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A SECTORAL ANALYSIS OF WOOD, PAPER, PULP INDUSTRIES IN SOUTH AFRICA

Sector Studies
Research Project

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A sectoral analysis of wood, paper and pulp industries in South Africa

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EXECUTIVE SUMMARY

Preamble

This is one of fourteen sector studies aimed at contributing to greater alignment between skills development strategies and the development requirements of key sectors in the national economy. As such it aims to facilitate integration of the Department of Labour's skills development mandate with sectoral demands. Effective coordination mechanisms are required to ensure that SETA Sectoral Skill Plans and the overall National Skills Development Strategy are all closely aligned and informed by the development of sector strategies at DTI, the promotion of advanced technology platforms at DST, and the production of appropriate levels of highly skilled scientists and industry professionals by the Department of Education. All of these initiatives comprise key contributions that together will drive sectoral renewal and growth across the South African economy.

Therefore, the primary purpose of this research project to facilitate synchronisation of the education and training requirements of the wood, paper, and pulp (WPP) sector with its development strategies. It seeks to enhance complementarities within the Department of Labour's skills development mandate and the strategic development needs of the WPP sector. In this regard, it is one of fourteen sector studies collectively designed to provide an analytical 'bridge' for more effective information flow between the sectoral context on the demand-side and the National Skills Development Strategy on the supply-side.

Research Focus

In order to provide as comparable and comprehensive overview as is possible this study has adopted a similar approach to the other sectoral studies. Spatial dynamics are detailed in terms of volume of product, employment, and the value of these products. Key drivers for change are also reviewed. These drivers include policies across spheres and tiers government. Industry strategies and international competitive drivers are considered as well. Constraints and opportunities within the sector and its sub-sectors are reviewed with interdependencies between segments of the WPP sector being given special attention. Within each of the major components of the sector specific firm level case studies review what appear to be critical strategies and dynamics in the skills development systems. The strengths and weakness of the WPP skills system are thereby reviewed and priority interventions identified.

Conclusions and Recommendations

South Africa's wood, paper, and pulp (WPP) sector is a competitive and well established sector capable of making a significant contribution to national economic development. Significantly, it has substantial direct and indirect linkages with the informal sector. It is therefore an important component of many poor South African's

livelihoods and in the context of the sector's promotion it offers a critical opportunity to demonstrate how pro-poor development can be achieved. In the context of the present analysis it also offers an opportunity to establish precedents in skills training and education that can facilitate the integration of the informal economy with the first while at the same time promoting formal economy's competitiveness.

The sector is largely structured geographically around the location of timber resources, although significant beneficiation also occurs around urban centres in Gauteng and the Western Province. Envisioned expansion of afforestation in the Eastern Cape and KwaZulu-Natal will potentially play a critical role in those provinces rural development. The sustainable growth of timber inputs is critical to the future of the WPP sector's competitiveness. The paper and pulp sector has clearly established competitive advantage and a coherent policy supported by skills development to ensure this competitiveness is sustained. Similarly, there are relatively large firms in primary processing and secondary beneficiation sector that are well positioned competitively for the near future.

There are a multitude of small and medium enterprises (SMEs) in the sector whose existence appears to be tenuous with prospects of either marginalised subsistence or withdrawal being likely for many of these firms. This uncertainty around the future for the SMEs comes from uncertainties around timber supplies and the system of skills development. Despite these concerns the sector has benefited from a large rise in domestic demand in recent years. Domestic demand for products from the WPP sector therefore represents a real competitive advantage for many domestic producers. However, competition from abroad continues to grow especially as other countries with similarly favourable growing environments facilitate export promotion.

A critical challenge facing the sector is its ability to produce the necessary timber supplies for primary processing and secondary beneficiation. In terms of markets, timber supplies are allocated either to fibre (round wood) or sawmilling (saw logs). The transformation of growers to increasing small-scale community growers is a challenge to both round wood and saw log supplies. In terms of saw log supplies, the increased role of community growers appears to threaten output as a result of the growing cycle being about two-thirds longer than round wood. With the withdrawal of the state from saw log production there is a real threat that South Africa will not have an adequate supply of saw logs for its existing downstream sectors, let alone any additional beneficiation based on saw logs. Community growers are also a challenge for round wood supplies as linkages between the fibre sector and the growers are limited leading to potential uncertainty of feedstock.

Among the larger scale commercial timber growers increasing outsourcing of work to contractors has created a range of challenges. It has contributed to a highly competitive and increasingly marginalised workforce and firms who are unable and unwilling to invest in skills training and equipment to increase their efficiencies. As a result both round wood and saw log supplies are reduced.

