735

Plantation Crops Research and Development in the New Millennium (2002): 184-191

FROM PRIMARY EXPORTS TO VALUE ADDITION: EMERGING TRENDS IN MAJOR NATURAL RUBBER PRODUCING COUNTRIES

Toms Joseph and K. Tharian George
Rubber Research Institute of India, Kottayam Kerala 686 009, India

ABSTRACT

Secondary data analysis of global consumption pattern of Natural Rubber (NR) indicated that the share of Major Natural Rubber Producing Countries (MNRPC) had significantly increased between 1950's and late nineties. However their relative share in gross elastomer consumption including Synthetic Rubber (SR) was only 22 % compared to 60 % in the case of Industrially Advanced Countries (IAC). The SR promoted by IAC's has been replacing NR from early forties and has the specific characteristics of a vertical integration with the dominant tyre and tube sector and an oligopolistically determined price. As a result the export intensity of NR from MNRPC's had significantly declined since 1950's. In addition the relative share of MNRPC's in the total value of world rubber based (NR, SR and rubber products) exports had declined from 20.3 % in 1980 to 17.6 % in 1996 compared to the increase in the share of IAC's from 62.4 to 69.8 %. In the present era of globalization and trade liberalization, a long term policy for sustained value addition of NR in the MNRPC's has to focus on diversified markets and products with specific locational advantage in terms of higher NR content, labour intensity, negligible brand loyalty and import restrictions.

INTRODUCTION

In the growing process of market integration, widely referred as globalization, the concept and strategy of value addition has critical significance. The extent of value addition and its distribution among different factors of production are crucial in determining the growth and survival of individual economies in the context of the unprecedented advancement in the globalisation of economic activities. In this context it will be of topical importance to examine the trends in value addition realised by individual countries in different commodities from a historical perspective. The genesis of the historical dependence of the developing countries on the exports of primary commodities in global trade is generally considered as a relic of the colonial heritage. This theoretical position assumes significance as even in the era of globalisation, the relative share of developing countries in the total value of world exports of primary commodities was 40.3 per cent in contrast to this group's share of 27.1 per cent in the total value of world exports of manufactured products.

The issues of secular decline and terms of trade and value addition of the primary commodities exported from developing countries have been vigorously debated in the international forums without a consensus during the last five decades, the consequences and responses across countries and products vary significantly. Despite the inter-regional differences in the achievements in value addition, natural rubber (NR) has been a classic case illustrating the persistent historical polarisation of production in the South and value addition in the North. Even in 1998, the relative share of all NR producing countries in the total world consumption of NR was estimated to be only 37.8 per cent (IRSG, 2000) (Apparently, the NR producing countries have been basically decimated to the status of raw material bases of the rubber products industries concentrated in the developed countries and regions such as USA, EU and Japan for more than a century (George, 1999[a]). An important manifestation of the concentration in NR consumption has been the dominance in world exports of rubber products worth US $ 40.97

billion, as the combined share of USA, EU and Japan was around 80 per cent in 1996 (UN, 1997). Nevertheless, the significant strides by a few among the major natural rubber producing countries (MNRPCs) towards value addition and product exports due to specific historical, locational, structural and policy factors deserve due attention in the era of globalisation. It is this conceptual background that the present paper is conceived with the following objectives:

- To highlight the trends in the historical polarisation in production and consumption of NR;
- To account for the status of value addition and exports of rubber products in the MNRPCs;
- To analyse the factors contributing to the trends in value addition and exports; and
- To assess the prospects of MNRPCs in value added exports in the context of the growing process of market integration.

METHODOLOGY AND DATABASE

The MNRPCs included in the study are Thailand, Indonesia, Malaysia, India, China and Sri Lanka, which together accounted for 89 per cent of the world NR production during 1998 (IRSG,2000). The performance of the MNRPCs is analysed in comparison with those of industrially advanced countries (IACs) and rest of the world. The IACs comprised of entire Western Europe, United States (US), Canada, Australia, Japan and South Korea. The study is based on secondary data from different sources, mainly, International Rubber Group (IRSG), United Nations (UN) and International Trade Centre (ITC) and a large number of country reports and other publications. In the absence of any other reliable measures, the relative shares in consumption of NR and gross elastomers and structure and growth in rubber based exports had been adopted as the indicators of rubber based value addition and export competitiveness.

