RICE INTERNATIONAL COMMODITY PROFILE

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1 Introduction

Rice, a strategic agricultural and food commodity

Rice is a major food staple and a mainstay for the rural population and for household food security. It is mainly cultivated by small farmers in holdings of less than one hectare. Rice also plays an important role as a "wage" commodity for workers in the cash crop or non-agricultural sectors. This duality has given rise to conflicting policy objectives, with policy makers intervening to the rescue of farmers when prices fell too low or in the defence of consumer's purchasing power, in cases of sudden prices hikes.

Rice is of special importance for the nutrition of large reaches of the population in Asia parts of Latin America and the Caribbean and, increasingly so, in Africa. As a result, it plays a pivotal role for the food security of over half the world population. It is also a central component of the culture of a number of communities. For those reasons, rice is considered as a "strategic" commodity in many countries, both developed and developing, and has consequently remained subject to a wide range of government controls and interventions

2 Production

2.1 Rice Varieties


Oryza sativa L.

There are only two major species of cultivated[1] rice: ***Oryza sativa***, or Asian rice, and ***Oryza glaberrima*****,** or African rice. The rice varieties grown across the world belong overwhelmingly to the *O. Sativa* (O.S) species, while cultivation of the O.G is confined to Africa. Even in that region, however, O.G varieties are fast being replaced by the O.S, which displays much higher yields than the O.G., a characteristic that has prevailed over the special advantages afforded by the O.G, in the form of weed tolerance, pest resistance or fast maturing growth. In the late 1990s, the Africa Rice Centre, WARDA, managed to cross the two species into an inter-species hybrid called "**NERICA**" (standing for "New Rice for Africa"), which combines the ruggedness of local African rice with the high productivity of the Asian rice[2].

Although there are many *Oriza Sativa* varieties cultivated commercially, they belong to two major subspecies: the Indica, long grain rice,

[1] The Oryza genus also includes some 20 other, mostly wild, species

[2] New Rice for Africa (NERICA), an interspecific hybrid between the local African rice (*Oryza glaberrima)* and the exotic Asian rice (*Oryza sativa*) offers new opportunities for rice farmers in Africa. NERICAs have unique characteristics such as higher yields of 1.5 tons per hectare (t/ha) without fertilizer application, and with good management up to 4 t/ha are recorded on farmers' fields compared with unimproved upland varieties that yield less than 1 t/ha (WARDA, 2001). Other NERICA qualities include early maturity, some 30–50 days earlier than other upland varieties, tolerance to major stresses, higher protein content and good taste compared with the traditional rice varieties. NERICAs have also been reported to have stable yields under different management conditions (Dingkuhn and Randolph, 1997). Because NERICAs are more resistant to most pests and diseases, the use of pesticides and fungicides can be reduced to an absolute minimum, thereby reducing the negative environmental impacts associated with such chemicals. Because NERICAs are early maturing, they offer opportunities for double cropping within a year thus increasing farmers' income

characterized by a wide adaptability to different environments and the Japonica, round grain, rice, distinguished by its strong responsiveness to fertilizer applications. **Japonica** rice is mainly cultivated (and consumed) in temperate and tropical-upland climatic zones, in Australia, China (in the three northern Provinces of Heilongjiang, Jilin and Liaoning and the eastern central provinces of Anhui, Jiangsu and Zhejiang), the Chinese province of Taiwan, the Democratic Republic of Korea, the European Union (EU), Japan, the Republic of Korea, Russia, Turkey and the Unites States (California State). Overall, some 80 million tonnes of Japonica rice were estimated to have been gathered in 2000-2005, about 13 percent of world output. **Indica** rice varieties, which are especially well adapted to tropical climates but also thrive in temperate climatic conditions, account for the bulk of world rice production. Many of the rice hybrids available to producers derive from the basic Indica varieties, including the semi-dwarf rice varieties, the introduction of which led to record yield increases throughout Asia in the 1960s and 1970s. Although also belonging to the Indica long grain rice family, fragrant rice is often considered separately, because of their distinctive perfume that commands a price premium. The principal varieties defined as aromatic are the **fragrant "Hom Mali" rice** produced by Thailand and the various types of **Basmati** exclusively grown on the Himalayan foothills by India (in the states of Haryana and Punjab) and Pakistan (in the state of Punjab).

Although research into **genetically-modified (GM) rice** has intensified since the decoding of the rice genome in 2002, no GM rice has been officially released for commercial production as of 2006. Genetic modifications on the rice crop have concentrated on (i) improving the nutritional qualities of the grain with, for example, the "Golden Rice" customized to contain high levels of vitamin A; (ii) reducing input applications, by developing pest-resistant Bt (Bacillus thuringiensis), fungal (e.g. bacterial blight) -resistant or herbicide (e.g. glufosinate) -tolerant rice strains; (iii) extending the rice production frontier, by engineering seeds to withstand submergence, drought or salinity. Despite those breakthroughs, governments have refrained from authorizing farmers to plant GM rice, not only because of concerns over the impact of GM rice on human health or the environment, but also because of fears that a loss of the GM rice-free status could jeopardize access to key rice markets. The recent discovery of unauthorized Liberty Link GM rice in rice consignments from the United States provide an instance of potential disruption, when those findings triggered the imposition in many countries of tight testing requirements on imports of US rice. On the other hand, pressure to adopt GM rice varieties is intensifying in the developing countries, especially in those facing resource constraints and large populations. Chinese farmers were already alleged to be growing GM rice varieties, although not formally authorized by the Government for commercial release.

2.2 Rice ecosystems

Adhering to a classification by the International Rice Research Institute (IRRI), rice is cultivated in four broad production ecosystems:

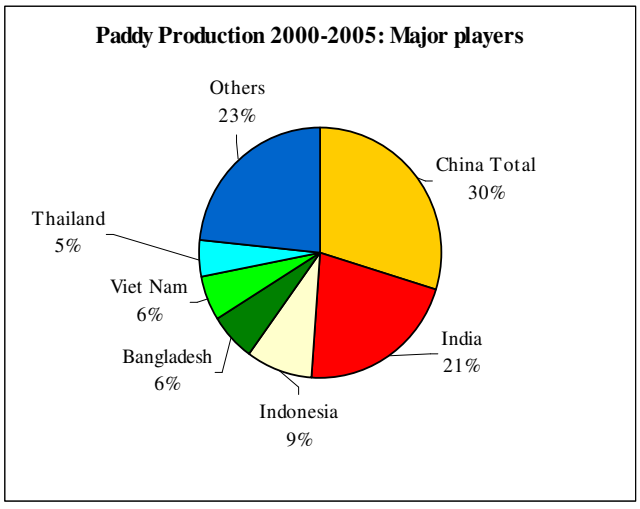
(i) **irrigated**: rice grown with good water control and flooded throughout the growing season
(ii) **rainfed lowland**: rice relying on the rainfall, with fields bundled to retain water, with a maximum of 10 consecutive days of water depth exceeding 100 cm
(iii) **upland**: rice grown without surface water, relying solely on the rainfall and
(iv) **flood-prone**: deepwater rice, grown in river areas, with no structured water control and water submergence in depth exceeding 100 cm for more than 10 days and up to five months

Based on the rice cultivation patterns prevailing in the mid-1990s, irrigated rice systems predominate, covering about half of the global rice area and generating around three quarters of global output. Rainfed lowland rice production systems ranked second in importance, covering around 35 percent of rice land base, followed by the upland rice ecology, with 9 percent, and flood-prone ecosystems, with 3 percent of the world area under rice.

