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# Issues in Infrastructure for Export of Rice from India

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## Abstract

Rice is exported in two varieties, basmati (aromatic) and non-basmati. The basmati rice exports are in three categories: white, brown and parboiled. India earned Rs 18.4 billion in 2001-02 from exports of basmati rice and non-basmati rice contributed Rs 13.3 billion for the same period.

This paper focuses on promoting rice exports, for which infrastructural and policy requirements are discussed.

***Basmati***

1. Disseminating information to farmers on export potential and price trends
2. Encouraging advanced irrigation facilities
3. Facilitating technology advancement regarding efficient harvest of basmati rice, control of insects, pests and diseases
4. Enhancing quality milling capacities to improve the yield per ton
5. Providing stable power supply to reduce the utilization of generators, making milling process cost effective in the long run
6. Promoting Indian basmati rice brand in the international market

***Non-basmati***

1. Mandating open mandi procurement rather than FCI canalized procurement by exporters
2. Improving storage facilities
3. Proactively making provisions for wagon availability during peak movement
4. Improving the efficiency of supply chain through special purpose agri jetties in ports like Kandla and Mundra on the west coast, and Paradip and Vishakhapatnam on the east coast to reduce ship turnaround time

# Rice Exports

## Executive Summary[1]

- Rice is exported by India in two varieties, basmati (aromatic) and non-basmati. To promote exports, the following infrastructural and governmental support needs to happen.

**Basmati**

- Government should promote the Indian basmati rice brand in the international market.

- Even without additional promotion, we can sell more basmati rice if supply were available

- The two most important features of basmati Rice are that it is long grained and it has a gentle aroma. Basmati is sold in three forms, parboiled, brown (after dehusking) and white (after dehusking and milling). If it is parboiled, then some of the aroma is lost. Even then, Saudi Arabia uses parboiled basmati rice because it prefers to have rice mixed with meat (like Biriyani) for which, parboiled rice helps in the complete cooking of both the ingredients.

- Milling capacity is no problem, but power breakdown is a problem in milling. The basmati rice producers use generators, but this is expensive in the long run.

- The farmers switch between basmati rice and non-basmati rice. Non-basmati is preferred over basmati since the yield in basmati rice production is low as compared to non-basmati rice because of (i) lack of technology advancement regarding efficient harvest of basmati rice and control of insects, pests and diseases, (ii) lack of irrigation facilities, and (iii) lack of access to information on basmati rice export potential and price trends. More research and development is required for basmati. Contract farming should be encouraged. The concept of agri export zones which the government has initiated in the northern states is a step in the right direction. This also would enable bypassing the Mandi and thus avoiding extra logistics and tax based costs.

**Non-basmati**

- Govt. release/Open Procurement: The open mandi procurement rather than the FCI canalised procurement by exporters should be facilitated to incentivise the exporters to have long term stakes in the business of non-basmati rice exports, which has significant growth potential. The earlier policy of releasing stocks only from the buffer when there is surplus does not lend itself to brand building and sustained exports.

- Quality Milling: Quality milling capacity is an issue, to avoid high percentage of broken rice.

- Storage: Storage facilities have to be improved significantly. Controlled atmosphere storage like in Japan should be adopted in India. Japan can preserve rice under controlled condition for seven years without any degradation.

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- Transportation: Railway is a major constraint as wagons are not available for peak movement.

- Ports: It would be essential to think of special purpose agri jetties in ports like Kandla and Mundra on the west coast, and Vishakhapatnam and Paradip on the east coach to reduce ship turnaround times and improve the supply chain efficiency.

# Part I

# Market and Supply Scenario

**Rice Exports**

1. Rice exports constituted 1.5% and 2.3% of the total Indian exports during 2001-02 and 2002-03 respectively (Exhibit 1.1). The share of rice exports to total exports has gradually declined from 4.3% to 2.3% since 1995-96 to 2002-03. Similarly, as a share of agricultural exports, rice exports have reduced from 22.3% to 19% during the same period.

2. The unit value of rice in India has fluctuated from Rs 13.54 per kg in 1995-96 to Rs 14.37 per kg in 2001-02 (Exhibit 1.2).

3. In terms of the major markets for India, Saudi Arabia accounted for 39% of the total export value in 2001-02, followed by Nigeria at 8.7%, South Africa at 7.5% and Kuwait at 6.8% (Exhibit 1.3). In terms of quantity also, Saudi Arabia was the largest country with 26.4% in 2001-02, followed by South Africa at 14.4%, Nigeria at 13.7%, and then Indonesia at 6.4%.

4. The rice yield per hectare (ha) has increased overall from 1970-71 to 2000-01 from 1123 kg/ha to 1913 kg/ha, although there is fall in the figure between the years 1994-95 to 1995-96 and 1999-00 to 2000-01 (Exhibit 1.4). The total area for production of rice has marginally increased from 40.2 million ha in 1980-81 to 44.4 million ha in 2000-01 (Exhibit 1.5). The total rice production in India was around 84.9 million tons (mt) in 2000-01, 93.1 mt in 2001-02 and 77.7 mt in 2002-03. Due to the drop in production in 2002-03 (largely due to the weather), buffer stocks would be used to provide for production.

5. The state wise rice production in India is given in (Exhibit 1.6). In 2000-01, Andhra Pradesh had the highest share of production (12.46 mt), followed by West Bengal (12.43 mt), Uttar Pradesh (11.54 mt), Punjab (9.15 mt), and Tamil Nadu (7.22 mt). West Bengal just lost its earlier consistent place at the top.

6. The total world rice production in 2003-04 is expected to be 390 mt (Exhibit 1.7). Among the top rice producing countries in 2003-04, China is expected to be the highest with 118 mt in 2003-04, followed by India at 90 mt, Indonesia at 33 mt, and Bangladesh at 26 mt.

   The paddy production for the year 1999-00 was estimated at 597.9 mt, with China producing the maximum of 199.5 mt, which was almost 33.4 percent of the produce (Exhibit 1.8). This paddy amounted to a world rice yield of 409 mt in 1999-00 (Exhibit 1.7).

7. Among the rice consuming countries, China is expected to be at the top with consumption of 135 mt, followed by India at 85 mt, Indonesia at 37 mt and Bangladesh at 26 mt in 2003-04 (Exhibit 1.9). The total world rice consumption has risen from 387 mt in 1998-99 to 409 mt in 2002-03 and is expected to be 412 mt in 2003-04.

8. The largest exporters of rice were Thailand with 7.75 mt in 2003, followed by India and Vietnam at 4 mt each, and then US at 3.7 mt. The total world exports stood at 27.42 mt in 2003 (Exhibit 1.10).

   In 2000, Thailand had a value market share of 25%, followed by US at 12.7%, and Vietnam at 10.2%. India stood fourth with 9.9% market share (Exhibit 1.11).

9. The largest importers were Indonesia at 3.5 mt in 2003, followed by Nigeria at 1.25 mt, Philippines at 1.2 mt and Iraq at 1.1 mt. Brazil and Bangladesh were next, each with 1 mt of rice imports (Exhibit 1.12).

   In 2000 European Union had a value market share of 16.8%, followed by Saudi Arabia at 5.6%, Iraq at 5.5%, Iran at 4.5% and Indonesia at 4.27% (Exhibit 1.13).

10. Production and productivity details of the world's top ten rice importers and exporters are given in Exhibits 1.14 and 1.15 respectively.

11. We examine India's position in the Saudi Arabia and USA markets which hold the first and sixth positions in value wise importance to India in 2001-02. In terms of quantity, while Saudi Arabia held the first position, the position of USA was tenth in 2001-02 (Exhibit 1.3). In 2002, the largest exporter to Saudi Arabia by quantity was India (71.6%). This was followed by USA (11.2%), Pakistan (7.7%), and Thailand (7.1%) (Exhibit 1.16). In 2001, the largest exporter to USA by quantity was Thailand (71.5%). This was followed by Australia (12%), India (10.96%), Pakistan (2.3%), and Canada (1.1%) (Exhibit 1.17).

12. Indica was the most extensively traded variety of rice, which contributed to the lion's share of 80% of the worldwide trade. This was followed by Japonica (12%) and aromatic varieties like Basmati (10%) (Exhibit 1.18).

13. The value share of basmati rice with respect to total rice exports for India has fallen from 73.6% in 2000-01 to 58.1% in 2001-02. The figure has been fluctuating over the decade. The value share of basmati rice with respect to total agricultural exports was 6.6% and to total exports was 0.9% in 2001-02 (Exhibit 1.19).

14. Indian basmati is well accepted in the Middle East, which constituted about 77% of our basmati exports in quantity in 2001-02. Saudi Arabia constituted 57.46% of the total value share, followed by UK (10.64%), Kuwait (10.49%), USA (5.14%) and UAE (2.71%) in 2001-02 (Exhibit 1.20).

15. The quantity wise market share between India and Pakistan for the years 2001-02 and 1999-00 are given in Exhibit 1.21 and Exhibit 1.22 respectively. In terms of quantity market share, while we had 89.86% for Saudi Arabia, 78% in Kuwait, we had only 6.87% in UAE in 2001-02. The UAE market is very price sensitive, where Pakistan has an advantage. India's quantity market share was 69% for both UK and USA. In terms of continent wise market share shift between 1999-00 and 2001-02 with respect to Pakistan, India has gained in North America, and Australia/South Africa/New Zealand, but has lost in East Asia.

16. The quantity wise market share of basmati rice exports between India and Pakistan was 55:45 in the year 2001-02 (Exhibit 1.23).

17. India earned Rs 17.8 billion in 1999-00 from the exports of basmati rice. Saudi Arabia accounted for 60% of the value share (Exhibit 1.24).

    India produces about 1.3 mt of basmati. About half of India's production (about 0.65 mt) is exported. Pakistan produces 0.75 mt of which 0.55 mt is exported.

18. There is potential for a higher per capita consumption of basmati rice in the countries that India is exporting to as well as the other countries. The main bottlenecks to increased exports of basmati are
    a) Need for greater awareness and usage of the product
    b) Domestic prices, which sometimes offer higher margins than exports
    c) Production constraints, when farmers sometimes switch to non-basmati rice, which, due to its higher yields, matches the contribution per hectare

19. Basmati rice is distinguished by the characteristics of aroma, grain length and cooking qualities. Traditionally, this variety has been grown in the Sub-Himalayan Indo-Gangetic Plains. Attempts to grow such a variety in other parts of the world, especially the US, have not been successful, especially in the distinctive aroma, which is now accepted as being the function of the agro-climatic conditions of this region, and hence not replicable. Also, the term basmati ('that which has aroma'), which one of the aromatic rice variety developers in the US tried to patent has now been recognised and protected (by WTO) as valid only for such rice grown in this region from India and Pakistan.

20. Types of basmati rice exports: The exports are in three categories: parboiled, brown rice and white rice. Parboiled rice is primarily exported to Saudi Arabia, and brown rice to Europe.

    The cooking qualities of parboiled rice enable better 'combination' cooking (for example with meat) and hence is a favourite in Saudi Arabia. (However, there is a reduction in the aroma. Consequently, there is potential for substitution by newly developed high-end aromatic varieties of non-basmati rice).

    Europe imports brown rice in order to protect its milling capacity. This is ensured through a duty structure which charges 450 Euros per ton for white rice and 14 Euros for brown rice.

21. Yield from paddy to basmati rice: 100 tons of paddy produce an effective 82 tons of white rice. Seven tons are lost as husk, eight tons as bran and three tons as moisture. Upto another 10% is lost during sorting, to get uniform length and colour.

    For example, one of the exporting companies procured about 60,000 tons of paddy, from which it produced and exported 12,000 tons of parboiled rice, 6,000 tons of brown rice, and 18,000 tons of white rice. 20,000 tons of paddy were used to get the 12,000 tons of parboiled rice (losses due to husk, bran, moisture and brokens). 9,000 tons were used to get 6,000 tons of brown rice (losses due to husk, moisture and brokens). 30,000 tons were used to get 18,000 tons of white rice (losses due to husk, bran, moisture and brokens).
    The above yields are also similar for non-basmati rice.

22. Basmati prices: The typical C&F price for white rice is US$ 900 to 1,000 per ton, parboiled is US$ 800 per ton and brown rice is US$ 750 per ton. Thus, the range is between Rs 35,000 to Rs 47,000 per ton. Interestingly, the domestic ex-factory price of basmati is higher at an average of Rs 50,000 per ton. The mandi price is typically in the range of Rs 14,000 to Rs 23,000 per ton with an average procurement price of Rs 19,000 for an exporter.
    Prices from Pakistan are less expensive due to a more favourable exchange rate and lower taxation.

23. In the context of basmati, contract farming is being encouraged by the government through the idea of agri export zones. This has a twin objective of ensuring reliability of supply for exports and avoiding the mandi-based procurement route.

24. In 2001-02, India exported more than twice the quantity of non-basmati rice compared to basmati rice. In terms of value, basmati rice exports was about 1.4 times non-basmati rice exports. The performance of non-basmati rice was a significant improvement over the previous year, though less than the peaks of 1995-96 and 1998-99. (Exhibit 1.25)

25. As to value wise export of non-basmati rice from India in 2001-02, Nigeria constituted 20.8% of the total share, followed by South Africa (17.8%), Saudi Arabia (14%) and Indonesia (7.2%). However, Kuwait, the second largest market for Basmati rice had a share of only 0.9% for non-basmati rice (Exhibit 1.26).

26. India earned Rs 13.5 billion in 1999-00 from the exports of non-basmati rice. Bangladesh accounted for 26.9% of the value share, followed by Saudi Arabia at 15.7%. (Exhibit 1.27)

27. While there is potential for non-basmati rice exports, the government policy regarding release of stocks vis-à-vis buffer stocks and the subsidies do not provide for a steady and sustainable effort. The commitment to this needs to be sorted out at the policy level, after which, the infrastructure would become an issue. Key concerns are
    a) Procurement from FCI
    b) Hinterland transportation to ports
    c) Handling at ports

**Exhibit 1.1**

**Share of Rice Exports to Total Exports of India**

| Year | Rice Exports | Agri Exports | Total Exports | Share of Rice Exports to Agri Exports | Share of Rice Exports to Total Exports |
|---|---|---|---|---|---|
| | (Rs billion) | (Rs billion) | (Rs billion) | (%) | (%) |
| 1995-96 | 45.68 | 204.41 | 1063.52 | 22.3 | 4.3 |
| 1996-97 | 31.73 | 243.64 | 1188.17 | 13.0 | 2.7 |
| 1997-98 | 33.71 | 246.25 | 1301.01 | 13.7 | 2.6 |
| 1998-99 | 62.81 | 257.23 | 1397.52 | 24.4 | 4.5 |
| 1999-00 | 31.26 | 248.87 | 1590.95 | 12.6 | 2.0 |
| 2000-01 (P) | 29.43 | 272.88 | 2013.56 | 10.8 | 1.5 |
| 2001-02 (P) | 31.74 | 279.24 | 2090.18 | 11.4 | 1.5 |
| 2002-03 (P) | 58.95 | 310.30 | 2527.90 | 19.0 | 2.3 |

(P) Provisional

Source: APEDA. Export Statistics for Agro and Food Products. 2001-02 (www.apeda.com and www.rbi.org.in)

**Exhibit 1.2**

**Variation in Rice Exports in India**

| Year | Unit | Rice Exports | Variation | | Unit Value |
|---|---|---|---|---|---|
| | | | Absolute | (%) | (Rs per kg) |
| 1994-95 | Q (tons) | 890620 | 122940 | 16.01 | |
| | V (Rs billion) | 12.06 | -0.81 | -6.29 | 13.54 |
| 1995-96 | Q (tons) | 4914010 | 4023390 | 451.75 | |
| | V (Rs billion) | 45.68 | 33.62 | 278.85 | 9.30 |
| 1996-97 | Q (tons) | 2511980 | -2402030 | -48.88 | |
| | V (Rs billion) | 31.72 | -13.96 | -30.55 | 12.63 |
| 1997-98 | Q (tons) | 2388960 | -123020 | -4.90 | |
| | V (Rs billion) | 33.71 | 1.99 | 6.26 | 14.11 |
| 1998-99 | Q (tons) | 4963600 | 2574640 | 107.77 | |
| | V (Rs billion) | 62.81 | 29.10 | 86.32 | 12.65 |
| 1999-00 | Q (tons) | 1896130 | -3067470 | -61.80 | |
| | V (Rs billion) | 31.26 | -31.55 | -50.23 | 16.49 |
| 2000-01 | Q (tons) | 1534480 | -361650 | -19.07 | |
| | V (Rs billion) | 29.43 | -1.82 | -5.84 | 19.18 |
| 2001-02 | Q (tons) | 2208560 | 674080 | 43.93 | |
| | V (Rs billion) | 31.74 | 2.31 | 7.84 | 14.37 |

Source: APEDA. Export Statistics for Agro and Food Products. 2001-02 (www.apeda.com)