Dichotomy of NR production and consumption

The historical polarisation of world NR production and consumption and its persistence even in recent times with marginal changes have attracted wide academic attention over time (Mc Fadeyean, 1944; Knorr, 1945, Drabble, 1973: 1991, Barlow, 1978; Balow *et al.*, 1994; George and Sethuraj, 1996; Mohankumar and George 1999, George, 1999[a]). The accumulated academic wisdom tends to highight the point that historically the major driving force behind the dynamic growth and concentration of NR production in the South East Asia has been the development and concentration of world automotive tyre manufacturing and allied products in US, Europe and Japan. Although the post-colonial period witnessed major structural changes in the NR sector of MNRPCs, the configurations of the colonial legacy have been systematically sustained due to a variety of a factors emerged in rubber products manufacturing, development of synthetic substitutes and increasing de-materialisation of the production process though domestic NR consumption has significantly increased.

As evident from Table 1. the share of MNRPCs in the world NR consumption has significantly increased from 3.8 per cent in 1950 to 31.9 per cent in 1988. However, the fallacy of this growth in domestic consumption it is evident from the fact that even in 1998, the relative share of MNRPCs in gross elastomer consumption including synthetic rubber (SR) was only 22 per

Table 1. Relative share of MNRPCs in world production and consumption of NR (%)

Year	MNRPCs		IACs		Rest of the world	
	Production	Consumption	Production	Consumption	Production	Consumption
1920	86.5	-	-	100.0	13.5	-
1950	92.0	3.8	-	92.3	8.0	13.9
1980	89.7	17.2	-	57.3	10.3	25.5
1998	88.8	31.9	-	52.2	11.2	15.9

Source : Barlow *et al.*, 1994; IRSG, 1974; 1984; 1986; 2000

cent compared to 60 per cent of the IACs (IRSG, 2000). Another important dimension of world elastomer consumption is the sustained sectorial concentration by the dominant automotive tyre and allied products sector located in the IACs. In 1998, this sector accounted for 78 per cent of NR and 59 per cent of total elastomer consumption in the IACs (IRSG, 2000). An important corollary of the persistent dominance of world elastomer consumption by the IACs has been the systematic replacement of NR by SR since 1940s and its prominence in world elastomer consumption since 1962 (IRSG, 2000). Over the years, the dynamic growth of world SR industry has been ensured by the acquisitions by and associations with the tyre multinational companies. In this process of vertical integration, the captive sales of SR have very often been insulated from market instabilities compared to the competitively determined NR prices. This point is corroborated by a negative trend growth rate in NR prices (-1.48%) compared to a positive growth rate (1.57%) in the export prices of synthetic rubber during 1980-98 period (George 1999[b]). Therefore, the NR producing countries have been increasingly exposed not only to the vulnerability of the prices but also there were inherent internal compulsions to enhance domestic consumption over time. However, progress in domestic consumption varied across the MNRPCs and the export intensity of NR production remained to be higher even in 1998 (Table 2). India and China had been net importers of NR and imports formed 85 per cent of domestic production of the latter during 1999 (IRSG, 2000)

Table 2. Export intensity of NR production in MNRPCS

Country	Export intensity of production (%)		
	1950	1980	1998
Malaysia	99.4	97.0	62.3
Indonesia	99.2	95.5	94.3
Thailand	99.6	94.4	91.6
Sri Lanka	99.8	88.8	44.0
India	-	-	1.8
China	-	-	-
MNRPCs	96.2	81.3	64.9

Source : IRSG, 1974; 1984; 1986; 2000

Trends in domestic consumption

Among the MNRPCs, China has reported the highest increase in domestic consumption of NR and total elastomers followed by India and Malaysia. Despite the disparate performance of the MNRPCs, the emerging trends towards value addition and contributing factors deserve explanation . The achievements of China towards value addition have been impressive and at present it is the second largest consumer of rubber behind USA.

India has the distinction of achieving the earliest break from the status of an NR exporter to a net importer among the MNRPCs due to a host of factors such as lower NR price and colonial patronage during the inter-war and Second World War periods and high level of protection and import substitution policy during the post - independent phase (Mathyoo, 1960; Sarma, 1947; Mohankumar and George, 1999). Its inward oriented rubber products manufacturing industry is dominated by the dry rubber products with a prominent position of the tyre and tube sector.

