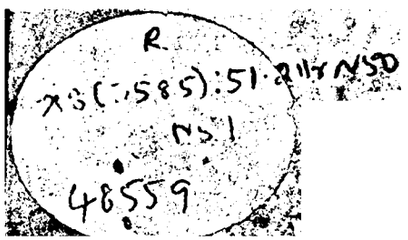
REPORT ON THE MARKETING OF CASTOR SEED IN THE MADRAS PRESIDENCY



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BY
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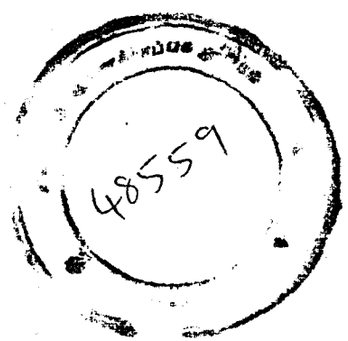

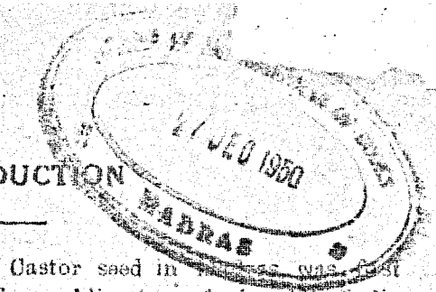

INTRODUCTION

A report on the Marketing of Castor seed in [illegible] was first prepared during 1948. With the publication of the All India report by the Central Marketing Department in 1947, the Madras report was made up-to-date, in line with that report, and data of recent years have also been included. Although compared to Groundnut, the production of Castor seed is relatively small in India and Madras, the crop is particularly important for the country on account of its utilisation in the industries and medicine. In view of the expanding industrialisation of the country, the oil will play a greater role in the economy of the country, while the oil cake is a valuable manure.

This report deals with the various aspects of production and marketing, from the field to the consumer including prices, utilisation and costs of marketing of the seed, oil and cake. The form of the report is on the lines of the extensive and valuable survey report prepared by the Government of India in the Provinces and States and many portions of the report have been freely incorporated.

Many recommendations have been made to improve the marketing by increasing production and maintaining the quality of seed and oil. Particular mention may be made of the recent fixation by the Government of India of grade standards for Castor oil under 'Agmark', the extension of which will improve the quality of oil in Indian and world markets.

Thanks and acknowledgments are due to producers, the trade, co-operative societies and Government departments, who kindly helped the marketing staff in the preparation of this report. Much of the valuable information regarding Indian and world markets, has been gathered from the report on the "Marketing of Castor seed in India" by the Marketing Department of the Government of India.

(*Sd.*) S. N. VENKATARAMANA IYER,
State Marketing Officer.

REPORT ON THE MARKETING OF CASTOR SEED IN THE MADRAS PRESIDENCY

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CHAPTER I

Supply And Demand.

1. The Castor plant.

The Castor plant (*Ricinus communis*) in cultivated mostly as an annual, although a few perennials are also grown. The plant is grown mainly for its seeds, the oil finding use as a lubricant and illuminant, and also for several industrial and non-industrial purposes. In certain areas as Assam the plant is grown for the green leaves for feeding Eri-Silk worms. The cake is mainly used as a fertiliser. The dry stems are used for thatching up roofs and as fuel. Recent researches have shown that the stems can also be used for preparing paper pulp.

2. World area and production.

Data regarding area and production of castor growing countries are incomplete, but such data as have been published indicate that the world crop was of the order of $2\frac{1}{2}$ million acres, and production 350,000 tons during 1939. But latest figures of production as well as exports from different countries indicate that world production is now of the order of 500,000 tons. This was mainly contributed from Brazil (246,000 tons in 1943), India (215,000 tons), U.S.S.R. (52,000 tons in 1938), Manchuko and Argentina (8,000 tons).

3. International trade.

The net imports and exports of castor seed for certain important countries are given in Appendix I for the prewar period. At this period about half the world's production of castor seed was estimated to enter the international trade, the total net imports averaging 176,000 tons during 1934-38, and contributed chiefly by Brazil (91,000 tons) and India (46,000 tons). India was the largest country exporting castor before the war of 1914-18, and continued in this position till 1934, when Brazilian exports expanded.

The chief prewar importing countries for castor seed were the United States of America (53,100 tons), the United Kingdom (26,800 tons), Japan (27,600 tons), France (19,800 tons), Italy (13,600 tons), Germany (12,700 tons) and Belgo-Luxemburg (9,700 tons).

The international trade in castor oil is given in Appendix II. The prewar world trade averaged about 14,000 tons of which the chief exporters were India (5900 tons). Belgo-Luxemburg (3700 tons), United Kingdom (1900 tons), U.S.S.R. (1100 tons) and France (1000 tons). The largest importing country was Germany (6600 tons) followed by Sweden (1200 tons) and Czechoslovakia (1100 tons).

B. Production in India.

1. Area and production statistics.

Estimates of area and production of castor are published in the "Area and yield of Principal crops in India," and in the Government forecasts from the year 1920–21 and are given in Appendix III and IV. According to these figures, the area ranged generally between 1·2 to 1·5 million acres and production from 100,000 to 150,000 tons. Nearly half the area, ranging usually from 500,000 to 900,000 acres was reported from Hyderabad and about a fourth from Madras (250,000 to 400,000 acres).

The above statistics are however incomplete, as the crop is grown largely as a mixed crop and the area is estimated as an approximate proportion by the reporting officers.

In Madras the number of lines of the mixed crop of tenai (Setaria Italica) for one line of castor ranged from 2 to 6 in Guntur district and of groundnut from 8 to 18. Similar difficulties exist also in the United Provinces, as well as Bihar.

The production of castor in India is estimated as in other crops on the basis of "area X normal yield X seasonal factor." The normal yield was fixed as follows :—

Normal yield of Castor (lbs.per acre)

Bihar	...	350
Central Provinces	...	400
Madras	...	226
Orissa	...	285
United Provinces	...	600
Hyderabad	...	238
Bombay	...	400 to 500 in different dis

The standard yield for Hyderabad of 238 lbs. appears compared to 400 lbs. in the Central Provinces, as cor

two areas are similar. On the whole, the yields reported are low and in most provinces, the average over a number of years, is less than the 'standard yield' which represents the average.

With a view to ascertain the correct position in India, in respect of castor production, enquiries were made by the Central Marketing department with District Officers in different provinces and states and supplemented by information from merchants, exporters and processing concerns for the crop marketed between the three years 1939–40 to 1941–42. The production as above estimated is compared to the official crop estimate below :—

Production of Castor seed in India (000 tons)

Provinces or State	According to crop forecasts. Average 1936–37 to 1938–39	Average 1939–40 to 1941–42	1942–43	1943–44	Average annual production based on the data collected during
Bihar ...	4·7	4·3	5.0	5·0	35·0
Bombay ...	6·0	5·0	6.0	6·0	10·0
Central Provinces	5·7	4·8	4.0	5·0	5·0
Madras ...	23·0	25·3	25.0	25·0	25·0
Orissa ...	2·3	2·0	2.0	2·0	2·0
United Provinces	3·7	3·3	3.0	3·0	27·0
Baroda ...	5·0	5·0	8.0	7·0	15·0
Bombay States ...	7·7	7·0	6.0	15·0	18·0
Hyderabad ...	50·3	33·0	83.0	65·0	67·0
Mysore ...	6·0	8·0	5.0	7·0	8·0
Other areas not included in crop forecasts ...	...	...	...	...	3·0
Total India ...	114·4	97·7	147·0	140·0	215·0

It will be seen that the production of castor seed according to the crop forecasts is an underestimate. The actual commerci

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Vix VI.
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crop averaged 215,000 tons as compared to the estimate of 100,000 to 150,000 tons according to the forecasts.

2. Production in different provinces.

Of the total estimated production of 215,000 tons during the triennium ending 1941–42, the Hyderabad State accounted for 31%, Bihar for 16%, Madras 12%, the United Provinces 12½%, while Bombay and Bombay States contributed 13%. The important growing districts and season of supply are given below:—

Name of Province.	Important growing districts.	Extent of pure crop	Period of sowing.	Period of harvest.
Bihar ...	Bhagalpur, Purnea, Manghyr (River Banks)	60%	September-October.	March-April.
Bombay & States.	Kathiawar, Gujarat, Ahmedabad, Surat.	80%	June-July.	December-February.
Madras ...	Anantapur, Kurnool, Guntur, Nellore, Salem, North Arcot.	1/3	June-July.	November-February.
United Provinces.	Lakhimpur, Sitapur, Etawah (River Banks)	mostly mixed	June-July.	February - April
Baroda ...	Mehsana.	3/4	August.	January-March.
Hyderabad.	Nalgonda, Maboobnagar, Warangal, Karimnagar.	Pure in the East, hedge crop in the West.	June-July.	December-March.

3. Area and production in Madras.

(a) *Area*: The area under castor seed in different districts in Madras is given in Appendix V (a) and the trend of area in

Appendix V. The average area in the presidency declined from 426,000 acres in the quinquennium ending 1921–22 to 261,000 acres in the quinquennium ending 1946–47 as can be seen below:—

Average area under castor in Madras (1000 acres)

Quinquennium ending	Area (1000 acres)
1921–22	426
1926–27	358
1931–32	315
1936–37	292
1941–42	259
1946–47	261

Of the average area for the five years ending 1946-47, the district of Anantapur contributed 66,200 acres (or 25%), Nellore 43,200 acres (or 17%), Kurnool 33,300 acres (or 12½%), Guntur 27,100 acres (or 10%), Bellary 23,100 acres (or 9%) and Salem 19,100 acres (or 7%).

The Taluq-war areas under castor are given in Appendix VI. Important growing taluqs were Ongole and Vinukonda in Guntur, Markapur in Kurnool, Kudligi in Bellary and Anantpur, Kalyandrug and Kadiri in Anantpur.

(*b*) *Yield per acre.* The normal yield for different districts was fixed as below:—

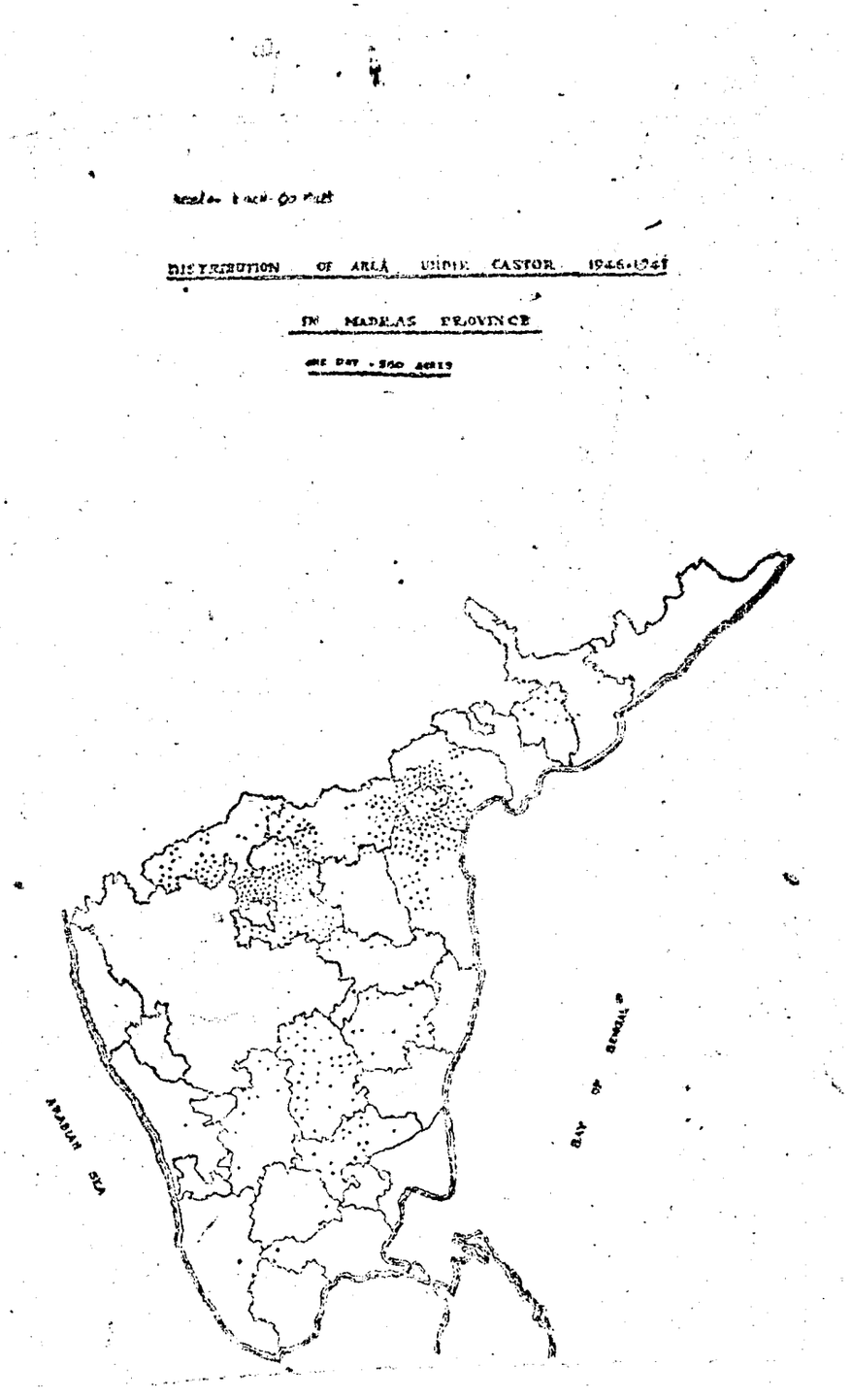
Normal yield of castor.

Name of District.	Yield per acre (lb).
Bellary, Anantapur, Cuddapah and Kurnool.	150
Vizagapatam, East and West Godavari Kistna, Guntur, Nellore, Chingleput, South Arcot, North Arcot and Chittoor.	250
Salem, Coimbatore, Trichinopoly, Tanjore, Madura, Ramnad, Tinnevelly, Malabar and South Kanara.	400

Castor is grown almost entirely under rainfed conditions, the irrigated crop being hardly 1%. On the light red soils of the Circars and the poor gravelly soils of the Ceded districts, castor is grown as a pure crop but the yields are low. In other cases, it is grown generally as a mixed crop. In Anantapur district, it is mixed with cowpea and red gram in rows 3 to 4½ feet apart. In richer soils of the districts, castor is mixed with crops like cholam, Cumbu, ragi, groundnut, lablab etc., and the castor lines are fairly wide apart, sometimes 6 to 12 feet. In irrigated lands, castor is grown round fields of sugarcane, plantains, betel vines, vegetable crops etc., or as a shade crop for turmeric at distances of 8 to 10 feet each way.

Variations in yield are due to several factors of soil and climate. The castor is usually grown in very poor soils by the ryot. The low yield of 150 to 250 lbs. per acre in the Ceded districts is due to the fact that the crop is grown on shallow red soils of a gravelly nature. When the crop is sown as mixture with tenai (Setaria Italica), the yield ranges from 400 to 500 lb. per acre as the number of castor lines are greater (1 to 5 of tenai). In mixtures with groundnut where the castor lines are grown for every ten, fifteen or eighteen lines of groundnut, the yield ranged from 150 to 250 lbs. per acre only. In light loamy soils yields are high and upto 750 lbs. per acre have been recorded in the Tindivanam agricultural research station, of the South Arcot District.

(c) *Total production*: Based on the area, the standard yield per acre and the seasonal factor of each year, the production of castor seed, as published in the season and crop reports of the Madras province is given in Appendix VII for the more important districts. There has been a general decrease in production in all the districts as Guntur, Bellary, Kurnool, Anantpur, Nellore, Coimbatore and Trichinopoly. Just as with area, production decreased as can be seen below (cf. Appendix V b).



Quinquennial average production of castor seed in the Madras Presidency (Tons)

Period.	Production.
1917–18 to 1921–22	42,000
1922–23 to 1926–27	34,000
1927–28 to 1931–32	30,000
1932–33 to 1936–37	28,000
1937–38 to 1941–42	24,000
1942–43 to 1946–47	22,000

The reasons for the fall in area and production are discussed in the following section.

2 Trend of area and production and future possibilities.

(*a*) *India.* As already indicated, the published figures of area and production of castor seed in India are incomplete and inferences about the trend of the crop drawn through such data may not be valid. It is however seen that the area according to forecasts indicates a decline from 1·8 million acres during 1921–22. to 1.2 million acres by 1937–38 and below 1·0 million acres by 1941–42. The declining position in the twenties is only to be explained by a fall in the demand for castor oil in India, as exports at that time were generally on the increase. Later when Brazil entered the world trade as an exporter from the year 1934, there was a still further decline in cultivation in India due to a fall in export demand. The second European War increased the demand for castor oil for lubrication and industrial purposes in India as a result of the restricted supplies of imported mineral lubricating oils. Consequently the area increased to about 1·4 million acres in the period 1942–43 to 1945–46, but there was a slight fall during 1946–47 to 1.35 million acres.

Trend of Area and yield of castor in India (according to forecasts)

	Period.	Area (1000 acres.)	Production (1000 tons.)
	1923–27	1459	... 128
	1928–32	1442	... 126
	1933–37	1495	... 130
	1938–42	1066	... 102
Year	1942–43	1366	... 147
	1943–44	1543	... 140
	1944–45	1468	... 131
	1945–46	1431	... 123
	1946–47	1346	... 121

The general indication is towards a decline during the quinquennium ending 1942, followed by a recovery in the war period when prices were favourable.

The future expansion of castor cultivation depends to a large extent on the export demand, as well as utilisation in India. The export is however likely to be affected by cultivation in Brazil which is now the largest producer of castor seed, with very favourable conditions of cultivation and yield per acre. It is, however, probable that the export demand for castor oil from India willl be maintained as the oil-crushing industry is not developed in Brazil. The development of aviation in India as well as the expansion of industries will also lead to a greater internal demand for castor oil as a lubricant and in industries such as Textiles, soap and leather.

The yield per acre of castor in India averaged only 160 to 240 lbs. and is very low compared to yields got in other countries as Manchuko (535 lbs.) and Brazil (750 to 2250 lbs). It has been possible in the United States of America to increase the yield considerably by introduction of better varieties and work at the experimental stations in India, also indicate similar possibilities as at Tindivanam, where the yield was of the order of 750 lbs. per acre. Introduction of high yielding castor varieties in India is therefore a good line of improvement. This will also have the advantage of increasing production to meet the increased demand without in any way affecting the area under food crops, for the 'grow more food campaign.'

(*b*) As already reported, the average area under castor in Madras has declined from about 426,000 acres during the quinquennium ending 1921–22 to 261,000 acres during the period ending 1946–47. This decline is much more pronounced than in India and has been occuring progressively. Among the causes for the decline, the following may be mentioned, namely:—

(1) the replacement of castor oil by mineral oils to a considerable extent in the prewar period,

(2) the increased substitution of cheaper kerosene oil for illuminating purposes,

(3) the expansion of groundnut at the expense of castor, as the former is a more paying crop.

Unlike in other provinces in India, there has been no pronounced recovery in the area under castor in Madras in the war period 1940 to 1945.

Castor occupied 8.4% of the total area under oil seeds during 1925-26, but the proportion fell to only 4.0% during 1946-47. In the same period, the area under groundnuts increased from 2.6 to 4.1 million acres and of all oil seeds from 4.5 to 5.7 million acres. The trend of area was as follows:—

Trend of area under Oil seeds and Castor. (000acres)

Period.	Ground-nuts.	Gingelly.	Castor.	Total Oil seeds.	Percentage share of	
					Castor.	Groundnut.
1925/26—1926/27.	2640	736	358	4482	8.0	58.9
1927/28—1931/32.	3286	773	315	5104	6.2	64·4
1932/33—1936/37.	3133	771	292	4907	5.9	63.8
1937/38—1941/42.	3771	777	259	5505	4.7	68.5
1942-43.	3382	840	277	5138	5.4	65.8
1943-44.	3550	697	279	5315	5.3	68.1
1944-45.	4300	616	285	5906	4.8	72.8
1945-46.	4165	599	235	5690	4.1	73.2
1946-47.	4121	673	229	5702	4.0	72.3

While in the period 1925 to 1947 the share of castor fell from 8 to 4% of the total area under oil seeds, the share of groundnuts rose from 59 to 72%. It will also be seen that while oil seeds increased by nearly 1·2 million acres in the period (or 27%), castor area fell by 1·3 lakhs of acres (or 36%).

C. Types and varieties.

1. Types.

(*a*) *India* :—Two types can be differentiated in India according to duration of the crop, namely the perennial and annual types. The annual types occupy over 97% of the area in India. In Madras, the perennial types are not of any commercial importance, although they are found in almost all districts irrespective of altitude or climatic conditions, in backyards of houses or field bunds. The size of the seed varies widely in the Madras perennial types, but in the whole of India, they generally produce bold seeds. Some perennials are also grown as annuals as the 'Pares' of Gujarat. The chief growing area for the perennial types in India was the Marathwada Division of Hyderabad.

(*b*) *Madras* :—The castor plant can also be classified into two main types according to the colour of the stem namely red and white. But although the colour of the stem is different, the seeds produced from them are practically the same.

2. Trade descriptions.

(*a*) *India* :—In addition to the perennial type called 'pares,' eight different trade types of castor seed in India are recognised and their main characteristics are as below :—

Characteristics of different trade descriptions of castor seed in India.

Trade description.	Size of seed and oil content.	Where grown.	Share to the total production of castor seed in India. per cent.	Remarks.
Chittoor.	Very small seeds-low oil content.	Warangal area of Hyderabad State and some parts of Madras and the Central Provinces.	8	Sells at a heavy discount. Mixtures of "Chitoor" and "Hyderabad" in the proportion 1:3 despatched from Warangal area to Bombay are known in the trade as "Bombay chalan."
Kathiawar.	Small seeds-low oil content.	Kathiawar States including Junagadh Jamnagar Kutch etc. and parts of Baroda State.	6	...
Madras.	Medium size seeds similar to "Hyderabad" oil content lower than "Hyderabad."	Anantapur Bellary, Kurnool, Cuddapah, Guntur and Nellore districts of Madras and adjoining areas in Mysore State.	10	Sells at a discount as compared with "Hyderabad." In the export trade, both "Hyderabad" and "Madras" Castor seed are shipped as Bombay of ordinary Castor seed.

Trade description.	Size of seed and oil content.	Where grown.	Share to the total production of castor seed in India.	Remarks.
			per cent.	
Hyderabad.	Medium size seeds-high oil content.	Hyderabad State and adjoining tracts in the Central Provinces.	25	Known as "Factory *chalan*" in Hyderabad markets and "Mughlai" in Bombay markets.
Gujarat.	Medium size seeds-oil content lower than "Hyderabad" and "Madras" seeds.	Gujarat area of Bombay and parts of Baroda State.	13	Sells at a discount as compared to other medium size seeds.
Calcutta	Bold seeds-high oil content.	Bihar.	15	Seeds from Colgong area of Bhagalpur district sell at a premium.
Salem.	Bold deep coloured seeds, medium oil content.	Salem, North Arcot, South Arcot, Trichinopoly and Coimbatore districts of Madras and some parts of Mysore State.	7	Considered by the trade to yield an oil with a low percentage of free fatty acids and commands a premium.
Cawnpore.	Bold seeds-oil content varying.	United Provinces and certain tracts of Bombay.	14	Seeds under this trade description generally consist of mixtures of seeds, with wide variations in size and oil content.
Pares.	Bold seeds-high oil content.	Hyderabad State, Madras and Bombay.	3*	*Including other trade descriptions of minor importance.

The "Chittoo" is small sized, the number of seeds to the gram averaging about 5·5, as compared to 2·1 for pares, 2·8 for Cawnpore, 3.2 for Salem, 4·5 for Madras and 4·3 for Hyderabad types. The Hyderabad seeds had the highest oil content, the average being 48%, sometimes 60%. The 'Pares' had the lowest oil content (average 44%) while other types ranged from 47 to 48% usually. The husk content was comparatively low in Pares (26%), while other types had 28 to 30%.

The analysis of the seeds for certain characters made at the Har Court Butler Technological Institute is given Appendix VIII.

(*b*) *Madras.* In Madras, two broad types are recognised by the trade namely (1) the "ordinary" type consisting of grey, medium sized seeds produced in Anantapur, Bellary, Kurnool, Cuddapah, Nellore and Guntur as also in Hyderabad.

(2) *The "Salem" type,* which is slightly bigger than the above, reddish in colour and grown in the districts of Salem, North Arcot, Tiruchirapalli, Madura and Ramnad. The Mysore produce is also similar to this. The 'small seeded type' known as 'sithamanakku' grown in vegetable and betel gardens is small and bright seeded and the limited production is used locally for medicinal purposes.

The ordinary type figures prominently in the trade of the coromandel coast, Bombay and Marmagoa. In the export trade of Bombay, both "Hyderabad" and "Madras" castor seeds are shipped as Bombay or ordinary castor seed. The Salem type has a reputation for a low free fatty acid content and used to be given a premium but not now.

It is roughly estimated that the area under the ordinary type was about 75% in Madras and of the Salem type 20 to 25%, the rest being covered by the 'small and perennial types.'

3. Research :—

Research work in India on castor seed is carried out mainly in the Agricultural Research Station, Tindivanam (Madras) and the Main Agricultural Experiment Farm, Himayat Sagar (Hyderabad) A certain amount of selection work has also been done in the United Provinces, Central Provinces, Baroda and Mysore.

Work at Tindivanam, which started in 1934, was devoted to the evolution, both by selection and hybridisation of high yielding strains with increased oil content and other desirable characters such as early maturing, profuse branching, production of capsules in quick succession, long heads, compact setting of capsules,

uniform maturity and non-dehiscent capsules. Upto 1948 three selections have been evolved namely, TMV 1, TMV 2, and TMV 3, and a perennial Co 1. Their characters are given below:—

Character of castor strains.

Characteristics.	Name of strains			
	TMV I	TMV 2	TMV 3	CO 1
Plant.	Short, rose coloured with medium thick stem.	Medium, rose coloured, thick.	Medium thick green.	Perennial.
Capsule.	Small, green with purple tinge, spiny dehiscent.	Medium, sparse green with purple, tinge, spiny, non-dehiscent,	Medium, sparse green, spiny dehiscent.	...
Seeds.	Small, grey speckled grey,	Medium oval, red brown.	Medium oval, red brown.	Large & mottled white.
Duration.	6½ months.	7 months.	8 months.	
Average acre yield lb.	750	775	750	...
Weight of 1 M. M. of beans.	2 lb. 7½ oz.	2 lb. 6 oz.	2 lb. 6½ oz.	...
No. of beans per pound.	1886	1560	1410	448
Percentage of oil (Chemical extraction)	51	50	55	55
Remarks.	Suitable as field crop.	Suitable as field crop.	Suitable as a border crop.	Perennial type suitable as a shade crop for plantations

Selection work is also in progress using the Kumbakonam type of plant which has shortest duration of five months. Upto 1948, the

area has spread to about 4000 acres under the above strains in Madras.

At the Himayat-sagar Agricultural Research Station, a scheme for castor research has been in operation since 1934 under the joint financing by the Indian Council of Agricultural Research and the Hyderabad Government. The object was the evolution of high yielding strains with high oil content suitable for different castor regions in India and particularly Hyderabad, together with research on cultural problems. One strain 172 is under distribution to ryots (re-named H.S.I) and gave an increased yield of 25 to 30% over local ordinary types while the oil content was 50 to 52% compared to 48% for the local variety. It has the advantage of a spineless capsule, which would facilitate easier picking.

4. Climate and varietal characteristics.

In India as well as Madras, certain tracts have a reputation for the good quality of the seed, as well as oil content. The trade generally prefers seeds weighing more per unit volume as this is an indication of soundness of the beans and lesser percentage of shell or immature beans. In Madras comparatively heavier seeds are got in the Salem area from Macheri and Dharmapuri and in the Sankari, Karamadai (Coimbatore), Palni (Madura) and the South from Vilis there is also variation in oil content as can be Koilpatti. Besides analysis made by the oil seeds specialist. seen below from an

Oil content of seeds from different districts.

Seed from	Average oil content. %
Anantapur	50·3
Kurnool	51·2
Salem	53·6
Cuddapah	51·4

One strain (899) grown in Tindivanam gave 49·5% of oil, as compared to 47·5% at Himayat Sagar, but in other cases, the differences were not pronounced. The above data indicate the possibilities of improving the quality of castor seed by choosing the proper type suitable for each area. Such work resulted in significantly improving the yield per acre in the U.S.S.R. and also the United States of America.

D. Quantity retained by producers.

India. The quantity of seed reserved by cultivators for sowing the next crop ranged from 3 to 5% of the production in different provinces and States. In most producing areas producer, also reserve some castor seed for their requirements of castor oil for lubricating their carts, cane crushers etc., and for use as a laxative and illuminant. The proportion so retained is high in certain partss Mysore and Madras, where cultivators are used to extract the oil by boiling the seeds in water.

It was estimated that in Madras the quantity retained by producers was of the order of 8% of production in Mysore, about 20% and in Hyderabad 6%. In parts of the United Provinces, Castor seed is used by cultivators for clarifying cane juice in the proportion of gur and rab, and the proportion of crop retained for this purpose and for sowing was estimated at 4%.

For India, as a whole, the quantity retained by producers was estimated at 18,000 tons or 6% of production.

Madras: For seed purposes, the retention by producers ranged from 4 to 5% in different districts. In the [illegible]eded districts, castor seed is administered to cattle for intestinal trouble, while in some major growing area a small quantity is retained for cart wheels, and ction of oil for medicinal purposes, lubrication of ed ranging from for lighting, the percentage of production so retained as a whole, the 10 to 12% including seed. For the Presidency f the order of 8%. quantity of castor seed retained by producers was e

E. Seasons of marketing.

(*a*) *India*: The Castor crop is generally arvested between December and February in Southern India and between February and April in Bihar and United Provinces. The peak period for marketing is therefore generally from February to April in Southern India and April to June in Northern India (about 65% of the crop).

In the consuming centres like Calcutta, Bombay and Madras the marketing season is slightly later than in the corresponding producing areas. In Calcutta, May was the month of peak supply, in Bombay and Madras March or April in normal times.

(*b*) *Madras*: The following table gives an indication of the monthly supplies to certain important stations during the year 1947,

Monthly movements of castor seed by rail to important stations (1947) Railway maunds.