**Exhibit 1.3**
**Major Markets for Indian Exports of Rice**

| Country | Unit | 1997-98 | | 1998-99 | | 1999-00 | | 2000-01 | | 2001-02 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Absolute | (%) | Absolute | (%) | Absolute | (%) | Absolute | (%) | Absolute | (%) |
| Saudi Arabia | Q ('000 tons) | 446.92 | 18.71 | 569.03 | 11.46 | 557.03 | 29.38 | 631.46 | 41.15 | 582.89 | 26.39 |
| | V (Rs billion) | 10.71 | 31.76 | 15.23 | 24.25 | 12.70 | 40.62 | 13.09 | 44.48 | 12.45 | 39.22 |
| | Unit Value Rs/Kg | 23.96 | | 26.76 | | 22.79 | | 20.74 | | 21.36 | |
| Nigeria | Q ('000 tons) | 122.41 | 5.12 | 201.11 | 4.05 | 109.05 | 5.75 | -- | 0.00 | 302.15 | 13.68 |
| | V (Rs billion) | 1.19 | 3.53 | 2.20 | 3.51 | 1.09 | 3.49 | -- | 0.00 | 2.77 | 8.71 |
| | Unit Value Rs/Kg | 9.73 | | 10.96 | | 10.00 | | -- | | 9.15 | |
| South Africa | Q ('000 tons) | 266.11 | 11.14 | 525.01 | 10.58 | 148.10 | 7.81 | 57.81 | 3.77 | 318.44 | 14.42 |
| | V (Rs billion) | 2.44 | 7.22 | 5.38 | 8.57 | 1.58 | 5.06 | 0.61 | 2.07 | 2.37 | 7.47 |
| | Unit Value Rs/Kg | 9.15 | | 10.25 | | 10.68 | | 10.53 | | 7.45 | |
| Kuwait | Q ('000 tons) | 81.03 | 3.39 | 39.73 | 0.80 | 58.33 | 3.08 | 90.33 | 5.89 | 76.12 | 3.45 |
| | V (Rs billion) | 2.07 | 6.13 | 1.00 | 1.60 | 1.41 | 4.52 | 2.39 | 8.11 | 2.09 | 6.57 |
| | Unit Value Rs/Kg | 25.49 | | 25.24 | | 24.25 | | 26.44 | | 27.40 | |
| UK | Q ('000 tons) | 53.52 | 2.24 | 45.78 | 0.92 | 53.08 | 2.80 | 111.98 | 7.30 | 63.51 | 2.88 |
| | V (Rs billion) | 1.69 | 5.02 | 1.68 | 2.67 | 1.73 | 5.54 | 3.04 | 10.32 | 1.93 | 6.09 |
| | Unit Value Rs/Kg | 31.62 | | 36.67 | | 32.60 | | 27.12 | | 30.43 | |
| USA | Q ('000 tons) | 62.39 | 2.61 | 5.94 | 0.12 | 17.97 | 0.95 | 39.05 | 2.54 | 31.18 | 1.41 |
| | V (Rs billion) | 1.29 | 3.82 | 0.21 | 0.34 | 0.73 | 2.33 | 1.36 | 4.62 | 1.04 | 3.26 |
| | Unit Value Rs/Kg | 20.65 | | 36.07 | | 40.59 | | 34.82 | | 33.24 | |
| Indonesia | Q ('000 tons) | -- | 0.00 | 18.70 | 0.38 | 1.18 | 0.06 | 0.00 | 0.00 | 141.86 | 6.42 |
| | V (Rs billion) | -- | 0.00 | 0.19 | 0.30 | 0.02 | 0.06 | 0.00 | 0.00 | 0.96 | 3.01 |
| | Unit Value Rs/Kg | -- | | 9.97 | | 14.80 | | 0.00 | | 6.74 | |
| UAE | Q ('000 tons) | 84.85 | 3.55 | 93.47 | 1.88 | 70.78 | 3.73 | 56.77 | 3.70 | 48.15 | 2.18 |
| | V (Rs billion) | 1.42 | 4.22 | 1.55 | 2.47 | 1.49 | 4.78 | 1.22 | 4.14 | 0.84 | 2.64 |
| | Unit Value Rs/Kg | 16.75 | | 16.61 | | 21.10 | | 21.49 | | 17.42 | |
| Bangladesh | Q ('000 tons) | 420.24 | 17.59 | 2331.64 | 46.97 | 379.18 | 20.00 | 317.90 | 20.72 | 102.65 | 4.65 |
| | V (Rs billion) | 3.60 | 10.68 | 22.46 | 35.76 | 3.62 | 11.56 | 2.97 | 10.07 | 0.80 | 2.53 |
| | Unit Value Rs/Kg | 8.56 | | 9.63 | | 9.53 | | 9.33 | | 7.82 | |
| Malaysia | Q ('000 tons) | 0.06 | 0.00 | 25.34 | 0.51 | 0.25 | 0.01 | 9.49 | 0.62 | 52.48 | 2.38 |
| | V (Rs billion) | 0.00 | 0.00 | 0.32 | 0.51 | 0.00 | 0.01 | 0.17 | 0.57 | 0.52 | 1.65 |
| | Unit Value Rs/Kg | 10.17 | | 12.55 | | 16.52 | | 17.66 | | 9.97 | |
| Yemen Arab Republic | Q ('000 tons) | 58.59 | 2.45 | 36.18 | 0.73 | 39.61 | 2.09 | 21.08 | 1.37 | 22.78 | 1.03 |
| | V (Rs billion) | 0.56 | 1.66 | 0.42 | 0.68 | 0.57 | 1.82 | 0.33 | 1.14 | 0.49 | 1.55 |
| | Unit Value Rs/Kg | 9.55 | | 11.72 | | 14.36 | | 15.86 | | 21.58 | |
| Singapore | Q ('000 tons) | 15.07 | 0.63 | 15.00 | 0.30 | 15.31 | 0.81 | 17.38 | 1.13 | 40.13 | 1.82 |
| | V (Rs billion) | 0.19 | 0.56 | 0.22 | 0.36 | 0.26 | 0.84 | 0.29 | 0.97 | 0.46 | 1.44 |
| | Unit Value Rs/Kg | 12.62 | | 14.94 | | 17.24 | | 16.47 | | 11.41 | |
| Sri Lanka | Q ('000 tons) | 151.15 | 6.33 | 20.45 | 0.41 | 61.98 | 3.27 | 0.52 | 0.03 | 46.62 | 2.11 |
| | V (Rs billion) | 1.27 | 3.75 | 0.18 | 0.28 | 0.51 | 1.64 | 0.01 | 0.02 | 0.36 | 1.13 |
| | Unit Value Rs/Kg | 8.37 | | 8.67 | | 8.25 | | 9.68 | | 7.70 | |
| Other Countries | Q ('000 tons) | 626.62 | 26.23 | 1036.20 | 20.88 | 384.27 | 20.27 | 180.70 | 11.78 | 379.58 | 17.19 |
| | V (Rs billion) | 7.29 | 21.64 | 11.75 | 18.71 | 5.54 | 17.73 | 3.97 | 13.48 | 4.67 | 14.72 |
| | Unit Value Rs/Kg | 11.64 | | 11.34 | | 14.42 | | 21.96 | | 12.31 | |
| **Total** | Q ('000 tons) | **2388.96** | **100.00** | **4963.60** | **100.00** | **1896.13** | **100.00** | **1534.49** | **100.00** | **2208.55** | **100.00** |
| | V (Rs billion) | **33.71** | **100.00** | **62.81** | **100.00** | **31.26** | **100.00** | **29.43** | **100.00** | **31.74** | **100.00** |
| | Unit Value Rs/Kg | **14.11** | | **12.65** | | **16.49** | | **19.18** | | **14.37** | |

Source: APEDA. Export Statistics for Agro and Food Products. 2001-02 (www.apeda.com and www.rbi.org.in)

**Exhibit 1.4**

**All India Area and Yield of Rice**

| Year | Area (million ha) | Rice Yield (Kg/ha) |
|---|---|---|
| 1970-71 | 37.59 | 1123 |
| 1975-76 | 39.48 | 1235 |
| 1980-81 | 40.15 | 1336 |
| 1985-86 | 41.14 | 1552 |
| 1990-91 | 42.69 | 1740 |
| 1991-92 | 42.65 | 1751 |
| 1992-93 | 41.78 | 1744 |
| 1993-94 | 42.54 | 1888 |
| 1994-95 | 42.81 | 1911 |
| 1995-96 | 42.84 | 1797 |
| 1996-97 | 43.43 | 1882 |
| 1997-98 | 43.45 | 1900 |
| 1998-99 | 44.80 | 1921 |
| 1999-00 | 44.97 | 1994 |
| 2000-01 | 44.36 | 1913 |

Source: Directorate of Economics and Statistics. 2000.

**Exhibit 1.5**

**Rice Production in India**

| Year | Production | Area | Yield | Coverage Under Irrigation |
|---|---|---|---|---|
| | (million tons) | (million ha) | (Kg/ha) | (%) |
| 1980-81 | 53.63 | 40.15 | 1336 | 40.7 |
| 1990-91 | 74.29 | 42.69 | 1740 | 45.5 |
| 1991-92 | 74.68 | 42.65 | 1751 | 47.3 |
| 1992-93 | 72.86 | 41.78 | 1744 | 48 |
| 1993-94 | 80.30 | 42.54 | 1888 | 48.6 |
| 1994-95 | 81.81 | 42.81 | 1911 | 49.8 |
| 1995-96 | 76.98 | 42.84 | 1797 | 50.1 |
| 1996-97 | 81.74 | 43.43 | 1882 | 51.1 |
| 1997-98 | 82.56 | 43.45 | 1900 | 50.2 |
| 1998-99 | 86.06 | 44.80 | 1921 | - |
| 1999-00 | 89.67 | 44.97 | 1994 | - |
| 2000-01 | 84.86 | 44.36 | 1913 | - |
| 2001-02 | 93.1 | | | |
| 2002-03 | 77.7 | | | |

Source: 1. CMIE Statistics. December 2002.
(www.indiancommodity.com )
2. Federal ministry of Agriculture, Govt. of India
(www.indiaonestop.com/gnp3.htm#major)

## Exhibit 1.6

## State Wise Rice Production in India

(million tons)

| State | West Bengal | Uttar Pradesh | Andhra Pradesh | Punjab | Tamil Nadu | Bihar | Orissa | Assam | Karnataka | Haryana | *Others* | All-India |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1992-93 | 11.55 | 9.15 | 8.79 | 7.03 | 6.81 | 2.61 | 5.39 | 3.30 | 3.07 | 1.87 | 13.32 | 72.87 |
| 1993-94 | 12.11 | 9.64 | 9.56 | 7.65 | 6.75 | 4.75 | 6.62 | 3.36 | 3.16 | 2.06 | 14.64 | 80.30 |
| 1994-95 | 12.23 | 9.78 | 9.28 | 7.70 | 7.56 | 4.19 | 6.35 | 3.28 | 3.17 | 2.23 | 16.04 | 81.81 |
| 1995-96 | 11.89 | 9.79 | 9.01 | 6.85 | 5.29 | 4.35 | 6.23 | 3.39 | 5.38 | 1.85 | 12.96 | 76.98 |
| 1996-97 | 12.64 | 11.20 | 10.69 | 7.33 | 5.81 | 0.00 | 4.44 | 3.33 | 3.21 | 2.47 | 20.21 | 81.31 |
| 1997-98 | 13.24 | 11.68 | 8.51 | 7.90 | 6.89 | 5.40 | 6.21 | 3.38 | 3.21 | 2.56 | 13.57 | 82.55 |
| 1998-99 | 13.32 | 10.83 | 11.88 | 7.94 | 8.14 | 5.29 | 5.39 | 3.26 | 3.66 | 2.43 | 13.95 | 86.08 |
| 1999-00 | 13.70 | 12.63 | 10.64 | 8.72 | 7.53 | 5.19 | 5.19 | 3.86 | 3.64 | 2.58 | 16.01 | 89.68 |
| 2000-01 | 12.43 | 11.54 | 12.46 | 9.15 | 7.22 | 4.61 | 4.61 | 4.00 | 3.73 | 2.68 | 12.43 | 84.87 |

Source: CMIE Statistics – Agriculture, December 2002

## Exhibit 1.7

## World Rice Production

**(million tons)**

| ***Country*** | **1998-99** | **1999-00** | **2000-01** | **2001-02** | **2002-03** | **2003-04** |
|---|---|---|---|---|---|---|
| | | | | | **11-Sep** | **11-Sep** |
| China | 139.10 | 138.94 | 131.54 | 124.32 | 122.18 | 118.00 |
| India | 86.00 | 89.70 | 84.87 | 91.60 | 75.70 | 90.00 |
| Indonesia | 31.85 | 33.45 | 32.55 | 32.42 | 33.20 | 33.30 |
| Bangladesh | 19.85 | 23.07 | 25.09 | 25.50 | 25.36 | 26.00 |
| Vietnam | 20.11 | 20.93 | 20.47 | 20.67 | 21.33 | 21.00 |
| Thailand | 15.59 | 16.50 | 16.90 | 16.50 | 17.12 | 17.80 |
| Burma | 9.28 | 9.86 | 10.77 | 10.44 | 10.44 | 10.44 |
| Philippines | 6.67 | 7.77 | 8.14 | 8.45 | 8.45 | 8.50 |
| Japan | 8.15 | 8.35 | 8.64 | 8.24 | 8.09 | 7.20 |
| Brazil | 7.88 | 7.77 | 7.06 | 7.48 | 7.00 | 7.30 |
| United States | 5.80 | 6.50 | 5.94 | 6.76 | 6.51 | 6.20 |
| South Korea | 5.10 | 5.26 | 5.29 | 5.52 | 4.93 | 4.70 |
| Egypt | 2.65 | 3.79 | 3.97 | 3.58 | 3.71 | 3.90 |
| Pakistan | 4.67 | 5.16 | 4.70 | 3.74 | 4.23 | 4.50 |
| EU | 1.75 | 1.75 | 1.57 | 1.62 | 1.71 | 1.63 |
| Taiwan | 1.31 | 1.35 | 1.34 | 1.25 | 1.27 | 1.14 |
| Australia | 0.97 | 0.79 | 1.26 | 0.93 | 0.28 | 0.36 |
| Other Countries | 27.35 | 28.28 | 27.27 | 27.58 | 28.41 | 28.49 |
| **World Total** | **394.08** | **409.20** | **397.35** | **396.59** | **379.91** | **390.46** |

Source: USDA

## Exhibit 1.8

## Paddy Production for the Year 1999-2000

| Sr. No | Top Producing Countries | Paddy Production (million tons) | (%) |
|---|---|---|---|
| 1. | China | 199.5 | 33.37 |
| 2. | India | 131.4 | 21.98 |
| 3. | Indonesia | 50.4 | 8.43 |
| 4. | Vietnam | 32.0 | 5.35 |
| 5. | Bangladesh | 30.7 | 5.13 |
| 6. | Others | 153.9 | 26.74 |
| | Total | 597.9 | 100.00 |

Source: Mbabaali, S. 1999.

## Exhibit 1.9

## World Rice Consumption

(million tons)

| *Country* | 1998-99 | 1999-00 | 2000-01 | 2001-02 | 2002-03 | 2003-04 |
|---|---|---|---|---|---|---|
| | | | | | 11-Sep | 11-Sep |
| China | 133.57 | 133.76 | 134.36 | 134.58 | 134.80 | 135.00 |
| India | 81.15 | 82.67 | 75.85 | 87.35 | 82.68 | 85.25 |
| Indonesia | 35.03 | 35.40 | 35.88 | 36.36 | 36.79 | 36.95 |
| Bangladesh | 21.85 | 23.77 | 24.96 | 25.55 | 26.10 | 26.40 |
| Vietnam | 15.76 | 16.77 | 17.25 | 17.40 | 17.55 | 17.70 |
| Burma | 9.28 | 9.50 | 9.70 | 9.90 | 10.10 | 10.20 |
| Thailand | 8.90 | 9.30 | 9.35 | 9.77 | 9.92 | 10.00 |
| Philippines | 8.00 | 8.40 | 8.75 | 8.90 | 9.55 | 9.70 |
| Japan | 9.10 | 9.45 | 9.00 | 8.92 | 8.79 | 8.66 |
| Brazil | 7.96 | 8.03 | 8.05 | 8.08 | 8.10 | 8.10 |
| Korea, South | 5.02 | 4.99 | 5.00 | 5.56 | 5.01 | 5.12 |
| United States | 3.59 | 3.85 | 3.68 | 3.87 | 3.58 | 3.88 |
| Egypt | 2.77 | 2.86 | 3.02 | 3.15 | 3.28 | 3.30 |
| Iran | 2.91 | 2.85 | 2.93 | 3.00 | 3.08 | 3.10 |
| EU | 2.11 | 2.19 | 2.21 | 2.22 | 2.23 | 2.23 |
| Korea, North | 1.56 | 2.00 | 1.84 | 2.00 | 2.20 | 1.64 |
| Taiwan | 1.33 | 1.32 | 1.20 | 1.15 | 1.15 | 1.15 |
| South Africa | 0.54 | 0.54 | 0.55 | 0.60 | 0.65 | 0.68 |
| Other Countries | 36.88 | 40.92 | 42.13 | 42.37 | 43.47 | 43.26 |
| World Total | 387.32 | 398.54 | 395.67 | 410.72 | 409.02 | 412.30 |

*Source: USDA*

## Exhibit 1.10

## International Trade in Rice (Quantity) by Principal Exporters

**(million tons)**

| **Country** | **1996** | **1997** | **1998** | **1999** | **2000** | **2001** | **2002** | | **2003 (12 Aug)** | **2004 (12-Aug)** |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Absolute** | **(%)** | | |
| Thailand | 5.28 | 5.22 | 6.37 | 6.68 | 6.55 | 7.52 | 7.25 | 25.98 | 7.75 | 8.25 |
| India | 3.55 | 1.95 | 4.67 | 2.75 | 1.45 | 1.94 | 6.65 | 23.85 | 4.00 | 3.50 |
| United States | 2.62 | 2.29 | 3.17 | 2.64 | 2.85 | 2.54 | 3.30 | 11.82 | 3.70 | 2.80 |
| Vietnam | 3.04 | 3.33 | 3.78 | 4.56 | 3.37 | 3.53 | 3.25 | 11.64 | 4.00 | 4.00 |
| China | 0.27 | 0.94 | 3.73 | 2.71 | 2.95 | 1.85 | 1.96 | 7.04 | 2.25 | 2.50 |
| Pakistan | 1.68 | 1.98 | 1.99 | 1.84 | 2.03 | 2.42 | 1.60 | 5.75 | 1.60 | 1.60 |
| Burma | 0.27 | 0.02 | 0.09 | 0.06 | 0.16 | 0.67 | 1.00 | 3.59 | 0.50 | 0.50 |
| Uruguay | 0.6 | 0.64 | 0.63 | 0.68 | 0.64 | 0.81 | 0.53 | 1.89 | 0.70 | 0.75 |
| Egypt | NA | NA | NA | NA | 0.50 | 0.71 | 0.47 | 1.70 | 0.70 | 0.70 |
| Australia | 0.56 | 0.64 | 0.55 | 0.67 | 0.62 | 0.62 | 0.36 | 1.29 | 0.30 | 0.25 |
| EU | 0.32 | 0.37 | 0.35 | 0.35 | 0.31 | 0.26 | 0.36 | 1.28 | 0.48 | 0.48 |
| Argentina | 0.37 | 0.53 | 0.56 | 0.67 | 0.33 | 0.36 | 0.23 | 0.84 | 0.20 | 0.20 |
| Guyana | 0.26 | 0.29 | 0.25 | 0.25 | 0.17 | 0.18 | 0.15 | 0.54 | 0.18 | 0.18 |
| Other Countries | 0.9 | 0.61 | 1.51 | 1.09 | 0.93 | 1.05 | 0.78 | 2.80 | 1.07 | 0.54 |
| **World Exports** | **19.71** | **18.81** | **27.65** | **24.94** | **22.85** | **24.44** | **27.88** | **100.00** | **27.42** | **26.24** |
| **World Exports** (US$ million) | **7756.9** | **7759.9** | **9563.3** | **7880.8** | **6559.5** | | | | | |
| **World Exports** (US$/ton) | **393.55** | **412.54** | **345.87** | **315.99** | **287.07** | | | | | |
| **World Exports** (US$/kg) | **0.39** | **0.41** | **0.35** | **0.32** | **0.29** | | | | | |

Source: USDA

## Exhibit 1.11
## International Trade in Rice (Value) by Principal Exporters

**(US$ million FOB)**

| Year | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | (%) |
| Thailand | 1196.0 | 1425.8 | 1301.7 | 1558.2 | 1951.8 | 1999.9 | 2157.5 | 2097.9 | 1950.4 | 1638.1 | 24.97 |
| USA | 756.3 | 735.0 | 770.3 | 1015.2 | 996.5 | 1031.0 | 932.4 | 1208.4 | 945.5 | 836.0 | 12.74 |
| Vietnam | 234.5 | 417.7 | 363.0 | 425.0 | 530.0 | 855.0 | 870.9 | 1019.7 | 1025.1 | 667.4 | 10.17 |
| India | 309.8 | 370.7 | 411.8 | 385.9 | 1416.1 | 888.3 | 910.2 | 1507.4 | 726.1 | 655.5 | 9.99 |
| China (including Taiwan and Hong Kong) | 181.8 | 232.9 | 266.2 | 533.1 | 56.5 | 137.1 | 277.9 | 936.1 | 674.6 | 578.3 | 8.82 |
| Pakistan | 345.2 | 412.3 | 320.3 | 241.5 | 462.8 | 514.2 | 479.8 | 567.7 | 591.1 | 533.3 | 8.13 |
| Italy | 360.7 | 452.4 | 372.9 | 431.5 | 368.1 | 455.9 | 374.1 | 352.2 | 365.2 | 309.6 | 4.72 |
| Australia | 140.5 | 188.4 | 160.6 | 223.2 | 215.5 | 243.8 | 281.6 | 225.8 | 268.1 | 229.4 | 3.50 |
| Uruguay | 117.9 | 107.6 | 155.3 | 152.1 | 163.9 | 228.5 | 255.3 | 281.9 | 195.8 | 195.8 | 2.98 |
| Egypt | 38.7 | 57.3 | 40.1 | 78.6 | 56.7 | 117.7 | 71.4 | 135.2 | 87.6 | 112.6 | 1.72 |
| Argentina | 36.1 | 53.1 | 75.9 | 79.8 | 138.0 | 98.2 | 204.9 | 225.3 | 172.5 | 103.6 | 1.58 |
| Other Countries | 764.1 | 891.3 | 945.9 | 1133.7 | 1117.7 | 1187.2 | 944.0 | 1005.7 | 878.8 | 700.0 | 10.67 |
| **World Exports** | **4481.4** | **5344.4** | **5183.9** | **6257.9** | **7473.7** | **7756.9** | **7759.9** | **9563.3** | **7880.8** | **6559.5** | **100.00** |

Source: FAO database 2001. (www.irri.com)

