



A Review

Production and export of chillies from India

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SUMMARY : Chilli (*Capsicum annum L.*) is one of the important commercial crops of India. It is a crop of tropical and sub-tropical regions and requires a warm humid climate. Chillies exports from India are mostly to Sri Lanka, USA, Nepal, Mexico and Bangladesh. Among these countries, USA, Sri Lanka and Mexico are the major buyers for Indian chillies. It is worth noting that the growth rate in export of chilli is increasing over a period on one hand and export competitive on the other. The quantity of chilli exports grew annually by 14.32 per cent, export value by 23.16 per cent and unit value by 8.41 per cent. Thus, country has a comparative advantage in the export of chili and this can be achieved with the concerted efforts of government by developing transport facilities to export the chilli.

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BACKGROUND AND OBJECTIVES

India has wide diversity of climate and soils on which large number of horticultural crops such as fruits, vegetables, ornamentals, medicinal and aromatic crops, plantation crops, spices etc are grown. So far as the contribution of horticultural crops to Indian economy is concerned, fruits and vegetables are grown only on 7-8 per cent of gross cropped area but contribute more than 18.8 per cent to the gross value of agricultural output and they share 52 per cent of export earnings of total agricultural produce. Besides providing nutritional and livelihood security and helping poverty alleviation and employment generation, this sub-sector sustains a large number of agro-industries, which generate huge additional non-farming employment opportunities.

India is called as spice wealthy nation as its total production of spices is around 40 lakh tonnes from an area of about 25 lakh hectares. In the world, nearly 45 per cent of supply of spices in volume and 25 per cent in value is from India (Anonymous, 2005). Indian export is only 10 per cent of its production to over 130 countries.

Chillies (*Capcicum annum L.*) is a tropical and sub tropical spice crop. India is the largest

producer and consumer of chillies in the world contributing 25 per cent of the total world production. Chilli is also known as Capsicum, red pepper, Paprika depending upon the species and variety and also the manner in which it is prepared and used. Chilli is used as an essential condiment in foods for its pungency and red colour. Besides these properties, chilli is a rich source of vitamin A, C, E and P and has certain medicinal properties. It is used in homeopathy. A non-conventional use of chilli is in the self-defense sprays, which is gaining popularity in USA. The spray consists of capsicum oleoresin at ultra high emission rate which temporarily immobilizes the attacker. In recent years, chillies export earned more share in total spices export from India. With this background in the present paper an effort has been made to study the export of chilli from India with the following objectives:

- To study the area, production, productivity and export of chillies.
- To assess the share of export in production of chillies.

RESOURCES AND METHODS

The study utilizes the secondary data

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gathered from the various publications (Spices Statistics and Spice India) of Spices Board. The data gathered pertained to area, production, yield, export quantity, export value and export unit value of chillies for the pre liberalization period (1970-71 to 1990-91) and post- liberalization period (1991-92 to 2008-09). Percentage, mean and coefficient of variation were computed wherever necessary for the above variables.

To study the annual growth rate in quantity and value of export of coir products, the compound growth rate was computed using semi log or exponential model (Gujarathi and Sangeetha, 1995).

$$\ln y_t = a + \beta_t t + u_t$$

where,

Y_t = Quantity (tonnes) of coir products exported in year t.

t = Time element which takes the value 1, 2 n for various years.

a_t = Intercept

β_t = Regression coefficient

Annual compound growth rate (r) = $[(\text{Antil } \beta_t) - 1] \times 100$

Estimation of extent of instability:

Coefficient of variation (CV): which explains the fluctuations over the period

$$\text{CV (per cent)} = (\text{Standard deviation/mean}) \times 100$$

OBSERVATIONS AND ANALYSIS

Chilli is being cultivated in almost all the states of India. State wise area, production and productivity of chillies during 2007-08 are presented in Table 1. It is being cultivated in an area of about 8.05 lakh hectares with a production of about 12.97 lakh tones in India. The national average productivity was 1611 kg per ha. Among the states, Andhra Pradesh and Punjab had above national average productivity and rest of the states had below national average productivity. From the

