Indian Mustard Production : Markets and Economics of Typical Production System

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1. An overview:

Indian vegetable oil economy is the fourth largest in the world next only to USA, China and Brazil accounting for about 14 percent of world's oilseed area and 7 percent of world's oilseeds production, besides significantly contributing to worlds' oil-meal production (about 6 %) and its exports (about 4 %). India contributes about 6 percent of world vegetable oil production, 11 percent of world vegetable oil imports and about 9 percent of world's edible oil production.

2. Domestic oil production, imports and total edible oil consumption in India

The oilseed scenario in the country has undergone a sea change in the last two decades. India was a net importer of edible oils till 1980s. However, it became almost self-sufficient in mid nineties. It has now become worlds' second largest importer of the edible oils. Imported oils account for more than one third of annual edible oil consumption in the country with an annual import bill of over Rs. 100,000 million.

Table 1: Domestic production, imports and total vegetable oil consumption in India

Year	Domestic Production MMT	Veg. Oil Imports MMT	Total Consumption MMT	Import Rs in Million
2001-02	6.15	4.32	10.47	64,650
2002-03	4.66	4.37	9.03	87,800
2003-04	7.14	5.29	12.43	116,832
2004-05	7.25	4.54	11.79	110,769
2005-06	8.32	4.29	12.61	89,610
2006-07	7.24	4.22	11.46	95,399
2007-08	8.20	4.90	13.10	102,987

Source : Ministry of Agriculture, Govt. of India

Between 2003-04 and 2007-08 (Oil Year, November-October), edible oils constituted about 90 percent of total oil vegetable oil imports which were mainly crude palm and soybean oils. The palm based oil constituted about 70 percent of total imported edible oils. Besides palm and soybean oils, a small quantity of sunflower and coconut oils has also been imported in India.

During the last one decade, Rapeseed-Mustard oil constituted about 17 percent of total edible consumed in India and it accounts for one third (35 %) of the domestic edible oil production in the country followed by groundnut (30 %) and soybean (22%) .

The per capita consumption of edible oils in India has reached over 11 kg, from 10 kg during the last five years.

3. Oilseeds Situation in India

Although net sown area has not increased between 1975-76 and 2005-06, the gross irrigated area has doubled and total cropped area has increased by thirteen percent in these three decades. The area under food grain crops has remained between 120 and 130 million hectares.

There are nine important oilseed crops cultivated in India viz. Groundnut, rapeseed-mustard, soybean, sunflower, safflower, sesamum, niger, castor and linseed. The area under oilseeds increased from 11 million hectares to 27 million hectares between 1954-55 and 2004-05 while average productivity of oilseeds doubled during this period from about 500 kg to 1000 kg per hectare. About 28 percent area under oilseeds in irrigated in India. The oilseeds production has doubled during 1987-88 and 1996-97 from 12 million MT to 24 million MT while productivity increased from 629 to 926 kg/ha during the same period. This increase in oilseeds production and productivity could be attributed to implementation of various oilseeds development programme under the Technology Mission on Oilseeds and Pulses.

The mean domestic availability of edible oils from oilseeds between 1995-96 and 2006-07 indicate that groundnut, rapeseed-mustard and soybean constitute 82 percent of total domestic supply of edible oils. However, their share in total kitty of edible oils vary year to year. For example, during 2006-07, rapeseed-mustard, groundnut and soybean contributed 39, 19 and 24 percent respectively to total domestic oil production while their share in 2007-08 stood at 26, 32 and 23 percent respectively.

Over 90 percent of oilseeds production is centred in nine states viz. Madhya Pradesh, Rajasthan, Maharashtra, Gujarat, Andhra Pradesh, Karnataka, Tamil Nadu, Uttar Pradesh and Haryana. Rajasthan with an area share of around 20 percent contribute over 40 percent to oilseed production in the country. More than half of the area under oilseeds is under irrigation in Haryana, Rajasthan and Uttar Pradesh.

