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Dynamics of household edible oil consumption in rural and urban Tamil Nadu (India)

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ABSTRACT

Till 1990's the dominant edible oil produced and consumed in India were rapeseed-mustard and groundnut. The technological, economic and policy changes thereafter induced dynamics in consumer demand for food, including edible oils. The markov chain analysis for rural and urban Tamil Nadu state revealed that there is perceptible shift in edible oil consumption from traditional groundnut oil to Other Edible Oils (OEO). The possible reason for these shifts are increased urbanization (changing lifestyles), increased awareness, availability of oils in packet form in varied quantities even in remote rural areas, change in relative prices of oils, and increased income levels of rural and urban households. The secondary data published by National Sample Survey Organisation (NSSO) did not clearly disintegrate the OEO's, hence the primary data was employed to determine the current status of edible oil consumption. The results revealed that presently, the dominant edible oil consumed is sunflower oil in both the rural and urban regions of Tamil Nadu. The groundnut oil, which was traditionally consumed by households, has been replaced by sunflower oil, implying the need for appropriate changes in the production front.

Keywords: dynamics, consumption, edible oils, households,

Introduction

In the agricultural economy of India, oilseeds are important next to food grains in terms of acreage, production and value. India accounts for about 13 per cent of world oilseeds area, 8 per cent of world oilseeds output, and 6 per cent of world vegetable oil production (Hegde, 2003). The Indian edible oil market is the world fourth-largest after the USA, China and Brazil. The diverse agro-ecological conditions in the country are favourable for growing seven annual edible oilseeds, which includes, viz., groundnut, rapeseed-mustard, soybean, sunflower, sesame, safflower and niger. Among these, groundnut, rapeseed-mustard and soybean, account for nearly 77 per cent of oilseeds area and 86 % of oilseeds production (Hegde, 2007). Despite favourable climatic conditions and highest area under oilseeds (26 m ha) India is the second largest consumer after china, meeting more than half of its requirements of edible oil through imports. In India, the demand for oilseeds and vegetable oil is increasing due to increase in population, increased standard of living and rapid urbanization (Sudhakara babu and Hegde, 2011). The per capita consumption of edible oil in India was around 11.2 kg/per capita/year it is far below the world average of 17.8 kg/per capita/year (Ramesh and Murughan, 2008). The total edible oil consumption during 2009-10 was around 10.0 million tonnes and projected to increase to 13.31 million tonnes during 2014-15.

Tamil Nadu is one of the major oilseeds producing state in India. The major edible oilseed crops grown in this state are groundnut, sesame and sunflower. The total area under oilseed crop in the state is 0.659 million ha with total production of 1.15 million tonnes (Damodharm and Hegde, 2007). The gross value of output from all oilseeds amounts to Rs.3891.11 crores during the year 2007-08 (www.tn.gov.in/deptst/stateincome). The population of Tamil Nadu was 67.0 million during 2010 and it is expected to reach 70.6 million by 2020 (GOI, 2001)

Consumer demand for edible oils

Economic growth is the driving force for the significant change in consumer demand for food including edible oils. As the economy grows and income rises, the household demand for edible oils increases due to change in the food consumption pattern. Household income and prices of edible oils are the major economic factors that determine the demand. Some of the empirical studies viz., Bhalla and Hazell (1997), Kumar (1998), Radhakrishna & Venkatareddy (2002) and Mittal (2006) estimated the demand for food commodities including the edible oil as a group and also studied the changes in food consumption pattern at national level. However, these studies did not concentrate on the dynamics in edible oil consumption at the national as well as at disaggregated (state) level. The studies on edible oil consumption changes will be helpful for planning oilseed production in the country as well as for formulating appropriate trade policy.

