

WORLD RICE MARKET - PROSPECTS OF INDIA'S RICE EXPORTS

Thesis submitted to Dr.B.R.Ambedkar Open University
for the Award of the Degree of

Doctor of Philosophy

IN DEVELOPMENT STUDIES
(Specialisation: Economics)

By

P. KANAKA DURGA

Supervisor

Prof. N. KRISHNAJI

Centre for Economic and Social Studies

Nizamiah Observatory Campus, Begumpet

Hyderabad - 500 016 (A.P) India.

December, 1997

DECLARATION

I hereby declare that the work embodied in this Thesis entitled "WORLD RICE MARKET - PROSPECTS OF INDIA'S RICE EXPORTS" carried out by me under the supervision of Prof. N. Krishnaji, Senior Fellow, Centre for Economic and Social Studies, has not been submitted for any other Degree or Diploma either in part or in full to this or any other University.

Station: Hyderabad

Date : 27-12-97

P. Kanaka Durga
(P. KANAKA DURGA)

Prof. N. Krishnaji
Senior Fellow
Centre for Economic and Social Studies
Nizamiah Observatory Campus
Begumpet
Hyderabad - 500 016


CERTIFICATE

This is to certify that the Thesis entitled "World Rice Market - Prospects of India's Rice Exports" submitted by P.Kanaka Durga for fulfilment of the award of Doctor of Philosophy in Development Studies to the Dr. B.R. Ambedkar Open University is a record of bonafide work carried out by her under my guidance and supervision.

The results embodied in this Thesis have not been submitted to any other University or Institute for the award of any Degree or Diploma.

Station : Hyderabad

Date : 27-12-97


(Prof N. Krishnaji)
Supervisor

ACKNOWLEDGEMENT

This Thesis would not have been completed but for the enthusiastic support of numerous scholars and friends both inside and outside Centre for Economic and Social Studies (CESS). My understanding of the world rice market and my insights on the India's rice economy came from many interactions with scholars and from participation in formal and informal seminars and discussions. While it is very hard for me to mention the names of every one whose wisdom and advice I gained from, I would like to say that this Thesis would not have been possible if there was no help from these people.

At the very outset, I express my deep sense of gratitude and heartfelt thanks to my supervisor Prof N. Krishnaji, Senior Fellow, CESS, whose ceaseless inspiration and sincerity in guiding me and correcting each of my chapters meticulously gave a proper shape to this dissertation. I am very fortunate to have such a scholar as my supervisor. I owe my debt of gratitude to him for having extended his valuable guidance throughout the course and at different stages of the study.

My sincere thanks are due to Prof R. Radhakrishna, Senior Fellow, CESS, who was extremely generous with his time and was ready to read the Chapters and discuss the contents at length. He made very helpful comments on all my chapters.

I am very grateful to Prof. Venkatramaiah, Director, CESS for his comments and valuable suggestions on some of the aspects of my dissertation.

I express my sincere thanks to Ph.D Programme Co-ordinator, Dr. Kanakalatha Mukund, and Assistant Programme Co-ordinator Mr. Venkataiah and the former Programme Co-ordinator Dr Sudhakar Reddy for their help and keen interest in making all the arrangements and facilities efficiently that a Ph.D requires.

My grateful thanks are due to the staff members of the CESS library, Mr Vijay Kumar, Mr Sudhakar, Mr Srinivas and Mrs Gousia for their help in utilising the library facilities effectively and efficiently.

I thank the Computer Centre, CESS for enabling me to utilise computer facilities generously. I express my heartfelt thanks to my friend Mr Shyam Sunder who has readily helped me whenever I approached him for help in solving some of my computer problems.

I thank the officials of the Indian Council of Social Science Research (ICSSR), New Delhi, for considering me for the award of Doctoral Fellowship for a period of four years which enabled me to undertake my Ph.D work and complete it in time but for which the study would be a long drawn and arduous task.

I thank several staff members of the CESS who helped me during this course. Recognition in particular ought to go to Dr. Indrakant, Reader, Department of Economics, Osmania University, Mr. Ravi, Dr. K.S. Reddy, Dr. Mitra, Dr. James and Dr. Suri Babu. I thank the Finance Department, especially Mr. Nateswar, for its help in making arrangements and enabled me to use the fellowship in time. I thank non-teaching staff of CESS, Bucchi Ramulu, Komaraiah, Ramachandran and Mahendar Reddy for their help during the period of my stay in CESS.

