The Republik of South Africa´s forest sector

Lars Lönnstedt

The Swedish University of Agricultural Sciences
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Abstract

The South African consumption of paper and paperboard in 2006 was about 2.5 million tons. The total production was 2.9 million tons. (Sweden's was 12 million tons.) Production of "Other paper and paperboard" was dominating (1.8 million tons), other than "Printing and writing paper" and "Newsprint". The total export of paper and paperboard was almost 1 million tons. (Export of paper and paperboard from Sweden was 10.8 million tons.) The South African consumption of sawn wood was about 2.5 million m^3. The total production was about 2.1 million m^3. (Sweden's was about 17.8 million m^3.) Total export was almost 1 million m^3. (The Swedish' was 13.2 million m^3.)

The forest resources consist of three main types: Plantations, indigenous/natural forests and woodlands/savannas. Plantations cover almost 1.3 million ha of South Africa and are one of the largest planted forests in the world. Indigenous forests cover approximately 0.5 million ha. Savannas contribute the bulk of the wooded land area. Depending on how woodlands are classified the area ranges between 29 and 46 million ha. The round wood production was about 30 million m^3 solid volume excl. bark, compared with Sweden's 62 million m^3. About one third of this volume is coming from plantations.

The industrial use is about 60% (18 million m^3) for South Africa and 90% (56 million m^3) for Sweden. The rest is used as fuel wood and charcoal. The conifer share of the industrial wood is for South Africa 30% and for Sweden 95%.

One advantage for the forest products industry is the well-managed plantations with quickly maturing trees. However, there is a limit for how much land that is suitable for plantations. Another restriction regarding plantation is water supply. The land restitution causes uncertainty about the short term availability of round wood. Thus, supply of wood raw material put an upper limit for the industry's possibility to expand. Another restriction is electricity supply. Further more, there is a shortage of skilled workers.

The sawmilling industry does not show the success story of the pulp and paper industry. Of course the development of the country itself is most important for the development of the forest sector.

South Africa is a rich country and a fairly well developed country. However, problems do exist. The country is still in many ways segregated. One consequence is that skilled people leave the country. The unemployment rate is high. One consequence is criminality which also means a threat for the tourist business. The big differences between developed cities and the country side is another problem. Still other problems are corruption and AIDS/HIV.

Key words: pulp and paper, sawmills, plantations, consumption, production, export, forest products, round wood

Foreword

During three months, starting from mid October 2008, I was a guest professor at University of KwaZulu-Natal, Pietermaritzburg, South Africa. However, I did not know much about the South African forest sector. I was aware that Rottneros planned to move a paper machine to South Africa due to high electricity prices in Sweden. Thus, before leaving Sweden I started to learn more about it. As I expected that I would be asked to give a set of presentations I though it would be a good idea to compare the forest sectors of South Africa and Sweden. I started to collect some statistics. Later on I realized that it could be of value to share this information with others by writing a report. South Africa has two major companies, Sappi and Mondi, competing with Swedish companies on the world market.

The aim of this report is to give an overview of the forest sector of the Republic of South Africa. As the consumption of forest products is the reason for processing and use of wood raw material I start with consumption and end with forest and forestry. In between I present the forest products industry.

The main source of information is different books, articles and reports that I have found on the web. The main data source is FAOSTAT database.

I want to thank MSc European Forestry Erasmus Mundus Consortium for the scholarship that made it possible for me to go to the University of Kwazulu-Natal. Professor Janusz Zwolinski, head of forestry, has been most helpful for arranging my stay. I want to thank him and other colleagues at the university that I worked with and met.

Pietermaritzburg January 6, 2009

Lars Lönnstedt

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South Africa – an overview

The Republic of South Africa is located at the southern tip of the continent of Africa. The South African coast stretches 2 798 kilometers and borders both the Atlantic and Indian oceans. To the north of South Africa Namibia, Botswana, Zimbabwe, Mozambique and Swaziland lie, while the Kingdom of Lesotho is an independent enclave surrounded by South African territory. The total land area is 1 221 037 km² (122.1 million ha) which makes the country the 25th largest in the world. The forest land area is 9.2 million ha, 7.5% of the total land area. (Forest land is defined according to ECE/FAO.) The planted area is almost 1.3 million ha or about 1% of the total land area. Sweden's land area is 41.2 million ha and forest land area is 27.5 million ha.

Independence from Great Britain was achieved in 1961 when South Africa was declared a republic. The leading National Party legislated for a continuation of racial segregation despite opposition both in and outside of the country. The segregation begun under Dutch and British colonial rule, Boer republics, and subsequent South African governments (and which in 1948 became legally institutionalized segregation known as apartheid). In 1990 the then president F.W. de Klerk began to dismantle this legislation, and in 1994 the first democratic election was held in South Africa. This election brought Nelson Mandela and the current ruling party, the African National Congress, ANC, to power, and the country rejoined the Common-wealth of Nations.

South Africa is known for its diversity, and eleven official languages are recognized in its constitution. English is the most commonly spoken language in official and commercial public life; however it is only the fifth most spoken home language. South Africa is ethnically diverse, with the largest Caucasian, Indian, and racially mixed communities in Africa. Although about 80% of the South African population is black, this category is neither culturally nor linguistically homogenous. The black population speaks a number of different Bantu languages; nine of which have official status. Other ethnic groups are white (9.2%), colored (8.9%) and Asian (2.5%). The South African population is estimated at 47.9 million (2008). (Sweden's has about 9 million inhabitants.) The rural people constitute almost 40% of the total population and they are predominately women and children.

By UN classification South Africa is a middle-income country with an abundant supply of resources, well-developed financial, legal, communications, energy, and transport sectors, a stock exchange (the JSE Limited),

that ranks among the top twenty in the world, and a modern infrastructure supporting an efficient distribution of goods to major urban centers throughout the entire region. South Africa is (2007) ranked 30th in the world in terms of GDP (nominal) and 20th if purchasing power parity is used. The estimated nominal GDP was $283 billion and per capita $5,915 (68th in the world).

Even though South Africa for Africa has a high per capita income it suffers from large income gaps and a dual economy marking it as a developing country. South Africa has one of the highest rates of income inequality in the world. A decade of continual economic growth has helped to lower unemployment, but daunting economic and social problems remain. The average South African household income decreased considerably between 1995 and 2000. As for racial inequality, Statistics South Africa reported that in 1995 the average white household earned four times as much as the average black household. In 2000 the average white household was earning six times more than the average black household. The affirmative action policies have seen a rise in black economic wealth and an emerging black middle class. Other problems are crime, corruption, and HIV/AIDS.

Advanced development is significantly localized around four areas: Cape Town, Port Elizabeth, Durban, and Pretoria/Johannesburg. Beyond these four economic centers, development is marginal and poverty is still prevalent despite government efforts. However, key marginal areas have experienced rapid growth recently. Such areas include Mossel Bay to Plettenberg Bay; Rustenburg area; Nelspruit area; Bloemfontein; Cape West Coast; and the KwaZulu-Natal North Coast. Pretoria is the executive capital, Bloemfontein the judicial capital and Cape Town the legislative capital. Johannesburg is the largest city.

At the start of 2000, the president at the time Thabo Mbeki vowed to promote economic growth and foreign investment by relaxing restrictive labor laws, stepping up the pace of privatization, and cutting unneeded governmental spending. His policies faced strong opposition from organized labor. South Africa is also the largest energy producer and consumer on the continent. South Africa is a popular tourist destination, and a substantial amount of revenue comes from tourism. Among the main attractions are the diverse and picturesque culture, the game reserves and the highly regarded local wines.

The South African rand (ZAR) is one of the most actively traded emerging market currencies in the world. It has joined an elite club of fifteen

currencies, the Continuous linked settlement (CLS), where forex transactions are settled immediately, lowering the risks of transacting across time zones. The rand was the best-performing currency against the United States dollar (USD) between 2002 and 2005, according to the Bloomberg Currency Scorecard.

The volatility of the rand has affected economic activity, falling sharply during 2001 and hitting a historic low of 13.85 ZAR to the USD, raising fears of inflation, and causing the Reserve Bank to increase interest rates. The rand has since recovered, trading at 7.13 ZAR to the dollar as of January 2008 but due to the financial crisis the world is facing at the end of 2008 it is trading at about 10 ZAR to a dollar. The inflation rate has been high, about 13% fall 2008, but is expected to fall back to 6-7% at the beginning of 2009. The repo interest rate is presently (December 2008) 12% but is expected to be cut due to lower inflation.

Refugees from poorer neighboring countries include many immigrants from the Democratic Republic of Congo, Mozambique, Zimbabwe, Malawi and others, representing a large portion of the informal sector. With high unemployment levels amongst poorer South Africans, xenophobia is prevalent and many people born in South Africa feel resentful of immigrants who are seen to be depriving the native population of jobs, a feeling which has been given credibility by the fact that many South African employers have employed migrants from other countries for lower pay than South African citizens, especially in the construction, tourism, agriculture and domestic service industries. Illegal immigrants are also heavily involved in informal trading. However, many immigrants to South Africa continue to live in poor conditions, and the South African immigration policy has become increasingly restrictive since 1994.