Table 2: Area, Production and Yield of Nine Oilseeds during 2006-07 in major Producing States

State	Area Million ha	% to All India	Production Million MT	% to all India	Cumulative % of prod.	Yield kg/ha	% area under Irrigation
M.P.	6.09	22.97	5.81	23.92	23.92	955	7.7
Rajasthan	4.51	17.01	5.17	21.28	45.20	1146	63.6
Maharasthra	3.86	14.56	3.72	15.31	60.52	963	7.7
Gujarat	2.83	10.68	2.57	10.58	71.10	908	12.8
A.P.	2.24	8.45	1.36	5.60	76.7	609	16.5
Karnataka	2.35	8.86	1.13	4.65	81.35	478	21.1
Tamil Nadu	0.59	2.23	1.08	4.45	85.8	1829	49.4
U.P.	1.23	4.64	1.03	4.24	90.04	837	57.0
Haryana	0.62	2.34	0.83	3.42	93.45	1344	74.3
W.B.	0.70	2.64	0.65	2.68	96.13	918	58.8
Orissa	0.32	1.21	0.18	0.74	96.87	550	14.3
Bihar	0.14	0.53	0.15	0.62	97.49	1031	37.1
Assam	0.27	1.02	0.13	0.54	98.02	495	2.5
Punjab	0.07	0.26	0.08	0.33	98.35	1111	87.4
Others	0.69	2.60	0.40	1.65	100	NA	NA
All India	26.51	100.00	24.29	100	100.00	916	28.1

Oilseeds are cultivated on about 16 percent of gross cropped area in the country next to area under cereal crops, which occupy over half of the grossed cropped area in the country. About one fourth of the area under oilseeds is covered under rapeseed-mustard.

4. Rapeseed-Mustard Production in India

Rapeseed-Mustard is the second most important oilseed crop in India after groundnut. The cultivated species in India comprises *B. juncea*, (Indian Mustard), *B.* campestris (var. brown sarson, var. yellow sarson and var. toria), *B. napus* (Gobhi Sarson), *B. carinata* (Karan Rai) and *Eruca sativa* (Taramira) *B. juncea* contributes over ninety percent of area and production under rapeseed-mustard in India. Rapeseed-mustard constitute one fourth area of oilseeds grown in the country. The normal area and production of rapeseed-mustard in India is 6.27 million hectares and 6.67 million metric tonnes, respectively with a productivity of 1063 kilogram per hectare. Between 1949-50 and 2007-08, the compound growth of area, production and productivity of rapeseed-mustard was 1.96 %, 4.10 % and 2.1 % , respectively. Although area under mustard grew considerably between 1989-92 and 2003-05, there was negetaive growth rates in 200-01, 2002-03, 2006-07 and 2007-08.

The productivity of rapeseed-mustard was also influenced by poor performance of South-West monsson during 2002 and 2004 when 39 and 56 percent districts of the country received excess to normal rains.

Table 3: Area, Production and Yield of Nine Oilseeds during 2006-07 in major Producing States

State	Area in mill. Ha	% of All India	Production in Mill. MT	% of All India	Cumulative %	Yield kg/ha	% area Under Irrigation
Rajasthan	3.21	47.28	3.81	51.21	51.21	1185	82.5
U.P.	0.83	12.22	0.87	11.69	62.9	1057	75.6
Haryana	0.6	8.84	0.8	10.75	73.66	1343	74.2
M.P.	0.69	10.16	0.69	9.27	82.93	999	50.2
Gujarat	0.36	5.3	0.5	6.72	89.65	1396	98
W.B.	0.42	6.19	0.34	4.57	94.22	803	72.6
Assam	0.24	3.53	0.12	1.61	95.83	487	1.9
Bihar	0.09	1.33	0.09	1.21	97.04	1029	38.3
Punjab	0.04	0.59	0.05	0.67	97.72	1122	92.4
Others	0.31	4.57	0.17	2.28	100	NA	-
All India	6.79	100	7.44	100		1095	72.1

With increased import of edible oils, the share of mustard oil consumption in total edible oil consumed in India decreased from one fourth in 1996-97 to almost one fifth in 2006-07.

After soybean, rapeseed-mustard meal constitute the second largest qunaity out of the total oilmeal exports from India. Between 1997-98 and 2007-08, the rapeseed-mustard contributed about 15 percent of total oil meal exports from India. Togather with soybean, they contribute more than 90 percent of meal exports from India.