	To Madras City.	Marmagoa Harbour	Coconada Port.	Total.
January ...	1,010	1,880	...	2,890
February ...	2,190	1,550	450	4,190
March ...	1,940	8,220	9,640	19,800
April ...	990	34,400	6,120	41,560
May ...	...	16,990	19,070	36,060
June ...	400	11,750	9,690	21,840
July ...	...	3,800	23,300	27,100
August ...	...	2,640	7,210	9,850
September ...	220	...	19,580	19,800
October ...	...	...	13,100	13,100
November ...	...	2,520	4,270	6,790
December ...	...	2,110	8,930	11,040
	6,750	85,900	121,360	214,010

F. Imports.

(*a*) *India*: Small quantities amounting to about 1000 tons annually were imported by road to Bihar through land frontier routes from Nepal.

(*b*) *Madras*: (i) *Trend.*

Imports by sea were negligible but large imports were received by rail, the average being about 16,130 tons for the years 1936-37 to 1940-41. The quantities received were as follows:—

Imports by rail of Castor seed into the Madras Presidency. (Tons)

Year.	From Orissa.	Bombay	Hyderabad.	Mysore.	Central Provinces & Berar.	Others.	Total.
1936-37 ...	125	76	22,612	22	389	...	23,224
37-38 ...	745	58	13,675	74	574	..	15,126
38-39 ...	510	145	5,599	30	329	1	6,614
39-40 ...	899	75	23,760	1,843	383	3	26,104
40-41 ...	1,427	64	6,947	760	369	...	9,567
Average ...	739	84	14,319	546	489	1	16,127
1941-42 ...	...	...	...	...	...	...	6,354

Year.	From						Total.
	Orissa.	Bombay	Hydera-bad.	Mysore.	Central Provinces & Berar.	Others.	
1942-43 ...	4	2	3,190	380	35	13	3,624
43-44 ...	24	48	6,016	72	...	...	6,160
44-45 ...	...	8	1,700	...	...	...	1,708
45-46 ...	...	117	1,176	...	...	...	1,293
46-47 ...	...	479	4,170	27	15	..	4,691
47-48 ...	57	156	2,185	102	...	16	2,516
Average 1942-43 to 1947-48 ...	14	135	3,073	99	8	5	3,334

(Figures from 1942-43 refer to M. & S.M. Railway stations only but these cover practically all imports by rail)

It will be seen that imports are on the decline, the quantity being 2516 tons during 1947-48, as compared to 23,224 tons during 1936-37. Part of the imports are destined to the Madras and other parts in the province for export to foreign countries and the decline is partly due to the fall in the export demand.

(ii) *Periodicity.* The monthly imports of castor seed by rail are given in Appendix IX. Large imports usually commence from January and reach a peak in March or April and decline thereafter. The average monthly imports for the five years ending 1939-40 and 1947-48 were as below :—

Average monthly imports of castor seed into Madras (Tons)

Month.	Pre-war. 1935-36 to 1939-40	Period 1943-44 to 1947-48
January	1275	348
February	2882	541
March	2992	678
April	2404	518
May	1420	304
June	1004	193
July	1028	162

Month.	Pre-war. 1935-36 to 1939-40	Period 1943-44 to 1947-48
August	1413	54
September	1053	129
October	1441	108
November	848	85
December	573	141
	18,933	3,261

(iii) *Sources.* About 90% of the imports of castor seed by rail were received from Hyderabad during the quinquennia ending 1942 and 1948. Supplies from Orissa have now practically stopped, while Bombay and Mysore accounted for 4 and 3% respectively in recent years.

G. Exports.

I. From India.

(a) *Quantities and trend.* The export of castor seed oil and cake from India from the year 1900 are given in Appendix X. The first recorded exports from India were 225 tons during 1877/8, which increased to 12,000 tons next year. The trade expanded steadily thereafter reaching about 40,000 tons by 1900 and nearly 100,000 tons by 1907-08 and averaged 114,000 tons prior to the first European War. In the war period 1914-15 to 1918-19 exports declined to a range of 80,000 to 85,000 tons annually, partly due to limited shipping and partly due to greater demand for export as oil which is less bulky. From the year 1918-19 purchases were made by the British Ministry of Food to meet the demands of the Air Ministry and over 54,000 tons were exported under the arrangement during 1918-19. The exports which reached the lowest figure of 8500 tons during 1919-20, increased to 85,000 tons by 1923-24 and 121,000 by 1928-29.

From 1928-29 onwards there was a steady decline in the exports due to competition of cheap mineral oils with castor oil as lubricants on account of which the prices of castor seed also took a downward trend. About this period, the production of castor seed in Brazil began to develop and this country took up India's place in export markets from the year 1932. Exports from India which averaged 111,000 tons in the quinquennium ending 1928-29, averaged only 97,000 during the five years ending 1933-34, and less than 48,000 tons in the period ending 1938-39, the lowest export being 7600 tons during the year 1933-39.

In the war period 1939 to 1945, abnormal conditions prevailed and restrictions were also imposed in 1941–42 on the export of castor seed to countries other than United Kingdom. Exports ranged from 67,000 tons during 1940–41 to 14,000 tons during 1943–44.

(*b*) *Destinations.* Exports of castor used to be made from British parts and in a small measure from Kathiawar ports. In the period 1910 to 1914, the chief importers were ths United Kingdom (54,000 tons), France (15,700 tons), Belgium (13,700 tons), United States of America (11,800 tons) and Italy (11,100 tons) out of a total of 114,000 tons. Between 1929 and 1934, the United States were the chief importers (35,900 tons) followed by united Kingdom (25,400 tons) France (17,100) and Italy (7800 tons) out of a total of 98100 tons. When exports declined in the next quinqennium ending 1938–39 to 47,700 tons, the demand in the United States of America fell off to only 3900 tons as also of France (7500 tons) and the chief importer was the United Kingdom (18,400 tons). In recent years (1939–40 to 1943–44, when exports declined further to 38,600 tons, the chief importer of Indian castor seed was the United Kingdom (23,100 tons) the next best being the United States of America (5600 tons) and Australia (4000 tons).

The details are given in Appendex XI and Appendix XII for British ports and Kathiawar ports respectively.

(*c*) *Ports of shipment*:—The shares of the ports of different maritime provinces in the export of castor seed out of India are given in Appendices XI and XII and the position is summarised below :—

Shares of different ports in the export of castor seed from India.

Ports of	Quantities (000 tons) (average) Period				Percentages. Period			
	1910/14.	1930/34.	1935/39.	1940/44.	1910/14.	1930/34.	1935/39.	1940/44.
Bengal ...	6.5	5.9	5.5	7.6	5.7	6.0	11.6	19.7
Bombay ...	92.4	50.3	19.0	12.6	81.4	51.3	39.8	32.6
Sind ...	0.2	0.1	0.1	N.	0.2	0.1	0.2	N.
Madras ...	14.5	37.5	19.7	13.8	12.7	38.2	41.3	35.7
Kathiawar ...	n.a.	4.3	3.4	4.6	n. a.	4.4	7.1	12.0
	113.6	98.1	47.7	38.6	100.0	100.0	100.0	100.0

Exports from Bombay which amounted to 81% of the total, have now declined to only 33%. Madras which contributed 12½% during the period ending 1914, is now the largest exporter with 37%, largely accounted through the port of Coconada.

(*d*) *Quality* :—Exports from the Bombay and Madras ports comprise medium size seeds sold under the names "Hyderabad" "Madras," "Bombay" or "ordinary" From the Madras ports and coromandel ports, some shipments consist of bold seeds known as the "Salem" Similarly some "Gujarat" seeds are exported from Bombay. Small seeds of the "Kathiawar" type are exported from Kathiawar, while two-thirds of the exports from Calcutta consisted of bold seeds known as Calcutta," while the rest were of the Cawnpore type.

Although Brazilian seeds have a higher oil content and lower free fatty acid than Indian castor seeds, they are irregular and not uniform in size. As a consequence Indian seeds are preferred by some importing areas, as they are easier to work.

(*a*) *periodicity* :—Exports increase from March and are usually high till August, after which there is a decline in the quantities exported.

2. From Madras.

(*a*) *Quantities and trend.*

(*i*) *By Rail.*

Small quantities of castor seed ranging from 500 to 1000 tons annually used to be exported in prewar years by rail to other provinces, chiefly Bengal.

Foreign exports of Castor seed by Sea from Madras (Tons)

Year.	To United States of America.	United Kingdom	France.	Germany.	Belgium	Poland.	Nether lands.	Japan.	Spain	Italy.	Austra-lia.	Others	Total.
1937–38 ...	...	8,886	1,800	44	245	1,102	252	2,455	50	2,147	...	1	16,982
38–39 ...	...	1,014	40	1,050	...	827	2,001	...	50	...	...	...	4,991
39–40 ...	1,099	1,014	1,000	...	300	316	1,524	...	...	101	...	...	5,354
40–41 ...	12,348	15,941	5,000	...	...	...	...	499	...	1,496	100	10	35,394
41–42 ...	...	12,387	...	...	...	...	...	130	...	...	200	...	13,217
Average 1937–38 to 1941–42	2,689	7,948	1,570	219	109	449	785	617	20	749	60	2	15,187
1942–43 ...	...	3,435	...	...	...	...	...	...	...	...	297	51	9,783
43–44 ...	...	3,071	...	...	...	...	...	...	...	...	1,786	...	4,857
44–45 ...	...	840	...	...	...	...	...	...	...	...	...	...	840
45–46 ...	...	897	...	...	...	...	...	...	...	...	1,395	...	2,292
46–47 ...	...	719	...	...	...	...	...	...	...	...	...	...	719
Average 1942–43 to 1946–47	...	2,992	...	...	...	...	...	...	...	...	695	10	3,699
1947–48 ...	...	...	...	...	...	...	...	...	...	...	...	...	...

Exports of castor seed by rail to other provinces (tons)

Year.	To Calcutta.	Bombay.	Mysore.	Hydera-bad.	Others.	Total.
1936–37 ...	241	33	209	2	34	519
37–38 ...	572	31	40	1	1	645
38–39 ...	116	...	33	...	1	150
39–40 ...	201	488	86	...	3	778
40–41 ...	972	162	40	...	...	1194
Average ...	420	147	82	...	8	657
1941–42 ...	...	...	...	...	...	413
42–43 ...	...	8	476	5515	...	5999
43–44 ...	...	...	51	3708	...	3759
44–45 ...	...	..	...	1892	...	1892
45–46 ...	...	...	...	3953	3	3956
46–47 ...	...	...	...	3290	...	3290
Average ...	...	2	105	3672	1	3780
1947–48 ...	...	1250	131	1208	...	2589

During the warperiod, exports were destined to Hyderabad, mainly, the average being 3780 tons annually. From 1947–48, onwards exports revived to Bombay and Mysore.

(*ii*) *Exports by sea.* Exports to other provinces by sea were negligible but comparatively large quantities used to be exported to foreign countries as below :—

Foreign exports of castor seed by sea from Madras (tons)

(*vide* statement opposite page)

The trend of exports was as below in pre-war years :—

Exports of castor seed from Madras Ports (Pre-war)

1924–25 ...	15,284
25–26 ...	20,859
26–27 ...	35,562
27–28 ...	18,539
28–29 ...	40,992
29–30 ...	33,115
30–31 ...	41,279

31–32 ...	33,407
32–33 ...	33,107
33–34 ...	46,720
34–35 ...	34,666
35–36 ...	18,385
36–37 ...	23,525
37–38 ...	16,982

Just as with India, there was a decline in the past decade in exports, which ranged from 35,000 to 46,000 tons between 1931 to 1935 fell to 16,980 tons by 1937–38 and reached the lowest figure of 5354 tons in 1939–40 prior to the recent war. Exports increased to 35,394 tons during 1940–41 due to large demand from United Kingdom and United States of America. During 1941–42, there was control over exports to countries other than United Kingdom. The quantity declined to only 719 tons during 1946–47 and was nil during 1947–48.

Ports of shipment :—Exports of castor seed were made generally from Madras port or occasionally from Coconada or Vizagapatam and very rarely from other ports.

Export of castor seed through different Ports (tons)

Name of Port.	Average 1937–38 to 1941–42	1942–43	1943–44	1944–45	1945–46	1946–47	1947–48
Fort St. George, Madras ...	2066	3497	3938	830	1593	...	...
Coconada ...	12041	2052	...	...	...	...	...
Vizagapatam ...	23	2344	1519	...	699	68	...
Masulipatam ...	314	...	...	...	...	651	...
Cuddalore ...	644	499	...	...	...	...	...
Calicut ...	...	997	...	...	...	...	...
Cochin ...	...	343	...	...	...	...	...
Others ...	101	51	..	...	...	...	...
	15,189	9783	4857	830	2292	719	...

In addition exports were made from the Marmugoa port as follows:—

Year.	Tons.
1944	2873
1945	4675
1946	6691
1947	3664
1948	nil
Average	3581

Periodicity. The average monthly exports during the five years ending 1941-42 and 1946-47 were as below:—

Monthly exports of castor seed by sea (tons) to foreign countries.

	Average 1937-38 to 1941-42	Average 1942-43 to 1946-47
January	670	520
February	550	100
March	1110	80
April	3760	600
May	1530	160
June	810	300
July	2590	320
August	960	80
September	1470	270
October	190	590
November	600	270
December	960	470
	15,190	3,700

The exports were influenced by shipping difficulties and abnormal conditions during the war and no particular periodicity was noted in recent years.

H. Net available Supplies.

(*a*) *India.* The production of castor seed in India has been estimated at 215,000 tons for the period ending 1941-42. The average exports for that quinquennium amounted to 45,000 tons and imports

were negligible. The net available supplies of castor seed in India thus averaged 170,000 tons annually for the above period.

(*b*) *Madras.* The net available supplies in Madras were as below:

Net available supplies of castor seed in Madras.
(000 tons)

	1939-40 to 1941-42.	1942-43 to 1946-47.
Estimated production. ...	25.0	22.0
Imports by rail from other provinces ...	14.0	3.3
Arrivals by coastal steamers ...	...	...
Total supplies ...	39.0	25.3
Exports by rail to other provinces ...	0.8	3.8
Despatches by coastal steamers. ...	...	...
Exports abroad ...	18.0	7.3*
Total despatches ...	18.8	11.1
Net available supplies ...	20.2	14.2

(*Includes exports from Marmagoa port)

It is thus seen that consumption in Madras has declined in the quinquennium ending 1946-47 from 20,200 tons to 14,200 tons or 13.9%. The reasons for this decline have been discussed in a former section.

I. Utilisation.

(*a*) *India.* There are no records of castor seed crushed in India. The quantity used for crushing can therefore be estimated only approximately. As already indicated the seed rate varies from 8 to 20 lb. per acre in different provinces and the total used for seed in India was of the order of 8500 tons. The quantity used for clarifying gur (jaggery) in the United provinces was roughly about 1000 tons, while the quantity utilised in the villages directly as seed for

medicinal purposes was roughly 500 tons. The balance of 160,000 tons was estimated to be used for crushing in both villages and at important centres.

Supplies and utilisation of castor seed in India (tons)

Supplies.	Average 1939-40 to 1941-42.	Utilisation.	Average 1939-40 to 1941-42.
Estimated production ...	215,000	Used as seed for sowing.	8,500
		As blarifying agent for gur.	1,000
Exports ...	45,000	For medicinal use as seed.	500
		For crushing.	160,000
Net available supplies. ...	170,000.	Total.	170,000

(b) Madras. The utilisalion in Madras was roughly as follows:–

Supplies and utilisation of castor seed in Madras (tons)

	1939-40 to 1941-42.	1942-43 to 1946-47
Net supplies (as estimated before). ...	20,200	14,200
Used as seed for sowing ...	1,160	1,160
For other purposes ...	small	small
Estimated quantity utilised for crushing. ...	19,040	13,040

J. Inter-provincial Demand.

Based on data of inter-provincial trade by rail and coastal steamers and the estimated production, the average net available supplies of castor seed in some of the more important provinces and states for the yers 1939-40 to 1941-42 is given below :—

Supplies of castor seed in certain provinees and States.

(Average 1939-40 to 1941-42)

Thousand tons.

	Hydera-bad.	Bihar.	United Pro-vinces.	Madras.	Bombay.	Bengal.
Estimated production ...	67·0	35.0	27.0	25.0	43.0	1.0
Imports by rail from other provinces. ...	...	0.4	1.1	14.0	25.1	12.3
Imports by coastal steamers ...	...	...	...	...	1.0	0.1
Total supplies ...	67.0	35.4	28.1	39.0	69·1	13.4
Exports by rail to other areas ...	33.0	9.0	4.8	0.8	0.3	0 1
Exports by coastal steamers ...	...	...	...	...	0.4	...
Exports abroad ...	...	...	...	18.0	16.8	10.0
Total despatches ...	33.0	9.0	4 8	18.8	17.5	10.1
Net available supplies ...	34.0	26.4	23 3	20 2	51.6	3.3

The largest exporter was Hyderabad. The annual consumption in Bombay was highest (51600 tons) followed by Hyderabed (34,000) Bihar (26,400), United Provinces (23,300) and Madras 20,200 tons.

CHAPTER II

Preparation for market and extraction of oil.

A. Preparation for market.

(*a*) *India.* As all the fruit clusters on the castor plant do not mature at the same time, the harvesting operations may take from 5 to 10 weeks. Usually a cluster or fruit head is considered ready for harvest when one or two of the capsules show signs of drying. In dehiscent varieties harvesting has to be hurried to avoid loss of seed by shedding. The number of pickings may range from three to six, the interval between pickings being one to two weeks depending on variety and conditions.

In harvesting, the usual method is to cut or break off the fruit heads. In Kathiawar and West Khandesh, where harvesting is done late i.e. when most capsules are dry, the capsules are stripped off during harvest. In the former method, a large number of immature capsules are got, giving kernels of poor weight and low oil content. Experiments at the Cawnpore Farm showed that immature kernels give from 1 to 10% less oil, average being about 5%. Even in selected strains at Coimbatore, the difference was 5% oil in favour of matured grains. If, however, harvesting is delayed, there is considerable loss due to shedding. More frequent pickings to harvest capsules as they get dry will increase the cost. A solution to the problem is indicated in the evolution of non-dehiscent types and work on such lines is being carried out in Madras and Hyderabad.

(*b*) *Madras.* In Madras, both methods of harvesting are adopted (1) namely cutting or breaking the capsules, or (2) stripping the earhead as a whole when most capsules are dry. In dehiscent varieties, the harvest is done a bit earlier to avoid shedding, but a greater proportion of green or immature capsules is collected. Ryots generally prefer the practice of removing the earheads as a whole, when a few capsules are fairly mature, as this reduces the cost.

2. Threshing and winnowing.

In most parts of Madras, the harvested fruit heads or capsules are heaped in a corner of the farm house covered with straw and weighted to exclude air. They are thus left for 4 to 7 days. A certain amount of fermentation, as well as ripening of green pods take place in the interval and this is said to help threshing. The heaps are then spread out and dried in the sun.

The practice in Northern India is however different. Here the common practice is to bury the capsules in pits. This is supposed to ripen unmature capsules, as well as soften them for easier dehusking. Afterwards, the capsules are dried in the sun for 2 or 3 days and threshed. In some cases, capsules are threshed directly after drying without storing or heaping.

In Madras threshing is done by beating with sticks. Sometimes, particularly in non-dehiscent varieties, the unopened capsules are rubbed between planks to separate the beans. The beans are next winnowed to remove the outer covering and foreign matter, cleaned, packed in gunny bags and stored in the farm till marketing.

In Northern India threshing is done by beating the dried capsules or by treading them under bullocks' feet. The latter method is adopted for large quantities. Winnowing is done with the help of wind.

B. Extraction of oil.

(*a*) *India.*

(*1*) *Methods and machinery employed for crushing.*

The following methods are used for crushing castor seed in India :—

(1) Power driven mills, which may be expellers, hydraulic presses or rotaries or rotary ghannis,

(2) Bullock driven chekkus (ghannis)

(3) Manually operated screw presses,

and (4) By the boiling process.

The seeds are largely crushed with the husk on and to a small extent after removing the husk by decortication. The latter process gives a light coloured oil. Medicinal oil is prepared by pressing the seeds cold often after decortication.

A brief description of the different processes is given below :—

(1) *Expellers* :—The crushing of castor seed is practised only by a few expellers in India. In the process, the crushing of the seeds takes place within a steel cage by means of a series of hardened steel worms so arranged on a revolving shaft as to produce gradually increasing pressure on the seeds, which are fed into the cage in the form of a meal. In Madras, the crushed seed pass through a steam

jacketed trough before entering the cage. The oil flows through hot perforations of the cage and the cake is forced out through the end opposite to the feed. The quantity crushed by an expeller is usually 3 to 4 tons per day of 10 hours and may roughly amount to 1000 tons per annum. The cost of crushing a maund of oil by expellers ranged from Rs. 1/14 to Rs. 2/8 during 1942-43, and Rs. 2/8 to Rs. 3/- during 1943-44.

(*b*) *Hydraulic Presses*:—A number of hydraulic presses are employed for crushing castor seed in India. The presses are of two types, namely the closed or cage type and the open or Anglo-American type. The seeds which are rolled into meal, heated and moistened with steam, are placed between the plates of presses and subjected to pressure from hydraulic pumps. A battery of ordinary sized hydraulic presses with 16 plates can handle about 10 to 12 tons per day of 10 hours. The costs of crushing ranged from Rs. 2 to 2/4 per maund of oil during 1942-43 and Rs. 2/8 to Rs. 3/8 during 1943-44.

(*c*) *Rotary mills*:—These are employed only in Gujarat in Bombay and Baroda. They usually work in pairs and the capacity of a pair of rotary mills was usually half a ton of seeds per day of 10 hours.

(*d*) *Chekkus*. The "chekkus" of southern India is called *Kolhu* or *ghanni* in the north. This indigenous device consists essentially of a pestle rotating in a mortar, and is largely used for groundnut. Crushing of castor seed is however limited and the recovery of oil by the chekku is much lower than with power-driven mills or presses. In Madras the seed is not decorticated but immersed sometimes in boiling water before feeding. The oil flows out through a spout at bottom or is removed through soaking in cloth and pressing. The quantity of castor seed crushed by a chekku per day ranged from 85 to 125 lbs. depending on the size.

(*e*) *Screw Presses*:—A screw press also called a hand press, consists of a number of plates worked by a screw. The seeds after being made into a meal are packed in gunny or cloth pieces and inserted between the plates of the press. They are subjected to heat from an open fire from one or both sides of the press. Pressure is applied by one or two men working a wheel attached to the end of the screw with levers, so that the plates get closer and closer to one another. The oil squeezed out is collected in a trough placed below. About half a ton may be crushed by a screw press in a day of 10 hours. The relative cost of crushing during 1942-43 in different centres in India was as below:—

Average cost of crushing one maund of oil by screw presses 1942-43 (Rs./as.)

Items.	Centres. Chapra	Cawnpore	Guntur	Warangal	Calcutta
Labour ...	0/14	1/0	0/13	0/13	0/10
Canvas ...	0/8	0/7	0/14	0/8	0/8
Fuel ...	0/14	0/12	0/8	0/7	1/4
Miscellaneous charges ...	0/4	0/5	0/6	0/4	0/6
Total ...	2/8	2/8	2/9	2/0	2/12

The cost was only 0/14/0 to Rs. 1/-in pre-war years (1939.)

In Madras, the castor seeds are passed twice or thrice in a two roller mill or winnowed after passing once through the roller mill as in Guntur, Madura and Coimbatore districts. The crushed seeds are packed in small rectangular packets in gunny pieces and inserted between the plates of the press. The material is heated by open fire on either side of the packed plates. The extraction of the oil takes place as a result of pressure brought about by 4 or 5 men working a wheel attached to the end of the screw with lever, so that the plates get closer and closer together. The maximum pressure is applied and the time taken for a change is 1½ to 2 hours.

The relative costs of crushing one maund of oil during 1943 and 1948 were as follows:—

Relative cost of crushing one maund of castor oil during 1943 and 1948. (Rs. As.)

	Guntur District.		North Arcot District.	
	1943	1948	1943	1948
Crushing into meal and winnowing ...	0/5	0/10	0/8	0/10
Packing in gunny ...	0/10	1/8	0/9	1/14
Fuel. ...	0/8	2/0	0/10	1/2
Cost of gunnies ...	0/14	1/9	0/6	0/12
Other charges ...	0/4	0/12	0/4	0/12
	2/9	6/7	2/0	5/2

(f) *Boiling process* :—This is a very old method still prevalent in villages and is the common method adopted by producers. In Madras, the castor seed is first roasted and crushed into a meal. The crushed meal is mixed with water in big mud pots and boiled. During boiling, the castor oil floats to the top and is collected. It is finally boiled to remove traces of moisture. Much the same method is practiced in Northern India by producers. The oil obtained by the boiling process is specially valued for medicinal purposes in rural areas of Madras as well as India.

Method of extracting castor oil in other countries.

In the United States of America, it is customary to pass the clean, untreated seed in cage hydraulic presses. The press cake is ground and the residual oil obtained by solvent extraction and graded as No. 3. The oil first got by expression is called No. 1.

(2) *Yield of Oil and Cake.*

The average oil content of different types of castor seeds produced in India ranged from 46 to 48% of the weight of the whole unhusked seeds. The percentage of oil however varies with the type of machinery or method employed as follows :—

Yield of oil percentage.

	Average percentage
Boiling method.	30 to 32
Chekkus.	30 to 38
Rotary *mills.*	39
Hand presses.	39
Expellers.	40 to 41
Hydraulic presses.	40 to 41
Double pressing.	42

The lowest yield of oil was got by the boiling method and next with chekkus. The highest yield was got from expellers and hydraulic pre s (40 to 41%).

The yield of cake depends on the recovery of oil and may range from 58 to 70%, the milling loss being 1 to 3%. The cake got by the

boiling process is not quite dry or well formed and is therefore not put on the market. When crushed after the seeds are decorticated, the cake may range from 35 to 55% averagin about 40% of the dehusked seed.

(3) Quality of oil and methods of processing.

(a) *India.* (i) *Refined oil.*

The castor oil obtained by crushing the seeds, known as raw oil in the trade, contains some mucilaginous matter in suspension. The presence of such matter together with moisture, promotes the development of free fatty acids and thus adversely affects the keeping quality. Most of the larger mills therefore generally filter and heat and often further refine the oil before putting the same on the market. Filtering removes the sediment, while heating removes excess moisture and destroys the enzyme lipase, which is present in castor seed and is capable of splitting the oil into its constituents viz., fatty acids and glycerol. Refining may be done with the object of reducing the percentage of free fatty acids, bleaching the colour or removing the odour.

Many of the establishments working with hand presses also give some refining to their oil by heating it in open pans with water to which common salt or washing soda is added and then filtering the oil through gunnies or a piece of cloth. Such oil is nearly as good as filtered oil from the power mills. The heated oil is also sometimes kept for a week or so in shallow settling tanks exposed to the sun. The sun's rays have a bleaching effect on the oil and the colour becomes considerably lighter.

Chekku oil is however not further processed, and has consequently poor keeping qualities. This defect can be remedied, if co-operative sale societies of chekku owners are formed with a view to filter and refine the oil and thus improve its quality.

(ii) *Cold drawn oil.*

Castor oil used for medicinal purposes should be cold-drawn i.e. no heat should be applied during crushing before extraction of oil. The poisonous element recin, present in castor kernels, does not pass into the cold drawn oil. Large quantities of cold drawn oil are now prepared by many mills in India and some of the hand presses.

In rural areas the oil prepared by the boiling process is considered the best for medicinal uses. The quality of such oil has improved considerably and some well known firms abroad used Indian Medicinal castor oil for packing under their well known proprietory marks for castor oil.

(b) Madras: (i) hot and cold drawn oils.

In Madras there are no marked differences in the oil obtained from different sources, but a distinction is made between the castor oil of the trade and the medicinal oil got from small seeds (*seethamanakku*). The trade and the public distinguishes between two kinds of castor oil, namely:—

(i) Cold drawn oil and (ii) hot drawn oil.

The cold drawn oil is prepared without application of heat in *chekkus* or hydraulic presses, and is free from the poisonous, principle 'ricin' and used to sell at a premium of one anna per pound (1943-44). The oil from hand presses is hot drawn as heat is applied. The hot drawn oil from the Salem district is darker in colour than that got from Guntur or Madura which is yellow, because less heat is applied. The latter fetches a premium up to 0/8/0 per maund. The hot drawn oil is mostly used for lighting or lubrication.

(ii) Boiled oil. Boiled castor oil is prepared as follows. About 4 to 6% of water is added to the oil in a trough and boiled for about four hours until all the water evaporates. Experience is necessary to decide the right stage, as overboiling gives a darker colour and underboiling promotes rancidity. In the Government Medical Stores 100 lb. of water are added to 500 lb. of oil and the liquid boiled in steam jacketed enamelled iron pans for about four hours.

(c) Other countries:

In America and Western countries, the expressed oil is heated under diminished pressure until moisture is removed. When desirable the warm oil is agitated for a short time with 2 to 4% Fuller's earth along with 0·2 to 1% activated carbon and filtered. It is customary to deodarise the medicinal oil with superheated steam in a vaccum deodoriser.

Hydrogenated castor oil is prepared in the usual manner as other oils.

4. Properties and composition of Castor oil.

According to Jamieson (Fats and Oils) the following are the properties and composition of castor oil. Castor oil is distinguished from most other oils by its high specific gravity, acetyl value and viscosity, solubility in alcohol and slight solubility in large quantities of petroleum, ether, gasolene, kerosene etc. It dissolves in its own volume of petroleum ether, and dissolves at ordinary temperatures in glacial acetic acid, while all other oils except croton dissolve only in the heated acid. Its acetyl value is higher than that of any other known fatty oil. The oil does not dry on exposure to air, but the specific gravity increases while iodine and acid value undergo no change. The oil is dextro-rotatory.

Grade designations and definition of quality of castor oil produced in India.

Grade designation.	Description.	Physical and chemical characteristics.	
		Clarity.	Colour.
Medicinal.	The oil shall be genuine cold drawn refined product of castor seed. It shall be free from admixture with other oils or fats and also from sediment and suspended matter.	The oil shall be of such a degree of clarity as to enable Bourgeois print to be read through a 4" column of the oil taken in a 100 c. c. Nessler glass.	Not deeper than 1.0 Y. in 1 cm. cell on Lovibond Tintometer scale.
Firsts Special.	The oil shall be genuine refined product of castor seed. It shall be free from admixture with other oils or fats and also from sediment and suspended matter.	The oil shall be of such a degree of clarity as to enable Bourgeois print to be read through a 4" column of the oil taken in a 100 c. c. Nessler glass.	Not deeper than a combination of 1.5 Y and 0.2 R in 1 cm. cell on Lovibond Tintometer scale.
Firsts.	The oil shall be the genuine refined product of castor seed. It shall be free from admixture with other oils or fats and also from sediment and suspended matter.	The oil shall be of such a degree of clarity as to enable Bourgeois print to be read through a 4" column of the oil taken in a 100 c. c. Nessler glass.	Not deeper than a combination of 4.0 Y and 0.4 R in 1 cm. cell on Lovibond Tintometer scale.
Seconds.	The oil shall be the genuine product of castor seed. It shall be free from admixture with other oils or fats and also from sediment and suspended matter.	It shall be of such a degree of clarity as to enable Bourgeois print to be read through $1\frac{1}{2}$" column of the oil taken in a 100 c. c Nessler glass.	Not deeper than a combination of 8.0 Y and 0.8 R in 1 cm cell on Lovibond Tintometer scale.