I wish to thank my friend and co -Ph.D scholar Mr Srinivas who helped me in editing some of my chapters. I acknowledge my Co-Ph.D scholars Mr. Vijay and Mr. Ramana Murthy for their helpful discussions on some of the aspects of my topic. I thank my all other friends Usha, Ramesh, and Sri Devi for giving encouragement and support in different ways.

I thank the libraries of ICRISAT, Osmania University, Directorate of Rice Research, Hyderabad Central University, Indian Institute of Foreign Trade, Food Corporation of India, Institute of Economic Growth for allowing me to use their facilities.

I have immensely benefited from my discussions with Prof C.H. Hanumantha Rao, Chairman, CESS, Dr. K.N. Murty, Reader, Department of Economics, Hyderabad Central University, Prof Ashok Gulati, ICAR, and Dr. Janaiah, DRR. I greatly acknowledge their help. I thank Mr Hussain, rice exporter from Andhra Pradesh, who enlightened me on some of the aspects of rice trading practices in Andhra Pradesh. I thank Prof Vijaya Khatti, IIFT, and officials of FCI, Delhi, MARKEFED, NAFED for spending their valuable time in the course of my discussions with them.

I am always indebted to my family members, especially my parents for their co-operation, help and providing amicable and conducive academic atmosphere at home.

CONTENTS

Chapter No.	Chapter Title	Page No.
I	Introduction	1 - 6
II	Trends in Rice Production and Consumption	7 - 48
III	Structure of the World Rice Market	49 - 87
IV	Domestic and World Rice Prices	88 - 120
V	Quantitative Analysis of Patterns of Trade for Major Rice Trading Countries	121 - 133
VI	Rice Economy of Thailand	134 - 149
VII	Trends in India's Rice Exports	150 - 172
VIII	Trade Liberalisation and Competitiveness of India's Rice Exports	173 - 203
IX	Rice Exports - Implications for Food Security Using An Econometric Model	204 - 225
X	Summary and Conclusions	226 - 233
	Appendix Tables	234 - 260
	Bibliography	261 - 272

List of Tables

Table No.	Description	Page No.
Chapter II		
2.1.1	Continent-wise Annual Average Paddy Production and Their Respective Shares in World Paddy Production	10
2.1.2	Continent-wise Annual Average Harvested Area and Yield for Paddy	11
2.2.1	Annual Average Shares of Paddy Production and Harvested Area in World Paddy Production by Major Paddy Producing Countries	14
2.2.2	Annual Average Rice Production, Area and Yield, Fertiliser Consumption and Area Under High Yielding Varieties of Rice in China	17
2.2.3	Average Annual Growth Rates of Rice Production, Area and Yield in China (Per cent)	18
2.2.4	Production, Area and Yield of Paddy and Wheat in India	25
2.2.5	Fertiliser Consumption, Irrigated Area and HYV Area for Rice and Wheat in India	27
2.2.6	Annual Growth Rates of Production, Area and Yield of Rice, Wheat and Total Cereals in India (Per cent)	30
2.2.7	Production, Area, Yield, Fertiliser Consumption, HYV and Irrigated area of Rice in Indonesia	35
2.2.8	Annual Growth Rates of Rice Production, Area and Yield in Selected Asian Countries	37
2.2.9	Production, Area, Yield, Fertiliser Consumption and Irrigated Area for Rice in Thailand	41

2.2.10	Production, Area, Yield, Fertiliser Consumption, Irrigated Area and Area Under HYV of Rice in Philippines	43
2.3.1	The Effects of Changes in Population, Income and Prices on the Growth of Rice Consumption: Selected Asian Countries	46
2.3.2	Aggregate Rice Consumption and Growth Rates	47
Chapter III		
3.1.1	Annual Average Rice Production, Exports and Ratio of Exports to Production in the World	51
3.1.2	Annual Average Ratio of (%) Rice Exports to Production By Continent	52
3.1.3	Annual Average Ratio of (%) Rice Exports to Production By Major Rice Exporting Countries	53
3.1.4	Annual Average Ratio of (%) Rice Consumption to Production: Selected Asian Countries	54
3.1.5	Annual Average Rice Exports By Continent	55
3.1.6	Annual Average Shares of Rice Exports in World's Total By Continent	58
3.1.7	Annual Average Rice Exports of Major Rice Exporting Countries (Million Tonnes)	59
3.1.8	Share of Rice Exports of Major Rice Exporting Countries (Per cent)	60
3.1.9	Annual Average Rice Imports By Continent (Million Tonnes)	66
3.1.10	Share of Rice Imports in Total World Rice Imports By Continent (Per cent)	67
3.1.11	Annual Average Rice Imports By Major Rice Importing Countries (Million Tonnes)	70