The irrigated rice eco-systems are characterized by high cropping densities, intensive use of agrochemicals, energy and water. Yields under this system are highest, approaching the ceilings achieved at research stations, so the scope for further productivity increases appears limited in absence of major technological breakthroughs. There is, likewise, little potential for expanding the area under this ecosystem, given soaring costs of irrigation infrastructure, growing competition for water[3] and energy and the progressive loss of rice land to urbanization. Irrigated rice systems are also associated with adverse environmental impacts, as intensive application of pesticides and fertilizers contaminates surface and underground waters, while flooded rice fields release high levels of methane (CO4), the second most dangerous greenhouse gas after carbon dioxide (CO2) contributing to global warming.

As yields in the irrigated rice ecologies have reached a plateau and given the growing competition for resources from the agricultural and other sectors, rice production in the future may have to rely increasingly on lowland rice ecosystems with water control. On the other hand, upland (rainfed) rice systems do not offer much promise in terms of rice yields and reliability.

2.3 Geographical concentration of production



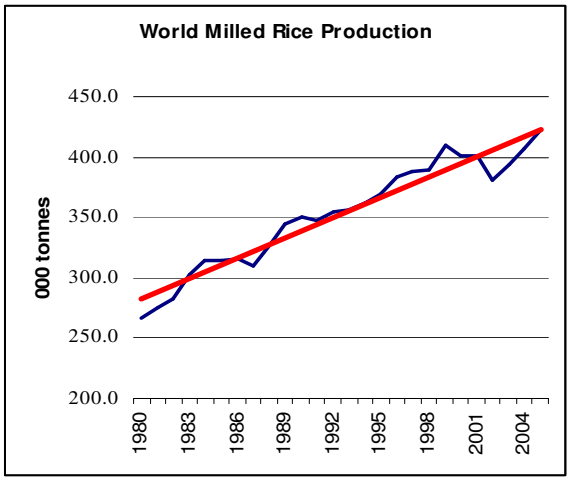
Rice can be produced under a wide spectrum of locations and climates, but, geographically, Asia is the hub of 90 percent of world production, with China and India responsible for 30 percent and 21 percent, respectively of the world aggregate. Rice is particularly important for food security, as it is produced overwhelmingly in the developing countries and, in particular, in low-income food deficit countries (LIFDs), which produce about three quarters of the total. The dominance of Asian countries in paddy production dwarfs the contribution from countries in other regions, but Brazil in South America and Egypt in North Africa are also relevant paddy producers, each with a 1 percent share in world output.

[3] It takes about 3,000 litres of water to produce one kilogram of rice.

Table 2: Paddy production by economic group and region and major players			
	2000-2005	**2000-2005 Share in World**	**2000-2005 Accumulated Share**
Production By Economic Grouping And Region	**000 tonnes**	**%**	**%**
World	599,641	100.0	
Developed	25,449	4.2	
Developing, All	574,192	95.8	
Of Which: LIFD	455,514	76.0	
Asia	543,347	90.6	
Latin America & Car.	23,882	4.0	
Africa	18,591	3.1	
North America	9,621	1.6	
Europe	3,284	0.5	
Oceania	916	0.2	
Major Producing Countries	**000 tonnes**	**%**	**%**
China total	178,391	29.7	29.7
India	128,203	21.4	51.1
Indonesia	52,371	8.7	59.9
Bangladesh	38,199	6.4	66.2
Vietnam	34,266	5.7	71.9
Thailand	27,747	4.6	76.6
Myanmar	22,726	3.8	80.4
Philippines	13,719	2.3	82.7
Brazil	11,477	1.9	84.6
Japan	11,048	1.8	86.4
United states	9,621	1.6	88.0
Pakistan	7,142	1.2	89.2
Korea, Republic of	6,769	1.1	90.3
Egypt	5,980	1.0	91.3

2.4 Production trends and prospects

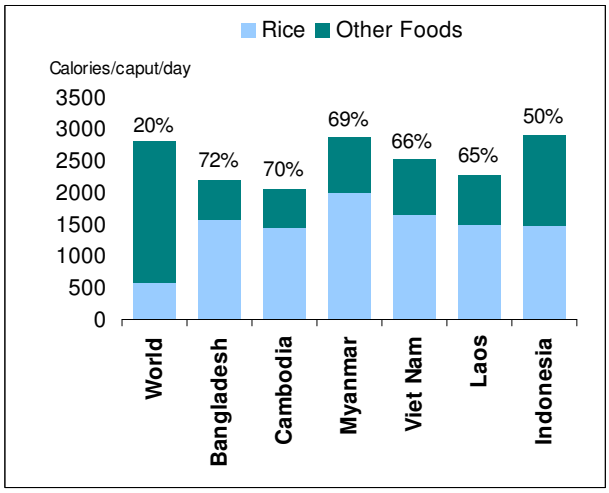
Global rice production in the 1990s has been expanding at 1.8 percent per year, marginally above population growth. By the end of the decade, it reached some 610 million tonnes of paddy (410 million tonnes in milled equivalent). In the early 2000, the sector was subject to a major overhaul, when several important producers took steps to cut domestic rice surpluses and reduce the size of rice inventories. The production downsizing process continued until 2003, when production started to peak again, reaching an all-time high of 632 million tonnes (422 million tonnes of milled rice) in 2005.



Most of expansion since the early 1980s has been sustained by increases in productivity rather than in area, although the opening of new rice lands was the main force sustaining production gains in Africa. In recent years, there have been indications that rice productivity growth may be stalling, with yields even showing a tendency to decline in the highly intensive irrigated production systems. This has raised concerns over the future of the rice sector, especially as competition for basic resources (in particular, land and water) from other agricultural and non-agricultural activities and the negative environmental impacts associated with rice cultivation are also threatening the long run sustainability of rice production, especially in Asia. The problem is less severe in Latin America and the Caribbean and in Africa but, there, the expansion of the sector is held back by the very high costs necessary to develop the basic infrastructure, especially for irrigated rice cultivation.

Rice production is foreseen to follow a dynamic pace of expansion in the 2010s, sustained by moderate growth in the area planted to rice. The opening of new land should help sustain production in countries such as Myanmar or Indonesia in Asia and is likely to remain the main source of growth in Africa. In other cases, the area cultivated to rice could be increased without the opening of new land, through multiple cropping, as more rice is grown off season with irrigation, a process already well advanced among Asian countries, in particular Bangladesh. By contrast, the rice land bases are expected to shrink in some major producing countries, including China, Malaysia, Thailand and Viet Nam, where governments have opted for a removal of the crop from marginal lands and for the establishment of specialized rice producing zones. In general, productivity gains are expected to remain the overriding factor in sustaining global production growth in the coming ten years, as most countries still have considerable scope for raising yields through the adoption of improved management practices and the dissemination of hybrids, which several governments are supporting through subsidies. However, although productivity gains are expected in all regions, wide yield differences are likely to persist across countries, with Egypt expected to reap 10 times more per hectare than Nigeria or Mozambique (see latest OECD/FAO medium term outlook).

3 Consumption



With an average 56 kg per caput consumption, rice is the single most important food item in terms of calorie intake, providing, on average, over 20 percent of the human dietary energy. For a number of countries, this contribution is substantially larger, approaching 70 percent in Bangladesh, Cambodia and Myanmar. As reflected in table 3, there were 34 countries in the early 2000s that derived more than 20 percent of their energy intake from rice. They were mostly in Asia, but also in Africa (e.g. Madagascar, Sierra Leone and Guinea Bissau) and LAC (e.g. Guyana, Suriname and Cuba).