Over 70 percent area under rapeseed-mustard is irrigated. Almost entire mustard area in Gujarat is irrigated.

4.1 Rapeseed-Mustard production hot spots in India

Rajasthan, Uttar Pradesh, Haryana, Madhya Pradesh and Gujarat constitute 90 percent of production in the country. Rajasthan alone contribute almost half of the mustard production in the country. There are six hot spots where mustard production is concentrated (65%).

Table 4: Rapeseed-Mustard production hot-spots in India

Hot Spot No.	Area (Million Ha)	Production (MMT)	States	Districts
I	0.94 (14 %)	1.15 (15%)	Rajasthan	Sawaimadhopur, Alwar, Bharatpur, Jaipur, Dausa and Sikar
II	0.65 (9.6%)	0.85 (11.5%)	Rajasthan & Gujarat	Chittorgarh, Pali, Udaipur, Jalore, Nagaur, Palanpur, Mehsana and Patan
III	0.57 (8%)	0.68 (9%)	Haryana	Gurgaon, Sirsa, Hissar, Rewari, Bhiwani and Mahendra Garh
IV	0.50(7%)	0.6 (8)	Rajasthan M.P. & U.P.	Morena, Bhind, Dhaulpur, Agra and Mathura
V	0.50(8%)	0.7(10%)	Rajasthan	Jhunjhunu, Churu, Sriganganagar & Hanumangarh
VI	0.6 (9%)	0.7 (10 %)	Rajasthan	Bhilwara, Kota, Tonk, baran and Bundi

Figures in parenthesis are percentage of all India

5. Marketing of Rapeseed-Mustard in India

The Marketable Surplus Ratio in rapeseed-mustard in India is over 70 percent. A large section of farmers sell entire mustard produced during the season. Most of the mustard is sold through 11,700 whole sale and primary markets existing in and around mustard growing regions. These include over 3500 regulated Principal and Sub-Market yards. The future trading in mustard is also undertaken through Multi-commodity Exchange of India Limited (MCX), Mumbai, National Multi-Commodity Exchange of India Limited (NMCE), Ahmedabad, National Commodity & derivatives Exchange Limited (NCDX), Mumbai and National Board of Trade (NBT), Indore. The quality specifications of mustard have been specified under AGMARK. The Government Agencies also prescribe specifications for mustard procurement.

5.1 AGRICULTURAL PRODUCE (GRADING & MARKING) ACT, 1937 (AGMARK STANDARDS).

Standards of various agricultural commodities prescribed under the provisions of the Agricultural Produce (Grading & Marking) act, 1937 are popularly called AGMARK Standards. AGMARK standards comply with minimum standards of quality & safety prescribed in Prevention of Food Adulteration Rules, 1955. In addition AGMARK standards differentiate between quality by having three grades for Mustard and Rape seed. The grades are differentiated on the basis of foreign matter, dead badly discoloured and damaged, unripe shriveled and slightly damaged ,small atrophied seeds, admixture of other varieties of seed etc .

5.1.1 AGMARK Standards of Mustard and Rapeseed

Grade designation and definition of quality of Mustard and Rapeseed comprising *Brassica compestris var. sarson/toria Dichotoma/and Brassica juncea/Brassica nigra (Rai)* grown in India.

Special characteristics

Maximum percentage by weight					
Grade Designation	**Foreign matter**	**Dead, badly discoloured and damaged**	**Unripe shriveled and slightly damaged**	**Small atrophied seeds**	**Admixture* of other varieties of mustard**
(1)	(2)	(3)	(4)	(5)	(6)
Special	1.0	1.0	1.5	5.0	5.0
Standard	2.0	1.5	3.0	10.0	10.0
General	3.0	2.0	4.0	20.0	15.0

5.2 Standards of Central Warehousing Corporation

5.2.1 General Characteristics

Mustard seeds to be accepted in ware house shall be :

(a)Free from visible moulds and insect infestation live or dead, any other deleterious substance and musty odour
(b)Free from harmful seeds such as *Argemone* seeds.
(c) Reasonably dry, and
(d)In sound merchantable condition, having the pungent characteristic smell of the variety of the mustard supplied.