3.1.12	Share of Rice Imports In Total World Rice Imports By Major Rice Importing Countries	71
3.1.13	Hirschman-Herfindahl's Index of Concentration of Trade	74
3.1.14	Coefficient of Variation of (Per cent) of Rice and Wheat Trade:1965 - 93	72
3.1.15	Coefficient of Variation of (Per cent) of Rice and Wheat Trade for Major Rice Exporting and Importing Countries 1965-93	73
3.2.1	World Cereal, Rice and Wheat Production and Their Respective Shares in Total World Cereal Production	78
3.2.2	Ratio of World Wheat Exports to Production	79
3.2.3	Ratio of Exports to Production: Wheat	80
3.2.4	International Prices and Rice and Wheat (US \$ / tonne)	85
Chapter IV		
4.1.1	Cross Price Relationship Between Rice Exporters	92
4.1.2	Correlation Coefficient Between the Rice Export Unit Values	92
4.1.3	Cross Price Relationships Among Rice Importing Countries	93
4.1.4	Correlation Coefficient Between the Importers	94
4.1.5	Correlation Coefficient Between Thailand and USA Monthly Rice Price Data	98
4.1.6	Linkages In the Monthly Rice Prices of Thailand and USA	97
4.2.1	Variability in Domestic and World Rice Price for Selected Asian Countries for Selected Periods	104

4.2.2	Correlation Between the Domestic and World Real Rice Prices for Selected Asian Countries for Selected Periods	105
4.2.3	Ratio of Domestic Price to Border Price in Selected Asian Countries	109
Chapter V		
5.1	Parameter Estimates of Rice Export Equation: Cochrane Orchutt Generalised Least Squares Estimation	131
5.2	Parameter Estimates of Rice Import Equation: Cochrane Orchutt Generalised Least Squares Estimation	132
5.3	Parameter Estimates of Rice Export Share Equation: Cochrane Orchutt Generalised Least Squares Estimation	133
Chapter VI		
6.1	Annual Average Percentage Self-Sufficiency of Selected Food Crops in Thailand	141
6.2	Food Consumption Per capita Per Day in 1975 and 1986 and Projections for 2000	142
6.3	Per Capita Availability of Rice, Wheat and Total Cereals in India (grams/day)	143
6.4	Annual Average Population, Rice Production, Area and Yield in Thailand	144
6.5	Annual Average Population, Rice Production, Area and Yield in India	147
6.6	Average Production Costs and Farm Price of Rice in Thailand	148
6.7	Cost of Cultivation of Rice in Punjab and Haryana (US \$/tonne)	149

Chapter VII

7.1	Value of India's Exports (Rs Crores)	150
7.1.1	Quantity and Value of India's Rice Exports	152
7.1.2	Quantity of Rice Exports and Imports By Major Trading Countries	153
7.1.3	World's Major Rice Exporters and Their Respective Ranking	154
7.2.1	Variety-wise Rice Exports from India	157
7.2.2	Destination-wise India's Basmati Rice Exports	161
7.2.3	Destination-wise India's Basmati Rice Exports	162
7.2.4	Destination-wise India's Non-Basmati Rice Exports	163
7.2.5	Share of (%) Non-Basmati Rice Exports Destination-wise	164
7.2.6	Variety-wise Quantity, Value and Unit Value of India's Rice Exports By Destination	166
7.2.7	Rice Exports of Thailand By Destination	167
7.2.8	Destination-wise Rice Exports and Respective Shares of Major Exporters	168
7.3.1	Unit Value of India's Rice Exports	170
7.3.2	Unit Value of Rice Exports from India By Variety	171
7.3.3	Unit Value of Rice Exports of Major Rice Exporting Countries	171