In India, the edible oil consumption is changing in the recent past due to several socio-economic and policy changes. More changes are occurring in the fast growing states like Tamil Nadu due to several factors. Firstly, it is one of the most urbanized states of India in terms of degree of urbanization (percentage of population in urban areas) and town density (number of towns per thousand square kilometers). As per 2001 census, 44 per cent (27.2 million) of people of Tamil Nadu state live in urban area. The urbanization coupled with high literacy level (73 per cent as against national level 65 per cent, census 2001) also has effect on the consumption shift in edible oils both in terms of quantity and type of oil. Secondly, the consumption of sesame oil is very peculiar to Tamil Nadu state which is conspicuous by its absence in other states of India. Thirdly, the Government of Tamil Nadu also supplies the edible palm oil through the Public Distribution System (PDS), at subsidized price. This policy induced some change in the consumption of edible oils, especially, among the poor households in the state. The above facts amply highlight the importance and changes taking place in edible oils consumption in the state of Tamil Nadu (India). Hence, the present study

was undertaken 1) to assess the temporal shift in consumption of major edible oils in Tamil Nadu and 2) to ascertain the present pattern of consumption of edible oils by the households in Tamil Nadu.

It was hypothesized that the consumption pattern of edible oil has remained static over the years in Tamil Nadu state.

Data Constraints

The National Sample Survey Organization (NSSO) publishes data on different edible oils consumed by the rural and urban households for different states and for different rounds. For Tamil Nadu, NSSO data encompass only five oils viz., vanaspathi/margarine, mustard oil, groundnut oil, coconut oil and Other Edible Oils (OEO's). The OEO's group consists of different oils which are not clearly differentiated by the NSSO data. Moreover, information on the important oils consumed by the households in recent years like sunflower oil, soybean oil, rice bran oil, palm oil and the traditional oils like sesame are completely lacking in the NSSO data. The latest 61st round of NSSO data is pertaining for the period 2004-05 and virtually no data on consumption of different edible oil is available after 2004-05.

Data and methodology

Both primary and secondary data were used in the present study. The secondary data from four quinquennial NSSO rounds i.e. 43rd (July 1987-June 1988), 50th (July 1993- June 1994), 55th round (July 1999-June 2000), and 61st (July 2004-June 2005) on consumption pattern of households were used for analyzing the temporal shift in consumption, whereas, to study the present pattern of consumption of edible oils by the households, the primary data was collected from the households during the year 2009-10. Multistage sampling procedure was followed to collect the primary data (household edible oil consumption data). In the first stage, five zones were identified viz., North, South, West, East/Coastal and Central zones such that it represents all geographical regions of the state. From each zone, one district was randomly selected. In the northern zone Vellore district, in western zone Coimbatore district,

in central zone Tiruchirappalli district, in the east/coastal zone Nagapattinam district and in south zone Kanyakumari district were selected for the study. In the second stage, one taluk from each of the selected districts and one block from the selected taluk were selected randomly. In the third stage, from each of the selected blocks a cluster of three villages was selected. The household samples from the selected district headquarter were considered as urban samples and the household samples from the selected cluster of villages constituted the rural sample. In the final stage, the rural and urban households were randomly selected and interviewed using the pre-tested questionnaires developed for the purpose. Primary data was collected from the randomly selected households through personal interview during the year 2009-10. The urban sample size was 100 in each zone and similarly rural sample size was 100 in each zone. In total, 1000 sample households were surveyed from all the five zones of the Tamil Nadu state of India.

Analytical techniques

The temporal shift in consumption of edible oils were analyzed by employing a first order finite Markov Chain Model which captured the net effect in changes in the consumption of edible oil over a period of time. Markov chain approach was employed to ascertain the shift in consumption of edible oils between 43rd round (1987-88) to 61st round (2004-05). The estimation of the transitional probability matrix (P) was central to this analysis. The element P_{ij} of the matrix indicated the probability that share would switch from commodity 'i' to commodity 'j' over time. The diagonal elements P_{ij} where $i=j$ indicated the probability that the commodity retaining its value share. In the context of the current application, the change in consumption was treated as a random process. The average share of the selected commodity from among the commodity group in any round depends only on the share of the previous period and which was algebraically denoted as Eq. (1):

$$E_{jt} = \sum_{i=1}^n [Ei_{t-1}] P_{ij} + e_{it} \dots\dots\dots (1)$$

where,

E_{jt} = shift in per capita share of j^{th} commodity (edible oil) during the round t

E_{it-1} = per capita share of i^{th} commodity (edible oil) during the round $t-1$