## Exhibit 1.12
## International Trade in Rice (Quantity) by Principal Importers

**(million tons)**

| Country | 1998 | 1999 | 2000 | 2001 | 2002 | | 2003 (12 Aug) | 2004 (12 Aug) |
|---|---|---|---|---|---|---|---|---|
| | | | | | Absolute | (%) | | |
| Indonesia | 5.77 | 3.73 | 1.50 | 1.50 | 3.50 | 12.55 | 3.50 | 3.50 |
| Nigeria | 0.90 | 0.95 | 1.25 | 1.91 | 1.82 | 6.53 | 1.25 | 1.00 |
| Philippines | 2.19 | 1.00 | 0.90 | 1.18 | 1.18 | 4.23 | 1.20 | 0.50 |
| Iraq | 0.63 | 0.78 | 1.27 | 0.96 | 1.18 | 4.22 | 1.10 | 1.10 |
| Iran | 0.84 | 1.31 | 1.10 | 0.77 | 0.96 | 3.46 | 0.75 | 1.50 |
| EU | 0.79 | 0.78 | 0.85 | 0.92 | 0.96 | 3.44 | 0.88 | 0.88 |
| Saudi Arabia | 0.78 | 0.75 | 0.99 | 1.05 | 0.94 | 3.36 | 0.95 | 0.95 |
| Senegal | 0.60 | 0.70 | 0.59 | 0.87 | 0.86 | 3.08 | 0.75 | 0.75 |
| South Africa | 0.53 | 0.51 | 0.52 | 0.57 | 0.80 | 2.87 | 0.65 | 0.65 |
| Cote d'Ivoire | 0.52 | 0.60 | 0.45 | 0.65 | 0.70 | 2.51 | 0.65 | 0.65 |
| N Korea | 0.25 | 0.16 | 0.40 | 0.54 | 0.65 | 2.35 | 0.70 | 0.30 |
| Japan | 0.47 | 0.63 | 0.66 | 0.68 | 0.62 | 2.21 | 0.65 | 0.65 |
| Brazil | 1.56 | 0.78 | 0.70 | 0.67 | 0.55 | 1.97 | 1.00 | 0.85 |
| Cuba | 0.37 | 0.43 | 0.42 | 0.48 | 0.54 | 1.93 | 0.50 | 0.55 |
| Mexico | 0.30 | 0.34 | 0.42 | 0.39 | 0.53 | 1.90 | 0.55 | 0.60 |
| Malaysia | 0.63 | 0.62 | 0.60 | 0.63 | 0.48 | 1.72 | 0.50 | 0.55 |
| USA | 0.30 | 0.36 | 0.31 | 0.41 | 0.42 | 1.51 | 0.43 | 0.44 |
| Russia | 0.22 | 0.58 | 0.40 | 0.25 | 0.41 | 1.46 | 0.35 | 0.35 |
| Eastern Europe | 0.33 | 0.36 | 0.34 | 0.38 | 0.36 | 1.31 | 0.38 | 0.37 |
| Singapore | 0.30 | 0.42 | 0.35 | 0.44 | 0.36 | 1.28 | 0.38 | 0.38 |
| Ghana | 0.20 | 0.13 | 0.19 | 0.37 | 0.35 | 1.26 | 0.25 | 0.25 |
| Turkey | 0.28 | 0.32 | 0.31 | 0.23 | 0.34 | 1.23 | 0.35 | 0.35 |
| Bangladesh | 2.52 | 1.22 | 0.64 | 0.40 | 0.31 | 1.12 | 1.00 | 0.50 |
| China | 0.26 | 0.18 | 0.28 | 0.27 | 0.31 | 1.09 | 0.30 | 0.30 |
| Other Countries | 5.13 | 5.65 | 5.74 | 6.38 | 6.47 | 23.21 | 6.69 | 6.80 |
| Unaccounted | 0.98 | 1.65 | 1.68 | 1.53 | 2.29 | 8.21 | 1.73 | 1.53 |
| **World Imports** | **27.65** | **24.94** | **22.85** | **24.44** | **27.88** | **100.00** | **27.42** | **26.24** |
| **World Imports** (US$ million) | **9163.9** | **9165.8** | **7482.3** | | | | | |
| **World Imports** (US$/ton) | **331.42** | **367.51** | **327.45** | | | | | |
| **World Imports** (US$/kg) | **0.33** | **0.37** | **0.33** | | | | | |

Source: USDA

## Exhibit 1.13

## International Trade in Rice (Value) by Principal Importers

*(US$ million CIF)*

| Year | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | | 2000 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | (%) |
| EU | 1195.1 | 1348.9 | 1168.5 | 1342.4 | 1252.5 | 1588.8 | 1429.8 | 1291.0 | 1361.2 | 1255.8 | 16.78 |
| Saudi Arabia | 147.1 | 295.9 | 310.2 | 228.6 | 277.9 | 363.7 | 433.1 | 500.7 | 415.0 | 415.0 | 5.55 |
| Iraq | 106.0 | 165.0 | 223.0 | 75.0 | 85.5 | 81.0 | 253.0 | 212.0 | 267.0 | 410.0 | 5.48 |
| Iran | 266.2 | 393.1 | 452.0 | 171.7 | 670.0 | 483.0 | 245.6 | 205.6 | 252.5 | 337.1 | 4.51 |
| Indonesia | 53.1 | 172.6 | 7.2 | 157.3 | 885.2 | 766.3 | 108.9 | 861.1 | 1327.5 | 319.1 | 4.27 |
| Japan | 4.9 | 5.6 | 41.4 | 1440.1 | 22.4 | 267.2 | 331.2 | 272.6 | 309.3 | 265.4 | 3.55 |
| Nigeria | 85.0 | 96.0 | 91.0 | 100.0 | 81.0 | 130.0 | 263.0 | 223.5 | 258.8 | 258.8 | 3.46 |
| Syria | 42.9 | 43.4 | 45.2 | 42.3 | 58.4 | 61.7 | 84.0 | 48.0 | 50.2 | 237.5 | 3.17 |
| USA | 93.6 | 106.6 | 124.2 | 150.1 | 141.2 | 178.5 | 236.0 | 203.1 | 217.0 | 209.9 | 2.81 |
| Malaysia | 127.5 | 135.9 | 110.0 | 112.4 | 142.0 | 213.6 | 236.0 | 232.3 | 189.3 | 189.3 | 2.53 |
| UAE | 111.1 | 148.7 | 204.9 | 125.1 | 200.8 | 184.7 | 140.0 | 177.0 | 187.0 | 187.0 | 2.50 |
| Brazil | 372.3 | 154.4 | 214.1 | 323.4 | 293.6 | 301.4 | 323.4 | 545.4 | 275.1 | 140.8 | 1.88 |
| South Africa | 117.2 | 106.1 | 99.3 | 127.3 | 137.2 | 163.8 | 170.5 | 150.8 | 140.1 | 140.1 | 1.87 |
| Philippines | 0.1 | 0.3 | 37.1 | 0.7 | 82.7 | 308.9 | 211.3 | 646.6 | 239.9 | 135.6 | 1.81 |
| Singapore | 80.3 | 92.2 | 96.6 | 108.6 | 116.0 | 138.5 | 151.8 | 121.4 | 147.3 | 131.8 | 1.76 |
| Bangladesh | 2.7 | 2.6 | 3.6 | 13.5 | 218.3 | 253.6 | 40.3 | 234.8 | 540.9 | 124.0 | 1.66 |
| China | 41.0 | 40.3 | 36.6 | 143.5 | 435.3 | 288.1 | 141.8 | 121.2 | 79.5 | 114.9 | 1.54 |
| Canada | 68.1 | 74.9 | 73.7 | 81.7 | 91.2 | 107.8 | 124.4 | 119.3 | 114.4 | 112.6 | 1.50 |
| Korea - DPR | 33.5 | 80.0 | 45.0 | 11.2 | 180.0 | 111.5 | 104.0 | 133.7 | 75.0 | 111.0 | 1.48 |
| Turkey | 41.5 | 92.7 | 85.8 | 56.3 | 109.4 | 82.1 | 94.8 | 96.5 | 97.6 | 108.2 | 1.45 |
| Mexico | 36.0 | 103.1 | 72.1 | 104.1 | 79.6 | 123.3 | 129.1 | 111.5 | 125.1 | 101.5 | 1.36 |
| Cuba | 69.6 | 83.3 | 109.8 | 72.5 | 107.3 | 126.5 | 83.4 | 99.4 | 141.2 | 100.8 | 1.35 |
| Other Countries | 2075.7 | 2269.6 | 2087.7 | 2148.6 | 2296.1 | 2586.3 | 2501.8 | 2556.5 | 2355.0 | 2076.3 | 27.75 |
| **World Imports** | **5170.3** | **6011.2** | **5739.0** | **7136.0** | **7963.6** | **8910.1** | **7837.4** | **9163.9** | **9165.8** | **7482.3** | **100.00** |

Source: APEDA. Export Statistics for Agro and Food Products. 2001-02 (www.apeda.com and www.rbi.org.in)

## Exhibit 1.14

## World's Top Ten Rice Importers

| | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Iran** | | | | | | | | | | |
| Area Harvested ('000 Hectares) | 575 | 600 | 600 | 560 | 570 | 600 | 560 | 600 | 550 | 450 |
| Yield | 2.52 | 2.50 | 2.83 | 2.68 | 2.72 | 2.67 | 2.86 | 3.08 | 2.82 | 2.67 |
| Milled Production ('000 tons) | 1450 | 1500 | 1700 | 1500 | 1550 | 1600 | 1600 | 1850 | 1550 | 1200 |
| Imports ('000 tons) | 1261 | 1221 | 665 | 1759 | 1574 | 1288 | 844 | 1313 | 1100 | 1400 |
| Exports ('000 tons) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Domestic Consumption ('000 tons) | 2200 | 2250 | 2400 | 2800 | 2850 | 2950 | 3000 | 3050 | 3100 | 3100 |
| Share in World Imports (%) | 9.87 | 8.76 | 3.88 | 8.68 | 8.30 | 7.23 | 3.35 | 5.01 | 5.15 | 6.13 |
| **Saudi Arabia** | | | | | | | | | | |
| Area Harvested ('000 Hectares) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Yield | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Milled Production ('000 tons) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Imports ('000 tons) | 559 | 783 | 891 | 724 | 618 | 814 | 660 | 775 | 750 | 950 |
| Exports ('000 tons) | 0 | 0 | 0 | 0 | 0 | 0 | 25 | 27 | 30 | 25 |
| Domestic Consumption ('000 tons) | 559 | 783 | 822 | 721 | 640 | 700 | 715 | 735 | 750 | 800 |
| Share in World Imports (%) | 4.37 | 5.62 | 5.20 | 3.57 | 3.26 | 4.57 | 2.62 | 2.96 | 3.51 | 4.16 |
| **Brazil** | | | | | | | | | | |
| Area Harvested ('000 Hectares) | 4614 | 4384 | 4390 | 4242 | 3858 | 3477 | 3285 | 3700 | 3678 | 3338 |
| Yield | 1.49 | 1.54 | 1.63 | 1.80 | 1.77 | 1.86 | 1.77 | 2.13 | 2.11 | 2.20 |
| Milled Production ('000 tons) | 6868 | 6733 | 7150 | 7640 | 6818 | 6463 | 5815 | 7876 | 7768 | 7336 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Imports ('000 tons) | 450 | 716 | 980 | 895 | 770 | 849 | 1400 | 900 | 600 | 490 |
| Exports ('000 tons) | 0 | 0 | 0 | 11 | 8 | 10 | 5 | 46 | 25 | 25 |
| Domestic Consumption ('000 tons) | 7650 | 7750 | 7770 | 7885 | 7800 | 7982 | 7980 | 7955 | 7959 | 8000 |
| Share in World Imports (%) | 3.52 | 5.14 | 5.72 | 4.42 | 4.06 | 4.77 | 5.55 | 3.44 | 2.81 | 2.15 |
| **Senegal** | | | | | | | | | | |
| Area Harvested ('000 Hectares) | 73 | 80 | 86 | 80 | 77 | 73 | 73 | 73 | 75 | 75 |
| Yield | 1.73 | 1.74 | 1.58 | 1.31 | 1.30 | 1.33 | 1.55 | 1.11 | 1.31 | 1.31 |
| Milled Production ('000 tons) | 126 | 139 | 136 | 105 | 100 | 97 | 113 | 81 | 98 | 98 |
| Imports ('000 tons) | 410 | 380 | 400 | 275 | 500 | 462 | 574 | 600 | 700 | 700 |
| Exports ('000 tons) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Domestic Consumption ('000 tons) | 511 | 515 | 510 | 410 | 520 | 534 | 625 | 710 | 800 | 875 |
| Share in World Imports (%) | 3.21 | 2.73 | 2.33 | 1.36 | 2.64 | 2.59 | 2.28 | 2.29 | 3.28 | 3.06 |
| **Indonesia** | | | | | | | | | | |
| Area Harvested ('000 Hectares) | 11103 | 11012 | 10735 | 11439 | 11570 | 11137 | 11730 | 11850 | 11650 | 11700 |
| Yield | 2.82 | 2.84 | 2.82 | 2.83 | 2.87 | 2.88 | 2.65 | 2.69 | 2.87 | 2.83 |
| Milled Production ('000 tons) | 31350 | 31318 | 30315 | 32333 | 33215 | 32084 | 31118 | 31853 | 33445 | 33110 |
| Imports ('000 tons) | 539 | 22 | 1120 | 3081 | 1081 | 839 | 5765 | 3729 | 1500 | 1800 |
| Exports ('000 tons) | 0 | 472 | 222 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Domestic Consumption ('000 tons) | 30820 | 31344 | 32166 | 34081 | 33554 | 33993 | 34813 | 35300 | 35900 | 36200 |
| Share in World Imports (%) | 4.22 | 0.16 | 6.53 | 15.21 | 5.70 | 4.71 | 22.86 | 14.24 | 7.03 | 7.88 |
| **Iraq** | | | | | | | | | | |
| Area Harvested ('000 Hectares) | 85 | 95 | 100 | 150 | 150 | 140 | 140 | 130 | 120 | 110 |
| Yield | 1.53 | 1.37 | 1.50 | 1.67 | 1.33 | 1.43 | 1.43 | 1.54 | 1.33 | 1.36 |
| Milled Production ('000 tons) | 130 | 130 | 150 | 250 | 200 | 200 | 200 | 200 | 160 | 150 |
| Imports ('000 tons) | 548 | 647 | 64 | 99 | 234 | 744 | 630 | 779 | 1261 | 1300 |
| Exports ('000 tons) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Domestic Consumption ('000 tons) | 653 | 650 | 366 | 349 | 434 | 894 | 830 | 929 | 1196 | 1350 |
| Share in World Imports (%) | 4.29 | 4.64 | 0.37 | 0.49 | 1.23 | 4.18 | 2.50 | 2.98 | 5.91 | 5.69 |
| **Malaysia** | | | | | | | | | | |
| Area Harvested ('000 Hectares) | 650 | 660 | 668 | 665 | 663 | 660 | 655 | 640 | 660 | 665 |
| Yield | 1.77 | 1.80 | 1.95 | 1.99 | 2.01 | 1.97 | 1.95 | 1.96 | 1.96 | 2.14 |
| Milled Production ('000 tons) | 1150 | 1190 | 1300 | 1325 | 1330 | 1300 | 1280 | 1255 | 1290 | 1425 |
| Imports ('000 tons) | 367 | 470 | 390 | 319 | 402 | 563 | 638 | 630 | 617 | 658 |
| Exports ('000 tons) | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Domestic Consumption ('000 tons) | 1527 | 1585 | 1650 | 1709 | 1715 | 1705 | 1837 | 1940 | 1957 | 2008 |
| Share in World Imports (%) | 2.87 | 3.37 | 2.27 | 1.57 | 2.12 | 3.16 | 2.53 | 2.41 | 2.89 | 2.88 |
| **Republic of South Africa** | | | | | | | | | | |
| Area Harvested ('000 Hectares) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Yield | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Milled Production ('000 tons) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Imports ('000 tons) | 384 | 420 | 478 | 425 | 448 | 486 | 561 | 529 | 514 | 475 |
| Exports ('000 tons) | 0 | 0 | 0 | 0 | 0 | 2 | 8 | 11 | 8 | 10 |
| Domestic Consumption ('000 tons) | 384 | 420 | 443 | 423 | 425 | 454 | 503 | 543 | 531 | 500 |
| Share in World Imports (%) | 3.01 | 3.01 | 2.79 | 2.10 | 2.36 | 2.73 | 2.22 | 2.02 | 2.41 | 2.08 |
| **Nigeria** | | | | | | | | | | |
| Area Harvested ('000 Hectares) | 1370 | 1482 | 1214 | 1666 | 1700 | 1658 | 1650 | 1650 | 1660 | 1650 |
| Yield | 2.33 | 2.36 | 1.80 | 1.32 | 1.33 | 1.18 | 1.12 | 1.15 | 1.21 | 1.21 |
| Milled Production ('000 tons) | 3185 | 3500 | 2182 | 2200 | 2260 | 1950 | 1850 | 1900 | 2000 | 2000 |
| Imports ('000 tons) | 296 | 440 | 382 | 300 | 300 | 350 | 731 | 900 | 950 | 1200 |
| Exports ('000 tons) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Domestic Consumption ('000 tons) | 3100 | 3700 | 2900 | 2600 | 2500 | 2500 | 2525 | 2650 | 2800 | 2950 |
| Share in World Imports (%) | 2.32 | 3.16 | 2.23 | 1.48 | 1.58 | 1.96 | 2.90 | 3.44 | 4.45 | 5.25 |
| **Japan** | | | | | | | | | | |
| Area Harvested ('000 Hectares) | 2049 | 2106 | 2139 | 2212 | 2118 | 1977 | 1953 | 1801 | 1788 | 1770 |
| Yield | 4.26 | 4.57 | 3.33 | 4.93 | 4.62 | 4.76 | 4.67 | 4.53 | 4.67 | 4.88 |
| Milled Production ('000 tons) | 8740 | 9621 | 7129 | 10903 | 9781 | 9413 | 9123 | 8154 | 8350 | 8636 |
| Imports ('000 tons) | 18 | 18 | 2623 | 9 | 451 | 500 | 499 | 554 | 639 | 730 |
| Exports ('000 tons) | 0 | 0 | 0 | 410 | 0 | 30 | 574 | 210 | 200 | 600 |
| Domestic Consumption ('000 tons) | 9523 | 9500 | 9400 | 9332 | 9450 | 9320 | 9200 | 9100 | 9450 | 9300 |
| Share in World Imports (%) | 0.14 | 0.13 | 15.30 | 0.04 | 2.38 | 2.81 | 1.98 | 2.12 | 2.99 | 3.20 |

