Chapter 1: INTRODUCTION

1.1. Background

Agriculture continues to be an important economic sector in most developing countries of the world. According to the World Development Report 2008, there is growing recognition among governments and donors that agriculture is a fundamental instrument for sustainable development and poverty reduction in agriculture-based countries and addressing the environmental agenda everywhere. In agriculture-based countries, it generates on average 29 per cent of the GDP and employs 65 per cent of the labour force. It is a source of livelihood for an estimated 86 per cent of rural people. It is a major provider of environmental services, generally unrecognised and unremunerated, sequestering carbon, managing watersheds, and preserving biodiversity. The world of agriculture has changed dramatically since the last decade. Dynamic new markets, far-reaching technological and institutional innovations, and new roles for the state, the private sector, and civil society all characterize the new context for agriculture. Today's improved opportunities and greater willingness to invest in agriculture provides optimism that agriculture-for-development agendas can move forward.

Agriculture is the most important economic sector in India. It contributed about 19 per cent to the GDP, about 15 per cent of total exports and employed two-thirds of the work force in 2006-07. Despite a steady decline of its share in the GDP, it is still the largest economic sector and plays a significant role in the overall socio-economic development of India. Yields of all crops have grown since 1950, due to the special emphasis placed on agriculture in the five-year plans and steady improvements in irrigation, technology, application of modern agricultural practices and provision of agricultural credit and subsidies since the Green Revolution. However, international comparisons reveal that the average yield in India is generally 30 per cent to 50 per cent of the highest average yield in the world.

1.2. Rice Economy

Rice is the major food grain and a staple food for a large part of the world's human population, especially in East and Southeast Asia. Following World War II, there was a concern about the impending food crisis in Asia, which led to garnering support...
among international donors and national policymakers to launch the so-called Green Revolution technology - improved seeds, expanded irrigation, and the increased use of chemical fertilizers. It aimed at enhancing the world’s production of food grains including rice, maize and wheat. Among major food grains, rice cultivation is relatively labour-intensive and requires plenty of water for irrigation and therefore it is well-suited in countries and regions with low labour costs and high rainfall. For rice cultivation, various types of land management systems are being adopted. Lowland is the predominant cultural type in South and South-East Asia, while shallow and intermediate type of lowland rice cultivation is predominant in India.

Rice occupies an important place in agricultural economy of India. It is a staple food for almost 65 per cent of the population. Among food grains, rice occupies one-quarter of the gross cropped area (GCA), and accounts for about 44 per cent of the national food grain production. In India rice is grown under widely varying conditions of altitude and climate. Therefore, the rice growing seasons vary in different parts of the country, depending upon temperature, rainfall, soil types, water availability and other climatic conditions. In northern and western parts of the country, where rainfall is high and winter temperature is fairly low, only one crop of rice is grown during the months from May to November. In eastern and southern regions of the country, the mean temperature is favourable for rice cultivation throughout the year. Hence, in these regions two or three crops of rice are grown in a year. These three seasons for growing rice in India viz., autumn, winter and summer. Autumn rice is known as pre-kharif rice. The sowing of pre-kharif rice is taken up during May to August. However, the time of sowing slightly differs from state to state according to weather condition and rainfall pattern. It is harvested in September-October.

Autumn rice crop is know as ‘Aus’ in West Bengal, ‘Ahu’ in Assam, ‘Beali’ in Orissa, ‘Bhadai’ in Bihar, ‘Virippu’ in Kerala and ‘Kuruval/Kar/Sornavari’ in Tamil Nadu. Off late during this time farmers in Punjab are cultivating a sixty day rice crop called ‘Satthi’. About 7 per cent of the country’s rice crop is grown in this season. The varieties grown during this season are mostly varieties of short duration ranging from 90 to 110 days. The main rice growing season in the country is the ‘Kharif’. It is known as winter rice as per the harvesting time. The sowing time of winter (kharif) rice is June-July and it is harvested in November-December. Winter rice is known as ‘Aman’ in West Bengal, ‘Sali’ in Assam, ‘Sarrad’ in Orissa, ‘Agahani’ in Bihar and