P_{ij} = probability that share will shift from the i^{th} commodity to j^{th} commodity

e_{it} = error-term which is statistically independent of e_{it-1} , and

n = number of commodities (edible oils)

The transitional probabilities P_{ij} , which can be arranged in a $(c \times r)$ matrix, had the following properties:

$$\sum_{i=1}^n P_{ij} = 1 \quad \text{and} \quad 0 \leq P_{ij} \leq 1$$

The probability matrix was estimated using 43rd round to 61st round NSSO data. The transition probability matrix was estimated in the linear programming (LP) framework by a method referred to as minimization of Mean Absolute Deviation (MAD); the LP formulation is as per expression below (2):

$$\text{Min, } OP^* + I_e \dots\dots\dots (2)$$

Subject to

$$X P^* + V = Y G P^* = 1$$

$$P^* \geq 0$$

where, P^* is a vector of the probabilities P_{ij} , O is a null vector; I is an appropriately dimensional vector of edible oil; e is the vector of absolute errors ($|U|$); Y is the vector of proportion of per capita shares of other edible oils; X is a block diagonal matrix of lagged values of Y ; V is the vector of errors; and G is a grouping matrix to add the row elements of P

arranged in P^* to unity. P^* vectors were arranged to obtain the transitional probability matrix which indicated the overall structure of the transitions that had taken place in the system. Essentially, the transitional probability matrix captures the dynamics of the changes in per capita consumption of edible oils in Tamil Nadu in value terms. The individual probabilities P_{ij} indicate the probability of the shift from the commodity 'i' to commodity 'j'.

Results and Discussion

Changes in per capita consumption of edible oils in rural Tamil Nadu

To study the changes in quantity of monthly per capita consumption of edible oils across income classes in rural Tamil Nadu, four rounds of NSSO data i.e 43rd, 50th, 55th and 61st round were used. The NSSO considers only four major edible oils viz., vanaspathi/margarine, mustard oil, groundnut oil, and coconut oil (Table 1). All the other oils (soybean, sunflower, sesame etc.,) consumed by the households were grouped as Other Edible Oils (OEO's).

During the 43rd round (1987-88), the major oils consumed by the rural households were groundnut oil and OEO's. The quantity of groundnut oil consumed was 0.17 kg per capita per month followed by OEO's (0.04 kg per capita per month). Over different rounds, the per capita consumption of groundnut oil increased and reached a peak of 0.27 kg per capita per month during the 55th round (1999-00), and thereafter declined to 0.23 kg per capita per month during the 61st round (2004-05). This decline in groundnut oil consumption in recent years in rural Tamil Nadu was compensated by higher consumption of other oils. The per capita groundnut oil consumption increased by only 35 per cent since the base period consumption (1987-88) whereas leapfrog jump of 418 per cent in OEO's consumption. Thus, we can conclude that there is perceptible shift in consumption of edible oil from traditional groundnut oil to other oils in rural Tamil Nadu. Besides the shift in oil consumption, the per

capita oil consumption per month also doubled from 0.22 kg during 43rd round (1987-88) to 0.44 kg during the recent 61st round (2004-05) in rural Tamil Nadu (Table 1).

Changes in per capita consumption of edible oils in urban Tamil Nadu

The major oil consumed among the urban households was groundnut oil and OEO's. The groundnut oil consumption was 0.20 kg per capita per month during 43rd round (1987-88) and increased to 0.27 kg during the 50th round (1993-94) and started declining thereafter and in the recent 61st round it stands at 0.143 kg per capita per month. This shows that the consumption of groundnut oil is declining in urban Tamil Nadu and this decline started after 50th round (1993-94), whereas in rural Tamil Nadu the decline in groundnut oil consumption was observed after the 55th round. It affirms there is a lag in consumption shift from traditional to newer oils between the urban and rural areas.

