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table

UNIDO INDUSTRY REPORTS
MARKET PULP

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Pulp & Paper International

(a) Recent trends and current conditions

Market pulp is considered as the leading indicator of the pulp and paper business. When the price for pulps made for sale on the international markets falls, the health of the whole industry can generally be said to be weakening. When it rises, the pulp and paper business is usually in for a run of good fortune. The relationship is not just superstition, because market pulp is an indicator of the cost of fiber, which in turn is the main operating cost for paper and board mills around the world.

About 92% of the 34.9 million tons of market pulp made in the world in 1991 was chemical woodpulp (see Table). That is to say, pulp manufactured by chemical treatment of wood, rather than grinding. Some 78% is so-called kraft pulp, made by the cooking of wood in sulfate (alkaline) solutions. Such pulps are prized for their high fiber strength. Sulfite pulps and semi-chemical pulps account for the rest of the chemical pulp output. Most of these chemical market pulps are used for papermaking. Just 8.2% of the pulp output is used in other applications such as textiles.

Mechanical woodpulp, made by grinding, are far less important as commodities, accounting for just 6.2% of the total production. The dominant grades are chemi-thermomechanical pulps, recently-developed pulps, in which woodchips are treated by heat and chemicals before grinding.

The rest of the market is made up of specialized fibers, such as nonwood pulps and some wastepaper pulps. The latter are becoming increasingly popular as environmental pressure for recycling grows in the developed countries.

The developed countries, especially North America, accounted for the lion's share (85.1%) of the output in 1991 (see Table 2). But there are some significant participants in the market among the developing countries. Brazil, with 5.8% of world output in 1991 is especially important, as is Chile with 2.1%. And a new Asian player in the market - Indonesia - is rapidly building up capacity and output.

The biggest importers of market pulp are also the developed nations. Western Europe is the biggest consumer, importing 12.9 million tons in 1991, out of the 24.3 million tons traded across national frontiers. The developing nations have been aided in their penetration of the pulp market by the availability of fast-growing plantation forests and low labor costs. Typically, wood accounts for 50% of total operating expenditure, so countries which can grow wood to maturity in short periods can score an advantage over their competitors.

Brazil has led the way with the development of eucalyptus (hardwood) plantations with a cycle time of six to seven years. Similar growing conditions for this species exist in parts of Chile, in Indonesia, in Argentina and in parts of Africa.

Chile has been a pioneer on the softwood side: its radiata pine plantations typically reach maturity in twenty-four years. Of course, fast-growing trees are only part of the story. The fiber pulp produced must meet the very specific demands of the papermakers. Traditionally, the softwood fiber of the Nordic and Canadian regions has been regarded as the highest quality available.

But low wood costs are undoubtedly standing the developing nations in good stead, and there may well be a further drift of production capacity further south over the next few years. With high fiber costs, northern producers may seek higher-value applications for their fiber.

Market conditions in 1992 were not favorable, with demand sluggish towards the end of the year and oversupply weakening pricing. On top of this, environmental considerations led many producers to invest heavily in new technology at the end of the 1980s and first two years of the 1990s, resulting in heavy debts and a weakened company structure. Despite these problems, output probably grew marginally in many countries (see Table 3). Some of the figures in this table are preliminary and the final figures may be higher.

Prices for market pulp are notoriously cyclical. Table 4 illustrates the way that the current downswing has developed in the world's biggest buyer market - Europe - since 1989. Northern bleached softwood kraft (NBSK) pulp is considered the benchmark grade of the industry and pricing is given here in both US dollars and deutschemarks. But for completeness, the table includes three other grades, US southern pine (softwood) pulp, northern birch (hardwood) and eucalyptus pulp (hardwood).

At the end of the first quarter of 1993, a resolute attempt was being made by several suppliers to raise prices again to restore the profitability of the producers. Industry sources thought that the rise stood a reasonable chance of success, although recessions in some of the major buying nations, especially Germany and Central Europe and Japan threatened to keep demand and prices weak.

Complicating the market, environmental pressure from consumers of paper in some major markets has forced producers to develop new grades of pulp, bleached without chlorine or chlorine chemicals. These pulps are subject to higher production costs and carry a premium on the market. Typically, this amounts to DM 120/ton CIF in Germany (see section (e) on Environmental Considerations and Energy).

