

Study of Determinant Factors of Paddy Export From India

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Abstract

The present study was conducted to evaluate the study of determinants of export of paddy from India by the way of studying the multiple regression model was employed for the analysis. The model is fitted and R^2 value was used to fit the model to analyze the parameters under study and the data used for regression analysis were for 48 years. (1970-71 to 2017-18). Seven independent variables viz., domestic production of paddy (X_1), Wholesale Price of Paddy (X_2), International Price of Paddy (X_3), World Production Paddy (X_4), exchange rate (X_5), NPC ration (X_6) and EPR (X_7) jointly explained the 95 per cent of total variation in export of paddy from India. The factors determining of paddy export that the Domestic production, Wholesale price of paddy and Exchange rate were significantly declined whereas International price of paddy and EPR were significantly increased during the study period.

Key words : Multiple Regression model, Domestic production, World production, Wholesale price, International price, EPR, NPC, and Exchange rate.

Historical evidence suggests that paddy (*Oryza sativa* L.) was originated either in southern parts of India or in the parts of India and Burma. It is also being cultivated in China since ancient times and China occupies the first place in paddy production in the World. The region of India, Burma, Thailand and Cambodia is the centre for many wild paddy varieties.

Paddy is the most widely grown cereal in the World and is staple food for more than 60 per cent of World's population. World paddy production has increased steadily but at a slow pace from about 400 million tonnes to 477 million tonnes in the past 15 years.

Developing countries are the main players in the world paddy trade, accounting for 83 per cent of export and 85 per cent of imports. While there are numerous importers of paddy, the exports of paddy are limited. Just five countries Thailand, Vietnam, China, the United States

and India – in decreasing order of exported quantities, accounted for about three quarters of world paddy exports in the year 2002. In the year 2010, the three largest exporters of paddy, in decreasing order of quantity exported were Thailand, Vietnam and India. Together, they accounted for nearly 70 per cent of the world paddy exports. The primary variety exported by Thailand and Vietnam were Jasmine paddy, while exports from India included aromatic Basmati variety. China, an exporter of paddy in early 2000s, was a net importer of paddy in the year 2010. Major importers usually include Nigeria, Indonesia, Bangladesh, Saudi Arabia, Iran, Iraq, Malaysia, Philippines, Brazil and some African and Persian Gulf countries.

India has emerged as the major paddy exporter since 2017-18 onwards replacing Thailand and accounts for about 26.3 per cent of total paddy exports in the World. Apart from India, exports from Vietnam also increased significantly from the year 2017-18 onwards,

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taking it to the second position with about 7.5 per cent share in the total paddy exports.

India is the second largest producer as well as consumer of paddy in the World. Similar to the trends in world production, paddy production in India has also increased at a slow pace 109,000 thousand tonnes in the year 2018-19 primarily due to rise in yields.

Paddy export from India is determined by various factors and therefore, reliable estimates of determinants of export are essential for the formulation of appropriate policies. The present study viz., Study of determinants of export of paddy from India has examined the multiple regression model with World and domestic production, international and domestic price, EPR, NPC and exchange rate of paddy in India.

Objective of the study

To study the factor determinants of export of paddy.

Methodology

This chapter explains the characteristics of the study area, the sampling procedure, nature and sources of data, the statistical tools and techniques employed for analysing the data are presented.

Description of the study area : In India the area is suitable for cultivation of paddy and scattered in all over India. Hence the export performance and competitiveness of paddy was examined at National level.

Nature and sources of data : The study is completely based on secondary data, Therefore required data for the present study was collected from various reports viz., APEDA, Agricultural statistics at a glance 2015, <https://www.indexmundi.com/commodities/?commodity=rice & months=36>, Maharashtra at

A Glance, Economic Survey (GOI), Ministry of Agriculture and Co-operation (Agricoop), Food Corporation of India (FCI), Commission for Agricultural Costs and Prices (CACP), International Monetary Fund (IMF), Food and Agricultural Organization (FAO), World Trade Organization (WTO), International Food and Policy Research Institute (IFPRI), International Rice Research Institute (IRRI), Rice Board of India and Ministry of Food.

The data on area, production, and productivity of paddy, domestic and international prices and export etc. was collected for the period 1970-71 to 2017-18.