In urban Tamil Nadu, the OEO's consumption has increased from 0.14 kg per capita per month during 43rd round (1987-88) to 0.41 kg during the recent 61st round (2004-05). Hence, it can be concluded that, the groundnut oil consumption is declining, whereas, the OEO's consumption shows increasing trend in urban Tamil Nadu (Table 2). The results also revealed that the per capita consumption of groundnut oil and coconut oil declined by 29 per cent and 70 per cent respectively, whereas the OEO's consumption increased by 190 per cent from the base year consumption (1987-88) in urban Tamil Nadu. The decline in groundnut oil and coconut oil consumption was overcompensated by higher consumption of OEO's in urban Tamil Nadu. The consumption increase in OEO's might be due to increased awareness about the health benefits of these oils. Moreover, some of the OEO's like sunflower, rice bran oil, palm oil etc., are priced lower than the groundnut and coconut oil and this might have also induced the shift in consumption from traditional oils. Besides shift in edible oil consumption from traditional oils, the total edible oil consumption per capita per month also increased from 0.37 kg during 43rd round (1987-88) to 0.55 kg per capita during 61st round (2004-05) in

urban Tamil Nadu. The total edible oil consumed per person per month is increasing in both rural and urban regions, but consumption is more in urban areas vis-à-vis rural areas. This trend might be due to high income and different food consumption pattern among urban household's vis-à-vis rural counterparts (Table 2).

Shift in consumption of edible oils in rural Tamil Nadu

The compositional change in edible oil consumption in Tamil Nadu or which oil has given way to which oil was studied by applying Markov chain analysis. The edible oil commodity-wise monthly per capita expenditure for all the income classes from round 43rd (1987-1988) to round 61st (2004-2005) was used to analyze the shift or compositional changes in edible oil consumption for rural Tamil Nadu. Before analyzing the shift in per capita expenditure, the per capita per month expenditure share across rounds is compared. It is observed that the per capita consumption expenditure share of edible oils like vanspathi/margarine, mustard oil and groundnut oil decreased across the rounds (Table 3). The groundnut oil share decreased substantially from 84 per cent in 43rd round (1987-88) to 52 per cent during 61st round (2004-05) when compared to total expenditure on edible oils in their respective years. The coconut oil share shows some fluctuation but during the last round its share was only 0.79 per cent. Substantial increase in consumption expenditure share of other edible oils was observed from a meagre 12 per cent during 43rd round (1987-88) to 47 per cent during 61st round (2004-05) and this confirms the shift in expenditure pattern.

The transitional probability matrix presented in Table 4 provides a broad indication of changes/shift in edible oil consumption pattern in rural Tamil Nadu from 43rd to 61st round. The row elements in a transitional probability matrix provide the information on the extent of loss in consumption expenditure by particular edible oil to consumption of other edible oils. The column elements indicate the probability of gain in consumption

expenditure share by particular edible oil from other edible oils. The diagonal elements indicate the probability of retention of consumption expenditure by that particular edible oil.

The transitional probability estimated for rural Tamil Nadu indicated that the highest retention probability of 1.00 expenditure share for other edible oils followed by 0.84 probability for Groundnut oil. Vanaspathi/Margarine is expected to gain in consumption expenditure from mustard oil by 0.02 probability and groundnut oil by 0.002 probability. Mustard oil does not gain from any of the edible oils, where as Groundnut oil is expected to gain in consumption expenditure from vanaspathi/margarine by 0.52 probability and mustard oil by 0.65 probability implying that vanaspathi/margarine or mustard oil consuming households are moving towards groundnut oil. Coconut oil is expected to gain from vanaspathi by 0.48 probability. The other edible oils gain in consumption expenditure from mustard oil by 0.13 probability and from coconut with a probability of 1.00 implying that there is a shift in per capita consumer expenditure towards other edible oils from mustard and coconut oil. The probability of vanaspathi losing its share is 0.52 and 0.48 for Groundnut oil and Coconut oil, respectively. Mustard oil is losing its expenditure share to groundnut oil by 0.65 probability, implying that mustard oil consumers are moving to groundnut oil.

We can conclude that people are switching over from traditional oils to OEO's in rural areas. The traditional groundnut oil loses to OEO's by 0.13 probability, implying that groundnut consumers are shifting to OEO's in rural areas. The possible reason for these shifts in rural areas are increased urbanization (changing lifestyles), increased awareness about health benefits of different oils, availability of oils in packet form in different quantities in remote rural areas, change in relative prices of edible oils and change in income levels of rural households in recent years.