Table 1: State-wise area, production and productivity of chillies during 2007-08

Sr. No.	States	Area		Production		Yield (kg/ha)
		Hectares	Per cent to total	Tonnes	Per cent to total	
1.	Andhra Pradesh	223.00	27.67	772.00	59.48	3462
2.	Arunachal Pradesh	2.40	0.30	3.60	0.28	1500
3.	Assam	16.00	1.99	10.00	0.77	625
4.	Bihar	2.90	0.36	3.90	0.30	1345
5.	Chhatisgarh	5.60	0.69	2.60	0.20	464
6.	Gujarat	8.00	0.99	8.00	0.62	1000
7.	Haryana	0.70	0.09	0.70	0.05	1000
8.	Himachal Pradesh	0.70	0.09	0.30	0.02	429
9.	Jammu and Kashmir	0.70	0.09	0.70	0.05	1000
10.	Karnataka	136.00	16.88	155.00	11.94	1140
11.	Kerala	1.40	0.17	1.30	0.10	929
12.	Madhya Pradesh	43.01	5.34	44.75	3.45	1040
13.	Maharashtra	100.00	12.41	44.00	3.39	440
14.	Manipur	7.90	0.98	4.30	0.33	544
15.	Meghalaya	1.90	0.24	1.40	0.11	737
16.	Mizoram	1.30	0.16	0.80	0.06	615
17.	Nagaland	0.80	0.10	1.00	0.08	1250
18.	Orissa	76.10	9.44	63.90	4.92	840
19.	Punjab	2.60	0.32	4.20	0.32	1615
20.	Rajasthan	20.60	2.56	27.40	2.11	1330
21.	Tamil Nadu	67.40	8.36	34.10	2.63	506
22.	Tripura	2.00	0.25	2.50	0.19	1250
23.	Uttar Pradesh	16.00	1.99	15.00	1.16	938
24.	Uttarakhand	6.00	0.74	2.00	0.15	
25.	West Bengal	62.40	7.74	93.70	7.22	1502
26.	Andaman and Nicobar Island	0.40	0.05	0.70	0.05	1750
	All India	805.81	100.00	1297.85	100.00	1611

table, it was observed that three south Indian states *viz.*, Andhra Pradesh, Karnataka and Tamilnadu were the leading chilli producing states. The share of these states in the total chilli area of the nation was 52.91 per cent contributing 74.05 per cent to the total production of chilli in the country. The contribution of rest of the states towards chilli production of the country was only about 25.95 per cent. Among the three major chilli growing south Indian states, Andhra Pradesh is the leading state in the country as its share in the total area was to the extent of 27.60 per cent contributing 59.48 per cent of the nation's chilli production.

Temporal variation in area production and productivity:

Over the years, the chilli is being cultivated in an area of seven to nine lakh hectares but the production has increased from 5.20 lakh tonnes to 13.53 lakh tonnes with the increased productivity levels during 1970-71 to 2008-2009. There was spurt in the area, production and productivity of chilli especially in the year 1985-86. The area under chilli has declined continuously after 2000-2001 and at the same time there was increase in the productivity except during the year 2002-2003. Looking to the data it is apparent that the increase in chilli production is due to increase in the productivity than the increase in area (Table 2).

The cardinal factors driving this significant increase in production are the use of high yielding hybrids in place of varieties, increase in average yield, favourable weather conditions and changing consumption pattern. Better crop management practices and higher yield levels led to bumper crop harvest during 2000-2001 and 2001-2002 resulting in a sharp fall in prices during that period. Due to unattractive

prices, most of the farmers shifted their production to other cash crops like cotton, sugarcane, etc., and thus resulting in a decline in area and production under chilli cultivation in subsequent years. Moreover, crop damage due to floods in major producing regions of south India, particularly in 2007-2008 resulted in sharp decline in production. During that year, prices posted historic high of Rs. 7000/- per quintal in the domestic market. These attractive prices have prompted farmers to increase acreage under chilli cultivation over the last two years. The increased productivity may be attributed to advent of high yielding varieties and improved crop management practices.