TABLE 1: MARKET PULP 1991: OUTPUT BY GRADE AND CONTINENT (1,000 tons)

Grade	Europe	North America	Latin America	Asia	Australasia	Africa	Total
Bleached softwood kraft	3,489	8,695	734	91	122	75	13,206
Bleached hardwood kraft	4,203	3,152	1,789	1,168	-	171	10,483
Semi-bleached softwood kraft	141	319	30	-	28	-	518
Unbleached softwood kraft	522	564	382	268	140	160	2,036
Unbleached hardwood kraft	27	-	19	21	-	-	67
Dissolving, high-alfa kraft	23	628	13	-	-	-	664
Bleached softwood sulfite	1,256	542	22	26	-	-	1,846
Bleached hardwood sulfite	372	-	-	-	-	-	372
Semi-bleached softwood sulfite	12	-	-	-	-	-	12
Unbleached softwood sulfite	232	-	1	-	-	-	233
Dissolving, high-alfa sulfite	302	998	2	185	-	435	1,922
Stone groundwood	371	45	-	-	-	-	416
Refiner mechanical	34	80	-	-	10	-	124
Chemi-mechanical	70	-	-	-	-	-	70
Thermomechanical	45	112	-	-	-	-	157
Chemi-thermomechanical	338	870	58	-	116	-	1,382
Semi-chemical	213	-	-	40	-	-	253
Soda	-	-	49	-	-	-	49
Bagasse	-	-	25	48	-	3	76
Cotton linters	40	165	-	-	-	-	205
Esparto	-	-	-	-	-	41	41
Straw	12	-	-	-	-	8	20
Other nonwood	3	-	-	116	-	-	119
Deinking	85	106	-	-	-	-	191
Other recycled	2	12	-	-	-	-	14
Total	11,792	16,288	3,124	1,963	416	893	34,476

Source: Pulp & Paper International, Market Pulp Survey 1992. (Brussels, Miller Freeman Inc., August 1992).

TABLE 2: MARKET PULP 1990-91: OUTPUT AND TRADE BY MAJOR PRODUCING COUNTRIES
(1,000 tons)

	Production 1991	Percentage share
Developed countries		
United States	7,982	22.9
Canada	7,789	22.3
Sweden	3,371	9.7
CIS (estimate)	2,000	5.7
Finland	1,575	4.5
Portugal	1,315	3.8
Japan	954	2.7
France	781	2.2
Spain	744	2.1
Norway	597	1.7
Developing countries		
Brazil	2,039	5.8
Chile	740	2.1
Taiwan Province	320	0.9
Argentina	250	0.7
China (estimate)	245	0.7
SHARE OF OUTPUT 1991		
	Production	Percentage share
A. North America	15,771	45.2
Western Europe	9,577	27.5
Japan	954	2.7
Eastern Europe	2,785	8.0
Other	591	1.7
Total A	29,678	85.1
B. Asia		
Centrally planned economies (including China)	245e	0.7
Market economies	888	2.5
Latin America	3,234	9.3
Africa	815	2.3
Total B	5,182	14.9
Total, A and B	34,860	100.0

Source: Pulp & Paper International, Fact and Price Book 1993 (Brussels, Miller Freeman Inc., December 1992).

TABLE 3: MARKET PULP PRODUCTION, 1992 ESTIMATES (1,000 tons)

United States	8,980
Canada	6,985
Sweden	3,380
Russia (approx)	1,950
Finland	1,540
Portugal	1,300
Japan	930
Spain	810
France	800
New Zealand	656
Brazil	2,173
Chile (approx)	800
Argentina	253

Source: Pulp & Paper International, Road to recovery is no easy climb (Brussels, Miller Freeman Inc., January 1993), pp.33-41.