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 Uttar Pradesh. ‘Sarava’ in Andhra Pradesh. ‘Mundakan’ in Kerala and ‘Samba/Thaladi’ in Tamil Nadu. About 84 per cent of the country’s rice crop is grown in this season and generally, medium to long duration varieties are grown in this season. Basmati and all varieties of Non-Basmati rice are grown during this season in the states of Punjab, Haryana, Western Uttar Pradesh and small parts of Jammu and Kashmir. Summer rice is called as ‘Rabi’ rice. It is known as ‘Boro’ in Assam and West Bengal, ‘Dalua’ in Orissa, ‘Dalwa’ in Andhra Pradesh, ‘Punja’ in Kerala and ‘Navarai’ in Tamil Nadu and ‘Garma’ in Bihar. The sowing time of summer rice is November to February and harvesting time is March to June. The area under summer rice is only 9 per cent and early maturing varieties are mostly grown in this season.

Meanwhile, India’s Green revolution technology had helped to increase the food production particularly wheat and rice. The food-grain production increased from 82 Million Tonnes (MT) in 1960-61 to an estimated 209.2 MT in 2006-07. The spectacular increase in food production can be attributed to use of improved inputs needed for higher yields along with an efficient public distribution system and price supports for farmers. In fact, Government of India announces a Minimum Support Price (MSP) well in advance i.e. before start of sowing season to encourage the farmers to grow crops. The MSP acts as guaranteed floor price on which farmers sell their produce to the government procurement agency. The Food Corporation of India (FCI) undertakes procurement of foodgrains on behalf of Government throughout the country. About 20 to 25 per cent of the total rice production in the country is purchased both under levy from the rice mills and directly in the form of paddy from the farmers. Stocks of paddy directly purchased from the farmers are subsequently milled by FCI. Rice so purchased is transported from the surplus to the deficit areas for distribution under the Public Distribution System (PDS). In addition, rice is also taken to deficit areas for price stabilization through open sale. This not only ensures food for the poor but also checks prices of even other products of made of rice. Further, Central Government maintains buffer stock of rice and wheat to ensure food security and price stabilisation. The stocks are also utilized for running various Welfare Schemes envisaged by the Government of India.

With active support of the government, crops like rice and wheat spread in vast regions of the country and their adoption in the non-traditional areas was made possible. Though wheat was introduced in some parts of eastern India, but their yield remained at low level. However, increase in area and production of rice in the north
western parts of the country is noteworthy. The major rice producing states included West Bengal, Uttar Pradesh, Andhra Pradesh, Punjab, Tamil Nadu, Bihar, Orissa, Assam, Karnataka and Haryana. Among these states, West Bengal, Uttar Pradesh, Andhra Pradesh and Punjab accounted for more than 50 per cent of total rice production in the country.

However in recent years India has been heading towards a serious shortage of rice as the production of rice declined from 93.34 (MT) in 2001-02 to 92.76 MT in 2006-07 (Table 1.1). The trend was particularly disturbing at a time when the country's rice consumption was increasing 1 to 1.5 MT every year and the Planning Commission estimated that by 2020, the demand for rice would exceed 120 MT. Extrapolating the trends of rising demand and falling production leads to a shaky food security situation. According to Agriculture Ministry figures, already, the net per capita availability of the grain had declined from 79.2 kg per year in 1992 to 64.7 kg per year in 2005. In the past two years, the price of rice had also risen by about 10 to 15 per cent. In the year 2007, the ministry estimated kharif rice production to be around 80.15 MT, a fractional increase from 80.11 MT in 2006-07. Rabi, the winter crop, contributed another 11-12 MT.