The study period : The study period was divided into two periods based on the policy of the government on WTO of trade at different periods. However, for better understanding of growth rates in area, production and productivity were compared for the period from 1970-71 to 2017-18 which was further divided into two sub periods.

Period-I : Pre-WTO Period (1970-71 to 1994-95)

Period-II : Post-WTO Period (1995-96 to 2017-18)

Overall Period : (1970-71 to 2017-18)

Analytical Techniques : Keeping in view the objectives of the study, data collected were subjected to analysis through the following statistical techniques.

a. Nominal Protection Coefficient (NPC) : Nominal Protection Coefficient is a direct measure of competitiveness of a country towards a commodity in the context of free trade. The nominal protection coefficient (NPC) is defined as the ratio of the domestic price to the World reference price of the commodity under consideration.

Symbolically,

$$\text{NPC} = \text{Pd} / \text{Pr}$$

Where, NPC = Nominal protection coefficient of paddy, Pd = Domestic wholesale price of paddy and Pr = World reference price of paddy

b. Export Performance Ratio (EPR) :

The Export Performance Ratio (EPR) was estimated to examine the comparative advantage of India in the export of paddy, following the method suggested by Balassa (1965), using Equation (1).

$$\text{EPR} = \text{Sit} / \text{Swt}$$

Where, Sit = Share of paddy in India's total export, Swt = Share of paddy in World total export,

c. Determinants of export of paddy in India : To determine the factors affecting the export quantity of paddy from India, export function was estimated. To examine the influence of price and non-price factors on export of paddy, the following variables was selected.

Export Function : To determine the factors affecting the export quantity of paddy from India, export function was estimated by multiple regression model.

$$Y = a + b_1 x_1 + b_2 x_2 + b_3 x_3 + b_4 x_4 + b_5 x_5 + b_6 x_6 + b_7 x_7 + u$$

Where, Y = Export quantity of paddy (Tonnes), X₁ = Domestic production of paddy (Tonnes), X₂ = Wholesale price of paddy (Rs. q⁻¹), X₃ = International price of paddy (Rs. q⁻¹), X₄ = World production paddy (Tonnes), X₅ = Exchange rate, X₆ = NPC, X₇ = EPR, a = Intercept, bi's = Regression coefficients and u = Error terms

Results and Discussion

This chapter is devoted to express the results obtained from the study of determinants of export of paddy from India. The discussion regarding nominal protection coefficient, Export performance ratio and determinants of export of paddy are briefly discussed in this chapter. The finding of the present investigation are discussed under following headings.

1. Analysis of factors of Determinants of paddy
3. Determinants of paddy Export From India

Determinants of export of paddy from India : The factors influencing the export of Indian paddy was analysed. The data pertaining to different aspects that influence the export of paddy were collected for 48 years from 1970-71 to 2017-18. The multiple regression model was employed for the analysis. The model is fitted and R² value was used to fit the model to analyze the parameters under study.

It is revealed from the Table2. that, the factors determining paddy export from India were studied by using multiple regression model where quantity exported (Y) regressed against domestic production (X₁), wholesale price (X₂), international price (X₃), World production (X₄), exchange rate (X₅), Nominal Protection Coefficient (NPC) (X₆) and Export Performance Ratio (EPR) (X₇). The data used for regression analysis were for 48 years. (1970-71 to 2017-18).

Table 2 shows that the Domestic Production (X₁), Wholesale price (X₂), Exchange rate (X₅) and NPC (X₆) were negatively significant. Whereas, the international price (X₃), World Production of paddy (X₄) and EPR (X₇) were positively significant. The regression coefficient of domestic production of paddy (X₁) is 0.03 with negatively significant at 5 per cent level of significant. It indicates that if the domestic