Specific gravity at 30°/30°C.	Refractive Index at 40°C.	Saponification value.	Iodine value	Acid value.	Acetyl value.	Unsaponification matter.	Critical solution temperature in alcohol.
0.952 to 0.958	1.47 to 1.474	177 to 184	82 to 90	Not higher than 4.0	Not less than 140	Below 0.8 per cent.	Below 0°c
0.952 to 0.958	1.47° to 1.474	177 to 184	82 to 90	Not higher than 2.0	Not less than 140	Below 0.8 per cent.	Below 0°C
0.952 to 0.958	1.470 to 1.474	177 to 184	82 to 90	Not higher than 4.0	Not less than 140	Below 1.0 per cent.	Below 0 C
0.958 to 0.958	1.470 to 1.474	177 to 184	82 to 90	Not higher than 6.0	Not less than 140	Below 1.0 per cent.	

The characteristics were as follows :—

Specific gravity at 15°	...	... 0.958 to -968
Iodine number.	...	... 82 to 90
Saponification value.	...	... 177 to 187
Acetyl value.	...	... 148 to 150
R. M. Value.	...	... 0.2 to 0.3
Unsaponifiable percentage.	...	... 0.3 to 0.7
Refraction index at 15°C	...	... 1.479 to 1.481
25°C	...	... 1.477
40°C	...	... 1.466 to 1.473

The oil contains ricinoleic acid 80 to 86%, oleic acid 7 to 9%, linoleic acid 3 to 3½%, and stearic and dyhydroxy stearic acids 2 to 3%. The glycerides are ricinolein, diricinoleo stearin and dioleo-ricinolein.

5. Grading and Grade standards for Castor oil.

(a) *India.* It has been reported particularly by the Indian Trade Commissioners in several countries that it might not be possible to develop the markets for castor oil abroad, unless the oil was sold on the basis of some standards. The question was engaging the Agricultural Marketing Advisor to the Govt. of India from time to time and draft specifications were drawn up and discussed at a conference of castor oil interests held in July 1948 at Bombay. Finally the following grade specifications were accepted and notified by the Government of India in 1948 under the Agricultural Produce Grading and Marking Act.

The following grades were specified namely, medicinal, First special, First and Seconds. A description of the standard grades is given in statement below :—

Grade designations and definition of quality of castor oil produced in India.

(*Vide*–statement in pages 38 and 39).

The medicinal castor oil shall be cold drawn with an acid value not higher than 4.0. The First Special shall have an acid value not exceeding 2·0, the Firsts not exceeding 4-0, and the seconds not exceeding 6-0. Different specifications have also been laid for colour and clarity.

The fixation of such standards will help to promote the trade in castor oil under guaranteed qualities. It is also desirable that the export of castor oil under standard grades be made compulsory under the Sea Customs Act as in tobacco and sannhemp. Such a step will maintain the reputation for quality of Indian castor oil and widen the markets abroad.

6. Location of crushing establishments and quantity crushed.

(a) *India* :—The number of expellers, rotaries and presses in different provinces engaged in castor crushing is given below :—

Number of castor crushing establishments in India (1943)

Name of Province.	Power driven mills.	Screw presses. Total	Screw presses. No. working
Bihar	1	194	167
Bengal	5	36	36
Bombay	16	n.a.	...
Madras	4	130	130
United Provinces	5	200	(partly)
Central Provinces	1	...	...
Hyderabad	2	331	70 fully others partly.
Mysore	3	3	3

The important centres where power mills are situated were Howrah in Bengal (2), Ahmedabad in Bombay (7) and Cawnpore (4) in the United Provinces.

The centres where expellers and screw presses operate for castor seed in Madras are given below :—

Localities and number of castor crushing establishments in Madras.

	District.			Total.
1. Expellers.	Salem.	Krishnagiri.	1	2
	North Arcot.	Tiruppattur.	1	
2. Screw presses.	Coimbatore.	Coimbatore	1	2
		Pollachi.	1	
	Guntur.	Guntur.	9	53
		Gurzala.	1	
		Narasaraopet	22	
		Ongole.	10	
		Sattenapalle.	2	
		Vinukonda.	9	
	Kistna.	Bezwada.	2	130
	Kurnool.	Pothikonda.	4	
	Madura.	Madura.	7	
	Malabar.	Palghat.	2	

	District.			Total.
	North Arcot.	Vellore.	5	
	Salem.	Edapadi.	24 } 25	
		Krishnagiri.	1 }	
	South Arcot.	Tindivanam.	1	
	Vizagapatam.		6	
	North Arcot.		9	
	Others.		15	
3. Hydraulic Press.	Madras.	Madras City.	4	4

The quantities of castor seed and oil and cake obtained in different provinces was as follows :—

Estimated quantities of castor seed crushed and oil and cake obtained in different Provinces and States

Thousand tons (Average 1939-40 to 1941-42).

Provinces or State.	Quantity handled by			Total quantity of castor seed crushed.	Quantities of oil obtained.	Quantities of oil cake obtained.
	Power Mills.	Screw Presses.	Chekkus and boiling process.			
Bengal ...	2·0	1·0	...	3·0	1·2	1·8
Bihar ...	2·0	20·0	2·0	24·0	9·3	14·5
Bombay and Baroda	45·0	...	3·0	48 0	19·4	28·1
Madras ...	5·0	12·0	2·0	19·0	7·4	11·4
United Provinces ...	8·0	12·0	2·0	22·0	8·6	13·2
Hyderabad ...	2·0	29·0	1·0	32·0	12·5	19·2
Mysore ...	4·0	2·0	...	6·0	2·4	3·6
Others ...	2·0	2·0	2·0	6·0	2·2	3·7
Total ...	70·0	78·0	12·0	160·0	62·0	96·5

One important point to be noted in the above, is that castor seed has to move from one province to another before crushing. Thus Hyderabad crushed only 32,000 or only half the crop of 67,000 tons. Of this the power mills handled only 2000 tons, and the bulk of oil was got from screw presses where extraction is low. The quantity crushed in Bihar was only 24,000 tons out of a production of 35,000 tons. Here also there was loss of oil as only 2000 tons were crushed by power mills. In Bombay however the bulk of the crushings (48,000 tons) was done in power mills and about 5000 tons of seed were imported.

But oil and cake are imported from other areas. This also applied to Bengal. It would therefore appear that the industry needs to be rationalised. The crushing facilities in different areas should be developed and the quantities crushed worked out on the basis of supplies of seed, demand for oil and cake, export demand and railway freight. This will result in more efficient crushing and eliminate wasteful transport.

In Madras, the quantity of castor seed crushed has been decreasing in recent years as shown in Chapter I.

7. Economics of crushing castor seed with and without husk.

The bulk of the castor seed crushed in India is done without decorticating and removing the husk. This is partly because the decortication of kernels involves additional processing and machinery, thus increasing costs. Besides there are working difficulties in handling castor kernels with either expellers, open (Anglo-American) presses or even *chekkus*. The crushing of kernels can be done only with cage presses and screw presses. Although the oil from husked seeds is whiter in colour and fetches a better price, the price of cake got called white castor cake is not based on nitrogen content and is not sufficiently remunerative. The analysis of white and black castor cake was as follows:—

Chemical composition of white and black castor cake.

	Percentage.		
	Nitrogen.	K2·0	P2·05
White cake (from decorticated seeds)	6·6	1·2	2·6
Black cake (from undecorticated seeds)	4·5	0·7	1·9

Based on analysis, the price of white castor cake should be at least 50% higher than that of black castor. During December 1944, the actual price was only 8% higher *i.e.* Rs. 5/6 per maund as compared to Rs. 5, for black castor. A higher price for the cake will encourage the crushing of decorticated seeds.

CHAPTER III.

Supplies and utilisation of Castor Oil and Castor Cake.

(1) Production of castor oil.

a. World production :

According to the Commodity Year Book, United States of America, 1948, the world production of castor oil was as follows :—

Year.		World production of castor oil Tons.
Average 1935–39	...	180,000
1945	...	176,000
1946	...	167,000
1947	...	160,000

b. India.

The average quantities of castor oil produced in the different provinces and States of India for the three years 1939–40 to 1941–42 are estimated as below :—

Estimated annual production of castor oil in India.

Tons (1939–40 to 1941–42)

	Power mills.	from Screw presses	Chekkus & boiling processes.	Total.
Bengal ...	800	400	...	1,200
Bihar ...	800	7,800	700	9,300
Bombay & Baroda ...	18,400	...	1,000	19,400
Madras ...	2,000	4,700	700	7,400
United Provinces ...	3,300	4,700	600	8,600
Hyderabad ...	800	11,300	400	12,500
Mysore ...	1,600	800	...	2,400
Others ...	800	800	600	2,200
Total ...	28,500	30,500	4,000	63,000

Out of 63,000 tons of oil produced, power mills accounted for 28,500 tons, screw presses for 30,500 tons and the balance of 4,000 tons by chekkus and the boiling process. There are however indications that the quantity produced is decreasing. Thus in Madras, the production is estimated to have declined from 7,400 tons in 1940–42 to only 5,600 tons in recent years.

Imports.

a. India.

Imports into India were on a small scale only and comprised negligible quantities imported from the United Kingdom for medicinal purposes.

b. Madras.

Imports of castor oil are received by sea into Madras mostly from Bombay and to a small extent from Bengal. The quantities imported were as follows :—

Imports of Castor oil into Madras by sea from other Provinces

Year.	Tons.
1937–38	40
1938–39	32
1939–40	38
1940–41	39
1941–42	17
Average	33
1942–43	33
1943–44	14
1944–45	33
1945–46	22
1946–47	63
1947–48	76
Average	40

Imports by sea into Madras have been increasing in recent years, the maximum being 76 tons during 1947–48 as compared to an average of 33 tons in the previous five years. More quantities are imported by rail.

Including imports by rail, the quantity imported into Madras was estimated to be of the order of 2,000 tons between 1940 and 1942.

(3) Exports.

a. India.

The quantities of Castor oil exported from India for the years 1899 to 1948 are given in Appendix X. Exports were so high as 17,000 tons during 1891–92, but declined to 7,000 tons by 1905–06

and 3,900 tons by 1914-15 due to the inferior quality of oil made worse by adulteration. This led to more exports as seed. The war of 1914-18 again gave an impetus to exports of oil which increased to about 6,700 tons (1915 to 1919). The cessation of that war brought about a further decline to 2,100 tons by 1930-31. The Ottawa agreement of 1933 reduced the duty of Indian Castor oil in England by 15%, and this increased the exports to an average of 5,800 tons between 1935 and 1939. With the II world war, exports declined steadily and stood at 200 tons during 1943-44. The decline in exports in recent years is attributable to the increased consumption of castor oil in India. In the coming years, it would be preferable to export surplus castor in the form of oil, as the oil cake can be utilised for manure and the crushing industry will also be benefitted.

It may be mentioned that Calcutta was formerly one of the largest crushing centres and had about 300 screw presses thirty years ago, as compared to only 36 at present. Now the industry is most developed in Bombay, although large supplies are got from Madras and Hyderabad. Two important considerations are necessary to improve the industry. First, the crushing of seeds should be planned in suitable centres based on the supply and demand, thus reducing the cost of distribution and transport as seed. Secondly the quality of the oil should be standardised. The Government of India have recently notified grade standards for castor oil in India and these standards must be made compulsory in exports abroad, under the Sea Customs Act as in the case of tobacco and sannhemp. This will improve the reputation for quality of Indian Castor oil in world markets and thereby develop the trade.

Exports of castor oil from India to different destinations are given in Appendix XIII. The average quantities exported were as follows :—

Average foreign exports of castor oil from India (tons)

To	Period 1909-10 to 1913-14	1929-30 to 1933-34	1934-35 to 1938-39	1939-40 to 1943-44
United Kingdom ...	528	2430	8081	1150
Germany ...	...	474	530	52
Union of South Africa.	...	152	258	317
Egypt ...	...	...	176	136

To	Period 1909-10 to 1913-14	1929-30 to 1933-34	1934-35 to 1938-39	1939-40 to 1943-44
Mauritius and dependencies ...	402	85	105	42
Straits settlements ...	550	44	43	28
Australia ...	1,706	54	85	11
New Zealand ...	642	128	88	37
Canada ...	...	72	239	1,028
Ceylon ...	311	100	87	26
Others ...	644	260	564	662
	4,782	3,799	5,856	3,484
Share of				
Bengal ...	4,219	609	512	
Bombay ...	27	2,249	4,475	
Madras ...	517	940	869	

As compared to the period 1910-14, exports declined to Australia, New Zealand, and the Straits Settlements. From the year 1933-34 onwards, the United Kingdom was the largest market for Indian Castor oil. Although the quantities have declined, the chief markets were United Kingdom and Canada.

(*b*) *Madras*

The quantities of Castor oil exported from Madras to foreign countries ranged between 500 to 1,000 tons annually (*cf.* Appendix X). Recent exports were as below.

Foreign Exports of Castor oil.

Year.	Tons.
1941-42	591
1942-43	173
1943-44	45
1944-45	37
1945-46	72
1946-47	67
1947-48	2,639

There was a marked revival of exports during 1947-48 to the highest recorded level of 2,639 tons of which 2,150 tons were exported from the Coconada port. Exports of Castor oil by sea to other provinces were small and negligible.

The main destinations for exports from Madras were the United Kingdom, Burma and Ceylon. The average exports for the years 1937-38 to 1941-42 were 460 tons to United Kingdom, 126 tons to Burma and 116 tons to Ceylon out of a total of 763 tons exported.

(c) Share of different ports.

Between the years 1934-35 and 1938-39 the Bombay ports accounted for 75% of the foreign exports, Madras ports for 15% and Bengal ports for 9%. Prior to 1915 Bengal ports accounted for nearly 90% of the Indian foreign trade in Castor oil. Later Bombay became the chief exporter.

(4) Net available supplies and utilisation of Castor oil.

(a) India.

As an average of the three years 1939-40 to 1941-42, the production of castor oil in India was 63,000 tons and average exports 5,000 tons, thus leaving a balance of 58,000 tons for utilisation in the country. On the basis of enquiries made by the Provincial and Central Marketing staff during the survey, the quantities of Castor oil utilised for various purposes were estimated as below:—

Utilisation of Castor oil (Tons)

(Average 1939-40 to 1941-42)

Purpose.	Estimated Quantity Tons.	Percentage to total
Lubrication:—		
(i) Machines, bearings etc., singly or blended with mineral oils ...	24,000	41·3
(ii) Bullock carts, cane crushers etc.	9,000	15·5
Lighting	9,000	15·5
Preparation of Turkey Red Oil.	5,000	8·6
Soap manufacture ...	3,000	5·2
Hair oils	2,000	3·5
Leather and tanning industries.	2,000	3·5
Preparation of liquid disinfectants ...	1,000	1·7
Medicinal use ...	2,000	3·5
Miscellaneous uses ...	1,000	1·7
Total ...	58,000	100·0

The position regarding the various uses is indicated below:—

(a) Lubrication:

Castor oil is a non-drying oil and is more viscous than any other vegetable oil. It retains its viscosity at high temperatures and remains in liquid form at low temperatures. On account of these qualities it is regarded as an excellent lubricant and is used extensively for bearings of internal combustion machines (aeroplanes) and for blending with mineral oils.

Before the war of 1914-18, the Indian railways used to purchase large quantities of castor oil for use in their locomotives and workshops and some had their own mills for crushing castor seed. In the past two decades, mineral oils replaced castor oil but due to shortage of the former, the railways are again purchasing more castor oil in recent years.

Castor oil is also used for lubrication in the various industries in India as the textiles, flour milling, jute, sugar etc. The quantity used for lubricating country carts, cane crushers, persian wheels etc., is estimated at 9,000 tons annually, while the lubrication by railways and industries is estimated to account for 24,000 tons.

(b) Lighting:

On a small scale castor oil is used for lighting purposes in all producing areas. The Railways also use castor oil for signal lights and hand lamps, sometimes mixed with a small quantity of kerosene oil to reduce the viscosity (in one case one seventh). Of the estimated quantity of 9,000 tons used in India for lighting, about 6,000 tons were used in Madras and Hyderabad due to reduced supplies and increased prices of kerosene oil. In Bihar and United Provinces, other vegetable oils replaced castor oil for lighting due to lower prices.

(c) Turkey red oil:

The preparation of sulphonated castor oil called Turkey Red Oil, which finds use in the cotton dyeing, printing and leather

industries, is estimated to have utilised 5,000 tons of castor oil in India.

(*d*) *Soap manufactures* :

For manufacture of soaps, it is estimated that 3,000 tons of castor oil are utilised in India. As castor oil gives a certain transperency to soaps, it is used in the manufacture of transparent soaps. Soft soaps used in jute and textile industries are also made with castor oil. Jute fibres get a shining silky appearance, when washed with castor oil soaps.

(*e*) *Hair oils.*

Certain agencies manufacture refined scented castor oil, as the Tata's Swastic and Calcutta Pharmaceuticals. Even raw oil is used in rural areas of Madras for promoting growth of hair. The annual consumption in India is of the order of 1,000 tons.

(*f*) *Leather and Tanning industries.*

Castor oil has a softening effect on leather and also serves as a preservative. Tanneries in the United Provinces, Bengal, Madras and Hyderabad utilise castor oil for preserving leather belting, water buckets, shoes etc. Castor oil is also used for fat liquoring in the leather industries. The total quantity utilised for all the above purposes is estimated at 2,000 tons annually.

(*g*) *Preparation of liquid disinfectants.*

Castor oil finds a use in the preparation of "phenyles" and disinfectants in India to the tune of nearly 1,000 tons annually, about half of which is utilised in Calcutta alon

(*h*) *Medicinal use.*

As purgative both in hospitals and [illegible] there is widespread use of castor oil to the tune of about 2,000 tons annually. Rural areas utilise the oil prepared by the boiling process.

The castor oil purchased for use in the hospitals in India is required to satisfy the British Pharmacopœia standards below:-

British Pharmacopoeia standards for castor oil adopted by Hospitals in India.

Specific gravity at 15·5°C	...	... 0·958 to 0·969
Saponification value	...	... 177 to 187
Refraction Index at 40°C	...	... 1·4695 to 1·4730
Acid value	...	... Not more than 4
Iodine value	...	... 82 to 90
Optical rotation	...	... not less than 3·5

The oil for medicinal purposes should remain bright when cooled at 0°C and kept at that temperature for three hours.

Miscellaneous uses.

In Gujarat, castor oil is used as a preservative for food grains and pulses. Due to dearth of tung oil the use of castor oil in the paint and varnish industry has been recently introduced. But the quantity utilised is small for this purpose, as well as for the preparation of gums and adhesives.

B. Inter-provincial demand.

Inter-provincial movements of castor oil are not recorded in official publications. Enquiries made by the marketing staff indicate that the trade by road or coastal steamers is very small but imports and exports occur by rail. The following is the estimated production and consumption of Castor oil in important provinces and States for the years 1939-40 to 1941-42.

Estimated net supplies of Castor oil in different Provinces and States (Average 1939-40 to 1941-42)

Tons.

Province or State.	Estimated Production	Estimated arrivals fromother parts of India.	Estimated despatches to other parts of India.	Exports Abroad Average (1939-40 & 1940-41)	Net available Supplies
Bengal ...	1,200	7,000	600	600	7,000
Bihar ...	9,300	200	6,500	...	3,000
Bombay including Bombay States and Baroda. ...	19,400	2,000	2,600	3,800	15,000
Madras ...	7,400	2,600	200	800	9,000
United Provinces ...	3,600	1,000	3,000	...	6,000
Hyderabad ...	12,500	...	3,500	...	9,000
Mysore ...	2,400	600	1,000	...	2,000
Other areas. ...	2,200	5,000	500	...	7,000
Total ...	63,000	18,700	18,500	5,200	58,000

The main surplus areas for castor oil were Bihar, United Provinces and Hyderabad. The main directions of supply were from Bihar to Calcutta, from Hyderabad to Bombay and Madras and from the United Provinces to Punjab, North-West Frontier Province and Bombay. Supplies from Bombay were sent to Sind, Rajputana and Central India.

In order of consumption the most important areas were Bombay, next Madras and Hyderabad followed by Bengal and the United Provinces. While in Madras and Hyderabad where large quantities were utilised in rural areas for lighting and lubrication, castor oil in other centres was largely used by industrial concerns and railways for lubrication and industrial purposes.

(c) Utilisation in Madras.

It has been estimated that consumption in Madras was of the order of 9,000 tons in the years 1939 to 1942. In recent years due to decreased production, the consumption has gone down to about 7,000 tons. One of the largest uses for castor oil in Madras was for medicinal purposes. About 200 tons of oil are estimated to be consumed by hospitals and about 1,000 tons in rural areas by the boiling process. The railways formerly used castor oil mainly for lubricating motion parts, but from the year 1942, it was also used as a locomotive oil. One railway, which took only about 80 tons annually between 1939 and 1942, is now taking over 500 tons. The present railway consumption is of the order of 700 tons annually. The oil should confirm to the following specifications.

Specification for Castor oil used by the railways.

Specific gravity at 30°C	...	0·954 to 0·958
Saponification value	...	178 to 184
Iodine value	...	82 to 90
Acid value	...	Not more than 6.

(The oil shall be of such a degree of clarity to enable Boygeois print to be read through a 1½" column of the oil taken in a 100 c.c. Nessler glass). Hot drawn boiled oil is used for the purpose.

The use of castor oil for illumination purposes is decided by the availability of the cheaper kerosene oil. In the war-years, due to limited supplies of kerosene, the consumption increased. Usually oil from hand presses is used. The consumption is now of the order of 1,500 to 2,000 tons annually.

Besides the use by railways, castor oil is also used for lubrication of machinery in the industries as expellers, pumping sets, flour mills etc., to the tune of about 1,000 tons annually, while the use for country carts, sugarcane crushers and boats was of the order of 500 tons annually. It is possible to give only rough estimates of the uses for other purposes, but broadly the present uses for different purposes are indicated below.

Utilisation of Castor oil in India.

	Tons.
Lubrication of (a) Machinery	1,000
(b) Country carts, crushers etc ...	500
Utilisation by railways	700
Illumination	1,700
Medicinal	1,200
For Toilet, Soap etc.	1,000
Tanning	500
Other uses	400
	7,000

(d) Utilisation of Castor oil in other countries.

The oil got by ordinary expression called No. 1 oil is used for medicinal and technical purposes. The oil got by solvent process (*No. 3 oil*) is used only for technical purposes in the crude state or refined. Jamieson gives the following uses for castor oil :-

(Vegetable Fats and Oils)

A large quantity of Castor oil is converted into sulphonated castor oil called Turkey Red oil, used for dyeing cotton fabrics with alizarine and in the finishing of cotton, linen, silk and leather. Among other articles in the manufacture of which castor oil is used may be mentioned some kinds of transparent soap, textile soap, imitation leathers, sticky fly paper typewriter inks and lubricants. It is said that the use of castor oil in soaps increases the lathering power as well as the solubility of the soap in cold water. In Western countries, castor oil was used for lubricating air craft motors of the rotary air cooled type but now mineral oils are used as castor oil attacks metal parts and there are also difficulties due to viscosity and heat. In tropical countries, castor oil is used for lubrication of heavy machinery including locomotives.

Considerable quantities of castor oil are used in the manufacture of nitro-cellulose backing furnishes. It is also used in the prepara-

tion of perfume aromatics and in the manufacture of sebacic acid used in the synthesis of nylon fibre. Dehydrated oil is used in the paint, enamel and varnish industries as a drying oil, and several commercial synthetic products are prepared by treating the dehydrated oil further with chemicals. Blown castor oil is used for grinding lacquer paste colours and for plasticising purposes. Hydrogenated oil is sulphonated for use in the preparation of ointments.

B. CASTOR CAKE

(1) Production

Between the years 1939–40 and 1941–42, the average production of castor oil cake in India was estimated at 95,500 tons of which the share of Bombay and Baroda was 28,100 tons, Hyderabad 19,200 tons, Bihar 14,500 tons, United Provinces 13,200 tons and Madras 11,400 tons.

(2) Imports and exports

(a) *India* :—There have been no import of castor cake into India. The quantities exported to foreign countries (*c.f.* Appendix X) averaged 6,000 tons prior to the War of 1914–18 and rose to 11,500 tons during 1915–16 and 10,000 tons in 1917–18. After that war, exports declined to 1,000 tons during 1922–23 and kept at less than 2,000 tons annually in most years. After the outbreak of the II world war, exports became negligible due to control over exports.

(*b*) *Madras* :—The foreign exports of castor cake from Madras were as follows :—

Foreign exports of Castor cake (tons)

1937–38	995	Mainly to Ceylon.
38–39	511	
39–40	627	
40–41	10	
41–42	50	
1942–43 onwards	No exports.	

Imports used to be got from Hyderabad and also from Mysore to the tune of about 9,000 tons between 1940 and 1942.

(3) Net available supplies and utilisation of Castor cake.

Based on production and exports, the supplies of castor cake consumed in India averaged 95,000 tons between 1940 and 1942.

The entire quantity is used as manure, as it cannot be fed to cattle due to the presence of the poisonous substance 'ricin.' Besides its high nitrogen content, the cake is supposed to act as a soil disinfectant. It is said that some mills used castor cake as fuel, due to short supplies of coal, but this practice is objectionable as the manurial value is lost.

In Madras, the usual dose was 500 lb. per acre of paddy and 1,300 lb. per acre of sugarcane or turmeric. It is said that the practice of applying castor cake is not common in Mysore and the cake is sent to Nilgiris for potato manuring.

(4) Inter-Provincial demand.

Although exact statistics are not available of movements of castor cake, the following gives an estimate of the quantities utilised in different provinces and states.

Estimated net available supplies of castor cake in different Provinces and states (tons). (Average 1939-40 to 1941–42)

Provinces or State.	Estimated Production.	Estimated arrivals from other areas.	Estimated despatches to other areas.	Net available Supplies.
Bengal ...	1,800	12,000	2,800	11,000
Bihar ...	14,500	200	7,700	7,000
Bombay & States ...	28,100	4,300	2,400	30,000
Madras ...	11,400	9,000	400	20,000
United Provinces ...	13,200	800	4,000	10,000
Hyderabad ...	19,200	....	12,200	7,000
Mysore ...	3,600	...	2,600	1,000
Other areas ...	3,700	5,700	300	100
	95,500	32,000	32,400	95,100

In Bengal castor cake was used for manuring potatoes and tea gardens. In Bihar and United Provinces half the supplies was used for sugarcane and the rest for potatoes, onions and other vegetables. The crops for which castor cake was used in Bombay were potatoes and plantains and in Madras sugarcane, paddy turmeric and plantains.

CHAPTER IV – PRICES.

(1) Comparison of Indian and World prices.

The average prices at Indian castor seed from Bombay (c.i.f. Hull) in the United Kingdom are compared below with the prices at Bombay and Guntur, for the year 1936–37 to 1948–49.

Average price of Indian Castor seed in London, Bombay and Guntur.

(Converted into £/S per ton)

Year.	Bombay Seed United Kingdom (Hull)	Bombay.	Guntur.
1936–37	13/7	10/11	10/6
37–38	14/0	10/14	10/12
38–39	11/0	8/13	9/3
39–40	15/18	11/15	11/14
40–41	18/7	11/3	12/10
41–42	19/12	11/3	11/1
42–43	28/12	20/3	19/1
43–44	32/6	27/15	28/14
44–45	33/17	24/6	24/10
45–46	...	...	25/9
46–47	50/	36/6	37/3
47–48	...	48/9	46/15
48–49	57/7	45/6	44/14

It will be seen that there is a great similarity between the average prices at Bombay and Guntur, the differences often being less than one pound per ton. As compared to Bombay, London prices were higher by about £ 3 per ton in the prewar year 1937 to 1939, but as the war progressed, the differences increased to £ 8 per ton during 1942–43, and £ 9 during 1944–45, on account of increased freight insurance and other war risk charges. The freight per ton (of 12 cwt), was increased from 15 shillings to 40 shillings in prewar years to 68 shillings by 1940. During 1948–49, the differences between prices at Bombay and prices of the same seed at London was of the order of £ 10 per ton.

(2) Comparison of prices of Indian and Brazilian seeds.

Mention has already been made of the competition in world markets of the two major supplying countries namely India and

Brazil. Comparative prices of castor seed from the above countries in the United Kingdom available for the prewar years, and for the year 1948 are given below :—

Comparative prices of Bombay Castor seed and Brazilian Castor seed in the United Kingdom (£ S. per ton)

Year.	Brazilian seed.	Bombay seed.
1936–37	12/ 7	13/7
37–38	12/14	14/0
38–39	8/10	11/0
1948 June	46/ 0	61/0
July	41/ 0	60/0
August	40/ 0	58/0
September	39/ 0	58/0
October	35/ 0	58/0
November	35/ 0	58/0
December	35/ 0	58/0

Indian Castor seed invariably used to get a better price in the London Market than Brazilian seed. The higher price was partly due to the more uniform quality of the Indian seed, although the oil content is lower. Part of the differences is also attributable to differences in freights and incidental charges. The increased price of Bombay seed over Brazilian seed in London which was only 1 to 2 pounds per ton in prewar years, rose to 23 pounds per ton by the end of 1948.

(3) Trend of prices.