*Source: USDA*

# Exhibit 1.15
## World's Top Ten Rice Exporters

| | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Thailand** | | | | | | | | | | | |
| Area Harvested ('000 hectares) | 8792 | 9053 | 9160 | 8676 | 9196 | 9032 | 9267 | 9937 | 9900 | 10080 | 10048 |
| Yield | 1.29 | 1.49 | 1.43 | 1.46 | 1.54 | 1.59 | 1.47 | 1.56 | 1.58 | 1.64 | 1.67 |
| Milled Production ('000 tons) | 11347 | 13464 | 13145 | 12672 | 14124 | 14388 | 13662 | 15510 | 15589 | 16500 | 16830 |
| Imports ('000 tons) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| Exports ('000 tons) | 3988 | 4876 | 4971 | 4720 | 5943 | 5281 | 5216 | 6367 | 6679 | 6549 | 6300 |
| Domestic Consumption ('000 tons) | 8400 | 8400 | 8500 | 8500 | 8250 | 8443 | 8590 | 8800 | 8900 | 9600 | 9990 |
| X Potential | 2947 | 5064 | 4645 | 4172 | 5874 | 5945 | 5072 | 6710 | 6689 | 6900 | 6840 |
| Share in World Exports (%) | 31.15 | 32.17 | 31.80 | 28.21 | 27.11 | 25.80 | 25.88 | 23.02 | 25.00 | 27.09 | 26.51 |
| | | | | | | | | | | | |
| **USA** | | | | | | | | | | | |
| Area Harvested ('000 hectares) | 1142 | 1125 | 1267 | 1146 | 1342 | 1252 | 1135 | 1256 | 1318 | 1421 | 1230 |
| Yield | 4.46 | 4.53 | 4.50 | 4.57 | 4.95 | 4.49 | 4.80 | 4.58 | 4.40 | 4.58 | 4.96 |
| Milled Production ('000 tons) | 5098 | 5096 | 5704 | 5240 | 6648 | 5628 | 5453 | 5750 | 5798 | 6502 | 6104 |
| Imports ('000 tons) | 151 | 169 | 195 | 220 | 256 | 245 | 334 | 294 | 336 | 321 | 327 |
| Exports ('000 tons) | 2331 | 2128 | 2515 | 2564 | 3322 | 2694 | 2488 | 2755 | 2730 | 2804 | 2654 |
| Domestic Consumption ('000 tons) | 2981 | 3064 | 3008 | 3283 | 3396 | 3420 | 3243 | 3278 | 3587 | 3846 | 3865 |
| X Potential | 2117 | 2032 | 2696 | 1957 | 3252 | 2208 | 2210 | 2472 | 2211 | 2656 | 2239 |
| Share in World Exports (%) | 18.21 | 14.04 | 16.09 | 15.33 | 15.15 | 13.16 | 12.34 | 9.96 | 10.22 | 11.60 | 11.17 |
| | | | | | | | | | | | |
| **Pakistan** | | | | | | | | | | | |
| Area Harvested ('000 hectares) | 2114 | 2097 | 1974 | 2188 | 2125 | 2162 | 2252 | 2316 | 2424 | 2515 | 2350 |
| Yield | 1.54 | 1.55 | 1.58 | 1.83 | 1.62 | 1.84 | 1.91 | 1.87 | 1.93 | 2.05 | 2.00 |
| Milled Production ('000 tons) | 3265 | 3243 | 3116 | 3995 | 3447 | 3967 | 4307 | 4333 | 4674 | 5156 | 4700 |
| Imports ('000 tons) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Exports ('000 tons) | 1274 | 1419 | 918 | 1232 | 1660 | 1632 | 1834 | 2099 | 1837 | 2104 | 2000 |
| Domestic Consumption ('000 tons) | 2100 | 2150 | 2250 | 2300 | 2400 | 2531 | 2550 | 2550 | 2600 | 2600 | 2650 |
| X Potential | 1165 | 1093 | 866 | 1695 | 1047 | 1436 | 1757 | 1783 | 2074 | 2556 | 2050 |
| Share in World Exports (%) | 9.95 | 9.36 | 5.87 | 7.36 | 7.57 | 7.97 | 9.10 | 7.59 | 6.87 | 8.70 | 8.41 |
| | | | | | | | | | | | |
| **Vietnam** | | | | | | | | | | | |
| Area Harvested ('000 hectares) | 6278 | 6490 | 6623 | 6643 | 6803 | 7124 | 7040 | 7377 | 7575 | 7660 | 7565 |
| Yield | 1.97 | 2.26 | 2.21 | 2.42 | 2.39 | 2.48 | 2.56 | 2.59 | 2.65 | 2.71 | 2.79 |
| Milled Production ('000 tons) | 12393 | 14638 | 14641 | 16049 | 16246 | 17683 | 18003 | 19094 | 20108 | 20747 | 21100 |
| Imports ('000 tons) | 0 | 0 | 0 | 0 | 10 | 1 | 1 | 0 | 60 | 40 | 40 |
| Exports ('000 tons) | 1048 | 1914 | 1592 | 2264 | 2314 | 3040 | 3327 | 3776 | 4555 | 3370 | 4000 |
| Domestic Consumption ('000 tons) | 11345 | 12724 | 13049 | 13785 | 13942 | 14644 | 14677 | 15318 | 15613 | 17417 | 17140 |
| X Potential | 1048 | 1914 | 1592 | 2264 | 2304 | 3039 | 3326 | 3776 | 4495 | 3330 | 3960 |
| Share in World Exports (%) | 8.19 | 12.63 | 10.19 | 13.53 | 10.56 | 14.85 | 16.51 | 13.65 | 17.05 | 13.94 | 16.83 |
| | | | | | | | | | | | |
| **India** | | | | | | | | | | | |
| Area Harvested ('000 hectares) | 42687 | 42650 | 41775 | 42034 | 42500 | 42300 | 43283 | 43420 | 44600 | 44970 | 44600 |
| Yield | 1.74 | 1.75 | 1.74 | 1.91 | 1.91 | 1.88 | 1.88 | 1.90 | 1.93 | 1.99 | 1.95 |
| Milled Production ('000 tons) | 74291 | 74680 | 72868 | 80300 | 81160 | 79620 | 81312 | 82540 | 86000 | 89480 | 87000 |
| Imports ('000 tons) | 0 | 15 | 55 | 0 | 0 | 0 | 0 | 12 | 4 | 86 | 0 |
| Exports ('000 tons) | 700 | 600 | 650 | 750 | 4150 | 3700 | 2100 | 4000 | 3350 | 1400 | 850 |
| Domestic Consumption ('000 tons) | 73091 | 74595 | 75273 | 76050 | 77010 | 78920 | 81212 | 77552 | 81154 | 82450 | 83500 |
| X Potential | 1200 | 85 | -2405 | 4250 | 4150 | 700 | 100 | 4988 | 4846 | 7030 | 3500 |
| Share in World Exports (%) | 5.47 | 3.96 | 4.16 | 4.48 | 18.93 | 18.07 | 10.42 | 14.46 | 12.54 | 5.79 | 3.58 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Italy** | | | | | | | | | | | |
| Area Harvested ('000 hectares) | 215 | 206 | 216 | 232 | 236 | 239 | 238 | 233 | 223 | 221 | 220 |
| Yield | 4.52 | 4.13 | 3.69 | 3.67 | 3.47 | 3.29 | 3.48 | 3.92 | 3.87 | 4.00 | 3.31 |
| Milled Production ('000 tons) | 972 | 850 | 797 | 851 | 820 | 785 | 828 | 914 | 863 | 884 | 728 |
| Imports ('000 tons) | 15 | 5 | 20 | 25 | 25 | 34 | 82 | 70 | 65 | 71 | 78 |
| Exports ('000 tons) | 580 | 613 | 575 | 540 | 490 | 416 | 644 | 588 | 525 | 610 | 630 |
| Domestic Consumption ('000 tons) | 350 | 336 | 330 | 330 | 330 | 330 | 330 | 330 | 335 | 336 | 275 |
| X Potential | 622 | 514 | 467 | 521 | 490 | 455 | 498 | 584 | 528 | 548 | 453 |
| Share in World Exports (%) | 4.53 | 4.04 | 3.68 | 3.23 | 2.24 | 2.03 | 3.20 | 2.13 | 1.96 | 2.52 | 2.65 |
| | | | | | | | | | | | |
| **Uruguay** | | | | | | | | | | | |
| Area Harvested ('000 hectares) | 110 | 127 | 134 | 134 | 146 | 146 | 156 | 180 | 205 | 183 | 150 |
| Yield | 3.32 | 3.41 | 3.66 | 3.27 | 3.86 | 4.64 | 4.66 | 3.69 | 4.44 | 4.62 | 4.67 |
| Milled Production ('000 tons) | 365 | 433 | 490 | 438 | 563 | 677 | 727 | 665 | 910 | 846 | 700 |
| Imports ('000 tons) | 11 | 0 | 0 | 12 | 4 | 4 | 4 | 1 | 2 | 0 | 0 |
| Exports ('000 tons) | 270 | 344 | 415 | 385 | 493 | 600 | 645 | 576 | 745 | 685 | 685 |
| Domestic Consumption ('000 tons) | 75 | 80 | 85 | 80 | 80 | 80 | 80 | 85 | 90 | 95 | 100 |
| X Potential | 290 | 353 | 405 | 358 | 483 | 597 | 647 | 580 | 820 | 751 | 600 |
| Share in World Exports (%) | 2.11 | 2.27 | 2.66 | 2.30 | 2.25 | 2.93 | 3.20 | 2.08 | 2.79 | 2.83 | 2.88 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Australia** | | | | | | | | | | | |
| Area Harvested ('000 hectares) | 89 | 127 | 125 | 132 | 128 | 137 | 152 | 147 | 148 | 133 | 186 |
| Yield | 6.33 | 6.35 | 5.46 | 5.86 | 6.35 | 5.04 | 5.88 | 6.44 | 6.58 | 5.92 | 6.74 |
| Milled Production ('000 tons) | 563 | 806 | 683 | 774 | 813 | 691 | 894 | 947 | 974 | 787 | 1253 |
| Imports ('000 tons) | 28 | 31 | 29 | 28 | 31 | 36 | 37 | 38 | 51 | 50 | 50 |
| Exports ('000 tons) | 519 | 607 | 525 | 500 | 500 | 550 | 657 | 537 | 662 | 610 | 690 |
| Domestic Consumption ('000 tons) | 212 | 250 | 267 | 262 | 294 | 302 | 307 | 313 | 333 | 345 | 350 |
| X Potential | 351 | 556 | 416 | 512 | 519 | 389 | 587 | 634 | 641 | 442 | 903 |
| Share in World Exports (%) | 4.05 | 4.00 | 3.36 | 2.99 | 2.28 | 2.69 | 3.26 | 1.94 | 2.48 | 2.52 | 2.90 |
| | | | | | | | | | | | |
| **China** | | | | | | | | | | | |
| Area Harvested ('000 hectares) | 33064 | 32590 | 32090 | 30360 | 30171 | 30745 | 31406 | 31765 | 31214 | 31284 | 30000 |
| Yield | 4.01 | 3.95 | 4.06 | 4.10 | 4.08 | 4.22 | 4.35 | 4.42 | 4.46 | 4.44 | 4.43 |
| Milled Production ('000 tons) | 132532 | 128667 | 130354 | 124390 | 123151 | 129650 | 136570 | 140490 | 139100 | 138936 | 133000 |
| Imports ('000 tons) | 68 | 93 | 212 | 968 | 1998 | 852 | 322 | 261 | 178 | 280 | 300 |
| Exports ('000 tons) | 689 | 933 | 1431 | 1518 | 32 | 265 | 938 | 3734 | 2708 | 2951 | 3000 |
| Domestic Consumption ('000 tons) | 126711 | 128527 | 127135 | 127840 | 129117 | 130037 | 132154 | 135517 | 136070 | 137265 | 136800 |
| X Potential | 5821 | 140 | 3219 | -3450 | -5966 | -387 | 4416 | 4973 | 3030 | 1671 | -3800 |
| Share in World Exports (%) | 5.38 | 6.16 | 9.16 | 9.07 | 0.15 | 1.29 | 4.65 | 13.50 | 10.13 | 12.21 | 12.62 |
| | | | | | | | | | | | |
| **Argentina** | | | | | | | | | | | |
| Area Harvested ('000 hectares) | 110 | 140 | 140 | 140 | 180 | 182 | 225 | 213 | 289 | 190 | 126 |
| Yield | 2.72 | 3.04 | 2.84 | 2.79 | 3.36 | 3.13 | 3.47 | 3.09 | 3.74 | 3.10 | 3.17 |
| Milled Production ('000 tons) | 299 | 425 | 398 | 390 | 605 | 570 | 780 | 657 | 1080 | 588 | 400 |
| Imports ('000 tons) | 1 | 2 | 1 | 6 | 5 | 7 | 9 | 8 | 15 | 15 | 15 |
| Exports ('000 tons) | 75 | 207 | 276 | 203 | 327 | 366 | 530 | 599 | 654 | 520 | 200 |
| Domestic Consumption ('000 tons) | 219 | 180 | 175 | 189 | 200 | 210 | 215 | 220 | 235 | 240 | 215 |
| X Potential | 80 | 245 | 223 | 201 | 405 | 360 | 565 | 437 | 845 | 348 | 185 |
| Share in Total World Exports (%) | 0.59 | 1.37 | 1.77 | 1.21 | 1.49 | 1.79 | 2.63 | 2.17 | 2.45 | 2.15 | 0.84 |

Source: USDA

## Exhibit 1.16
## Saudi Arabia's Rice Imports

*(tons, %)*

| **Country of Origin** | **2001** | | **2002** | |
|---|---|---|---|---|
| | **Quantity** | **Share** | **Quantity** | **Share** |
| India | 640,000 | 68.1 | 590,000 | 71.6 |
| US | 139,910 | 14.9 | 92,147 | 11.2 |
| Pakistan | 75,794 | 8.1 | 63,984 | 7.7 |
| Thailand | 69,101 | 7.4 | 58,309 | 7.1 |
| Other | 15,000 | 1.5 | 20,000 | 2.4 |
| Total | 939,805 | 100.0 | 824,440 | 100.0 |

Source: ORYZA (http://www.oryza.com/)

## Exhibit 1.17
## USA's Rice Imports

(tons)

| Country of Origin | **1995** | **1996** | **1997** | **1998** | **1999** | **2000** | **2001** | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Absolute** | **(%)** |
| Thailand | 196560 | 212135 | 236185 | 226522 | 243635 | 243544 | 294999 | 71.49 |
| Australia | 0 | 0 | 0 | 655 | 11024 | 0 | 49601 | 12.02 |
| India | 18457 | 27994 | 25694 | 32559 | 35222 | 42729 | 45201 | 10.95 |
| Pakistan | 6477 | 4670 | 5943 | 8939 | 8007 | 11201 | 9497 | 2.30 |
| Canada | 332 | 340 | 809 | 1504 | 1397 | 1424 | 4576 | 1.11 |
| Other Countries | 6428 | 33684 | 48069 | 29500 | 58174 | 8758 | 8744 | 2.12 |
| **Total Imports** | **228254** | **278823** | **316700** | **299679** | **357459** | **307656** | **412,618** | **100.00** |

Source: Rice Situation and Outlook Yearbook (www.agronomy.ucdavis.edu)

**Exhibit 1.18**

**World Wide Trading of Different Types of Rice**

| **Sr No** | **Type of Rice** | **Contribution to Total Rice Trade (%)** |
|---|---|---|
| 1. | Indica | 75-80 |
| 2. | Japonica | 10-12 |
| 3. | Aromatic like Basmati/Jasmine | 10 |
| 4. | Glutinous | Remaining about 2-5 |

Source: Gulati, A. 2002

## Exhibit 1.19

## Share of Basmati Rice to Total Exports of India

| *Year* | Basmati Rice | Non-Basmati Rice | Total Rice Exports | Total Agri-Exports (APEDA Scheduled Products) | Total Agri-Exports (All Products)* | Total Exports* | Share of Basmati Rice to Total Rice Exports | Share of Basmati Rice to APEDA Scheduled Agri Exports | Share of Basmati Rice to Total Agri Exports | Share of Agri to Total Exports | Share of Basmati Rice to Total Exports |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | (Rs billion) | (Rs billion) | (Rs billion) | (Rs billion) | (Rs billion) | (Rs billion) | (%) | (%) | (%) | (%) | (%) |
| 1990-91 | 2.95 | 1.65 | 4.60 | | | 325.58 | 64.1 | | | | 0.9 |
| 1991-92 | 4.35 | 3.20 | 7.55 | | | 440.42 | 57.6 | | | | 1.0 |
| 1992-93 | 7.00 | 1.98 | 8.98 | | | 536.88 | 78.0 | | | | 1.3 |
| 1993-94 | 10.61 | 2.25 | 12.86 | 28.49 | | 697.49 | 82.5 | 37.2 | | | 1.5 |
| 1994-95 | 8.65 | 3.40 | 12.05 | 29.70 | | 826.73 | 71.8 | 29.1 | | | 1.0 |
| 1995-96 | 8.51 | 37.17 | 45.68 | 79.15 | 204.41 | 1063.52 | 18.6 | 10.8 | 4.2 | 19.2 | 0.8 |
| 1996-97 | 12.48 | 19.25 | 31.73 | 77.23 | 243.64 | 1188.17 | 39.3 | 16.2 | 5.1 | 20.5 | 1.1 |
| 1997-98 | 16.85 | 16.86 | 33.71 | 72.71 | 246.25 | 1301.01 | 50.0 | 23.2 | 6.8 | 18.9 | 1.3 |
| 1998-99 | 18.77 | 44.04 | 62.81 | 96.82 | 257.23 | 1416.04 | 29.9 | 19.4 | 7.3 | 18.2 | 1.3 |
| 1999-00 | 17.80 | 13.46 | 31.26 | 73.65 | 248.87 | 1629.25 | 56.9 | 24.2 | 7.2 | 15.3 | 1.1 |
| 2000-01 | 21.66 | 7.77 | 29.43 | 92.13 | 272.88 | 2013.56 | 73.6 | 23.5 | 7.9 | 13.6 | 1.1 |
| 2001-02 | 18.43 | 13.31 | 31.74 | 101.69 | 279.24 | 2077.44 | 58.1 | 18.1 | 6.6 | 13.4 | 0.9 |

** Extracted from CMIE Statistics*

Source: APEDA. Export Statistics for Agro and Food Products. 2001-02 (www.apeda.com)

**Exhibit 1.20**

**Country-Wise Exports of Basmati Rice**

| Country | 1997-98 | | 1998-99 | | 1999-00 | | 2000-01 | | 2001-02 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Quantity | Value | Quantity | Value | Quantity | Value | Quantity | Value | Quantity | Value | Value Share | Cumulative Share |
| | (tons) | (Rs million) | (tons) | (Rs million) | (tons) | (Rs million) | (tons) | (Rs million) | (tons) | (Rs million) | (%) | (%) |
| Saudi Arabia | 353988.2 | 9649.93 | 442994.4 | 13678.80 | 396676.3 | 10585.14 | 478124.5 | 10987.84 | 406096.7 | 10588.07 | 57.46 | 57.46 |
| Kuwait | 71930.4 | 1954.05 | 31359.8 | 893.47 | 47738.1 | 1259.24 | 82799.6 | 2273.46 | 65257.3 | 1961.11 | 10.64 | 68.10 |
| UK | 53521.9 | 1692.24 | 45781.0 | 1679.01 | 53081.5 | 1730.53 | 111984.5 | 3037.04 | 63514.4 | 1932.58 | 10.49 | 78.59 |
| USA | 28247.3 | 922.57 | 4978.1 | 200.87 | 16372.9 | 707.07 | 36179.3 | 1307.71 | 26854.9 | 946.50 | 5.14 | 83.73 |
| UAE | 23999.7 | 809.52 | 19982.8 | 735.55 | 32297.2 | 1024.54 | 30150.8 | 905.30 | 15286.1 | 499.73 | 2.71 | 86.44 |
| Yemen Arab Republic | 327.0 | 11.66 | 2135.7 | 47.59 | 9773.8 | 192.20 | 6164.1 | 133.07 | 14119.4 | 321.34 | 1.74 | 88.18 |
| Canada | 9469.9 | 302.28 | 3321.3 | 115.56 | 2450.4 | 82.25 | 8479.5 | 302.15 | 7126.3 | 253.30 | 1.37 | 89.56 |
| France | 11546.9 | 317.10 | 8463.0 | 275.33 | 12027.9 | 336.81 | 22140.4 | 578.47 | 9083.5 | 237.05 | 1.29 | 90.84 |
| Belgium | 6500.0 | 183.49 | 6551.6 | 201.23 | 7512.2 | 240.90 | 8854.3 | 236.21 | 7194.9 | 194.73 | 1.06 | 91.90 |
| Germany | 3765.0 | 121.79 | 2421.8 | 76.44 | 3677.4 | 116.66 | 8659.0 | 236.05 | 6051.2 | 174.21 | 0.95 | 92.84 |
| Italy | 2177.5 | 62.63 | 301.3 | 10.76 | 4100.3 | 104.50 | 8439.0 | 200.54 | 6039.1 | 151.45 | 0.82 | 93.67 |
| Iran | - | - | - | - | - | - | - | - | 5014.2 | 123.21 | 0.67 | 94.34 |
| Sweden | 378.0 | 9.62 | 221.0 | 7.71 | 704.5 | 21.70 | 3939.9 | 106.81 | 4493.8 | 120.48 | 0.65 | 94.99 |
| Oman | 3049.2 | 92.83 | 6340.6 | 185.29 | 6462.5 | 162.08 | 7186.8 | 198.88 | 2993.4 | 86.81 | 0.47 | 95.46 |
| Seychelles | 2210.5 | 54.89 | 1487.0 | 38.72 | 2657.2 | 76.52 | 4677.0 | 129.48 | 3395.9 | 85.29 | 0.46 | 95.92 |
| Others | 21566.9 | 665.68 | 21aa417.0 | 622.79 | 42848.0 | 1163.26 | 33943.3 | 1026.59 | 24544.8 | 751.80 | 4.08 | 100.00 |
| **Total** | **592678.3** | **16850.27** | **597756.4** | **18769.09** | **638380.1** | **17803.38** | **851721.8** | **21659.61** | **667065.8** | **18427.66** | **100.00** | |
| *Japan* | *23.0* | *1.00* | *273.5* | *12.29* | *1103.9* | *43.89* | *94.1* | *4.41* | *10.0* | *0.35* | | |

Source: APEDA. Export Statistics for Agro and Food Products. 2001-02 (www.apeda.com)