Table 1. Determinants factors of export quantity of paddy

Year	Domestic production of rice '000tonnes (X ₁)	Wholesale price of paddy (Rs. qtl-1)	International price of paddy (Rs./qtl)	World rice production '000tonnes	NPC	EPR	Exchange rate (000 crore)
1970-71	42225	102	262.73	213012	0.39	0.73	238.62
1971-72	43068	80	160.04	215772	0.50	0.48	265.70
1972-73	39245	120	150.41	208937	0.80	0.47	318.66
1973-74	44051	130	82.72	227555	1.57	0.39	450.37
1974-75	39579	100	1166.36	225662	0.09	1.62	682.43
1975-76	48740	137	266.03	242892	0.53	0.76	734.97
1976-77	41917	107	657.85	235387	0.16	0.97	890.21
1977-78	52617	122	36.31	250121	3.36	0.38	988.41
1978-79	53773	125	123.58	262069	1.01	2.85	1073.22
1979-80	42330	128	213.01	256114	0.60	6.24	1352.85
1980-81	53631	134.4	148.24	269911	0.91	8.31	1611.40
1981-82	53248	150.7	762.51	277923	0.20	17.00	1755.70
1982-83	47116	153.8	1440.46	284966	0.11	12.98	1795.08
1983-84	60097	172	548.63	307011	0.31	7.11	1876.09
1984-85	58337	162.3	524.45	316763	0.31	5.53	2235.39
1985-86	63825	176.3	1164.75	317998	0.15	12.72	2431.13
1986-87	60416	187.3	495.74	316052	0.38	10.06	2699.75
1987-88	56862	201.1	965.43	315130	0.21	15.79	3265.93
1988-89	70489	237.3	756.16	332068	0.31	11.15	4001.35
1989-90	73573	235.5	808.66	345312	0.29	9.40	5034.41
1990-91	74291	242.8	635.31	351406	0.38	8.70	6117.43
1991-92	74680	325	1392.11	353287	0.23	12.58	7997.14
1992-93	72868	358.2	1473.82	353862	0.24	12.70	9815.50
1993-94	80300	403	1710.38	354660	0.24	13.33	11530.78
1994-95	81810	404.3	290.83	364092	0.41	10.12	13554.08
1995-96	76980	515.3	1249.30	368774	0.41	29.94	16786.53
1996-97	80736	807.81	1507.96	380370	0.54	18.64	19170.67
1997-98	82545	838.64	708.28	387420	1.18	18.27	20331.88
1998-99	86077	955.98	2259.98	394899	0.42	25.67	22732.80
1999-00	89683	960.91	2157.62	409288	0.44	14.26	24642.46
2000-01	84977	914.63	1521.50	399199	0.60	14.51	28996.72
2001-02	93334	935.61	501.58	399397	1.87	14.10	29234.53
2002-03	71814	885.19	1333.15	378120	0.66	22.44	31595.46
2003-04	88522	912.07	1314.70	392468	0.69	15.06	35354.14
2004-05	83127	971.66	1429.20	400818	0.68	18.38	41802.12
2005-06	91785	1024.62	1371.66	417887	0.75	14.90	46315.97
2006-07	93345	1109.05	1117.13	420142	0.99	14.09	54950.93
2007-08	96682	1159.94	3481.18	433887	0.33	18.31	57975.90
2008-09	99172	1541.15	5228.34	449716	0.30	10.66	70263.71
2009-10	89083	1573.98	5054.78	439963	0.31	8.66	60782.52
2010-11	95970	1803.91	2263.51	450371	0.80	6.98	69976.68
2011-12	105301	1949.99	1858.33	468105	1.05	9.93	85587.96
2012-13	42754	2218.12	3125.45	473954	0.71	15.66	98850.56
2013-14	44136	2509.48	4005.65	478987	0.63	19.20	107224.70
2014-15	44110	2471.71	4460.97	479766	0.55	18.97	118233.70
2015-16	43378	2359.78	4001.53	473252	0.59	17.02	104026.20
2016-17	42964.98	2359.78	2812.66	486664	0.85	14.93	106533.30
2017-18	42900	2384.32	4796.82	488313	0.50	20.31	120197.60

Source: Policy Paper by Ramesh chand, <http://unctadstat.unctad.org>, www.ricestat.com, www.indiastat.com

Table 2. Determinant of Paddy Export From India

Variables	Coefficients	S.E.
Intercept	-175251.0000	1441427
Domestic Production of Paddy (Tonnes) (X_1)	-0.0254**	0.012161
Wholesale Price of Paddy (Rs. qtl^{-1}) (X_2)	-1206.5300***	176.66
International Price of Paddy (Rs. qtl^{-1}) (X_3)	4818.9000***	719.78
World Production Paddy (Tonnes) (X_4)	0.0029	0.0075
Exchange Rate (X_5)	-41660.5600*	22791.33
NPC (X_6)	-2906.1700	285467
EPR (X_7)	59635.2000*	29864.24
R ²	0.95	-