The monthly prices of Castor seed from 1937 to March 1949 in important markets are given in Appendix XIV for Vizianagaram, Guntur, Nandyal, Bellary and Tirupattur markets as compared to Bombay. The trend of prices is indicated by the average annual prices given below :—

Average annual prices of Castor seed (Rs. per Imperial Maund)

Year.	Vizia-nagaram	Guntur.	Nandyal.	Bellary.	Tirupat-tur.	Average	Bombay
1937 ...	5/ 8	5/ 2	5/ 1	4/ 6	n.a.	5/ 0	5/ 6
1938 ...	4/14	4/12	5/ 4	4/ 2	4/ 4	4/10	4/ 7
1939 ...	4/12	4/10	5/ 4	4/ 0	4/ 8	4/10	4/15
1940 ...	6/ 5	6/10	6/10	5/ 6	5/13	6/ 2	6/ 4
1941 ...	5/ 5	4/15	5/ 6	3/15	4/ 6	4/ 5	5/ 3
1942 ...	7/ 2	7/10	6/ 5	5/ 8	7/ 6	6/13	7/13
1943 ...	14/ 4	13/ 8	14/11	11/11	13/ 0	13/ 7	14/ 1
1944 ...	14/ 8	12/ 4	11/13	11/ 4	11/ 3	12/ 3	11/12
1945 ...	12/ 0	11/15	9/15	10/10	11/ 4	11/ 2	11/ 6
1946 ...	15/ 8	16/ 9	14/ 6	11/14	17/ 1	15/ 1	16/ 6
1947 ...	21/ 4	22/ 9	20/14	13/ 9	20/ 8	19/11	22/ 8
1948 ...	21/ 0	22/ 1	21/15	14/ 4	20/10	20/ 1	22/14

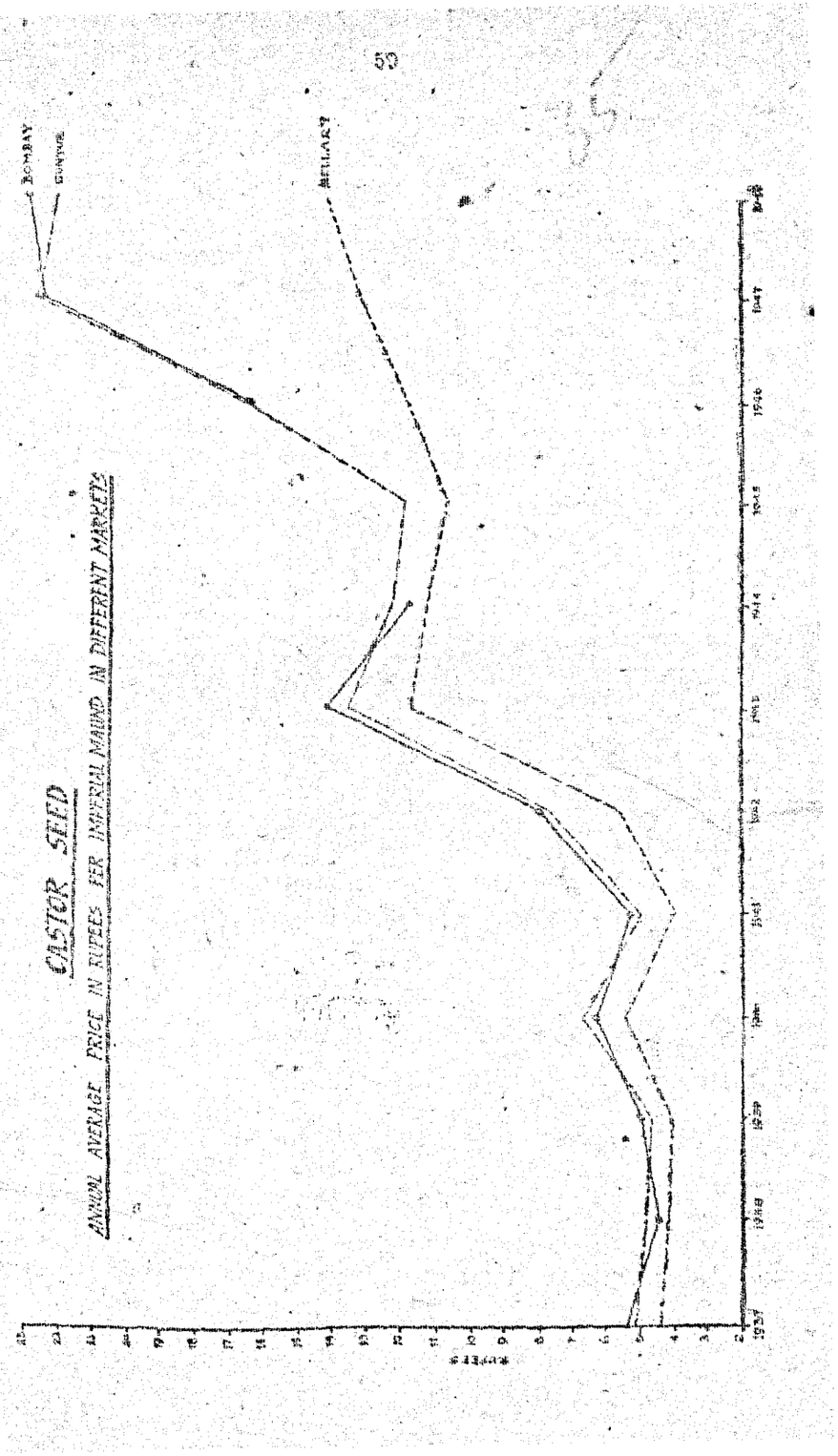
Mention has already been made of the close correspondence between prices at Bombay and Guntur. The course of prices in other markets was also similar, but prices in Bellary were distinctly lower. The general course of prices was as below :—

A fall from Rs. 5 to Rs. 4-10 from 1937 to 1938-39, a rise during 1940 to Rs. 6-2 and a fall in 1941 to Rs. 4-0. After this prices rose to Rs. 6-13 in 1942. There was a steep rise to Rs. 13-7 in 1943 and to Rs. 20 by 1948, with a slight fall during 1945. Marked increase in prices were noted from the year 1943 (Rs. 13-7) when the price rose to double that of 1942. A similar course of prices is seen in the Bombay Market also.

(4) Comparison with prices of other oil seeds

India.

A comparison of the annual prices of different oil seeds in Bombay from the year 1928-29 in given below :—



Comparative prices of Castor seed with other oil seeds in Bombay (Rs./ as per Cwt.)

Year.	Castor seed.	Groundnut Kernel.	Linseed Bold.	Rape seed Yellow.	Sesamum White.
1928-29	10/ 1 (100)	11/11 (116)	10/11 (106)	11/ 4 (112)	12/ 5 (122)
29-30	9/11	10/ 6 (107)	12/ 3 (126)	10/ 4 (106)	11/ 4 (118)
30-31	7/13	7/ 6 (84)	9/ 5 (119)	8/ 7 (108)	8/15 (114)
31-32	6/15	7/ 6 (106)	6/ 7 (93)	7/ 5 (105)	8/10 (124)
32-33	6/ 5	7/11 (122)	5/15 (94)	6/ 2 (97)	8/ 3 (130)
33-34	5/ 5	5/ 5 (100)	6/ 2 (115)	5/ 8 (104)	6/ 3 (116)
34-35	5/11	6/ 1 (103)	6/10 (116)	6/ 5 (111)	7/ 5 (141)
35-36	6/15	7/15 (114)	6/13 (99)	7/13 (112)	9/13 (141)
36-37	7/ 2	8/14 (125)	7/ 8 (105)	7/12 (109)	8/14 (125)
37-38	7/ 4	6/15 (97)	8/ 0 (110)	7/14 (109)	8/ 9 (118)
38-39	5/14	5/ 8 (94)	7/ 2 (121)	7/ 8 (128)	7/11 (131)
39-40	7/15	6/13 (86)	8/ 7 (106)	8/ 7 (106)	8/ 8 (107)
40-41	7/ 7	6/ 0 (81)	7/ 8 (101)	7/11 (103)	8/12 (118)
41-42	7/ 7	7/ 6 (99)	8/ 3 (110)	7/11 (103)	9/ 1 (132)
42-43	13/ 7	13/ 0 (97)	11/13 (88)	11/ 4 (84)	14/10 (109)
43-44	18/10	18/ 5 (96)	15/ 5 (82)	18/10 (100)	22/15 (123)
44-45	16/11	14/14 (89)	15/ 3 (91)	19/ 7 (117)	26/ 5 (158)
45-46	...	...	...	...	...
46-47	23/14	23/ 8 (99)	26/ 0 (109)	31/ 3 (131)	n.a. ...
47-48	32/ 3	30/ 4 (94)	28/ 9 (87)	33/11 (105)	39/ 8 (123)

Taking the price of castor seed as 100, the relative values of other oil seeds for each year are also given in brackets above. During 1928–29 castor seed was the cheapest of the five oil seeds and again from 1933–34 to 1936–37. From the year 1937–38 castor seed became dearer than groundnuts and this position has been more or less maintained up-to-date (1947–48). Linseed became cheaper than Castor seed during the years 1931–32 and 1932–33, and again after 1942–43. The increased prices of linseed during 1933–34 and 1934–35 were due to increased export demand, consequent on a 10% preference granted in favour of Indian Linseed in the Ottawa Agreement of 1933. The price of rape seed has been slightly higher than castor in all years except 1932–33 and 1942–43. The prices of sesamum seed have been uniformly higher than castor seed in all years, usually by 15 to 25%, the highest increase being in 1944–45 (58%). The variations in prices are due to a number of complex factors, some of which affect individual oil seeds.

5. *Prices in different markets.*

(a) The average prices of castor seed in different markets in India were as follows :—

Name of market.	Average prices of Castor seed (Rs. per maund).		
	1937–38 to 1939–40	1940–41 to 1942–43	1946–47 to 1948–49
Bombay	5/3	6/14	21/4
Calcutta	4/0	6/ 3	...
Cawnpore	4/3	6/ 2	...
Chupra (Bihar) ...	4/2	6/ 2	...
Warangal (Hyderabad) ...	4/6	5/13	...
Guntur	5/2	6/14	21/1

Prices at Bombay and Guntur were almost equal, and higher than at Calcutta. Prices were relatively low at Warangal and Cawnpore.

The annual average prices of castor seed in different markets have already been given under *trend of prices*. Prices are relatively low at Bellary and Tirupattur. Comparatively higher prices were recorded at Guntur, Nandyal and Vizianagaram.

6. *Seasonal variations in prices.*

A study of the monthly course of prices in several markets in India upto 1943 indicates that prices in United Provinces and Bihar

were usually high in April fell to June and more or less kept steady until next January. Prices declined again from January to March. In Bombay and Hyderabad, there was a fall in prices from January to March, the prices being slightly higher in other months. From 1943 onwards when prices of castor seed took an upward course, the seasonal variations in prices were not uniform. During the year 1944 prices generally declined from January to December, while during 1945, prices were more or less the same in all months. During the years 1944 and 1946, there was a pronounced rise of prices from January to December.

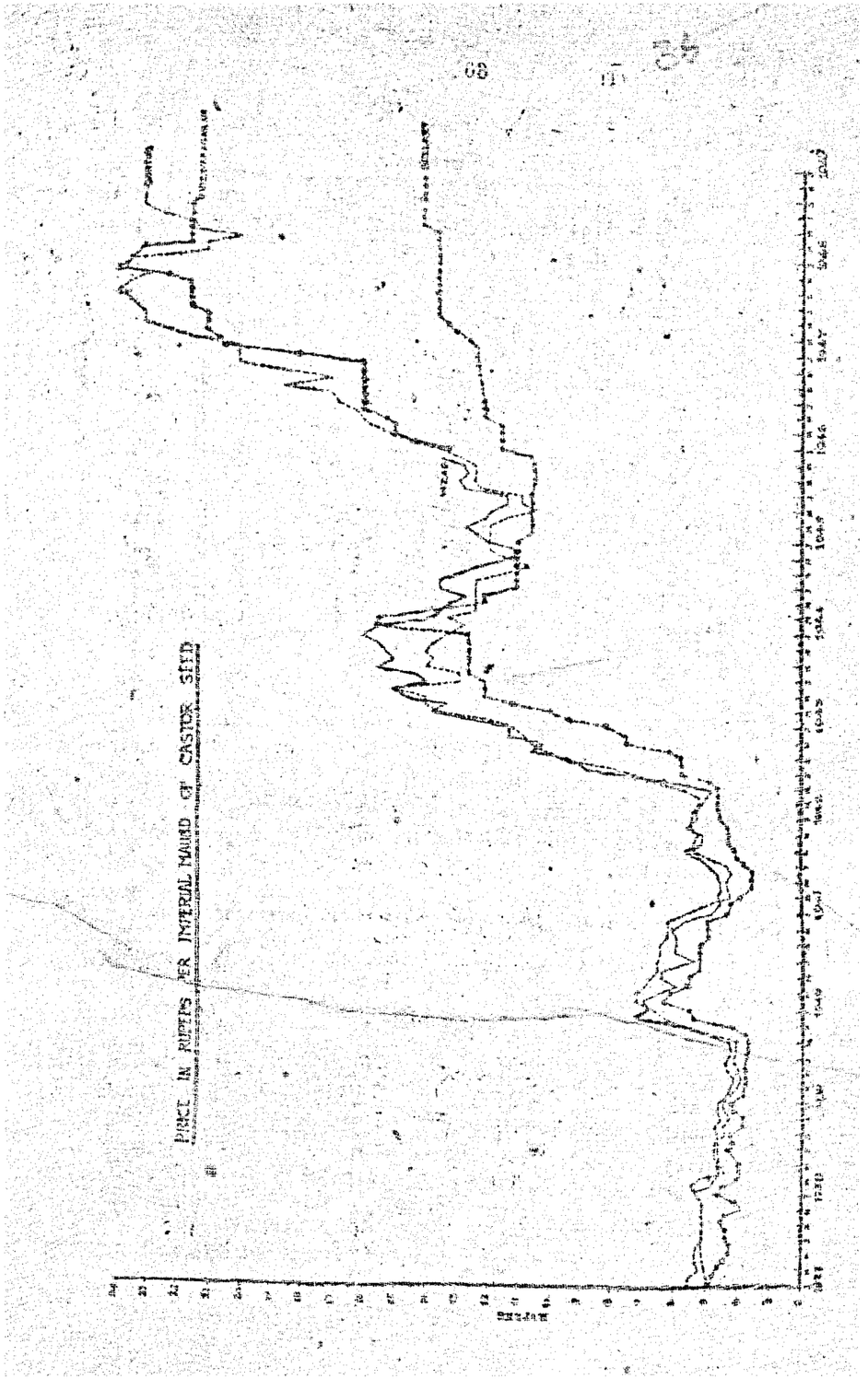
The monthly course of prices in different markets from the year 1937 to 1949 are given in Appendix XIV and also in the facing diagram.

7. *Price variations for different varieties and qualities.*

In the Calcutta market, the Coconada quality (Rs 15-12) used to fetch a higher price than the qualities from Bihar, and the lowest price was paid for Cawnpore (Rs. 14) during 1943-44. In Bombay, Hyderabad quality used to fetch a premium of about 8 annas per maund over Cawnpore qualities (1944). In Madras, Salem quality was generally considered best, due mainly to its high oil content and low percentage of free fatty acids.

8. *Futures.*

Although there is no trading in 'futures' with castor seed in Madras, a short note is given below in regard to "futures" trading in some centres of India as Bombay, Baroda State and Kathiawar. Prior to the Government of India ban on the trading in 'futures' in oil seeds imposed during 1943, Bombay futures were carried on under two options namely May and September, the former for 11 months and the latter for 6 months only. A close examination of the prices by the Marketing Department of the Government of India revealed that on the whole futures trading exercised a 'bearish' or downward influence in Bombay in prewar years both in May and September options, where prices were low, and a 'bullish' effect where prices were high (1940-42) after the war. There is however little evidence that futures trading in castor had any stabilising influence. However, the month of September is too early for knowing the export position, especially about exports from Brazil, which affect the Indian shipments. The trade may therefore examine the desirability of re-organising 'futures' trading in castor seed on a more rational basis, when such transactions are resumed.



B. Castor Oil.

Trend of prices.

The monthly wholesale prices of Castor oil are given in Appendix XV for Madras City. The trend of prices for the past decade was as below :—

Average prices of Castor oil (Rs. per maund) F.O.R. Madras.

Year	Madras
1937	12/11
1938	11/ 0
1939	10/15
1940	15/12
1941	11/ 8
1942	20/ 4
1943	33/11
1944	32/ 8
1945	32/12
1946	43/ 2
1947	55/ 3
1948	59/ 1

It will be seen that Castor oil prices which remained from Rs. 10 to 12 per maund till 1941, rose to Rs. 20 during 1941, ranged about Rs. 33 till the year 1945 and still further rose to Rs. 59 by the year 1948. During the year 1949, prices fell to Rs. 43 by the end of July 1949 partly due to fall of prices in the London Market as can be seen below.

Comparative average prices of Castor oil in recent years.

		Madras	Calcutta Firsts	London (£ per ton) (Ministry of Food prices)
		Rs. per maund		
1947	...	55/ 3	75	180
1948	1st half ...	59/ 5	73/11	180
	2nd half ...	58/14	72/13	170
1949	January ...	58	74	170
	February ...	58/ 4	74/ 8	170
	March ...	51	72/ 8	170
	April ...	46/10	72/ 8	170
	May ...	45/13	71	142
	June ...	44	67/ 8	122
	July ...	43/ 5	66/ 8	122

The prices of Castor oil also vary with quality. In the Calcutta market Castor oil is sold in three qualities No. 1 fine pale and Liverpool qualities, 2nd and 3rd, the difference between each being about Re. 1 per maund during 1949. Castor oil obtained from first pressing (firsts) from decorticated seeds used to fetch a higher price on account of its lighter colour or lower free fatty acids, than the oil from second pressing or undecorticated seeds. Oil from mills also used to fetch a higher price than the oil from *Chekkus*, as the latter is not refined or filtered.

C. Castor Cake.

The average price of Castor cake in the Tirupattur and Guntur markets per maund (of 82 2/7 lbs) was as follows in the past decade.

	Price of Castor cake per maund at	
	Tirupattur.	Guntur.
	Rs. A.	Rs. A.
1937	1 8	...
1938	1 8	1 9
1939	1 9	1 14
1940	1 9	1 15
1941	1 3	2 2
1942	1 14	2 13
1943	4 0	5 11
1944	4 0	4 15
1945	4 1	4 15
1946	4 12	4 14
1947	6 4	5 0
1948	6 0	7 6

Prices which ranged usually from Rs. 1-8-0 to 2 per maund from 1937 to 1942, rose to over Rs. 4 or Rs. 5 per maund between the years 1943 and 1946. Prices again rose in recent years (1947-48) to a range of from Rs. 6 to Rs. 7 per maund.

The monthwar prices of Castor cake are given in Appendix XVI.

The prices of white Castor cake got from decorticated cake usually fetched a higher price of As. 4 to 8 per maund in producing districts.

Millers' margin in crushing Castor seed.

The margin from crushing Castor seed depends on the relative price of the seed, oil and cake. The following table gives an approximate margin by crushing one maund of Castor seed at Tirupattur.

Margin between prices of Castor oil, seed and cake (Rs./as) per maund of seed.

—	Price of one maund of seed.	Price of 40% of oil.	Price of 57% of cake.	Difference of price of oil and cake over that of seed.
1939	4/ 8	4/ 4	0/ 9	0/ 5
1940	5/13	6/ 2	0/ 9	0/14
1941	4/ 8	4/ 9	0/ 7	0/ 8
1942	7/ 8	7/10	1/ 1	1/ 3
1943	13/ 0	12/10	1/11	1/ 5
1944	11/ 3	12/12	2/ 4	3/13
1945	11/ 4	12/ 1	2/ 5	3/ 2
1946	17/ 1	17/ 6	2/12	3/ 1
1947	20/ 8	21/ 8	3/14	4/14
1948	20/10	23/ 0	3/ 6	5/12

The difference has been varying from year to year and has been increasing. During 1942–43, the cost of milling was As. 13 per maund of seed during 1947–48, Rs. 2–1–0. The margin from crushing was as follows :—

—	Tirupattur	
	1942—43	1947—48
	Rs. A.	Rs. A.
Difference in price of oil and cake over seed	1 4	5 5
Cost of crushing	0 13	2 1
Miller's margin and costs ...	0 7	3 4
Miller's margin as percentage on price of seed ...	4·3%	15·8%

Although the margin due to crushing has increased in recent years, the overhead expenses have also increased and this will reduce the profit.

CHAPTER V.

Assembling Methods and Practices.

A. Assembling of Castor seed.

(1) *Agencies employed* :—It has been estimated that about 8% of the Castor production in Madras and about 6% in India are retained by growers, the rest being offered to the market. In the large growing districts of Madras like Anantapur the marketable surplus is sold by cultivators in the nearest assembling market, or to village merchants or agents of wholesale merchants or press owners. Occasionally the Castor seed is sold in the local weekly market or *shandie* to the highest bidder or at the prevailing market rate, in lots. In the larger markets, the produce is also sold through Commission agents, the usual charge being 4 pies per rupee. Crushing factories and hand-presses, purchase large quantities from surrounding villages through agents or in shandies. In the smaller producing areas, the produce is entirely used by cultivators or sold locally.

Some Co-operative loan and sale societies also, assemble Castor seed by advancing loan on the security of produce upto 60% of the value of the produce, charging a commission of 4 pies in the rupee, the members arranging for their own buyers. One of the most important of such societies is the Kalyandurg loan and sale society, which accounted for 1,000 maunds of seed annually.

The proportion of produce sold directly by producers in assembling markets and *shandies* is estimated to vary widely. It was reported to be so low as 10% in Bihar and so high as 75% in the United Provinces. In Madras it was estimated that nearly half the crop is sold by producers direct to press owners, chekkus, or in *shandies*. In India as a whole, about half the production is directly marketed by the cultivators. While in the villages, producers have the disadvantage of manipulation of weights and scales done by the middlemen, sale in a market affords more competition, and saves for them the middleman's profits. There are however many markets in India where malpractices exist in the way of dubious weights and measures, unauthorised charges and allowances. This can be remedied by establishing 'regulated markets' by legislation, and controlling market practices through properly constituted market committees, in the large castor producing areas. In Madras regulated markets have been established for Cotton, in Tirupur, Nandyal and Adoni, for groundnuts in South Arcot district, and for tobacco in Guntur district and Bezwada, under the

Madras Commercial Crops Market Act. Recently the Act has been amended to include more commodities, and proposals to open such markets for potatoes, arecanuts and cocoanuts in important districts, are now under active consideration of the Madras Government.

(2) *Markets* :—Castor is marketed along with other agricultural commodities in the markets in India. The places of marketing vary in size from small shandies, to wholesale markets in certain large producing areas. In Madras, village merchants, chekku owners and agents of wholesalers also, purchase Castor seed in the cultivators' dwellings. The weekly shandies held in many towns are the most important assembling, as well as, distributive markets for Castor seed. Wholesalers and chekku owners make most of their purchases in such shandies, especially in the large producing districts. These shandies are under the management of Local bodies such as District Boards or Municipalities. In the large consuming markets, the shandies form the main agencies for distribution, and the owners may transact business as wholesalers, commission agents or even retailers for Castor seed, along with other commodities. There are no separate *mandies* dealing in Castor seed as this is a minor commodity. A list of important markets for Castor seed is given in Appendix XVII with the quantities handled annually in each. The most important market was Narasaraopet (11,880 tons) in Guntur district. Among others were Salem (4,500 tons), Edapad (3,500 tons) in Salem district Palmaner in Chittoor district (3,000 tons), Bellary (2,200 tons) and Guntur (2,000 tons).

Among the large important markets for Castor seed in other Provinces of India were Colgong (5,000 tons) and Chupra (9,000 tons) in Bihar, Ahmedabad (8,500 tons) in Bombay, Srikpera (8,800 tons) and Lakimpur (6,500 tons) in the United Provinces and Badepally (10,000 tons) and Bhongir (6,000 tons), in Hyderabad.

(3) *Systems of sale, market practices and charges.*

(1) *Method of sale* :—Producers usually have only small lots for sale, and prices are offered for the whole lot by village merchants according to judgment of quality, without however examining for refractions, damaged seed, etc. Where producers offer their produce for sale, usually in bags, buyers examine samples by throwing up in the hand lightly and judging the sound produced, a hollow sound indicating less oil and inferior quality. Sometimes brokers or sellers take samples to wholesalers, who make a thorough examination for sound and refractions, and by also weighing a unit measure. Crushing establishments also make similar examination. Exporting agents

buy on the basis of fair average quality of season, with limits for refraction and damaged seeds based on written contracts, the analysis being done at Madras, after the stuff has been delivered in the buyers godown.

(b) *Units of purchase* :—The unit of quotation in the villages is usually by volume being a local or Madras measure. A Madras measure of of good quality seed weighs upto 98 tolas and inferior stuff weighs only 90 tolas. The local measure in Chittoor and North Arcot is only ½ a Madras measure and in Anantapur two-thirds. In parts of Guntur, Castor seed is sold by weight only, a bag weighing 175 lbs. Exporting agents buy on the basis of weight, the unit being a bag of 165 lbs. In the wholesale markets, transactions are mostly by weight only. In the wholesale trade in oil, the unit is a maund or a tin of specified weight. The wholesale unit for castor cake is a candy of 500 lbs. but in some markets the unit is a ton or a bag of 160 or 164 lbs

(c) *Sampling* :—The method of sampling and analysis adopted by Messrs. Ralli & Company was as follows :—

Castor seed is spread in a layer 2" thick on a zinc table, and samples drawn by means of small scoops are passed from the circumference to the centre. About 5 to 6 such samples are taken from different portions of the layer, and one thousand grains of these weighed out and cleaned. The dirt and other admixtures are separated out and the percentage worked out. Out of the cleaned samples, 100 seeds are cleaned and kernels examined for colour. Yellowish, reddish or black seeds are taken as damaged ones, and the percentage worked out by counting the seeds.

"Weighing is done by professional weighmen in assembling areas, but the scales vary from place to place and there is a diversity of weights and measures. There is necessity for standardisation of weights and measures. The Government of Madras have recently (1948) enacted a legislation called "The Madras Weights and Measures" for the purpose, and the framing of rules; and appointment of inspectors is under consideration. According to this Act, the Madras standards of weight will be a maund of 25 pounds a viss (120 tolas) and the Seer (24 tolas) and the palam (3 tolas), besides the All India standards. The standard measures will be the Madras measure of 108 cubic inches and the type seer (72 cubic inches).

(d) *Methods in India* :—As in Madras, the systems of sale vary from the sale by visual examination at the villages, to contracts used

in the export trade. In Hyderabad, a special system of bidding premium is in vogue, whereby the day's rate is fixed by auction and premiums over this rate are offered for selected individual Roups.

(e) *Market charges* :—In some markets in India as Salem, Ahmedabad and Bhongir an octroi of one to three annas per cart used to be levied. The Commission charged ranged from 0-12-0 per Rs. 100 in Bihar to Re. 1-4-0 at Madras, by seller. Some markets also used to charge commission on the buyers, at 0-0-3 per maund as at Madras. In Madras, the handling charges amounted to 0-1-0 per maund shared by buyer and seller and there were also some allowances as 2½% in Bombay and Baroda. During the years 1940 to 1942, the total market charges amounted from Rs. 2 to Rs. 3 per Rs. 100 in most markets, but in Ahmedabad, they amounted to Rs. 6-2-0 per Rs. 100 and Rs. 8 in the United Provinces. It is desirable that such varying charges are regularised through establishment of regulated markets.

A few instances of market charges prevalent in the past quinquennium are given below :—

Market charges on Castor seed.

—	Kalyandurg.	Bellary.
Octroi or Local Board tax ...	0-1-0 per cart (seller).	...
Commission per rupee { Seller ...	6 to 9 pies ...	4 pies.
Commission per rupee { Buyer	1 pie ...	...
Charity per Rs. 100 ...	0-2-0 ...	0-1-0
Weighing and stitching (seller).	Done by Commission agent.	0-0-3 per maund.
Allowances for samples etc. ...	Nil. ...	About 1%.
Sales Tax	1%. ...	1%.

E. Distribution of Castor seed.

1. *Agencies* :—The distribution from assembling centres to crushing centres and ports is effected mainly by wholesalers, commission agents, millers and exporters, usually from wholesalers in producing markets. The large mills and exporters do not deal with producers, but small crushing establishments or *chekkus* may purchase from local merchants or growers. The retail distribution of Castor seed may be considered negligible, as the crushing establishments as well as merchants purchase Castor seed in wholesale lots. It is only Castor oil that is distributed on a wide scale in retail.

2. *Contracts used* :—Only a few big oil mills in India enter into written contracts for purchase of Castor seed. In Bombay and other centres, the terms of contract and rules are drawn up by the local Grain Merchants' Association. There are two contracts (1) rail or delivery terms contract and (2) Bazaar terms contract in Bombay, with basis specified as follows :—

Terms of contract for purchase of Castor seed.

Basis : ...	... 4% refraction mutual in the case of rail or delivery terms and 5% under Bazaar terms.
Dead seeds :	... 1% free : 1 to 5% reckoned as ⅛th dirt ; over 5 to 10% reckoned as ¼th dust ; over 10 to 16% reckoned as 3/8th dirt ; over 16% rejection at buyer's option.
Damaged seeds :	... 12% free ; from 13 to 17% allowance at 1 pie per cent ; from 18 to 20% allowance at 2 pies per cent ; from 21 to 30% allowance at 3 pies per cent ; over 30% at buyer's option.

All foreign matter, including grain and oil seeds other than Castor seed, is reckoned as dirt; refraction includes dirt, foreign matter, plus proportion of "dead" and "damaged" seeds as are reckoned as dirt.

Under rail or delivery terms, 90% of the value of the goods is paid to the seller on railway receipt and the balance adjusted after analysis. Under Bazaar terms, contract delivery and weighment are made at seller's godowns and payment should be within 24 hours. Brokerage is paid by buyer and 10 bags sampled for quality. The Bombay seed Traders' Association adopted a slightly different basis for future trading, the buyer's rejection option being, over 8% for dead seeds and over 20% for damaged seeds. The delivery months were May and September and the Unit of transactions 500 cwt.

A form of contract used by exporters in Madras and other markets is given in Appendix XVIII. The basis is current year's crop of fair average quality, and not to contain more than 2% foreign matter.

Exporter's terms of contract for Castor seed.

Basis:	...	Current year's crop, quality fair, average of the season and not to contain more than 2% foreign matter and 10% dirt.
Foreign matter:	...	2% free; over 2 upto 2·25% proportionate allowance to buyers; over 2·25% rejection at buyer's option. Below 2%, buyers pay proportionate allowance to sellers.
Damaged seeds:	...	10% free; over 10% upto 15%, 1/10th allowance for every 1 per cent; over 15% to 30%, 4th per cent allowance to every 1%; over 30% rejection at buyer's option.

This was the procedure prior to the imposition of the ban by Government in oil seeds futures (1943). Sales by exporters to the United Kingdom and Europe were made on the basis of the terms of the Incorporated Oil Seed Association contract for East Indian Castor seed. The basis of this contract was pure seed, and the buyer is entitled to allowance equal to the percentage of admixture upto 2% and double the allowance for excess over 2%. Disputes shall be referred to arbitration in London.

3. *Cost of distribution and price spread between producer and consumer.*

The costs of distribution include such items as transport, loading and unloading, gunnies, commission, intermediary margins etc., and vary with she localities and distances of transport. The following gives indication of the charges incurred locally by crushing mills in Tirupattur (North Arcot) from Krishnagiri (growing area).