Directly linked to the supply of timber is the competitive advantage of companies in the WPP sector. Without competitively priced timber inputs a substantial competitive advantage of the sector will be lost. Transformation of skills levels in the paper and pulp sector is another key aspect of the sector's challenge to ensure competitiveness

in the future. Increasing knowledge intensity of the workforce has therefore become a critical priority within the sector.

A challenge identified in training the workforce to enhance its skills is the outcomes based learning approach. This approach requires mentorship which is resisted within the workforce and adds considerable work to translate the existing curriculum. The uptake of learnership opportunities has therefore been constrained. If this is not to play a significant role in the future their needs to be increasing acceptance of the mentorship and integrated learning environment espoused by outcomes based education.

Another challenge facing the sector is its domestic competition with the large and well developed non-renewable resource sector. International scarcities in engineer and other technical skills heightens this competitive environment in which enterprises in the WPP sector must compete against local and international inter-sectoral demand for priority skills.

Related to the difficulties in mentorship based training is the historic division of the workforce. Social capital and common cause is often limited between racial and occupational components of the workforce. This lack of social capital also appears to characterise the lack of networks and effective associations among SMEs in the sector. Development of social capital would appear to be a key area to support the sector's general competitiveness and its ability to respond to future challenges.

Lastly, there appears to be a large number of supply driven training initiatives in the wood furniture sector. While opportunities do appear to exist in this part of the WPP sector, many of these programmes do not appear to have examined the requisite skills around market analysis, procurement, and general demand profiling. As a result skills appear to be being developed that are not aligned to the sector's broader needs and development dynamics.

Among the needs for development in the skills training system are programmes focused on facilitating the transition from the informal to the formal sectors of the economy. Activities such as non-timber forest product development and recycling may take place primarily by members of the informal sector. There are experience has shown that many opportunities do emerge within these activities that can lead to these informal sector business becoming part of the formal sector. However, to facilitate this transformation a sustained and systematic skills development and SME support programme is need that assists in training not just in production, but in broader business skills like marketing, transport and finance. This type of programme will also assist in skills alignment in sub-sectors like forest contractors where it will identify growth constraints.

There also appears to be a need for more responsive and management focused skills development among all levels of skills. This is needed in the context of a dynamic international productive environment, which although more pronounced in relatively integrated international sectors like paper and pulp is a feature in most WPP markets. Developing skills training which increases this autonomy within jobs while recognising and making each worker aware of their interdependencies with other parts of the production value chain can facilitate low skilled and intermediate

skilled jobs contribution to the sector's competitiveness. It will also likely create awareness of business opportunities that might not be apparent within the top-down highly skilled focused management paradigm.

The largest need within the skills training system appears to exist within the sector's SMEs. Their limited resources and lack of strong associations has meant that the skills training available to them is typically supply driven rather than aligned more closely to demand. As a result collaborative initiatives to develop skills training from the SMEs themselves would appear highly advantageous. This initiative could also be aligned with the broader productive and business skills development in the sector through facilitators like a large scale extension service or business support programme. While many prototypes for this support work exist they do not appear to have approached a level of diffusion that would make their contribution to the WPP sector significant.

The WPP sector spans a range of activities with differing priorities and types of interventions being required. The following is an initial list of programmes that appear likely to facilitate the alignment of skills training to broader strategic priorities and growth in the sector:

Within the context of the above discussion, the following recommendations are made:

- There is a need to develop an integrated monitoring and evaluation system that is used to inform the industry and policy makers about constraints and opportunities in the sector. One of the first aspects of this system should be focused on the dynamics of afforestation. Delays in the envisioned afforestation uptake to date appear to be creating serious constraints on downstream development in the sector. Saw log shortages for example obviously limit development opportunities for wood products and wooden furniture. Similarly, development of the paper and pulp industry requires increasing secure supplies of round wood. Development of a monitoring and evaluation system of these supplies can therefore play an important role in skills development targeting and identifying constraints to the envisioned development of the sector. The system can also provide a gate way for stakeholder interdependencies to be identified and develop increased coordination. It would be a critical component to developing an integrated skills planning tool for the sector that encompasses SMEs as well as the comparatively well organised larger enterprises in the sector.

- Given the long growth cycle of both round wood and saw log resources afforestation amongst community growers needs to be supported by associated livelihood initiatives. Thus, both non-timber forest products (NTFP) and resource based products from forest transition zones need to be encouraged and mentored within the community growers on a systematic basis. Whether formally or informally based, the livelihoods developed from these activities can provide short-run returns that support the long-run security of timber products and thereby reduce uncertainties and risks associated with timber supplies among what are often impoverished rural communities.