Principal international trading partners of South Africa – besides other African countries – include Germany, Japan, Switzerland, the United Kingdom, and the United States. Chief exports include corn, diamonds, fruits, gold, metals and minerals, sugar, and wool. Machinery and transportation equipment make up more than one-third of the value of the country’s imports. Other imports include chemicals, manufactured goods, and petroleum.

Consumption and trade with forest products

INTRODUCTION

Consumption is here defined as apparent consumption, i.e., changes in inventories are not considered. Apparent consumption is calculated as production + import - export.

As a reference also production is presented. However, more details about production will be given in the next chapter.

I will also in this chapter present export and import data. I will compare these data with data for Sweden. The forest products industry ranks among the top exporting industries in South Africa.

PAPER AND PAPERBOARD

Consumption and production of paper and paperboard has followed each other relatively closely. As Figure 1 shows, at the beginning of the studied period consumption was somewhat higher while the opposite is true for the last full ten years. One consequence is that export has increased. Also import has increased to some extent.

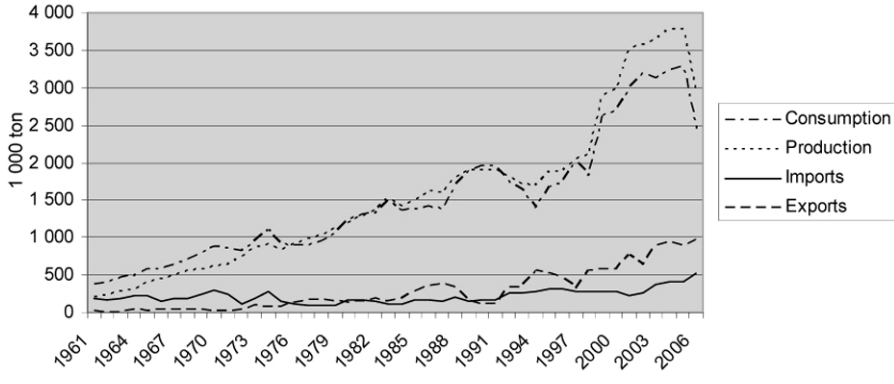

Figure 1. Apparent South African consumption, production, export and import of paper and paperboard 1961-2006. Source: FAOSTAT

Figure 2 compares export of paper and paperboard from South Africa and Sweden. Sweden is a major exporter compared with South Africa (and many other countries). I have chosen also to show pulp export in the same figure. Even for pulp Sweden is bigger but the difference is less.

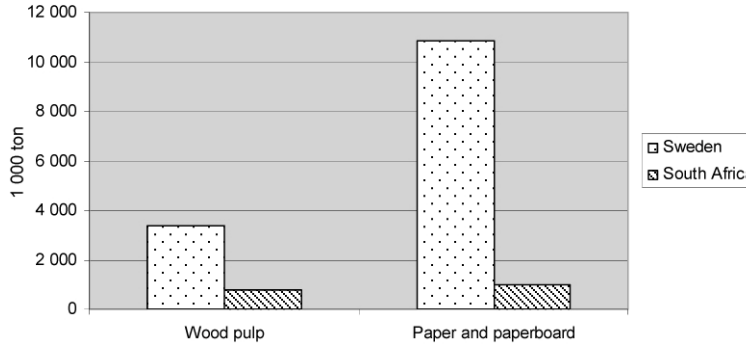

Figure 2. Export of pulp, paper and paperboard in South Africa and Sweden, year 2006. Source: FAOSTAT Database

Figure 3 gives more detail about the consumption of paper and paperboard; the major products are other paper and paperboard while newsprint and printing and writing paper are more marginal. Consumption has increased for all products especially for other paper and paperboard.

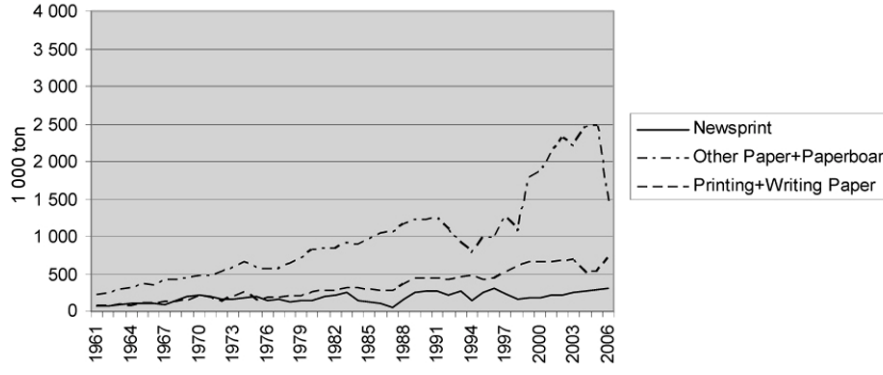

Figure 3. Apparent South African consumption of newsprint, printing paper and paperboard 1961-2006. Source: FAOSTAT

PULP

Also pulp production exceeds consumption during the last two decades of the studied period (Figure 4). Import is marginal while the tendency for export is an increase.

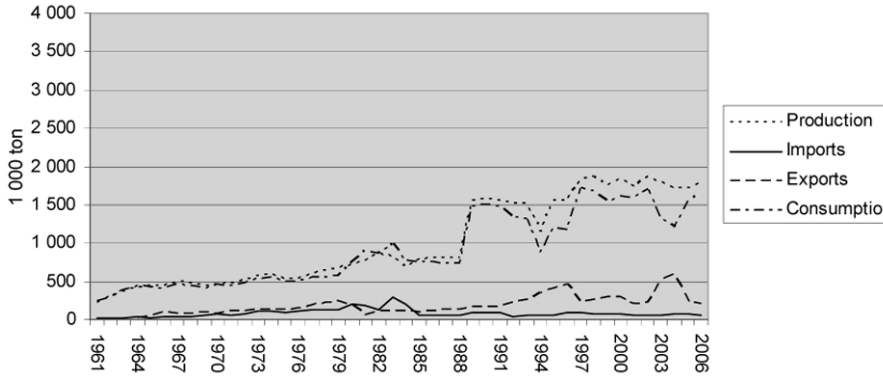

Figure 4. Apparent South African consumption, production, export and import of pulp 1961-2006. Source: FAOSTAT

It does not take a full ton of pulp for making a ton of paper and paperboard as for example clay and other materials are added. However, this is marginal. Thus, one can conclude after a comparison of Figure 1 and 3 that other fiber sources than wood raw material are used, as recycled paper. More information about this will be given in the chapter about forest and forestry.

SAWN WOOD

Consumption has during the studied period more or less been higher than production except for the years around 1990 when they are pretty close to each other (Figure 5). The gap has been filled by import. Export is marginal.

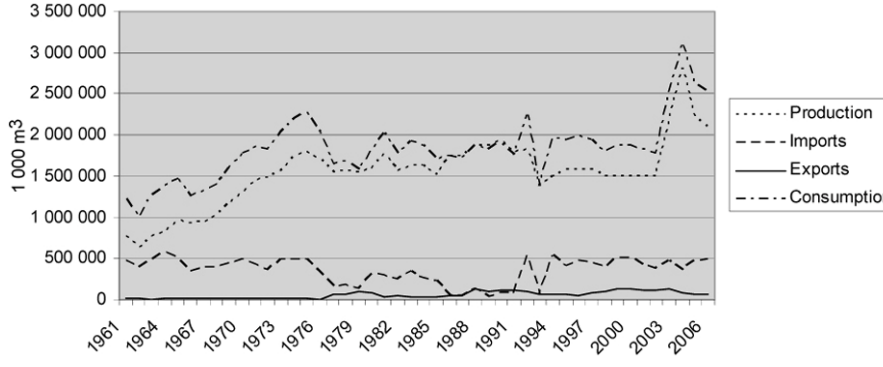

Figure 5. Apparent South African consumption, production, export and import of sawn wood 1961-2006. Source: FAOSTAT

As already stated, sawn wood export from South Africa is marginal. Figure 6 shows export of sawn wood from Sweden. It is far from marginal.

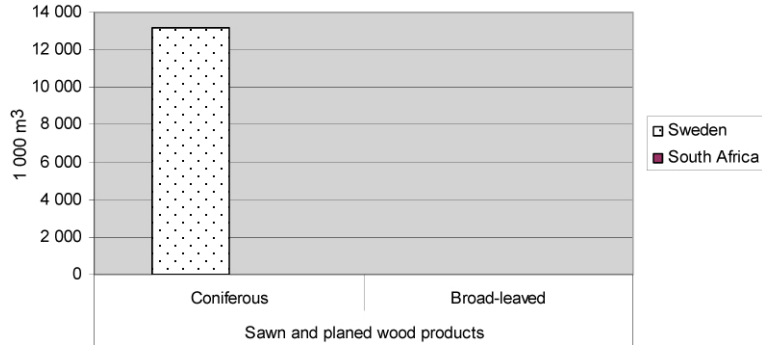

Figure 6. Export of sawn wood from South Africa and Sweden, year 2006
Source: FAOSTAT Database

Production of forest products

INTRODUCTION

The South African pulp and paper sector has been successful. The companies have employed modern technology and improved continually, both in the plantations and in the manufacturing process and moved quickly to an export-led strategy when production exceeded domestic demand (compare with Figure 1). This success contrasts strongly with the sawmilling sector, which has had a protectionist strategy, where exports were slow to develop, and innovation has been weak. (Jackson, 2006)

Let me as an introduction present some general data about the forest products companies. Table 1 presents average size of plant by consumption of roundwood and number of plants. Table 2 presents employment figures. Compared with Sweden that is producing much more the employment numbers are very large, not the least for forestry.