**Exhibit 1.21**
**Imports of Basmati Rice for the Year 2001-02**

| Country | Import of Basmati Rice from | | | Country-wise Share for | | Market Share for | |
|---|---|---|---|---|---|---|---|
| | India | Pakistan | Total | India | Pakistan | India | Pakistan |
| | (tons) | (tons) | (tons) | (%) | (%) | (%) | (%) |
| ***Middle East*** | ***509595*** | ***401904*** | ***911499*** | ***76.39*** | ***73.07*** | ***55.91*** | ***44.09*** |
| Saudi Arabia | 406097 | 45832 | 451929 | 60.88 | 8.33 | 89.86 | 10.14 |
| Kuwait | 65257 | 18404 | 83661 | 9.78 | 3.35 | 78.00 | 22.00 |
| UAE | 15286 | 207269 | 222555 | 2.29 | 37.68 | 6.87 | 93.13 |
| Yamen | 14119 | 32032 | 46151 | 2.12 | 5.82 | 30.59 | 69.41 |
| Oman | 2993 | 45147 | 48140 | 0.45 | 8.21 | 6.22 | 93.78 |
| Qatar | 2263 | 27794 | 30057 | 0.34 | 5.05 | 7.53 | 92.47 |
| Bahrain | 2060 | 23776 | 25836 | 0.31 | 4.32 | 7.97 | 92.03 |
| Isarel | 987 | 0 | 987 | 0.15 | 0.00 | 100.00 | 0.00 |
| Jordan | 533 | 1650 | 2183 | 0.08 | 0.30 | 24.42 | 75.58 |
| | | | | | | | |
| ***Europe*** | ***100196*** | ***58266*** | ***158462*** | ***15.02*** | ***10.59*** | ***63.23*** | ***36.77*** |
| UK | 63514 | 29129 | 92643 | 9.52 | 5.30 | 68.56 | 31.44 |
| France | 9084 | 1502 | 10586 | 1.36 | 0.27 | 85.81 | 14.19 |
| Belgium | 7195 | 3944 | 11139 | 1.08 | 0.72 | 64.59 | 35.41 |
| Italy | 6039 | 5626 | 11665 | 0.91 | 1.02 | 51.77 | 48.23 |
| Germany | 6051 | 4599 | 10650 | 0.91 | 0.84 | 56.82 | 43.18 |
| Sweden | 4494 | 1459 | 5953 | 0.67 | 0.27 | 75.49 | 24.51 |
| Netherlands | 2723 | 10888 | 13611 | 0.41 | 1.98 | 20.01 | 79.99 |
| Switzerland | 369 | 731 | 1100 | 0.06 | 0.13 | 33.55 | 66.45 |
| Spain | 296 | 388 | 684 | 0.04 | 0.07 | 43.27 | 56.73 |
| Denmark | 431 | 0 | 431 | 0.06 | 0.00 | 100.00 | 0.00 |
| | | | | | | | |
| ***North America*** | ***33981*** | ***17443*** | ***51424*** | ***5.09*** | ***3.17*** | ***66.08*** | ***33.92*** |
| USA | 26855 | 12074 | 38929 | 4.03 | 2.20 | 68.98 | 31.02 |
| Canada | 7126 | 5369 | 12495 | 1.07 | 0.98 | 57.03 | 42.97 |
| | | | | | | | |
| ***East Asian Countries*** | ***3939*** | ***31251*** | ***35190*** | ***0.59*** | ***5.68*** | ***11.19*** | ***88.81*** |
| Singapore | 1583 | 2690 | 4273 | 0.24 | 0.49 | 37.05 | 62.95 |
| Mauritius | 1092 | 19793 | 20885 | 0.16 | 3.60 | 5.23 | 94.77 |
| Malaysia | 603 | 5333 | 5936 | 0.09 | 0.97 | 10.16 | 89.84 |
| Bangladesh | 339 | 192 | 531 | 0.05 | 0.03 | 63.84 | 36.16 |
| Sri Lanka | 140 | 2823 | 2963 | 0.02 | 0.51 | 4.72 | 95.28 |
| Japan | 100 | 124 | 224 | 0.01 | 0.02 | 44.64 | 55.36 |
| Hong Kong | 82 | 296 | 378 | 0.01 | 0.05 | 21.69 | 78.31 |
| | | | | | | | |
| ***Australia, New Zealand and South Africa*** | ***4149*** | ***10486*** | ***14635*** | ***0.62*** | ***1.91*** | ***28.35*** | ***71.65*** |
| South Africa | 2108 | 1195 | 3303 | 0.32 | 0.22 | 63.82 | 36.18 |
| Australia | 1631 | 7818 | 9449 | 0.24 | 1.42 | 17.26 | 82.74 |
| New Zealand | 410 | 1473 | 1883 | 0.06 | 0.27 | 21.77 | 78.23 |
| | | | | | | | |
| ***Other countries*** | ***15206*** | ***30685*** | ***45891*** | ***2.28*** | ***5.58*** | ***33.14*** | ***66.86*** |
| | | | | | | | |
| ***Total Imports by all Countries*** | ***667066*** | ***550035*** | ***1217101*** | ***100.00*** | ***100.00*** | ***54.81*** | ***45.19*** |

Source: FAO Statistical Database, 2002

**Exhibit 1.22**

**Imports of Basmati Rice for the Year 1999-00**

| Country | Import of Basmati Rice | | | Country-wise Share for | | Market Share for | |
|---|---|---|---|---|---|---|---|
| | India | Pakistan | Total | India | Pakistan | India | Pakistan |
| | (tons) | (tons) | (tons) | (%) | (%) | (%) | (%) |
| ***Middle East*** | ***499198*** | ***351867*** | ***851065*** | ***78.20*** | ***70.58*** | ***58.66*** | ***41.34*** |
| Saudi Arabia | 396676 | 50578 | 447254 | 62.14 | 10.15 | 88.69 | 11.31 |
| Kuwait | 47738 | 19142 | 66880 | 7.48 | 3.84 | 71.38 | 28.62 |
| UAE | 32297 | 172422 | 204719 | 5.06 | 34.59 | 15.78 | 84.22 |
| Yamen | 9774 | 26479 | 36253 | 1.53 | 5.31 | 26.96 | 73.04 |
| Oman | 6462 | 35930 | 42392 | 1.01 | 7.21 | 15.24 | 84.76 |
| Qatar | 3307 | 26389 | 29696 | 0.52 | 5.29 | 11.14 | 88.86 |
| Bahrain | 2944 | 20927 | 23871 | 0.46 | 4.20 | 12.33 | 87.67 |
| | | | | | | | |
| ***Europe*** | ***87333*** | ***63600*** | ***150933*** | ***13.68*** | ***12.76*** | ***57.86*** | ***42.14*** |
| UK | 53082 | 26925 | 80007 | 8.32 | 5.40 | 66.35 | 33.65 |
| France | 12028 | 2929 | 14957 | 1.88 | 0.59 | 80.42 | 19.58 |
| Belgium | 7512 | 8025 | 15537 | 1.18 | 1.61 | 48.35 | 51.65 |
| Holland | 4250 | 10913 | 15163 | 0.67 | 2.19 | 28.03 | 71.97 |
| Italy | 4100 | 9123 | 13223 | 0.64 | 1.83 | 31.01 | 68.99 |
| Germany | 3677 | 3685 | 7362 | 0.58 | 0.74 | 49.95 | 50.05 |
| Switzerland | 845 | 342 | 1187 | 0.13 | 0.07 | 71.19 | 28.81 |
| Spain | 731 | 242 | 973 | 0.11 | 0.05 | 75.13 | 24.87 |
| Sweden | 705 | 1315 | 2020 | 0.11 | 0.26 | 34.90 | 65.10 |
| Denmark | 403 | 101 | 504 | 0.06 | 0.02 | 79.96 | 20.04 |
| | | | | | | | |
| ***North America*** | ***18823*** | ***16442*** | ***35265*** | ***2.95*** | ***3.30*** | ***53.38*** | ***46.62*** |
| USA | 16373 | 11311 | 27684 | 2.56 | 2.27 | 59.14 | 40.86 |
| Canada | 2450 | 5131 | 7581 | 0.38 | 1.03 | 32.32 | 67.68 |
| | | | | | | | |
| ***East Asian Countries*** | ***12348*** | ***33295*** | ***45643*** | ***1.93*** | ***6.68*** | ***27.05*** | ***72.95*** |
| Mauritius | 7936 | 14884 | 22820 | 1.24 | 2.99 | 34.78 | 65.22 |
| Bangladesh | 1561 | 1043 | 2604 | 0.24 | 0.21 | 59.95 | 40.05 |
| Singapore | 1500 | 2498 | 3998 | 0.23 | 0.50 | 37.52 | 62.48 |
| Japan | 1104 | 377 | 1481 | 0.17 | 0.08 | 74.54 | 25.46 |
| Sri Lanka | 109 | 2042 | 2151 | 0.02 | 0.41 | 5.07 | 94.93 |
| Hong Kong | 82 | 563 | 645 | 0.01 | 0.11 | 12.71 | 87.29 |
| Malaysia | 56 | 11888 | 11944 | 0.01 | 2.38 | 0.47 | 99.53 |
| | | | | | | | |
| ***Australia, New Zealand and South Africa*** | ***1755*** | ***10870*** | ***12625*** | ***0.27*** | ***2.18*** | ***13.90*** | ***86.10*** |
| Australia | 1010 | 6179 | 7189 | 0.16 | 1.24 | 14.05 | 85.95 |
| South Africa | 640 | 3492 | 4132 | 0.10 | 0.70 | 15.49 | 84.51 |
| New Zealand | 105 | 1199 | 1304 | 0.02 | 0.24 | 8.05 | 91.95 |
| | | | | | | | |
| ***Other countries*** | ***18923*** | ***22456*** | ***41379*** | ***2.96*** | ***4.50*** | ***45.73*** | ***54.27*** |
| | | | | | | | |
| ***Total Imports by all Countries*** | ***638380*** | ***498530*** | ***1136910*** | ***100.00*** | ***100.00*** | ***56.15*** | ***43.85*** |

Source: FAO Statistical Database, 2001

**Exhibit 1.23**

**Basmati Rice Exports from India and Pakistan**

| *Country* | 1999-00 | | | 2000-01 | | | 2001-02 | | |
|---|---|---|---|---|---|---|---|---|---|
| | **Quantity** | **Quantity Share** | **Value** | **Quantity** | **Quantity Share** | **Value** | **Quantity** | **Quantity Share** | **Value** |
| | (tons) | (%) | (Rs million) | (tons) | (%) | (Rs million) | (tons) | (%) | (Rs million) |
| India* | 638380 | 56.15 | 17803.3 | 851722 | 62.91 | 21659.6 | 667066 | 54.81 | 18427.7 |
| Pakistan** | 498530 | 43.85 | NA | 502061 | 37.09 | NA | 550035 | 45.19 | NA |
| ***Total Basmati Rice*** | ***1136910*** | ***100.00*** | ***NA*** | ***1353783*** | ***100.00*** | ***NA*** | ***1217101*** | ***100.00*** | ***NA*** |

Source: * APEDA. 2001-2002.
** USDA. Pakistan Grains

**Exhibit 1.24**

**Exports of Basmati Rice (1999-00)**

| **Importing Country** | **Amount** (Rs billion) | (%) |
|---|---|---|
| Saudi Arabia | 10.6 | 59.6 |
| UK | 1.7 | 9.6 |
| Kuwait | 1.3 | 7.3 |
| UAE | 1.0 | 5.6 |
| Others | 3.0 | 18.0 |
| Total | 17.8 | 100.0 |

Source: www.indiancommodity.com

**Exhibit 1.25**

**Item Wise Export of Rice from India**

| **Year** | **Basmati Rice** | | **Non-Basmati Rice** | | **Total Rice** | |
|---|---|---|---|---|---|---|
| | Quantity | **Value** | **Quantity** | **Value** | **Quantity** | **Value** |
| | ('000 tons) | (Rs billion) | ('000 tons) | (Rs billion) | ('000 tons) | (Rs billion) |
| 1990-91 | 232.41 | 2.95 | 272.70 | 1.65 | 505.11 | 4.60 |
| 1991-92 | 235.59 | 4.35 | 525.79 | 3.20 | 761.38 | 7.55 |
| 1992-93 | 286.17 | 7.00 | 276.74 | 1.98 | 562.91 | 8.98 |
| 1993-94 | 527.23 | 10.61 | 240.45 | 2.25 | 767.68 | 12.87 |
| 1994-95 | 442.17 | 8.65 | 448.45 | 3.40 | 890.62 | 12.06 |
| 1995-96 | 373.31 | 8.51 | 4540.70 | 37.17 | 4914.01 | 45.68 |
| 1996-97 | 523.13 | 12.48 | 1988.85 | 19.25 | 2511.98 | 31.72 |
| 1997-98 | 592.68 | 16.85 | 1796.28 | 16.86 | 2388.96 | 33.71 |
| 1998-99 | 597.76 | 18.77 | 4365.84 | 44.04 | 4963.60 | 62.81 |
| 1999-00 | 638.38 | 17.80 | 1257.75 | 13.46 | 1896.13 | 31.26 |
| 2000-01 | 851.72 | 21.66 | 682.76 | 7.77 | 1534.48 | 29.43 |
| 2001-02 | 667.07 | 18.43 | 1541.49 | 13.31 | 2208.56 | 31.74 |

Source: APEDA. Export Statistics for Agro and Food Products. 2001-02 (www.apeda.com)

**Exhibit 1.26**

**Country-wise Export of Non-Basmati Rice**

| Country | 1997-98 | | 1998-99 | | 1999-00 | | 2000-01 | | 2001-02 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Quantity (tons) | Value (Rs million) | Quantity (tons) | Value (Rs million) | Quantity (tons) | Value (Rs million) | Quantity (tons) | Value (Rs million) | Quantity (tons) | Value (Rs million) | Value Share (%) | Cumulative Share (%) |
| Nigeria | 122411.0 | 1191.53 | 201108.8 | 2203.89 | 109046.4 | 1090.85 | -- | -- | 302149.1 | 2765.30 | 20.8 | 20.8 |
| South Africa | 266107.8 | 2435.47 | 525012.9 | 5383.90 | 148103.6 | 1581.66 | 57805.5 | 608.91 | 318444.9 | 2371.07 | 17.8 | 38.6 |
| Saudi Arabia | 92935.0 | 1057.42 | 126036.0 | 1549.06 | 160358.4 | 2111.28 | 153340.4 | 2105.73 | 176789.9 | 1861.98 | 14.0 | 52.6 |
| Indonesia | -- | -- | 18701.0 | 186.38 | 1183.6 | 17.52 | 0.1 | 0.00 | 141864.9 | 956.36 | 7.2 | 59.7 |
| Bangladesh | 420237.0 | 3599.27 | 2331638.0 | 22459.83 | 379176.6 | 3615.06 | 317897.8 | 2965.24 | 102645.3 | 802.73 | 6.0 | 65.8 |
| Malaysia | 60.0 | 0.61 | 25344.5 | 318.07 | 245.1 | 4.05 | 9492.9 | 167.65 | 52482.5 | 522.99 | 3.9 | 69.7 |
| Singapore | 15065.6 | 190.13 | 15001.7 | 224.11 | 15312.0 | 263.97 | 17383.6 | 286.30 | 40133.3 | 457.91 | 3.4 | 73.1 |
| Sri Lanka | 151152.0 | 1265.38 | 20450.9 | 177.29 | 61983.5 | 511.49 | 521.9 | 5.05 | 46615.6 | 358.96 | 2.7 | 75.8 |
| UAE | 60848.5 | 612.00 | 73491.4 | 816.60 | 38478.3 | 468.87 | 26620.9 | 314.61 | 32868.6 | 339.20 | 2.5 | 78.4 |
| Ivory Coast | 1000.0 | 9.22 | 161818.0 | 1584.82 | -- | -- | -- | -- | 42924.2 | 274.91 | 2.1 | 80.5 |
| Russia | 137945.7 | 1535.79 | 121827.2 | 1410.12 | 142275.1 | 1562.00 | 1645.0 | 20.61 | 31148.1 | 253.85 | 1.9 | 82.4 |
| Somalia | 66684.0 | 630.90 | 140062.2 | 1394.84 | 19769.0 | 200.48 | 2745.0 | 32.71 | 23498.0 | 171.31 | 1.3 | 83.6 |
| Yemen Arab Republic | 58265.7 | 547.85 | 34043.7 | 376.53 | 29836.9 | 376.44 | 14913.1 | 201.15 | 8657.8 | 170.28 | 1.3 | 84.9 |
| Ghana | 57.3 | 0.58 | 9574.1 | 104.13 | 13189.0 | 94.91 | 500.0 | 5.42 | 21240.0 | 145.34 | 1.1 | 86.0 |
| Iran | 36137.0 | 391.86 | 55844.7 | 698.69 | 199.1 | 2.37 | -- | -- | 16354.5 | 133.51 | 1.0 | 87.0 |
| Benin | 5519.0 | 58.92 | 20286.0 | 210.32 | -- | -- | -- | -- | 19420.0 | 127.29 | 1.0 | 88.0 |
| Kuwait | 9098.7 | 111.01 | 8374.4 | 109.23 | 10594.7 | 155.11 | 7535.3 | 115.11 | 10867.6 | 124.60 | 0.9 | 88.9 |
| Tanzania | 2954.2 | 29.29 | 16789.3 | 155.72 | 14.0 | 0.26 | 0.1 | 0.00 | 14838.0 | 118.72 | 0.9 | 89.8 |
| Mozambique | 13061.0 | 101.41 | 10104.0 | 108.32 | 7840.5 | 77.92 | -- | -- | 15240.0 | 116.84 | 0.9 | 90.7 |
| Maldives | 2116.9 | 22.25 | 62.0 | 0.67 | 219.0 | 2.71 | 8918.9 | 109.09 | 10271.5 | 111.28 | 0.8 | 91.5 |
| Algeria | 13500.0 | 110.85 | 105.0 | 1.18 | -- | -- | -- | -- | 10413.0 | 91.18 | 0.7 | 92.2 |
| USA | 34138.7 | 365.67 | 963.1 | 13.41 | 1601.9 | 22.45 | 2872.2 | 52.18 | 4323.6 | 89.82 | 0.7 | 92.9 |
| Oman | 6336.3 | 62.98 | 6620.6 | 80.38 | 8391.0 | 118.29 | 7530.7 | 116.28 | 6778.1 | 84.90 | 0.6 | 93.5 |
| Kenya | 3042.2 | 28.98 | 37073.5 | 369.21 | 13042.0 | 87.85 | 22.0 | 0.21 | 12148.7 | 83.04 | 0.6 | 94.1 |
| Nepal | 264.1 | 1.87 | 267.3 | 2.32 | 23664.4 | 297.90 | 20162.5 | 190.42 | 7805.7 | 69.08 | 0.5 | 94.7 |
| Bhutan | 11952.0 | 99.96 | 9654.1 | 84.57 | 5224.6 | 47.84 | -- | -- | 6919.9 | 61.83 | 0.5 | 95.1 |
| Bahrain | 4124.3 | 45.46 | 3859.8 | 45.89 | 4880.8 | 61.31 | 4738.3 | 63.49 | 4235.0 | 54.44 | 0.4 | 95.5 |
| Djibouti | 8475.0 | 76.82 | 9435.0 | 107.39 | 10485.5 | 117.09 | 3439.0 | 31.26 | 5582.0 | 49.40 | 0.4 | 95.9 |
| Others | 252791.1 | 2276.24 | 382292.9 | 3861.64 | 52633.0 | 566.14 | 24678.4 | 383.48 | 54825.3 | 545.58 | 4.1 | 100.0 |
| **Total** | **1796280.0** | **16859.70** | **4365842.0** | **44038.50** | **1257748.0** | **13455.80** | **682763.6** | **7774.89** | **1541485.1** | **13313.70** | **100.0** | |
| *Japan* | *3372.0* | *41.40* | *17389.2* | *186.27* | *62.0* | *0.44* | *97.1* | *0.95* | *42* | *0.60* | | |

Source: APEDA. Export Statistics for Agro and Food Products. 2001-02 (www.apeda.com)

**Exhibit 1.27**

**Exports of Non-Basmati Rice (1999-00)**

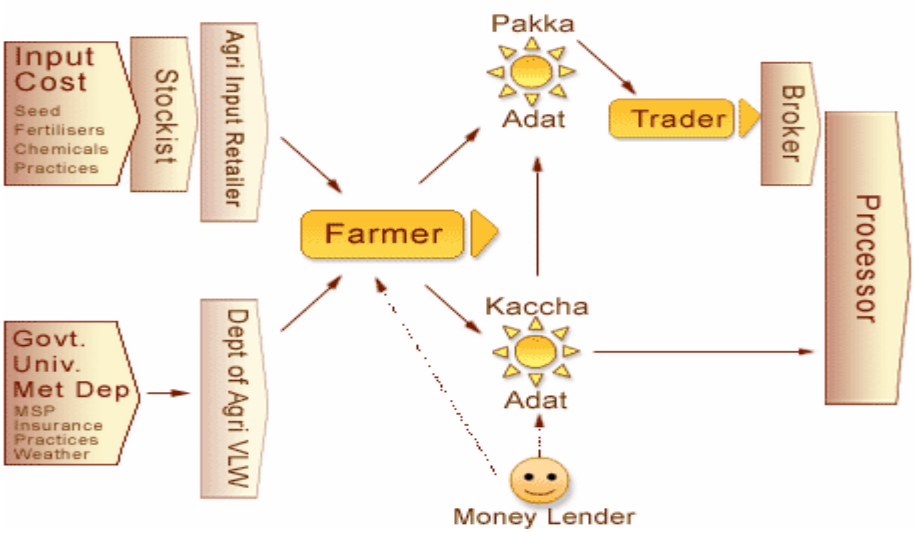
| **Importing Country** | **Amount** (Rs billion) | **(%)** |
|---|---|---|
| Bangladesh | 3.62 | 26.9 |
| Saudi Arabia | 2.11 | 15.7 |
| South Africa | 1.58 | 11.7 |
| Russia | 1.56 | 11.6 |
| Others | 4.58 | 34.1 |
| **Total** | **13.45** | **100.0** |