Shift in consumption of edible oils in urban Tamil Nadu

The monthly per capita consumption expenditure for different edible oils across all classes for urban Tamil Nadu is presented in Table 5. It can be observed the consumption expenditure share of edible oils like vanaspathi/margarine, mustard oil, groundnut oil and coconut oil decreased substantially over the rounds. The groundnut oil share decreased substantially from 68 per cent in the 43rd round to 25 per cent during 61st round. The coconut oil share decreased from 3 per cent to 0.6 per cent. Vanaspathi and mustard oil also shows declining trend. However, the other oils increased substantially from 26 per cent during 43rd round to 74 per cent during 61st round implying shift in consumption of other oils in the recent years.

The transitional probability matrix provides a broad indication of changes/shift in edible oil consumption pattern in urban Tamil Nadu from 43rd to 61st round (Table 6). The transitional probability estimated for urban Tamil Nadu indicated that the highest retention probability of 0.91 expenditure share was in case of other edible oils followed by 0.45 probability for Groundnut oil. Vanaspathi/Margarine is expected to gain in consumption expenditure from Groundnut oil by 0.007 probability and from other oils by 0.001 probability. Mustard oil does not gain from any of the oils where as Groundnut oil is expected to gain in consumption expenditure from coconut by one probability, vanaspathi/margarine by 0.77 and from other edible oils by 0.09 probability. Coconut oil is expected to gain from vanaspathi by 0.16 probability and from groundnut oil by 0.03 probability. The other edible oils gain in consumption expenditure from mustard oil by 1 probability and from Groundnut with a probability of 0.52.

The probability of vanaspathi losing its share was 0.77 and 0.16 for Groundnut oil and coconut oil respectively. Mustard oil loses its expenditure share completely to other edible oils. The groundnut oil loses to other edible oils by 0.52 probability, coconut by 0.03

probability and vanaspathi/Margarine by 0.007 probability. The coconut oil completely lost to groundnut oil, whereas other edible oil loses its expenditure share to groundnut by 0.09 probability. In case of urban Tamil Nadu, the above empirical results imply that there is a shift in consumption from groundnut oil to other oils in urban areas. The above changes are brought out by rise in education levels, rise in income levels and emergence of health conscious middle class in urban areas.

Several studies (Kumar and Mathur, 1996, Kumar, 1998, Hanumantha Rao, 2000 and Mittal, 2006) have shown a shift in consumption of food commodities in India, from coarse cereals to fine cereals, from low value to high value commodities like fruits, vegetables, milk & milk products, meat, fish, egg etc. Though the above stated studies do not directly consider the shift among the edible oils, the present study is in conformity with above studies that as income and education levels increase, the consumption shift is not only on the food types but also among edible oils (i.e from traditional oils to newer oils). Hence, there is a need for a shift in the crop production strategies such that the non-traditional oil crops production has to be stepped up in consonance with the consumption change.

Current status of consumption of edible oils in Tamil Nadu

The complete information on kind and quantity of different edible oils consumed by the denizens of rural and urban Tamil Nadu was collected through primary survey and the results are presented below.

Rural

Around 0.660 kg of edible oil per capita per month was consumed among the sample rural households in Tamil Nadu during the year 2009-10 (Table 7). The major oil consumed was sunflower (0.203 kg) followed by Groundnut oil (0.139 kg), palm oil (0.153 kg), Sesame (0.102 kg), and Coconut oil (0.54 kg). It can be concluded that, the consumption of sunflower

was more than the traditional Groundnut oil in rural Tamil Nadu. An amount of Rs.49.84 per capita per month was spent for oils in rural Tamil Nadu. Among the total oil expenditure 30 per cent was spent on sunflower oil followed by 25 per cent on sesame oil, 23 per cent on groundnut oil, 12 per cent on palm oil, 9 per cent on coconut oil and one per cent on other oils that includes rice-bran oil, soybean oil and corn oil. Hence, it can be concluded that the highest per capita consumption and expenditure in rural Tamil Nadu was on sunflower oil (non-traditional oil) followed by groundnut oil.