Cost of distribution per maund of Castor seed (1948).

—	1948 Rs. a. p.	1938 Rs. a. p.
Producers' net price	21 0 0	3 11 0
Handling and carting to shandy ...	0 2 0	0 0 6
Shandy charges	0 0 6	0 0 6
Producer's price at shandy ...	21 2 6	3 12 0

	1948 Rs. a. p.	1938 Rs. a. p.
Seller's charges for stitching and loading	0 1 0	0 0 6
Commission at assembling centre at 0-1-0 per rupee	1 7 0	0 3 9
Handling and cartage from Krishnagiri to Tirupattur	0 6 0	0 2 0
Total cost at mill site ...	23 0 6	4 2 3

During 1943, it was estimated that when the cost of delivery at Bombay was Rs. 15 the producer's share at Hyderabad was Rs. 12-14-0.

4. *Export costs.*

The average price of Castor seed in Madras during the first quarter of 1949 was Rs. 30 per cwt. and the price at European ports Rs. 36. The relation between prices at different ports of export were as follows:

	Rs. per ton.
Price F. O. B. Madras	600
Steamer freight	48
Price c. i. f. Hull (England) ...	720

During prewar years and during 1943, the approximate exports cost from Bombay were as follows:—

Approximate distribution of prices in exports.

(Rs. per ton).

—	1939	1943
Price at Bombay	120	356
Price F. O. B. Bombay	125/10	372/7
War risk	...	22/5
Steamer freight	20	95/9
Price c. i. f. Hull	151	510

C. Transportation.

(a) *By road.* As with other agricultural commodities, Castor is transported by road mainly from villages to assembling markets

and from assembling markets to rail head. The bullock cart is the chief means of transport, upto a distance of 25 miles, but cultivators use their own carts for the market. The quantities handled by motor lorries are small in the case of Castor. The costs of transport for a cart of capacity 15 to 25 maunds, for about 20 miles increased from 2 to 3 annas per maund in 1941, to about 4 to 6 annas in recent years. The costs in urban areas would be higher, the costs having increased from about 1½ annas per maund to 4 annas per maund even for short distances of about 3 miles. A considerable quantity of Castor seed is imported in the adjoining districts of Madras from Hyderabad by road.

(b) *By rail.* In the ordinary trade and for commercial transport from assembling to distributing or export markets, large quantities of Castor seed are transported by rail. The major movements of Castor seed from important stations are given in Appendix XIX. The major exporting and receiving stations were as follows with quantities handled during the year 1947.

Imports and exports of Castor seed by rail for important stations (1947).

Importing centre.	Quantity Rly. maunds.	Exporting station.	Quantity Rly. maunds.
Madras City stations ...	6,749	Jalarpet ...	96,780
Marmagoa	85,886	Bezwada ...	1,06,815
(about 50,000 maunds from Madras stations)		Arkonam.	7,693
Coconada	1,21,360	Guntakal ...	5,723
Narasaraopet	14,741	Coconada ...	6,393
Yerraguntla	10,850	..	...
Ongole	24,160	...	...
Tenali	13,990	...	...

About 2½ lakhs of railway maunds of Castor seed are moved by rail in the M. & S. M. Railway stations of the Presidency. Of these, the chief exports were made to the ports of Coconada and Marmagoa and in a smaller scale to Guntur district, Cuddapah and West Godavari. Movements from Jalarpet, which totalled nearly a lakh of maunds, were directed largely to Coconada Port and in a smaller measure to Guntur, Madras and Cuddapah districts.

Besides the ports of Coconada, Marmagoa and Madras, the largest receiving stations were the milling centres at Narasaraopet, Ongole and Tenali in Guntur district and Proddatur (Yerraguntla) in Cuddapah district.

For transport by rail, Castor seed was grouped till the revised classification of 1946 under Class I, for which the maximum and minimum rates were respectively 0·38 and 0·10 of a pie per maund per mile. The maximum rate was the ordinary rate, except where schedule rates or station to station rates were given. Before the recent classification of goods rates in 1948, Castor seeds were carried under a schedule in the M. & S. M. and parts of South Indian Railway at 0·140 of a pie per maund per mile. Besides some station to station rates were also given as instanced below :—

Station to Station rates for Castor seed (1940–41)

Rate per maund per mile (pies)

From	To	Miles.	Maximum rate.	Station to Station rate.
Donakonda ...	Coconada ...	228	0·38	0·35
Kavali ...	Madras ...	141	0·38	0·30
Ongole ...	Coconada ...	220	0·38	0·33

Recently (in 1948) the railways have introduced a new system of classification. In wagon loads Castor seeds along with other oil seeds would be carried under standard wagon load scales W 1/M, i.e. 0·35 pies per maund for the first and 0·25 for distances beyond. Oil cakes could be classed under W A/Ar at owner's risk, i.e. 0·25 pie for the first hundred miles, 0·20 for the next 300 miles and 0·15 for distances beyond.

Formerly Castor cake was also grouped under Class I, but Castor oil was grouped under Class II at owner's risk and Class II-A at railway risk, i.e. at 0·42 to 0·46 of a pie per maund per mile subject to a minimum of 5·100 per maund per mile. The oil was charged at exceptional rates in G.I.P. and B.B. & C.I. Railway (0·38 pie per maund per mile).

The steamer freight on Castor seed has varied considerably from the prewar years. The rates from Madras port during 1940 and 1948 were as follows to different destinations.

Steamer freight on Castor seed per ton (Rs/-) from Madras Port.

To		1943	1948
United Kingdom	...	Sh. 140	Sh. 130
Calcutta	...	Rs. 36/8	Rs. 36/8
Colombo	...	,, 46	,, 46
Bombay	...	,, 36/8	,, 36/8
Other Ceylon ports	...	,, 50/8	,, 55/8

The rate from Bombay to London which ranged from 12 to 42 shillings per ton of 12 cwt. during 1936 to 1939, increased to 88 shillings by December 1940 and were quoted at 80 shillings in July 1949.

CONCLUSIONS AND RECOMMENDATIONS

(All-India Report)

Improving Acreage and Production Statistics.

The acreage and productions statistics in respect of Castor crop grown in India are subject to considerable error. Firstly, much of the Castor crop is grown mixed with other crops in which case, the accuracy of the area reported under Castor seed depends largely on the judgment of and care taken by the reporting officials. Secondly, the area statistics in respect of permanently settled tracts have a large margin of error, because no regular records of area sown under different crops are maintained in such tracts. Thirdly, adequate crop cutting experiments on Castor do not appear to have been conducted and consequently figures of "standard yields" used for estimation of production are of doubtful accuracy. Similarly, the "crop condition factor" appears to be under-estimated in most cases.

Data collected during the survey indicate that the annual production of Castor seed in India during the three years 1939–40 to 1941–42 averaged about 215,000 tons as against the official figure of 98,000 tons for this period. It is obvious that the published statistics are gross under-estimates and the urgent need for improving their accuracy cannot be too strongly stressed.

Increasing the production of Castor seed.

While the area under the production of Castor seed expanded rapidly in Brazil after the 1914–18 War, the crop in India did not show any marked expansion during the last 25 years with the result

that while at one time, India was the biggest exporter of Castor seed and an important exporter of Castor oil, the position has now been taken by Brazil.

The demand for Castor oil in the world markets is likely to expand considerably with the development of aviation. The demand for Castor oil and Castor cake for consumption in India has increased considerably in recent years and is likely to expand further.

A steady and large demand for Castor seed may, therefore, be anticipated in the post-War period and it would be of advantage to bring about an increase in the production of Castor seed in India. This can be best done by bringing waste lands into use—for instance, lands lying on both sides of the railway tracts—for growing the crop and also by taking steps to increase the yields per acre, which compare very unfavourably with those in other countries.

Evolving and spreading the cultivation of suitable varieties in different areas.

The yields per acre were at one time very low in the U.S.S.R. but as a result of work done at experimental agricultural stations and selecting varieties most suitable for particular areas, the yields have considerably increased. In India, some research work has been done in the direction of finding suitable high yielding and high oil content strains for different Castor regions. A few promising strains have been produced and tried at Government farms with encouraging results. One strain has also been released on a limited scale for sowing by cultivators. A great deal has, however, still to be done to bring about an increase in the yields obtained on cultivators' fields by spreading the cultivation of suitable and improved varieties and giving producers the necessary guidance.

The dehiscent varieties suffer from the disadvantage that there is considerable loss of seed by shedding. To avoid this, harvesting has often to be hurried with the result that a large number of immature capsules are picked up. This adversely affects both the quality and quantity of the produce. Experiments in connection with evolving non-dehiscent varieties are in progress in Madras and Hyderabad, and similar work should be taken up in other Castor growing tracts also.

Utilisation of Castor stems.

Castor stems, when dry, are used for thatching up roofs and as fuel. Recent researches have shown that stems can be used for pre-

paring paper pulp. The possibilities and economics of the utilisation of Castor stems for the paper industry may be explored.

Marketing cleaner produce.

Castor seed reaching the assembling markets in different areas generally contains 2 to 8 per cent refraction, consisting largely of loose shell, earth, pieces of stone and damaged and undeveloped seeds. The produce is often cleaned at the assembling market before being despatched to ports and crushing centres but a good deal of produce has to be cleaned once again at ports before being exported. This is obviously wasteful. Cleaning the produce at ports and assembling markets costs more than at farms and it would be in the interests of producers themselves if they market their crop in a cleaner form.

Better statistics regarding Castor crushing and movement of Castor oil and cake.

Statistics regarding the quantities of Castor seed crushed or Castor oil and cake produced in India from year to year are completely lacking. The crushing establishments can now be required under the Industrial Statistics Act (1942) to furnish data about oilseeds handled and oils and cakes produced by them. The matter may, with advantage, receive the attention of the authorities concerned as also of the Indian Central Oilseeds Committee when formed.

Similarly, statistics regarding the quantities of Castor oil and cake despatched from one province or State to another are not available. In the "Accounts relating to the Rail (and River-borne) Trade of India", statistics in respect of Castor oil are recorded along with those of several other oils under a common head. Similarly, figures for Castor cake are grouped with those of other oilcakes under a common head. This does not permit the quantities of Castor oil and Castor cake consumed in different areas to be known. The possibilities of recording figures for Castor oil and Castor cake separately may, therefore, be examined.

Rationalising castor seed crushing industry:—Castor seed crushing has developed in different parts of India in a haphazard manner without any definite plan or co-ordination between supply and demand. This involves wasteful transport and inefficient crushing which add to the cost of distribution and ultimately reduce the returns to castor seed producers.

India can develop an expor trade in Castor oil only if she is able to put the oil on the export markets at competitive prices, for which it will be necessary to eliminate all unnecessary distribution costs and increase the crushing efficiency. The industry, therefore, needs to be rationalised and the matter may receive the attention of the trade and the Indian Central Oil seeds Committee when constituted.

Improving the yield and quality of oil obtained by crushing Castor seed in Chekkus.

The recovery of oil when Castor seeds are crushed in chekkus averages about 35 per cent as compared with an yield of about 39 per cent when rotary mills and screw presses are used and 40 to 42 per cent when expellors or hydraulic presses are employed. The crushing of Castor seed by chekkus is thus obviously wasteful and steps should be taken either to discourage the crushing of Castor seeds by chekkus or to make such improvements as would increase their efficiency.

The oil from chekkus generally receives no further processing to remove mucilaginous matter which together with moisture helps in the development of free fatty acids. The keeping quality of chekku oil is, therefore, generally poor. A chekku owner may not be able to provide arrangements for the processing of his oil individually but it should be possible for the chekku owners to process and market their oil collectively on a co-operative basis. The formation of chekku owners (telis) co-operative societies may be encouraged in such areas as have a number of chekkus working within comparatively short distances.

Developing export trade in Castor oil.

Castor oil figured in India's export trade earlier than Castor seed. The exports of Castor oil were as much as 17,000 tons in 1891–92 but later, on account of the inferior quality of the oil exported, the exports of Castor oil declined in favour of exports of Castor seed. The exports of Castor oil during the quinquennium 1934–35 to 1938–39 averaged 5,800 tons only. After the outbreak of the present War, there has been a sharp drop in exports of Castor oil due mainly to its increased consumption in India. In the post-War period, India would require considerable quantities of Castor oil for her own use but she is likely to have some surplus of Castor seed, particularly, if her production of this oil seed increases. The surplus could be exported either in the form of seed or oil. It would be desirable to export Castor oil rather than Castor seed because by

exporting oil, the Castor cake would be retained in the country for use as fertiliser.

Maintaining quality of oil exported.

India lost her export trade in Castor oil during the early years of the present century, to some extent, due to the inferior quality exported. Although the quality of oil produced in India has vastly improved since, it would be necessary, if India is to develop an export trade in Castor oil again in the post-War period, to take steps to ensure that the quality of oil placed on the export markets is maintained. One way for doing this would be for the Government to lay down a minimum standard of quality for export and not to permit export of any consignment below the prescribed minimum standard. Alternatively, grades and grade specifications could be laid down for castor oil under the Agricultural Produce (Grading and Marking) Act and exports restricted to graded oil.

Stabilisation of prices.

The prices of Castor seed, as is the case with most agricultural commodities, are subject to considerable seasonal variations. They tend to fall in the period immediately following the harvesting of the crop. The maximum variations between the prices at different periods of the year are sometimes as much as 26 per cent. As the producers dispose of the bulk of their crop within a short period after its harvesting, the fall in prices at that time and the subsequent wide fluctuations in prices adversely affect the producers. Measures which may be taken towards stabilisation of prices would be of advantage to the producers.

Re-organisation of "futures" trading.

Prior to the imposition of ban on "futures" in oilseeds, "futures" trading in Castor seed at Bombay used to be carried on in respect of two options, *viz.*, May and September. An examination of the quotations for these two options and the corresponding "ready" prices shows that the "futures" trading exerted, on the whole, a bearish influence on prices during the period 1936-37 to 1938-39 when prices were low, and a bullish influence during the period 1939-40 to 1941-42 when prices were high. There appears to be little evidence to show that "futures" trading in Castor seed had, as in the case of several other agricultural commodities, a stabilising influence on prices. The trade may, therefore, examine the desirability of re-organising the "futures" trading in Castor seed on a more rational basis.

Establishment of regulated markets, improving management of markets prescribing market charges, licensing weighment, standardisation of weights and measures.

When a producer takes his produce to a market for sale, he is usually faced with a host of market charges, dubious weights and measures, a variety of allowances and many malpractices. All these tend to reduce his net return. The position can be improved by the establishment of "regulated markets" or entrusting the management of markets to properly constituted committees including growers' representatives. The conditions of sale at the markets may be improved by providing amenities to sellers, prescribing market charges, licensing weighment, making the use of standard weights and measures, etc.

Marketing on Co-operative lines.

Producers usually prefer to take their crop to a market for sale but in many cases, their indebtedness or financial obligations leave them no choice but to sell their crop to their creditor merchant or through their creditor 'arhatiya.' At other times, they may not be able to take the produce to the market on account of quantities being small or for lack of adequate transport facilities. Even when they are able to take the produce to the market, they cannot usually sell it to their best advantage. These difficulties can, to a large extent be obviated by producers selling their produce collectively on a co-operative basis. The development of co-operative marketing would help the producers in getting better returns for their produce.

Standardisation of contract terms.

There is no uniformity regarding the terms of contracts adopted by different trade associations, exporters, millers and other buyers. Not only do the terms regarding quality and scales of allowances show variations at different centres but also as adopted by different trade associations at the same centre. Such variations have a harmful effect on the quality of the produce and even sometimes provide an incentive to adulteration. Prices at different centres are difficult to compare and the seller often does not know what net return he would get for his produce. The position can be improved by the trade associations, exporters and millers eliminating the differences in their contracts, by adopting one standard contract.

Examination of railway freight.

The basis of charging railway freights on Castor seed was apparently worked out when much of the Castor crop was exported abroad. The bulk of the crop is now crushed in the country and the question of railway freights should receive attention in any plan which may be prepared for developing castor seed crushing in the light of supplies of castor seed available and the requirements of oil and cake, in different parts of India.

Increasing the producer's share in the consumer's price.

The producer's share in the consumer's price can be increased, by stimulating demand, stabilising prices, eliminating waste and reducing assembling and distribution costs. The various suggestions made in the foregoing pages aim at this objective, and it is hoped that the producer, who now gets only 8½ to 12½ annas out of the consumer's rupee, can get a few annas more. If he could get only an additional one anna per maund for his Castor seed, the gain to the producers would be nearly 4 lakhs of rupees.

Madras Presidency

(Summary)

1. *Supply and demand.*

The average area under Castor seed in Madras declined from about 4,20,000 acres in the twenties to about 2,61,000 in recent years. Anantapur (25 %), Nellore (17 %), Kurnool (12 %), Guntur (1 %), Bellary (9 %) and Salem were the most important districts.

The yield per acre ranged from 150 to 400 lbs. in different districts. The production in Madras was estimated at 25,000 tons as compared to 2,15,000 in India, according to data collected by the Central Marketing Department for the years 1940 to 1942. The world crop at the time was probably of the order of 5,00,000 tons, of which the share of Brazil was about 2,46,000 tons. From the year 1935, the contribution of Brazil to the international trade has been increasing, and was 91,000 tons as compared to 46,000 tons from India, which was formerly the world's largest exporting country. India, however, continues to occupy the first place as an exportor of Castor oil.

Imports of Castor seed by rail and sea into Madras, declined from 14,000 tons in the period ending 1941–42 to only 3,300 tons in recent years. Hyderabad was the chief source of imports. In the

same periods, exports averaged 18,800 tons and 11,000 tons respectively. The net available supply, declined from about 20,200 tons to 14,200 tons. The United Kingdom and the United States of America are now the most important markets for Castor seed. During the three years ending 1941–42, the net supply in India was estimated at 1,70,000 tons of Castor seed and exports 45,000 tons.

2. *Preparation for market and processing.*

In the triennium ending 1941–42, the quantity of Castor seed crushed in India was estimated at 1,60,000 tons of which the share of expellers was 70,000 tons, screw presses was 78,000 tons and *chekkus* 12,000 tons only. About the same period the quantity crushed in Madras was estimated at 19,000 tons of which the largest share was accounted by screw presses (12,000 tons) and next by expellers (5,000 tons) and *chekkus* (2,000 tons). In Madras two expellers, 130 screw presses and four hydraulic presses were engaged in the industry besides the *chekkus*.

The Castor oil used for medicinal purposes is cold drawn. The percentage of oil to seed, ranged between 40 to 41 % with expellers and hydraulic presses, but was only 30 to 38 % by *chekkus*. The oil from expellers is often filtered and refined, but the oil from *chekkus* is usually not so processed.

Recently the Government of India have notified Grade standards for Castor oil into four grades, namely, Medicinal (cold drawn), First Specials, Firsts and Seconds, depending on clarity, colour and chemical composition. The iodine value has been fixed at 82 to 90, acetyl value not less than 140, while the acid value for the Firsts Specials, First, and Second grades have been fixed at not higher than 2, 4 and 6 respectively.

It is very desirable that these grade standards, are made compulsory for exports, as in the case of tobacco and sannhemp, in order that the reputation of Indian Castor oil in world markets is improved.

3. *Supplies of Castor oil and Castor cake.*

Indian production of Castor oil in the triennium ending 1941–42, was estimated at 63,000 tons, the share of Madras being 7,400 tons, and of Bombay 19,400 tons. In recent years the average production in Madras, was about 5,600 tons.

Exports of Castor oil from India decreased from about 5,000 tons in the quinquennium ending 1939 to only 3,484 tons in the quinquennium ending 1944. Exports of Castor oil from Madras, which stood at below 100 tons between 1943 and 1947, increased to 2,699 tons during 1947–48.

Indian consumption of Castor oil averaged 58,000 tons, of which about 33,000 were estimated to be utilised for lubrication purposes, 9,000 tons for lighting and 2,000 tons for the leather trade. In Madras, out of 7,000 tons, about 1,500 tons were estimated to be used for lubrication, 1,700 tons for illumination, 700 tons by railways and the rest for various uses as toilet and medicine. In other provinces and States, there is greater use of Castor oil in the industries.

The annual production of Castor cake in the triennium ending 1941–42 was roughly about 95,500 tons in India, the share of Madras being about 11,000 tons. Production has now declined. Including imports, the demand during 1941–42 was estimated at 90,000 tons of Cake in Madras.

4. *Prices.*

Prices of Castor seed in Madras increased from about Rs. 5 per maund during 1937, to Rs. 14 during 1943 and about Rs. 22 during 1948–49. During 1949, prices declined. The course of prices in Madras markets and in Bombay was more or less similar. Prices in London increased from £ 13 per ton during 1937 to about £ 57 during 1948.

During 1928–29, Castor seed prices were higher than those of groundnut kernel, but in recent years, the latter is cheaper. The relative prices of oil seeds in Indian and world markets are due to complex factors, some of them affecting individual oil seeds.

The prices of Castor oil in Madras increased from Rs. 11 during 1938 to Rs. 59 during 1948, but fell to Rs. 43 by July 1949. In the London market, the prices fixed by the Ministry of Agriculture declined from £ 170 per ton during 1948–49 (London) to only £ 120 by July 1949.

Between 1937 and 1948, the prices of Castor cake increased from about Rs. 1-8-0 per maund to about Rs. 7 in the Madras markets.

Indian Castor seed invariably sold at higher price than Brazilian seed in England, partly due to better quality.

5. *Marketing methods and practices.*

About half the crop in Madras and India is estimated to be marketed directly by producers in India, the rest being assembled by village merchants and brokers.

The methods of sale may be visual examination at the village, sales on samples or on the basis of written contracts by exporters.

The Producer's share generally ranged from 55 to 80% of the consumer's price in India, depending on the distance of transport and other factors. In exports, the price at Madras port formed five-sixth of the London price (*c. i. f.*) while steamer freight accounted for one-eighth.

The main receiving stations for Castor seed were the ports of Coconada, Madras and Marmagoa and the large milling centres at Narasaraopet, Ongole and Tenali in Guntur district, and Proddatur (Cuddapah). The main-exporting centres were Bezwada and Jalarpet.

APPEN

Net imports and exports of

IMPORTS

—	Average 1909–13	Average 1924–28	1929	1930	1931
Asia—					
Japan	...	12·7	12·0	10·4	13·7
America—					
United States ...	15·5	49·7	78·3	63·8	46·0
Europe—					
Belgo-Luxemb. Econ. Union	12·9	...	16·6	15·7	12·5
France	...	22·1	25·1	23·7	22·6
Germany	...	1·7	0·3	...	0·1
Italy	12·1	10·7	13·3	9·3	10·8
United Kingdom ...	43·9	30·9	34·7	36·2	31·1
U. S. S. R ...	5·6	...	...	...	0·4
Other countries— ...	...	2·2	2·6	3·2	3·1
Total ...	98·0	130·0	182·9	162·3	140·3

EXPORTS

Asia—					
China	...	9·0	10·1	7·0	4·6
India	111·2	109·3	120·0	84·3	112·7
Manchuko ...	...	...	...	...	...
America—					
Argentina ...	...	...	1·5	...	...
Brazil	1·8	13·4	20·6	23·1	19·0
Africa—					
Angola	...	1·4	1·3	1·5	0·9
French Morocco ...	...	0·1	0·1	...	...
French West Africa ...	...	0·3	1·0	1·3	0·5
Madagascar ...	...	1·2	2·3	1·4	1·4
U. S. S. R. ...	...	...	7·2	7·0	...
Other countries— ...	1·7	5·5	6·6	9·3	8·0
Total ...	114·7	140·2	170·7	133·9	147·1

DIX I.

Castor seed for certain countries.

(thousand tons)

1932	1933	Average 1929–33	1934	1935	1936	1937	1938	Average 1934–38
13·6	19·6	13·9	19·2	20·3	30·2	41·0	27·4	27·6
37·1	50·5	55·1	41·4	34·5	73·2	65·5	60·9	53 1
10·1	10·0	13·0	10·8	9 6	3·3	9·6	10·4	9·7
18·1	20·1	21 9	18·8	21·1	21·5	17·9	19·6	19·8
...	0·5	0·2	6·0	10·5	13 1	18·1	15·9	12·7
10·0	11·4	11·0	10·8	19·7	15·5	16·5	5·4	13·6
25·0	32·6	31·9	35·5	36·1	30·0	32·3	...	26·8
...	...	0·1	5·2	...	...	...	....	1·0
3·6	4·0	3·3	4·1	6·1	2·9	2·4	2·2	3·6
117·5	148 7	150·4	151·8	157·9	194·7	203·3	181·8	167·9

(thousand tons).

1·5	0·1	4·7	0·2	...	0·6	0·2	...	0·2
80·9	89 0	97·4	68·6	62·0	41·0	50·2	9·2	46·2
...	16·2	3·2	23·8	29·3	19 8	26·8	15·7	23·1
...	1·3	0·6	1·3	2·2	1·7	4 2	0·7	2·0
12·2	35·0	21·8	42·1	70·5	100·5	118·0	124·0	91·0
1·1	0·9	1·1	0·8	4·2	2·4	3·9	...	2·3
...	0·2	0·1	0·1	0 2	0·2	1·2	0·2	0·2
0·3	1·0	0·8	1·7	1·4	0·9	0·9	1·5	1·3
1·0	1·9	1·6	2·7	0·7	3·3	2·4	2·5	2·3
7·8	3·1	5·0	...	...	...	...	...	...
6·5	10·1	8·1	8·2	8·2	5·8	7·7	7·3	7·6
111·3	158·8	144·4	149·5	178·7	176·2	215·5	161·1	176·2

APPEN

Net imports and exports of Castor

IMPORTS

—	Average 1909–13	Average 1924–28	1929	1930	1931
Asia—					
Japan	0·5	0·4	...	0·2	0·9
America—					
Canada	0·8	0·6	0·9	0·6	0·7
United States ...	...	0·2	...	...	...
Argentina ...	0·2	0·2	0·2	0 1	0·1
Africa—					
Egypt ...	...	0·9	0·4	0·6	0·5
Union of South Africa ...	0·5	0·6	0·8	0·6	0·5
Europe—					
Austria	2·7	0·5	0·5	0·5	0·4
Czechoslovakia ...	...	1·7	1·6	1·5	1·5
Germany	7·8	6·2	8·7	7·6	6·9
Netherlands ...	...	0·8	0·8	0 8	0 8
Sweden	...	1·8	1·1	0·8	0·8
U.S.S.R.	0·1	...	...	...	...
Australia—	1·7	...	0·2	0 3	0·2
Other Countries ...	0·6	1·2	1·3	1·6	1·3
Total ...	14 9	15·1	16·5	15·2	14·6

EXPORTS

Asia—China	...	0.2	...	0·2	0 2
India	4·8	2·4	2·6	2·1	3·3
Indo-China	0·4	1·0	0·7	0·4	0·3
Japan	...	...	...	...	...
America—Brazil ...	...	...	...	...	...
United States ...	...	...	0·2	0·3	0·2
Europe—Belgo. Luxem. Econ. Union ...	4·1	5·2	6·3	4·9	4·8
France	2·7	3·5	3·2	3·2	3·4
Italy	0·6	0·1	0·1	0·1	0·1
United Kingdom ...	9·3	3·2	4·3	5·3	4·4
U.S.S.R.	...	...	...	...	...
Total ...	21·8	15·6	17·4	16·5	17·4

DIX II.

oil for certain countries

(thousand tons)

1932	1933	Average 1929–33	1934	1935	1936	1937	1938	Average 1924–28
...	...	0·2	...	...	...	...	0·5	0·1
0·9	1·1	0·8	1·1	1·0	1·0	1·1	0·9	1·0
0·4	0·4	0·2	...	...	...	0·1	...	...
...	...	0·1	...	...	...	...	...	...
0·5	0·6	0·5	0·3	0·3	0·5	0·6	0·4	0·4
0·4	0 5	0·6	0·5	0·4	0·4	0 6	0 5	0 5
0·3	0·3	0·4	0 4	0·6	0·4	0·5	0·4	0 6
1·1	1·0	1·3	1·1	1·0	1·3	1·5	0·8	1·1
5·8	6·5	7 2	7·6	5·1	4·5	6·1	9 6	6 6
0 6	0·6	0.7	0·6	0·6	0·6	0 6	0·3	0·5
1·1	1·1	1·0	1·1	1·3	1·4	2·0	...	1·2
...	...	...	0·1	0 8	...	...	...	0·2
0·2	0·2	0·2	0·2	0·1	...	...	0·1	0·1
1·3	1·3	1·5	1·7	1·3	1·1	1·0	2·1	1·4
12·6	14·4	14·7	14·7	12·5	11·2	14·1	15 6	18 6

(thousand tons)

...	...	0·2	...	...	0·1	0·1	0·2	0.1
5·0	5·8	3·6	5·5	5·8	6·0	7·5	4·8	5·9
0·3	0·3	0·4	0·2	0·2	0·2	0·7	...	0·3
...	...	...	...	0·4	0·2	0·2	...	0·2
0·2	0·1	0·1	0·2	0·2	0·4	0·3	0·1	0·2
...	...	0·1	...	...	3·3	...	...	0·1
4·1	4·0	4·8	4·1	3·6	3·6	3·3	4·0	3·7
3·0	2·1	3·0	1·7	1·4	0·9	0·3	0·6	1·0
0·1	0·1	0·1	0·1	0·3	0·1	...	...	0·1
0·8	3·8	3·7	4·0	3·1	1·6	...	...	1.9
...	...	...	...	...	1·6	4·1	...	1·1
13·5	16·2	16·2	16·7	15·0	15·0	16·1	9·7	14·6

APPENDIX III.

Area under Castor seed in India.

(Thousand acres).

Year	Bihar (a)	Bombay (b)	Central Provinces and Berar	Madras	Orissa (c)	Sind (d)
1920–21	38	81	52	391	...	...
1921–22	35	74	42	381	...	...
1922–23	38	63	45	327	...	...
1923–24	35	60	40	339	...	...
1924–25	35	77	52	359	...	...
1925–26	46	77	52	378	...	...
1926–27	44	119	55	385	...	...
1927–28	47	163	45	360	...	...
1928–29	51	87	47	344	...	...
1929–30	55	128	47	256	...	...
1930–31	55	92	46	283	...	...
1931–32	54	77	38	330	...	...
1932–33	52	81	39	356	...	...
1933–34	56	57	37	305	...	3
1934–35	55	43	32	278	...	1
1935–36	35	43	29	252	20	1
1936–37	33	47	30	264	25	1
1937–38	34	42	34	247	20	7
1938–39	34	46	28	270	20	5
1939–40	34	41	30	266	20	2
1940–41	33	41	29	267	19	2
1941–42	35	38	29	244	20	3
1942–43	35	49	29	277	19	4
1943–44	37	46	34	279	22	2
1944–45	33	53	32	285	22	2

(a) The figures upto 1934–35 (when Bihar and Orissa together formed one province) include Orissa.
(b) The figures upto 1930–31 include Sind, as also Gujarat and Kathiawar States. Those for 1931–32 and 1932–33 include Sind.
(c) Figures prior to 1935–36 are included under Bihar.
(d) Figures prior to 1933–34 are included under Bombay.
(e) Unmixed crop only.
(f) Totals upto 1930–31 include Bombay States, but, that for 1920–21 exclude the United Provinces.
(g) Figures prior to 1931–32 are included under Bombay.
(h) Totals upto 1930–31 do not include Bombay States and that for 1920–21 Baroda and Mysore also.
Na—Not available.