- The State needs to enhance its support for this broad development of the WPP sector, not only in terms of enhancing productivity of timber resources but the poverty alleviation associated with timber, and NTFP. The sector's current system of innovation is currently aligned to the productive needs of the large formal producers. This is a consequence of their comparatively large funding burden. However, within the context of a development focused State and a broader conceptualisation of corporate social responsibility this timber focused system can develop a more inclusive and holistic design which is an example for national integration and formal informal sector synergies.

The growth and development potential of the WPP sector is tremendous. Currently, many initiatives appear to be pulling resources within the sector a variety of directions to the detriment of each. This analysis has suggested some general steps to facilitate this alignment with a focus upon the role of skills. If South Africa can succeed in these efforts it can create a renewable resource model with development linkages to neighbouring nations and perhaps across Africa that facilitates inclusion rather than the enclaves that historically characterise the region's development.

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GLOSSARY OF ABBREVIATIONS

ABET	Adult Basic Education and Training
AIDS	Acquired Immune Deficiency Syndrome
ARC	Agricultural Research Council
ASGI-SA	Accelerated and Shared Growth Initiative for South Africa
BBBEE	Broad-based Black Economic Empowerment
BEE	Black Economic Empowerment
CBO	Community Based Organisation
CI&S	Criteria, indicators and standards
CRLR	Commission on Restitution of Land Rights
CSIR	Council for Scientific and Industrial Research
DEAT	Department of Environmental Affairs and Tourism
DIT	Durban Institute of Technology
DLA	Department of Land Affairs
DoL	Department of Labour
DPE	Department of Public Enterprise
DPLG	Department of Provincial and Local Government
DoA	Department of Agriculture
DoT	Department of Transport
DTI	Department of Trade and Industry
DWAF	Department of Water Affairs and Forestry
EIS	Environmental Impact Assessment
FABI	Forest and Agricultural Biotechnology Institute
FESA	Forest Engineering Southern Africa
FET	Further Education and Training
FFP	Forest and forest products
FIETA	Forest Industry Education and Training Authority
FMSD	Furniture Manufacturing Skills Development Project
FSA	Forestry South Africa
FSC	Forest Stewardship Council
GDP	Gross Domestic Product
HEIs	Higher Education Institutions
HET	Higher Education Training
HIV	Human Immuno Virus
HtFVs	Hard to Fill Vacancies
ICFR	Institute for Commercial Forestry Research
ICTs	Information and Communication Technologies
IT	Information Technology
JIPSA	Joint Initiative on Priority Skills Acquisition
LAAC	Licensing Assessment Advisory Committees
MOU	Memorandum of Understanding
MTO	Mountain to Oceans
NBI	National Business Initiative
NCT	Natal Co-Operative Timber Company
NGO	Non-Governmental Organisation
NQF	National Qualifications Framework
NMMU	Nelson Mandela Metropolitan University
NSF	National Skills Fund
NTFP	Non-Timber Forest Products
NTSI	National Training Strategy Initiative
OSHA	Occupational Safety and Health Act
PAMSA	Paper Manufacturers Association of South Africa

PGDS	Provincial Growth and Development Strategy
PRASA	Paper Recycling Association of South Africa
R & D	Research and Development
SAFCA	South African Forest Contractors Association
SAFCOL	South African Forestry Company Ltd
SAIF	Southern African Institute of Forestry
SALGA	South African Local Government Association
SALMA	South African Lumber Millers Association
SANAS	South African National Accreditation System
SAQA	South African Qualification Authority
SATGA	South African Timber Growers Association
SAWGU	South African Wattle Growers Union
SCE	Senior Certificate Examination
SETA	Sector Education and Training Authority
SFRA	Stream Flow Reduction Activity
SMEs	Small and Medium Enterprises
SSVs	Skill Shortage Vacancies
StatsSA	Statistics South Africa
TAPPSA	Technical Association of the Pulp and Paper Industry of Southern Africa
TIMSS	Trends in International Mathematics and Science Study
UKZN	University of KwaZulu-Natal
UNISA	University of South Africa
UoP	University of Pretoria
WfW	Working for Water
WoF	Working on Fire
WPP	Wood, Paper and Pulp
WSP	Workplace Skills Plan

ACKNOWLEDGEMENTS

The author would like to thank Professor J. Zwolinski from the Forestry Programme at the University of KwaZulu Natal for his insightful comments on an earlier draft. I have tried to incorporate his comments throughout the report. However, this report is not, necessarily, a reflection of his opinions and inaccuracies that might exist are the author's.