TABLE 4: MARKET PULP PRICES IN EUROPE 1989-93

Quarter	NBSK (US\$)	NBSK (DM)	Southern pine (US\$)	Birch (DM)	Eucalyptus (Ecu)
1989					
I	810	1,435	780	1,340	645
II	840	1,530	810	1,440	690
III	840	1,630	810	1,520	725
IV	840	1,630	810	1,520	725
1990					
I	840	1,400	680	1,300	640
II	840	1,400	650	1,250	610
III	800	1,310	650	1,100	530
IV	775	1,100	630	975	465
1991					
I	715	1,075	605	895	430
II	625	1,050	540	880	435
III	520	950	480	900	435
IV	490	850	450	900	440
1992					
I	530	870	480	905	440
II	550	870	520	960	470
III	600	870	560	900	440
IV	500-540	870	460-490	820	360-390
1993					
I	425-440	730-750	380-400	-	310-340

Source: PPI This Week (Brussels, Miller Freeman Inc, 1992-93).

(b) Manufacturing capacity of the developing countries

It is difficult to put precise figures on production capacity for market pulp. Several mills have the ability to swing between production for the market and production for neighboring paper machines. Some pulp is also tied to the operations of particular buyers and, strictly speaking, does not qualify as market pulp. PPI estimates total market pulp capacity at around 43 million tons in 1992. Table 5 gives PPI's best estimates of the market pulp capacity of several of the developing countries in that year.

TABLE 5: MARKET PULP CAPACITY IN DEVELOPING COUNTRIES IN 1992 (1,000 tons)

Developing country	Market pulp capacity	Percentage of world total
Brazil	2,500	5.8
Chile	1,000	2.3
Taiwan Province	460	1.1
Indonesia	350	0.8
China	285	0.7
Argentina	265	0.6
Swaziland	180	0.4
Thailand	130	0.3

Source: Pulp & Paper International, Market Pulp Survey 1992. (Brussels, Miller Freeman Inc., August 1992).

(c) Capacity utilization and expansion plans

Again, because of the existence of swing machines and tied tonnage, it is extremely difficult to give an accurate capacity utilization figure. However, Taking PPI's best estimate of total capacity, we believe that in 1991 the industry ran at only about 81% of its total capacity. The period 1990-end 1992 saw a number of new projects come on stream. However, with weakening markets and low prices in that period, many plans have for further expansion have been returned to the shelf to await the upturn. With so little definite new capacity coming on stream, there should be a chance for the market to recover its supply-demand balance. It is very noticeable that most of the new projects are in the developing countries.

TABLE 6: SOME RECENT AND PROPOSED MARKET PULP CAPACITY EXPANSIONS 1992-96 (1,000 tons)

Country	Company	Additional capacity	Comments
Finland	Enocell, Uimaharju	150	Started up
Finland	Metsä-Botnia, Rauma	400	Not before 1996
France	CDRA, St. Gaudens mill	120	Started up
France	CDRA, Tarrascon mill	40	Started up
Portugal	Celbi, Figueira da Foz	360	Not likely before 1996
Sweden	Södra Skogsägarna, Mönsteras mill	400	Not likely before 1996
Canada	Alberta-Pacific, Alberta	500	Starting up in 1993
Canada	Celgar Pulp, BC	220	Starting up in 1993
Canada	Millar Western, Meadow Lake, Saskatchewan	200	Started up
Canada	Shin Ho Canada, Ontario	150	Unlikely before 1995
Canada	Tembec, Temiscaming	150	Started up
USA	Weyerhaeuser, Plymouth, North Carolina	125	To start in 1995
Argentina	Celulosa Puerto Piray Misiones	210	No date fixed
Argentina	Massuh, Paso de Libres, Corrientes	120	Not before 1995
Brazil	Bahia Sul, Mucuri, Bahia	250	Started up
Brazil	CVRD	500	Not before 1996
Brazil	Cenibra, Minas Gerais	350	To start in 1994
Brazil	Norcell, Bahia	420	Not before 1996
Brazil	Riocell, Guaiba	320	Not before 1995
Chile	Attisholz	80	To start in 1995
Chile	Celulosa Pacifico	315	Started up
China	Qingzhou, Fujian	150	To start up in 1994
Indonesia	Indah Kiat, Riau	400	To start up in 1993
Indonesia	Inti Indorayon, Riau	500	To start up in 1996
Indonesia	Riau Andalan, Riau	500	To start up in 1995
Indonesia	Wira Karya Sambi, Jambi	350	To start up in 1995
Indonesia	Tanjung Enim Lestari, Sumatra	410	To start up in 1995
Thailand	Phoenix Pulp & Paper Khonkaen	100	To start up in 1993

Source: Pulp & Paper International, Capacity Investment Survey (Brussels, Miller Freeman Inc., 1993).