Urban

The per capita per month of edible oil consumed among urban sample households in Tamil Nadu during the year 2009-10 was 0.780 kg. The major oil consumed was sunflower (0.372 kg) followed by groundnut oil 0.142 kg, palm oil 0.128 kg, sesame oil 0.101kg, coconut oil 0.027 kg and 0.011kg of other oils (rice-bran oil, soybean and corn oil). We can infer that the consumption of sunflower was more than the traditional groundnut oil in urban Tamil Nadu. An amount of Rs.58.32 per capita per month was spent for oils in urban Tamil Nadu. Among the total oil expenditure 43 per cent was spent on sunflower oil followed by 22 per cent on sesame oil, 20 per cent on groundnut oil, 9 per cent on palm oil, 4 per cent on coconut oil and one per cent on other oils.

It can be concluded that, presently, in both the rural and urban regions, the dominant edible oil consumed was sunflower oil. In rural Tamil Nadu, the second most oil consumed was palm oil whereas, in urban areas groundnut is the next major oil. Hence, we can conclude that the sunflower oil has replaced groundnut oil that was traditionally consumed by households. Hence, appropriate changes are required on the production front to cater the changing needs of the people of the Tamil Nadu state.

Summary and conclusion

There is shift in consumption of edible oils from traditional groundnut oil to OEO's in the study region. The groundnut oil consumption is declining whereas OEO's consumption is increasing in both rural and urban areas. The consumption expenditure share of edible oils like vanaspathi/margarine, mustard oil, groundnut oil decreased substantially over the years both in rural and urban Tamil Nadu, where as expenditure on OEO's has increased. It further confirms, OEO's consumption is prominent in both the rural and urban Tamil Nadu. The per capita edible oil consumption also has increased besides the shift in oil preference in both rural and urban areas. The preference for newer oils and overall increase in per capita consumption of edible oils will likely to continue in the coming years at a faster pace. Hence, augmenting the production of household preferred edible oils are crucial to meet the demand domestically. The horizontal increase (area expansion) is near impossible in India, hence, the productivity improvement through extension of frontier technologies especially in the household preferred edible oil crops like sunflower, sesame etc., is the need of the hour.

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Table 1: Monthly Per capita consumption of Edible oils in Rural Tamil Nadu-43rd to 61st round of NSSO survey

Sl. No.	Edible oil	Quantity (kg)			
		43 rd round (1987-88)	50 th round (1993-94)	55 th round (1999-00)	61 st round (2004-05)
1	Vanaspati/ Margarine	0.00	0.00	0.00	0.00
2	Mustard oil	0.00	0.00	0.00	0.00
3	Groundnut oil	0.17	0.24	0.27	0.23 (35.3)
4	Coconut oil	0.00	0.01	0.01	0.00
5	Other Edible Oils (OEO's)	0.04	0.11	0.14	0.21 (417.5)
6	Total	0.22	0.38	0.43	0.44 (100.5)

Note: Figures in parentheses indicate per cent change over 43rd round *Source:* Compiled from different surveys publication of NSSO

Table 2: Monthly Per capita consumption of Edible oils in Urban Tamil Nadu-43rd to 61st round of NSSO survey

Sl. No.	Edible oil	Quantity (kg)			
		43 rd round (1987-88)	50 th round (1993-94)	55 th round (1999-00)	61 st round (2004-05)
1	Vanaspati/ Margarine	0.01	0.00	0.00	0.002
2	Mustard oil	0.00	0.00	0.00	0.000
3	Groundnut oil	0.20	0.27	0.22	0.143 (-28.5)
4	Coconut oil	0.01	0.01	0.01	0.003 (-70.0)
5	Other Edible Oils (OEO's)	0.14	0.20	0.31	0.405 (190.0)
6	Total	0.37	0.48	0.54	0.553 (49.5)

Note: Figures in parentheses indicate per cent change over 43rd round *Source:* Compiled from different surveys publication of NSSO

Table 3: Monthly per capita consumption expenditure on Edible oils in rural Tamil Nadu