Source: (www.indiancommodity.com)

# Part II

# Supply Chain and Infrastructure

**1. Farmer to Processor Supply Chain**




Paddy

Harvesting and Winnowing

↓

Loading in open Tractor trailers/Other modes

↓

Mandi

Kuchha Adatia
Commision agent lends mainly to farmers

↓

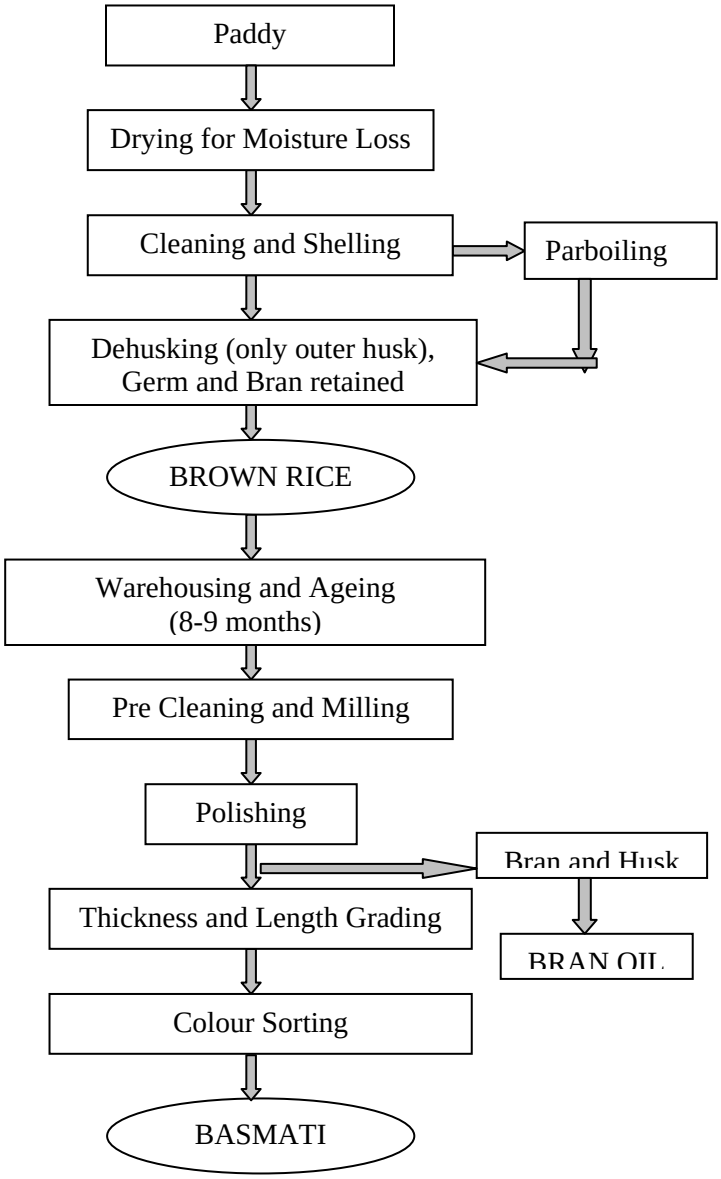
Pucca Adatia
Buyers agent finances the purchase on behalf of the buyer

↓

Winnowing, bagging, transportation (usually by trucks) to Rice Mills

Source: 1. ITC Ltd. (http://www.itcportal.com/)
2. Case on Punjab Markfed

## 2. Processor Activities



## 3. Problems in Supply Chain of Rice Exports

A good analysis and compilation of the problems in the supply chain of rice exports is available in a paper [by Datta, Kapoor and Bhasin, 2001]. They categorised the problems in five areas. (i) constraints on supply (ii) constraints in procurement (iii) constraints in processing (iv) logistics problems (v) marketing constraints.

- Constraints on supply
  - Need to augment production and productivity to sustain exports
  - Constraints due to inappropriate farmer-consumer perspective
  - Untapped potential
  - Imports of lower quality and broken rice
  - Environmental considerations

- Constraints in procurement
  - Lack of requisite statistics for purchase planning by the exporters
  - High incidence of local taxes/charges and local restrictions
  - Inefficient FCI functioning and unfavourable FCI pricing policy
  - Mixture of qualities at the Mandi level

- Constraints in processing
  - Excessive investment in rice milling capacity
  - Low incidence of modern rice mills
  - Levy disincentives to exporting rice mills
  - Inadequate bank finance
  - Failure to tap the full potential of by-product processing
  - Power cuts and inappropriate power tariffs
  - Inadequate training
  - High import duties on quality machinery

- Logistics problems
  - Quality control system in India
  - Exporter pre-qualifications
  - Problems in transport
  - Constraints on free movement of rice
  - Problems at Kandla Port
  - Customs problems
  - Moisture problem during shipment

- Marketing constraints
  - Stiff competition and near stagnation of Indian Basmati in the traditional Middle East market
  - Untapped potential markets
  - Weevils
  - Eco-friendly and environmentally acceptable packaging
  - Inadequate information on international consumer demand and consumer prefrences

## 4. Key Issues

- For the *basmati* rice, which is handled more carefully, the problems are in terms of creating quality during milling and preserving that during transportation. Large private investment has been made in this. Milling technologies have been imported but some of them are not suitable to the Indian grain. Efficient milling could provide some competitive edge for unbranded *non-basmati* rice.

- Proper storage of rice is a key concern particularly if the foreign markets have to be accessed. In this context, silos and low temperature storage should be considered at least for the premium segment like *basmati*. The need for this has not been felt as yet because so far generally there are no large inventories of *basmati* carried over. Presence of such storage would incentivise higher production and procurement of *basmati*, without a concern for falling prices. In the case of *non-basmati* rice, storage is neglected. Virtually unlimited quantities of paddy lie stored in open and much of that gets deteriorated because either the milling capacities are inadequate or there is no off-take of the milled rice.

- There is potential for a higher per capita consumption of *basmati* rice in the current importing countries as well as in the rest of the world. The main bottlenecks to increased exports of *basmati* are

  (i) Need for greater awareness and usage of the product (Japan is an example)
  (ii) Production constraints, when farmers sometimes switch to *non-basmati* rice, which, due to its higher yields, matches the contribution per hectare. There is also the issue of higher local sale prices and lower export realization in India. In this context, contract farming is being encouraged by the government through the agri export zones. This has a twin objective of ensuring reliability of supply and avoiding the mandi-based procurement route, which has higher costs due to logistics and taxes.

- For the *non-basmati* rice, the operations are through FCI under the government controlled minimum support price. While there is potential for *non-basmati* rice exports, the government policy regarding release of stocks vis-à-vis buffer stocks and the subsidies do not provide for a steady and sustainable effort. Recently, the government has permitted direct mandi procurement by the exporters. The commitment to this needs to be sorted out at the policy level.

- While *basmati* rice moves in containers (both by rail and road), *non-basmati* rice generally seeks to move by rail due to the price subsidy. During peak dispatch periods to ports from the Punjab-Harayana-UP region, shortage of rake allotment by the Railways has been a significant issue.

- For *non-basmati* rice, congestion at ports due to high waiting periods for rice shipments has also been an area of concern. Exhibit 2.1 gives the volume of rice loaded at various ports over the past three years. Kandla port carries bulk of the exports (3.4 mt in 2002-03). Mundra, a private port near Kandla, is also catching up (0.4 mt in 2002-03) (All the other ports in the country together handled 0.6 mt in 2002-03). These ports have the locational advantage of serving the northern hinterland. Kandla had turnaround times for rice vessels as high as 10-12 days (more recently, 5-7 days) against the normal average of

3-4 days for all vessels at the port. (International averages have been 1-2 days in efficient ports). The turnaround times at Mundra are better, being a newer port with less congestion.

- An effort was made to develop a separate agri-jetty at Kandla Port for reducing turnaround times by streamlining handling for agri-exports. APEDA and Punjab State Government were proposing to contribute the equity, but however, the plan was rejected. The reasons for rejection were low capacity utilization of the proposed jetty (Normally it is upto 95% in Kandla, but for specialised rice jetty, it would be as low as 55-60%). It was viewed that in case of a separate agri-jetty, other jetties would be more congested whereas agri-jetty would be lying unused, which would be inefficient. This argument would be valid if there was a constraint on the number of jetties for expansion at Kandla, which does not seem to be the case. The draft at Kandla is about 10.5 mts, while many other ports including in India have a draft of 12 mts or more. However, this may not be an issue since most vessels carrying rice would handle the Kandla draft.

**Exhibit 2.1**

**Volume of Rice Loaded at Various Major Ports**

('000 tons)

| Port | 2000-01 | 2001-02 | 2002-03 |
|---|---|---|---|
| | | | |
| Vishakhapatnam | 28 | 42 | 466 |
| [2] | | | |
| Tuticorin | 2 | 46 | 48 |
| | | | |
| Mumbai | 51 | 68 | 152 |
| | | | |
| Kandla | 680 | 1531 | 3388 |
| | | | |
| All Ports | 761 | 1687 | 4059 |

Source: Indian Ports Association. 2001-02.

[2] No/insignificant quantity of rice handled in the ports of Kolkata, Haldia, Paradip, Ennore, Chennai, Cochin, New Mangalore, Mormugao, and JNPT. There was no rice unloading in 2001-02. In 2000-01 the unloading was 60,000 tons in Vizag and 4,000 tons in Vishakhapatnam.

# Part III

# Customer and Competitor Countries

## Saudi Arabia, Dubai and Japan *(Customers)*

### 1. Saudi Arabia

Overview:

No rice is produced in the Kingdom. Calendar Year 2002 Saudi Arabian rice imports are estimated at 824,000 mt, down by 14 percent from last year's level. Imports this year are forecast to increase by 9 percent from last year's level (see PSD table). The increase is attributed to a strong consumer demand, due mainly to the high population growth rate of 3.4 percent, increasing number of pilgrims that come to Mecca (more than five millions pilgrims come to Mecca each year to perform Ummra and Haj rituals) and exports (including food donations to nearby countries). The Saudi government does not impose import tariffs on rice, providing Saudi traders the opportunity to re-export imported rice to Yemen and other nearby destinations.

Saudi Rice Imports:

Total rice imports in CY 2002 decreased by more than nine percent compared to the previous year. The two main reasons given for the decline in rice imports last year were the lead scares in American rice which reportedly affected the total rice consumption for a few weeks early in 2002 and the boycott America campaign that drastically reduce the consumption of American rice for most of 2002.

Accounting for about 72 percent of Saudi rice imports in 2002, India has been the main beneficiary from the growing Saudi rice market. Basmati (white and parboiled) and Parimal rice are the leading Indian varieties imported. Based on official Indian Customs data, rice exports to Saudi Arabia from India jumped from 288,637 mt in 1995 to 640,000 mt in 2001. In CY 2002, the total Indian rice imports to the Kingdom were reduced by about 8 percent. Basmati rice accounted for 78 percent of the total Indian rice exports to the Kingdom in 2002.

The United States has remained the second largest rice supplier to the Kingdom (followed by Pakistan & Thailand) despite its declining market share in recent years. According to the U.S. Customs data, U.S. rice exports declined from 163,540 metric tons in CY 2000 to 92,147 metric tons in CY 2002 (a decrease of about 44 percent). According to trade sources, the boycott America campaign that started early in 2001 to protest alleged U.S. bias in favor of Israel in the continued Israeli-Palestinian conflict, was the main factor for the continued decline in the share of the American rice in Saudi rice Market for the past two years. It is worth mentioning that one significant American rice importer that used to import between 15,000 and 20,000 metric tons annually under its own brand name is now importing all its requirements from Spain due mainly to the boycott pressure. The firm began Spanish long grain parboiled rice imports in mid 2002.

Reasons for Increased Demand for Indian Rice:

Saudi rice traders believe Indian rice exports will continue to gain market share at the expense of mostly American rice for the following reasons:

1. A significant percentage of Saudis and expatriates with low incomes have shifted from U.S. rice to Indian Parimal rice (PR106). Indian Parimal parboiled rice was introduced in the

Kingdom 9 years ago and has rapidly gained in popularity. Indian Parimal was instrumental in prompting a significant decline in exports of Thai parboiled rice to the Kingdom.

2. Competitive prices of Parimal and Basmati rice. Parimal rice is by far the least expensive parboiled rice available in the Kingdom, selling for far below one-half of the price of a major U.S. parboiled long grain rice brand. Retail price of 45 kg of Parimal rice as of March 2003 was $10.13 USD compared to up to$17.60 USD and $21.87 USDA per 45 kg for dominant U.S. parboiled rice sold in the Kingdom.

3. The Saudi rice trade acknowledges that the quality of U.S. rice is superior to Parimal rice, but concedes that the vast majority of consumers are unable to ascertain the difference between the two varieties. Sources allege that illicit traders often pass off Indian rice as American rice, by bagging Indian rice in bags associated with U.S.-origin rice. This practice, according to the trade, has been going on for several years, but is virtually impossible to stop.

4. The availability of dozens of brands of Basmati and non-Basmati rice, mainly from India, on the Saudi market has greatly increased competition at the expense of U.S. brands. There appears to be less than 10 different U.S. brands on the Saudi market.

5. While Indian and other rice are perceived as "natural" rice, U.S. rice has been frequently perceived as "manufactured," according to the Saudi rice trade. U.S. rice companies should work hard to dispel this myth.

Saudi Rice Cleaning and Bagging Plant:

The Saudi company AJWA is the only rice cleaning and bagging plant in the Kingdom. AJWA buys rice in bulk from the United States and other destinations, particularly India, and cleans and bags the rice under its own brand names. The firm stopped bagging Uncle Ben’s rice from the U.S. three months ago since the Saudi Uncle Ben’s agent is now sourcing from the Uncle Ben’s Spanish plant. The AJWA complex was built in 1995 and is located in Jeddah Port. It has the capacity to store 120,000 mt of rice and to process up to 450,000 mt of rice annually.

AJWA is responsible for unloading the vast majority of bulk grain shipments to Jeddah port. The plant is located next to three berths which it rents from the Port Authority. The berths can handle vessels carrying up to 100,000 mt of grains.

[Oryza. March, 2003.]

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Report Overview:

No rice is produced in the Kingdom. Calendar Year 2001 Saudi rice imports are estimated at 962,000 mt, up by 17 percent from last year’s level. Imports this year are forecast to increase by 8 percent from last year’s level (see PSD table). The increase is attributed to a strong consumer demand, due mainly to the high population growth rate of 3.4 percent, increasing number of pilgrims that come to Mecca (more than five millions pilgrims come to Mecca each year to perform Ummra and Haj rituals) and exports (including food donations to nearby countries). The Saudi government does not impose import tariffs on rice, providing Saudi traders the opportunity to re-export imported rice to Yemen and other nearby destinations.

Saudi Rice Imports:

Accounting for 65 percent of Saudi rice imports in 2000, India has been the main beneficiary of the growing Saudi rice market. Basmati (White and Sella) and Parimal rice is the leading Indian varieties imported. Based on official Indian Customs data, rice exports to Saudi Arabia from India jumped from 288,637 mt in 1995 to 627,392 mt in 2000. Basmati rice accounted for 80 percent of total Indian rice exports to the Kingdom in 2000.

On the contrary, Saudi imports from the United States and Thailand have fallen substantially since the early 1990s. U.S. rice exports to the Kingdom declined from 205,611 mt in 1993 to 141,060 mt in 2001. Thai rice exports to Saudi Arabia decreased from 127,947 mt in 1994 to 69,101 metric tons in 2001.

Reasons for Increased Demand for Indian Rice:

Saudi rice traders believe Indian rice exports will continue to gain market share. Reasons for the shift to Indian rice are as follows:

1. Growing shift in consumer demand away from American parboiled rice to Indian Sella Basmati rice (parboiled Basmati rice). Traders cite competitive pricing (the prices of Indian Sella rice and American rice are now identical as illustrated in the next paragraph), attractive packaging, extensive market promotion and the aromatic flavor of Sella rice as the main reasons for the success of Indian Sella Basmati rice in Saudi Arabia. Many local restaurants, mainly "Boukhari" restaurants, have been shifted to Sella Basmati rice.

2. A significant percentage of Saudis and expatriates with low incomes have shifted from U.S. rice to Indian Parimal rice (PR106). Indian Parimal parboiled rice was introduced in the Kingdom 8 years ago and has rapidly gained in popularity. Indian Parimal was instrumental in prompting a significant decline in exports of Thai parboiled rice to the Kingdom.

3. Competitive prices of Parimal and Basmati rice. Parimal rice is by far the least expensive parboiled rice available in the Kingdom, selling for far below one-half of the price of a major U.S. parboiled long grain rice brand. C&F prices for a metric ton of Parimal rice range between $198-$200 (this year's crop, last year's crop was sold for $217/mt), compared to up to $500 per metric ton for a dominant U.S. parboiled rice sold in the Kingdom (one U.S. brand rice is being sold at $356 per mt). While Sella Basmati rice (95% purity) and White Basmati rice have been quoted this month for $560 and $660 per metric ton respectively. Traditionally, Basmati rice varieties from Indian States of Banjab and Haryana command higher prices among Indian rice due to reported premium quality.

4. The Saudi rice trade acknowledges that the quality of U.S. rice is superior to Parimal rice, but concedes that the vast majority of consumers are unable to ascertain the difference between the two varieties. Sources allege that illicit traders often pass off Indian rice as American rice, by bagging Indian rice in bags associated with U.S.-origin rice. This practice, according to the trade, has been going on for several years, but is virtually impossible to stop. ! The availability of dozens of brands of Basmati and non-Basmati rice, mainly from India, on the Saudi market has greatly increased competition at the expense of U.S. brands. There appears to be less than 10 different U.S. brands on the Saudi market.

5. While Indian and other rice are perceived as "natural" rice, U.S. rice has been frequently perceived as "manufactured", according to the Saudi rice trade. U.S. rice companies have been working hard to dispel this myth.

Saudi Arabia Test U.S. Rice for Lead:

On January 28, 2002, the Saudi Ministry of Commerce (MOC) issued a circular number 41/7533 to local Chambers of Commerce informing them of its decision to put in place a temporary measure that requires laboratory testing for lead levels in rice imported from the US. The testing is in response to claims that tainted U.S. rice has been found in Japan, and of a reported ban by the Government of South Korea. The MOC instructed its quality control laboratories not to release any new U.S. rice shipments until test results indicate that they were free from lead contamination. The lead testing requirement was imposed on January 28 in response to claims that tainted U.S. rice had been found in Japan, and of a reported ban by the Government of South Korea. Within a few days, U.S. rice in both Japan and Korea was tested and found to have acceptable lead levels and deemed safe for human consumption.

On February 12, 2002, the test results came back negative for lead contamination and the MOC issued a press release stating that U.S. rice is safe for human consumption and can be sold freely in the Saudi market lifting a two-week restriction on U.S. rice that required laboratory testing for lead levels. Also, the MOC official told the ATO that future U.S. rice imports and packaging materials will be tested using normal testing procedures but that the MOC will periodically conduct lead tests.

Reduced Demand for U.S. Rice:

The January 28 MOC decision to test for lead levels in the U.S. rice was misquoted by several local newspapers. Some of the leading Arabic language dailies reported that the MOC banned the U.S. rice due to high content of lead that was harmful for pregnant women and children. Even after the restriction was lifted, some local food safety experts were quoted on local newspapers saying that consumers should wash U.S. rice several times before cooking. There were even suggestions that officials from the food safety inspections department of the Saudi Ministry of Municipality and Rural Affairs should inspect local restaurants to regularly make sure that they wash it throughly before cooking it in order to serve lead-free rice to the consumer.

