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Production And Market Dynamics Of Oilseeds In India

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ABSTRACT

The current research looked at the structural break in selected oil seeds in Karnataka and India with regards to their area, production and productivity, growth source, market integration, and price volatility. Area, output, and productivity statistics for Indian states and Karnataka's four revenue divisions were analyzed using secondary sources for the 48-year period beginning in 1971–72 and ending in 2016–17. Using monthly prices from January 2009 to February 2018 for selected crops, we analyzed the volatility of crop prices and the dynamics of the oil/seed wholesale markets in India and Karnataka. In India, groundnut and sunflower exhibit bigger spatial changes than other chosen oilseeds crops, as shown by the compound annual growth rate data. Post-Technology Mission on oilseed, India's entire oilseed crop shows clear signs of structural fractures.

Keywords: Production, Market, Dynamics, Oilseeds, India and Agricultural

INTRODUCTION

India is the world's number four oilseed producer. It is grown on 10.0% of the world's cultivated land yet uses up 20.8% of the total land. Groundnut, soybean, sunflower, sesame, Niger seed, mustard, and safflower oilseeds are all grown in the nation. Nearly 72% of the oilseed's region can only be farmed by small farmers using rainwater, leading to low yields. However, by adopting cutting-edge methods of crop cultivation, a significant improvement was made in oilseed output. As a result, oilseed output increased to 365.65 metric tons in 2016-17 from 108.3 lakh metric tons in 1985-86.

Over the last five years, India's oilseed output has increased. The country's output of 365.65 lakh tons in 2016-17 was up 10% over the previous year. The rate of output growth was 7.7% per year, compounded, from 2015–16 through 2016-17 Several government initiatives, including as the Rabi special program on mustard and rapeseed and the cluster demonstrations of better technology, were responsible for this success. Andhra Pradesh, Gujarat, Haryana, Karnataka, Madhya Pradesh, Maharashtra, Rajasthan, Tamil Nadu, Uttar Pradesh, and West Bengal are the top oilseed-producing states in India. About 20%, 20%, 19%, and 16% of overall output comes from Rajasthan, Gujarat, Madhya Pradesh, and Maharashtra, respectively.

More than half of all rural households in India still rely on farming for their primary source of income, making agriculture the cornerstone of the Indian economy. The economic survey for 2017–18 reports that the share of gva contributed by agriculture and related sectors has decreased from 18.2 percent in 2014–15 to 16.5 percent in 2017–18. India's primary

agricultural products include wheat, rice, maize, sugarcane, pulses, oilseeds, cotton, and vegetables. Rainfall is the main source of water for the crops used to make oils and pulses. India relied on imports of foodgrains, pulses, and oilseeds prior to the green revolution. To feed its people, the country imported massive amounts of grain from international markets, particularly the United States. However, once the green revolution was introduced in the mid-1960s, India started its road toward food security with the adoption of high-yielding, disease-resistant dwarf varieties of wheat and rice.

India's diverse agroclimatic zones allow for the cultivation of a wide range of oilseeds. Most oilseeds may be used in the kitchen, and their oil is a popular cooking medium. However, oilseeds also have a wide variety of industrial uses, including in the production of soap, cosmetics, ointments, paints, varnishes, and more.

LITERARTURE REVIEW

Viswanatha reddy k et.al (2017) India is the world's fourth-largest oilseed producer, accounting for around 19% of worldwide area and 2.7% of global output. The acreage and output of oilseed crops have increased dramatically during the last 30 years. However, oilseeds' growth rate of area and production is negligible, and there exists great variety in their yield throughout various states, in comparison to cereals like rice and wheat. The research analyzed the development patterns of the most important oilseeds throughout the nation. Both geographically and chronologically, oilseeds' output performance was bleak.

Meena, murlidhar et.al (2015). The 1980s and 1990s were the heyday of oilseed production in India, which puts them just behind cereals on the country's crop map. All oilseeds except soyabean had negative area expansion in the previous two decades, which resulted in flat or declining domestic output.As a result, India now imports more than half of its yearly edible oils need, which is being fueled by the country's rapidly growing urban population. Either increasing national oilseeds production or switching to superior alternative crops with a greater oil content, such palm (4 ton ha1), is necessary to achieve food security. The current research sheds light on the dynamic nature of India's oilseeds and edible oil market.