Note: ***, ** and * indicates 1, 5 and 10 per cent level of significance

production of paddy increased by one tonne then export of paddy was decline by 0.03 tonne. If wholesale price (X_2) increased at 1 Rs. qtl^{-1} then export of paddy decline at 1206.53 tonnes with 1 per cent level of significant. Demand for paddy export from India was found to be increased with increase in international prices of paddy (X_3), with 1 Rs. qtl^{-1} increase in international prices of paddy the export of paddy would be increased by 4818.90 tonne. World production of paddy (X_4) was positive but non-significant it indicates that the increase in the world production of the paddy export will increased at 0.003 tonne. If exchange rate (X_5) increased at 1 Rs. qtl^{-1} then export of paddy decline at 41660.56 with 10 per cent level of significant. Nominal Protection Coefficient (X_6) was negative but non-significant. This indicates that if the domestic price of paddy was less than international price, then it increased export of paddy from India. Export Performance Ratio (X_7) was positively significant with 10 per cent level of significant. This indicates that, the share of paddy in India's total export was more than share of paddy in the World total export. Similar observations were reported by Adhikar (2016) and Yamini (2019).

Conclusions

1. Seven independent variables viz., domestic

production of paddy (X_1), Wholesale Price of Paddy (X_2), International Price of Paddy (X_3), World Production Paddy (X_4), exchange rate (X_5), NPC ration (X_6) and EPR (X_7) jointly explained the 95 per cent of total variation in export of paddy from India. The coefficient of international prices of paddy and the World production paddy were statistically significant and have positive impact on export of paddy

2. The regression coefficient of domestic production of paddy (X_1) is 0.03 with negatively significant at 5 per cent level of significant.
3. Wholesale price (X_2) increased at 1 Rs. qtl^{-1} then export of paddy decline at 1206.53 tonnes with 1 per cent level of significant
4. Paddy export from India was found to be increased with increase in international prices of paddy (X_3), with 1 Rs. qtl^{-1} increase in international prices of paddy the export of paddy would be increased by 4818.90 tonne.
5. World production of paddy (X_4) was positive but non-significant.
6. Exchange rate (X_5) increased at 1 Rs. qtl^{-1} then export of paddy decline at 41660.56 with 10 per cent level of significant.

7. Nominal Protection Coefficient (X_6) was negative but non-significant.
8. Export Performance Ratio (X_7) was positively significant with 10 per cent level of significant.

References

- Abolagba, E. O., Onyekwere, N. C., Abonkolor, B. N. and Umar, H. Y. 2010. Determinants of agricultural exports. *J. Humane Ecology*, 29 : 181-84.
- Ananthi, S. 2000. An econometric analysis of Indian rice exports. M.Sc.(Agri) Thesis, (Unpublished), University of .Agricultural Science, Dharwad, Karnataka.
- Anup Adhikari, Sekhon, M. K. and Manjeet Kaur. 2016. Export of rice from India: Performance and determinants. *Agricultural Economics Research Review*, 29(1): 135-150.
- Anup Adhikari. 2014. Export of rice from India: performance and determinants. M.Sc. (Agri) Thesis (Unpublished), Punjab Agricultural University, Punjab. Bangalore, Karnataka, India.
- Bilal, M. and S.B.H. Rizvi. 2013. Determinants of rice exports: An empirical analysis of Pakistan. *J. Global Scientific Issues* (1) : 5-16
- Dass, S. K., Vashist, A. K. and Singh, C. 1984. Quantum, unit value and export value of coffee exports. *Agricultural Situation in India*, 39(10) : 751-755.
- Kumar Rai, A. B. and Mathura Rai. 2008. Export of cucumber and gherkin from India : Performance, destinations, competitiveness and determinants. *Agricultural Economics Research Review*, 21 :130-138.
- Kumar, N. R., Rai, A. B. and Rai, M. 2008. Export of cucumber and gherkin from India: Performance, destinations, competitiveness and determinants. *Agric. Econ. Res. Rev.*, 21:130-38.
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