Elasticity of demand for coconut oil for edible uses in India

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In India no reliable estimates of fats and oils consumption per capita are available. Some estimates have, however, been worked out based on production figures and rough estimates of the various end uses. These are, however, adequate to indicate the approximate level of consumption and major year to year changes.

These show that in relation to population, consumption is small. According to a recent study of the Foreign Agricultural Service of the United States Department of Agriculture entitled "Fats and Oils Economy of India" current per capita consumption of fats and oils in India is about 12.5 pounds per person per year. Though this is higher than the estimates for many South-east Asian countries it is below nearly all other countries. According to the same source between 1 to 2 pounds out of the 12.5 pounds mentioned are used for soap and non-food uses and 10 to 11 pounds go for food. These compare with the United States use of about 20 pounds for non-food products and 45 pounds for food. In India, edible fats and oils are mainly used for cooking, solid fats, ghee and vanaspathi constitute about 40 per cent of the total consumption for food and liquid oils the other 60 per cent. Consumption of the five major vegetable oils used mainly for food (groundnut, rape, mustard, sesame, coconut, linseed) has been steadily increasing from 6.4 lb. in 1934-38 to 8.1 lb. in 1944-48 and 8.6 lb. in 1954-58. Available supplies of coconut oil in India form only about 9 per cent of the above major oils. As a result per capita consumption in coconut oil is correspondingly low.

Consumption of oils

Response to price changes and consumer income:

In U. S. A. and Western Europe fats and oils are relatively abundant and prices low in relation to both income and price of other foods. When income rises or when prices fluctuate for fats and oils, consumers do not greatly change the quantity they purchase although they may shift to some

extent from one kind of fat or oil to another. In India, on the other hand, when consumption is low various statistical indications point out to a relatively sensitive response of consumption to changes in both price and income.

The object of this study is to estimate how consumers of coconut oil in India respond to changes in price of coconut oil or to changes in per capita income.

MATERIALS AND METHODS

Statistics relating to prices in India are available for a fairly long period before and after the II World War. But reliable data on per capita income is available for only 1948-49 and subsequent years. As regards per capita consumption no reliable data is available for either post-war or pre-war years. For, production of vegetable oils in India in the large number of village ghanies is not reported and no information of stocks held over or of sales are available. Estimates of consumption of oils in India have therefore to be built up from reports and estimates of oilseeds production and utilisation.

Estimates of consumption of coconut oil start with reported production of coconuts. Using the estimated proportions of nuts converted into copra and also the quantity of nuts required on an average to produce a ton of copra, an estimate of the total production of copra in India is arrived at. Out of this, allowance is made for quantities of copra consumed for edible uses and the balance is taken as copra used for crushing. Imports of copra used mostly for milling purposes are then added to arrive at the net available supplies of milling copra. A factor representing the industry wise out turn of oil per ton of copra is then applied to obtain an estimate of the quantity of oil produced. This quantity is then adjusted for imports of oil if any. The total thus obtained represents the quantity available for consumption in India. There are no data on stocks of coconut in India but it is generally agreed by traders that carry over stocks of copra or coconut oil from one financial year to the next are not much. To the available supplies of coconut oil a factor estimated to be the proportion used for edible uses is applied to obtain the quantity used for edible purposes.

Per capita consumption is arrived at by dividing the estimated net available supplies of coconut oil for edible uses by the mid-year estimated population each year

Relationship between consumption and price:

Table below shows the estimated consumption of coconut oil per person in India and the deflated whole sale price of coconut oil in India. The latter price is calculated for each year by dividing the wholesale price of coconut oil at Cochin by the All India Index of wholesale prices for that year (1952-53 = 100).

Year	Estimated consumption of coconut oil (per capita in oz.)	Deflated coconut oil prices (per ton)	Per capita national income
1950—51	14.82	2106.07	246.30
1951—52	15.89	1849.19	250.10
1952—53	16.12	1644.32	256.60
1953—54	17.08	1841.18	268 70
1954—55	18.51	1544 18	271.90
1955—56	18.90	1422.99	273.60
1956—57	19.93	1317.99	283.50
1957—58	20.41	1669.82	277.10
1958—59	18.21	1915.17	293.60

The following regression equations using actual consumption estimates and prices and also their logarithms were worked out.

(1) $Y_1 = 26.6822 - 0.0053\ Y_2$

(2) $\log Y_1 = 2.7845 - 0.4770 \log Y_2$

where Y_1 = consumption in oz. per person

Y_2 = average wholesale price of coconut oil at Cochin deflated by index of general wholesale price (index 1952-53 = 100).

Each of these regressions falls well within the range of its standard errors. The demand elasticity estimated by log curves is very close to elasticities at the means of the corresponding linear regressions.

The Statistical coefficients for 1950-51 to 1958-59 are as follows:

$r12^2 = 0.4600$

$r12 = -0.6782$

Coefficient	Natural Nos.	by values.
b_{12}	- 0.0053	- 0.4770
σb_{12}	0.0022	0.1981
$t\, b_{12}$	2.4091	2.4078
P	< 0.05	< 0.05
	> 0.02	> 0.02

The above analysis shows that there was a high correlation in the period 1950-51 to 1958-59 between consumption and price as measured by these estimates. A simple mathematical correlation, assuming a linear relationship gave a correlation coefficient of 0.6782. The indicated elasticity of demand with respect to price and consumption for the period was 0.50.

Relationship between income and consumption:

Annual estimates of national income in India show an upward trend since 1950 in income per person. Correlation between per capita income and per capita consumption was worked out. The results are shown below.

	$r 12^2 = 0.6750$	
	$r 12 = 0.8216$	
Coefficient	Natural Nos.	Log Values.
b_{12}	0.0989	1.6264
σb_{12}	0.0260	0.3649
$t b_{12}$	3.8038	4.4571
P	< 0.01 > 0.001	< 0.01 > 0.001

There is a significant correlation between per capita income and per capita consumption of coconut oil.

This suggests an income effect on coconut oil, oil consumption, and income elasticity works out to about 1.63. In view of the fact that only a brief time series has been considered the result can be treated as only tentative.

CONCLUSION

The above analysis shows that the elasticity of demand for coconut oil in India at the average price and consumption for the period 1950-51 to 1958-59 was of the order of 0.50. The data also suggest an income effect on coconut oil consumption but the effect cannot be clearly determined due to inadequacy of the data available.

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