

Research Article

Trends in production and export performance of gingelly and gingelly oil

■ N. KUMARASAMY AND C. SEKAR

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SUMMARY : Sesame (*Sesamum indicum* L.), commonly known as til or gingely is the oldest oil seed crop cultivated in the world. It was reported to be originated from Africa. Sesame was introduced into India by the earliest human migrants from Africa. Gingelly occupies 0.63 lakh hectares in Tamil Nadu with an average yield of 506 kg per hectare. The annual production was to an exact of 0.31 lakh tonnes. India exports gingelly seeds to China, Holland, USA, Germany, Turkey, Netherlands, Hong Kong, Israel, UK and UAE. The study focused on the production and export performance of the gingelly and oil. For the study, secondary data on area, production and yield of major gingelly producing districts of Tamil Nadu were estimated for the years from 1980-2010. The export performance of gingelly and gingelly oil in India was examined using secondary data from 1995-2010. The collected data were analysed from various statistical tools viz., compound growth rate and Markov chain analysis. From the results, it was found that during 1980-2010, the growth rate was positive for production and yield of gingelly in Erode and Karur districts. Erode district showed negative trend in area of during the year 1980-1990. The decreasing area of gingelly was due to poor rainfall and high drought during the period. The results indicated that area, production and yield of gingelly were low in four districts viz., Villupuram, Tanjavur, Cuddalore and Salem due to persistent drought. The trend in gingelly export in quantity was found to be higher in the period (1980-1990). It implies that a higher quantity of gingelly is being exported during the period which increased the unit price of gingelly with marginal increase in export value. The gingelly oil was not exported during 1980-1990. Subsequently the export of oil picked up and showed an increase ranging from 14-17 per cent, period between 1991-2010 due to the trade regime and export policies of the government. The Markov chain analysis showed that Republic of Korea was found to be one of the stable importers of Indian sesame seed because its original share of around 80 per cent over the period of 1995-2010 whereas Sri Lanka was found as one of the stable importers of Indian sesame oil because it retained its original share of around 40 per cent over the period of 1995-2010. It is concluded that Republic of Korea and Sri Lanka were the stable importer of sesame and oil from India, respectively. Because these countries have high level probability of retention.

KEY WORDS :

 Growth rate,
 Production,
 Export, Markov
 chain, Gingelly, Oil

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Author for correspondence :
N. KUMARASAMY

 Department of Agricultural
 and Rural Management,
 Centre for Agricultural and
 Rural Development Studies,
 Tamil Nadu Agricultural
 University, COIMBATORE
 (T.N.) INDIA
 Email: kumarasamytnau@gmail.com

 See end of the article for
 authors' affiliations

BACKGROUND AND OBJECTIVES

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 per cent of oilseeds production (Damodaram and Hegde, 2007). In India, the demand for oilseeds and vegetable oil is increasing due to increase in population, increased standard

of living and rapid urbanization (Sudhakarababu 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 Murugan, 2008).

Gingelly (Sesame) is an important edible oilseed in India. India exports gingelly seeds to China, Holland, USA, Germany, Turkey, The Netherlands, Hong Kong, Israel, UK, UAE, etc. Globally, China and India are the major gingelly producers. In India, gingelly seed production in *Kharif* (2012-13) was 3.40 lakh tonnes and it was 4.20 lakh tonnes in *Kharif* during 2011-12. The major gingelly producing states are Uttar Pradesh, Rajasthan, Madhya Pradesh, Orissa, Tamil Nadu and Gujarat.

In the world market, India has a reputation of being a net exporter of sesame. The country is one of the largest exporters of sesame exporting 5.4 lakh metric tonnes of sesame annually. As the production in India is sufficient to satisfy the domestic consumption demand, the marketed surplus of about 25 per cent of the total production is exported to various nations of the world.

Major issues:

- Year to year fluctuation in export of gingelly and gingelly oil is significant.
- There exists undue price fluctuation in the price of gingelly and gingelly oil in the national and international market.
- Importing countries of both gingelly and gingelly oil are of stable and it exhibited significant differences over years.

Objectives of the study:

The specific objectives of the study are:

- To examine the trend in area, production and productivity of gingelly in Tamil Nadu,
- To study the trend in exports and direction of trade of gingelly and gingelly oil from India.

RESOURCES AND METHODS

The key aspect of the present study was to estimate the compound growth rate of area, production and yield of gingelly in major districts of Tamil Nadu (1980-2010) and trend in export performance of gingelly and oil from India (1980-2010). The direction of trade of gingelly seed and oil from India (1995-2010) was estimated by Markov chain analysis. The study is based on the secondary data.

Tools of analysis:

The collected data were analyzed with reference to the objectives of the study. The analytical techniques employed in this study are explained in this section.