United Provinces (e)	Total British India (f)	Baroda	Bombay States (g)	Hyderabad	Mysore	Total Indian States (h)	Total India
Na	562	Na	...	678	Na	678	1,240
4	536	180	...	1,015	109	1,254	1,790
4	477	150	...	793	112	1,055	1,532
7	482	108	...	866	117	1,091	1,573
15	538	78	...	676	118	872	1,410
17	570	58	...	672	100	831	1,401
10	613	59	...	611	116	786	1,399
8	621	75	...	681	103	859	1,480
11	540	101	...	659	110	870	1,410
7	493	83	...	602	107	792	1,285
7	483	60	...	792	117	969	1,452
10	509	66	46	856	106	1,074	1,583
15	542	78	48	888	111	1,075	1,617
8	471	81	51	825	106	1,063	1,534
7	416	70	76	786	94	1,032	1,448
7	387	83	63	834	101	1,081	1,468
9	409	68	47	781	103	999	1,408
13	397	88	47	520	96	751	1,148
10	413	70	66	550	99	785	1,198
9	402	48	62	887	106	603	1,005
11	402	50	84	481	104	619	1,021
12	380	73	45	357	103	578	958
11	424	78	44	728	95	940	1,365
13	483	85	92	882	101	1,110	1,593
19	453	70	98	747	100	1,015	1,468

APPENDIX IV

Production of Castor seed in India

(Thousand tons)

Year	Bihar (i)	Bombay (ii)	Central Provinces and Berar	Madras	Orissa (iii)	Sind (iv)
1920-21	5	Na	7	39	...	...
1921-22	6	Na	6	36	...	...
1922-23	6	Na	Na	33	...	...
1923-24	5	Na	Na	30	...	...
1924-25	5	12	Na	38	...	...
1925-26	6	10	11	41	...	...
1926-27	6	18	9	29	...	...
1927-28	6	29	11	33	...	...
1928-29	7	16	9	32	...	...
1929-30	8	20	9	26	...	...
1930-31	8	13	9	28	...	...
1931-32	8	12	8	33	...	...
1932-33	8	12	7	38	...	...
1933-34	9	7	7	31	...	1
1934-35	8	4	6	28	...	N
1935-36	5	6	4	23	2	N
1936-37	5	6	6	25	3	N
1937-38	5	6	6	22	2	N
1938-39	4	6	5	22	2	N
1939-40	4	4	5	26	2	N
1940-41	4	6	5	27	2	N
1941-42	5	5	4	23	2	N
1942-43	5	7	4	23	2	1
1943-44	5	6	5	25	2	N
1944-45	4	7	6	25	2	N

(i) The figures upto 1934-35 (when Bihar and Orissa together formed one province) include Orissa.

(ii) The figures upto 1936-37 include Sind as also Gujarat and Kathiawar States. Those for 1931-32 and 32-33 include Sind.

(iii) Figures prior to 1935-36 are included under Bihar.

(iv) Figures prior to 1933-34 are included under Bombay.

(v) Unmixed crop only.

(vi) Totals upto 1924-25 are incomplete and those from 1923-24 to 1930-31 include Bombay States.

(vii) Figures prior to 1931-32 are included under Bombay.

(viii) Totals upto 1923-24 are incomplete and those from 1924-25 to 1930-31 do not include Bombay States.

Na — Not available.

N — Negligible.

APPENDIX IV

Production of Castor seed in India

(Thousand tons)

United Provinces (v)	Total British India (vi)	Baroda	Bombay States (vii)	Hyderabad	Mysore	Total Indian States (viii)	Total India.
Na	51	Na	...	33	Na	33	84
Na	48	Na	...	94	Na	94	142
Na	39	Na	...	78	Na	78	117
Na	35	Na	...	68	Na	68	103
Na	55	7	...	55	7	69	124
3	71	4	...	62	7	73	144
3	65	6	...	52	6	64	129
3	82	7	...	48	6	56	138
3	67	3	...	37	6	46	113
2	65	5	...	40	6	51	116
2	60	6	...	45	7	58	118
3	64	6	7	63	6	82	146
3	68	7	9	61	6	83	151
2	57	5	8	67	6	86	143
2	43	2	8	47	5	62	105
2	42	7	10	57	5	79	121
3	48	2	6	66	6	80	128
4	45	7	7	40	5	59	104
4	48	6	10	45	7	68	111
3	44	3	10	30	10	53	97
4	48	5	5	39	8	57	105
3	42	7	6	30	6	49	91
3	45	8	6	83	5	102	147
3	46	7	15	65	7	94	140
4	48	7	15	54	7	83	131

APPENDIX V.

Area and Production of Castor in Madras Presidency.

Year	Area in 1,000 acres	Quinquennial average	Production in 1,000 tons	Quinquennial average
1917-18	489		50	
18-19	396		38	
19-20	475	426	45	42
20-21	391		39	
21-22	381		36	
1922-23	327		33	
23-24	339		30	
24-25	359	358	38	34
25-26	378		41	
26-27	385		29	
1927-28	360		32	
28-29	344		33	
29-30	256	315	26	30
30-31	283		28	
31-32	330		33	
1932-33	355		38	
33-34	305		31	
34-35	278	292	23	28
35-36	257		23	
36-37	264		25	

Year	Area in 1,000 acres	Quinquennial average	Production in 1,000 tons	Quinquennial average
1937-38	247		22	
38-39	270		29	
39-40	268	259	26	24
40-41	267		27	
41-42	244		23	
1942-43	277		23	
43-44	279		25	
44-45	255	261	25	22
45-46	285		19	
46-47	229		19	
1947-48	241	...	20	

APPEN

Area of Castor in

District	1937-38	1938-39	1939-40	1940-41	1941-42	Average.
Vizagapatam ...	931	1,078	1,459	2,192	1,762	1,490
East Godavari.	8,848	6,756	6,231	7,849	6,425	7,222
West Godavari.	3,998	3,883	4,242	3,916	3,082	3,814
Kistna ...	3,757	3,042	2,319	3,299	2,870	3,057
Guntur ...	28,306	28,511	27,288	28,478	24,047	27,326
Kurnool ...	29,004	27,844	29,878	32,582	29,900	29,832
Bellary ...	13,659	17,836	17,644	21,301	17,597	17,607
Anantapur ...	59,234	68,507	79,147	69,576	61,705	67,634
Cuddapah ...	7,832	11,065	11,094	12,323	8,696	10,202
Nellore ...	39,856	46,156	38,356	34,866	37,288	39,304
Chingleput ...	14	21	2	5	9	10
South Arcot ...	659	3,550	770	801	837	1,323
Chittoor ...	3,635	4,763	5,267	5,116	3,983	4,553
North Arcot ...	5,240	5,307	4,403	5,067	5,378	5,079
Salem ...	20,634	20,618	18,934	19,784	20,915	20,167
Coimbatore ...	7,967	7,051	6,912	8,005	7,094	7,408
Tiruchirapalli.	7,909	9,251	7,377	6,633	7,097	7,654
Tanjore ...	337	373	388	744	176	393
Madura ...	2,394	2,298	1,987	1,775	2,071	2,105
Ramnad ...	773	669	793	944	1,040	844
Tinnevelly ...	1,212	1,108	926	1,008	943	1,039
Malabar ...	312	424	413	355	792	459
South Kanara.	211	214	230	264	248	231
The Nilgiris...	6	3	5	8	...	4
Total ...	246,718	270,278	266,051	266,786	243,954	258,757

DIX V (a)

the various districts

Share of district as % of total	1942-43	1943-44	1944-45	1945-46	1946-47	Average.	Share of district as % of total.
0·6	2,184	1,343	3,593	1,073	1,488	1,937	0·7
2·8	2,201	2,267	1,187	993	2,114	1,752	0·7
1·5	9,109	9,764	6,965	5,361	6,255	7,491	2·9
1·2	3,888	3,782	2,759	1,863	1,700	2,788	1·1
10·6	28,990	32,796	25,706	25,491	22,358	27,068	10·4
11·5	33,055	29,969	41,930	30,096	31,499	33,310	12·8
6·8	24,824	24,957	27,406	19,022	19,336	23,050	8·8
26·1	70,344	66,977	78,024	61,109	54,580	66,187	25·3
3·9	10,206	7,128	8,611	6,765	6,838	7,910	3·0
15·2	41,330	49,796	43,482	39,165	42,360	43,227	16·6
...	19	16	12	77	10	27	...
0·5	973	1,091	918	872	865	904	0·3
1·6	4,951	4,831	4,584	3,770	3,205	4,258	1·6
2·0	6,142	6,196	4,979	4,771	4,178	5,253	2·0
7·8	20,089	19,595	18,769	18,742	18,298	19,099	7·3
2·9	7,421	6,798	5,727	5,777	5,378	6,220	2·4
3·0	7,231	7,053	5,978	6,433	5,890	6,517	2·5
0·2	164	226	191	408	226	223	0·1
0·8	1,948	1,911	1,491	1,538	1,111	1,600	0·6
0.3	907	838	987	545	585	772	0·3
0·4	975	1,020	679	610	496	756	0.3
0:2	428	458	557	522	404	468	0·2
0·1	248	260	265	246	257	254	0·1
...	18	15	24	14	13	17	...
100·0	277,238	279,032	284,759	235,263	229,244	261,107	100·0

APPEN

Area under Castor seed—Talukwar.

Name of District and Taluk	1943–44			1944–45		1945–46			1946–47		
	Irrigated	Unirrigated	Total	Irrigated	Unirrigated	Total	Irrigated	Unirrigated	Total	Irrigated	Unirrigated	Total
Vizagapatam—												
Chicacole	...	63	63	...	23	23	...	9	9	...	12	12
Paleonda	...	86	86	...	64	64	...	31	31	...	38	38
Golconda	...	315	315	...	229	229	...	114	114	...	141	141
Sarvasiddhi	...	67	67	...	20	20	...	13	13	...	10	10
Zamindari—												
Parvatipuram	...	106	106	...	106	106	...	...	...	...	106	106
Suluru	...	236	236	...	248	248	...	175	175	...	202	202
Bobbili	...	10	10	...	37	37	...	38	38	...	...	...
Chipurupalli	...	30	30	...	20	20	...	16	16	...	14	14
Vizianagaram	...	...	...	...	...	...	...	...	...	...	80	80
Sringavarapukota	...	...	...	...	572	572	...	...	...	...	...	...
Vizagapatam	...	...	...	...	...	...	...	...	...	...	...	...
Viravilli	...	12	12	...	12	12	...	...	...	...	...	...
Anakapalle	...	...	...	...	...	...	...	...	...	...	...	...
Bimilipatnam	...	...	...	...	...	...	...	...	...	...	...	...
Gudem	...	12	12	...	3	3	...	2	2	...	3	3
Tekkali	...	...	...	...	4	4	...	4	4	...	...	...
Narasaraopet	...	2	2	...	5	5	...	6	6	...	15	15
Itchapur	...	90	90	...	48	48	...	103	103	...	57	57
Pithapatnam	...	66	66	...	97	97	...	...	...	...	118	118
Sompeta	...	204	204	...	2,110	2,110	...	178	178	...	100	100
Total	...	1,299	1,299	...	3,598	3,598	...	689	689	...	896	896
East Godavari—												
Rajahmundry	...	237	237	...	152	152	...	136	136	...	286	286
Peddapuram	...	90	90	...	54	54	...	41	41	...	40	40
Ramachandrapuram	2	207	209	1	146	147	...	59	59	...	146	146
Cocanada	...	12	12	...	...	...	...	...	...	...	...	...
Amlapuram	...	94	94	...	9	9	...	10	10	...	8	8
Razole	2	47	49	1	13	14	...	27	27	...	5	5
Zamindari—												
Pithapuram	...	...	...	...	2	2	...	...	...	...	...	...
Tuni	...	21	21	...	2	2	...	...	...	...	...	...

DIX VI.

1943–44 to 1946–47 (acres).

Name of District and Taluk	1943–44 Irrigated	1943–44 Unirrigated	1943–44 Total	1944–45 Irrigated	1944–45 Unirrigated	1944–45 Total	1945–46 Irrigated	1945–46 Unirrigated	1945–46 Total	1946–47 Irrigated	1946–47 Unirrigated	1946–47 Total
Agency—												
Badrachalam ...	...	...	...	...	...	...	...	...	...	...	10	10
Yellavaram ...	...	...	...	...	10	10	...	...	...	...	285	285
Chodavaram ...	...	468	468	...	170	170	...	170	170	...	...	...
Nagur, Venkatapuram ...	...	15	15	...	30	30	...	16	16	[illegible]	...	...
Total ...	4	1,191	1,195	2	588	590	...	459	459	...	780	[illegible]
West Godavari—												
Narasapur ...	...	20	20	1	6	7	1	13	[illegible]	1	[illegible]	[illegible]
Bhimavaram ...	...	1	1	...	...	...	...	1	[illegible]	...	...	[illegible]
Kamavarapukota, Chintalapudi ...	...	1,601	1,601	...	1,010	1,010	...	678	678	...	871	871
Tanuku ...	...	41	41	4	33	37	1	43	44	...	39	39
Tadepalligudem ...	...	354	354	...	232	232	...	147	147	4	242	246
Ellore ...	...	319	319	...	248	248	...	180	180	...	204	204
Nidadavole (Kovur) ...	...	2,085	2,085	...	1,449	1,449	...	724	724	...	849	849
Polavaram (Agency) ...	...	3,271	3,271	...	2,214	2,214	...	1,637	1,637	...	2,177	2,177
Total ...	...	7,692	7,692	5	5,192	5,197	2	3,423	3,425	5	4,383	4,388
Kistna—												
Tiruvur ...	...	33	33	...	24	24	...	15	15	...	19	19
Nandigama ...	...	3,203	3,203	...	2,354	2,354	...	1,590	1,590	...	1,234	1,234
Bezwada ...	...	243	243	...	120	120	...	43	43	...	127	127
Gannavaram ...	...	15	15	...	12	12	...	10	10	...	9	9
Nuzvid ...	...	6	6	...	5	5	...	6	6	...	2	2
Kaikalur ...	...	29	29	...	1	1	...	6	6	...	13	13
Gudivada ...	...	4	4	...	1	1	...	2	2	...	...	...
Bandar Masulipatam ...	...	...	...	...	...	...	...	...	...	...	...	...
Divi, Avanigadda ...	...	199	199	...	242	242	...	191	191	...	296	296
Total ...	...	3,732	3,732	...	2,759	2,759	...	1,863	1,863	...	1,700	1,700
Guntur—												
Sattenapalle ...	...	4,239	4,239	...	3,604	3,604	...	3,564	3,564	...	2,883	2,883
Guntur ...	...	478	478	...	197	197	...	225	225	...	204	204
Tenali ...	...	152	152	...	68	68	...	174	174	...	...	...
Repalli ...	...	42	42	...	19	19	...	23	23	...	17	17
Bapatla ...	4	63	67	...	...	...	5	36	41	...	33	33

Name of District and Taluk	1943-44			1944-45		1945-46			1946-47		
	Irrigated	Unirrigated	Total	Irrigated	Unirrigated	Irrigated	Unirrigated	Total	Irrigated	Unirrigated	Total
Ongole ...	...	7,059	7,059	1	5,720	5,721	...	5,216	5,216	1	7,849	7,850
Narasaraopet ..	...	3,178	3,178	...	7,710	7,710	4	2,473	2,477	...	1,934	1,934
Vinukonda ...	...	12,449	12,449	...	2,994	2,994	...	8,393	8,393	...	9,497	9,497
Palnad, Gurzala ...	...	5,132	5,132	...	5,393	5,393	...	5,378	5,378	...	...	...
Total ...	4	32,792	32,796	1	25,705	25,706	9	25,482	25,491	1	22,357	22,358
Kurnool—												
Markapur ...	9	11,454	11,463	3	13,812	13,815	3	11,927	11,930	2	13,591	13,593
Cumbum, Giddalore ...	2	2,456	2,458	3	3,121	3,124	...	2,823	2,823	4	3,388	3,392
Sirvel, Allagadda ...	16	392	408	3	298	301	...	376	376	2	438	440
Koilkuntla ...	2	2,236	2,238	...	2,886	2,886	...	2,932	2,932	...	2,648	2,648
Nandyal ...	5	729	734	...	589	589	...	688	688	...	728	728
Nandikotkur ...	18	1,275	1,293	...	1,361	1,361	...	1,161	1,161	...	1,063	1,063
Kurnool ...	10	1,456	1,466	1	1,764	1,765	...	1,599	1,599	...	1,682	1,682
Dhone ...	...	7,246	7,246	...	14,771	14,771	...	6,550	6,550	...	6,209	6,209
Pattikonda ...	5	2,658	2,663	...	3,318	3,318	...	2,037	2,037	...	1,924	1,924
Total ...	67	29,902	29,969	10	41,920	41,930	3	30,093	30,096	8	31,491	31,499
Bellary—												
Adoni ...	18	558	576	27	932	959	6	671	677	4	516	520
Alur ...	...	387	387	...	443	443	...	406	406	...	424	424
Bellary ...	1	244	245	9	403	412	6	361	367	4	763	767
Rayadrug ...	9	4,447	4,456	5	6,110	6,115	1	4,466	4,467	23	3,657	3,680
Hospet ...	6	2,071	2,077	7	1,684	1,691	...	1,298	1,298	...	1,270	1,270
Kudligi ...	...	9,965	9,965	174	10,367	10,541	157	6,671	6,828	...	7,323	7,323
Harpanahalli ...	...	3,659	3,659	...	3,531	3,531	...	2,402	2,402	6	2,772	2,778
Hadagalli ...	1	3,501	3,502	31	3,528	3,559	...	2,445	2,445	1	2,477	2,478
Sirugappa ...	...	90	90	6	149	155	2	130	132	2	94	96
Total ...	35	24,922	24,957	269	27,147	27,406	172	18,850	19,022	40	19,296	19,336
Anantapur—												
Tadpatri ...	...	2,491	2,491	...	4,483	4,483	...	3,433	3,433	...	3,355	3,355
Gooty ...	8	6,719	6,727	...	7,083	7,083	...	4,751	4,751	...	1,971	1,971
Anantapur ...	...	17,199	17,199	...	17,003	17,003	...	13,711	13,711	...	12,274	12,274
Kalyandrug ...	...	14,784	14,784	...	18,166	18,166	...	15,083	15,083	...	13,319	13,319
Dharmavaram ...	...	7,092	7,092	...	9,404	9,404	...	7,667	7,667	...	7,262	7,262
Penukonda ...	...	4,147	4,147	...	5,956	5,956	...	4,549	4,549	...	4,136	4,136

Name of District and Taluk		1943-44			1944-45			1945-46			1946-47		
		Irrigated	Unirrigated	Total	Irrigated	Unirrigated	Total	Irrigated	Unirrigated	Total	Irrigated	Unirrigated	Total
Kadiri	...	...	10,160	10,160	...	10,904	10,904	...	8,248	8,248	...	7,526	7,526
Hindupur	...	141	1,310	1,451	...	2,075	2,075	...	1,322	1,322	...	877	877
Madakasira	...	...	2,926	2,926	...	2,950	2,950	14	2,331	2,345	5	1,965	1,970
Uravakonda	...	...	...	...	...	...	...	...	...	...	...	1,890	1,890
Total	...	149	66,828	66,977	...	78,024	78,024	14	61,095	61,109	5	54,575	54,580
Cuddapah—													
Badvel	...	5	998	1,008	1	1,232	1,233	...	1,519	1,519	1,398	99	1,497
Siddhout	...	9	53	62	10	36	46	4	54	58	...	95	95
Pullampeta, Rajampet	...	2	2	4	2	59	61	...	5	5	...	6	6
Rayachoti	...	...	3,990	3,990	...	3,870	3,870	...	2,292	2,292	...	3,002	3,002
Cuddapah	...	74	188	262	1	377	378	...	259	259	5	188	193
Pulivendla	...	1	1,114	1,115	2	2,321	2,323	11	1,981	1,992	2	1,262	1,264
Jammalamadugu	...	1	454	455	2	503	505	5	351	356	2	489	491
Proddatur ...	...	1	34	35	2	16	18	2	20	22	1	25	26
Kamalapuram	...	2	200	202	...	177	177	...	262	262	...	264	264
Total	...	95	7,038	7,128	20	8,591	8,611	22	6,743	6,765	1,408	5,430	6,838
Nellore—													
Kandukur	...	1	6,401	6,402	8	6,208	6,216	9	3,170	3,179	...	5,151	5,151
Kavali	...	...	1,129	1,129	...	755	755	...	793	793	...	917	917
Koyur	...	...	2	2	...	2	2	...	2	2	...	1	1
Nellore	...	...	100	100	...	44	44	...	11	11	1	25	26
Gudur	...	...	188	188	...	169	169	...	178	178	...	249	249
Rapur	...	...	1,024	1,024	...	1,160	1,160	...	865	865	...	1,649	1,649
Atmakur	...	...	2,430	2,430	...	1,614	1,614	45	1,544	1,589	2	2,563	2,565
Udayagiri	...	3	2,754	2,757	1	3,591	3,592	3	2,219	2,222	3	3,055	3,058
Kanigiri	...	...	9,337	9,337	7	7,717	7,724	...	7,753	7,753	...	8,252	8,252
Zamindari—													
Sulurpet or Polur	...	...	9	9	...	18	18	...	14	14	...	16	16
Venkatagiri	...	...	22	22	...	25	25	...	20	20	...	24	24
Podili	...	...	14,955	14,955	...	12,918	12,918	...	13,269	13,269	...	15,716	15,716
Darsi	...	...	11,441	11,441	...	9,245	9,245	...	9,270	9,270	...	4,736	4,736
Total	...	4	47,792	47,796	16	43,466	43,482	57	39,108	39,165	6	42,354	42,360

Name of District and Taluk	1943-44			1944-45		1945-46			1946-47		
	Irrigated	Unirrigated	Total	Irrigated	Unirrigated	Irrigated	Unirrigated	Total	Irrigated	Unirrigated	Total
Chingleput—											
Ponneri	...	...	...	...	...	10	1	11	...	...	...
Saidapet	...	...	...	...	...	55	...	55	...	1	1
Chingleput	...	7	7	...	...	...	...	...	...	...	...
Madurantakam	...	1	1	1	1	...	1	1	...	3	3
Conjeevaram	...	8	8	10	10	...	9	9	...	5	5
Tiruvellur	...	...	...	...	...	...	...	...	...	...	...
Sriperambudur	...	...	...	1	1	...	1	1	...	1	1
Total	...	16	16	12	12	65	12	77	...	10	10
South Arcot—											
Ginjee	...	...	...	70	70	...	78	78	...	62	62
Tindivanam	...	...	...	15	15	...	12	12	...	10	10
Villupuram	...	...	...	5	5	...	5	5	...	11	11
Cuddalore	...	...	...	35	35	...	1	1	...	7	7
Chidambaram	...	...	...	...	8	23	2	25	...	3	3
Vridhachalam	...	...	...	423	448	3	405	408	...	340	340
Tirukkoyilur	...	...	...	68	68	...	101	101	...	68	68
Kallakurichi	...	...	...	214	269	47	195	242	20	144	164
Total	...	...	...	830	918	73	799	872	20	645	665
Chittoor—											
Madanapalli	...	2,621	2,621	2,446	2,446	...	1,833	1,833	1	1,655	1,656
Vayalpad	...	1,568	1,571	1,503	1,503	...	1,447	1,447	32	1,060	1,092
Chandragiri	...	128	128	124	124	6	93	99	29	61	90
Chittoor	...	165	166	147	147	14	54	68	2	30	32
Palmaner	...	314	314	268	268	...	302	302	...	319	319
Zamindari—											
Punganur	...	1	21	19	19	...	13	13	...	13	13
Kalahasti	...	...	...	...	...	...	...	...	...	1	1
Puttur	...	...	...	15	15	...	...	...	...	...	...
Tiruttani	...	10	10	12	12	...	8	8	...	2	2
Total	...	4,807	4,831	4,534	4,534	20	3,750	3,770	84	3,141	3,225

Name of District and Taluk	1943-44			1944-45		1945-46			1946-47		
	Irrigated	Unirrigated	Total	Irrigated	Unirrigated	Irrigated	Unirrigated	Total	Irrigated	Unirrigated	Total
North Arcot—											
Chengam ...	1	455	456	48	306	354	18	385	403	13	312	325
Tiruvannamalai ...	...	181	181	...	98	98	...	120	120	...	89	89
Polur ...	...	499	499	...	281	281	...	346	346	...	369	369
Wandiwash ...	...	509	509	...	396	396	...	352	352	...	399	399
Cheyyar ...	2	541	543	...	391	391	...	404	404	...	410	410
Wallajah ...	1	409	410	...	261	261	...	327	327	...	271	271
Arkonam ...	...	35	35	...	18	18	...	8	8	...	11	11
Vellore ...	...	496	496	...	551	551	5	400	405	6	228	234
Gudiyattam ...	5	1,408	1,413	3	1,203	1,206	3	1,066	1,069	4	983	987
Tirupattur ...	...	1,553	1,553	...	1,337	1,337	...	1,254	1,254	...	994	994
Zamindari—											
Arni ...	...	101	101	...	86	86	...	83	83	...	89	89
Total ...	9	6,187	6,196	51	4,928	4,979	26	4,745	4,771	23	4,155	4,178
Salem—											
Hosur ...	...	3,808	3,808	...	3,673	3,673	...	3,393	3,393	...	3,394	3,394
Krishnagiri ...	132	2,468	2,600	...	2,510	2,510	...	2,217	2,217	...	1,914	1,914
Dharmapuri ...	7	2,088	2,095	...	5	2,206	12	2,141	2,153	697	1,316	2,013
Hosur ...	...	3,745	3,745	...	3,294	3,294	...	3,424	3,424	...	3,586	3,586
Salem ...	2	623	625	3	608	611	3	628	631	2	640	642
Attur ...	766	206	972	105	671	776	675	92	767	65	747	812
Tiruchengode ...	9	2,276	2,285	...	2,373	2,373	...	2,470	2,470	4	2,542	2,546
Omalur ...	...	2,418	2,418	131	2,287	2,418	15	2,851	2,866	...	2,551	2,551
Namakkal ...	167	448	615	43	506	549	29	478	507	34	470	504
Rasipur ...	13	407	420	23	311	334	15	280	295	13	307	320
Yercaud ...	...	12	12	...	20	20	...	19	19	...	16	16
Total ...	1,096	18,499	1,9595	310	18,469	18,769	749	17,998	18,742	815	15,488	16,298
Coimbatore—											
Kollegal ...	1	1,538	1,539	...	1,470	1,470	...	1,482	1,482	...	1,394	1,394
Gobichettipalayam ...	63	923	986	28	828	856	38	1,007	1,045	67	952	1,019
Bhavani ...	41	789	830	24	509	593	60	639	699	53	643	696
Erode ...	19	226	245	2	173	175	3	262	265	1	197	198
Dharapuram ...	24	519	543	8	253	261	14	232	246	8	219	222
Udumalpet ...	36	155	191	7	95	102	8	110	118	48	42	90
Pollachi ...	4	978	982	...	700	700	7	820	827	1	631	632

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Name of District and Taluk	1943-44			1944-45		1945-46			1946-47		
	Irrigated	Unirrigated	Total	Irrigated	Unirrigated	Total	Irrigated	Unirrigated	Total	Irrigated	Unirrigated	Total
Palladam (Tirupur) ...	28	303	331	17	167	184	16	72	88	14	90	104
Avanthi ...	12	721	733	6	906	912	4	650	654	5	630	635
Coimbatore ...	20	398	418	474	...	474	343	10	353	18	260	278
Total ...	248	6,550	6,798	566	5,161	5,727	493	5,284	5,777	210	5,108	5,318
Trichirapalli—												
Musiri ...	32	1,271	1,303	17	1,349	1,360	10	1,308	1,318	10	1,315	1,325
Kulittalai ...	4	1,474	1,478	11	950	961	9	1,301	1,310	2	768	770
Trichirapalli ...	2	275	277	...	284	284	1	283	284	16	410	426
Udayarpalayam Jayakondacholapuram ...	6	469	475	6	489	495	1	382	383	3	371	374
Perambalur ...	1	1,462	1,463	4	1,247	1,251	2	1,223	1,225	3	1,257	1,260
Karur ...	26	656	682	17	438	455	37	504	541	15	451	466
Lalgudi ...	6	1,369	1,375	10	1,218	1,228	6	1,306	1,312	5	1,264	1,269
Total ...	77	6,976	7,053	65	5,919	5,984	66	6,367	6,433	54	5,836	5,890
Tanjore—												
Shiyali ...	...	8	8	...	12	12	...	46	46	...	22	22
Mayavaram ...	10	13	23	7	14	21	6	7	13	6	9	15
Kumbakonam ...	1	8	9	1	9	10	1	7	8	1	10	11
Nannilam ...	2	14	16	3	5	8	1	4	5	2	3	5
Negapatam ...	1	5	6	1	5	6	2	4	6	2	3	5
Tirutturaipundi ...	...	22	22	...	8	8	...	7	7	...	11	11
Pattukottai ...	...	2	2	...	3	3	...	176	176	...	...	...
Arantangi ...	...	...	...	...	...	...	...	...	...	...	2	2
Tanjore ...	4	126	130	1	94	95	3	69	72	1	60	61
Papanasam ...	1	8	9	1	26	27	3	71	74	86	2	88
Mannargudi ...	1	...	1	1	...	1	1	...	1	...	6	6
Total ...	20	206	226	15	176	191	17	391	408	98	128	226
Madura—												
Palni ...	72	133	205	30	128	153	19	...	19	20	51	71
Dindigul ...	14	326	340	4	278	282	13	249	262	4	161	165
Madura ...	2	61	63	64	6	69	...	15	15	...	62	62
Melur ...	54	932	986	128	608	781	...	824	824	...	721	721
Tirumangalam ...	59	15	74	1	27	28	...	23	23	...	11	11
Periakulam ...	5	60	65	6	75	81	13	35	48	...	27	27

Name of District and Taluk		1943–44			1944–45			1945–46			1946–47		
		Irrigated	Unirrigated	Total	Irrigated	Unirrigated	Total	Irrigated	Unirrigated	Total	Irrigated	Unirrigated	Total
Nilakottai	...	6	149	155	4	114	118	21	15	71	3	30	33
Kodaikanal	...	...	23	23	...	29	29	...	19	19	...	15	15
Total	...	212	1,699	1,911	232	1,259	1,491	66	1,215	1,281	27	1,078	1,105
Ramnad—													
Sattur	...	5	153	158	1	91	92	2	91	93	5	98	103
Srivilliputtur	...	...	149	149	4	129	133	...	121	121	317	...	317
Zamindari—													
Tiruvadanai	...	...	...	...	...	...	...	...	...	...	...	...	...
Ramnad	...	...	...	...	...	...	...	...	...	...	...	...	...
Mudukulattur	...	...	199	199	...	197	197	...	64	64	...	73	73
Arupukotai	...	8	33	41	8	20	28	...	33	33	4	18	22
Paramakudi	...	...	40	40	...	42	42	...	...	...	...	26	26
Sivaganga	...	19	188	207	17	180	197	17	180	197	...	23	23
Tiruppattur	...	...	41	41	...	298	298	...	37	37	...	21	21
Total	...	32	803	835	30	957	987	19	526	545	326	259	585
Tinnevelly—													
Sankaranarayanarkoil	...	...	...	41	1	27	28	1	20	21	2	15	17
Tenkasi	...	...	...	188	129	15	138	137	2	139	97	7	104
Ambasamudram	...	...	...	25	8	5	13	6	...	6	7	1	8
Tinnevelly	...	...	...	13	2	5	7	1	2	3	...	2	2
Nanguneri	...	...	...	73	76	...	76	...	64	64	1	60	61
Srivaikuntam	...	...	...	76	5	37	42	3	33	36	2	35	37
Tiruchendur	...	...	...	227	8	213	221	6	201	207	8	162	170
Koilpatti	...	...	...	377	5	149	154	20	114	134	3	94	97
Total	...	...	...	*1,020	228	451	679*	174	336	610	120	376	496*
Malabar—													
Chirakkal, Cannanore	...	...	78	78	...	78	78	...	93	93	...	70	70
Kottayam, Tellicherry	...	...	...	...	...	...	...	...	...	...	...	...	...
Kurumbunad, Badagara	...	...	...	...	...	...	...	...	...	...	...	...	...
Wyanad, Manantoddy	...	...	...	...	...	...	...	...	...	...	...	...	...
Calicut	...	...	...	...	...	...	...	...	...	...	...	...	...
Ernad, Manjori	...	...	26	26	...	28	28	...	6	6	...	62	62

* Includes also hemp.