(Rupees/month)						
Round	Vanaspathi/	Mustard	Groundnut	Coconut	Other	Total oil
(Year)	Margarine	oil	oil	oil	Edible Oils (OEO's)	
43 rd	0.03	0.06	4.27	0.15	0.59	5.1
(1987-88)	(0.59)	(1.17)	(83.72)	(2.94)	(11.56)	(100)
50 th	0.02	0.05	8.32	0.31	2.55	11.25
(1993-94)	(0.17)	(0.44)	(73.96)	(2.76)	(22.67)	(100)
55 th	0.00	0.02	10.35	0.51	5.8	16.68
(1999-00)	(0.00)	(0.12)	(62.05)	(3.06)	(34.77)	(100)
61 st	0.03	0.01	12.64	0.19	11.28	24.15
(2004-05)	(0.12)	(0.04)	(52.33)	(0.79)	(46.71)	(100)

Note: Figures in parentheses indicate percentage to total expenditure on Edible oils *Source:* Compiled from different surveys publication of NSSO

Table 4: Shift in the pattern of edible oil consumption in rural Tamil Nadu- Probability transition matrix for 43rd to 61st rounds of NSSO

Oil type	Vanaspathi/ Margarine	Mustard oil	Groundnut oil	Coconut oil	Other Edible Oils (OEO's)
Vanaspathi/Margarine	0	0	0.517	0.483	0
Mustard oil	0.018	0.333	0.649	0	0
Groundnut oil	0.002	0	0.843	0.030	0.1263
Coconut oil	0	0	0	0	1.0000
Other Edible Oils (OEO's)	0	0	0	0	1.0000

Table 5: Monthly per capita consumption expenditure on Edible oils in urban Tamil Nadu

(Rupees/month)						
Round (Year)	Vanaspathi/ Margarine	Mustard oil	Groundnut oil	Coconut oil	Other Edible Oils (OEO's)	Total oil
43 rd	0.27	0.00	5.08	0.2	1.92	7.47
(1987-88)	(3.61)	(0.00)	(68.01)	(2.68)	(25.70)	(100)
50 th	0.15	0.04	9.5	0.31	2.42	12.42
(1993-94)	(1.21)	(0.32)	(76.49)	(2.50)	(19.48)	(100)
55 th	0.12	0.02	8.63	0.52	12.64	21.93
(1999-00)	(0.55)	(0.09)	(39.35)	(2.37)	(57.64)	(100)
61 st	0.10	0.01	8.03	0.20	23.38	31.72
(2004-05)	(0.32)	(0.03)	(25.32)	(0.63)	(73.71)	(100)

Note: Figures in parentheses indicate percentage to total expenditure on Edible oils *Source:* Compiled from different surveys publication of NSSO

Table 6: Shift in the pattern of edible oil consumption in urban Tamil Nadu- Probability transition matrix for 43rd to 61st rounds of NSSO

Oil type	Vanaspathi/ Margarine	Mustard oil	Groundnut oil	Coconut oil	Other Edible Oils (OEO's)
Vanaspathi/ Margarine	0	0.074	0.771	0.155	0
Mustard oil	0	0	0	0	1
Groundnut oil	0.007	0	0.448	0.029	0.517
Coconut oil	0	0	1	0	0
Other Edible Oils (OEO's)	0.001	0	0.085	0	0.914

Table 7: Monthly Per capita consumption of edible oils by sample households in Tamil Nadu

Areas→ Oil type ↓	Rural		Urban	
	Quantity (kg)	Value (Rs.)	Quantity (kgs)	Value (Rs.)
Groundnut oil	0.139	11.55 (23.17)	0.142	11.80 (20.23)
Sunflower oil	0.203	14.81 (29.71)	0.372	25.23 (43.26)
Sesame Oil	0.102	12.38 (24.83)	0.101	13.07 (22.41)
Coconut Oil	0.054	4.41 (8.84)	0.027	2.33 (3.99)
Palm Oil	0.153	5.97 (11.97)	0.128	5.21 (8.93)
Other Oils (corn oil, rice bran oil etc.,)	0.010	0.72 (1.44)	0.011	0.68 (1.16)
Total Oils	0.660	49.84 (100)	0.780	58.32 (100)
Sample (n)	500		500	

Note: Figures in parentheses indicate percentage to total expenditure on edible oils