Chapter VIII

8.1.1	Comparison of India's Domestic with World Price of Rice	178
8.1.2	Wholesale Rice Price Quotations at Different Centers (Rs/Quintal)	179

8.1.3	Ratio of Wholesale Price of Rice to Price of Thai 5% Broken (Per cent)	180
8.1.4	Procurement Price, Market Charges, Transport Cost and Other Charges of Punjab Superfine Rice At Bombay Railway Station (Rs / quintal)	183
8.1.5	Comparison of Price of Thailand and Punjab Rice At Bombay Railway Station	182
8.2.1	Incidence of Poverty in Rural India, 1973-93	184
8.2.2	Increase in Area and Production of Food Grains	187
8.2.3	Average Area of Rice in Major Rice Producing States (Million Hectares)	188
8.2.4	Average Yield of Rice in Major Rice Producing States (Tonnes / Hectare)	188
8.2.5	Projected Total Demand and Production of Foodgrains (Million Tonnes)	189
8.2.6	Projected Total Demand and Supply of Rice and Other Foodgrains (Million Tonnes)	190
8.2.7	State-wise Percentage of Irrigated Area	191
8.3.1	Level of Protection in Developed and Developing Countries 1985-87: Percentage of Total Value of Agricultural Output	194
8.4.1	Rice Milling Technology in India	197
9.1.1	Quantum of Procurement of Rice, Wheat and Total Foodgrains, Public Distribution Sales of Rice and Total Closing Stocks with FCI	209
9.1.2	Shares of Rice and Wheat Procurement and the Proportion of Rice and Wheat Procurement in Production	210
9.2.1	Percapita Net Production, Net Availability and Wholesale Price Index of Rice and Total Cereals	213
9.2.2	Fluctuations in Production and Availability	214

9.4.1	Parameter Estimates of Reduced Form Rice Price Equation	224
9.4.2	Parameter Estimates of Structural Equation of Procurement and PDS for Rice	224

List of Graphs

Graph No.	Description of the Graph	Page No.
2.1	Trends in Rice Production, Area and Yield in China (1970-71 = 100)	20
2.2	Trends in Rice Production, Area and Yield in India (1970-71 = 100)	28
3.1	Trends in Rice Exports (Million Tonnes)	56
3.2	Share of (%) Asia's Rice Exports and Imports in World's Total	57
3.3	Trends in Rice Exports	61
3.4	Trends in International Rice and Wheat Prices	86
4.1	Domestic and World Rice Prices	110-114
6.1	Trends in Percapita Cereal and Rice Production in Thailand and India	145
6.2	Trends in Rice Yield in Thailand and India	146
7.1	Rice Export Shares in World Rice Exports in 1995	154
7.2	India's Basmati and Non-Basmati Rice Exports : Tonnes	156
8.1	Trends in Indian Domestic and World Rice Prices (Rs/Tonne)	176
8.2	Trends in Ratio of Domestic to World Price Ratio	177
9.1	Trends in Wholesale Rice Price Index	212
9.2	Trends in Issue and Procurement Prices	212

List of Appendix Tables

Table No.	Description	Page No.
2.1	Rice Milling Rates	234
2.2	Rice Crop Calendar Year By Country	235
2.3	Paddy Production by Continent	236
2.4	Rice Yield Per Hectare By Continent	237
2.6	Rice Statistics in China	238
3.1	Wheat Production and Shares in World Wheat Production By Continent	239
3.2	Wheat Production and Shares in World Wheat Production by Country	240
3.3	Wheat Exports and Shares in World Wheat Exports By Country	241a
3.4	Wheat Imports and Share in World Wheat Imports By Country	241b
3.5	Wheat Production and Consumption of Major Wheat Producers	242
3.6	Rice Production and Consumption of Major Rice Producers	243
3.7	Growth Rates of Rice and Wheat Production and Consumption	244
5.1	Tariff and Non-Tariff Measures in Rice Importers in Rice Importing Countries	245-246
5.2	Tariff and Non-Tariff Measures in Rice Exporters in Rice Exporting Countries	247
7.1	Variety-wise Rice Exports from India to Various Destinations	248-257
8.1	Average Area of Foodgrains in Selected States	258
8.2	Average Production of Foodgrains in Selected States	259
9.1	Methods of Procurement for Rice in 1991-92	260