Impact of economic liberalization on chilli production:

To understand the impact of economic liberalization on chilli production and productivity the pre and post analysis was carried out and presented in Table 3. It can be observed from the table that there was increase in the mean area (3.10 %) during post-liberalization period over pre-liberalisation, but there was substantial increase with respect to mean production (79.56%) and productivity (77.75%) during the same period. Further, the values of coefficient of variations for area and production were higher during the pre-liberalization than the post liberalization period. This showed that there is stability in the area and production of chilli during post-liberalization than the pre-liberalization period. However, the coefficient of variation for productivity was higher during the post liberalization than the pre-liberalization period. This may be attributed to sudden spurt in the productivity especially in the recent years (2003-04 onwards) due to advent of hybrids in chilli production.

Table 2: Area, production and productivity of Chillies in India, 1970-71 to 2008-2009

Years	Area		Production		Productivity	
	Lakh ha	Per cent change	Lakh tonnes	Per cent change	kg/ha	Per cent change
1970-71	7.83	-	5.2	-	664	-
1975-76	7.4	-5.49	5.26	1.15	711	7.05
1980-81	8.35	12.84	5.09	-3.23	610	-14.24
1985-86	9.04	8.26	8.77	72.30	970	59.15
1990-91	8.16	-9.73	7.19	-18.02	881	-9.17
1995-96	8.84	8.33	8.09	12.52	915	3.86
2000-01	8.84	0.00	10.46	29.30	1183	29.30
2001-02	8.81	-0.34	11.13	6.41	1263	6.77
2002-03	8.28	-6.02	9.06	-18.60	1094	-13.39
2003-04	7.94	-4.11	12.74	40.62	1605	46.64
2004-05	7.67	-3.40	12.34	-3.14	1609	0.27
2005-06	6.9	-10.04	10.14	-17.83	1470	-8.66
2006-07	7	1.45	11.5	13.41	1643	11.79
2007-08	7.2	2.86	12.5	8.70	1736	5.68
2008-09	8.01	11.25	13.53	8.24	1689	-2.71

Table 3: Variation in area, production and productivity of chilli in India during pre and post-liberalization periods

Period	Particulars	Mean	Coefficient of variation (%)
Pre –liberalization (1970-71 to 1990-91)	Area (lakh ha)	8.06	8.43
	Production	5.87	22.27
	Productivity (kg/ha)	724.04	15.72
Post-liberalization period (1995-96 to 2007-08)	Area (lakh ha)	8.31	8.23
	Production	10.54	24.48
	Productivity (kg/ha)	1286.99	26.90
Per cent change during post over pre-liberalization period	Area	3.10	--
	Production	79.56	--
	Productivity	77.75	--

Export of chillies:

Chillies exports from India are mostly to Sri Lanka, USA, Nepal, Mexico and Bangladesh. Among these countries, USA, Sri Lanka and Mexico are the major buyers for Indian chillies. It exports in different forms like chilli powder, dried chilli, pickled chillies and chilli oleoresins. Chillies consumed in the food processing industry are known for its colour and pungency, whereas, the countries like the US, the UK, and Sweden use chilli for manufacture of oleoresins and extracts on a large scale. India today faces stiff competition from China and Pakistan who offer their produce in International market at very competitive price. The details of quantity of chillies exported from India over the years are presented in Table 4. It could be observed from the table that the quantity of chillies exported over the years rose from 2073 tonnes in 1970-71 to 1.49 lakh tonnes in 2008-09. The increase in export was in tune with increase in production as India is the major producer and