Compound growth rate :

Compound growth rate was used to find out the trend in area, production and productivity of gingelly in major districts

of Tamil Nadu.

$$Y_t = a (1+r)^t U_t$$

when, linearised, it became, $\ln Y_t = a + b_t + V_t$

β was calculated using OLS regression from which 'r' was estimated as below:

$$r = (s - 1) \times 100$$

where,

Y_t = Area/ production/ productivity/ in time 't'

r = Annual compound growth rate

V_t = $\ln U_t$ - error term

t = discrete time in years; 0, 1, 2

Markov chain analysis:

The structural change in sesame seed and oil exports was examined using Markov chain model. Central to the Markov model is the transitional probability matrix 'P'. The elements P_{ij} of this matrix indicate the probability that exports of sesame seed and oil switch from country 'i' to country 'j' over time. The diagonal element P_{ij} where $i=j$, measures the probability of a country retaining its market share. In other words, an examination of the diagonal elements of the transitional probability matrix indicates the loyalty of an importing country to a particular country's exports. In the context of current application, structural change was treated as a random process in which ten importing countries viz., China, Korea, USA, Turkey, Netherlands, Egypt for sesame seed and Mexico, Sri Lanka, Vietnam, China, USA, Netherlands were considered. This is algebraically expressed as:

$$E_{jt} = E_{it-1} P_{ij} + e_{jt}$$

where,

E_{jt} = Exports of sesame and oil from India during the year 't' to jth country,

E_{it-1} = Exports to ith country during the year 't-1',

P_{ij} = The probability that exports would shift from ith country to jth country,

e_{jt} = The error-term which is statistically independent of E_{it-1} ,

r = The number of importing countries.

OBSERVATIONS AND ANALYSIS

The present study analyses the export of gingelly and oil based on the objectives and the results thus, obtained are presented and discussed below:

District wise area, production and productivity of gingelly in Tamil Nadu (1980-2010):

From Table 1 it could be inferred that the trend in area, production and productivity of gingelly in major district of Tamil Nadu were analysed in 1980-2010. The growth rate was positive for production and yield of gingelly in Erode and Karur districts. Erode exhibited negative trend in area of

gingelly during 1980-1990. This decrease in area of gingelly was due to poor rainfall and high drought during the period. However, on the whole, over years though there had been a positive growth rate of area, production and productivity. This had been made possible by the technology mission of oil seed and the people concerned. The promising levels of production and productivity in the six major districts and the state as a whole emphasises prospects for further improvement in the gingelly performance through enhancing the productivity levels.

Trend in export quantity of gingelly and oil from India (1980-2010):

The trend in gingelly export in quantity was found to be

higher in the period I than in periods II and III. It implies that a higher quantity of gingelly is being exported during the period I, which increased the unit price of gingelly with marginal increase in export value.

It could be inferred from Table 2 that gingelly oil was not exported during 1980-1990. Subsequently the export of oil picked up and showed an increase ranging from 14-17 per cent, period between 1991-2010 due to the trade regime and export policies of the government.

Direction of trade of sesame seed export from India (1995-2010):

The transitional probability presented in Table 3 depicts a broad idea of change in the direction of trade of Indian

Table 1: Growth rate of area, production and yield of gingelly in Tamil Nadu during 1980-2010

District	Period-I			Period-II			Period-III			Overall		
	1980-1990			1990-2000			2000-2010			Area	Production	Yield
	Area	Production	Yield	Area	Production	Yield	Area	Production	Yield			
Erode	-0.37	0.21	0.58	3.29	13.79	10.17	-0.97	-0.23	0.75	1.4	3.6	2.0
Karur ¹	0	0	0	0	0	0	2.27	5.59	5.03	2.27	5.59	5.03
Villupuram ²	0	0	0	0	0	0	-6.87	0.02	0.03	-6.87	0.02	0.03
Tanjavur	25.77	26.60	0.66	-12.92	-9.42	4.02	8.98	7.62	-1.25	-2.74	-1.4	1.2
Cuddalore ³	0	0	0	0	0	0	-5.20	-2.05	3.32	-5.20	-2.05	3.32
Salem	6.50	5.43	-1.00	4.53	7.06	2.41	-15.44	-17.94	-2.96	-2.1	-2.14	1.64
Tamil Nadu	5	5.3	0.29	-5.01	0.03	5.31	-4.16	-5.41	-1.3	-1.98	-0.26	1.75

Note : 1 was comes under Trichy districts, 2 and 3 was comes under South Arcot district

Table 2: Trend in export quantity of gingelly and oil

Sr. No.	Year	Sesame seed		Sesame oil	
		Export quantity (%)		Export quantity (%)	
1.	1980-1990	24.92		0.0	
2.	1991-2000	16.18		14.02	
3.	2001-2010	7.64		17.39	