Table 3: Apparent calorie intake and contribution from rice, 2000-2002 average			
Countries where rice represents more than 20 percent of calorie intake	**All foods - Grand Total**	**Rice (Milled Equivalent)**	**Rice Share**
	Cal/caput/day	Cal/caput/day	percent
World	**2795**	**567**	**20.3%**
Bangladesh	2189	1577	72.0%
Cambodia	2059	1445	70.2%
Myanmar	2880	2002	69.5%
Viet Nam	2534	1662	65.6%
Laos	2285	1493	65.3%
Indonesia	2912	1469	50.4%
Madagascar	2061	985	47.8%
Sierra Leone	1926	816	42.4%
Thailand	2453	1038	42.3%
Philippines	2375	1004	42.3%
Guinea-Bissau	2101	874	41.6%
Nepal	2443	940	38.5%
Sri Lanka	2388	900	37.7%
Timor-Leste	2812	965	34.3%
Comoros	1748	585	33.5%
Guinea	2382	769	32.3%
Senegal	2280	731	32.1%
India	2420	766	31.7%
Korea, Dem People's Rep	2137	676	31.6%
Korea, Republic of	3059	927	30.3%
China, Mainland	2956	873	29.5%
Guyana	2709	786	29.0%
Liberia	1997	569	28.5%
Malaysia	2891	800	27.7%
Solomon Islands	2238	615	27.5%
Brunei Darussalam	2855	749	26.2%
Suriname	2628	685	26.1%
Côte d'Ivoire	2620	597	22.8%
Vanuatu	2572	586	22.8%
Japan	2783	628	22.5%
China, Macao SAR	2498	563	22.5%
Mauritius	2955	623	21.1%
Cuba	2998	624	20.8%
Source: FAO			

3.1 Nutritional content

The nutritional characteristics of rice vary according to a number of factors, in particular varieties, the production location and post-harvest transformations. Among the latter, particularly influential are the degrees of milling and the storage and cooking practices. Although rice can be consumed after different degree of transformation, largely depending on consumer tastes, it is most commonly consumed "white", after undergoing various degrees of polishing, which generally imply an 8-10 percent bran removal (the main parts of the rice kernel are the husk, the bran layer and the embryo).

Rice is a major source of energy and an important one of protein: 100 grams of raw white rice provide 361 kcal and 6 grams of protein. Rice also contains substantial amounts of zinc and niacin. On the other hand, it is low in calcium, iron, thiamine and riboflavin and has virtually no beta-carotene (Vitamin A). It is noteworthy that the highest the degree of polishing, the lowest the level of proteins, vitamins and minerals in the final product.

Table 4: Rice Nutrition Facts (per 100 g of raw rice)

	White Rice	**Brown Rice**
Moisture (water), g	10.20	11.20
Calories, kcal	361.00	362.00
Carbohydrates, g	82.00	77.70
Protein, g	6.00	7.40
Total Fat, g	0.80	2.40
Dietary Fibre, g	0.60	2.80
Calcium, mg	8.00	12.00
Phosphorus, mg	87.00	255.00
Potassium, mg	111.00	326.00
Sodium, mg	31.00	12.00
Vitamin B1 (Thiamine), mg	0.07	0.26
Vitamin B2 (Riboflavin), mg	0.02	0.04
Vitamin B3 (Niacin), mg	1.80	5.50
Source: Thai Food Composition Table (1999) Institute of Nutrition Mahidol University		

3.2 Novel, value-added, rice products

Once milled, rice can be stored without refrigeration for over one year and consumed directly by the household with no further major transformation except simple cooking. For these reasons, rice is generally considered an "easy" food. Nonetheless, in response to new consumer needs, processing of raw rice into new products has been undertaken, with the development of instant rice, specialty and ready to serve rice. Other examples of rice-based value-added products include rice flour and starch; cakes and puddings, baked bread and crackers; breakfast cereals; rice snacks and noodles, baby/weaning foods, rice milk, fermented foods and beverages; pet foods and bran products. The absence of gluten constitutes an additional

advantage that makes rice particularly suitable as an alternative to wheat in breads, pasta and like products. Non-food uses of rice include rice paper and glues. Its utilization in cosmetics has also taken off in Japan. Unlike in the case of wheat, however, the bulk of rice is consumed in the form of grain and most of the further processed rice products are geared towards specialty or niche markets.

3.3 Consumption trends and prospects

Because of its nutritional characteristics and of the high price it commands compared with other starchy crops, rice is predominantly a food commodity, with human consumption estimated to represent around 85 percent of total rice utilization, feed 5 percent and other end-uses, including seeds and post-harvest losses, the remaining 10 percent. Although the Government of Japan has announced it would convert some of its large rice surpluses for biofuel, this is likely to remain an exceptional end-use for rice as economics do not support the viability of a rice-based fuel sector.

Besides population, consumption of rice as food is mainly driven by changes in per caput demand, itself influenced by changes in prices, incomes and urbanization. Because it is a major staple food, consumer responses to price signals are smaller than for non-basic food commodities, but demand for rice tends to react swiftly to changes in incomes and, especially, urbanization. Income elasticities are still positive[4] in most developing countries, but they have already turned negative[5] in fast growing economies, such as China or Malaysia.

Per caput food rice consumption averaged 56.9 kg in 2005, 0.7 kg less than in 1997. However as world population is estimated to have risen from 5.8 billion to 6.5 billion people over the period, overall rice food use grew by 10 percent to 368 million tonnes in 2005. Since the mid 1990s, global food rice consumption has risen at an annual rate of 1.1 percent somewhat below growth in world population, confirming the tendency of per caput rice consumption to fall. The latter was largely a reflection of developments in Asia, where per caput rice consumption declined from 87 kg in 1996 to 83 kg in 2005, which contrasted with the tendency prevailing in other regions. In Africa, especially, per caput food rice consumption rose from less than 17 kilos to over 23 kilos over the ten year period, sustained by low international prices, which stimulated imports, but also by an on-going shift of rural populations to the cities. The effects on overall demand were compounded by the strong population growth in the region, in the order of 2.3 percent per year.

At the world level, total consumption (including food, feed and other uses) is estimated to have reached 417 million tonnes in 2005, 11 percent more than in 1996. The increase was much stronger in Africa, passing from 14.2 million tonnes in 1996 to 22.2 million tonnes in 2005, a 56 percent surge. Overall rice utilization increased in all the other regions, though less markedly than in Africa. Even in Asia, increases in population have kept overall demand on the rise, despite the tendency for per caput rice consumption to decline.

Medium term prospects point to a recovery in per caput rice demand over the next ten years, which would propel overall world rice consumption growth from 1.2 percent per year in the 1996 to 2005 period to 1.4 percent in the following ten years to over 490 million tonnes by 2015. In absolute terms, much of the increase will concentrate in Asia, with a projected consumption of some 420 million tonnes in 2015, about 50 million tonnes more than in 2005. Over the same period, Africa is foreseen to consume 8 million tonnes more of rice. Much smaller increases are expected in the other regions.

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[4] indicating that per caput demand for rice increases (falls) when per caput revenues increase (fall)

[5] indicating that per caput demand for rice increases (falls) when per caput revenues fall (increase)

4 Rice International Trade

4.1 Special features of rice trade

Rice is mostly eaten in the same country where it is produced, so trade in rice is small, both in absolute terms and as a proportion of global production. With an average of 27 million tonnes, the size of the international rice market is only one quarter of that in wheat and little over one third of trade in maize. Since the early 1990s, the volumes of rice exchanged internationally have risen quantity-wise, but also in relation to production, resulting in a "deepening" of the rice international market. Nonetheless, this remains "**thin"** if compared with the other two major cereals, as rice traded on world markets only represented 7 percent of global production in 2000-05, compared with 18 percent for wheat and 11 percent for maize.