5.2.2 Special Characteristics:

The grading may be done on the basis of extraneous matter, damaged , discoloured and dead seeds, shriveled, immature and slightly damaged seeds, admixture of other varieties of mustard , the presence of small atrophied seeds , and presence of whole sound seeds present in the sample.

Specification:

Grade designation	Foreign matter	Maximum limit of tolerance % by weight					
		Damaged discoloured & dead seed	Shriveled immature & slightly damaged	Admixture of variety other than named	Small atrophied seeds	Whole sound seeds of the variety of mustard by weight (Min.)	Moisture by weight
1	2	3	4	5	6	7	8
Grade-1 (Special)	1.0	1.0	1.5	3.0	5.00	92	7
Grade-II (Standard)	3.0	2.0	4.0	10.0	10.00	80	7
Grade-III (General)	5.0	3.0	3.0	15.0	20.00	60	7

Adopted from IS : 2799-1964

5.3 STANDARDS APPLICABLE FOR PURCHASES BY NATIONAL AGRICULTURAL COOEPRATIVE MARKETING FEDERATION OF INDIA LTD. (NAFED).

5.3.1 The main objectives of the NAFED are

a) Providing marketing support to the farmers through its commercial purchases.
b) Acting as an Agency of Government of India for purchases under Market Intervention Scheme (MIS).
c) Assisting farmers by supply of agricultural inputs .

5.3.2 To meet these obligations, the NAFED make purchases of Mustard and Rapeseed and for this purpose following standards for all varieties of Mustard and Rapeseed are applicable.

GRADE SPECIFICATIONS OF RAPESEED/MUSTARD PRESCRIBED BY THE GOVT. OF INDIA FOR PRICE SUPPORT SCHEME DURING 2005-2006 MARKETING SEASON

S.No.	Special characteristics	Maximum limits of tolerance (% by weight) for FAQ
1.	Impurities/foreign matter (including Tara Mira)	2
2.	Admixture with other types (including Toria)	10
3.	Unripe, Shriveled or immature	4
4.	Damaged & weeviled	2
5.	Small atrophied seeds	10
6.	Moisture content	8

5.4 IMPORTANT FACTORS INFLUENCING MUSTARD PRICES

- Various Supply and demand factors influencing global edible oil scenario.
- International prices of other oilseeds and oils.
- Fluctuations in Production.
- Market arrivals.
- Government regulations governing import /export of oil/meals.
- Domestic demand for mustard oil and meal.
- Monsoon situation.
- Market operators and processors.

The market safeguard mechanism of minimum support price (MSP) is available for the main crops including rapeseed-mustard in India. A favourable MSP in mustard during 1989-90 (from Rs. 460 to Rs. 525 per quintal, an increase of 25 percent) and again in 2003-04 (from Rs.1340/- to Rs.1600/- per quintal, an increase 19 percent)) helped in increasing rapeseed-mustard production by 26 and 62 percent over preceding year respectively. Between 1987-88 and 1996-97, the MSP for rapeseed - mustard doubled resulting in its increased production by 93 percent from 3.45 to 6.66 million tonnes. The area and productivity of rapeseed-mustard also increased by 41 and 36 percent respectively during the same period. Since last one decade, the average productivity of rapeseed-mustard has been around 1000 kilogram per hectare. However, with globalisation of Indian economy, the area and production of rapeseed-mustard is largely influenced by global supply and demand of edible oil as well as comparative advantage of the crop against other winter season crops mainly wheat and barley prices.

The Government Agencies procured about 4.5 million MT mustard under MSP between 2000-01 and 2005-06.

6. Typical Mustard production Systems- A case Study

In a case study involving 175 farmers in seven major mustard producing districts spread in five states highlights the variability in package of practices followed by farmers in mustard production and seed yield and net returns that farmers received during 2007-08.