Murlidhar meena et.al (2016) The purpose of this research was to document the evolution of the country's oilseed industry during the pre-WTO (1970–1971) and post–WTO (1995–2012–2013) eras. Production climbed by more than three and a half times, from 8.6 Mt to 31.1 Mt, due to an increase in area under oilseeds (from 16.6 in 1970-71 to 26.7 Mha in 2012-13) and an increase in yield (from 519 to 1164 kg/ha). The study period saw shifts in the relative acreage and output of several oilseeds. Soybean and rapeseed & mustard have replaced the groundnut and other oilseeds including safflower, sesamum, niger, castor, and linseed as the most important oilseed crops since the 1970s. As a consequence of TMOP in 1986, the area planted and yield produced of all oilseeds increased more rapidly before the WTO era compared to after. The fact that more than 70% of oilseeds in the nation are produced under rain fed and resource deficient settings explains why all the oilseeds, save sunflower, had more volatility in output than area and yield. During the research period, there was an uptick in the production, availability, and consumption of edible oils. While groundnut, rapeseed, and

mustard oils were traditionally consumed, these locally produced oils have been replaced by imported palm, sunflower, and soya oils.

Singh, ajoy et.al (2017). When it comes to edible oil, India is a major participant on the international stage, ranking as the world's second-largest importer, third-largest user, and fourth-largest oilseed producer. The majority (82%) of inland oilseeds come from rapeseed, mustard, soybean, and peanut. The average annual intake is on the rise, and by 2025, experts predict it will reach 24 kg per person. Due to a wide imbalance between supply and demand, increasing reliance on imports is inevitable for countries that rely on edible oilseeds for sustenance. The oil seed industry in India as a whole has extremely poor productivity and must be improved in order to save valuable foreign currency. The situation calls for a review of the underlying research and the resulting policy decisions. This article looks at the state of the Indian oilseed industry and offers suggestions for the future.

Niti aayog (2015) Agriculture (which also includes forestry and fisheries) is still the primary means of subsistence in India. Its percentage of total production dropped from 28.3% in 1993–94 to 14.4% in 2011–12, while its part of total employment dropped from 64.8% to 48.9% over the same time period. That's why India's agricultural sector continues to employ about half the country's labor force. Due to their relatively little contribution to GDP, this group of workers has substantially lower average earnings than their counterparts in manufacturing and services. As a result, the future of India's low-income people is tied to agricultural development. The study focuses on five key areas of agriculture that might provide economic benefits to millions of farm households right now. The first issue is that several agricultural indicators, such as production per hectare, are still far below average when compared to other nations. Within the nation itself, there are also substantial geographical differences. There hasn't been a significant technical advancement in quite some time, which contributes to issues like low and erroneous input usage and limited access to contemporary technologies. Second, the minimum support prices (MSP) and the agricultural marketing system that only distributes a tiny part of the final price to the actual farmer mean that, on average, farmers do not realize remunerative pricing.

METHODOLOGY

Information on the crops sampled, data collection time frame, key markets for secondary data collection, and similar specifics are provided by the sampling technique.Bellary, Challakere, Raichur, Tumakuru (Sira), and Bengaluru market for groundnut; Bagalkot, Gadag, Koppal, Raichur, and Bellary for sunflower; and Belgum (Bailhongal), Bidar (Basavakalyana), Dharwad (Hubli), Haveri (Savanur), and Madhya Pradesh (Indore) for soybean. Specifically, we looked at the vegetable oil markets in Chennai, Delhi, Hyderabad, Mumbai, Rajkot, Bengaluru, Nagpur, Vijayawada, Bhopal, and Jaipur in India.

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Secondary data from a variety of sources were used to compile this research. A variety of sources provided the necessary geographical and temporal data for oilseed production. Area, production, and productivity figures for major oilseeds crops in India's various states and districts were compiled using information gathered from the Directorate of Economics and Statistics (DES), India stat, the Food and Agriculture Organization (FAO) statistics database, the Indian Oilseeds and Produce Export Promotion Council (IOPEPC), Oil World, and the reports of various government agencies. The Department of Consumer Affairs, the National Information Center (NIC), and the Global Economic Monitor (GEM), also known as the pink data sheet of the World Bank, were consulted in order to compile market price data for selected crops from January 2009 to February 2017.

DATA ANALYSIS

SPATIAL CHANGES IN AREA, PRODUCTION AND PRODUCTIVITY OF SELECTED OILSEEDS IN INDIA AND KARNATAKA

Table 1 shows the compound annual growth rate (CAGR) of groundnut among states. With the exception of Orissa, Gujarat, Andhra Pradesh, and Bihar, all of the states experienced negative increase in area during the first period (1971-86). Area planted with groundnut increased by more than 3% between 1987 and 2002 in several states (Kerala, Punjab, Rajasthan, West Bengal, and Madhya Pradesh), while the trend reversed in Andhra Pradesh, Bihar, and Orissa. Only Gujarat maintained positive growth. Area planted with groundnuts increased by more than five percent in Haryana and Rajasthan over the third period (2003-2018), while Madhya Pradesh and West Bengal exhibited positive growth (>0-3%) and the rest states showed negative growth.