The MOC decision to put on the temporary lead testing requirement and the distorted information provided by local newspapers drastically reduced the demand for the U.S. rice during the Hajj season (pilgrimage to Mecca) when demand for rice reached its climax as a result of arrival of more than two million Muslims to Mecca to perform Hajj (who stay up to two months in the Kingdom) and the heavy use of rice in Eid festivities. Catering companies usually stock up on rice starting one month before Hajj season. This year's Hajj coincided with February 21-25. Even now after the elapse of more than one month since the MOC declared the U.S. rice fit for human consumption, the demand for U.S. rice is very low compared to the corresponding period last year. This year's U.S. rice imports to Saudi Arabia is expected to decrease by at least 20,000 metric tons compared to last year's import level of 141,000 mt due to the lead scarce. To fight back the distorted image, some local importers have been advertising in local newspapers to assure the consumer that the rice has never been contaminated with lead and maintains its traditional superb quality.

Per the importers, the current ads have been producing some encouraging responses from wholesalers and retailers who have been significantly increasing orders in the past few days. We encourage the U.S. Rice Federation to conduct intensive generic U.S. rice promotion in the Kingdom to supplement the brand promotional activities being undertaken by some U.S. rice importers. TV, Radio (MBC-FM ), bulletin board, magazine (women's magazines) and newspaper advertisements (mainly Arabic) would be very effective.

Saudi Rice Cleaning and Bagging Plant:

The Saudi company AJWA is the only rice cleaning and bagging plant in the Kingdom. AJWA buys rice in bulk from the United States and other destinations, particularly India, and cleans and bags the rice under its own brand names.

The firm is also bagging Uncle Ben's rice sold in the Kingdom. The AJWA plant was built in 1995 and is located in Jeddah Port. It has the capacity to store 120,000 mt of rice and to process up to 450,000 mt of rice annually. AJWA is responsible for unloading the vast majority of bulk grain shipments to Jeddah port. The plant is located next to 3 berths which it rents from the Port Authority. The berths can handle vessels carrying up to 100,000 mt of grains.

Saudi Arabia Requires Lab Test for Lead Levels in U.S. Rice

On January 28, 2002, the Saudi Ministry of Commerce (MOC) issued a circular number 41/7533 to local Chambers of Commerce informing them of its decision to put in place a temporary measure that requires laboratory testing for lead levels in rice imports from the US. The testing is in response to claims that tainted U.S. rice has been found in Japan, and of a reported ban by the Government of South Korea.

The MOC said in its circular that several days ago it had instructed its quality control laboratories not to release any new U.S. rice shipments until test results indicate that they are free from lead contamination. The tests are reportedly being conducted at the MOC's laboratories and at the King Faisal Specialist and Research Center. Major American rice importers have informed the ATO that the MOC's restriction is not limited to new American rice shipments but also to rice already in importers warehouses and those stocked by the wholesalers. Per the traders, MOC officials have been collecting samples and recording stock levels of U.S. rice held both by importers and wholesalers. The MOC told them not to sell any quantity until results of the rice samples are released. On the other hand, major supermarkets contacted for this report have not received any word from the MOC and are continuing to sell U.S. rice as normal.

Although, the Saudi authorities are testing for the presence of lead in U.S. rice, they have no local standard to evaluate the test results. The Saudi Arabian Standards Organization which is responsible for issuing foodstuff standards published a revised specifications for milled rice in 1998 (Saudi Arabian Standard No. 431/Gulf Standard No 1003). But the standard did not put any requirement for lead testing in milled rice or establish acceptable levels of lead content in packaging materials and/or rice itself. ATO has learned that the MOC is currently searching for CODEX specifications for lead levels in rice to compare with its tests results.

Total Saudi rice imports for the CY 2001 has been forecast to reach 895,000 metric tons with the U.S. market share estimated at about 20 percent. It is important to underline that the temporary measure that requires laboratory testing of lead content in rice applies only to U.S. rice. Rice from other sources are not affected and they are being tested as per the Saudi standard No. 431.

The ATO has been in contact on a daily basis with senior officials of the Saudi Ministry of Commerce to work out an amicable solution for this problem. Information received from FAS/Washington and the U.S. rice industry has been delivered to the MOC on a daily basis.

MOC officials have verbally assured the ATO that the MOC will shortly release its test results without giving any deadline. We are very concerned with the long time the MOC is taking to conduct and issue test results. Despite the fact that the new regulation has been in place for about 8 days, no test results have been issued so far. It is worth mentioning that most of the U.S. rice exported to Saudi Arabia is bagged in polypropylene made in Jeddah, Saudi Arabia and meets the Saudi Arabia Standards Organization's specifications.

The raw material used in making the bags are also produced in the Kingdom. ATO has communicated this fact to the MOC to help expedite a favorable decision. The demand for rice has started to sharply increase due to the approaching Hajj season (pilgrimage to Mecca) due to the arrival of large numbers of pilgrims to the Kingdom. Traditionally the demand for rice reaches its climax one month before and one month after Hajj as a result of arrival of more than two million Muslims to Mecca to perform Hajj and heavy use of rice in Eid festivities. This year's Hajj coincides with February 20-24. Even though, a maximum of 10 days is enough for the Hajj journey to Mecca, each year hundreds of thousands of pilgrims stay for up to two months in the holy cities of Mecca and Madina. As a result, the demand for foodstuff including rice increases sharply in the vicinity of the two holy cities for a few weeks.

[Oryza. March, 2002]

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Overview:

Saudi Arabia does not produce any rice domestically. Calendar Year 2000 Saudi rice imports are estimated at 890,209 MT, up by 9 percent from year-earlier levels. The increase is attributed to strong consumer demand, due in part to the high population growth rate of 3.4 percent, increasing number of pilgrims that come to Mecca (over three millions pilgrims come to Mecca each year to perform Ummra and Haj rituals) and exports (including food donations to near by countries). The Saudi government does not impose import tariffs on rice, providing Saudi traders the opportunity to re-export imported rice to Yemen and other nearby destinations.

Rice Imports:

Accounting for 64 percent of Saudi rice imports in 1999, India has been the main beneficiary of the growing Saudi rice market. No rice is produced in the Kingdom. Basmati (White and Sella) and Parimal rice are the leading Indian varieties imported. Based on official Indian Customs data, rice exports to Saudi Arabia from India jumped from 288,637 MT in 1995 to 524,736 MT in 1999. Basmati rice accounted for 72 percent of total Indian rice exports to the Kingdom in 1999.
On the contrary, Saudi imports from the United States and Thailand have fallen substantially since the early 1990s. U.S. rice exports to the Kingdom declined from 205,611 MT in 1993 to 163,502 MT in 2000. Thai rice exports to Saudi Arabia decreased from 127,947 MT in 1994 to 64,707 metric tons in 2000.

Saudi rice traders believe Indian rice exports will continue to gain market share. Reasons for the shift to Indian rice are as follows:

1. A growing shift in consumer demand away from American parboiled rice to Indian Sella Basmati rice (parboiled Basmati rice). Traders cite competitive pricing, attractive packaging, and the aromatic flavor of Sella rice as the main reasons for the success of Indian Sella Basmati rice in Saudi Arabia. Many local restaurants, mainly “Boukhari” restaurants, have shifted to Sella Basmati rice.

2. A significant percentage of Saudis and expatriates with low incomes have shifted from U.S. rice to Indian Parimal rice (PR106). Indian Parimal parboiled rice was introduced in the Kingdom 7 years ago and has rapidly gained in popularity. Indian Parimal was instrumental in prompting a significant decline in exports of Thai parboiled rice to the Kingdom.

3. Competitive prices of Parimal rice. Parimal rice is by far the cheapest parboiled rice available in the Kingdom, selling for about one-half the price of U.S. parboiled long grain rice. Retail prices for a 45-kilogram bag of Parimal rice range between $13.00 and $14, compared to $22.5 to $30 for U.S. parboiled rice. The Saudi rice trade acknowledges that the quality of U.S. rice is superior to Parimal rice, but concedes that the vast majority of consumers are unable to ascertain the difference between the two varieties. Sources allege that illicit traders often pass off Indian rice as American rice, by bagging Indian rice in bags associated with U.S.-origin rice. This practice, according to the trade, has been going on for several years, but is virtually impossible to stop.

4. The availability of dozens of brands of Basmati and non-Basmati rice, mainly from India, on the Saudi market has greatly increased competition at the expense of U.S. brands. There appears to be less than 10 different U.S. brands on the Saudi market.

5. While Indian and other rice is perceived as "natural" rice, U.S. rice is frequently perceived as "manufactured", according to the Saudi rice trade. U.S. rice companies have been working hard to dispel this myth.

The Saudi company AJWA-RMTI is the only rice cleaning and bagging plant in the Kingdom. AJWA buys rice in bulk from the United States and other destinations, particularly India, and cleans and bags the rice under its own brand names. The AJWA plant was built in 1995 and is located in Jeddah Port. It has the capacity to store 120,000 MT of rice and to process up to 450,000 MT of rice annually.

AJWA is responsible for unloading the vast majority of bulk grain shipments to Jeddah port. The plant is located next to 3 berths, which it rents from the Port Authority. The berths can handle vessels carrying up to 100,000 MT of grains.
[Oryza. April, 2001.]

## 2. UAE (Dubai)

### Natvar and Co – Trader of Basmati Rice

"Imports semi-processed rice mainly from Pakistan. (Pakistani rice is preferred to Indian rice because of price advantage, quality being similar. The price of Indian Basmati rice is USD 800 per ton, and that of Pakistani Basmati rice is USD 550 per ton, the difference being USD 250 per ton. The carriage, insurance and freight (CIF) costs are borne by the exporter, and therefore the rice cost is inclusive of CIF costs). The company owns a rice mill, where they do grading, polishing and bagging into the buyer's brand. The company imports about 27,000 tons of basmati rice, of which 12,000 tons is consumed in UAE markets and rest of 15,000 tons are re-exported."

### Dawood - Trader of Basmati and Non-Basmati Rice

"The company imports basmati rice from Pakistan, packages them and re-exports to other countries. The company imports about 15,000 tons of basmati rice (super kernal and PK 385 with sizes of 7.3-7.5 mm and 6.8 mm respectively), which come in packets of 45 kgs. The company re-packs into sizes of 2, 5 and 10 kgs. The packets are branded as Royal Chef, Golden Falcon, Safina (for Iran markets) and Allaliya. The exports are made in Iran (50% ie 7,500 tons, by sea), and remaining 50% ie 7,500 tons in UAE (consumption) and Muscat by road.

Regarding the non-basmati rice, the company imports long grain parboiled rice from India and Thailand. The parboiled rice keeps insects away. The company cleans the rice and removes insects at their facilities in Dubai. The company imported about 1,400 tons of Ponni (raw and parboiled rice) and 1,800 tons of Mota (parboiled rice) respectively from Tamil Nadu and Kerala during 2002.

The company executives commented that ports in India are not transparent. There is a need of privatization.

The company is also into trading of cotton, jute, paper and silk."

### Mr Gandhi – Trader of Basmati and Non-Basmati Rice

"The company imports about 20,000 to 25,000 tons of basmati rice, from which about 5,000 tons comes from India and remaining from Pakistan. The company imports Super 385 basmati rice from Pakistan (75% of this rice is consumed in Dubai and remaining 25% is re-exported to Iraq). The price of Indian basmati rice is USD 750 per ton and that of Pakistani basmati rice is USD 550 per ton. One of the reasons for the price difference is the difference in exchange rates. The price of basmati rice in Indian domestic markets is Rs 60 per kg.

Regarding the non-basmati rice, the company imports about 40,000 to 50,000 tons of rice, which mostly comes from Punjab and Sindh provinces of Pakistan. The company also imports some quantity of brown rice from India, which is re-packaged, branded and exported to UK. The company also exports non-basmati parboiled rice to Africa. The company imports Sela non-basmati rice from Pakistan (the rice is parboiled and sometimes blended), and Parmal and Pusa

non-basmati rice from India. Pakistan is coming up with parboiling units and it has also set a Quality Committee to check the standards of rice.

The retail price of rice in Dubai is 35 Dirhams per 5 kg (for basmati rice) and 15 Dirhams per 5 kg (for non-basmati rice)."

**EMCO – Trader of Basmati and Non-Basmati Rice**

"The company imports about 50,000 tons of basmati rice. Of this, 45,000 tons comes from Pakistan and remaining 5,000 tons from India. The company imports Pakistan 385 (5.8 to 6.0 mm) and Super Kernal (7.25 mm) basmati rice from Pakistan. In fact, Pakistan is also in process of developing basmati rice with 7 mm length. The company avoids imports from India because it considers the Customs and RBI as major bottlenecks. The company prefers parboiled rice because parboiled rice allows to use the rice right away.

Amongst the non-basmati category, the company imports 70,000 to 1,00,000 tons of rice from Thailand. 90% of the above is re-exported to Iran.

The retail price of rice in Dubai varies from 2 to 8 Dirhams per kg. The price of basmati rice is 5 to 8 Dirhams per kg.

The company also trade in Super Silky (USD 30 per ton) and Kohinoor, Pan, Tilda (blend, packed in Saudi or UK) brands."

**Foreign Trade of Rice in Dubai in 2001**

| **Imports** | | **Re-Exports** | |
|---|---|---|---|
| Weight (kg) | Value(Dirhams) | Weight (kg) | Value(Dirhams) |
| 280,533,298 | 410,944,682 | 178,955,684 | 240,080,584 |

Source: Chamber of Commerce, Dubai

## 3. Japan

**Nichimen (A major trading house)**

"Till 1992, Japan was not into rice imports. But in 1992, due to poor crop, imports opened up and Japan imported 2.7 mt from Thailand, China and Australia. Imports were then allowed upto 500,000-600,000 tons under minimum access programme. At present, the importing systems are good, and Japan imported 767,000 tons of rice in 2002. Japan had one shipment from India in 1995. But there were pesticide/fungicide residues in the rice leading to serious problems.

At present, Japan is importing about 100 tons of basmati rice through containers. Basmati rice is consumed by residents and Indian Restaurants. It is eaten with curry.

Production of rice in Japan: Mostly in the Northern areas and seasonal. The domestic yield is 5 tons of brown rice per hectare. The large farmers mill paddy to brown rice, and the small farmers give it to cooperatives for milling. The farmers can procure loans from cooperatives, government and private traders.

Post liberalization, the farmers produced about two-third of the production through the subsidized 'Set Aside Programme' by the government. In this programme, about 80% of the amount is provided at low interest cost.

The amount of Japanese rice exports is very small. Japan prefers importing basmati rice from Pakistan, because it is less expensive compared to India. It is projected that the basmati consumption in Japan may go up. The Japanese prefer steamed, well cooked and glutinous rice. Explanations and demonstration to boost basmati usage and consequently the rice exports from India to Japan would be essential.

Selection of the country for importing rice: The government has organised procedures between different players including government, traders from exporting countries, importing intermediaries and wholesalers. Many of the transactions take place through tenders at specific periods, four or five times a year. It is important to understand these procedures and then break into the market.

**Thailand** *(Competitor)*

1. Thailand's rice exports are of the order of US$ 2 billion FOB, at a quantity of over 6 mt during 2000. The main customer countries were Iran, Nigeria, Hong Kong, USA and Singapore. (Exhibit 3.1) The total production of rice in Thailand is in the order of 26 mt. While this has been steady over the past four years, it has increased from about 20 mt over the past decade (Exhibit 3.2).

2. The government does not intervene in the rice trade in Thailand, except (i) during times of excess production when a price support is offered to the farmers and (ii) market creation through government to government (G2G) trade.

3. Hinterland infrastructure is very good, with an excellent road network, supplemented by barge transportation from farms to mills, mills to port and port to anchorage point for top up. Warehousing and bagging infrastructure is in plenty. Shipping capacity is also not an issue.

4. The potential markets are Japan (though it will grow slowly, due to the political nexus with the farmers): where the opportunity cost of land is high, Philippines and Indonesia: where the production is not consistently keeping up with demand and the US: where subsidies to farmers will reduce, making it unattractive for them to grow rice. Japan requires glutinous rice, which is not easy to produce in Thailand. India and China would be better suited to produce this.

5. The origin destination flows of rice cannot be easily predicted since many rice eating nations have production capacities close to the domestic demand. However, year to year, the production could be above or below the demand, making such countries either a net supplier or consumer. Japan, Philippines, Indonesia, and India until recently, are examples.

6. Indian rice exports, which have so far been the aromatic Basmati variety, have been primarily to NRIs in the Middle East, Europe and North America. To create an acceptance of Indian rice internationally, while price could be a primary driver, marketing for acceptance of quality and G2G trade support would be essential.

   Source: Hashim, K. 2002.

## Exhibit 3.1

### Thailand's Rice Exports

(million US $)

| COUNTRY | 1996 | 1997 | | 1998 | | 1999 | | 2000 |
|---|---|---|---|---|---|---|---|---|
| | | Q | V | Q | V | V | Jan-Aug | Jan-Aug |
| IRAN | 129.1 | 361.7 | 122.5 | 369.1 | 121.3 | 174.0 | 51.4 | 102.5 |
| NIGERIA | 111.5 | 584.5 | 183 | 517.8 | 147.8 | 180.4 | 94.7 | 101.9 |
| HONG KONG | 137.5 | 248.0 | 155.7 | 228.0 | 125.8 | 115.0 | 65.9 | 80.3 |
| UNITED STATES | 114.2 | 214.8 | 147.4 | 224.2 | 129.9 | 118.6 | 74.4 | 75.6 |
| SINGAPORE | 136.0 | 274.1 | 151.1 | 254.3 | 113.9 | 116.3 | 67.1 | 73.2 |
| SENEGAL | 27.9 | NA | 19.2 | NA | 32.3 | 74.9 | NA | 61.3 |
| CHINA | 274.9 | 320.8 | 168.1 | 254.7 | 120.3 | 81.0 | 41.6 | 55.3 |
| SOUTH AFRICA | 64.2 | 186.5 | 62.3 | 293.2 | 81.1 | 91.3 | 50.8 | 53.2 |
| MALAYSIA | 175.5 | 458.0 | 185 | 354.9 | 132.7 | 95.9 | 48.4 | 52.7 |
| IRAQ | NA | NA | 57.4 | NA | 44.0 | 58.1 | NA | 41.2 |
| TOTAL 10 COUNTRIES | 1,170.3 | 2704.3 | 1,251.9 | 2477.0 | 1,049.1 | 1,105.5 | 494.2 | 697.4 |
| OTHERS | 841.4 | 2567.9 | 823.8 | 3890.3 | 1,049.7 | 843.4 | 726.9 | 315.8 |
| **TOTAL EXPORTS** | **2,011.7** | **5272.2** | **2,075.7** | **6367.0** | **2,098.7** | **1,948.9** | **1221.1** | **1,013.2** |

Note: Indonesia has also been a major importer from Thailand, though erratic. In 1998, they imported about 1.5 million tons valued at US$ 500 million.
Source: Department of Business Economics (http://www.thailand.com/)

## Exhibit 3.2

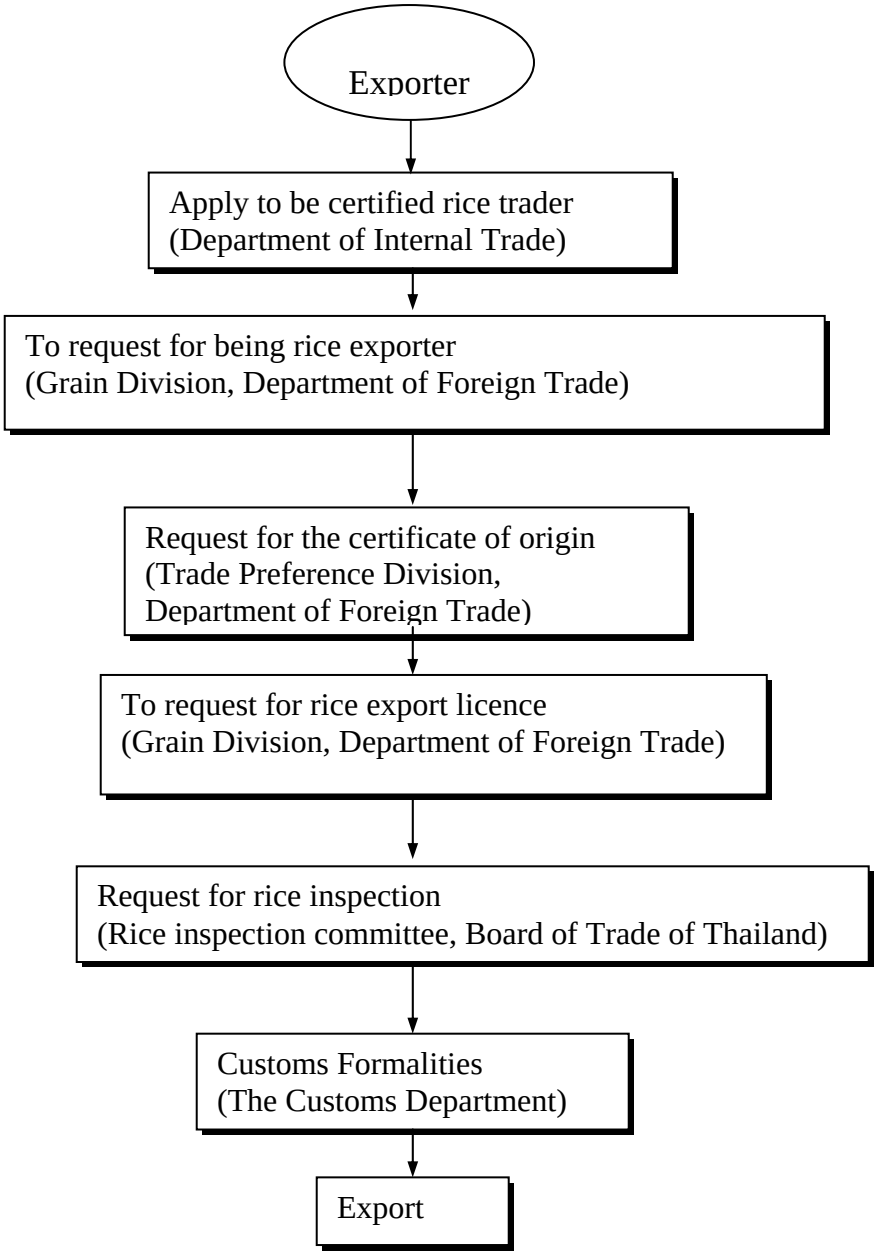
### Thailand Rice Production

('000tons)

| Year | Quantity |
|---|---|
| 1991 | 20400 |
| 1992 | 19917 |
| 1993 | 18447 |
| 1994 | 21111 |
| 1995 | 22016 |
| 1996 | 22332 |
| 1997 | 23340 |
| 1998 | 23450 |
| 1999 | 24172 |
| 2000 | 25608 |
| 2001 | 26954 |
| 2002 | 25945 |