Table 1. Average size of plant by intake1980 vs. 2007 and number of processing plants by type, 2007. Source: Godsmark, 2008

Type of processing plant	**1980**	**2007**	
	1000 m^3		**Number**
Pulp, paper and paperboard	351	694	20
Sawmills	25	43	102
Management timber mills	72	63	13
Pole mills	7	11	38
Other	26	59	5
TOTAL	-	-	178

Table 2. Employment in the forest sector 2007. Source: Godsmark, 2008

Sub-sector	Number of employees		Total employment
	Direct	Indirect	
Forestry	76 844	30 000	106 844
Pulp and paper	13 200	10 781	23 981
Sawmilling	20 000	n/a	20 000
Timber board	6 000	n/a	6 000
Mining timber	2 200	n/a	2 200
Other	11 000	n/a	11 000
TOTAL	129 244	40 781	170 025

PAPER AND PAPERBOARD

Production of other paper and paperboard is dominating as is consumption (compare Figure 7 with Figure 3). Production has increased quite substantially as has consumption. Also production of printing and writing paper has increased while production of newsprint has since the beginning of the 1980s been quite stable for almost two decades.

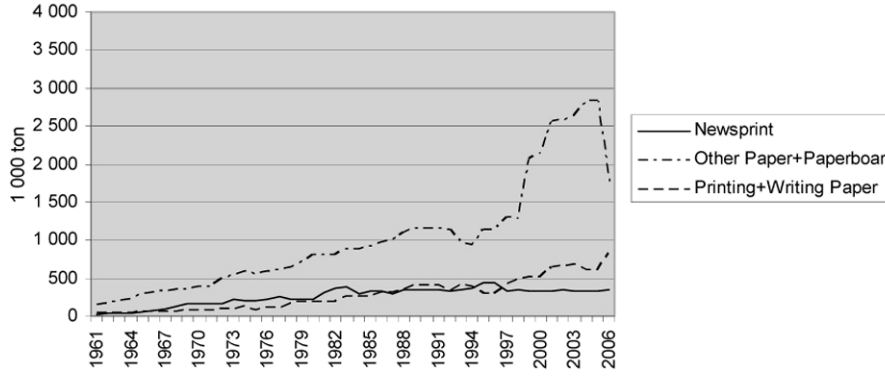

Figure 7. Production of newsprint, printing paper and paperboard 1961-2006. Source: FAOSTAT

Figure 8 compares production of paper and paperboard in South Africa and Sweden. Sweden is much bigger which was expected given the presentation of export data in Figure 2. The relative difference is largest for newsprint.

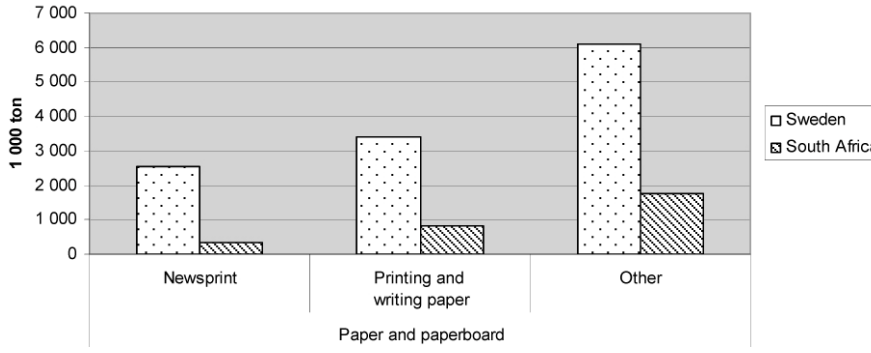

Figure 8. Production of paper and paperboard in South Africa and Sweden, year 2006. Source: FAOSTAT Database

PULP

Chemical wood pulp production has during the studied period always been larger than mechanical wood pulp production. The gap increased substantially after a capacity increase at the end of 1980 and has after that widened (Figure 9).

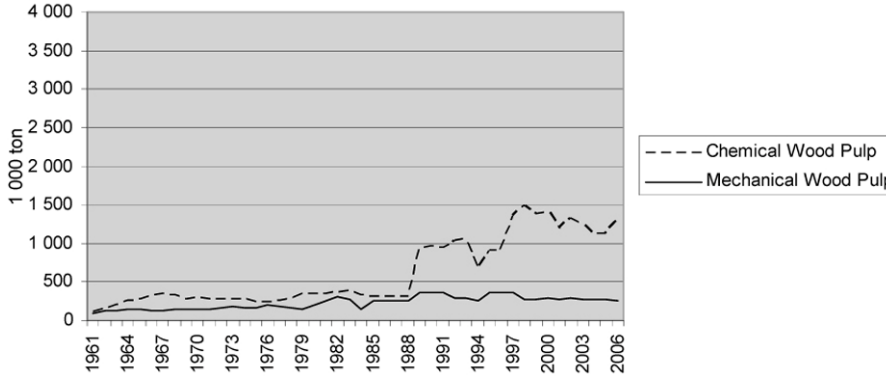

Figure 9. Production of chemical and mechanical wood pulp 1961-2006. Source: FAOSTAT

Once again it is possible to notice that the Swedish production is larger than the South African (Figure 10). In fact the relative difference is much larger for pulp than for paper and paperboard.

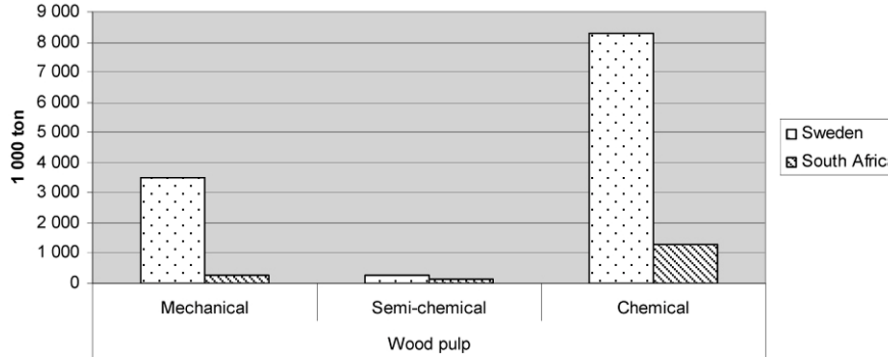

Figure 10. Production of pulp in South Africa and Sweden, year 2006. Source: FAOSTAT Database

PULP AND PAPER COMPANIES

Companies in the South African Pulp and Paper Sector in the Price Waterhouse Coopers Global Forestry and Paper Survey (2004) top 100 global companies, Mondi, a subsidiary of Anglo American is ranked 15th for 2002 and 2003. Sappi is ranked 20th for 2002 and 2003. Nampak is a new entrant in 2003 at 65th. Kimberly Clark, the US giant is ranked 4th for 2002 and 2003, the company has a subsidiary in South Africa. Proctor and Gamble (paper), another large US multinational is ranked 6th in 2002 and 10th in 2003, the company operates a distribution centre in South Africa for its products which are imported. Proctor & Gamble produces nappies in South Africa through a contractor under license.

Sappi and Anglo American-owned Mondi own substantial assets in many parts of the world. The two companies have expanded exports, and their South African operations now make up less than 30% of their global operations. Both Russia and China are expected to play a key role in the industry's growth over the next few years. Within this market the companies are well positioned and are internationally competitive. The South African paper and pulp industry is well integrated, from the cultivation of trees through to the manufacture of final consumer products. South Africa has an advantage owing to its fast-growing plantations.

Sappi

From a totally South African company in 1989 which exported approximately 50% of its total production to about 50 destinations throughout the world, the company has grown to an international enterprise with manufacturing facilities on four continents. Sappi is the leading producer of coated woodfree paper in North America, Europe and Africa commanding

26% market share in North America, 22% in Europe and 60% in Africa. The South African operations of Sappi comprised 24% (2003 financial year).

In 1988 Sappi acquired Usutu Pulp Company in Swaziland, one of the world's leaders in unbleached softwood kraft market pulp production and in 1989, acquired Saiccor, the world's single largest producer of dissolving pulp which it expanded in 1995. Sappi purchased five fine paper mills in the United Kingdom, and established Sappi Europe, with head office in London in 1990. Over the next five years Sappi acquired Speciality Pulp Services in Hong, 99% of Hannover Papier, Germany's leading producer of coated woodfree paper and 75% stake in S D Warren, the USA's largest manufacturer of coated woodfree paper, establishing Sappi Limited as the world's leading producer of these grades. During the same time, Sappi established Sappi Trading, the group's international trading company, Sappi Europe SA launched as the pan-European sales organisation for Sappi products. Sappi shares are listed on London and Frankfurt stock exchanges, and Paris Bourse.