Table 1: Cagr Based Spatial Changes in Groundnut Across States of India

Area				
CAGR (%)	>5	5 to 3	3 to >0	<0
1971-1986	OR,		GJ,AP, BH	MH, KA, RJ, HR, KL, MP, PB
1987-2002	KL, PB, RJ, WB	MP,	GJ	AP, BH, HR, KA,MH, OR
2003-2018	HR, RJ		WB, MP	BH, GJ, MH, KA, OR, AP, PB, KL
Production				
CAGR (%)	>5	5 to 3	3 to >0	<0
1971-1986	OR		GJ,AP, BH	MH, KA, RJ, HR, MP, PB, KL
1987-2002	KL, PB, RJ, WB		MP,GJ	AP, HR, BH, KA,MH, OR
2003-2018	HR, RJ		WB, MP	BH, GJ, MH, KA, OR, AP, PB, KL
Yield				
CAGR (%)	>5	5 to 3	3 to >0	<0
1971-1986		KA,MH	OR, RJ,GJ, PB	BH, MP, HR, AP, KL
1987-2002	MH, PB, RJ	MP	HR, OR, BH, GJ, WB, KL,	AP, KA
2003-2018	AP	BH,KL	MP, RJ, GJ, HR, WB, PB	KA, OR, MH

Table 2 displays the state-by-state breakdown of sunflower acreage, output, and productivity. While Maharashtra and Karnataka both grew by more than 5% in area between 1971 and 1986, Andhra Pradesh, Uttar Pradesh, Orissa, and Tamil Nadu all shrank. More than five percent of land was added to Nagaland, Bihar, Andhra Pradesh, and Orissa during Period II (1987-2002). While the area planted with sunflowers increased in states like Punjab and Uttar Pradesh, it decreased in the other states. While sunflower cultivation expanded in Jharkhand, Nagaland, Madhya Pradesh, and Orissa during period III (2003-2018), it shrank in the other states. In Karnataka, sunflowers are a very adaptable crop that work well in a wide variety of cropping systems and intercropping arrangements. Although about 10% of sunflower land is set aside for intercropping, the production of sunflowers is subject to systematic weather risk due to the fact that 80%-85% of sunflower land is under rain fed production. Both sunflower planting and harvesting have seen substantial shifts.

Table 2: Cagr Based Spatial Changes In Sunflower Across States Of India

Area				
CAGR (%)	>5	5 to 3	3 to >0	<0
1971-1986	MH, KA			AP,UP,OR,TN
1987-2002	NL, BR, AP, OR		PB,UP	MH, KA,WB, HR, MP, TN
2003-2018	JH	NL, OR		WB, MP, HR, BR, PB, KA, UP, CG, MH, AP, TN
Production				
CAGR (%)	>5	5 to 3	3 to >0	<0
1971-1986	MH, KA			AP,UP,OR,TN
1987-2002	NL, BR, AP, OR	UP	WB, PB	MH, KA, HR,MP,TN
2003-2018	JH, OR	MP	NL	WB, HR, BR, PB, KA, CG, UP, MH, AP, TN
Yield				
CAGR (%)	>5	5 to 3	3 to >0	<0
1971-1986	UP, MH		OR	KA, AP, TN
1987-2002	BR, NL, AP, HR, TN	UP, PB	OR, KA,WB	MH, MP
2003-2018	AP,JH, OR		MP, HR, KA, BR	PB, WB, MH, UP, CG, NL, TN

TEMPORAL CHANGES IN AREA, PRODUCTION AND PRODUCTIVITY OF SELECTED OILSEEDS IN INDIA AND KARNATAKA

Table 3 displays the outcome of a Bai-Perron analysis. The Bai-Perron test found three breakdowns in India: one in output in 1988, one in groundnut area in 2000, and two in productivity in 1988 and 2007. There are no fluctuations in sunflower area or output, however there are two in productivity between 1977 and 2007. While safflower yield and area both show no breakdowns, safflower productivity did so twice, in 1980 and 2005. There are no dips in the total soybean acreage, however there are dips in output in 1982, 1989, 1996, and 2007, and a single dip in productivity in 1993. There is one break (1994) in land use, two breaks (1981 and 2010) in output, and three breaks (1987, 2001, and 2010) in output per acre in 77 Production and Market Dynamics of Selected Oilseeds in India, with Special Reference to Karnataka Sesame. Two declines (1981 and 1989) in oilseed acreage, three declines (1981,

1988, and 2005), and three declines (1981, 1988, and 2007) in oilseed productivity characterize the whole oilseed industry.