Note: Year 2000 to 2002 are provisional data.
Source: FAO, Rome. FAOSTAT Database 2003.
(http://www.irri.org/)

**Supply Chain of Rice Exports Followed by Thailand**




Source: Department of Thai Trade. (www.thaitrade.com)

# Part IV

# Conclusion

## Conclusions:

### Basmati

- Government should promote the Indian basmati rice brand in the international market.
- Even without additional promotion, we can sell more basmati rice if supply were available
- The two most important features of basmati Rice are that it is long grained and it has a gentle aroma. Basmati is sold in three forms, parboiled, brown (after dehusking) and white (after dehusking and milling). If it is parboiled, then some of the aroma is lost. Even then, Saudi Arabia uses parboiled basmati rice because it prefers to have rice mixed with meat (like Biriyani) for which, parboiled rice helps in the complete cooking of both the ingredients.
- Milling capacity is no problem, but power breakdown is a problem in milling. The basmati rice producers use generators, but this is expensive in the long run.
- The farmers switch between basmati rice and non-basmati rice. Non-basmati is preferred over basmati since the yield in basmati rice production is low as compared to non-basmati rice because of (i) lack of technology advancement regarding efficient harvest of basmati rice and control of insects, pests and diseases, (ii) lack of irrigation facilities, and (iii) lack of access to information on basmati rice export potential and price trends. More research and development is required for basmati. Contract farming should be encouraged. The concept of agri export zones which the government has initiated in the northern states is a step in the right direction. This also would enable bypassing the Mandi and thus avoiding extra logistics and tax based costs.

### Non-basmati

- Govt. release/Open Procurement: The open mandi procurement rather than the FCI canalised procurement by exporters should be facilitated to incentivise the exporters to have long term stakes in the business of non-basmati rice exports, which has significant growth potential. The earlier policy of releasing stocks only from the buffer when there is surplus does not lend itself to brand building and sustained exports.
- Quality Milling: Quality milling capacity is an issue, to avoid high percentage of broken rice.
- Storage: Storage facilities have to be improved significantly. Controlled atmosphere storage like in Japan should be adopted in India. Japan can preserve rice under controlled condition for seven years without any degradation.
- Transportation: Railway is a major constraint as wagons are not available for peak movement.
- Ports: It would be essential to think of special purpose agri jetties in ports like Kandla and Mundra on the west coast, and Vishakhapatnam and Paradip on the east coach to reduce ship turnaround times and improve the supply chain efficiency.

# Part V

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# Part VI

# Appendices

## Appendix I

### Economics for setting up an Agri Export Zone for Basmati Rice in Punjab

The Punjab State Government (Punjab Markfed) proposed the Ministry of Commerce to set up an Agri Export Zone (AEZ) for Basmati Rice in Punjab. The location covers six contiguous high basmati rice producing districts, namely, Gurdaspur, Amritsar, Kapurthala, Jalandhar, Hoshiarpur and Nawanshahar. The locations for the AEZ are selected on the basis of potential of higher yields. At present, the yield in these regions is about 6-10 quintals per acre.

The Punjab Government identified the following requirements to be facilitated by the AEZ.
- Establishment of backward linkages by rice millers
- Standardization of the agronomic practices
- Demonstration and extension services
- Disease forecasting, IPM, agri information system
- Availability of quality seeds
- Research and development
- Export promotion

Figures 1 and 2 present constraint-action matrix and a suggested model for applying the AEZ approach for promoting exports of Basmati Rice.

Various agencies at state level and central level are identified to support the AEZ. Table 1 gives the role and responsibilities assigned to these agencies.

The cost of setting up AEZ is estimated at Rs 423 million. The amount is proposed to be funded as follows:

| | |
|---|---|
| Through Schemes of Central and State Government Departments | Rs 302 million |
| Investments by Rice Millers, Exporters and Entrepreneurs | Rs 121 million |
| Total Amount | Rs 423 million |

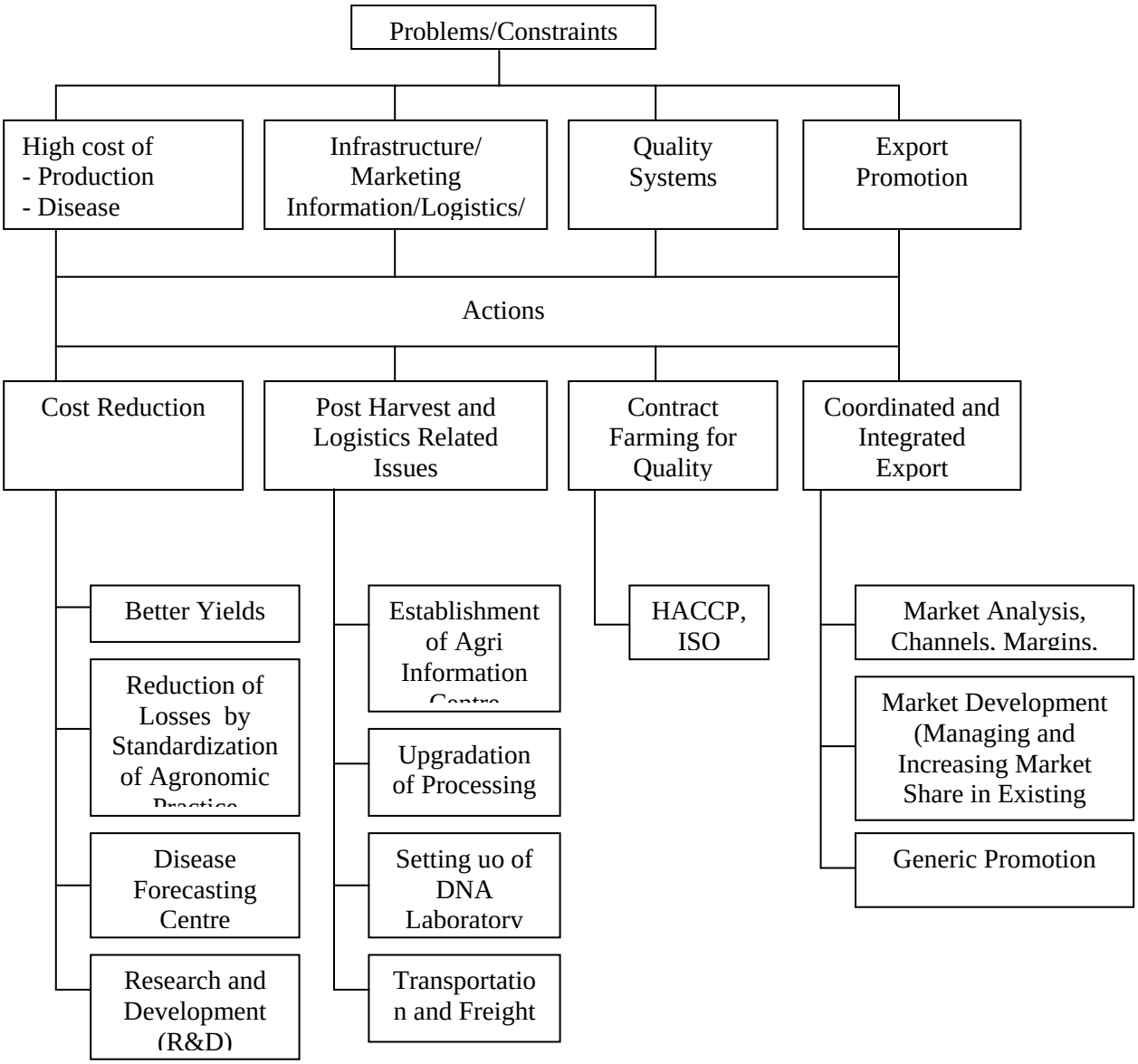
Table 2 gives the details of fund inflows and outflows.

The projected exports after proposed AEZ are assumed to increase above 40% that the current exports in next five years. In monetary terms, the increased benefit is upto Rs 83.70 million in the first year and Rs 405.00 million in the fifth year. Table 3 gives the projected exports in terms of quantity and value post AEZ.

Source: Punjab State Cooperative Supply and Marketing Federation Limited (MARKFED). January 2002.

**Figure 1**

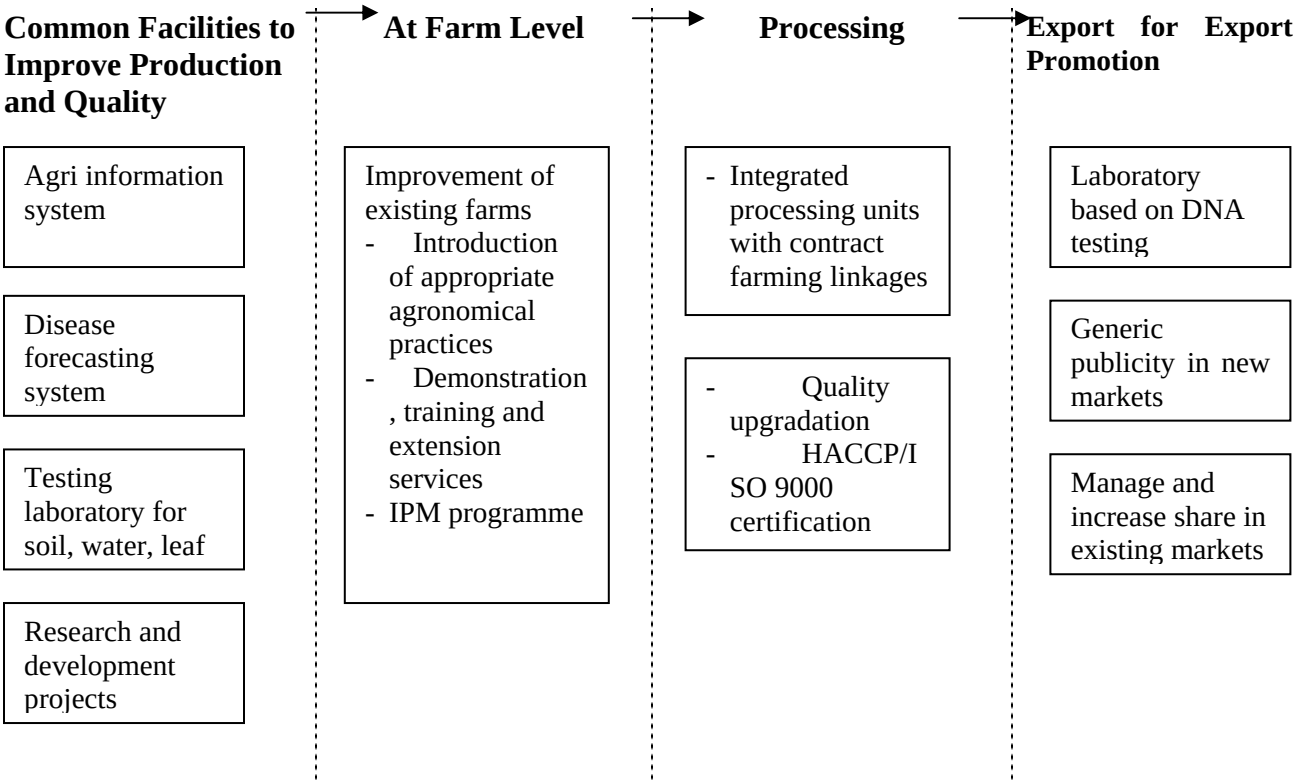
**Constraint-Action Matrix for Promotion of Export of Basmati Rice**




Source: Punjab State Cooperative Supply and Marketing Federation Limited (MARKFED). January 2002.

**Figure 2**

**Model of Agri Export Zone for Promoting Exports of Basmati Rice**




Source: Punjab State Cooperative Supply and Marketing Federation Limited (MARKFED). January 2002.

**Table 1**

**Role and Responsibilities of Agencies Involved in Supporting the AEZ**

| Name of Agency | Role of the Agency | Responsibilities towards the AEZ |
|---|---|---|
| ***State Government Agencies*** | | |
| 1. Punjab Markfed | • Function as nodal agency on behalf of state government for AEZ<br>• Work with existing exporters and farmers to set up backward linkages and standardization of practices<br>• Setting up disease forecasting centres in research centres | • Setting up of seed certification programme<br>• Organize the support available from Ministry of Food Processing for development of contract farming by linking the same to the processing units in the food park<br>• Set up the DNA based laboratory<br>• Organize infrastructure required for seed multiplication, extension and dissemination distribution<br>• Export promotional activities |
| 2. Punjab Agriculture University | • Providing technology for growing, post harvest management, processing along with research and development requirements | • Assisting Department of Agriculture in organizing demonstration and training<br>• Associating at least one extension specialist with the AEZ who will work as an interface between AEZ and University<br>• Futuristic research towards varietal improvement, adaptation of modern technoloty<br>• Work towards mechanization of operations by developing tools and equipments suitable for basmati cultivation and harvesting. |
| 3. Agricultural Department | • Provide extension services and extend various schemes to the AEZ. | • Provide extension services like training and education<br>• Implement package of agronomical practices<br>• Laboratory for leaf/tissue analysis<br>• Ensure compliance with codex requirement (water, pesticide residue) |
| 4. Punjab State Electricity Board | • Provide need based uninterrupted power supply to the processing units. PSEB may accord permission to units to generate their own electricity to avail duty concession on diesel. | • Organize uninterrupted power supply |

| | | |
|---|---|---|
| 5. Department of Sales Tax | • Provide concessions/ exemptions on taxation on finished goods | • Extend concessions to packaging materials and other inputs in AEZ.<br>• Grant similar concessions to exporters of basmati rice |
| 6. State Level Financial Institutions and Cooperative Banks | | • Provide need-based finance to enterprises engaged in cultivation, processing and exports, including service providers |
| ***Central Government Agencies*** | | |
| 1. Agricultural and Processed Food Products Developed Authority (APEDA) | • Coordinate programmes of various Central organizations, obtaining approval of Steering Committee, monitoring the implementation and putting up review reports of the Steering Committee.<br>• Extend assistance under various schemes | • Market development/promotion support by way of publicity<br>• Support for setting up/upgradation of quality assurance systems (HACCP, laboratory subsidy) |
| 2. Department of Food Processing Industries (DFPI) | • Grant aid and equity participation in post harvest facilities, and processing units for development of backward linkages<br>• Financial assistance to units in AEZ for modernization | • Provide grant and support for the AEZ. |
| 3. Ministry of Commerce | | • Extend benefits of other schemes to all units/facilities set up within the AEZ (EPCG Export House)<br>• Provide market development support through grant available under the Market Access Intervention Fund |
| 4. Indian Institute of Packing | • Development of packaging material<br>• Set up a field station for testing of packaging material | • Develop export worthy and acceptable packaging for exports of Basmati Rice by sea. |
| 5. Basmati Development Foundation | • Developing and financing central research and development centre<br>• Provide financial assistance for developing the envisaged infrastructure<br>• Provide assistance in trade promotion. | • Establishment of envisaged main development centre and sub centres<br>• Provide financial assistance for infrastructure like Disease Forecasting Unit and Agri Information Centre. |

Source: Punjab State Cooperative Supply and Marketing Federation Limited (MARKFED). January 2002.

**Table 2**

**Details of Fund Inflows and Outflows of the AEZ**

| Particulars | Capacity | Cost Per Unit (Rs million) | Total Cost for Three Years (Rs million) | Organization | Assistance Amount | Private Sector Invest-ment |
|---|---|---|---|---|---|---|
| Establishment of backward linkage of rice millers | 5 millers in each district undertaking atleast 2 farms per year | | 5.00 | Punjab Exporters and Rice Millers Association | 5% of total purchase upto limit of 1 million/ unit totaling to Rs 5 million | - |
| Demonstration and extension services<br>- Time and method of planting<br>- Planting density<br>- Integrated pest management<br>- Fertigation requirements<br>- Crop husbandry practices | 3000 farmers per year (500/ district | 4.50 | 13.50 | BDF | 13.50 | - |
| Pest and disease forecasting system | 6 locations | 0.25 | 1.50 | BDF | 1.50 | - |
| Agri information centre | 6 locations | 1.00 | 6.00 | State Agriculture Marketing Board | 6.00 | - |
| Seed production and certification | 1 | 5.00 | 15.00 | MARKFED/ BDF | 15.00 | - |
| Pre and post harvest management and logistics<br>- Processing units<br>- Quality system implementation | <br>12<br>30 | <br>10.00<br>0.40 | <br>120.00<br>12.00 | <br>MFPI<br>APEDA | <br>30.00<br>6.00 | <br>90.00<br>6.00 |
| Research and development<br>- Development of a standard IPM protocol<br>- Trail with improved varieties | | | | ICAR, CSIR, DFPI and APEDA | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| - For better yield | | | | | | |
| Marketing and brand promotion | | | | | | |
| 1. Increasing share in established markets<br>2. Survey of the new markets<br>- Australia, New Zealand and South Africa<br>- China and Far East<br>3. Generic promotion | | | 50.00<br>100.00<br>75.00 | MAI (Markets Access Intervention) (MOC) APEDA/BDF | 40.00<br>100.00<br>60.00 | 10.00<br>15.00 |
| Setting up DNA based laboratory | | | 25.00 | APEDA/BDF | 25.00 | |
| Total | | | 423.00 | | 302.00 | 121.00 |

Source: Punjab State Cooperative Supply and Marketing Federation Limited (MARKFED). January 2002.

**Table 3**

**Projected exports Post AEZ**

| | Unit | 1st year | 2nd year | 3rd year | 4th year | 5th year |
|---|---|---|---|---|---|---|
| Exports (Without Project) | Qty in lakh mt | 6.38 | 6.50 | 6.65 | 6.80 | 7.00 |
| Exports (With Project) | Qty in lakh mt | 7.00 | 7.60 | 8.30 | 9.10 | 10.00 |
| Incremental Exports | Qty in lakh mt | 0.62 | 1.10 | 1.65 | 2.30 | 3.00 |
| Value of Incremental Exports | Rs million | 1674.00 | 2970.00 | 4455.00 | 6210.00 | 8100.00 |
| Additional Profit/ Benefits | Rs million | 83.70 | 148.50 | 222.70 | 310.50 | 405.00 |

Source: Punjab State Cooperative Supply and Marketing Federation Limited (MARKFED). January 2002.

## Appendix 2

## Field Visits Undertaken

a) Punjab Markfed (procurement agency): Chandigarh and Amritsar

b) Farms, mandis and mills for rice procurement in the Amritsar area

c) Thailand (as a rice exporter)

d) Exporters offices and mills in the Karnal-Delhi belt

e) All India Rice Exporters Association (AIREA), Delhi

f) Agricultural and Processed Food Products Export Development Authority (APEDA)

g) Kandla Port

h) Dubai (as a rice importer from India and our main competitor, Pakistan, and as a re-exporter)

i) Japan (as a potential customer)