Table 1: Shares of global production traded on world markets

	Rice (milled eq.)			Wheat			Maize		
Average	Global Production	Global Trade	%	Global Production	Global Trade	%	Global Production	Global Trade	%
1980-89	305,306	11,734	4	497,379	97,044	20	438,592	64,522	15
1990-99	370,853	19,062	5	573,607	102,567	18	547,011	64,207	12
2000-05	400,817	27,482	7	594,278	107,060	18	647,639	78,785	11

A growing reliance on trade by countries in Africa and the Near East contributed to such a deepening. In those regions, rice imports now satisfy more than 40 percent of domestic requirements. The contribution is even higher for Central America and Caribbean countries, with half of their rice consumption now consisting of imports. For the developed countries as a group, about one quarter of domestic utilization in rice is met by external supplies.

The thinness of the rice international market is the result of, but also a reason for high protective policies. Indeed, nations, especially those accounting for a large share of global production, are reluctant to rely on a thin world market, perceived too small to provide a "dependable" source of supplies[6]. There are other reasons why government rice policies have traditionally been oriented towards self-sufficiency rather than self-reliance strategies. They have to do with the frequently entrenched consumer preferences for locally produced varieties, which are not always available on world markets, but also with a series of benefits connected with rice cultivation extending beyond the availability of food or the generation of earnings to producers. They are associated with the preservation of complex agro-ecosystems, the conservation of landscapes and wild bird's habitats and the cultural inheritance and history intrinsically tangled with the rice crop in many nations. The food security together with the "multi-functionality" aspects have justified a high degree of interference along the rice chain from production to consumption, which has converted the crop into one of the most protected agricultural commodities.

[6] For illustration purposes, when in 2002 India incurred a 21 million tonne contraction in output (milled rice equivalent) in the wake of a poor monsoon season, the country covered the shortfall out of its own reserves. It is difficult to imagine how India could have secured those supplies on the international market, which only traded 28 million tonnes of rice, without triggering sharp increases in international prices.

The particular characteristics of the commodity and the different degrees of protection applied across countries not only contributed to the thinness of the world rice market but also resulted in its **segmentation,** as rice is not a homogeneous commodity. Two major types of rice are traded internationally, Indica rice, which is subject to relatively low tariffs, and Japonica rice, the trade of which has been hindered by extremely high protection rates. Tariffs on rice products also tend to rise with the level of processing, with rates on husked or milled rice products generally higher than for paddy rice, as governments strive to protect their milling industry. As a result, the international rice market is largely divided into different sub-markets, depending on varieties (Indica, Japonica or aromatic rice), qualities (depending mainly on the percentage of brokens contained in the consignment) and stages of processing (paddy, husked or milled).

There are principally three varieties of rice traded on the international market, Indica, Japonica and fragrant rice, each of which can be marketed with different percentage of brokens (determining its "quality") or at different processing stages (paddy, husked or milled). Japonica rice is prevalently grown under sub-tropical and temperate climatic conditions, but in recent years, new strains have been adapted to tropical conditions and Japonica rice has started being produced in countries such as Thailand and Vietnam. This could imply that over the longer term, the market segmentation into Japonica and Indica rice may become less marked, with a larger number of countries able to shift from Indica to Japonica rice varieties or vice-versa, as prices change. A third, smaller rice market exists for fragrant rice varieties, which are mostly produced by Thailand (Jasmine or Hom Mali rice), Bangladesh and India (Basmati rice) in particular geographic areas. There is limited scope for an expansion of cultivation of those rice varieties, given their linkage to specific geographical locations. The potential for yield gains is also limited, because of the characteristics of these strains.

4.2 Trade trends and prospects

One of the most outstanding developments in the rice economy in the past 20 years has been a fast expansion in the volume of rice traded internationally, which passed from 12 million tonnes in the early 1980s to almost 30 million tonnes in the 2005, growing by 2 percent per year.

Viewed from the demand side, much of the trade expansion was on account of surging rice imports by Asian and African countries. Deliveries to the Near East and Central America and the Caribbean also grew vigorously. The increase in traded volumes witnessed in the 1990s was facilitated by a reduction of border protection, as several countries liberalized their trade policies. It also reflected a number of production setbacks, as was the case for Indonesia, which imported exceptionally high volumes in 1997 and 1998 in the wake of an El Niño weather anomaly. The growth in trade was supported by abundant supplies in the major exporting countries. In the early 2000s, in particular, China, India and other major players released large supplies from stocks, which were offered on the world market at relatively low prices.

Food aid in rice has fluctuated in recent years around 1.5 million tonnes, or 5 percent of total trade. Around 1 million tonnes, or about 70-75 percent of total rice food aid, have usually been directed to Asian countries, while countries in Africa usually received some 300 000 tonnes, representing about 20-25 percent of the total

Trade in rice is projected to record a fast pace of growth in the next decade, possibly reaching 35 million tonnes by 2015. The forces sustaining the expansion are likely to remain substantially the same as those which propelled trade in the 1990s, namely a strong import demand by Asian and African countries and a continued expansion of production in exporting countries such as India, Pakistan, Thailand, the United States and Viet Nam. On the other hand, resource constraints and growing domestic requirements may prevent China from maintaining a strong presence on export markets.

4.3 Rice Exports

4.3.1 Exporting firms

International trade in rice is mainly conducted through large international trading companies, which may deal with other grains and foodstuffs too. Some of the trading firms could also deal with rice processing, storage and transportation in the source markets and with its shipment to the import market. Because, in the case of rice, it is not uncommon to load a ship without knowing the destination of the rice, especially if directed to Africa, traders also carry the financial charges until a buyer is found and rice delivered. Unlike maize or wheat, rice is not a standardized commodity, so brokers play an important role in facilitating trade by identifying a suitable buyer and seller for the required rice types and qualities, getting in return a commission for their services. Brokers specialized in rice include Jacksons, Marius Brun et Fils, Schepens & Co SA, in Europe or Creed Rice, in the United States, or Western Rice Mills Ltd in Canada.

Private companies trading in rice are particularly numerous, many of them specializing in particular geographical areas. Because trade in rice is particularly risky, many of these firms have been subject to upheavals over time, with some ceasing to trade in rice or merged into other companies. In the 1990s, the main rice trading firms were Continental, Richco (Glencore) and Cargill, with other firms such as André, Global Rice, Riz et Denrées, Rial Trading, New Field Partner, Inglewood and Orco acting as niche players. By the 2000s, all of these firms had downscaled or abandoned their rice trade operations. The major rice private firms currently operating at the global level and trading at least 500 000 tonnes per year are:

- **American Rice Inc**: accounts for some 4 percent of world rice market and markets around one fifth of US rice.
- **Archer Daniels Midland Co**. (ADM)**:** a major US agricultural processing and trading firm
- **Ascot Commodities:** based in Switzerland and mainly dealing with rice sales to African markets.
- **Capital Rice Co. Ltd**: an affiliate of the STC Group, a Thai conglomerate of trading and manufacturing companies in the field of agro-industry; accounts for about a fifth of Thailand's rice exports.
- **Churchgate**: An Indian trading firm particularly active in Nigeria
- **Louis Dreyfus:** a French family firm
- **Nidera:** a family firm with headquarters in The Netherlands and major trading operations in Latin America.
- **Novel:** one of the largest privately held rice trading firm, based in Switzerland.
- **Olam:** a trading firm with headquarters in Singapore; part of a large Indian conglomerate, and one of the principal suppliers of rice to African countries.
- **Rustal:** a privately held firm based in Switzerland.
- **The Rice Corporation, TRC:** based in the United States; a major rice trading company, with worldwide trading operations and rice mills in Europe, Latin America and the United States.