In 1997, Sappi acquired Europe's largest producer of coated woodfree paper, KNP Leykam and restructured the Sappi group as two focused operating divisions – Sappi Fine Paper, domiciled in London, managing the coated and uncoated fine paper businesses, and Sappi Forest Products, domiciled in Johannesburg, managing the diversified forestry, pulp, particleboard and containerboard businesses. It is the market leader in Europe, North America and Africa and is the largest exporter of coated papers to Asia. All companies in the Sappi group shed their former names and assumed the name 'Sappi' worldwide. From 2000, Sappi’s strategy is to focus on pulp and paper and the company began to shed its non core operations. Sappi Fine Paper became the world's largest producer of coated fine paper. In 1998, The Sappi group listed its shares on the New York Stock Exchange.

Sappi Forest Products produces dissolving pulp, bleached and unbleached kraft pulp, containerboard, packaging paper, newsprint and sawn timber. The division owns and manages 540 000 hectares of Pine and Eucalyptus plantations in Southern Africa.

Sappi Waste Paper is a division of Sappi Kraft. Its core objective is to supply Sappi Kraft with waste paper for use in Sappi's mills throughout South Africa. One of these, Sappi's Cape Kraft Mill, runs on 100% recycled fibre. Sappi Waste Paper has a national network of recycling operations throughout the country. The company drives the procurement of waste paper through on-site waste management and recycling programmes. Sappi Waste

Paper also utilises an extensive network of recycling centres which purchase waste paper from numerous street collectors.

Mondi

Mondi forms part of Anglo American plc's wholly owned Paper and Packaging Division. Anglo American has its primary listing on the London Stock Exchange. The South African operations of Mondi comprised 33% (2002 financial year). Anglo Forest Products, operating under the Mondi International name, is an integrated paper and packaging group with operations and interests in Europe and South Africa. The Group has integrated production from forestry through to paper products and is principally involved in the growing of timber and manufacture of pulp, graphic paper, packaging papers and converted packaging. The packaging businesses are in the industrial packaging and corrugated packaging sectors and more recently in the flexible packaging sector.

Previously, Mondi has been managed along geographic lines, with Mondi Europe and Mondi South Africa under separate structures. In 2004, Mondi reorganised the group's uncoated woodfree businesses under a global product structure and to consolidate the group's packaging interests into two substantial integrated entities: Mondi Packaging and Mondi Business Paper. One entity under Mondi Business Paper is Mondi Business Paper South Africa.

Mondi Forests owns and manages extensive hardwood and softwood plantations. It has land holdings in Mpumalanga, KwaZulu-Natal, Eastern Cape, Limpopo Province and Swaziland. The area managed is 526 000 hectares (this includes Peak Timber Ltd, its associated company in Swaziland, with about 32 000 hectares of land). Of this, 335 000 hectares are afforestable. 329 000 hectares are planted – 31.7% to pine, 58.9% to gum, 8.7% to wattle and the remainder planted to sugar cane. Mondi Forests has a sustainable annual production of just less than 6 million tons of timber including pine, eucalyptus (gum) and wattle. This accounts for almost a third of the total timber production in South Africa. Current log production exceeds 5.4 million tons per year with 88.5% devoted to pulp logs, 6.1% to saw logs and 5.4% to mining timber, poles and other products

Mondi operates the largest wastepaper collection and recycling operation in South Africa, sourcing 316 000 tonnes of waste paper per year. Collection is from converters, other industries, hawkers, small businesses, retail and wholesale businesses, offices, schools, homes and community paper banks.

Mondi estimates that it has 5 000 suppliers ranging from hawkers to small businesses.

Nampak

Nampak Limited is listed on the JSE Securities Exchange South Africa in the Business Support Services sector. The primary business is in packaging. They do, however, operate three tissue mills and one corrugating paper mill in South Africa. Nampak is Africa's largest packaging manufacturer. It is also one of the top six manufacturers of folding cartons in Europe and enjoys a strong position in several important niche markets, including the healthcare market. It is the largest and most diversified packaging manufacturer in Africa with operations in the United Kingdom and Europe. It produces packaging products from metal, paper, plastic and glass, is a major manufacturer and distributor of tissue products, and has a significant position in the paper merchanting market. The group operates from manufacturing sites in South Africa, Kenya, Malawi, Mozambique, Namibia, Nigeria, Swaziland, Tanzania, Zambia, Zimbabwe, the United Kingdom, Belgium, France, Holland, Ireland and Italy. The group is actively engaged in the collection and recycling of all forms of used packaging. Nampak also exports to many countries world-wide. NamITech, a subsidiary company, is operating in the security sector of the IT industry servicing the telecommunications and financial services industries and to large corporations.

Other pulp and paper companies

Other pulp and paper companies in South Africa are usually privately owned small businesses using recycled waste. Many of the small paper mills start and up grade their mills with second hand plant equipment imported mainly from Europe and reconditioned. Almost all these mills produce tissue paper although there are a few that are producing cartonboard. Most of these mills have entered the market in the last 10-15 years, with investment rate in new operations increasing dramatically in this period and many of these mills are growing. There are also some smaller conversion companies that are producing toilet products and packaging.

SAWN WOOD

Production figures for sawnwood were presented in figure 4. In 2006 the production was almost 2.1 million m^3 compared with 770 000 m^3 in 1961. This means an annual average growth of about 2%.

Figure 11 compares production of sawnwood and woodbased-panels in South Africa and Sweden. The relative difference is much bigger than for

pulp and paper and paperboard. Both countries are small when it comes to production of woodbased-panels.

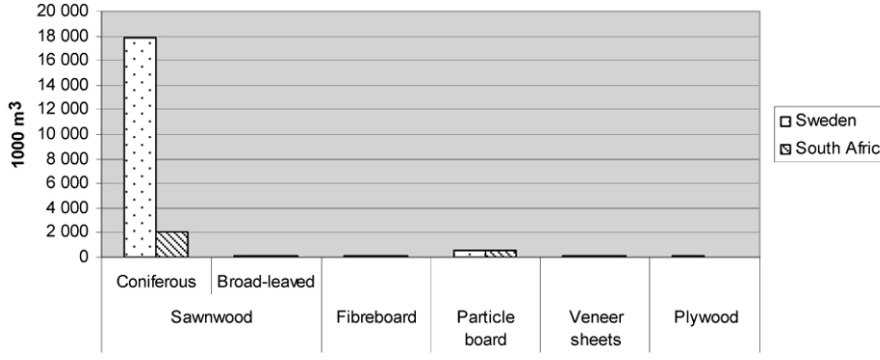

Figure 11. Production of sawnwood and woodbased-panels in South Africa and Sweden, year 2006. Source: FAOSTAT Database

SAWMILLING COMPANIES

At the end of 1990s there were an estimated 330 saw millers active in the market (Hejl et al. 2000). The bulk of these were small-scale saw millers and a breakdown of sawmills by size class is given in Table 3. Sawmills range in size from extremely large operations with a log intake in excess of 200 000 m^3/year to small-scale mills (including bush mills) with an intake of less than 5 000 m^3/year.

Table 3. Breakdown of sawmills by size class (1988/99)

Estimated use of sawlogs (m^3/year)	**Number of mills**	**Estimated use of sawlogs (m^3/year)**
< 5000	220	450 000
5 000-20 000	45	450 000
20 000-50 000	40	950 000
50 000-100 000	15	900 000
>100 000	10	1 350 000
Total	330	4 100 000

Although the small-scale mills account for almost 67% of the total number of establishments, they only process about 11% of the softwood sawlogs (op.cit.). The ten largest sawmills account for an estimated 33% of total production throughput. The Mondi group is the major supplier of softwood

sawn timber accounting for an estimated 25% of total supply. A breakdown of supply by sawmilling group is presented in Table 4.

Table 4. Estimated market shares of sawmilling groups (late 1990s)

Group	% of total supply
Mondi	25
Hans Merensky	15
Sappi	13
SAFCOL	8
Yorkcor	5
Small Scale Mills	11
Other/Independents	23
Total	100

Softwood sawmilling is concentrated in the north-eastern and south-eastern parts of Mpumalanga (op.cit). These regions account for an estimated 44% of total sawmilling activity. Other regions in order are Eastern Cape (18%), KwaZulu-Natal (15%), Western/Southern Cape (13%) and Northern Pro-vince (10%).

Small-scale mills are normally more predominant in areas that are far removed from major pulp mills and other operations consuming pulpwood (op.cit.). In these areas such as the Northern Province, the Eastern Cape and South Western Cape areas, the small scale mills take in small wood from thinning and logs which are normally not considered as suitable raw material for the larger sawmills. The regional distribution of small-scale sawmilling therefore differs considerably from the distribution shown above.

Local softwood sawmills produce a range of sawn timber products. The average yield is about 43% (op.cit.). About 60% of sawn timber production is further processed into a range of final products; 4% of sawn timber production is exported with the balance finding application as structural timber in the building and construction industry. The major products are furniture, pallets, packaging materials and value added building materials. Structural timber is mostly supplied to building merchants, which supply the builders' market. Some of the major merchant groups add further value by producing pre-fabricated roof trusses, mouldings, laminated products, etc. An estimated 7% of sawmill output is converted, in-house, to final products. These products produced by sawmills include shelving, laminated beams,

flooring, ceilings etc. Of the products produced, an estimated equivalent volume of about 200 000 m^3 is exported.

