounted for 19.91 per cent. In the sample households, 95 per cent of total expenditure was spent towards food items, among the food items cereals occupied first position and thus cereals occupied the most important items in the consumption basket which indicated its importance in meeting the calories requirement of the people followed by non vegetarian items. The next important consumption of food items are pulses and milk and milk products. Next position was accounted by millets and minor millets; the percentage of total expenditure towards these food items in sample households was ranging from seven to ten per cent. Least importance was given for fruits and vegetables in sample families.

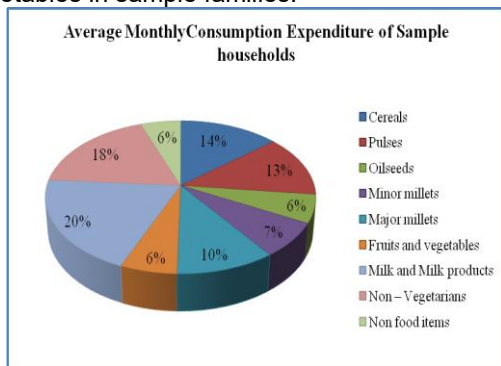


Fig. 2. Average Monthly Consumption Expenditure of Sample households

**3.1.1 Relative share of selected minor millets in total expenditure of minor millets**

The percentage share of selected minor millets in the total expenditure on minor millet is presented in table -2.

**Table-2**  
Percentage share of selected minor millets  
(Rs/household/month)

S.No	Minor millets	Avg of consumption	Percentage to total
1	Samai	134.78	38.80
2	Varagu	88.14	25.36
3	Thenai	69.58	20.02
4	Other minor millets (excluding above three minor millets)	54.98	15.82
	Total	347.48	100.00

It could be seen from the table that the sample households spent, 38.80 per cent of total expenditure on minor millets towards the purchase of samai followed by varagu (25 per cent), thenai (20.02 per cent) and other minor millets (15.82 per cent). Hence, the study concluded that the samai was preferred more compared to other minor millets.

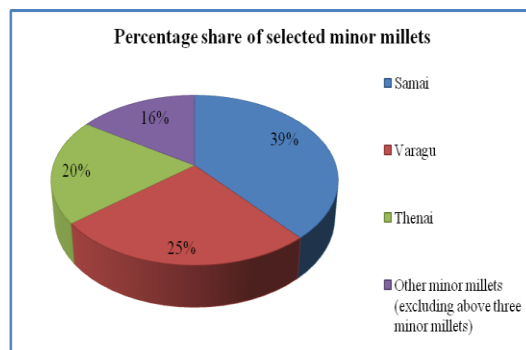


Fig. 3. Percentage share of selected minor millets

**3.2 Demand Analysis**

**3.2.1 Estimated uncompensated (Marshallian) own price and cross price elasticities**

Marshallian (uncompensated), Hicksian (Compensated) own and cross price elasticities and expenditure elasticities were estimated. The Marshallian elasticities are given in table - 3.

**Table – 3**  
Estimated uncompensated (Marshallian) own price and cross price elasticities

S.No		Samai	Varagu	Thenai
1	Samai	-0.0039	-0.4112	-0.1649
2	Varagu	-0.8023	-0.1994	-0.1903
3	Thenai	-0.9101	-0.5280	-0.3725

It could be seen from the table that the own price elasticities of selected minor millets were between -1 and 0. Own price elasticities for all three products were negative and it was in the order of samai (-0.0039), varagu (-0.1994) and thenai (-0.3725). This result revealed that the purchase of samai was decreased by 0.04 per cent when its price increased by 10 per cent; whereas the demand for varagu was decreased by nearly two per cent and that of thenai was 3.7 per cent. The cross price elasticities were negative which indicated that the samai, varagu and thenai have complementary relationship.

**3.2.2 Estimated compensated (Hicksian) own price and cross price elasticities**

The compensated (Hicksian) own price and cross price elasticities were calculated and the results are given in table – 4.

**Table – 4**  
Estimated compensated (Hicksian) own price and cross price elasticities

S.No		Samai	Varagu	Thenai
1	Samai	-0.1689	-0.1240	-0.0449
2	Varagu	-0.2335	-0.2977	-0.6422
3	Thenai	-0.2031	-0.1530	-0.3361

The Hicksian own price elasticities were similar to the Marshallian own price elasticities. All own price elasticities of minor millets were between -1 and 0; The negative own price elasticity showed that the products are said to be normal goods and products were less responsive to price changes. Of the nine compensated cross price elasticities for the minor millets were negative, making the products complement. Here also the demand for thenai was decreased more compared to

other two products when price increased by ten per cent.

### 3.2.3 Expenditure Elasticities of Minor Millets

The results of expenditure elasticities are given in table- 5. The value of thenai was greater than one which showed that thenai is a luxury good for Salem households.

**Table – 5**  
*Expenditure Elasticities of Minor Millets*

S.No	Minor Millets	Elasticity	Marginal expenditure share%
1	Samai	0.9448	36.47
2	Varagu	0.9966	25.10
3	Thenai	1.2387	24.62

The expenditure elasticities for samai and varagu were also less than but nearly one, indicated that they were necessity items in household diet. Marginal expenditure share were calculated by following Basarir (2013), Agbola (2003) and Powell's (1974) approach. According to the results, an increase in income of households in future would make them allocate more of their income proportionally on the purchase of samai, varagu and thenai in descending order of marginal expenditure share.

## 4 CONCLUSION

The consumption expenditure and demand for minor millets namely samai, varagu and thenai were estimated. The study concluded that samai was preferred by sample households. Nearly 40 per cent of expenditure on minor millets was spent towards the purchase of samai. The study also indentified that thenai was a luxury good for sample households and hence it showed higher response to price changes compared to samai and varagu. The expenditure share showed that 36 per cent of incremental income was spent towards the purchase of samai.

## 5 REFERENCES

- [1] Agbola,F.W., "Estimated of food demand pattern in South Africa based on a survey of households" *Journal of Agricultural and Allied Economics*, 35(3) : 663-670, 2003.
- [2] Anbukani.P, S.J.Balaji and M.L., Nithyashree, "Production and consumption of minor millets in India-A structural break analysis", *Annual Agricultural Research*, 38(4) : 1-8, 2017.
- [3] Basarir.A., (2013) "An Almost Ideal Demand System Analysis of Meat Demand In UAE", *Bulgarian Journal of Agricultural Science*, 19(1), PP:32-39
- [4] Gobalan ,C., Rama Sastri, B.V., "Balasubramaniyan, S.C.,, "Nutritive value of Indian foods" *National Institute of Nutrition. Indian Council of Medical Research*, 2002.
- Luke Olarinde, Joachim Binam, Tahirou Abdoulaye, Adewalw A. Adekunle and Fatunbi Oluwole., "An Assessment of Farm Input demand in the Sudan Savanna of Nigeria: The Influence of the Innovation Platform Systems of the Integrated Agricultural Research for Development (IAR4D) of the (SSA CP)," *Journal of Agricultural and Environmental Studies*, 2(1), PP : 97-117, 2010.
- [5] Powell,A.A., "Empirical Analytics of demand systems", *Lexington Books*, 1974.

[6] Thakur Satyendra Singh, and Sharma. H.O. "Trend and Growth of small millets production in Madhya Pradesh as compared to India", *International Journal of Agricultural Science*, 10(1), PP : 4983 – 4986, 2018.

[7] www. Worldgrain.com, 2017.

[8] www. Morder Intelligence.com, 2017.