Rice exports are also operated by State Trading Enterprises (STEs) or other government institutions, which are particularly active in concluding government-to-government transactions, sometimes in the form of barters. Government-to-government rice agreements often involve importing countries such as Cuba, Malaysia, Indonesia, the Islamic Republic of Iran, Iraq, the Philippines and Sri Lanka and exporting countries such as Myanmar, Pakistan, Thailand and Vietnam.

State trading enterprises play a dominant role in China, in particular **the China National Cereals, Oils and Foodstuffs Import and Export Corporation (COFCO)**; in India, the **state Project and Equipment**

Corporation (PEC) is a large **exporter of non-basmati rice;** in Myanmar**,** the **Myanmar Agricultural Produce Trading (MAPT)** still deals with the bulk of exports despite an opening to the private sector in 2002. In Pakistan, rice trade is largely in the hands of private companies, but government-to-government deals are facilitated by the **Trading Corporation of Pakistan (TCP**), a state trading company, on behalf of private firms that will carry the transaction through. Likewise, in Thailand, **the Public Warehouse Organization (PWO)** of the Department of Foreign Trade of Thailand may participate in rice import tenders and enter into government-to-government agreements. In Viet Nam, rice exports are dominated by state trading enterprises, in particular, the Northern and Southern Food Corporations (**Vinafood I and Vinafood II**).

4.3.2 Concentration of exports

The major suppliers of rice to the international market all belong to Asia. Thailand has kept the leading exporter position for the past 40 years, although its share of trade has dwindled. Viet Nam and India ranked second and third in 2000-2005, while Pakistan and China have been, respectively the fourth and the fifth largest sources of supplies. Outside of Asia, Egypt, Uruguay, Argentina and, especially the United States are also major rice exporters.

Over time, the supply side of the international rice market has remained concentrated, with the four leading exporting countries (Thailand, Vietnam, India and the United States) shipping 71 percent of aggregate trade flows in 2000-2005 and the top ten exporters supplied some 95 percent of the total.

TOP TEN RICE EXPORTING COUNTRIES											
1980-89			1990-99			2000-05			2015 (Projected)		
Major Exporters	000 tonnes	Share	Major Exporters	000 tonnes	Share	Major Exporters	000 tonnes	Share	Major Exporters	000 tonnes	Share
World	11,734	100	World	19,062	100	World	26,837	100	World	35,614	100
Thailand	4,237	36	Thailand	5,398	28	Thailand	7,703	29	Thailand	11,434	32
USA	2,434	21	Viet Nam	2,697	14	Viet Nam	3,889	15	Viet Nam	6,392	18
Pakistan	1,025	9	USA	2,641	14	India	3,831	15	USA	4,043	11
China	710	6	India	2,122	11	USA	3,245	12	India	3,275	9
Myanmar	482	4	Pakistan	1,615	8	Pakistan	2,201	8	Pakistan	2,810	8
India	405	3	China	1,525	8	China	1,825	7	Egypt	1,097	3
Australia	388	3	Australia	541	3	Uruguay	694	3	Uruguay	909	3
EC 12	369	3	Uruguay	478	3	Egypt	683	3	Argentina	694	2
Viet Nam	364	3	Argentina	318	2	Myanmar	416	2	Australia	642	2
Uruguay	214	2	EC 12	263	1	Argentina	307	1	China	513	1

The fact that the bulk of rice exports originates in a relatively small number of countries makes trade in rice particularly susceptible to changes in government policies in those key countries. In recent years, for instance, Viet Nam repeatedly imposed restrictions on exports, to avert shortages on the domestic market. Between 2001 and 2004, India resorted to export subsidies, which contributed to a strong expansion of trade but also to low world rice quotations. On the other hand, in Thailand, large government purchases at relatively high prices have constrained export sales in recent years, lowering its contribution to trade from 36 percent in the 1980s to 29 percent in the first half of the 2000s. At the same time, the other major exporters' shares rose, sometimes quite significantly, providing a more dependable base source of supplies

to the world market. In addition, a few countries consolidated themselves as reliable exporters of rice, in particular, Argentina Uruguay and Egypt, while the EU and, more recently, Australia have reduced their presence in the market. In the EU, this was caused by the restructuring of the sector, which has substantially reduced the generation of surpluses, and the implementation of the WTO commitments on export subsidies. In the case of Australia, the decline in exports was mainly a reflection of severe shortfalls in production caused by lingering drought problems.

In the medium term, the same exporting countries are anticipated to dominate the market, but Thailand and Viet Nam are foreseen to increase their market shares, mainly at the expenses of India and China. Resources constraints in these two countries are foreseen to induce them to adjust their production strategy mainly with the aim to cover domestic needs, with exports limited, in the case of India, to high priced markets, such as Basmati shipped to the EU or to Near East countries or, in the case of China, to cheap surplus rice, mainly sold on African markets.

4.4 Rice Imports

In most countries, imports of rice are conducted by the private sector, sometimes in competition with a state importing agency. Governments may influence the private sector purchases not only through tariffs and other import restrictions but also through access to foreign exchange, or phytosanitary requirements. In many cases, state importing enterprises continue to be the key players in the rice market, often also holding responsibilities for domestic procurement, storage and distribution or rice to consumers.

4.4.1 Major state trading companies importing rice

State enterprises are often the main, if not the sole, entities allowed to import rice. They play an important role in Indonesia, Malaysia, the Philippines and Sri Lanka but also in Comoros, Cuba, Kenya, etc. Although state trading enterprises are increasingly required to operate on a commercial basis and to be financially self-sustained, they do not always pursue pure profit maximisation objectives, as they have pledged to also fulfil social-oriented functions, such as domestic price stabilization and food distribution to the poor.

- Cape Verde: Rice imports handled by EMPA, a para-statal company. Since 1998, private traders are also allowed to import rice
- Comoros: rice imports under a government monopoly by the “Office National d'Importation et de Commercialisation du Riz” (ONICOR)
- Cuba: rice largely under a government monopoly by the Empresa Cubana Importadora Alimentos (Alimport)
- Indonesia’s Badan Urusan Logistik (BULOG): handles the bulk of rice imports to the country
- Islamic Republic of Iran: the Ministry of Commerce, its Service Extension Company and other state trading agencies (e.g., Bonyade Shahid, Bonyade Mostazafan, and Taavoni Marzneshinan) handle the bulk of imports to the country.
- Japan: Imports of rice under the WTO Minimum Import quota administered by the Government Food Agency
- Kenya: rice imported by the National Cereals and Produce Board (NCPB) through open tenders, alongside private sector importers.
- The Republic of Korea: Imports of rice under the WTO Minimum Import quota administered by the Ministry of Agriculture and Forestry (MAF)

- Malawi: the National Food Reserve Agency (NFRA) imports grains when necessary (and administers food aid grants).
- Malaysia: Padiberas Nasional Berhad (BERNAS), a former state trading enterprise now privatized, has been granted a rice import rice monopoly until 2010, with the option for renewal for another five years.
- Mauritania: a para-statal, the Société Nationale d'Importation & d'Exportation, SONIMEX, imports and distributes rice alongside private sector traders.
- Mauritius: the State Trading Corporation (STC) holds an import monopoly on non-luxury rice and imports luxury rice alongside private traders.
- The Philippines: imports of rice largely under the control of the National Food Agency, but farmers are allowed to import limited rice volumes.
- Sri Lanka: the Cooperative Wholesale Establishment (CWE) held a monopoly on all grain imports until 2002, when the trade was liberalized. Now, imports of rice are made through open tenders, competing with private traders.