Briefly something will be said about the marginal and local hardwood sawn timber industry (op.cit.). The local hardwood sawn timber industry consumes an average of 260 000 m^3 of hardwood logs (90% Saligna) to produce a range of sawn hardwood products. Local production of hardwood sawn timber is estimated at 120 000 m^3 of which about half is used in mining applications. The market is dominated by Hans Merensky Holding (HMH) which produces about 70% of all hardwood timber. Mondi is the second largest supplier with an estimated market share of 20%. The bulk of hardwoods used for the furniture and joinery industries is imported with total imports amounting to about 220 000 m^3 per annum.

Hans Merensky Holdings (Pty) Ltd.

Hans Merensky Holdings (Pty) Ltd., is the holding company for South Africa's largest saw-milling group (Anon, c). The company is fully inte-grated. Already in 1929 Eucalyptus plantations were established in the Limpopo Province. Today these Eucalyptus plantations have become the only commercially grown hardwood in South Africa. Production of Eucalyptus is approximately 100 000 m^3/year with a sawmilling intake of 200 000 m^3/year The group has vast acres under Pine in the Mpumalanga Province Graskop area and from the Kwazulu-Natal Midlands to the Matiwane range near Umtata. Production of Pine round wood is approxi-mately 770 000 m^3/year with a sawmilling intake of 680 000 m^3/year Timber is processed through various sawmills situated across the eastern regions of South Africa. Tweefontein Sawmill is one of the largest in the southern hemisphere. It is unique in that it cuts both Eucalyptus and Pine sawlogs.

Yorkcor

The York Timber Organization Ltd, a subsidiary of Yorkcor, is a forest products enterprise (Anon, d). The company was incorporated in 1916 and has been listed on the JSE since 1946. York Timbers operates in various markets, domestic and overseas, and in various sectors of the timber trade and industry. The core business of the group is sawmilling. Soft timber is converted into a wide range of sawn wood products such as structural timber, scaffolding, furniture components, wood laminates, kitchen cupboard parts, brush and broom handles as well as wood chips for pulp and paper.

The company owns

- 61 000 hectares of plantation forests of which 56 000 hectares are pine and 5 000 hectares are eucalyptus.

- Seven sawmills, located in Sabie, Graskop, Jessievale, White River, Amsterdam & Lothair.
- A plywood plant in Sabie.
- In addition, the company owns 28 000 hectares of unplanted land reserved for conservation, streams, natural heritage sites, roads and access routes.

SAFCOL

SAFCOL, South African Forestry Company Ltd., is a state owned forestry company and has undergone a major change (Anon, a). Komatiland Forests (KLF), a subsidiary, should be transfer to the private sector in accordance with government policy objectives.

KLF manages 129 000 hectares in South Africa, 10% of the industrial forests (40% prior to privatisation), and produces 1.7 million m^3 of roundwood per year, approximately 9% of South Africa's roundwood production. KLF is dominant in the Limpopo and Mpumalanga provinces (northern region), where it owns 20% of industrial forests. KLF is primarily a sawlog producer, but pulpwood dimensions are produced in the process of producing sawlogs. Some stands were dedicated fibre/pulpwood stands, but these are minimal. About 15% of SAFCOLs timber production is sold as pulpwood.

In 1997, the government decided that the state should exit from plantation forestry (Anon, b). To allow the restructuring, the commercial plantation forests of SAFCOL and the Department of Water Affairs and Forests (DWAF) were separated into five, geographically logical "packages". Each package was established as a separate company and SAFCOL acts as the holding company for the state's equity interests in each subsidiary. During the period 1999 to 2005, a majority equity stake in four of the five packages, accounting for some 55% of the total forest area, was transferred to private ownership. The remaining package is operated by KLF. In addition to its forests, KLF has a small research and development facility, a tree nursery and one operational sawmill. At present, KLF accounts for more than 90% of SAFCOL's responsibilities and sales. A transaction which would have transferred majority ownership of KLF was terminated in March 2006, primarily because of concerns regarding industry structure and operation of the market for sawlogs. Whilst overall KLF accounts for only some 3.5% of employment in the sector, it also controls 30% of the country's supply of softwood sawlogs. As a result of that termination, the government confirmed in August 2006 that the KLF forests should be retained in public ownership, for the foreseeable future, to allow time for review of the future role of

SAFCOL and of KLF and for actions to improve industry structure and the working of the sawlog market.

Forets and forestry

INTRODUCTION

The forest resources of South Africa consist of three main components:

Plantations:
Plantations cover almost 1.3 million ha of South Africa and are one of the largest planted forests in the world.

Indigenous/natural forests:
Indigenous forests cover approximately 0.5 million ha. Almost three-quarters of these forests are conserved either as declared State forests or within formal protected areas.

Woodlands/savannas:
Savannas contribute the bulk of the wooded land area of South Africa, and are characterised by a co-dominance of trees and grasses. Depending on how woodlands are classified the area in South Africa ranges between 29 million and 46 million ha.

According to an FAO report (2005) South Africa has 9.203 million ha of forest land and 21.409 million ha of "other wooded land". Both of these concepts are defined according to ECE/FAO. The total growing stock is 635 million m^3 standing volume over bark.

PLANTATION FORESTS

The area of plantation forests grew rapidly during the period from about 1920 to 1985, slowed down and culminating at about 1.5 million ha in 1996 compared with almost 1.3 million ha in 2007 which means a decrease of 221 000 ha or almost 15%. Plantation forests are located mainly in the Mpumalanga, KwaZulu-Natal, Eastern and Western Cape and Limpopo Provinces, where climatic conditions are suitable, with the largest plantation areas in Mpumalanga (514 956 ha) and KwaZulu-Natal (486 967 ha). (Table 5)

Table 5. Land area and plantation forests in different provinces, 2007

	Land area		Planted forest	
	Million ha	**% of total land area**	**Ha**	**% of total provincial land area**
Mpumalanga	8.2	6.7	514 956	6.3
KwaZulu-Natal	9.1	7.5	486 967	5.3
Eastern Cape	17.1	13.9	155 078	0.9
Western Cape	12.9	10.6	61 097	0.5
Limpopo	12.0	9.8	48 096	0.1
South Africa	122.3	100.0	1 266 196	1.0

Currently, about 70% of plantations are owned by large companies and SAFCOL (Table 6). The State and municipalities, other than SAFCOL, owns about 7% of the total plantation area. There are also many farmers who participate in forestry. They can be grouped into commercial farmers and small growers. Many of these farmers belong to the South African Timber Growers Association (SATGA).

Table 6. Planted area by ownership, 2007

Ownership	**%**
Corporate (excl. SAFCOL)	60.2
SAFCOL:	10.1
State/municipalities	6.9
Commercial farmers	19.8
Small growers	3.6

The owner structure is changing and will continue to change as a consequence of the Restitution of Land Rights Act of 1994. The act provides that people who were prevented from retaining or obtaining rights to land as a result of a racially discriminatory law shall be entitled to restitution of the land they lost. This includes any registered or unregistered right (and may include customary rights) or simply the right arising from beneficial occupation for a continuous period of not less than ten years prior to dispossession. Claimants are assisted by Regional Land Claims Commissioners. Only where disputes cannot be resolved, are they referred to the Land Claims Court for adjudication. In all cases the settlements reached are reviewed by the Court and the results confirmed by Court Orders. Certain

State Forest land, and State land in SAFCOL's hands, as well as privately owned forests, is likely to become subject to restitution claims.

NCT Cooperative Limited is a supplier of round wood timber and the largest forestry-marketing organisation in southern Africa. It was established in 1949 as a marketing co-operative to cater to the needs of private and independent timber growers. Today membership stands at more than 2 000 shareholding members, representing a total area of 300 000 ha – 21% of afforested land in South Africa. NCT has recently entered the pulp market in South Africa with the construction of a new wood chip facility in the Port of Durban in 2004. It is also conducting a feasibility study for a pulp mill in KwaZulu-Natal. In March 2007 NCT and Rottneros, a Swedish forest products company, signed company signed a letter of intent to explore the possibility of building a jointly-owned mill for production of CTMP mechanical pulp at Richard's Bay. The fixed assets at Utansjö, which include a newly invested pulp line for production of CTMP pulp, are intended to be used as a basis for the new operation.

Overall, of the plantation areas, 53% is pines, 39% is eucalypts and 8% is wattle (acacia) (Table 7). Departmental statistics indicate that the most land suitable for further afforestation is in KwaZulu-Natal, the Eastern Transvaal and the Eastern Cape.

Table 7. Plantation area by species, 2007

Species	**%**
Pine	53.5
Eucalyptus	37.7
Wattle (acacia)	8.1
Other	0.7

A major advantage of the South African forest resource is the rapid growth rate of trees. Pine trees can already be used for pulping at 14 years of age, whereas eucalyptus trees can be felled after only seven years of age in the northeast coastal regions of KwaZulu-Natal and after 11 years in the cooler, dryer, high-lying areas. Productivity of these forests is high, averaging about 20 m^3/ha/year. They currently yield is about 16 million m^3 of wood per year, which satisfies about 94% of domestic demand.