(d) Restructuring and deployment

The tendency for the northern mills in industrialized countries to move into higher-value added products will continue. Although currency devaluations have increased the competitiveness of these companies, longer-term their fiber costs look set to rise faster than those in the developing nations. Some specialist and dedicated market pulp producers will continue to guard their positions, but many others will seek refuge from the pulp cycle in higher-value-added products.

In the developing nations, too, there may be some drift towards integration. Brazilian companies are already contemplating becoming major suppliers of uncoated woodfree papers to Europe and North America, based on their own eucalyptus pulp. Rather than build the paper machines in their own country, some producers may seek partners in their main markets. Some pressure may also come to be felt by the Indonesians as capacity in the Asian region grows.

Overall, however, it seems likely that the centers of market pulp supply will continue to move south. More companies from the industrialized world will buy shares in plantations and market pulp mills in the south as a means of protecting their fiber supplies. Examples of this are already occurring, with Chile the center of attention so far.

Around the turn of the century, New Zealand may also become a center for investment in pulp capacity. Its radiata pine forests, which will be maturing about then, yield a similar quality of fiber to those of Chile, and could therefore play an important role on the market.

Another area of the world with promise as a market pulp producer is Eastern Europe. Poland and the Czech Republic both have some potential to supply Europe's biggest buying market, Germany, with softwood kraft pulp. However, the operational cost advantages of these countries may be outweighed for a long time by the heavy investment needed to rebuild their old and inefficient mills.

It should also be recognized that recently-developed solvent pulping methods could - if they prove successful - allow small but competitive market pulp mills to be built in many locations around the world.

Finally, the restructuring of the market pulp industry could also be given impetus by government action. In particular, if the European Community begins a subsidized program to plant trees in order to take agricultural land out of production, the Community could start to be a good site for new, competitive mills.

(e) Environment and energy considerations

Producers of market pulp are having to react to the rapidly-changing environmental concerns of their customers, the papermakers. The latter are, in turn, responding to pressure from paperusers, often corporations seeking a "Green" image. Much of the environmental debate has been led by pressure groups such as Greenpeace, which have had considerable success in changing public opinion. The market pulp industry has been re-active rather than pro-active throughout.

It is worth noting that the changes demanded by environmentalists in manufacturing processes and product specifications are rarely guided by hard scientific experiment, but rather by intuitively-constructed guidelines put forward by the pressure groups.

The level of environmental awareness also varies greatly from country to country. Central Europe, especially Germany, is acting as the trail-blazer, with North America and the UK also becoming more Green. Concern about such issues is more muted in the developing countries.

Broadly, there are three main concerns affecting this industry: (1) forestry practices; (2) bleaching and effluent management practices; and (3) the demand for an increased level of paper recycling.

(1) Arguments about forestry practices center on the following: the use of old-growth forest for pulp and papermaking; clear cutting of large areas of forest; the use of chemical fertilizers and pesticides; the sustainability of plantation forests of fast-growing species; and concerns for wildlife and the maintenance of a diversity of species in the forest. For the pulp industry, these concerns have to be balanced against the need for cheap fiber.

It seems certain that regulations restricting logging of old-growth forest will tighten in North America. Similarly, laws and guidelines for protecting rare animals and birds will be introduced, making fiber from some regions (notably the Pacific Northwest) more expensive.

Elsewhere, pulp companies will need to submit their forestry procedures to more public scrutiny. Setting aside "islands" of untouched native forests as nature reserves within plantations is one way forward which is already practiced by some of South America's largest companies. Developing new disease and pest-resistant trees by genetic manipulation is also to be a priority in avoiding the overuse of harmful chemicals.

Despite growing environmental opposition, plantation forests of fast-growing species will be a dominant source of fiber for the industry and will limit the industry's demand for land. Planting on unused wasteland, rather than replacing native forest, will make such plantations more acceptable.

(2) The focus of environmental concern within the pulp mill has fallen on the use of chlorine and its derivatives as bleaching agents. Ever since minute traces of dioxins were found in pulp mill effluent in the mid-1980s, the environmental pressure groups have been engaged in a public relations campaign to eliminate all chlorine compounds from the bleach plant. This is despite the fact that no solid evidence of harm to marine or land life resulting from chlorinated organic compounds has yet been advanced.