4.4.2 Tariffs and Special Safeguards

Japan, the Republic of Korea, the Philippines and the Chinese Republic of Taiwan have resorted to the WTO Special Treatment provision, which permitted them to exempt rice from the tariffication process that was required under the Uruguay Round Agreement on Agriculture in 1995. Since then, Japan and the Chinese Republic of Taiwan have renounced to the Special Treatment for rice and have opened trade to the private sector, subject to high tariffs, while the Republic of Korea and the Philippines have negotiated an extension of the Special Treatment beyond 2004.

In addition, many countries have bound the tariff on rice at very high levels, often of more than 50 percent, or made them eligible to the Special Safeguards.

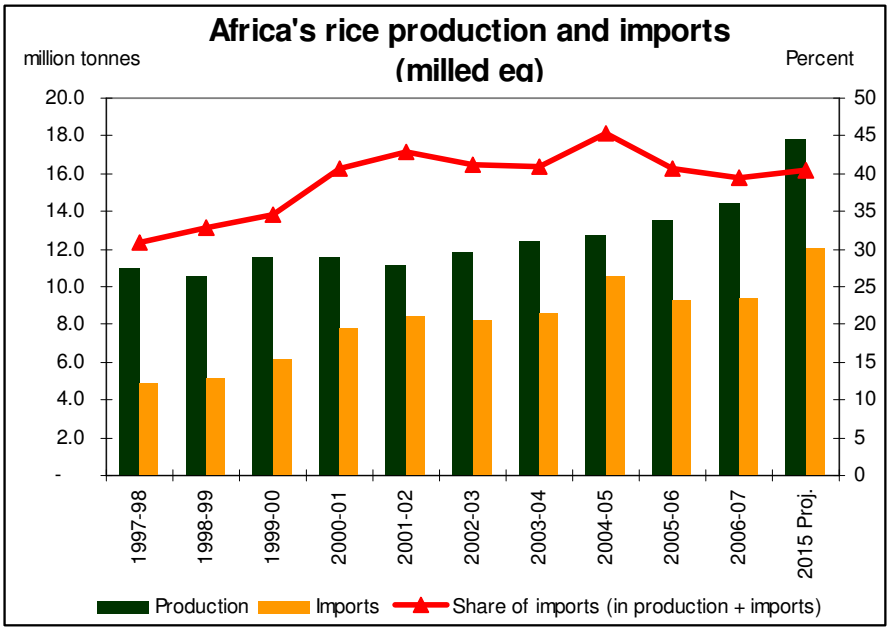
Table 4: Countries with URAA tariff schedules designating rice as subject to the Special Treatment or to the Special Safeguard and/or with rice tariff bound of at least 50 percent

	Ad-valorem Bound rate and SSG/ST status		Ad-valorem Bound rate and SSG/ST status
Angola	55	Macedonia	SSG
Antigua and Barbuda	100	Malawi	125
Bangladesh	50	Mali	60
Barbados	100	Mauritania	75
Belize	110	Mexico	SSG
Benin	60	Moldova	SSG
Brazil	55	Morocco	162 + SSG
Brunei	50	Mozambique	100
Bulgaria	SSG	Namibia	SSG
Burkina Faso	100	Nicaragua	60 + SSG
Burundi	100	Niger	50
Cameroon	80	Nigeria	150
Chad	80	Pakistan	100
China	65+ SSG	Panama	90
Colombia	189+ SSG	Peru	68
Congo	55	Philippines	ST
Costa Rica	SSG	Romania	120 + SSG
Dominica	150	Rwanda	80
Ecuador	57	Seychelles	80
El Salvador	SSG	Sierra Leone	50
European Union	SSG	South Africa	SSG
Gabon	60	Sri Lanka	50
Georgia	SSG	St. Kitts and Nevis	95
Ghana	99	St. Lucia	130
Grenada	100	St. Vincent and the Grenadines	130
Guatemala	90+SSG	Swaziland	SSG
Guyana	100	Switzerland	SSG
Haiti	66	Taiwan, Chinese Rep.	ST
Hungary	57+ SSG	Tanzania	120
India	80	Thailand	52 + SSG
Indonesia	160	Togo	80
Jamaica	100	Trinidad and Tobago	100
Japan	SSG	Tunisia	60 + SSG
Kenya	100	Uganda	80
Korea, Rep. of	ST	United States	SSG
Kuwait	100	Uruguay	55 + SSG
Kyrgyz Republic	SSG	Venezuela	122 + SSG
Lesotho	200	Zambia	125

4.4.3 Concentration of imports

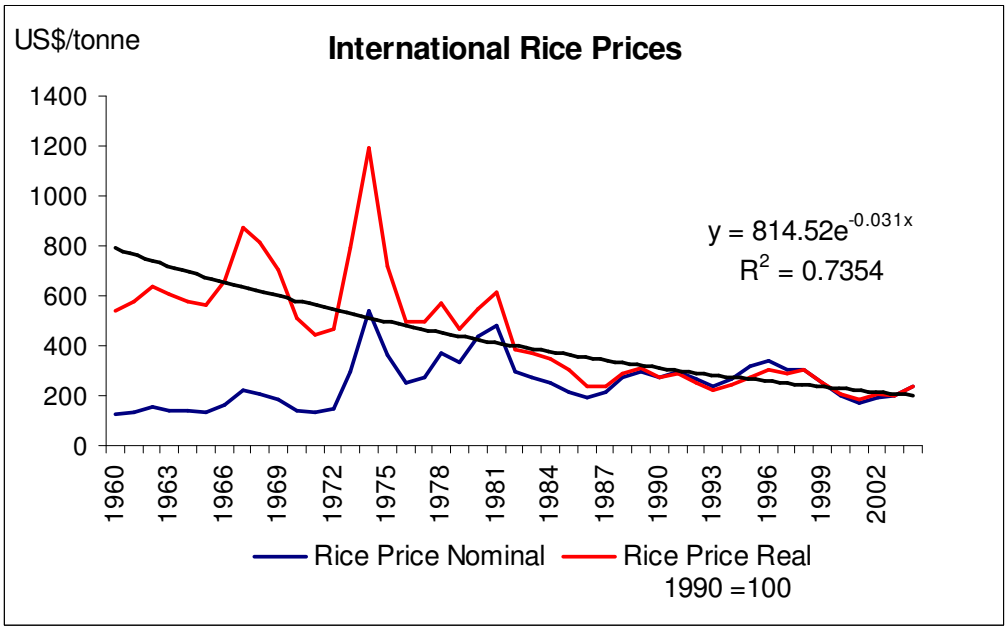
Although Asian countries have normally been the largest importers of rice, large shipments to African countries in recent years have converted the region into a major destination of trade, especially for highly broken and parboiled rice. For instance, in 2000-2005, there were three African countries (Nigeria, Senegal and Côte d'Ivoire) among the 10 largest importers of rice, compared with only one (Nigeria) in the 1990s. Overall, the region imported 8 million tonnes of rice in the first half of the 2000s, representing more than 30 percent of traded volumes, up from 23 percent in 1990-1999. However, countries in Asia continued to absorb the largest share of trade, with 48 percent. Thus, the demand side of the international rice market remains fragmented and, unlike for exports, the geographical concentration of rice imports is weak, with the ten major importers responsible for only 40 percent of global trade. The progressive opening of markets to trade is expected to further weaken the concentration of rice imports in the medium, as, by 2015 the 10 major importers are seen to represent only 35 percent of overall trade, headed by Indonesia, Nigeria and the EU. However, overall, shipments to African countries are projected to increase from 8.2 million tonnes in 2000-2005 to 12.1 million tonnes by 2015, which would lift their share in world imports from 31 percent to 34 percent. China is also expected to become an important market, especially for fragrant rice, as continued brisk economic growth will stimulate domestic demand for high quality rice products.