Table 3: Sesame seed export from India (1995-2010)

Country	China	Republic of Korea	USA	Turkey	Netherlands	Egypt
China	0.4647957	0.1391751	0.2462564	0	0.1497729	0
Republic of Korea	0.0515	0.8022904	0.1461765	0	0	0
USA	0.8144646	0	0.1855354	0	0	0
Turkey	0.205006	0.0367	0.0642	0.4995647	0	0.1944837
Netherlands	0	0	0	0.4610042	0.4162833	0.1227126
Egypt	0	0	0.2225563	0	0.2644235	0.5130202

Table 4 : Sesame oil export from India (1995-2010)

Country	Mexico	Sri Lanka	Vietnam	China	USA	Netherlands
Mexico	1.0	0	0	0	0	0
Sri Lanka	0	0.402792	0.1056083	0.1524131	0.3391866	0
Vietnam	0	1.0	0	0	0	0
China	0	0.2331135	0.3048	0.1416038	0.3204827	0
USA	0.1705402	0	0	0.3723358	0	0.457124
Netherlands	0	0	0	1.0	0	0

sesame during 1995-2010. The six major countries which imported Indian sesame seed were China, Republic of Korea, USA, Turkey, Netherlands and Egypt. The export to remaining countries was pooled under the category of other countries. It can be seen from Table 3, that Korea was found to be one of the stable importers of Indian sesame because it retained its original share of around 80.22 per cent over the period. It gained a major share from the Turkey to an extent of 03.6 per cent. The china retained 46.47 per cent of its original share and gained major share from USA and hence, in future USA will be one of the most stable importer and its growth may be higher for sesame seed import from India. Turkey was also found to be a stable importer as it retained its share of 49.95 per cent and it lost only a minimum share to other countries. Netherlands and Egypt are also stable importers of sesame seed. So compared to other countries in case of USA only a minimum share was retained. It showed that Republic of Korea was the stable importer of sesame from India.

Direction of trade of sesame oil export from India (1995-2010) :

The transitional probability presented in Table 4 depicts a broad idea of change in the direction of trade of Indian sesame oil for the period (1995-2010). The six major countries which imported Indian sesame oil were Mexico, Sri Lanka, Viet Nam, China, USA, The Netherlands. The export to remaining countries was pooled under the category of other countries. It can be seen from Table 4 that Sri Lanka was found as one of the stable importers of Indian sesame oil because it retained its original share of around 40 per cent over the period of 1995-2010. It also gained share from the China (23.33%). The China retained 14 per cent of its original share and major share gain from Sri Lanka and lost a major share to USA. Sri Lanka is one of the major importer of sesame oil from India. Hence, compared to major importing countries at present, the countries pooled under 'others category' would import sesame oil from India in the near future.

Conclusion:

The study focused on the trend in production and export performance of gingelly and oil. For the study, secondary data on area, production and yield of major gingelly producing district of Tamil Nadu were estimated for the years from 1980-2010. The export performance of gingelly and gingelly oil in India were examined using secondary data from 1995-2010. The collected data were analysed from various statistical tools viz., compound growth rate and Markov chain analysis. From the results, it was found that during 1980-2010, the growth rate was positive for production and yield of gingelly in Erode and Karur districts. Erode district showed negative trend in area of during the year 1980-1990. The decreasing area of gingelly was due to poor rainfall and high drought during the

period. The results indicated that area, production and yield of gingelly were low in four districts viz., Villupuram, Tanjavur, Cuddalore and Salem due to persistent drought. The trend in gingelly export in quantity was found to be higher in the period (1980-1990). It implies that a higher quantity of gingelly is being exported during the period which increased the unit price of gingelly with marginal increase in export value. The gingelly oil was not exported during 1980-1990. Subsequently the export of oil picked up and showed an increase ranging from 14-17 per cent, period between 1991-2010 due to the trade regime and export policies of the government. The Markov chain analysis showed that Republic of Korea was found to be one of the stable importers of Indian sesame seed because it original share of around 80 per cent over the period of 1995-2010 whereas Sri Lanka was found as one of the stable importers of Indian sesame oil because it retained its original share of around 40 per cent over the period of 1995-2010. It is concluded that Republic of Korea was the stable importer of sesame and Sri Lanka was the stable importer of sesame oil from India. Because these countries have high level probability of retention.

Authors' affiliations :

C. SEKAR, Post Harvest Technology Centre, Centre for Agricultural and Rural Development Studies, Tamil Nadu Agricultural University, COIMBATORE (T. N.) INDIA Email: csekar2000@gmail.com

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