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Castor Crop Cultivation in Gujarat:
Problems, Prospects and Export Potential

S. S. Kalamkar and H. Sharma

Report submitted to the

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Foreword

Castor is an important industrial non-edible oilseed crop and India is the world's largest producer of castor seed accounting for 85.02 per cent share of total world caster seed production. India also dominates in the international castor seed oil trade as India is a leading exporting country of castor oil and its derivatives. China imports castor oil from India, converts it to derivatives and sells these as high value-added products. There is a large scope for improving India's earning from castor by converting the castor oil to various derivatives. With the world becoming more environmentally conscious and with increasing replacement of synthetic products with naturally derived products, castor oil-based derivatives could find increasingly attractive markets worldwide. The major castor producing states are Andhra Pradesh, Gujarat, Karnataka, Odisha, Rajasthan and Tamil Nadu. Gujarat is the India's largest producer of castor in India, accounting for about 85.09 per cent in total production of castor in the country (2019-20). The productivity of castor in Gujarat is the highest not only in India but also in the World. Not only area and production of castor but also its export is the on increasing trend. However, the castor farmers are facing the problems in the cultivation of crop. The farmers have been reporting production as well as marketing constraints. The input costs also have been reported risen, mostly on fertilizers, pesticides and water. Thus, there is a need to have insights into the problems, prospects and export potential of castor crop cultivation in Gujarat. The Directorate of Economics and Statistics, Ministry of Agriculture and Farmers Welfare, Government of India has entrusted our Centre to undertake a state-specific study on 'Castor Crop Cultivation in Gujarat: Problems, Prospects and Export Potential'.

The present study is based on both secondary and primary data. The secondary data were compiled from published sources and primary data were collected from the selected 400 castor growers from selected five districts (Banaskantha, Kutch, Patan, Mehsana and Surendranagar) of Gujarat. The multistage random sample method was used for the selection of castor growers. The reference period for the primary data collection was the agriculture year 2020-21. Simple tabular analysis was used for data analysis. The study found that castor growing is a step forwards in the diversification and commercialization of agriculture. The benefit-cost ratio was found to be economically efficient in castor cultivation in all groups. The study came out with suitable policy implications.

I am thankful to the authors and their research team for putting in a lot of effort to complete this excellent piece of work. I also thank the Directorate of Economics and Statistics, Ministry of Agriculture and Farmers Welfare, Government of India, for their unstinted cooperation and support. I hope this report will be useful for those who are interested in castor cultivation and its export.

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The study on 'Castor Crop Cultivation in Gujarat: Problems, Prospects and Export Potential' has been carried out at the Agro-Economic Research Centre, Sardar Patel University, Vallabh Vidyanagar, Anand, Gujarat, as entrusted by the Directorate of Economics and Statistics, Ministry of Agriculture and Farmers Welfare, Government of India, New Delhi.

We have benefited immensely from various scholars and officials from different government departments while carrying out this study. At the outset, we would like to thank **Dr. Shirish Kulkarni, Former Vice Chancellor and Prof. Niranjan Patel**, presently Officiating Vice-Chancellor of our University and Chairman, AERC Governing Body for their constant encouragement and support for undertaking such research activity at the Centre. We also thank **Dr. Jyoti Tiwari**, Former Registrar (In-charge), **Dr. Mitesh Jayswal,** Registrar (Incharge), and **Dr. Bhautik A. Patel** (Deputy Accountant & CAO Incharge) of our University for their administrative support for this project.

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The study would not have reached this stage without the active co-operation of the respondent from selected villages in Gujarat who provided all the required data for the study without any hesitation and expectation. Thanks to each of market functionary for sharing their experience and data. We thank each one of them for their invaluable support.

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List of Abbreviations

$	-	Dollar
APEDA	-	Agricultural and Processed Food Products Export Development Authority (APEDA)
APMC	-	Agricultural Produce Market Committee
Av.	-	Average
CACP	-	Commission for Agricultural Cost and Prices
CDVI	-	Cuddy Della Valle index
CGR	-	Compound Growth Rate
COC/CoC	-	Cost of Cultivation
CV		Coefficient of Variation
FAOSTAT	-	Food and Agriculture Origination of United Nation Datasets
FLD	-	Farm Level Demonstration
GOG		Government of Gujarat
GOI	-	Government of India
ha	-	Hectare
hh/HH	-	Household
HYV		High Yielding Varieties
KVK	-	Krishi Vidyan Kendra
L	-	Large
LDB	-	Land Development Bank
M	-	Marginal
M.T./mt	-	Metric Tone
MJ/ha	-	Energy input
MOA&FW	-	Ministry of Agriculture and Farmers Welfare
NDEX	-	National Commodity & Derivatives Exchange Limited
NPC	-	Nominal Protection Coefficient (NPC
NPK	-	Nitrogen Phosphorus Potash
NSA	-	Net Sown Area