South Africa has become a world leader in the selective breeding and cloning of eucalyptus species. Tree breeders are moving on from breeding

purely for faster growth and better disease resistance and are now examining ways of breeding specific characteristics into the trees to enhance their pulp making properties. This opens up the possibility for developing niche pulp and paper products and the possibility of a sustained competitive advantage.

The use of production of the plantations can be seen from Table 8. A little more than half of plantations produce softwood. More than two thirds of these cuttings are used as sawlogs and most of the rest as pulpwood. For hardwood it is the opposite, 80% is used as pulpwood. More than a tenth is used by the mining industry. Only about 3% is used as sawlogs.

Table 8. Plantation area by management objectives, 2007

Objectives	**Softwood (%)**	**Hardwood (%)**
Pulpwood	30.4	79.7
Sawlogs	68.5	3.4
Poles	0.9	3.5
Mining	0.0	11.5
Other	0.1	1.9
AREA	677 079 ha	589 118 ha

Over 80% of the plantation areas in South Africa are certified to the Forest Stewardship Certification (FSC) standard.

Many plantation forests are being used for purposes in addition to that of the wood that they supply. These include, for example, non-wood or minor forest products, such as ferns and forest mushrooms, recreation and tourism, which are growing rapidly.

The area currently afforested amounts to about 60% of the total area that could be biologically suitable for forestry. Expansion will be driven by economic need, and constrained by the competition for water resources, by environmental concerns and by social concerns.

Commercial plantations are largely confined to the few parts of the country with an annual rainfall of more than 800 mm. These are also the source areas of many of the rivers on which the country relies for its water supply. Water is used by vegetation through the evaporation of intercepted water and through transpiration. In South Africa, commercial forest plantations mostly replace low, seasonally dormant grassland, open deciduous woodland, or

low to medium-height evergreen fynbos. Because of the size of the plantation trees, their deep rooting, and evergreen habit, they use more water than the indigenous vegetation.

NATURAL FORESTS

South Africa has never been rich in natural forests (Anon, 2000). Climate and the age-old effect of fires have confined natural forests to about 0.2% of South Africa's land area. The small extent of natural forest has been depleted especially by European settlers during the 18th and 19th centuries, and by people forced to settle in the former homelands in the 20th century, when serious loss of forests occurred on some areas. Overall, however, much of the natural forest has survived.

There are about 530 000 ha of indigenous or natural forests in the country, which occur mainly along the southern and eastern escarpment, the coastal belt and in sheltered kloofs or ravines. There has been an increase in the use of natural forests as sources of medicine, building material, fuel wood and food. It is estimated that around 80% of South Africa's population still uses medical plants, most of which are sourced from natural forests.

The largest natural forests occur in the Knysna region. Except for the forests of the Amatolas and Woodbush, forests elsewhere are small and scattered. In the former Transkei, no forests are larger than 1 800 ha; the forests in the mountains are all smaller than 700 ha. The largest areas of natural forest occur in the Eastern Cape (about 140 000 ha) and in KwaZulu-Natal (about 91 200 ha). This is followed by the Western Cape (about 60 000 ha) and the Northern Province and Eastern Transvaal (about 35 000 ha). Most of these areas are owned by the State, which since April 1994 also includes the forest areas in the former homelands. Only in KwaZulu-Natal is a substantial portion of natural forest in private ownership.

Small amounts of timber are harvested from the forests of Knysna and the Eastern Cape. The annual incremental yield from all these forests is probably about 600 000 to 700 000 m^3/year, of which only about 4 000 m^3 is harvested. This is a negligible amount relative to the country's need for wood. Currently, the greatest value of these forests is for environmental protection, biodiversity, and ecotourism.

WOODLANDS

Vast areas of woodlands can be found in the semi-arid to sub-humid parts of South Africa (Anon, 2000). Although humans have been using woodlands for thousands of years, perhaps depleting resources locally, it was not until

the policies of the 20th century took hold, that overcrowding in the former homelands resulted in rapid degradation in many parts.

Today, the condition of woodlands conserved in national parks, statutory nature reserves and privately managed conservation areas is generally good. However, approximately 65% of the former homelands are located within the woodland regions. Elsewhere, white commercial farmers have significantly reduced the extent of woodlands through bush-clearing for agriculture. Generally, though, woodlands used for stock farming, are in reasonable to good condition, although in some areas bush encroachment has transformed the woodlands to thickets.

Although the productivity of savannah woodlands is generally low, about 0.1 to 2 m^3/ha/year, the aggregate wood production is large, estimated at 10 or more million m^3/year. This production still plays an important part in the rural economy.

Trees and tree products of the woodlands and forests play an important and often under-estimated role for rural communities, and are central to their lives. Rural people use natural forests and especially woodlands for many purposes. These include:

- fuelwood, the major source of energy for cooking, lighting and heating;
- timber for construction material and wood carving;
- fruit, an important dietary supplement, and sap for brewing of beer and wine;
- bark for making ropes and weaving;
- medicinal products such as bark, bulbs, leaves and roots;
- honey production;
- harvesting of insects, mushrooms and other edible plants;
- grass for thatching and weaving, and for grazing cattle.

The economic value of forests and especially of woodlands to communities often equates to a significant proportion of the income of rural households. One-third of households in South Africa are estimated to rely on fuelwood. Women in these households often walk long distances to fetch firewood. Average time spent this way is estimated conservatively at five hours per

household per week. The amount of wood consumed for household needs equates nearly to that used in the formal forestry industry.

ROUNDWOOD PRODUCTION

The total use of roundwood during the period has increased with 8.7 million m^3 (+ 78%). The biggest increase comes from pulpwood with 9.7 million m^3 (+ 229%), (Figure 12). The afforested area has increased by 9%.

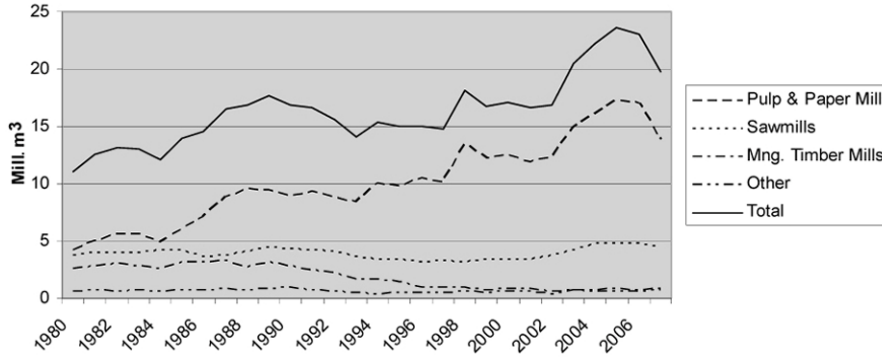

Figure 12. Use of roundwood in processing plants 1980 to 2007. Source: Godsmark, 2008

Table 9 describes from what provinces roundwood from other forests than plantations is coming. As can be expected this also reflects where these forests can be found. Table 10 describes the species mixture and Table 11 where the wood is used.

Table 9. Total roundwood production excl. plantation, 2007. Source: Godsmark, 2008

Province	**%**
Mpumalagna	38.9
Kwa Zulu Natal	46.0
Eastern Cape	8.6
Western Cape	3.1
Limpopo	3.4
TOTAL VOLUME	20.3 million m^3

Table 10. Total roundwood production excl. plantations by species, 2007. Source: Godsmark, 2008

Species	**%**
Pine	44.4
Eucalyptus	50.2
Wattle	5.3
Other	0.0

Table 11. Total roundwood production excl. plantations by product, 2007 Source: Godsmark, 2008

Objectives	**Softwood (%)**	**Hardwood (%)**
Pulpwood	41.6	83.5
Sawlogs	56.7	2.3
Poles	0.9	3.7
Mining	0.0	6.7
Other	0.8	3.8
VOLUME	9.0 million m^3	11.3 million m^3

According to FAOSTAT South Africa's roundwood production in 2006 was 30.1 million m^3 solid volume excl. bark compared with Sweden's 62.0 million m^3. The industrial use is about 60% (18.0 million m^3) for South Africa and 90% (56.1 million m^3) for Sweden. The rest is used as fuelwood and charcoal. The conifer share of the industrial wood is for South Africa 30% and for Sweden 95%.

In South Africa most of the industrial roundwood is used for pulping, 82%, compared with 49% in Sweden (Figure 13).

Figure 13. Industrial wood, coniferous production in South Africa and Sweden, 2006. Source: FAOSTAT Database

A split after species shows that for South Africa 46% of confer industrial roundwood is used for pulping compared with 64% in Sweden. Corresponding figures for non-conifers are 90% for both countries (Figure 14). No fibre from natural forests is used in the production of pulp.