TOP TEN RICE IMPORTING COUNTRIES											
1980-89			1990-99			2000-05			2015 Projected		
Major importers	**000 tonnes**	**Share**	**Major importers**	**000 tonnes**	**Share**	**Major importers**	**000 tonnes**	**Share**	**Major importers**	**000 tonnes**	**Share**
World	**11,842**	**100**	**World**	**18,816**	**100**	**World**	**26,707**	**100**	**World**	**35,831**	**100**
Asia	5,760	49	Asia	9,724	52	Asia	12,692	48	Asia	14,809	41
Africa	3,035	26	Africa	4,243	23	Africa	8,194	31	Africa	12,051	34
Iran I.R.	674	6	Indonesia	1,769	9	Nigeria	1,730	7	Indonesia	3,026	8
EC	664	6	Iran I.R.	895	5	Indonesia	1,720	6	Nigeria	2,090	6
Saudi Arabia	520	4	Brazil	858	5	Philippines	1,116	4	EU(25)	1,277	4
Indonesia	510	4	Saudi Arabia	840	4	Iraq	1,033	4	South Africa	1,199	3
Iraq	506	4	Bangladesh	693	4	Iran I.R.	968	4	Saudi Arabia	1,088	3
Nigeria	419	4	EC	625	3	Saudi Arabia	870	3	China	943	3
Senegal	357	3	Philippines	602	3	Bangladesh	804	3	Malaysia	780	2
Côte d'Ivoire	352	3	Japan	553	3	Senegal	771	3	Philippines	772	2
China Hong Kong	348	3	Nigeria	534	3	Brazil	726	3	Mexico	760	2
Malaysia	320	3	Iraq	517	3	Côte d'Ivoire	715	3	Japan	682	2



4.5 International rice prices and import costs

Rice is not a uniform commodity and consumer preferences for specific types and qualities are often entrenched, which limits the scope for substitution. Market fragmentation has thwarted the establishment of internationally recognized grades or standards and delayed the establishment of futures markets. Presently there are more than 50 different published international price quotations for rice



The most frequently used export price to represent the market is the Thai 5 broken, fob Bangkok, which has been quoted since 1957. Although other prices may move in different directions on day-to-day or even monthly basis, the different rice markets have been found to be integrated, as prices tend to move together over the long run.

Since the early 1960s, rice international prices have followed a falling tendency both in nominal and real terms, mainly reflecting yield gains on the supply side, which were transferred to consumers through lower prices. Other shorter terms factors, however, have contributed to low prices in particular periods, in particular bumper crops, changes in policies in major producing countries and exchange rates movements. The decline in prices was particularly pronounced between 2001 and 2002, but a recovery has been in act since then. Although average yields are likely to keep improving in the medium term, resource constraints, in particular land, water and labour are likely to push marginal costs upward. Projections to 2015 point to an international price (represented by Thai rice, 100B) of US$ 314 per tonne, which is 9 percent above the level prevailing in 2005.

Rice is generally transported by sea, either in break bulk vessels or container vessels. Break Bulk vessels capacity varies between hundred metric tonnes up to over 25,000 metric tonnes. They carry the rice usually packed in polyethylene bags, varying in weight from 1 kg, 30 kg, 50 kg, up to 1000 kg. Container vessels allow for a quick and convenient loading and unloading, but are more expensive. Rice is placed in bags into the container, with a capacity ranging from 23 to 27 metric tonnes, which is then placed on the vessel deck. One of the variables influencing the freight is the distance from the loading port, which may add substantially to the cost of the imported rice. For instance, freights from Karachi, in Pakistan, as of December 2006, varied from US$ 10 per tonne of rice, if delivered to the United Arab Emirates, to US$ 132 per tonne if delivered in Monrovia (Liberia) or Abidjan (Côte d'Ivoire).

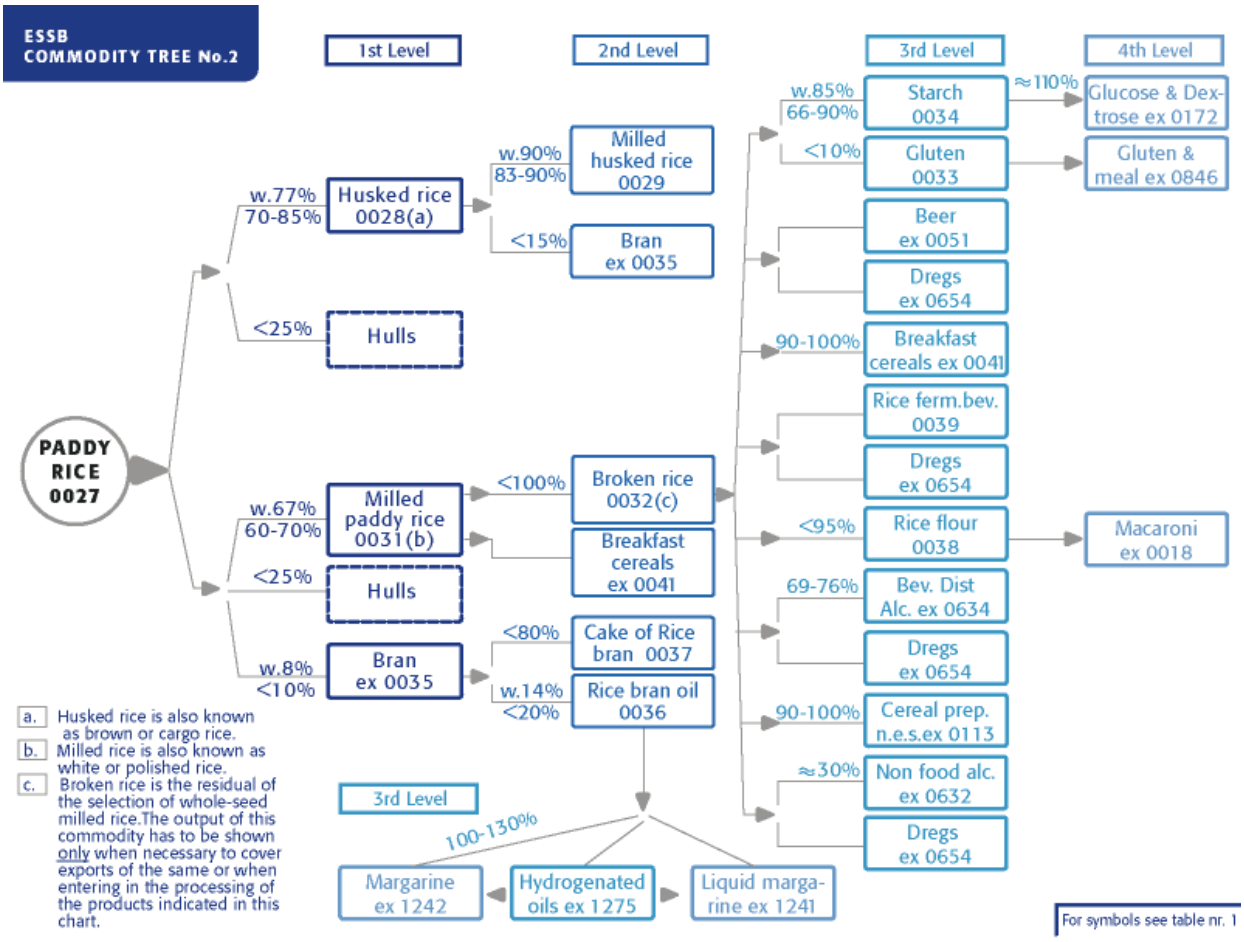
Freight Rates From Karachi Port To:			
Country	Port	Freight	Freight
		Per 25 Tonne Container	Per Tonne
		US $	US $
Kenya	Mombassa	900.00	36.00
Tanzania	Dar-Es-Salam	900.00	36.00
Mozambique	Beira	1,400.00	56.00
	Nacala	1,400.00	56.00
	Maputo	1,400.00	56.00
South Africa	Durban	1,100.00	44.00
Angola	Luanda	3,200.00	128.00
Senegal	Dakar	2,500.00	100.00
Cameroon	Douala	2,650.00	106.00
Ivory Coast	Abidjan	3,300.00	132.00
Liberia	Monrovia	3,300.00	132.00
Russia	Novorossiysk	1,500.00	60.00
Lithuania	Klaepeadia	1,500.00	60.00
Ukraine	Odessa	1,450.00	58.00
Uae	Jebel Ali	250.00	10.00
Iran	Bander Abbas	450.00	18.00
Poland	Gydinia	1,400.00	56.00
Data from rice trader, December 2006			