Table 1.1: Stagnating Rice Production in India

<table>
<thead>
<tr>
<th>Years</th>
<th>Area (Million Hectare)</th>
<th>Production (Million Tonne)</th>
<th>Yield (Kg/Hectare)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001-02</td>
<td>44.9</td>
<td>93.34</td>
<td>2079</td>
</tr>
<tr>
<td>2002-03</td>
<td>41.18</td>
<td>71.82</td>
<td>1744</td>
</tr>
<tr>
<td>2003-04</td>
<td>42.59</td>
<td>88.53</td>
<td>2077</td>
</tr>
<tr>
<td>2004-05</td>
<td>41.91</td>
<td>83.13</td>
<td>1984</td>
</tr>
<tr>
<td>2005-06</td>
<td>43.66</td>
<td>91.79</td>
<td>2102</td>
</tr>
<tr>
<td>2006-07</td>
<td>43.7</td>
<td>92.76</td>
<td>2084</td>
</tr>
</tbody>
</table>

Source: Agricultural Statistics at a Glance, Ministry of Agriculture (Various Issues)

Rapid conversion of cropland to non-farm use, inadequate irrigation facilities and lack of new and healthy seeds had led to a slowdown of rice production. The Planning Commission estimated that of 44 million hectares of harvested area under rice, only 46 per cent was irrigated and the rest was rain-fed. And although more than 110 high-yielding varieties had been developed in the last decade, only 10 per cent of the paddy areas in the country were sown with healthy seeds. These had a direct bearing on productivity as a recent National Bank for Agriculture and Rural Development (NABARD) study found. In 224 districts, about 57 per cent of total rice area, the yield was less than 1.5 tonnes per hectare (T/ha) - below the national average.

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of 2 T/ha. In contrast, the average yield in China, the world's largest producer of the grain was around 6.5 T/ha.

Low production affected government procurement. In 2006-07, it was around 25.75 MT, which was below the record 27.66 MT in 2005-06. And during the first week of the marketing season in 2007, procurement dropped by 22 per cent compared to 2006-07. Panic-struck, the government banned exports of Non-Basmati rice but partially revoked it during mid-October 2007. To augment local needs a temporary solution could be imports, but this would lead to a rise in global rice prices.

Since human population is growing at the same rate as food grain production during the recent decade, it throws new challenges to the policy makers to find ways to augment the food production, particularly rice and wheat to feed the growing population. During November, 2007 Government of India launched National Food Security Mission with aim of increasing production of rice by 10 million tonnes, wheat by eight million tonnes and pulses by two million tonnes in the next four years. The strategy was to bridge the yield gaps by introducing modern technologies and improved agronomic practices. The mission covers 305 districts in 16 states.

India ranks second in the global rice production (21.5 per cent) only after China. Since domestic requirement is so high, India did not become a major rice exporting country until mid-eighties. Its share in world rice trade, mainly in the form of small-volume exports of highly prized Basmati rice, was insignificant. In fact, the export of rice increased, from 7.3 lakh tonnes in 1980-81 to 8.9 lakh tonnes in 1994-95 and then to a record 5.0 million tonnes in 1995-96. Presently, India is the second largest exporter of rice after Thailand (5.9 million tonnes). The global new trading system, introduced by World Trade Organisation (WTO) attempts to regulate the world agricultural markets so as to ensure fair play of market forces. Apart from the price consideration, the quality of produce will also matter, when it comes to competing in the world market.

Though Basmati rice is an important commodity in the export basket of India’s agricultural products, little evidence is available on its cultivation, processing and trading. Therefore, in this study an attempt has been made to document relevant information relating to production and trade in Basmati rice. The study also attempts to assess the impact of WTO rules on Basmati rice in terms of geographical cultivation and international trade.

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1.3. Characteristics of Basmati

The word Basmati is split into 'Bas' meaning aroma and 'mati' meaning sense; in Hindi 'Basmati' implies 'ingrained aroma'. The very aroma of Basmati gives its unique characteristics unmatched by any other grain in the world. In the Indian sub-continent, farmers have been growing scented rice (Basmati) from times immemorial. Basmati grown in this region distinguishes itself from all other aromatic rice on the qualities such as superfine long kernels, exquisite aroma, sweet taste, silky texture, delicate curvature and linear kernel elongation with least breadth wise swelling on cooking. Basmati rice possesses the shape or length-to-width ratio of over three and its colour is found to be translucent, creamy white. When cooked, the texture should be firm and tender without splitting, and it should be non-sticky. This quality varies with amount of amylose present in the rice. The cooked rice does not become sticky, when the amylose content ranges from 20-22 per cent and turns sticky with the value of 0-19 per cent. Basmati aroma arises from a cocktail of 100 compounds, hydrocarbons, alcohols, aldehydes and esters. Among these, an important molecule responsible for aroma is 2-acetyl-1-pyrroline.