Table 4: Production and export of chillies in India during 1970-71 to 2008-2009

Years	Production (in lakh tonnes)	Export (in tonnes)	Percentage of export to production
1970-71	5.2	2,073	0.40
1975-76	5.26	3,532	0.67
1980-81	5.09	7,682	1.51
1985-86	8.77	1,241	0.14
1990-91	7.19	24,534	3.41
1995-96	8.1	56,165	6.93
2000-01	10.46	62,448	5.97
2001-02	11.13	69,998	6.29
2002-03	9.06	81,022	8.94
2003-04	12.89	86,575	6.72
2004-05	17.76	138000	7.77
2005-06	10.23	113,174	11.06
2006-07	13.23	149022	11.26
2007-08	13.71	209000	15.24
2008-09	13.53	188000	13.90

consumer of chillies. The export of chillies in proportion to production was just 0.4 per cent in the year 1970-71 rose to 13.90 per cent in the year 2008-09, still there is a potential to increase its export. The point to be noted here is that the proportion of export increased especially after 1990-91. This was further investigated by taking two periods (pre and post-liberalization) in order to understand the impact of economic liberalization on chilli export (Bhullar, 2005).

Impact of economic liberalization on chillies export:

Table 5 depicts the details of production and export of chilli during pre and post liberalization period. It could be observed from the table that there was substantial increase in the export of chilli during post-liberalisation period (527.11%) over pre-liberalisation. The instability in the export of chilli was much higher during pre-liberalization period (87.71%) than the post-liberalization (26.07%) as indicated by their coefficient of variation. Indian chilli exports are mainly influenced by domestic demand and uneven production which is interrupted by erratic monsoon, drought and yield factor. India's chilli exports are showing an increasing trend since last decade especially from 1990-91. This may be attributed to rising export demand coupled with short supply from other major producers, and the ban by the European Union on imports of chilli from Pakistan due to presence of aflatoxin in its produce. Pakistan's export share in global trade has been grabbed by India that resulted in historic high exports from India in the last couple of years.

Export quantity, value and unit value of chillies:

The quantum of exports, export value and unit value has increased over the years (Table 6). From year to year there is a positive change in the quantity exported, export value and unit values except in 2005-06 and in the year 1985-86 there was decline in the quantity exported and obviously the export value though there was positive change in the unit value of export compared to the previous period (1980-81). The remarkable increase in export both in terms of quantity and value especially

Table 5 : Impact of economic liberalization on chillies export

Periods	Particulars	Mean	CV
Pre –liberalisation (1970-71 to 1990-91)	Production (lakh tonnes)	8.06	8.43
	Export (tonnes)	0.97	87.71
Post-liberalisation period (1991-92 to 2008-09)	Production (lakh tonnes)	10.64	17.09
	Export (tonnes)	7.69	26.07
Per cent change during post over pre liberalisation period	Production	68.81	--
	Export	527.11	--

Table 6: Export quantity, value and unit value of chillies from India, 1970-71 to 2008-2009

Years	Export quantity		Export value		Unit value	
	Tonnes	Per cent change	Rs. in lakhs	Per cent change	Rs/kg	Per cent change
1970-71	2,073	-	108.67	-	5.24	-
1975-76	3,532	70.38	318.06	192.68	9.01	71.78
1980-81	7,682	117.50	555.59	74.68	7.23	-19.69
1985-86	1,241	-83.85	202.03	-63.64	16.28	125.09
1990-91	24,534	1876.95	2,755.55	1263.93	11.23	-31.01
1995-96	56,165	128.93	19,546.17	609.34	34.80	209.85
2000-01	62,448	11.19	22,973.30	17.53	36.79	5.71
2001-02	69,998	12.09	25,244.02	9.88	36.06	-1.97
2002-03	81,022	15.75	31,514.68	24.84	38.90	7.85
2003-04	86,575	6.85	36,687.81	16.41	42.38	8.95
2004-05	1,13,174	30.72	40,300.51	9.85	35.61	-15.97
2005-06	1,49,022	31.68	80,855.99	100.63	54.26	52.37
2006-07	2,09,000	40.25	1,09,750.00	35.74	52.51	-3.22
2007-08	1,88,000	-10.05	1,08,095.00	-1.51	57.50	9.49
2008-09	2,04,000	8.51	1,29,172.80	19.50	63.32	10.13