Because of the high freights, exporters have tended to target near-bye markets, with the United States predominantly supplying countries in Latin America and the Caribbean and Asian countries concentrating on Asia and Africa. Supplies to European countries may originate from both Asia and the Americas. However, despite the high freights involved, countries in South America, in particular Uruguay, have made major inroads on Near East markets in recent years, a sign that the international rice market is becoming more integrated.

On top of the freight from the exporting to the importing locations, imports are subject to insurance. As a result, the difference between the FOB and CIF (FOB price plus freight and insurance) prices is usually in the order of US$ 50 per tonne[7]. Additional expenses, including tariffs and other taxes, unloading costs (usually estimated at 2 percent of the CIF price), wharf charges, phytosanitary control fees, bank fees for the issuance of letter of credit, etc.

[7] To convert the fob price into the CIF prices, freight (the cost of which varies depending on the means and distance) and insurance (about 1 percent of the insured fob value) are added.

ANNEX 1: FAO RICE COMMODITY TREE



Source: http://www.fao.org/fileadmin/templates/ess/documents/methodology/tcf.pdf

ANNEX 2: THAI RICE TYPES

Thai Jasmine White Rice, also called fragrant rice or "Hom Mali" rice, is recognized world wide as Thailand's specialty. Thai Jasmine Rice belongs to the Indica (long-grain) category and could be divided into 3 main categories as A, B and C according to their quality; Prime Quality, Superb Quality and Premium Quality.

Brown Rice belongs to the Indica (long-grain), similar to white rice. The only difference between these two varieties is the milling. As a result, in brown rice, only the husk is removed while the bran layer remains. Because of the bran layer, brown rice contains more nutrients than white rice. In particular, Brown rice is very high in fiber and vitamin B.

White Rice belongs to the Indica (long-grain) category. It is also known as polished rice or fully milled rice because most of the other layer-the husk and the bran layer-are removed from the kernel, through the milling process.

Broken Rice, during the milling process, broken rice is separated from the white rice, the shape of which remains intact. In other words, broken rice is the damaged white rice. A grain of broken rice gives a low fiber texture and low nutrient level, while retaining its high energy content.

Short Grain Rice belongs to the Japonica (short-grain) category and has short, round, and plump kernel. When cooked, short-grained rice is stick together, although not as much as glutinous rice. In Japanese and Korean cuisine, short-grained rice is primary consumed in every meal.

Parboiled Rice means non-glutinous rice that has passed through the parboiling process and has its bran removed. Parboiled rice are divided into 9 grades: 1) 100 Sorted 2) 100 3) 5 Sorted 4) 5 5) 10 Sorted 6) 10 6) 10 7) 15 8) 25 9) Broken rice A1

Glutinous Rice also called sticky rice or sweet rice, consists of amylose and amylopectin starch. With a chalky white texture. The standards for White glutinous rice are specified as follows: White glutinous rice 10;

Source: **http://www.pechsiam.com/allabout_ricetype.htm**

ANNEX 3

EXPORT PRICES FOR RICE													
	Thai 100 B 1/	**Thai Parboiled 100**	**U.S. 2/4 Long grain**	**Viet 5**	**Thai 25**	**India 25**	**Viet 25**	**Pak 25**	**Thai A1 Super** 2/	**U.S. 2/4 Medium Grain** 3/	**Egypt Grade 2/ 6 178 Camolino Short Grain**	**Pak Basmati ordinary**	**Thai Fragrant 100**
	US $/tonne, f.o.b.												
2001	**177**	**194**	**264**	**166**	**153**	**185**	**148**	**148**	**135**	**256**	**204**	**332**	**275**
2002	**197**	**194**	**207**	**187**	**171**	**140**	**168**	**159**	**151**	**219**	**279**	**366**	**306**
2003	**201**	**196**	**284**	**183**	**176**	**163**	**167**	**175**	**151**	**310**	**291**	**357**	**449**
2004	**244**	**247**	**372**	**224**	**225**	**n.a.**	**212**	**230**	**207**	**420**	**317**	**468**	**443**
2005	**291**	**285**	**319**	**255**	**259**	**236**	**239**	**235**	**219**	**310**	**327**	**473**	**404**
2004													
December	280	278	329	238	253	n.a.	226	230	220	331	315	455	424
2005													
January	293	288	335	253	265	n.a.	243	244	230	325	317	460	433
February	298	291	329	261	269	n.a.	247	245	234	309	326	453	437
March	295	288	324	258	266	n.a.	244	245	230	310	324	467	427
April	300	299	321	258	268	n.a.	245	243	226	309	324	472	417
May	298	290	323	252	263	237	239	235	220	309	326	472	403
June	290	283	315	243	255	242	230	239	213	309	338	472	382
July	280	274	309	241	247	240	222	238	208	309	331	473	377
August	287	282	296	256	255	229	238	236	214	309	341	475	406
September	290	287	309	258	258	229	240	234	218	n.a.	326	475	401
October	293	286	318	258	260	236	240	225	221	n.a.	315	475	395
November	283	275	324	261	250	236	243	223	211	n.a.	312	488	383
December	286	276	327	262	251	237	243	218	206	n.a.	341	500	388
2004 Jan.-Dec.	244	247	372	224	225	n.a.	212	230	207	420	317	468	443
2005 Jan.-Dec.	291	285	319	255	259	236	239	235	219	310	327	473	404

Sources: Jackson Son & Co. (London) Ltd. and other public sources.

1/ White rice, 100 second grade, f.o.b. Bangkok. 2/ White broken rice. 3/ F.A.S. basis.

Source: “FAO Rice Price Update”, available at: http://www.fao.org/es/esc/en/15/70/highlight_533.html