OBC		Other Backward Class
RA	-	Ricinoleic Acid
RRB	-	Regional Rural Bank
Rs.	-	Rupees
Su	-	Sulphur
S	-	Small
SAP	-	State Agricultural Plan
SAUs	-	State Agricultural University
SC	-	Scheduled Caste
SCR		Season and Crop Report
SD		Standard Deviation
SHG		Self Help Group
Sig.	-	Significance
SM	-	Semi-Medium
SOEI	-	Solvent Extractor's Association of India
SRR	-	Seed Replacement Ratio
ST	-	Scheduled Tribe
TE		Triennium Endings
VECM	-	Vector Error Correction Model
Y	-	Yield

Castor Crop Cultivation in Gujarat: Problems, Prospects and Export Potential

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Introduction

India is the leader in global castor seed production and dominates in the international castor oil trade. India supplies almost 85 per cent to 90 per cent of the world's requirement of Castor Oil and its derivatives. The India became the first choice for the major importing countries like China, France, USA, Germany, Netherland, Thailand, Japan, UK and Korea, whereas for Italy, India was the second choice. This indicates that India's position in world's castor oil market is very strong and there is a great opportunity to expand it. The major castor-producing states in India are Andhra Pradesh, Gujarat, Karnataka, Odisha, Rajasthan, and Tamil Nadu. Though the area and production of castor as well as its export are on increasing trend, the castor farmers are facing problems in the cultivation of crop. The farmers have been reporting production as well as marketing constraints. The input costs also have been reported risen, mostly on fertilizers, pesticides and water. Thus, there was a need to have insights into the problems, prospects and export potential of castor crop cultivation in Gujarat. In view of the same, the present study was undertaken. The present study is based on both secondary and primary data. The secondary data were compiled from published sources and primary data were collected from the selected 400 castor growers from selected five districts (Banaskantha, Kutch, Patan, Mehsana and Surendranagar) of Gujarat. The multistage random sample method was used for the selection of castor growers. The reference period for the primary data collection was the agriculture year 2020-21.

2. Findings from Secondary data

- Gujarat is India's largest producer of castor in India, accounting for about 85.60 percent of the total production of castor in the country (2020-21). The productivity of castor in the state is the highest not only in India but also in the world.
- Castor growing is considered as a step forward towards diversification and commercialization of agriculture in Gujarat. The cropping pattern of Gujarat state has changed during the last five-decade period (1971-2021). Though the share of oilseed in total cropped area remained the same around 20 per cent during last five-decade period, share of castor crop in total cropped area has increased from 0.61 per cent in TE 1972-73 to 5.62 per cent in TE 2020-21.
- In *kharif* season, castor is the dominant non-edible oilseed crop while some farmers are also growing it in rabi season. The castor varieties grown in the district are given in GCH-2, GCH-4, GCH-5, GCH-6, GCH-7, GC3, GNCH-1(rabi), and GCH-8.
- At present, the seed replacement ratio (SRR) of castor is reported to be 50 percent. Thus, the scope of SRR is ambient in the future to enhance the productivity of castor in the state, especially through the seed village concept

andhybrid seed production programs.

- Global castor oil and derivatives key players include Jayant Agro, NK Proteins, Adani Wilmar, etc. Global main three manufacturers hold a share over 50 per cent. India is the largest market, with a share of over 90 per cent, followed by China, and North America, both have a share of over 5 percent. In terms of product, Hydrogenated Castor Oil is the largest segment, with a share of about 30 per cent,
- Castor oil is a promising commodity that has a variety of applications in the coming years, particularly as a renewable energy source. Castor seed is not exported but castor oil and meal are exported. India exported more than 7.34 lakh tons of castor oil worth of Rs 6802 crore during the year 2020-21.
- The major trading centers of castor and its derivatives in India are Rajkot (Gujarat), Ahmedabad (Gujarat), Gondal (Gujarat), Gadwal (Gujarat), Bhabar (Gujarat), Disa (Gujarat), Kadi (Gujarat), Jedcherla (Andhra Pradesh) and Yemignoor (Andhra Pradesh). Also castor and its derivatives like castor seed, castor oil and castor oil cake are traded in Indian commodity exchanges.
- The seasonal indices of market arrivals and prices of castor seed for different markets *viz;* Dasada (Patdi), Radhanpur, Bhabhar, Thara, Mehsana and Kadi shows the existence of seasonality in all the markets. Higher indices of market arrivals of castor seed were noticed immediately after harvest.
- The season behavior of castor prices revealed the existence of seasonality in all the markets. Higher indices of market arrivals of castor seed were noticed immediately after harvest in the selected markets arrivals reached peak during April and relatively shoot up in September and October. The different markets of castor in the state of Gujarat were closely linked with each other for the movement of castor seed prices