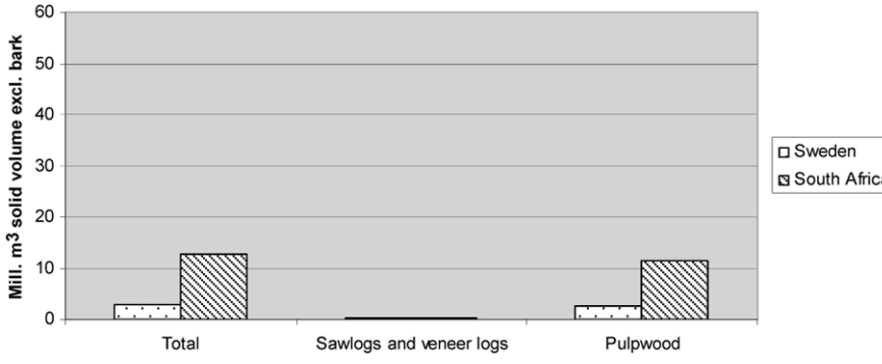

Figure 14. Industrial wood, non-coniferous production in South Africa and Sweden, 2006. Source: FAOSTAT Database

Figure 15 shows export of roundwood, chips, particles and wood residues from South Africa and Sweden. South Africa has quite a substantial export of chips, particles and wood residues, about 5.8 million m^3s 2006. Sweden's export of roundwood was 3 million m^3s.

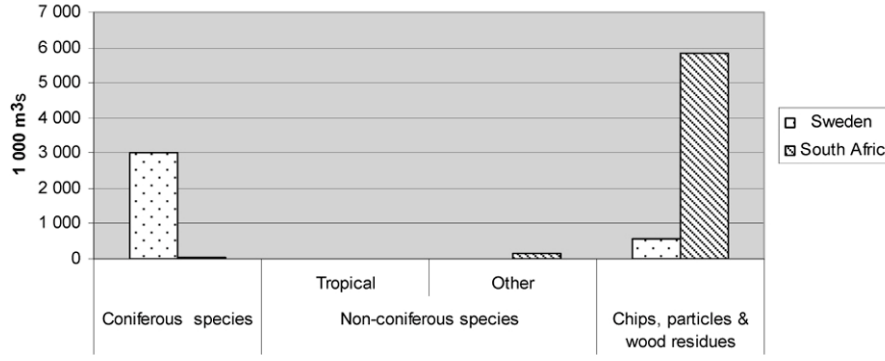

Figure 15. Export of roundwood, chips, particles and wood residues, coniferous and non-coniferous, from South Africa and Sweden, year 2006. Source: FAOSTAT Database

Figure 16 shows import of roundwood, chips, particles and wood residues from South Africa and Sweden. As can be seen import to South Africa is almost non-existent. Sweden, on the other hand, has quite a big import. The import of conifer species was in 2006 almost 3.2 million m^3s, of non-conifer species about 3.5 million m^3s, and of chips, particles and wood residues almost 1.6 million m^3s.

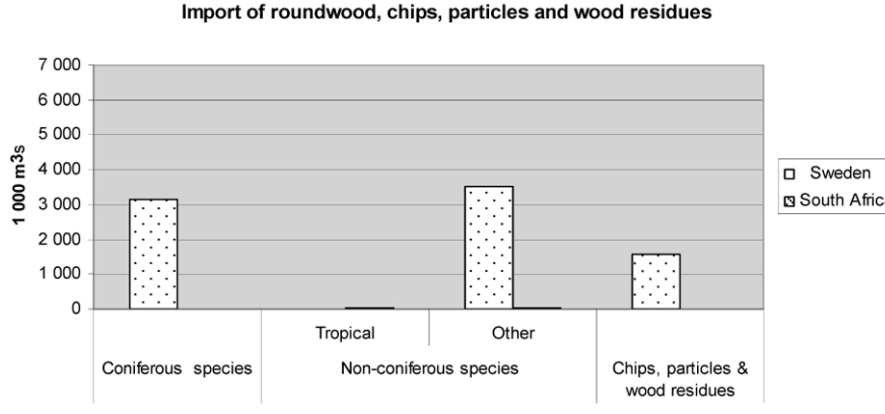

Figure 16. Import of roundwood, chips, particles and wood residues, coniferous and non-coniferous, to South Africa and Sweden, year 2006. Source: FAOSTAT Database

PRODUCTION OF CHIPS AND RECOVERED PAPER

Pulpwood harvested from plantations provides the main source of fibre. This is supplemented by forest and saw-milling residues. Figure 17 shows, based

on FAOSTAT, production of chips and particles. It should be noted that this is the total production and that all of this does not necessarily goes to pulp mills. The production has steadily increased during the 2000s. Wood chips and particles is by FAO defined as wood that has been deliberately reduced to small pieces from wood in the rough or from industrial residues, suitable for pulping, for particle board and fibreboard production, for fuelwood or for other purposes.

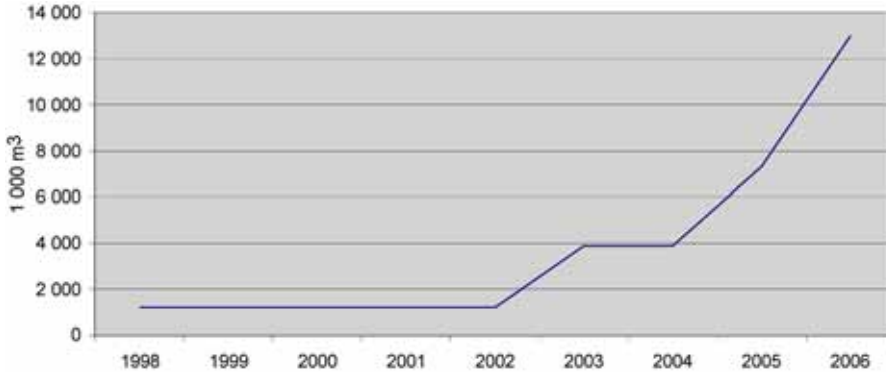

Figure 17. Production of chips and particles.

Recovered paper is an important fibre source when producing paper (compare with above where production of paper and paperboard was related to pulp production). Based on FAOSTAT Figure 18 shows the total quantity of recovered paper and also as a share of apparent consumption of paper and paperboard. The share has varied about less than 50% while to total quantity has increased as a consequence of increased consumption. Recovered paper is by FAO defined as waste and scrap of paper or paperboard. This commodity includes paper and paperboard which has been used for its original purpose and residues from paper conversion. This includes waste and scrap collected for re-use as a raw material for the manufacture of paper and related products.

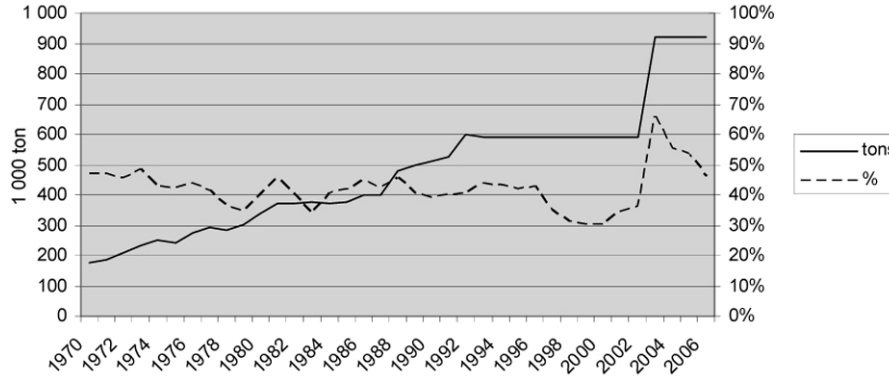

Figure 18. Recovered paper, total and as a share of apparent consumption of paper and paperboard.

Another supplementary fibre source is bagasse, which is sugar-cane residue. Bagasse is a fibrous residue from the processing of sugar cane. In 2004, 115 000 tons of pulp were produced from this fibre source, to make packaging papers coated fine papers and tissue.

Comments

The pulp and paper industry of South Africa is successful and well managed, not the least Sappi and Mondi. These two companies are truly global. A big global company gives financial strength. However, it does not automatically mean high profitability which the experience from companies in North America and Northern Europe shows. Smaller more regional companies have been more successful in this respect and have also increased their capacity. The major threat comes from companies in South America and Southeast Asia.

The South African forest products industry is highly competitive. The mills are well located for the new emerging markets in China and India. The infrastructure is well developed. Another advantage is the well-managed plantations with quickly maturing trees. However, there is a limit for how much land that is suitable for plantations. Another restriction regarding plantation is water supply. The land restitution causes uncertainty about the short term availability of roundwood. However, even if the ownership it transferred to local communities it seems the companies have found one possible solution by leasing the land. Thus, supply of wood raw material put an upper limit for the industry's possibility to expand. Another restriction is electricity supply. A long term solution for South Africa's electricity supply remains to be found. Further more, there is a shortage of skilled workers.

The sawmilling industry does not show the success story of the pulp and paper industry. However, there exist some larger sawmills that may have the financial strength for investing in marketing, product development and investment in production facilities. Also the growth of the South African economy with new homes will help. However, once again the supply of wood may be a restriction. Further more, an expansion of the sawmilling industry will mean increased competition about wood and increasing prices.