Trends in exports

Any systematic attempt to assess the specific locational advantages of MNRPCs in value added exports and export competitiveness has to incorporate an analysis of the trends in the relative shares in world exports of major forms of rubber and rubber products. Table 4 indicates that the relative shares of Thailand, China and India in total value of world exports of rubber and rubber products have improved compared to the declining shares of Malaysia, Sri Lanka and Indonesia . Among the MNRPCs, the maximum increase in the relative share has been achieved by Thailand from 3.1 per cent in 1980 to 6.0 per cent in 1996. Despite the inter- country differences in the trends in relative shares in world exports of NR, SR and rubber products, the MNRPCs as a group has improved the shares in the three product categories, whereas the relative shares of IACs in SR and rubber products declined during the 17 year period. Paradoxically, the share of MNRPCs in total value of rubber based world exports has declined from 2.3 in

Table 3. Trends in domestic consumption of NR and elastomers in MNRPCs

Country	Relative share in world NR consumption (%)			Relative Share in world ealstomer consumption (%)		
	1950	1980	1998	1980	1990	1998
Malaysia	0.3	1.2	5.1	0.19	0.36	2.52
Indonesia	0.3	1.2	1.5	0.22	0.37	1.23
Thailand	0.0	0.7	2.8	0.02	0.22	1.75
Sri Lanka	0.0	0.4	0.8	0.01	0.12	0.33
India	1.1	4.5	8.9	0.71	3.95	11.21
China	2.0	9.0	12.8	1.38	3.95	11.21
MNRPCs	3.8	17.2	31.9	2.53	6.75	21.52
World ('000 MT)	1708	3760	6550	2543	12545	16410

Source : IRSG, 1974; 1984; 1986; 2000

1980 to 17.6 per cent in 1996 compared to the notable increase in the share of IACs from 62.4 per cent to 69.8 per cent during the period. The NR exports in value terms registered a CGR of only 1.23 per cent between 1980 and 1996 compared to 4.28 and 7.71 per cent of SR and rubber products respectively.

The decline in the over all relative share of MNRPCs demands further investigation into the trends in the composition of export earnings of this group., Table 5 gives the trends in the product wise shares in total value of rubber based exports. The most striking trends observed during the period are a steep decline in the relative share of NR and a sharp increase in the share of rubber products in the export earnings of MNRPCs. The decline in the relative share of NR in the total export earnings inspite of a more than 31 per cent increase in the volume of NR exports by MNRPCs during 1980-96 (IRSG, 1986, 2000) has to be primarily explained in terms of a secular decline in free market prices. The price of rubber in constant US dollar (1990=100) declined from 197.9 cents per in 1980 to 60.7 cents per kg. in 1999 (World Bank, 2000). Therefore, logically, the explanation for the observed decline in the relatives share of MNRPCs in the global rubber based exports from 20.3 per cent to 17.6 per cent (Table 4) may be sought in the dwindling fortunes of NR exports. In fact, the progressive increase in the share of rubber products in the total export earnings of this group from 2.6 to

Table 4. Share of different blocks in rubber based exports (%)

Country /Bloc	1980				1990				1996			
	NR	SR	RP	Total	NR	SR	RP	Total	NR	SR	RP	Total
Malaysia	35.8	0.0	0.3	10.5	26.7	0.0	1.8	4.3	19.1	0.1	3.5	5.2
Indonesia	19.8	0.0	0.0	5.7	20.4	0.0	0.3	2.5	26.3	0.0	0.7	4.1
Thailand	10.2	0.0	0.3	3.1	21.9	0.0	0.9	3.1	33.1	0.1	2.0	6.0
Sri Lanka	2.6	0.0	0.0	0.8	1.8	0.0	0.1	0.3	1.4	0.0	0.4	0.5
India	0.0	0.0	0.3	0.2	0.0	0.0	0.5	0.4	0.1	0.1	0.4	0.3
China	0.0	0.0	0.0	0.0	0.0	0.4	0.7	0.6	0.6	0.3	1.8	1.5
MNRPCs	68.4	0.0	0.9	20.3	70.8	0.4	4.3	11.2	80.6	0.6	8.8	17.6
IACs	1.6	97.9	84.3	22.4	3.8	88.3	84.5	76.0	2.6	41.1	80.0	69.8
Rest of the World	30.0	2.1	14.8	17.3	25.4	11.3	11.2	12.8	16.8	18.3	11.2	12.6
World (Million US$)	5935	3013	11583	20531	4200	5192	28271	37663	7301	6145	40974	54420