As mentioned before, Basmati rice is a high value and traditional export crop of India and comprises an important position in India's agricultural exports. It is a gift from Mother Nature to the Indian Sub-continent and grows only in the Indo-Gangetic Plains beneath the Himalayas. The Himalayan agro-climate has an important role to play in the existence of this unique rice line. It is mainly cultivated between latitudes 30°N to 33°N and between longitudes 75°E to 77°E. The heritage of Basmati rice is shared only between India and Pakistan. In Pakistan, it is cultivated only in the province of Punjab comprising the districts of Sheikhupura, Sialkot, Gujranwala, Narowal, and Hafizabad. In India it is grown in parts of Punjab, Haryana, Uttarakhand, Western Uttar Pradesh and some pockets of Jammu & Kashmir.

Basmati is a tropical crop and requires particular soil and climatic conditions. The suitable soil type is clay. The rice is grown in puddle fields in high temperature and high humidity conditions but there are low temperatures during the ripening period. Day temperatures of 25°C and night temperatures of 21°C and short days during crop maturity is a necessary prerequisite for good aroma and better cooking qualities. The crop flowers only when the sunshine hours (day length) decline from 14 to 12 or less, a condition that is available at the end of September in Northwest India.
It **is cultivated during the Kharif season starting from mid/end July to mid November.** When compared to Non-Basmati varieties, Basmati is a relatively long duration crop.

**In recent years, state governments in Northwest India encourage farmers to cultivate Basmati for several reasons.** Firstly, Basmati paddy requires comparatively less number of irrigations than Non-Basmati paddy. That is, for every ten days one irrigation is required for Basmati crop and for Non-Basmati the irrigation requirement is every four days\(^1\). Moreover the monsoons are active during the Basmati sowing period (July) as against the Non-Basmati sowing period (June) due to which Basmati needs lesser number of irrigations. Thereby Basmati is considered to be an effective substitute for Non-Basmati in the regions where, ground water table is falling. Secondly, the ownership of Basmati has become a deeply emotive issue, which was contended in WTO under Patent Clause. In late 1997, an American company, Rice Tec Inc, was granted a patent by the US Patent Office to call the aromatic rice grown outside India ‘Basmati’. With this patent right, Rice Tec Inc would be able to not only call its aromatic rice ‘Basmati’ within the US, but also label it ‘Basmati’ for exports. It had the potential of endangering Basmati exports from both India and Pakistan. Already the US was trying to capture the international Basmati market with brands like ‘Kasmati’ and ‘Texmati’ described by them as superior Basmati type rice. Thirdly, the popularity of other long-grain aromatic varieties like ‘Jasmine Rice’ of Thailand could give a competition to Basmati. Lastly, with the development of South Asian Free Trade Area (SAFTA)\(^2\), India’s Basmati rice would have a market in Pakistan and similarly Pakistan’s Basmati rice would also have a market in India and therefore strategies are needed to increase India’s market share in Pakistan and also in other countries.

1.4. **Objectives of the Study**

Little empirical evidence is available in literature on the issues discussed above. The present study explores various aspects related to Basmati rice in India. The study has

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\(^1\) On an average for Basmati 15 irrigations are needed in 150 days and for Non-Basmati 30 irrigations are needed in 120 days - information received from sample farmers in Punjab and Haryana.

\(^2\) Indian agriculture accounting for only 0.6 percent or world trade, alone cannot achieve much, whether inside or outside the WTO. Just like the developed countries, formation of an economic alliance in India like the South Asia Free Trade Association (SAFTA), where India has common interests with Bangladesh, Sri Lanka and Pakistan on Jute, Tea and Basmati is required (Dasgupta, 2000).
been dealt at two levels i.e., analysis of the farm-level situation and analysis of international trade in Basmati rice. The specific objectives of the study are as follows;

1. Farm size category based Cost of Cultivation analysis.
   - To find out which category of farmers are the major producers of Basmati.
   - To estimate the prices, yields, gross output, costs and net returns of Basmati across farm size categories.
   - To carry out an exercise on the functional analysis of Basmati production and productivity.
   - To examine marketing channels, marketed surplus and price spread of Basmati.