CHAPTER ONE: INTRODUCTION

Problem Statement

This is one of fourteen sector studies aimed at contributing to a greater alignment between skills development strategies and the development requirements of key sectors of the national economy. Currently, this alignment has become more important as the government prepares to make decisive interventions within the realm of micro-economic reform. This is particularly so with the launch of both the Accelerated and Shared Growth Initiative in South Africa (ASGISA) and the National Industrial Policy Framework. The Department of Labour's National Skills and Development Strategy 2005-2010 and the skills development programmes of the 23 Sectoral Education and Training Authorities (SETAs) will need to harmonise more effectively with the demands of these sectorally driven economic policies than has been the case in the past.

Several socio-economic factors are currently driving a new approach to sectoral development nationally. Firstly, while unemployment has dropped recently it remains high and well above the target of halving unemployment that the government set in 2003. Second, since establishing macro-economic stability the government's economic policy focus has shifted to the micro-economic level. Third, recently industrial policy is seen as a key lever to facilitate development of priority economic sectors. Lastly, government has increasingly emphasised developing a more effective alignment between education and skills development and more general social and economic goals.

These factors have coalesced into the ASGISA programme. A central task for ASGISA is to provide an overarching socio-economic perspective for all government departments, thereby creating a greater need for alignment and coordination between otherwise discrete policies. The idea is that one overarching approach to state intervention will have a far greater impact on growth and development than a series of separate and unlinked mono-departmental policy initiatives.

In the context of this new policy environment, the Department of Labour's skills development mandate needs to complement the demands of these sectors' more effectively than they have historically. Effective coordination mechanisms are required to ensure that SETA Sectoral Skill Plans and the overall National Skills Development Strategy are all closely aligned and informed by the development of sector strategies at DTI, the promotion of advanced technology platforms at DST, and the production of appropriate levels of highly skilled scientists and industry professionals by the Department of Education. All of these initiatives comprise key contributions that together will drive sectoral renewal and growth across the South African economy.

Research Impetus

The primary purpose of this research project is to contribute to the above mentioned alignment of skills development strategies and the education and training requirements of the wood, paper, and pulp (WPP) sector. It seeks to enhance complementarities within the Department of Labour's skills development mandate and the strategic development needs of the WPP sector. In this regard it is one of fourteen sector studies, which collectively are designed to provide an analytical 'bridge' for more effective information flow between the sectoral context on the demand-side and the National Skills Development Strategy on the supply-side.

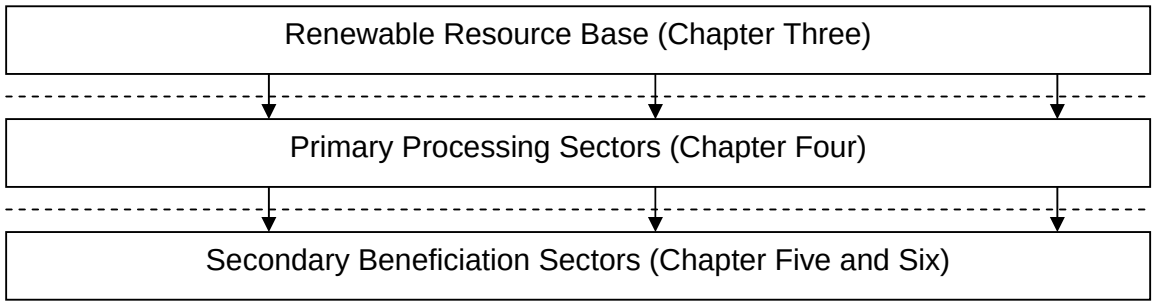
Research Approach

This study has adopted a similar approach as the other sectoral studies in order to provide as comparable and comprehensive overview as is possible. Spatial dynamics are detailed in terms of volume of product, employment, and the value of these products. Key drivers for change are also reviewed. These drivers include policies across spheres and tiers government. Industry strategies and international competitive drivers are considered as well. Constraints and opportunities within the sector and its sub-sectors are reviewed with interdependencies between segments of the WPP sector being given special attention. Within each of the major components of the sector specific firm level case studies review what appear to be critical strategies and dynamics. Within the context of all these features, the system of skills supply and demand is explicitly considered. The strengths and weakness of the skills market are thereby reviewed and priority interventions are identified.