RP: Rubber Products

Source : UN, 1983; 1995; 1997

Table. 5. Composition of export earnings from rubber and rubber products (%)

Country /Bloc	1980			1990			1996		
	NR	SR	RP	NR	SR	RP	NR	SR	RP
Malaysia	98.2	N	1.8	69.0	0.1	30.9	49.0	0.2	5.8
Indonesia	100.0	N	N	92.2	N	7.8	86.4	0.1	13.5
Thailand	94.5	N	5.5	78.1	0.1	21.8	74.5	0.1	25.4
Sri Lanka	98.5	N	1.5	72.4	N	27.6	38.5	N	61.5
India	8.4	N	91.6	N	1.1	98.9	2.4	2.5	95.1
China	N	N	N	0.1	9.2	90.7	5.2	2.0	92.8
MNRPCs	97.4	N	2.6	71.1	0.6	28.3	61.4	0.3	38.3
IACs	0.7	23.0	76.3	0.6	16.0	83.4	0.5	13.1	86.4
Rest of the World	50.1	1.7	48.2	22.0	12.2	65.8	17.8	16.4	65.8
World	28.9	14.7	56.4	11.2	13.8	75.0	13.4	11.3	75.3
World (Million US$)	5935	3013	11583	4200	5192	28271	7301	6145	40974

RP - Rubber Products

Source : UN, 1983; 1995; 1997

38.3 per cent has been nullified by the decline in the unit value of exports of NR leading to a decline in the relative share of NR by 36 percentage points (Table 5). Conversely, the share of IACs in the total value of world exports of rubber and rubber products has improved by 7.4 percentage points (Table 4) mainly on account of a structural shift in the composition of export earnings in favour of value added rubber products from 76.3 per cent in 1980 to 86.4 per cent in 1996 (Table 5). Though the observed trends in the rest of the world are in tandem with the other two groups, its share in the total value of exports has declined by 4.7 percentage points during the period. Among the MNRPCs, India and China have been maintaining the unique status of realising more than 90 per cent export earnings from rubber products.

From the analysis of trends in exports, the most discernible trend observed has been the preeminent position of IACs sustained over time and a marginal decline in the share of this group in the total value of world exports of rubber products. However, the disaggregate level analysis of the world rubber products exports shows that the IACs control 82 per cent of the world tyre and tube exports and 77.2 per cent of non-tyre exports even in 1996 (Table 6). This phenomenon has to be viewed in the backdrop of a steady structural shift in the composition of world exports of rubber products illustrated by a relatively higher CGR in the export values achieved by the non-tyre products (10.4%) compared to tyre and allied products (7%) during 1980-96 period. Table 6 illustrates the significant inroads made by the MNRPCs into the world non-tyre product exports at the expense of both IACs and rest of the world. The relative share of MNRPCs in the total value of world exports of non-tyre products registered an increase by 12.0 percentage points compared to the increase in tyre and allied products only by 5 percentage points during 1980-96. Malaysia and Thailand have exhibited better performance in capitalising emerging opportunities in the world market for non-tyre products followed by China and Sri Lanka.

It is important to note that country level concentration has declined by around 10 percentage points in the case of exports of tyre and non-tyre products (Table 7). The decline in geographical concentration was mainly due to the increasing cross border operations of the multinational corporations (MNCs) and the relocation of manufacturing facilities from IACs to the South. In fact, the four firm concentration in global sales of tyres has increased from 49 per cent in 1979 to 60.1 per cent in 1998 due to increasing mergers, acquisitions, FDI etc. during 1980s and 1990s. (Barlow *et al.*, 1994; EIU, 1999;

Table 6. Relative share in total values of world exports of tyre and non-tyre products