Table 7: Variation in quantity, value and unit value of chilli exports from India during pre and post-liberalization periods

Periods	Particulars	Mean	Coefficient of variation (%)
Pre –liberalisation (1970-71-1990-91)	Exports (tonnes)	7812.4	124.79
	Export value (Rs. Lakhs)	787.98	145.19
	Unit value (Rs./kg)	9.91	44.42
Post-liberalisation period (1995-96-2008-09)	Exports (tonnes)	71380.6	17.91
	Export value (Rs. Lakhs)	38110.57	29.92
	Unit value (Rs./kg)	38.52	8.41
Per cent change during post over pre-liberalization period	Export	823.4	--
	Export value	3932.45	--
	Unit value	299.1	--

Table 8: Compound growth rates for export of chillies during pre and post-liberalization periods

Sr. No.	Export particulars	Pre-liberalisation period (1976-77 to 1990-91)	Post-liberalisation period (1991-92 to 2008-09)	Overall period (1976-77 to 2008-09)
1.	Quantity	2.31 ^{NS}	13.84 ^{**}	14.32 ^{**}
2.	Value	8.77 ^{NS}	16.56 ^{**}	23.16 ^{**}
3.	Unit value	6.31 ^{**}	2.80 [*]	8.14 ^{**}

* and ** indicate significance of values at P=0.05 and P=0.01, respectively. NS=Non-significant

from 1990-91 onwards needs to be investigated. This may be partly due to changing economic environment and partly due to favourable weather conditions the supported in increasing the production to meet the domestic as well as external demand.

Variation in quantity, value and unit value of chilli exports from India during pre and post liberalisation periods is presented in Table 7. The mean of export values increased from Rs. 787.98 lakhs during pre-liberalization period to Rs. 38110.57 lakhs during post liberalization period. Similarly the unit value has increased from Rs. 9.91 to Rs. 38.52 during the same period. There was substantial increase during post-liberalization over pre-liberalization period in quantum of export (823.40%), export value (3932.45%) and unit value (299.10%). Introduction of sampling and mandatory quality testing of chilli and chilli product-consignments by the Spices Board before shipment for the presence of Sudan I-IV and aflatoxin has boosted the confidence of overseas buyers and helped India's exports. Further there was stability in the quantity exported, export value and unit value of exports during post-liberalization period compared to pre-liberalization period as indicated by lower coefficient of variation in post-liberalization period.

Growth analysis:

The Compound Growth Rates (CGRs) of exports of chillies for two periods 1976-77 to 1990-91 (pre-liberalisation period) and 1991-92 to 2008-09 (post-liberalisation period) were estimated and presented in Table 8. It can be observed from the table that the growth rates of quantity (2.31%) and export value (8.77%) were positive but non significant, while the growth rate of unit value (6.31%) was positive and significant. During post-liberalization period, all the variables (quantity, export value and unit value) were found to be positive and significant. As revealed in the earlier sections, the exports have increased substantially during the post liberalization period and was further confirmed by the growth rate analysis. For the overall period, the quantity of chilli exports grew annually by 14.32 per cent, export value by 23.16 per cent and unit value by 8.41 per cent.

Conclusion:

Andhra Pradesh is the leading state in the country as its

share in the total area was to the extent of 27.67 per cent contributing 59.48 per cent of the nation's chilli production and it has a strong impact on country's chilli production as reflected in the year 2008-09. The study observed that there was stability in production and exports of chilli during post-liberalization than the pre-liberalization period. The cardinal factors driving this significant increase in production are the use of high yielding hybrids in place of varieties, increase in average yield, favourable weather conditions and changing consumption pattern. The favourable weather conditions and change in economic environment are found to be the important factors in increasing the production to meet the domestic as well as external demand. There is a potential to increase the exports as currently India is exporting still less than 20 per cent of its production.

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