Name of District and Taluk	1943-44			1944-45			1945-46			1946-47		
	Irrigated	Unirrigated	Total	Irrigated	Unirrigated	Total	Irrigated	Unirrigated	Total	Irrigated	Unirrigated	Total
Ponnani ...	...	35	35	...	...	...	...	35	35	...	...	...
Walluvanad, Peruntalmanna.	...	255	255	...	295	295	...	279	279	...	260	260
Palghat ...	...	59	59	...	36	36	...	109	109	...	12	12
Cochin ...	...	...	...	...	...	...	...	...	...	...	...	...
Total ...	...	453	453	...	537	537	...	522	522	...	404	404
South Kanara—												
Coondapur ...	...	...	...	...	29	29	...	...	30	...	...	30
Udipi ...	...	...	...	...	...	...	...	...	...	...	...	26
Karakal ...	...	...	...	...	...	...	...	...	...	...	...	...
Mangalore ...	...	...	...	...	...	...	...	...	...	...	...	...
Uppinangadi, Puttur ...	...	...	...	...	65	65	...	...	49	...	...	45
Kasargod ...	...	...	...	...	141	141	...	...	167	...	...	156
Total ...	...	...	260	...	265	265	...	...	246	...	...	257
Nilgiris—												
Coonoor ...	...	...	...	...	4	4	...	3	3	...	5	5
Gudalur ...	...	...	...	...	5	5	...	6	6	...	5	5
Ootacamund ...	...	...	...	...	16	16	...	5	5	...	3	3
Total ...	...	...	15	*26	25	25	...	*14	14	...	*13	13

* Total area of castor and Lamp oil combined.

APPEN

Production of castor seed in the

Year	Name of				
	Guntur	Kurnool	Bellary	Anantapur	Nellore
1917-18	7,200	3,700	3,400	6,300	7,000
18-19	7,200	2,700	1,100	2,300	4,800
19-20	5,200	3,200	3,300	5,900	4,000
20-21	4,600	1,700	2,100	3,000	5,000
21-22	5,200	1,700	1,400	4,300	4,600
22-23	5,800	2,200	920	3,400	3,500
23-24	4,800	1,800	1,100	1,600	3,900
24-25	5,800	2,350	1,400	3,700	4,850
25-26	6,300	3,500	1,300	4,800	6,700
26-27	4,100	2,300	1,200	4,500	3,200
27-28	5,100	2,450	1,150	4,800	4,900
28-29	4,260	2,560	1,450	5,330	5,100
29-30	2,500	1,700	940	1,650	4,700
30-31	2,370	1,820	1,160	4,680	2,640
31-32	4,350	2,300	1,850	3,800	4,850
32-33	4,090	1,920	1,470	5,280	6,970
33-34	3,390	2,080	850	4,080	5,580
34-35	3,520	2,050	570	1,380	3,830
35-36	2,500	1,970	1,100	3,430	3,940
36-37	2,480	1,830	1,470	3,320	4,250
37-38	2,620	1,550	610	2,580	4,320
38-39	2,670	1,620	1,270	3,900	4,220
39-40	2,860	1,920	1,220	5,880	3,720
40-41	3,270	2,200	1,500	5,030	3,700
41-42	2,420	1,820	1,120	3,800	3,870
42-43	2,590	1,990	1,220	2,820	3,920
43-44	3,290	1,870	1,500	3,630	4,450
44-45	2,730	2,810	1,690	4,440	4,370
45-46	2,560	1,710	890	2,660	3,500
46-47	2,250	1,900	1,170	2,920	3,300

DIX VII.

Madras Presidency (by districts) Tons.

District.

Salem	Coimbatore	Trichinopoly	Other Districts	Total
5,000	3,200	2,300	12,790	50,890
3,400	2,100	2,200	11,730	37,530
3,500	3,300	2,300	13,760	44,460
4,000	3,200	2,300	12,730	38,630
3,400	2,800	2,100	10,780	36,280
3,500	2,400	1,700	9,790	33,290
2,900	1,200	1,200	11,080	29,580
3,500	1,850	1,300	12,840	37,590
3,700	1,700	1,400	11,530	40,030
2,600	1,300	1,250	8,440	28,890
3,000	1,650	1,400	8,570	33,020
3,140	1,870	1,310	7,890	33,410
3,750	1,900	1,600	7,310	30,030
3,640	1,970	1,440	8,300	28,020
4,000	1,500	1,400	8,920	32,970
4,250	2,140	1,850	9,540	37,510
4,380	1,700	1,350	7,720	31,140
2,680	930	1,020	6,900	22 780
2,970	860	1,450	4,990	23,210
3,550	1,240	1,520	4,420	24,580
3,720	1,410	1,410	4,140	24,860
2,870	720	1,170	3,970	22,410
3,720	1,120	1,230	3,570	25,630
4,970	1,420	1,150	4,750	27,890
4,110	1,180	1,260	3,820	23,200
3,590	1,390	1,290	4,270	22,980
3,500	1,010	1,200	4,190	24,640
3,350	920	960	3,910	25,180
3,180	880	1,080	2,750	19,160
3,870	860	950	2,730	19,350

APPENDIX VIII

Results of analysis of samples of certain trade descriptions of Castor seed.

—	Chittoo.	Madras.	Hyderabad.	Gujarat.	Calcutta or Colgong.	Salem.	Cawnpore.	Pares.
Number of samples analysed ...	7	25	9	8	5	3	37	5
Number of seeds per 100 grams—								
Maximum ...	630	501	500	390	380	340	340	240
Minimum ...	400	400	350	330	330	280	210	190
Average ...	567	445	431	359	356	315	275	210
Percentage of husk in the seeds—								
Maximum ...	32·0	32·3	31·5	30·0	30·5	30·1	31·1	27·2
Minimum ...	29·0	27·4	26·5	26·9	25·1	25·7	25·3	24·3
Average ...	30·2	29·7	29·0	28·6	27·9	28·2	28·1	25·9
Moisture (%)—								
Maximum ...	6·9	7·0	6·9	5·9	7·6	6·8	6·4	4·7
Minimum ...	4·0	4·1	4·8	3·2	5·3	4·4	3·6	3·7
Average ...	5·4	5·6	5·6	4·7	7·6	5·8	4·7	4·3
Shell present in the samples (%)—								
Maximum ...	1·7	2·6	2·0	...	4·0	2·4	8·2	...
Minimum ...	1·7	0·7	2·0	...	1·1	1·2	1·3	...
Average ...	1·7	1·6	2·0	....	2·7	1·7	2·7	...

APPENDIX VIII—*(Contd.)*

—	Chittoo.	Madras.	Hyderabad.	Gujarat.	Calcutta or Colgong.	Salem.	Cawnpore.	Pares.
Damage seeds (%)—								
Maximum ...	3·1	3· 9	1·6	3· 4	4·2	2·2	10·1	3·5
Minimum ...	1·7	0· 2	1·6	0· 8	1·6	0·4	0·3	2·7
Average ...	2·4	1·12	1·6	2·12	2·5	1·3	2·8	3·1
Impurities (%)—								
Maximum ...	2·2	3· 2	0·7	1· 0	2·2	...	4·1	0·8
Minimum ...	0·8	0· 4	0·7	0· 6	2·0	...	0·2	0·8
Average ...	1·3	1· 5	0·7	0· 7	2·0	...	1·4	0·8
Oil content (%)—*								
Maximum ...	46·1	48·8	60·8	49·2	50·9	48·9	51·4	53·2
Minimum ...	42·4	43·1	45·4	45·4	46·6	45·9	36·9	43·4
Average ...	44·3	46·6	48·1	47·1	48·7	47·4	48·0	48·8

* Calculated on the basis of clean seed.

APPEN

Imports of Castor seed into Madras Presidency

(In railway

From	April	May	June	July	August
1942-43					
Nizam's territory ...	368	333	162	796	27,010
Mysore ...	10	...	41	489	4,871
Orissa ...	...	98	...	...	...
Central Provinces and Berar ...	...	...	...	...	...
Bombay ...	...	...	...	...	...
Karachi ...	...	...	...	...	...
Total ...	378	431	203	1,285	32,481
1943-44					
Nizam's territory ...	886	301	563	6,513	2,181
Mysore ...	1,170	380	2	...	...
Orissa ...	454	182	8	9	...
Bombay ...	164	...	...	...	...
Total ...	2,674	863	568	6,522	2,181
1944-45					
Nizam's territory ...	18,783	8,194	4,148	4,886	509
Bombay ...	...	...	49	...	...
Total ...	18,783	8,194	4,197	4,886	509
1945-46					
Nizam's territory ...	3,298	1,260	589	68	...
Mysore ...	...	...	...	...	...
Bombay ...	...	...	...	...	...
Total ...	3,298	1,260	589	68	...

DIX IX.

by rail (M. S. M. Railway stations only).

maunds).

September	October	November	December	January	February	March	Total
44,214	9,834	328	13	1,547	221	1,964	86,890
1,389	1,362	1,342	84	609	128	121	10,296
...	...	...	...	...	...	...	98
898	15	...	...	...	...	...	913
20	8	32	...	...	...	...	60
...	362	...	...	...	...	...	362
46,521	11,081	1,702	97	2,056	349	2,085	98,619
2,322	...	790	3,184	38,078	63,792	45,096	1,53,686
...	405	...	...	...	...	...	1,967
...	...	...	...	...	...	...	668
...	...	...	...	479	439	287	1,319
2,322	405	790	3,184	38,557	64,231	45,373	1,57,565
1,210	265	...	...	22	1,080	2,108	41,205
...	...	36	...	17	93	29	215
1,210	265	36	...	39	1,173	2,178	41,420
...	41	796	2,021	3,915	430	19,684	32,002
...	...	...	...	...	3	...	3
25	196	811	214	730	..	1,196	3,172
25	237	1,607	2,135	4,645	433	20,880	35,177

APPEN

From	April	May	June	July	August
1946–47					
Nizam's territory ...	23,894	21,211	12,799	8,007	2,374
Mysore ...	61	...	...	...	595
Orissa ...	...	...	...	...	...
Central Provinces and Berar ...	...	...	...	...	...
Bombay ...	457	99	...	1,721	12
Total ..	24,412	21,310	12,799	9,728	2,981
1947–48					
Nizam's territory ...	19,252	8,609	5,713	492	9
Mysore ...	...	...	632	303	886
Bombay ...	1,432	694	490	189	701
Orissa ...	...	59	641	261	...
Calcutta ...	...	...	...	...	...
Central India ...	...	...	401	...	...
Total ...	20,684	9,362	7,877	1,245	1,596

DIX IX.—(*Contd.*)

September	October	November	December	January	February	March	Total
11,355	6,148	1,990	286	1,018	4,684	18,984	1,12,695
...	...	...	25	...	34	...	715
...	...	...	...	...	...	4	4
...	...	393	...	...	...	...	393
1,421	739	983	773	634	2,454	3,741	18,034
12,766	6,882	3,366	1,084	1,652	7,172	22,729	1,26,841
471	7,608	6,111	10,589	1,795	...	...	59,444
413	...	523	...	5	...	9	2,771
313	80	...	285	268	...	...	4,247
...	58	...	...	...	...	517	1,586
...	...	...	20	20	...	...	40
...	...	...	...	...	...	...	401
1,197	7,741	5,634	10,694	2,083	...	526	68,689

APPENDIX X

Exports of Castor seed, Castor oil and Castor cake from India

(000 tons.)

—	Exports of Castor seed.			Total.	Exports of Castor oil from British India.	Exports of Castor cake from British India.
	Through British India ports.	Through Kathiawar States ports.	Through Portugese ports in India.*			
1899–1900 ...	44·2			44·2	7·9	
1900– 01 ...	43·9			43·9	6·6	
1901– 02 ...	66·2			66·2	8·7	
1902– 03 ...	87·6			87·6	8·9	
1903– 04 ...	78·4			78·4	8·2	
1904– 05 ...	73·1			73·1	7·0	
1905– 06 ...	65·0			65·0	6·2	
1906– 07 ...	75·3			75·3	6·2	
1907– 08 ...	99·7			99·7	6·5	
1908– 09 ...	82·5			82·5	4·7	
1909– 10 ...	95·1			95·1	4·3	
1910– 11 ...	107·4			107·4	5·2	
1911– 12 ...	120·2			120·2	6·0	
1912– 13 ...	110·6	Not available.	Not available.	110·6	4·1	7·0
1913– 14 ...	134·8			134·8	4·3	4·9
1914– 15 ...	82·8			82·8	3·9	4·0
1915– 16 ...	88·0			88·0	6·2	11·5
1916– 17 ...	93·2			93·2	7·4	10·0
1917– 18 ...	98·1			98·1	9·0	2·9
1918– 19 ...	82·0			82·0	7·1	4·3
1919– 20 ...	8·5			8·5	1·3	4·1
1920– 21 ...	15·5			15·5	1·3	1·6
1921– 22 ...	48·8			48·8	0·8	0·9
1922– 23 ...	86·6			86·6	2·6	1·0
1923– 24 ...	85·0			85·0	2·5	1·1
1924– 25 ...	95·4			95·4	2·1	1·4
1925– 26 ...	109·8			109·8	3·0	1·2
1926– 27 ...	101·5		1·5	103·0	2·8	0·2
1927– 28 ...	121·7		1·0	122·7	2·0	0·1
1928– 29 ...	121·3		1·0	122·3	2·3	1·2

APPENDIX X—(*Contd.*)

—	Exports of Castor seed.			Total.	Exports of Castor oil from British India.	Exports of Castor cake from British India.
	Through British India ports.	Through Kathiawar States ports.	Through Portugese ports in India.*			
1929–30 ...	106·4			106·4	2·2	0·1
1930–31 ...	91·0		1·1	92·1	2·1	0·9
1931–32 ...	104·0	1·8	0·5	106·3	4·2	1·8
1932–33 ...	85·9	5·2	1·0	92·1	4·8	0·8
1933–34 ...	81·5	5·9	1·0	88·4	5·7	2·4
1934–35 ...	68·8	5·3		74·1	5·2	3·0
1935–36 ...	60·0	4·0		64·0	6·0	1·7
1936–37 ...	43·1	2·7		45·8	6·5	1·7
1937–38 ...	42·1	2·2		44 3	6·8	2·5
1938–39 ...	7·6	3·1		10·7	4·7	1·0
1939–40 ...	40·4	2·2		42·6	5·4	0·9
1940–41 ...	67·0	5·1		72·1	5·2	0·1
1941–42 ...	20·0	...		20·0	4·6	0·2
1942–43 ...	28·6	1·8		30·4	2·1	0·3
1943–44 ...	14·2	13·8		28·0	0·2	...

Not available.

* The statistics given are for calendar years. The figure for 1926 has been shown against 1926–27 and so on.

APPEN

Exports of Castor seed to different

(000

—	Average 1909-10 to 1913-14	1929-30	1930-31	1931-32	1932-33	1933-34	Average 1929-30 to 1933-34	1934-35
United Kingdom	53·9	24·7	19·6	23·2	22·7	27·1	23·4	26·4
France ...	15·7	16·5	16·0	20·3	16·3	13·0	16·5	9·2
Spain ...	0·7	2·8	3·3	2·1	2·3	2·3	2·7	2·8
Belgium ...	13·7	3·5	5·1	4·1	4·0	0·3	3·4	...
Germany ...	6·1	1·1	1·5	0·9	1·6	4·5	1·9	3·3
Italy ...	11·1	6·2	6·5	12·1	6·2	7·9	7·8	5·1
Netherlands ...	...	...	...	...	...	1·4	0·3	3·2
United States of America ...	11·8	51·0	38·5	34·8	28·4	23·5	35·2	13·9
Australia ...	0·2	0·2	0·2	1·2	1·0	0·9	0·7	1·8
Japan ...	...	N	N	4·0	1·9	...	1·2	0·5
Others ...	0·4	0·6	0·3	1·3	0·5	0·6	0·7	2·6
Total ...	118·6	106·4	91·0	104·0	85·9	81·5	98·8	68·8
Share of—								
Bengal ...	6·5	11·7	2·6	10·4	3·4	1·1	5·9	8·7
Bombay ...	92·4	61·0	47·1	60·2	49·4	33·6	50·3	25·2
Sind ...	0·2	0·6	N	N	N	0·1	0·1	0·2
Madras ...	14·5	33·1	41·3	33·4	33·1	46·7	37·5	34·7

N—Negligible quantities.

DIX XI.

countries through British India ports.

tons).

1935-36	1936-37	1937-38	1938-39	Average 1934-35 to 1938-39	1939-40	1940-41	1941-42	1942-43	1943-44	Average 1939-40 to 1943-44
22·4	20·5	13·7	1·4	16·7	12·0	35·4	14·1	21·1	10·6	18·6
14·6	6·5	4·9	0·2	7·1	2·0	9·6	...	...	...	2·3
2·8	0·7	0·1	N	1·3	0·1	...	...	...	...	N
0·7	3·6	1·2	...	1·1	0·3	...	...	...	...	0·1
0·5	0·1	0·1	1·1	1·0	...	...	...	...	...	...
6·7	1·5	6·8	...	4·0	0·7	1·8	...	...	...	0·5
2·9	0·2	1·9	2·9	2·2	2·2	...	...	...	...	0·4
4·0	1·7	...	...	3·9	13·3	14·5	...	...	...	5·6
2·0	2·1	1·8	0·4	1·6	1·7	2·8	4·6	7·0	3·6	4·0
1·0	4·3	10·6	...	3·3	6·8	2·6	1·3	...	...	2·1
2·4	1·9	2·0	1·6	2·1	1·1	0·3	...	0·5	...	0·4
60·0	43·1	42·1	7·6	44·3	40·4	67·0	20·0	28·6	14·2	34·0
10·1	4·5	4·3	...	5·5	14·1	13·8	2·2	5·7	2·3	7·6
31·2	15·0	20·8	2·5	19·0	20·6	17·8	4·6	13·1	7·0	12·6
0·3	0·1	N	N	0·1	0·2	N	...	...	...	N
18·4	23·5	17·0	5·1	19·7	5·5	35·4	13·2	9·8	4·9	13·8

APPEN

Exports of Castor seed to

Kathiawar States

Countries.	1931–32 (a)	1932–33	1933–34	Average (b)	1934–35	1935–36
United Kingdom ...	1	2	3	2	1	1
Germany ...	1	...	1	5	1	...
Netherlands ...	...	...	...	...	...	...
Belgium ...	...	...	...	...	...	...
France ...	...	...	1	1	1	...
Spain ...	...	...	1	...	...	...
Egypt ...	...	...	...	...	1	...
United States of America ...	...	2	...	1	...	...
Others ...	...	...	...	...	...	1
Total ...	2	4	6	9	4	2

(a) Sea-borne trade statistics for Kathiawar States ports are

(b) Average for three years 1931–32 to 1933–34.

DIX XII.

different countries through

ports (000 tons).

1936–37	1937–38	1938–39	Average	1939–40	1940–41	1941–42	1942–43	1943–44	Average
1	1	1	1	2	5	...	2	14	5
...	...	1	...	...	...	...	...	...	...
...	...	1	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...
1	1	...	1	...	...	...	...	...	...
2	2	3	2	2	5	...	2	14	5

not available prior to 1931–32.

APPEN

Exports of Castor oil to different countries

	Average 1909-10 to 1913-14.	1929-30.	1930-31.	1931-32.	1932-33.	1933-34.	Average 1929-30 to 1933-34.	1934-35.
United Kingdom ...	528	1,365	1,326	2,941	3,292	3,228	2,430	2,628
Sweden ...	...	...	...	23	11	51	18	117
Germany ...	...	34	61	563	680	1,082	474	1,120
Netherlands ...	...	10	15	7	26	227	57	219
Belgium ...	...	24	84	99	67	97	74	164
Egypt ...	...	...	...	...	...	...	...	...
Union of South Africa ...	...	220	136	109	114	186	152	157
Mauritius and Dependencies ...	462	89	73	36	60	117	35	95
Straits Settlements.	560	61	45	55	54	42	44	39
Commonwealth of Australia ...	1,705	93	57	38	37	47	54	60
New Zealand ...	643	137	139	95	146	124	108	139
Canada ...	...	...	...	26	106	220	72	87
Ceylon ...	311	110	96	78	103	117	†100	78
Burma* ...	...	...	...	...	...	...	...	...
Other countries ...	3341	97	87	115	133	323	111	810
Total ...	4,752	2,183	2,015	4,215	4,829	5,723	3,709	5,203
Share of—								
Bengal ...	4,219	661	483	648	523	680	499	673
Bombay ...	97	469	956	2,847	3,086	6,994	5,240	8,838
Sind ...	19	Neg.	...	...	5	...	1	...
Madras ...	517	1,053	607	725	1,215	1,098	949	754

* As Burma was part of British India upto 1936-37, the exports
† Includes 920 tons to Natal.

DIX XIII

through British India Ports (Tons).

1935-36.	1936-37.	1937-38.	1938-39.	Average 1934-35 to 1938-39.	1939-40.	1940-41.	1941-42.	1942-43.	1943-44.	Average 1939-40 to 1943-44.
4,110	4,395	4,169	3,103	3,681	2,635	2,546	523	48	...	1,150
111	78	105	21	86	58	15	...	...	...	15
657	98	771	5	530	258	...	...	...	...	52
116	46	44	...	85	...	...	...	...	...	...
108	185	41	...	100	...	...	...	...	...	...
58	367	244	212	176	226	452	...	...	...	136
273	818	310	231	258	373	280	423	452	59	317
78	124	94	136	105	123	85	...	...	...	42
36	44	43	52	43	52	88	...	...	...	28
28	51	36	65	46	34	22	...	...	...	11
84	73	87	64	88	68	118	...	...	...	37
27	219	385	525	239	1,190	931	2,283	703	8	1,023
75	96	94	90	87	90	92	...	...	...	36
...	...	198	187	77	166	150	...	...	...	63
282	406	225	43	253	108	394	1,397	873	96	574
6,043	6,501	6,796	4,734	5,856	5,381	5,173	4,626	2,076	163	3,484
550	556	479	404	512	647	652	Not available.			
4,453	4,902	5,272	3,877	4,475	4,046	3,648				
...	...	...	...	...	...	...				
1 040	1,043	1,045	453	869	688	873	591	173	45	...

to Burma prior to 1937-38 have not been included.

APPENDIX XIV.

Average wholesale prices of castor seed—Per imperial maund of 82-2/7 lbs. Rs.

Year and month	Vizianagaram	Guntur	Nandyal	Bellary	Tiruppattur	Bombay
	Rs. A.	Rs. A.	Rs. A.	Rs. A.	Rs. A.	Rs. A.
1937						
January ...	5 9	5 1	4 12	4 14	...	5 4
February ...	5 8	5 0	4 12	4 12	...	5 8
March ...	5 4	5 1	4 14	4 10	...	5 8
April ...	5 8	5 2	5 2	4 7	...	5 7
May ...	5 9	5 3	5 0	4 4	...	5 6
June ...	5 8	5 4	5 2	4 4	...	5 6
July ...	5 7	5 3	5 2	4 6	...	5 6
August ...	5 8	5 2	5 3	4 6	...	5 5
September ...	5 8	5 2	5 4	4 8	...	5 9
October ...	5 8	5 2	5 4	4 6	...	5 7
November ...	5 8	5 2	5 5	3 14	...	5 4
December ...	5 5	5 2	5 5	4 1	...	5 7
Average ...	5 8	5 2	5 1	4 6	...	5 6
1938						
January ...	5 5	5 5	5 5	4 10	...	4 14
February ...	5 2	5 8	5 4	4 7	...	4 13
March ...	4 15	5 4	5 5	4 0	...	5 5
April ...	4 12	4 8	5 5	3 14	4 2	4 12
May ...	4 11	4 11	5 3	3 13	4 5	4 11
June ...	4 13	4 11	5 2	4 12	4 7	4 9
July ...	4 13	4 11	5 5	4 4	4 4	4 7
August ...	4 13	4 10	5 5	4 2	4 3	4 6
September ...	4 12	4 9	5 5	4 3	4 3	4 6
October ...	4 12	4 8	5 4	3 13	4 3	4 3
November ...	4 12	4 5	5 5	3 12	4 2	4 3
December ...	4 10	4 8	5 4	4 2	4 3	4 6
Average ...	4 14	4 12	5 4	4 2	4 4	4 7
1939						
January ...	4 12	4 7	5 4	4 3	4 5	4 4
February ...	4 12	4 4	5 3	3 13	4 3	3 11
March ...	4 11	4 1	5 0	3 12	4 0	4 1

APPENDIX XIV—(*Contd.*)

Year and Month.	Vizianagaram.	Guntur.	Nandyal.	Bellary.	Tiruppattur.	Bombay.
	Rs. A.	Rs. A.	Rs. A.	Rs. A.	Rs. A.	Rs. A.
April ...	4 10	4 4	5 0	3 12	4 0	4 0
May ...	4 9	4 4	5 3	3 12	4 2	4 6
June ...	4 8	4 6	5 4	4 4	4 2	4 7
July ...	4 8	4 6	5 4	3 11	4 1	4 6
August ...	4 6	4 5	5 0	3 11	4 0	4 11
September ...	4 9	4 7	5 0	3 11	4 6	5 5
October ...	4 11	4 9	5 0	3 12	4 15	5 11
November ...	4 14	5 11	5 1	4 2	5 11	6 13
December ...	5 9	6 5	6 14	5 7	6 6	7 14
Average ...	4 12	4 10	5 4	4 0	4 8	4 15
1940						
January ...	5 10	6 12	6 14	5 8	6 12	8 3
February ...	6 8	7 5	6 14	6 5	6 10	7 7
March ...	6 8	7 5	6 14	6 3	5 15	7 3
April ...	6 8	7 0	6 14	5 10	6 1	6 4
May ...	6 8	6 12	6 14	5 9	6 7	7 1
June ...	6 7	6 9	6 15	5 5	5 11	5 15
July ...	6 4	6 10	7 0	5 4	5 4	5 11
August ...	6 4	6 8	7 2	5 4	5 9	5 1
September ...	6 4	6 8	6 10	5 4	6 2	5 3
October ...	6 4	6 4	6 1	5 0	6 3	5 6
November ...	6 4	6 4	6 0	5 0	5 2	5 6
December ...	6 2	6 0	5 15	5 0	4 5	5 0
Average ...	6 5	6 10	6 10	5 6	5 13	6 4
1941						
January ...	5 0	5 11	5 13	4 5	4 3	4 8
February ...	5 0	4 10	5 13	4 3	4 1	4 8
March ...	5 0	4 4	5 13	3 15	3 13	4 11
April ...	5 0	4 5	5 13	3 8	3 13	4 10
May ...	5 0	4 6	5 13	3 8	3 14	4 9
June ...	5 1	4 3	5 11	3 8	3 12	4 11
July ...	5 0	4 7	5 2	3 12	4 5	5 4
August ...	5 4	4 13	4 12	4 0	4 15	5 14
September ...	6 0	5 7	4 12	4 1	4 13	5 10

APPENDIX XIV—(*Contd.*)