Of course the development of the country itself is most important for the development of the forest sector. South Africa is a rich country and a fairly well developed country. However, problems do exist. According to me the apartheid history throw its shadow and will probably continue to do so for many years. The country is still in many ways segregated. It is easy to understand that the black community quickly wants to adjust for former injustices. It is difficult to be patient even if it would be the wisest. One consequence is that skilled people leave the country. The unemployment rate is high, very high. One consequence is criminality which also means a threat for the tourist business. The big differences between developed cities and the

country side is another problem. It is easy to point at the problem but difficult to come up with a solution. I am afraid that it will take long time for the country side to develop. Still other problems are criminality, corruption and AIDS/HIV.

References

Anon. a. SAFCOL http://www.dpe.gov.za/home.asp?id=411 (accessed 2008-12-09)

Anon. b. The future role of the South African Forestry Company Ltd (SAFCOL) and its operations subsidiary Komatiland Forests (pty) ltd (klf). Fact sheet. http://www.dpe.gov.za/res/Safcol%20Fact%20Sheet%20260307.pdf (accessed 2008-12-09)

Anon, c. About HM Timber. Overview. http://www.hansmerensky.co.za/HM_Timber/about/about_HM_timber.htm (accessed 2008-12-09)

Anon, d. Welcome to York. http://www.york.co.za/ (accessed 2008-12-09)

Anon, e. Republic of South Africa. http://en.wikipedia.org/wiki/South_africa (accessed 2008-12-09)

Anon. 2000. Appendix - the State of Forestry in South Africa Today. http://www.timberwatch.org.za/archives/2000807stateofforrestry.htm (accessed 2008-12-09)

Anon. 2004. Pulp and Paper Sector Summit. Resource book. Prepared by CSRSC for Naledi and CEPPWAWU.

FAO (2005) The Global Forest Resources Assessment 2005, Main Report, FAO Forestry Paper 147

FAOSTAT. http://faostat.fao.org/site/628/default.aspx (accessed 2008-12-09)

Godsmark. R. 2008. The South African Forestry and Forest Products Industry 2007. Produced by Forestry South Africa, August 2008. www.forestry.co.za/uploads/File/forest/statistical_data/SA%20Forestry%20Industry%202008.ppt

Heyl, L., von Maltitz G., Evans J., and Segoale R. 2000. Issues and Opportunities for Small-scale Sawmilling in South Africa: An Eastern Cape case study. A report prepared as part of the South Africa Country Study for the international collaborative research project steered by IIED: Instruments for Private Sector Forestry. http://researchspace.csir.co.za/dspace/bitstream/10204/2479/1/Hely_2000.pdf (2009.12.08)

Jackson, D. 2006. Article about the South African forest products industry. 06 March 2006 http://www.mmsmag.co.za/articledetail.aspx?id=253 (accessed 2008-12-09)

Publications from
The Department of Forest Products, SLU

Reports

1. Ingemarson, I. 2007. De skogliga tjänstemännens syn på arbetet i Gudruns spår. Institutionen för skogens produkter, SLU, Uppsala
2. Lönnstedt, L. 2007. *Financial analysis of the U.S. based forest industry*. Department of Forest Products, SLU, Uppsala
3. Lindholm, G. 2007. Marknadsanalys för produkter av grankärna. Institutionen för skogens produkter, SLU, Uppsala
4. Stendahl, M. 2007. *Product development in the Swedish and Finnish wood industry*. Department of Forest Products, SLU, Uppsala
5. Nylund, J-E. & Ingemarson, F. 2007. *Forest tenure in Sweden – a historical perspective.* Department of Forest Products, SLU, Uppsala
6. Lönnstedt, L. 2008. *Forest industrial product companies – A comparison between Japan, Sweden and the U.S.* Department of Forest Products, SLU, Uppsala
7. Axelsson, R. 2008. *Forest policy, continuous tree cover forest and uneven-aged forest management in Sweden's boreal forest*. Licentiate thesis. Department of Forest Products, SLU, Uppsala
8. Johansson, K-E.V. & Nylund, J-E. 2008. *NGO Policy Change in Relation to Donor Discourse: The Case of Vi Skogen*. Department of Forest Products, SLU, Uppsala
9. Uetimane Junior, E. 2008. *Anatomical and Drying Features of Lesser Known Wood Species from Mozambique*. Licentiate thesis. Department of Forest Products, SLU, Uppsala
10. Eriksson, L., Gullberg, T. & Woxblom, L. 2008. Skogsbruksmetoder för privatskogs-brukaren. *Forest treatment methods for the private forest owner.* Institutionen för skogens produkter, SLU, Uppsala
11. Eriksson, L. 2008. Åtgärdsbeslut i privatskogsbruket. *Treatment decisions in privately owned forestry*. Institutionen för skogens produkter, SLU, Uppsala
12. Lönnstedt, L. 2009. *The Republic of South Africa's Forets Sector.* Department of Forest Products, SLU, Uppsala

Master thesis

1. Stangebye, J. 2007. Inventering och klassificering av kvarlämnad virkesvolym vid slutavverkning. *Inventory and classification of non-cut volumes at final cut operations.* Institutionen för skogens produkter, SLU, Uppsala
2. Rosenquist, B. 2007. Bidragsanalys av dimensioner och postningar - En studie vid Vida Alvesta. *Financial analysis of economic contribution from dimensions and sawing patterns - A study at Vida Alvesta.* Institutionen för skogens produkter, SLU, Uppsala
3. Ericsson, M. 2007. En lyckad affärsrelation? – Två fallstudier. *A successful business relation? – Two case studies.* Institutionen för skogens produkter, SLU, Uppsala
4. Ståhl, G. 2007. Distribution och försäljning av kvalitetsfuru – En fallstudie. *Distribution and sales of high quality pine lumber – A case study*. Institutionen för skogens produkter, SLU, Uppsala

5. Ekholm, A. 2007. Aspekter på flyttkostnader, fastighetsbildning och fastighetstorlekar. *Aspects on fixed harvest costs and the size and dividing up of forest estates.* Institutionen för skogens produkter, SLU, Uppsala
6. Gustafsson, F. 2007. Postningsoptimering vid sönderdelning av fura vid Säters Ångsåg. *Saw pattern optimising for sawing Scots pine at Säters Ångsåg.* Institutionen för skogens produkter, SLU, Uppsala
7. Götherström, M. 2007. Följdeffekter av olika användningssätt för vedråvara – en ekonomisk studie. *Consequences of different ways to utilize raw wood – an economic study*. Institutionen för skogens produkter, SLU, Uppsala
8. Nashr, F. 2007. *Profiling the strategies of Swedish sawmilling firms.* Department of Forest Products, SLU, Uppsala
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10. Andersson, H. 2007. *Establishment of pulp and paper production in Russia – Assessment of obstacles.* Etablering av pappers- och massaproduktion i Ryssland – bedömning av möjliga hinder. Department of Forest Products, SLU, Uppsala
11. Persson, F. 2007. Exponering av trägolv och lister i butik och på mässor – En jämförande studie mellan sport- och bygghandeln. Institutionen för skogens produkter, SLU, Uppsala
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13. Karlhager, J. 2008. *The Swedish market for wood briquettes – Production and market development.* Department of Forest Products, SLU, Uppsala
14. Höglund, J. 2008. *The Swedish fuel pellets industry: Production, market and standardization.* Den Svenska bränslepelletsindustrin: Produktion, marknad och standardisering. Department of Forest Products, SLU, Uppsala
15. Trulson, M. 2008. Värmebehandlat trä – att inhämta synpunkter i produktutvecklingens tidiga fas. *Heat-treated wood – to obtain opinions in the early phase of product development.* Institutionen för skogens produkter, SLU, Uppsala
16. Nordlund, J. 2008. Beräkning av optimal batchstorlek på gavelspikningslinjer hos Vida Packaging i Hestra. *Calculation of optimal batch size on cable drum flanges lines at Vida Packaging in Hestra.* Institutionen för skogens produkter, SLU, Uppsala
17. Norberg, D. & Gustafsson, E. 2008. *Organizational exposure to risk of unethical behaviour – In Eastern European timber purchasing organizations.* Department of Forest Products, SLU, Uppsala
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19. Richnau, G. 2008. *Landscape approach to implement sustainability policies? - value profiles of forest owner groups in the Helgeå river basin, South Sweden.* Department of Forest Products, SLU, Uppsala
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22. Johansson. N. 2008. *An analysis of the North American market for wood scanners.* En analys över den Nordamerikanska marknaden för träscanners. Department of Forest Products, SLU, Uppsala

23. Terzieva, E. 2008. *The Russian birch plywood industry – Production, market and future prospects*. Den ryska björk-plywoodindustrin – Produktion, marknad och framtida utsikter. Department of Forest Products, SLU, Uppsala
24. Hellberg, L. 2008. Kvalitativ analys av Holmen Skogs internprissättningsmodell. *A qualitative analysis of Holmen Skogs transfer pricing method.* Institutionen för skogens produkter, SLU, Uppsala
25. Skoglund, M. 2008. Kundrelationer på Internet – en utveckling av Skandias webbplats. *Customer relationships through the Internet – developing Skandia's homepages.* Institutionen för skogens produkter, SLU, Uppsala
26. Hesselman, J. 2009. Bedömning av kunders uppfattningar och konsekvenser för strategisk utveckling. *Assessing customer perceptions and their implications for strategy development.* Institutionen för skogens produkter, SLU, Uppsala