3. Findings from Primary data

- The field survey results indicate that almost all the farmers had irrigated land which was put under castor cultivation. The average crop productivity of castor crop is estimated to be 26.5 qtls/ha.
- The total cost of cultivation of castor seed per hectare was estimated to be Rs. 87528/-. On average, per quintal price for castor seed output realized by the sample households was Rs 4872/- per quintal. Across the groups, 93.3 per cent of marginal holders, 86 per cent of smallholders and 76 per cent of marginal holders had sold all output at first instance only. Marginal farmers sold their output within 20 days of harvest.
- The net income realised by the farmer was estimated to be Rs. 42983/- per hectare. The benefit-cost ratio of 1.36 was found to be economically efficient in castor cultivation in all groups. The highest benefit cost ratio was estimated for large landholder group and the lowest was in case of small land holder group.
- The major constraints faced by the castor seed growers were the long duration of crop followed by lack of production technology and lack of resistant/tolerant varieties are major three technological constraints were cited by the sample farmers. The extreme variations in temperature followed by biotic stress and inadequate/excessive rainfall are three major agro-climatic factors were faced by the sample farmers.
- The major problems faced by Commission agent were of storage, TDS issues and payment problems were faced by the commission agents. While major constraints faced by the processor were lack of support from the government,

competition from large processing units, high cost of processing, and availability of credit. The exporter mentioned that Germany, France, UK, US, and other European countries were the major countries for the export of Caster Seed Oil in 2020-21.

- The major source of procurement of the produce- Castor seed oil during 2020-21 was processor within the state and mostly from the wholesaler. The major three problems faced at domestic markets were lack of regular supply and GST refund issues and high price compared to the quality.
- While at the international level, lack of knowledge about the standard quality norms in the international markets, lack of pre-shipment agency for inspection during export and a lack of export subsidy or support from the Government.

4. Conclusions and Policy Implications

- In view of low SRR in Gujarat, there is a need to create awareness about the importance of improved hybrids/ varieties through demonstrations, training, *shibir*, literature, etc. Establishing well-organized seed multiplication systems, seed supply chain and commercial market are very important for faster adoption of castor in India. Quality of seed should be given utmost importance. There is a need of providing training to progressive farmers for seed production at the local level.
- The partial adoption of recommended production/protection technologies affect the productivity of castor. Therefore, there is a need to create awareness among the castor grower about a package of practices, about scientific crop management through demonstrations and training.
- Low-input cost crop production technologies with higher input efficiencies based on climatic changes need to be developed to sustain castor production. Research on the region or location-specific production and protection technologies should be given priority.
- The long growing season of castor may be a constraint to adopt crop cultivation. The instability observed in various districts during the study period needs to be reduced and yield should be improved by developing wilt resistant, short duration, location-specific high yielding varieties of castor.
- In view of a large variation in productivity of castor seed crop across the districts, there is a need to narrow the yield gap across districts as well as in irrigated and rainfed conditions without mining natural resources.
- It was observed that castor seed produced after harvesting is not properly cleaned and dried, packing material used is mostly gunny bags and also contains foreign materials like iron nails, dust, stone, etc., such poor quality product gets less price for castor produce. Therefore, there is a need to propagate improved technology for drying cleaning, grading and bulk packaging to improve the quality of raw material for industrial supply and increase the farmer's income.
- Extension services can encourage castor adoption in new areas through the dissemination of information on castor cultivation which would help generate interest in stakeholders. Interdisciplinary collaborations in research projects are needed to ensure the sustainability of castor adoption in newer areas. The physical logistics such as warehousing, scientific management of stocks, and transportation are also to be improved.
- The international collaborations will increase both the efficiency and speed of research in developing castor as a bioenergy crop. This would further enable

castor farmers to realize the higher value of their produce

- There is a large scope for improving India's earnings from castor by converting castor oil to various derivatives. With the World becoming more environmentally conscious and with the increasing replacement of synthetic products with naturally derived products, castor oil-based derivatives could find increasingly attractive markets worldwide. The governments and private stakeholders should come forward to support castor cultivation by establishing industries related to castor processing and production of castor derivatives to realize the great economic potential of castor.
- Besides, a lack of adequate infrastructure and value additions are a couple of factors that are also responsible for making India a weak player on the price front. This anomaly can be corrected if the industry expands the market by developing castor oil derivatives and investing in research and development. If the industry works as a more cohesive unit, India could soon be in a better situation.
- In view of the numerous and significant threats, it is critical for all concerned to determine a strategy for initially protecting India's position in Castor and then chalking out a path to long-term sustainable growth. The current role of a commodity player supplying raw material (Castor Oil) to global consumers' needs to be upgraded and augmented into that of a value-added finished product (Castor Derivatives) supplier. The ability to achieve this will ensure a long-term and commercially profitable Castor business for the country.