Year and Month.	Vizia-nagaram	Guntur.	Nandyal.	Bellary.	Tirup-pattur.	Bombay.
	Rs. A.	Rs. A.	Rs. A.	Rs. A.	Rs. A.	Rs. A.
October ...	6 0	5 8	5 9	4 4	4 15	5 6
November ...	5 14	5 5	5 5	4 4	5 1	5 14
December ...	5 12	5 0	5 4	4 4	5 0	6 5
Average ...	5 5	4 15	5 6	3 15	4 6	5 8
1942						
January ...	5 13	5 8	5 5	4 3	5 0	6 0
February ...	5 10	5 7	5 5	4 8	5 0	5 11
March ...	5 5	5 4	5 4	4 9	5 0	5 14
April ...	5 3	5 4	5 5	4 10	5 0	6 3
May ...	5 0	5 12	5 5	4 10	5 8	6 9
June ...	6 3	6 9	6 5	4 13	7 2	7 10
July ...	8 1	7 8	5 5	5 13	8 2	9 1
August ...	8 1	8 7	5 15	5 13	8 4	9 12
September ...	8 6	9 9	8 3	5 13	8 12	n. a.
October ...	9 9	10 9	9 0	6 2	9 10	n. a.
November ...	9 8	10 9	9 8	7 3	10 8	9 9
December ...	10 3	10 14	10 9	7 8	10 8	11 9
Average ...	7 2	7 10	6 5	5 8	7 6	7 13
1943						
January ...	11 5	11 5	11 4	8 5	10 8	12 1
February ...	11 11	12 2	12 15	9 6	11 4	12 13
March ...	13 12	13 10	12 11	10 1	12 6	13 7
April ...	13 13	14 1	15 13	11 4	13 8	14 15
May ...	14 2	14 2	15 13	12 2	14 0	16 4
June ...	15 2	15 2	15 13	12 2	14 8	15 5
July ...	15 2	13 0	15 5	12 2	14 4	14 1
August ...	14 10	13 0	15 5	16 10	14 4	13 15
September ...	16 2	14 2	14 13	12 10	14 0	14 5
October ...	15 2	13 13	14 13	12 10	14 4	14 7
November ...	15 2	14 2	14 8	12 10	11 8	13 14
December ...	15 2	13 13	14 8	12 10	11 12	13 2
Average ...	14 4	13 8	14 11	11 11	13 0	14 1

APPENDIX XIV—(*Contd.*)

Year and month	Vizia-nagaram	Guntur	Nandyal	Bellary	Tirupa-ttur	Bombay
	Rs. A.	Rs. A.	Rs. A.	Rs. A.	Rs. A.	Rs. A.
1944						
January ...	15 2	13 5	14 13	12 10	12 8	11 8
February ...	15 2	12 13	15 13	15 10	12 8	10 14
March ...	15 2	13 5	14 13	15 8	13 4	12 0
April ...	15 2	12 8	12 2	...	12 0	12 3
May ...	15 2	12 8	10 10	12 2	10 12	12 0
June ...	14 10	12 8	10 10	12 2	10 12	12 3
July ...	14 10	12 8	10 10	11 2	11 6	12 15
August ...	14 10	12 8	10 10	11 2	11 4	12 3
September ...	14 2	11 8	10 10	11 2	10 0	11 9
October ...	14 2	10 8	10 10	11 2	9 8	11 1
November ...	14 2	11 8	10 10	11 2	10 0	11 5
December ...	12 8	12 0	9 8	11 2	10 4	11 7
Average ...	14 8	12 4	11 13	11 4	11 3	11 12
1945						
January ...	12 9	12 0	9 8	11 1	10 12	11 7
February ...	12 0	12 0	9 8	10 10	11 0	11 7
March ...	12 0	12 0	9 8	10 10	11 0	11 4
April ...	12 0	11 8	10 0	10 10	10 8	...
May ...	11 8	10 8	10 10	10 10	11 0	...
June ...	11 8	11 0	10 10	10 10	10 8	...
July ...	11 8	11 0	10 10	10 10	10 8	...
August ...	12 1	12 5	10 10	...	12 0	...
September ...	12 1	12 8	10 8	10 8	11 0	...
October ...	12 1	12 8	9 0	10 8	10 8	...
November ...	12 8	12 8	9 8	10 8	12 12	...
December ...	12 8	13 1	9 8	10 10	13 8	...
Average ...	12 0	11 15	9 15	10 10	11 4	...
1946						
January ...	13 5	13 3	10 0	11 10	14 6	12 7
February ...	14 5	14 5	11 5	11 10	14 6	14 2
March ...	15 2	15 2	13 7	11 10	16 0	15 11
April ...	15 2	15 14	13 11	11 10	15 14	15 13
May ...	15 5	16 2	13 11	12 2	17 4	16 9
June ...	16 2	16 5	13 11	12 2	18 0	16 8
July ...	16 2	16 14	14 8	12 2	18 0	16 7

APPENDIX XIV—(*Contd.*)

Year and month	Vizia-nagaram		Guntur		Nandyal		Bellary		Tiruppa-thur		Dombay	
	Rs.	A.	Rs.	A.	Rs.	A.	Rs.	A.	Rs.	A.	Rs.	A.
August ...	16	2	17	2	15	9	...		17	12	17	7
September ...	16	2	18	10	16	2	...		18	4	17	10
October ...	16	2	17	2	16	6	...		18	4	17	4
November ...	16	2	18	10	16	6	...		18	8	18	0
December ...	16	2	20	2	17	6	12	5	18	0	18	6
Average ...	15	8	16	9	14	6	11	14	17	1	16	6
1947												
January ...	18	2	20	2	18	8	12	5	17	0	18	12
February ...	20	9	20	1	18	12	12	5	17	0	19	2
March ...	20	13	21	9	19	0	12	9	17	0	22	4
April ...	21	1	22	5	20	1	13	1	19	4	22	2
May ...	21	1	23	1	21	2	13	5	20	8	20	12
June ...	21	1	23	1	21	2	13	10	20	8	22	4
July ...	21	9	23	5	21	10	13	10	22	0	25	9
August ...	21	9	23	9	21	14	13	10	21	8	24	7
September ...	21	9	24	1	22	10	15	10	23	6	24	7
October ...	21	9	23	5	22	3	13	10	22	0	23	3
November ...	22	5	22	13	21	14	13	10	22	8	22	13
December ...	24	1	23	13	21	14	13	10	23	0	24	10
Average ...	21	4	22	9	20	14	13	3	20	8	22	8
1948												
January ...	...		23	9	21	2	13	10	23	12	25	12
February ...	23	1	21	1	23	3	13	10	22	0	25	15
March ...	21	9	21	1	20	9	13	10	21	0	23	11
April ...	21	9	20	1	19	13	13	10	20	0	22	3
May ...	21	9	21	5	20	5	13	10	26	0	22	12
June ...	21	9	21	9	20	9	14	2	25	0	21	8
July ...	21	9	22	13	21	10	14	2	24	8	22	4
August ...	21	9	23	1	21	10	14	2	24	0	22	3
September ...	21	5	23	1	22	11	14	2	24	0	22	10
October ...	21	1	23	1	23	11	14	2	24	0	21	11
November ...	21	1	22	5	24	5	14	2	25	0	22	1
December ...	21	1	22	1	25	1	14	2	...		21	14
Average ...	21	9	22	1	21	15	14	4	21	10	22	14
1949												
January ...	21	1	21	5	25	5	14	2	...		...	
February ...	19	1	21	5	25	9	15	15	...		21	5
March ...	18	13	21	1	25	9	16	5	...		20	14

APPENDIX XV.

Average price of Castor oil.

(Rupees per maund).

	Madras			Tirupattur		
	Rs.	A.	P.	Rs.	A.	P.
1937						
January	13	2	0	...		
February	13	0	0	...		
March	12	13	0	...		
April	12	15	0	...		
May	12	13	0	...		
June	12	8	0	...		
July	12	9	0	...		
August	12	9	0	...		
September	12	9	0	...		
October	12	9	0	...		
November	12	7	0	...		
December	12	3	0	...		
	12	11	0	N.A.		
1938						
January	12	5	0	10	0	0
February	12	3	0	10	0	0
March	11	5	0	...		
April	10	8	0	10	3	0
May	11	0	0	10	5	0
June	11	5	0	10	8	0
July	10	13	0	10	6	0
August	10	13	0	10	4	0
September	11	0	0	10	1	0
October	11	0	0	10	1	0
November	10	8	0	10	0	0
December	11	3	0	10	0	0
	11	0	0	10	3	0
1939						
January	11	3	0	10	1	0
February	10	13	0	10	1	0
March	9	13	0	9	11	0
April	9	3	0	9	11	0
May	9	11	0	10	0	0

APPENDIX XV—(*Contd.*)

	Madras			Tirupattur		
	Rs.	A.	P.	Rs.	A.	P.
June	9	8	0	10	3	0
July	9	8	0	10	0	0
August	9	11	0	9	13	0
September	10	8	0	10	5	0
October	11	13	0	10	7	0
November	14	3	0	13	3	0
December	15	11	0	14	12	0
	10	15	0	10	12	0
1940						
January	16	2	0	16	0	0
February	17	11	0	16	4	0
March	17	3	0	15	13	0
April	16	7	0	15	13	0
May	16	5	0	16	0	0
June	16	1	0	15	7	0
July	14	14	0	15	3	0
August	15	0	0	15	5	0
September	15	1	0	15	12	0
October	15	12	0	15	15	0
November	14	14	0	14	7	0
December	13	11	0	12	7	0
	15	12	0	15	5	0
1941						
January	11	7	0	11	7	0
February	11	9	0	10	12	0
March	10	3	0	10	3	0
April	10	0	0	10	0	0
May	10	1	0	10	1	0
June	10	1	0	10	1	0
July	11	4	0	11	4	0
August	12	8	0	12	8	0
September	12	8	0	12	8	0
October	12	11	0	12	11	0
November	12	13	0	12	13	0
December	12	13	0	12	13	0
	11	8	0	11	6	0

APPENDIX XV—(*Contd.*)

	Madras			Tirupattur		
	Rs.	A.	P.	Rs.	A.	P.
1942						
January	13	5	0	12	13	0
February	14	0	0	12	15	0
March	14	3	0	13	1	0
April	15	11	0	14	3	0
May	18	11	0	16	13	0
June	20	3	0	18	5	0
July	22	3	0	19	12	0
August	22	0	0	21	7	0
September	21	11	0	22	7	0
October	27	0	0	25	5	0
November	25	13	0	26	11	0
December	28	5	0	25	13	0
	20	4	0	19	2	0
1943						
January	28	5	0	28	5	0
February	28	13	0	27	8	0
March	33	8	0	30	0	0
April	34	11	0	33	5	0
May	37	0	0	33	5	0
June	39	8	0	32	8	0
July	34	5	0	33	5	0
August	32	1	0	34	3	0
September	33	11	0	31	11	0
October	34	8	0	34	3	0
November	34	8	0	31	11	0
December	35	6	0	34	3	0
	33	11	0	32	0	0
1944						
January	35	5	0	34	3	0
February	34	3	0	33	5	0
March	34	13	0	33	5	0
April	34	5	0	30	13	0
May	33	13	0	31	11	0
June	34	0	0	33	5	0

APPENDIX XV—(*Contd.*)

—	Madras	Tirupattur
	Rs. A. P.	Rs. A. P.
July	33 11 0	31 11 0
August	32 8 0	31 11 0
September	31 8 0	33 5 0
October	28 13 0	30 0 0
November	28 8 0	28 5 0
December	29 0 0	30 0 0
	32 8 0	31 13 0
1945		
January	33 8 0	28 5 0
February	33 5 0	27 5 0
March	33 5 0	31 11 0
April	33 0 0	29 3 0
May	32 0 0	31 11 0
June	32 5 0	31 11 0
July	32 8 0	30 13 0
August	33 5	30 0 0
September	32 5 0	31 11 0
October	32 8 0	30 0 0
November	32 8 0	29 3 0
December	32 11 0	30 0 0
	32 12 0	30 2 0
1946		
January	34 13 0	33 5 0
February	37 0 0	33 5 0
March	38 13 0	38 5 0
April	46 0 0	39 3 0
May	46 0 0	48 5 0
June	44 13 0	50 0 0
July	45 0 0	45 13 0
August	45 0 0	45 13 0
September	44 5 0	46 0 0
October	45 13 0	48 5 0
November	45 11 0	48 5 0
December	46 5 0	47 8 0
	43 2 0	43 10 0

APPENDIX XV—(*Contd.*)

—	Madras	Tirupattur
	Rs. A. P.	Rs. A. P.
1947		
January	49 3 0	48 5 0
February	50 8 0	50 0 0
March	54 11 0	51 11 0
April	54 11 0	53 5 0
May	55 0 0	51 11 0
June	55 11 0	56 11 0
July	56 11 0	57 8 0
August	57 7 0	55 0 0
September	56 11 0	55 13 0
October	57 8 0	55 0 0
November	57 3 0	55 0 0
December	57 5 0	55 0 0
	55 3 0	53 12 0
1948		
January	59 11 0	60 0 0
February	60 13 0	59 3 0
March	58 5 0	60 0 0
April	58 11 0	55 13 0
May	58 11 0	55 13 0
June	59 11 0	55 13 0
July	61 5 0	55 13 0
August	58 11 0	55 13 0
September	58 0 0	56 11 0
October	56 11 0	56 11 0
November	58 0 0	60 0 0
December	60 5 0	N.A.
	59 1 0	57 7 0

APPENDIX XVI

Average wholesale prices of Castor cake per Imperial maund (Rs./As.)

—	Guntur.			Tirupattur.		
	Rs.	a.	p.	Rs.	a.	p.
1937						
January	N. A.			1	8	0
February	,,			1	7	4
March	,,			1	8	0
April	,,			1	8	0
May	,,			1	6	8
June	,,			1	5	4
July	,,			1	8	0
August	,,			1	8	8
September	,,			1	8	0
October	,,			1	8	8
November	,,			1	8	0
December	,,			1	8	0
	...			1	8	0
1938						
January	N.A.			1	9	4
February	,,			1	8	0
March	,,			1	8	0
April	1	9	0	1	8	0
May	1	9	0	1	8	6
June	1	10	0	1	7	2
July	1	9	0	1	6	8
August	1	9	0	1	7	4
September	1	10	0	1	7	4
October	1	10	0	1	8	8
November	1	10	0	1	10	0
December	1	9	0	1	8	0
	1	9	0	1	8	0
1939						
January	1	11	0	1	8	8
February	1	11	0	1	8	8

APPENDIX XVI—(*Contd.*)

—	Guntur			Tirupattur		
	Rs.	A.	P.	Rs.	A.	P.
March	1	11	0	1	7	8
April	1	12	0	1	7	8
May	1	13	0	1	7	4
June	1	14	0	1	8	8
July	1	14	0	1	8	8
August	1	15	0	1	7	6
September	1	15	0	1	10	8
October	1	14	0	1	9	4
November	2	1	0	1	9	4
December	2	2	0	1	9	4
	1	14	0	1	9	0
1940						
January	1	8	0	1	9	4
February	1	8	0	1	11	4
March	1	8	0	1	8	8
April	2	0	0	1	8	8
May	2	0	0	1	10	8
June	2	8	0	1	9	4
July	2	8	0	1	10	4
August	2	8	0	1	10	0
September	1	12	0	1	10	8
October	1	12	0	1	8	0
November	1	12	0	1	8	10
December	1	12	0	1	5	4
	1	15	0	1	9	0
1941						
January	1	12	0	1	2	8
February	1	12	0	1	2	8
March	1	12	0	1	3	4
April	2	0	0	1	3	0
May	2	0	0	1	2	8
June	2	5	4	1	1	4
July	2	8	0	1	0	0
August	2	13	4	1	2	0
September	2	8	0	1	2	8

APPENDIX XVI—(*Contd.*)

	Guntur.			Tirupattur.		
	Rs.	a.	p.	Rs.	a.	p.
October	2	5	4	1	3	0
November	1	12	0	1	5	4
December ...	1	12	0	1	5	4
	2	2	0	1	3	0
1942						
January	2	4	0	1	7	0
February	2	4	0	1	11	0
March	2	4	0	1	11	0
April	2	10	0	1	9	0
May	2	10	0	1	9	0
June	2	12	0	1	10	0
July	3	4	0	1	11	0
August	3	1	6	2	1	0
September	3	0	0	2	0	0
October	3	2	0	2	3	0
November	3	2	0	2	7	0
December	3	8	0	2	8	0
	2	13	0	1	14	0
1943						
January	3	12	0	2	9	0
February	4	0	0	2	8	0
March	5	4	0	3	3	0
April	5	8	0	3	7	0
May	5	12	0	3	5	0
June	6	0	0	4	5	0
July	6	8	0	5	2	0
August	6	12	0	3	15	0
September	6	12	0	5	0	0
October	6	12	0	4	13	0
November	5	12	0	4	15	0
December	5	4	0	4	15	0
	5	11	0	4	0	0

APPENDIX XVI—(*Contd.*)

	Guntur.			Tirupattur.		
	Rs.	A.	P.	Rs.	A.	P.
1944						
January	5	3	0	4	11	0
February	4	15	0	4	11	0
March	4	15	0	4	0	0
April	4	15	0	4	0	0
May	4	15	0	4	5	0
June	4	15	0	4	3	0
July	4	15	0	3	5	0
August	4	15	0	3	5	0
September	4	15	0	3	9	0
October	4	15	0	4	0	0
November	4	15	0	4	0	0
December	4	15	0	4	3	0
	4	15	0	4	0	0
1945						
January	4	15	0	4	0	0
February	4	15	0	3	13	0
March	4	15	0	4	3	0
April	4	15	0	3	12	0
May	4	15	0	4	3	0
June	4	15	0	4	3	0
July	4	15	0	4	3	0
August	4	15	0	4	3	0
September	4	15	0	4	3	0
October	4	15	0	4	3	0
November	4	15	0	4	4	0
December	4	15	0	3	15	0
	4	15	0	4	1	0
1945						
January	4	15	0	4	3	0
February	4	15	0	4	3	0
March	4	1	0	4	5	0
April	4	15	0	4	1	0
May	4	15	0	4	8	0
June	4	15	0	5	0	0

APPENDIX XVI—(*Contd.*)

	Guntur.			Tirupattur.		
	Rs.	A.	P.	Rs.	A.	P.
July	4	15	0	5	3	0
August	4	15	0	5	3	0
September	4	15	0	5	3	0
October	4	15	0	5	3	0
November	4	15	0	5	3	0
December	4	15	0	5	1	0
	4	14	0	4	12	0
1947						
January	4	15	0	5	5	0
February	4	15	0	5	5	0
March	4	15	0	5	8	0
April	4	15	0	5	9	0
May	4	15	0	5	13	0
June	4	15	0	6	11	0
July	4	15	0	6	11	0
August	4	15	0	6	11	0
September	4	15	0	6	11	0
October	4	15	0	6	11	0
November	5	3	0	7	1	0
December	6	12	0	6	11	0
	5	0	0	6	4	0
1948						
January	7	1	0	6	11	0
February	7	6	0	6	11	0
March	7	5	0	5	13	0
April	7	4	0	5	5	0
May	7	4	0	5	13	0
June	7	4	0	5	13	0
July	7	12	0	5	13	0
August	8	4	0	5	13	0
September	7	9	0	5	13	0
October	7	1	0	5	13	0
November	7	1	0	6	3	0
December		...			...	
	7	6	0	6	0	0

APPENDIX XVII.

List of certain important assembling markets for Castor seed in (1) India and (2) Madras.

(1) INDIA.

Name of State and District		Name of market	Estimated quantity handled annually (tons)	Destinations of export
Bihar	Bhagalpur	Colgong ...	5,000	Calcutta, Cawnpore.
	Saran	Chupra ...	9,000	Local.
Bombay	Ahmedabad	Ahmedabad	8,500	Local, Bombay.
United Provinces	Bareilly	Sirkhera...	8,800	Agra, Calcutta, Cawnpore.
	Kheri	Lakhimpur	6,500	Do.
Hyderabad	Mabubunagar	Badepally	10,000	Local, Bombay, Coconada, Madras.
	Nalgonda	Bhongir ...	6,000	Do.

(2) MADRAS.

District	Market	Annual quantity tons	Destinations of export
Bellary ...	Raydrug ...	2,200	Local, Marmagoa, Narasaraopet.
Chittoor ...	Palmaner ...	3,000	Madras, Vellore.
Coimbatore ...	Coimbatore	700	Local.
	Pollachi ...	1,500	Local and Dindigal.
East Godavari.	Rajahmundry	1,500	Coconada, Local.

APPENDIX XVII—(*Contd.*)

District	Market	Annual quantity tons	Destinations of export
Guntur ...	Guntur ...	2,000	Local, Narasaraopet.
	Narasaraopet	11,800	Local.
	Ongole ...	700	Local, Madras.
	Tenali ...	1,000	Local and Madras.
	Vinukonda ...	1,000	Do.
Madura ...	Dindigul ...	1,100	Do. and Madura.
	Madura ...	1,300	Local.
Nellore ...	Kandukur ...	1,300	Madras, Ongole.
North Arcot ...	Tirupattur ...	1,500	Local, Madras
	Vellore ...	1,500	Local, Madras.
Salem ...	Dharmapuri	1,100	Madras, Salem, Tirupattur.
	Edapadi ...	3,500	Local.
	Krishnagiri...	1,800	Madras, Tirupattur, Salem.
	Salem ...	4,500	Edapadu, Tirupattur, Local.

APPENDIX XVIII.

Copy of an exporter's contract for purchase of Castor seed in up-country in India.

.....Limited

Place.....

Season.....

Date.....

Contract No.....

Contract between (Buyers) and (Sellers) whereby the Buyers agree to buy and the Sellers agree to sell.....bags of.....each at Rs.....per bag of 265 lbs. on the following terms and conditions, *viz.*,

1. The seed to be new crop only, *i.e.*, of season.....and free from all wet or damaged seeds. In other respects quality to be fair average of the season and the goods not to contain more than 2 per cent admixture of foreign matters and 10 per cent damaged seeds.

(*a*) for any percentage of foreign matters above 2 per cent upto 2·25 per cent sellers to pay a proportionate allowance to buyers.

(*b*) for any percentage of foreign matters below 2 per cent buyers to pay sellers a proportionate allowance.

(*c*) for every 1 per cent damaged seeds over 10 per cent upto 15 per cent 1/16 per cent allowance off.

For every 1 per cent damaged seeds over 15 per cent upto 30 per cent 1/8th per cent allowance off.

2. Delivery to be completed between the.....and..... at Buyer's Godown at.....

3. (*a*) Buyers shall advance sellers 90 per cent of the contract value of the goods delivered by sellers and passed by buyers, the balance to be paid on the final completion of this contract.

(*b*) Buyers may in their discretion make advance to the sellers on presentation of clear R/Receipt made out in the name of

M/s.....both as consignor and consignee to the extent of 90 per cent of the contract value of the quantity covered by the R/Receipt. The balance to be paid on the final completion of the contract and on receipt of advice of correct delivery of weight, quality and condition at buyer's godown at.....

(c) In the event of the rejection or short and/or non-delivery and/or short outturn and/or allowances imposed by the buyers on any of the goods tendered by the sellers under this contract, any amount advanced by buyers on account of the contract price of such goods becomes due by the sellers to the buyers, sellers shall forthwith on demand refund the amount to buyers.

4. Should sellers fail to complete delivery of the above..... or any portion thereof within the time above fixed for the completion of the delivery thereof, Buyers have the following options :—

(a) To cancel the undelivered portion of this contract.

(b) To buy in.....or in Madras or in Bombay on the day next following the due date of this contract, or if Buyers should be unable to buy on the day, so soon thereafter as may with reasonable despatch be possible, at the market rate ruling on the day of purchase on Sellers' account and at Sellers' risk without any previous notice to Sellers the undelivered quantity and to recover from Sellers all loss and damage (if any) sustained by reason of Sellers' failure to perform this contract.

(c) To recover from Sellers the difference between the rate in this contract and the market rate ruling at.....or Madras or Bombay on the day (exclusive of Sundays and Holidays upon which the market is closed) next following due date of the contract.

5. Buyers are at liberty without any request from the Sellers to extend the time for delivery either for the whole or any portion of the above.....bags not delivered by written notice sent to the Sellers at their abovementioned address, which extension, if made, shall be without prejudice to any of the other terms of the contract.

6. The acceptance by Buyers at any time of a quantity less than that contracted for shall not, unless expressly so stated in writing signed by both parties, be taken to cancel the contract as to the balance of the quantity purchased.

7. Should the whole or any portion of the goods to be delivered under this contract be in any respect not in accordance with the stipulations of clause 1, buyers shall have the option of rejecting such goods or of accepting the same with an allowance to be fixed by them.

8. In the event of the rejection of any goods in exercise of the right or option arising under or conferred by this contract, buyers shall notwithstanding such rejection and without prejudice thereto and their right thereon, be entitled to retain the goods so rejected until refund by sellers of all the amounts advanced to sellers and all charges incurred by buyers on such goods is made and if within 10 days from service of written notice of such retention sent to sellers at their abovementioned address sellers shall not refund such advances and/or charges to buyers, the buyers shall be entitled without further notice to sell the goods so retained either by Public Auction or Private Sale and to receive the sale proceeds thereof and apply the same to the repayment of such amounts and charges due to or incurred and damages sustained by them. The charges payable to the buyers shall also include Godown rent at Re. 0-8-0 per ton per month and proportionate insurance charges.

9. Sellers agree to abide by the results found by buyers..... Sub-Agency as to quality, condition, weight and refraction as well as allowance, if any, to be made to buyers in respect thereof, whether sellers or their representative is present or not at the time of the said.....S/Agency examining Sellers' deliveries there. Buyers are not obliged to give nor are Sellers entitled to demand any notice of the time when such examination is to be made.

10. Any monies due by Buyers under this contract may be retained by them against any claim which they may have against the Sellers under any other contract through any cause whatever, notwithstanding any bankruptcy or insolvency or liquidation.

11. The above options shall be in addition to and not by way of modification or in curtailment of any right which Buyers may have by law by reason of Sellers' failure to perform this contract.

12. As a guarantee for the due fulfilment of this contract Sellers have deposited with Buyers the sum of Rs.....

13. Sellers may provide their own new 2 Twill bags 44" x 26½" : 2¼ lbs. in exchange from Buyers of an equal number of empty bags of the same quality and description.

14. Prohibition of export from any particular district or native or foreign territory does not relieve the Sellers from the obligation of duly fulfilling this contract.

15. Any notice by the Buyers under this contract may be served upon the sellers either personally or by sending it through the post in a letter addressed to the Sellers at their abovementioned address. If sent by post it shall be deemed to have been served at the time when the letter containing the same would have been delivered in the ordinary course of post.

16. Anything besides plain signature written in any language but English on this contract shall be null and void and shall not be construed in any way as part of the terms or conditions of this contract.

17. Payments will be made in Silver or Currency Notes at Buyers' option.

18. Sellers agree to give the Buyers an allowance of .....lbs. per bag in kind.

19. Any dispute arising with regard to this contract between the Buyers and Sellers should be referred to any court in the British territory which has competent jurisdiction.

Dated..... (Sd) .....,
Seller.

APPENDIX XIX

Major movements by rail of Castor seed (1947)

(M. & S. M. Railway only).

Railway maunds.

Within the Province.

From		To		
District	Centre	Centre.		Ry. maunds.
Bellary ...	Rayadrug ...	Nandyal	...	435
		Gudivada	...	160
		Bezwada	...	348
		Guntakal	...	421
		Vinukonda	...	178
		Yerraguntla	...	978
		Narasaraopet	...	477
		Cuddapah	...	284
	Bellary ...	Guntur	...	201
		Narasaraopet	...	693
		Yerraguntla	...	450
	Adoni ...	Vinukonda	...	211
		Narasaraopet	...	598
	Hospet ...	Vinukonda	...	107
		Marmagoa	...	1,250
	Waltair ...	Coconada	...	643
Vizagapatam ...	Waltair ...	Madras (Harbour)	...	220
North Arcot ...	Jalarpet ...	,, (Salt Cotaurs).		5,618
	,, ...	,, (Rayapuram)...		503
	,, ...	Rajahmundry	...	467
	,, ...	Coconada	...	73,399
	,, ...	Katpadi	...	1,782
	,, ...	Yerraguntla	...	3,274
	,, ...	Ongole	...	18,675
	,, ...	Nidubrolu	...	946
	,, ...	Tenali	...	1,446
	,, ...	Narasaraopet	...	974
	,, ...	Chinnaganjam	...	491
	,, ...	Kavali	...	205

APPENDIX XIX—(*Contd.*)

From: District	From: Centre	To: Centre	Ry. maunds.
North Arcot ...	Arkonam ...	Coconada ...	7,593
	Katpadi ...	,, ...	400
	Bezwada ...	Madras (Rayapuram) ...	408
		Marmagoa ...	38,707
		Coconada ...	36,217
		Narasaraopet ...	2,616
		Yerraguntla ...	1,381
		Waltair ...	3,332
		Ongole ...	8,611
		Tenali ...	10,885
		Cuddapah ...	633
		Ellore ...	3,006
		Nellore ...	800
		Dharmavaram ...	209
		Kavali ...	400
		Tadpatri ...	217
		Nuzvid ...	1,822
		Anakapalli ...	626
	Masulipatam ...	Guntur ...	1,652
Anantapur ...	Hindupur ...	Coconada ...	304
	,, ...	Ongole ...	322
	,, ...	Ellore ...	103
	,, ...	Bezwada ...	205
	Dharmavaram.	Narasaraopet ...	201
	Tiruorcharla ...	Raichur ...	450
	Guntakal ...	Narasaraopet ...	2,543
	,, ...	Muddanuru ...	580
	,, ...	Raichur ...	2,605
	Anantapur ...	Bhattiprolu ...	196
	,, ...	Bezwada ...	192
East Godavari.	Samalkot ...	Guntur ...	603
	Coconada ...	Marmagoa ...	189
	,, ...	Waltair ...	6,204
Kurnool ...	Dronachalam ...	Narasaraopet ...	470
	,, ...	Marmagoa ...	1,673

APPENDIX XIX—(*Contd.*)

From: District	From: Centre	To: Station	Ry. maunds.
	Tuggali ...	Narasaraopet ...	921
	Tarlapadu ...	,, ...	464
	Markapur Road	,, ...	1,742
	Kurichedu ...	,, ...	1,292
	Betamcherla ...	,, ...	258
	Kurichedu ...	Bezwada ...	358
Guntur ...	Vinukonda ...	,, ...	687
	Tenali ...	Waltair ...	612
	Ongole ...	Tenali ...	1,211
	,, ...	Coconada ...	1,292
Madras ...	Rayapuram ...	Tenali ...	508
	,, ...	Narasaraopet ...	251
		From other Provinces.	
Bombay ...	Gadag ...	Cuddapah ...	[illegible]5
	,, ...	Yerraguntla ...	1[illegible]8
	,, ...	Nandyal ...	[illegible]8
	,, ...	Gudivada ...	[illegible]0
	,, ...	Giddalore ...	589
	,, ...	Tirupati East ...	1,119
	,, ...	Vinukonda ...	145
	Bijapur ...	Yerraguntla ...	384
Mysore ...	Bangalore ...	Coconada ...	1,696
	,, ...	Yerraguntla ...	748
	,, ...	,, ...	1,022
Hyderabad ...	Raichur ...	Narasaraopet ...	205
	,, ...	Ongole ...	900
		To other Provinces.	
Anantapur ...	Anantapur ...	Hotgi ...	596
Bellary ...	Kottur ...	,, ...	1,142
	Hospet ...	,, ...	814
	Cuddapah ...	,, ...	577