The study indicates that in double cropping regions farmers tend to undertake lesser tillage operations. In certain regions farmers sow mustard on residual moisture, in other regions mustard is sown with a pre-sowing irrigation. Generally 1-2 irrigations are given to mustard crop except in Palanpur where farmers gave 5-6 irrigations in lighter soils. The sowing of mustard is undertaken from the second week of September to end of October depending upon temperature, water availability and harvest of previous crop. All the farmers understood the importance of sowing at a proper time and its implication with relation to management of pest and diseases, plant growth and development of seed and avoidance of forced maturity.

Farmers in Palanpur use bullocks for sowing while in other districts sowing was done through tractors. Some farmers in Alwar and Agra still practice broadcasting method of sowing. The study indicates that most of the farmers use recommended doses of nitrogen and phosphorus. However, sulphur application is not being undertaken by the majority of farmers except in case of Palanpur and Sriganganagar. Aphid is the most important insect-pest reported from all seven locations. Powdery Mildew disease was common in Palanpur while White Rust and *Sclerotinia* Rot were important diseases in other districts. *Orabanche* is emerging a new threat to mustard crop in parts of Rajasthan and Palanpur while at other locations crop faced frost/cold injury. The seed yield and net returns from the crop were highest in Rewari followed by Agra and Alwar districts, The mustard growers in Sriganganganagar received the lowest returns due to yield losses on account of frost during 2007-08.

In single cropping system, mustard is grown in fallow lands after rainy season . In double cropping system, mustard is generally grown after pearl millet or cluster beans or pulses. In some places pearl millet is taken as a third crop after harvest of mustard under assured irrigation conditions. Mustard is also grown as an inter-crop and mixed crop with wheat, potato, sugarcane, peas an gram in India.

During 2007-08 `Rohini' was grown by majority of farmers in Bharatpur and Morena. Laxmi, RH-30 and Pioneer were preferred in Sriganganagar ,Rewari and Palanpur respectively. In Alwar , DMH-1 and Seveka (local selection) and in Agra , Alankar and Jhankar were grown by most of the farmers covered under the study.

Low cost of cultivation against wheat, low labour and water requirement, depleting underground water and comparatively higher returns were some the factors that made farmers to choose mustard over other crops of the season. However, inadequate market support and assured higher returns from wheat were some of the reasons for dissatisfaction from mustard crop cultivation. The competing crops of mustard are wheat, potato, barley, peas and gram besides sugarcane are some of the most

7. Seed Sourcing by farmers- A Case Study

In another case study carried out in 2005-06 covering 203 farmers from 19 districts in six mustard growing states revealed that 62 percent farmers were using public bred varieties. Most of the farmers sourced the seed from public (38 percent), private (36 percent) and cooperative (14 percent) sources. Decision to buy seed is based on cost of seed (33 percent), nearness (25 percent) and trust (22 percent). The seed cost of most of the public varieties was below Rs. 50/acre as against private varieties, which ranged between Rs. 50 to 200/acre. About half of the farmers were happy with the quality of seed.

Over 62 percent farmers preferred to buy seed from public sources because of trust and low cost. Almost all farmers expressed their willingness to adopt the new mustard varieties/ hybrid. However, almost half of them wanted a yield increase of 20 percent and above for which they were willing to pay higher prices upto Rs. 300 /acre. About 19 percent farmers considered cost of seed not an issue if it gives higher yield.

The seed replacement rate in important rapeseed-mustard producing states in India is given in the following table.

Table 5 : MUSTARD SEED REPLACEMENT RATE (%) IN SELECTED STATES OF INDIA

Year	Gujarat	Rajasthan	M.P.	U.P.	Haryana	Punjab	W.B.
2001	71.44	68.95	7.15	26.83	46.41	26.00	30.00
2002	68.82	90.78	10.80	38.18	49.89	21.00	32.00
2003	94.04	55.52	9.56	38.25	55.76	20.00	35.00
2004	100.00	44.56	14.56	52.87	60.00	37.00	36.00
2005	100.00	47.81	21.29	52.00	69.69	21.00	37.00
2006	60.39	60.01	21.49	58.38	72.00	58.00	38.00

Note : The views express in the article are that of the author and does not necessarily reflects the views of the organisation that he represents.

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