Table 3: Structural break in production of oilseeds using Bai-Perron tests

Structural Break points (1971-2018)			
India			
Crops	**Area**	**Production**	**Productivity**
India			
Groundnut	2000, 2011	1988	1988, 2007
Sunflower	No breaks	No breaks	1977, 2007
Safflower	No breaks	No breaks	1980, 2005
Soybean	No breaks	1982, 1989, 1996, 2007	1993
Sesamum	1994	1981, 2010	1987, 2001, 2010
Total	1981, 1989	1981, 1988, 2005	1981, 1988, 2007
Karnataka			
Groundnut	No breaks	1987, 2000	1983
Sunflower	No breaks	1986	No breaks
Safflower	No breaks	1979	1979, 1992, 2005
Soybean[#]	1996, 2004, 2009, 2014	1992, 1997, 2004, 2011	1992, 2010
Sesamum	2000, 2012	2000, 2012	2012
Total	No breaks	1983, 2009	2010

COMPONENTS OF CHANGE IN PRODUCTION VARIABILITY

Table 4 shows the factors that affect India's average groundnut output throughout time. The percentage rise in change 00.04 may be traced back to an uptick in yield in period I, but not in periods II, III, or overall. increases in mean area of 89.28, 89.68, 89.29, and 63.81 percent, and interactions between area and yield of 03.11, 07.37, 11.93, and 27.12 percent in periods I, II, III, and the whole period. In periods I and II, yield and area co-variance accounted for 7.63, 2.97, and 9.12 percent of output increase, respectively, but in period III, it contributed to stability. The researchers found that the area has the greatest effect on average output changes, followed by the interaction between average area and average yield changes. In order to boost output, more land must be dedicated to cultivating groundnuts, and farmers should be incentivized to do so.

Table 4: Components of change in the average production of groundnut in India

Sl. No.	Sources of change		Components of Change (%)			
	Description	Symbol	I Period	II Period	III Period	Overall Period
1	Change in mean yield	$\Delta\bar{Y}$	00.04	-00.01	-00.01	-00.02
2	Change in mean area	$\Delta\bar{A}$	89.28	89.68	89.29	63.81
3	Interaction between change in mean area and mean yield	$\Delta\bar{A}$, $\Delta\bar{Y}$	03.11	07.37	11.93	27.12
4	Change in area-yield co-variance	ΔCov (A,Y)	07.63	02.97	-01.20	09.12
	Total		100	100	100	100

PRICE VOLATILITY IN SELECTED OILSEEDS IN INDIA

Table 4 shows the fluctuations in both the local and global groundnut markets. In the table, the volatility value is equal to the standard deviation of logarithmic values for the chosen oilseeds, and the volatility value's coefficient varies from -1 to 1, with closer to 1 indicating more volatility. Groundnut oil prices are displaying less volatility than groundnuts prices on the international market. This is in contrast to the local market, where the volatility of Delhi_oil (0.030), Chennai_oil (0.0477), Hyderabad_oil (0.0536), and Rajkot_oil(0.0571) prices is lowest. Except for the Delhi market, the volatility of local oil markets was higher than that of foreign markets. The local seed market was more volatile than the global seed market. The Raichur seed market (0.1944) and the Tumakuru pod market (0.1153) both exhibited quite high levels of volatility relative to other groundnut markets that were considered. These findings contradict those of Surabhi et al. (2018) on the transmission of prices and the volatility of prices for India's most widely consumed staples. The degree of volatility is lower in local pricing despite the fact that both international and domestic prices are variable.

Table 5: Price volatility in international and domestic prices of groundnut markets

Variables[#]	No. of observations	Mean*	Price volatility^
International price			
Groundnuts	134	0.0027	0.0534
Groundnut oil	134	-0.0011	0.0358
National prices			
Delhi(oil)	134	0.0027	0.0300
Rajkot(oil)	134	0.0007	0.0571
Chennai(oil)	134	0.0072	0.0477
Mumbai(oil)	134	0.0026	0.0708
Hyderabad(oil)	134	0.0031	0.0536
Bellary(pod)	134	0.0075	0.1245
Raichur(pod)	134	0.0089	0.1944
Bengaluru(Seed)	134	0.0047	0.0654
Challakere(pod)	134	0.0079	0.1270
Tumakuru(pod)	134	0.0044	0.1534

CONCLUSION

Changes in average total oilseeds output in Karnataka are similarly driven by shifts in mean area (107.5%) and the interplay of shifts in mean area and mean yield (6.33%). The primary components contributing to the change in variance of production of total oilseeds are the change

in area variance (55.10%), the change in residual factors (21.83%), and the interaction between the change in area variance and the mean yield (20.15%). Results show that local oil and seed prices have an effect on their international counterparts and that international oil and seed prices are stable when compared to domestic ones.

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