Pulp producers responded to the clamor from the marketplace, first by introducing elementally-chlorine-free (ECF) grades, made without the use of molecular chlorine, but still using some chlorine dioxide as a bleaching agent. Lately, TCF, or totally-chlorine-free grades have been developed, using a range of alternative bleaching chemicals including hydrogen peroxide and ozone. Today the brightness of these pulps is approaching that of chlorine-bleached pulp, and such grades sell at a premium to reflect their higher production costs.

It must be stressed that most of these changes have been driven by market

forces. Whether they have had the effect of improving the environment is debatable. It is also unclear which bleaching chemicals will eventually supersede chlorine compounds in the future. Although ozone is currently showing promise, a number of other chemicals are under investigation. It is equally important to notice that demand for bleaching chemicals depends on the stages of the pulp line which precede the bleach plant. The initial cooking process - in which the lignin which binds together the fibers is dissolved in a chemical solution - is crucially important. It is the lignin which gives the pulp its brown color. The more lignin removed in cooking, the lower the demand for bleaching chemicals. New cooking technology, both batch and continuous, is allowing more lignin to be removed early in the process without impairing the strength of the fibers. The installation of an oxygen treatment stage after cooking also permits more lignin to be removed, again reducing bleaching chemical demand.

While the industry has reacted fast to the market-led call for low-chlorine and TCF pulps, new research is showing that some natural compounds present in the tree itself may be harmful to the environment if released with mill effluent. It seems essential that the research begun to solve the chlorine "problem" should eventually lead to effluent-free pulp production (see below). Unfortunately, the low profitability of the industry at present may put the brakes on this development for a good few years.

(3) In developed countries, waste disposal is becoming a major problem because of the exhaustion of available landfill sites. Since paper can form up to 40% by weight of the trash going to landfill in countries such as the USA a movement to encourage more recycling has started. Potentially, this could change the role of the market pulp industry. The world currently recovers 37% of the paper and board it consumes for recycling. Roughly 37% of the materials used for papermaking worldwide are made up of waste. But there are enormous differences among countries. In the USA in 1991, for example, just 30% of raw materials used for papermaking was waste. In the Netherlands, it was 66%. The danger confronting the market pulp producers is that governments will mandate the use of recycled fibers to solve the landfill crisis. If legislation demanding minimum recycled fiber contents for printing papers were to be passed, for example, the effect on the industry would undoubtedly be significant. It is not possible yet to offer precise figures.

Again, there is a concern that recycling legislation will not necessarily aid the environment. For example, the chemical pulp process is energy self-sufficient, whereas energy has to be put in to slush wastepaper, and this will often be generated from fossil fuels. Also since fibers cannot be recycled indefinitely (the maximum is five times), a fresh flow of fiber will always be required. Legislation could tamper with that need and cause difficulties for papermakers in maintaining product specifications.

(f) Technological trends

Besides the advances being made in cooking procedures mentioned above, the other main trend is towards the "closed" mill. That is, the closing of the mill's water cycles so that no effluent is expelled from the production process. The process will take time to develop and may even prove impossible. Some commentators have seen chlorine compounds from the bleach plant as the main obstacle to closing the loops, but others say that this is not so. At least two major projects, one of them a six-month trial in Finland, have been conducted to assess the next steps.

(g) Short- and medium-term outlook

It seems that the bottom of the cycle has been reached and that market pulp producers can expect a recovery in their fortunes over the next few years. Much will depend on how fast economic growth recovers in the industrialized nations. A continuing recession in the European Community and Japan would mean that efforts to raise prices would progress only sluggishly. Most commentators feel that a full recovery will arrive during 1994. However, most also accept that the industry will not quickly shake off its boom and bust cycles.

It is likely that the developing nations will play a stronger role in this industry, and that South America and Indonesia will increase in importance as fiber suppliers in the medium term.

The pressures on the industry to respond to environmental pressure groups will continue unabated. It seems likely that TCF pulps will eventually become the norm, but that the closing of the mill will not be achieved until the end of the decade. The focus for market pulp mills may well change in the interim period towards the management of fiber resources and the challenge of recycled fiber.