Country /Bloc	Relative Share (%)					
	Tyre exports			Non - Tyre exports		
	1980	1990	1996	1980	1990	1996
Malaysia	0.1	0.1	0.4	0.9	4.4	7.9
	(35)	(39)	(34)	(15)	(7)	(5)
Indonesia	N	0.4	1.0	N	0.1	0.3
	(*)	(25)	(15)	(*)	(43)	(29)
Thailand	0.2	0.5	1.0	0.4	1.5	3.4
	(22)	(19)	(17)	(23)	(14)	(9)
Sri Lanka	N	0.1	0.4	0.1	0.1	0.4
	(*)	(44)	(32)	(30)	(35)	(25)
India	0.3	0.6	0.6	0.2	0.3	0.3
	(19)	(17)	(28)	(26)	(26)	(32)
China	N	0.6	2.2	N	0.8	1.3
	(*)	(16)	(12)	(*)	(19)	(15)
MNRPCs	0.6	2.3	5.6	1.6	7.2	13.6
IACs	85.1	86.6	82.0	82.5	81.3	77.3
Rest of the World	14.3	11.1	12.4	15.9	11.5	9.1
Relative Share (%)	69.3	61.2	57.9	30.7	38.8	42.1
World (Million US$)	8030	17307	23710	3553	10964	17264

N - Nil /Negligible Rankings are given in the parentheses (*) Rank below 50

Source : UN, 1983; 1995; 1997

Mohankumar and George, 2000). Though structural concentration of the exports of non-tyre products had been less pronounced compared to the tyre sector (Vettor, 1978), the recent acquisitions and mergers are strong pointers towards higher vertical and horizontal integration in the era of globalisation (Begin, 1999; Davis, 1999)

Interregional trade and market potential

A recent study by UNCTAD has classified rubber products into the group of industries which possess potential to penetrate into export markets in the early stages of industrial development. The rubber product industries of MNRPCs are more competitive compared to those of IACs due to lower labour cost. The estimates of ratio of wages per employee to value added per employee expressed as a ratio to the US level in 1995 in India, Indonesia, Malaysia and Thailand were 0.88, 0.72, 0.76 and 0.56 respectively (UNCTAD, 1996, 1999). The two other important dimensions of world trade in rubber products are the direction of trade as well as relative size of the market. Over 80 per cent of the world trade in rubber products is among developed countries belonging to Organisation for Economic Co-operation and Development (OECD). The rubber products exports are highly concentrated as even in 1996 US and Germany accounted for 13.2 and 10 per cent of tyre and tube imports and 12.8 and 9.8 per cent of non-tyre imports respectively. Other major importers of rubber products were UK (5.7%), France (5.4%), Canada (4.9%), Italy (4.6%), Netherlands

Table 7. Country level concentration in rubber product exports.

Sector	Share of first 10 countries in exports		
	1980	1990	1996
Tyre	86.4	81.5	74.2
Non-tyre	85.1	81.1	76.0
Total	86.0	81.3	75.0

Source : UN, 1983; 1995; 1997

(3.9%) and Spain (3.6%) (UN, 1997). Malaysia dominated exports of rubber products to the OECD markets during early 1990s by accounting for 45 per cent of total OECD imports from developing market economics, followed by Thailand (17%), China (5.2%), India (4.4%) and Sri Lanka (4.3%). However, the share of developing countries in the rubber products consumption of the North was only 3.1 per cent during 1995. The UNCTAD study assuming the continuation of the present annual growth rate of 4.9 per cent estimated the growth of the size of the Northern market from US $ 111.5 billion in 1995 to US $ 179.8 billion in 2005 (UNCTAD, 1999).

The emerging trends in the global rubber products manufacturing industry since early 1990s indicate further concentration and integration in production and marketing. This trend is more explicit in the dominant automotive tyre manufacturing sector. The operations of MNCs in rubber products are more focussed on the fast growing Asian market compared to the smaller markets of Latin America and Africa (Mullinex 1997). Even the latex based rubber products sector with specific locational advantages are increasingly being controlled by the MNCs based in developed countries as evident from the steady shift of glove manufacturing facilities from Malaysia to Thailand by multinationals such as Ansell, Safeskin Corporation, Semperit and Allegiance Group (Bachik, 1997; Muller, 1999).

CONCLUSION

Though commendable progress bad been achieved by MNRPCs in NR based value addition and product exports, the group's relative share in total value of global rubber based exports had declined over time. A logical explanation for the observed trends could be a secular decline in the prices and terms of trade of NR and rubber products exported by MNRPCs *vis-a-vis* the exports of IACs. Inspite of the achievements of India and China in South-South trade, the emerging global trends underline serious limitations on further growth in this direction. The rich dividends obtained by Malaysia, Thailand and Sri Lanka from the focussed exports of latex based products to OECD markets are also increasingly being threatened mainly by the steady growth in mergers and acquisitions as well as high degree of product concentration. A long term policy for sustained value addition of NR in the MNRPCs has to focus on diversified markets and products with specific locational advantage in terms of higher NR content, labour intensity, negligible brand loyalty and import restrictions.