2. Spatial and temporal analysis of Basmati rice trade.
   - To understand the rice trade policy of India.
   - To compare Basmati rice trade of India and Pakistan.
   - To study the major overseas markets of Basmati rice.
   - To analyse the global competitiveness of Basmati rice.

3. Assess whether the provisions of the WTO, namely the Agreement on Agriculture (AoA) and the Trade Related intellectual Property Rights (TRIPS) have had any impact on Basmati rice trade.

1.5. **Hypotheses**

1. **Large farmers allocate higher proportion of area towards Basmati cultivation as compared to small farmers.**
   Since, Basmati is a high value crop it can be hypothesized that large farmers are devoting a large share of area for its cultivation. This is because large farmers have greater access to marketing network and resources than small farmers.

2. **Modern varieties offer higher returns to farmers.**
   Modern varieties which include evolved and hybrid varieties are providing an opportunity for expanding area under high value Basmati and also for earning better returns.

3. **Farmers’ profitability is inversely proportional to the length of the marketing channel.**
   Large farmers have better access to marketing network and resources and also have better knowledge of the prevailing market prices which enable them to sell directly in the grain markets locally called ‘mandis’ than rely on middlemen. This
way Basmati cultivation could seem to be more profitable to the large farmers. On the other hand, small farmers in general lack proper access to marketing network and resources so they sell their produce to middlemen. Middlemen take their own commission and so small farmers do not realise reasonable prices. This way small farmer might be realizing lower prices than what they would have actually realised if they would sell directly in the mandis and be aware of what the market prices were.

4. As WTO rules become effective, Basmati exports from India would increase both spatially and temporally. With WTO rules on reduction in subsidies becoming more effective across the member countries including India and Pakistan, prices of Basmati rice are expected to increase. But then Basmati rice being a premium product could be insensitive to small price increases and hence it can be hypothesized that the demand level of Basmati rice from existing markets will continue to hold. Additionally, with globalization and increased incomes across the world and greater market access, Basmati rice is all set to proliferate into new markets. Hence the demand for a premium crop like Basmati is only expected to grow.

1.6. Scheme of Chapterisation

This study has been organized into ten chapters including this introductory chapter.

1. Chapter 1 – Introduction

This is the introductory chapter which has given an account of the India’s rice economy and the typical characteristic traits of Basmati rice followed by the objectives of this study.

2. Chapter 2 – Data and Methodology

The primary and secondary sources of data along with the methodologies used in the study especially cost of cultivation estimates are explained in this chapter.

3. Chapter 3 – National and International Issues Related to Basmati Rice

A review of available literature and issues related to Basmati rice including its varieties, patents, tariff structure, adulteration issues and constraints on its exports has been made in this chapter.

4. Chapter 4 – Socio-Economic Profile of Sample Households
This chapter looks into the demographic characteristics, economic profile and production structure and of the sample households of this study.

5. Chapter 5 – Distribution of Area and Output of Basmati by Farm Size Categories

This chapter analyses sample households cultivating paddy, area analysis of Basmati, its prices, and yields in physical and value terms.

6. Chapter 6 – Cost of Cultivation of Basmati

In this chapter, the economics of Basmati cultivation has been examined in detail using data collected through field investigation in selected Basmati growing regions of India.

7. Chapter 7 – Basmati Marketing

This chapter looks into aspects of Basmati marketing such as paddy marketing systems and trends, marketed surplus of paddy, price spread between producers and consumers of Basmati and a review of contract farming.

8. Chapter 8 – Spatial and Temporal Analysis of Basmati Rice Trade

This chapter discusses aspects of India’s Basmati rice trade and its competition with Pakistan. It also analyses the global competitiveness of Basmati.

9. Chapter 9 – Basmati Rice Trade and WTO

This chapter reviews the issues of the Agreement on Agriculture in the WTO and attempts and impact assessment of those WTO issues on Basmati rice trade.

10. Chapter 10 – Summary of Conclusions

This chapter provides a summary of the major findings of the study.