REFERENCES

Bachik, A.T. 1997. Malaysian Rubber Review, 18 (2): 32-40

Barlow,C. 1978. The natural rubber industry : Its development, technology and economy in Malaysia, Oxford University Press, Kaula Lumpur, 500 p.

Barlow,C., Jayasuriya, S.and Tan, C.S. 1994. The world rubber industry. Routledge, London, 364p.

Begin, S. 1999. Copper acquires standard products, *European Rubber Journal,* **181** (9):2.

Davis, B. 1999. Bridgestone remains No.1 in non-tyres, *European Rubber Journal*, **181** (9):6-7.

Drabble, J.H. 1973. Rubber in Malaya 1876-1922: The genesis of an industry, Oxford University Press, London, 256 p.

Drabbe, J.H. 1991. Malayan rubber : The inter - war years, Macmillian Academic and Professional Ltd, London, 362 p.

EIU. 1999. A review of M&A activitiy in the automotive rubber market, *Rubber Trends*, June, Economist Intelligence Unit, London, pp 57-66.

George, K.T. 1999[a]. Resource base and industrialisation: The case of rubber based industrial sector in Kerala, International Seminar on Resource-based Industrialisation of Kerala/India, December 18, Department of applied Economics, Cochin University of Science and Technology and MHO Netherlands.

George, K.T. 1999[b]. Elastomer industry : Challenges in the new millennium, The Hindu, November 3, p.26.

George, K.T. and Sethuraj, M.R. 1996. Dynamics

of world natural rubber economy: Its relevance to India, *Economic and Politicl Weekly,* pp 77-86.

ISRG. 1974. World Rubber Statistics Handbook, International Rubber Study Group, London, Vol.1.

ISRG. 1984. World Rubber Statistics Handbook, International Rubber Study Group, London, Vol.2.

ISRG. 1986. World Rubber Statistics Handbook, International Rubber Study Group, London, Vol.3.

ISRG. 2000. Rubber Statistical Bulletin, International Rubber Study Group, London, June 54 (9)

Knorr, K.E. 1945. World rubber and its regulation, Stanford University Press, California, pp 248-254.

Mathyoo, A.T. 1960. The rubber manufacturing industry, Association of Rubber Manufacturers of India, Calcutta 188 p.

McFadyean, A. 1994. The history of rubber regulation (1934-43), George Allen and Unwin, London, 239 p.

MohanaKumar,S. and George, K.T. 2000. Economic reforms in India : Impact on automotive tyre industry, *Economic and Political Weekly,* (forthcoming)

MohanaKumar,S. and George, K.T. 1999. Indian rubber products manufacturing industry: Evolutionary dynamics and structural dimensions, Monograph, Rubber Research Institute of India, Kottayam, Kerala, 39 p.

Muller,E. 1999. Exports of rubber products from Thailand, *The Rubber International,* I (4) 80-84

Mullinex, N. 1997. The future structure of the world tyre industry, International Rubber Forum -Rubber Industry Perspective, International Rubber Sutdy Group, London, pp 74-95.

Sarma, P.V.S. 1947. A short note on the rubber plantation industry in India, Government of India, India Rubber Board, Kottaya, 16 p.

UN. 1983. International Trade Statistics Year book, United Nations council for Trade and Development, Geneva, Vol 1&2.

UN. 1995. International Trade Statistics Year book, United Nations council for Trade and Development, Geneva, Vol 1&2.

UN. 1977. International Trade Statistics Yearbook, United Nations Council for Trade and Development, Geneva Vol 1&2.

UNCTAD. 1996. Trade Development Report 1996, United Nations Council for Trade and Development, pp 115-116.

UNCTAD. 1999. Trade Development Report 1996, United Nations Council for Trade and Development, pp 134-146.

Vettor, J.H. 1978. World rubber and tyre markets, Predicasts Inc. Ohio, p.137.

World Bnak. 2000. Global commodity markets : A comprehensive review and price forecast, April, No.2,pp 76-82.