Report Structure

The first part of the report contains a profile of the WPP sector. The profile begins in Chapter Two with a brief overview of the sector and the sub-sectors that constitute it. Figure 1.1 illustrates the WPP sector's value chain and the component sectoral chapter profiles. Chapter Three analyses the forestry sector, specifically the plantation forestry sector. As the renewable resource base upon which most of the other sectors are dependent, forestry dynamics are critical to the other downstream sectors.

Figure 1.1 The wood, paper and pulp sector and associated chapter profiles



Chapter Four reviews the primary processing sector. Fibre and sawmilling are two major sub-sectors. However, pulp fibre production is analysed as an integrated activity within the paper and pulp sector in Chapter Five. Nonetheless, fibre board, sawn lumber, and wood chips are significant sub-sectors whose growth potentials are profiled in the chapter. Attention then turns to secondary beneficiation with overviews of the paper and pulp sector in Chapter Five and the wooden furniture sector in Chapter Six.

Section Two then shifts focus upon the market for skills in the WPP sector. Chapter Eight reviews demand for skills across sectors. Profiling employment and occupational data the chapter also identifies future influences on skills demand from firm interviews, the sectoral profiles in part one, and associated secondary literature. In Chapter Nine, attention shifts to the supply of skills across for WPP and its composite sectors. The system of skills provision at all levels is reviewed with respect to the demands expressed in Chapter Eight in this chapter.

Chapter Nine then reviews thematic priority areas in the skills system. These are important challenges identified in the project across the component sectors. Lastly, Chapter Ten presents conclusions and recommendations for actions that will enhance skills development and support the sector's broader economic growth and development.

PART ONE: SECTOR PROFILE

CHAPTER TWO: SECTORAL OVERVIEW

Introduction

The South African wood, paper and pulp sector incorporates a range of productive activities fundamentally linked to its renewable forestry resources base. In 2004, these forestry resources encompassed 31.2 million hectares or nearly a quarter of South Africa's territory (DWAF, 2007). South Africa's forestry resources can be differentiated among three distinct ecological and economic systems: woodlands, plantation forests, and natural forests.

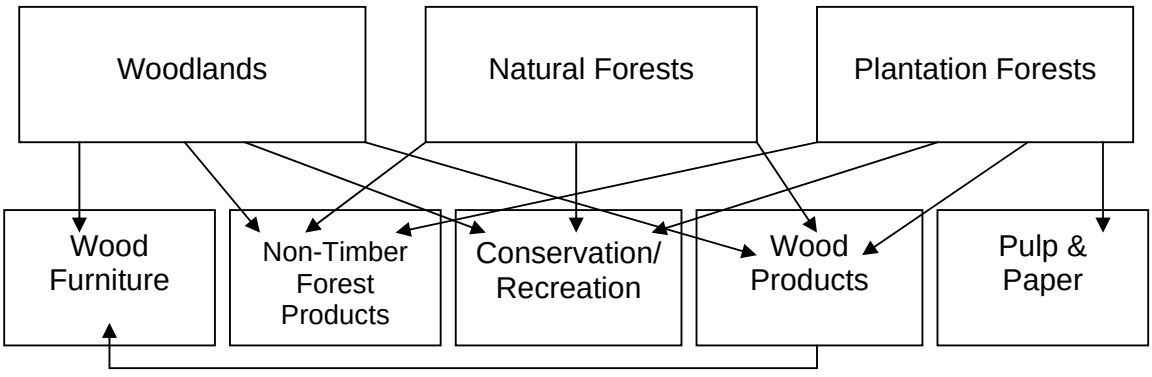
The wood, paper and pulp sector involves both the formal and informal economy. This complicates analysis of the sector's employment and output. In 2005, estimated total employment in the sector was 735,000 (Pilot State of the Forest Report, 2005; Chamberlain *et al.* 2005a, Forestry South Africa, 2006).

Formal output from the sector in 2004 was equal to R15 billion (FSA, 2006). In addition, forest resources were estimated to generate another R15 billion to the South African economy through tourism, communal livestock grazing, and non-timber forest products (Pilot State of the Forests Report, 2005). In 2005, the sector produced R9.35 billion in exports or 2.8% of South Africa's total exports.Net exports for the sector were R2.1 billion. The study's focus within this significant sector is detailed in the remainder of this chapter.

Sector Definition

The three types of forestry resources and their relationship to downstream economic activities are represented in Figure 2.1. Some linkages, such as conservation and recreation, exist for all forestry resources. Others, such as pulp and paper, are uniquely tied to specific forestry resources.

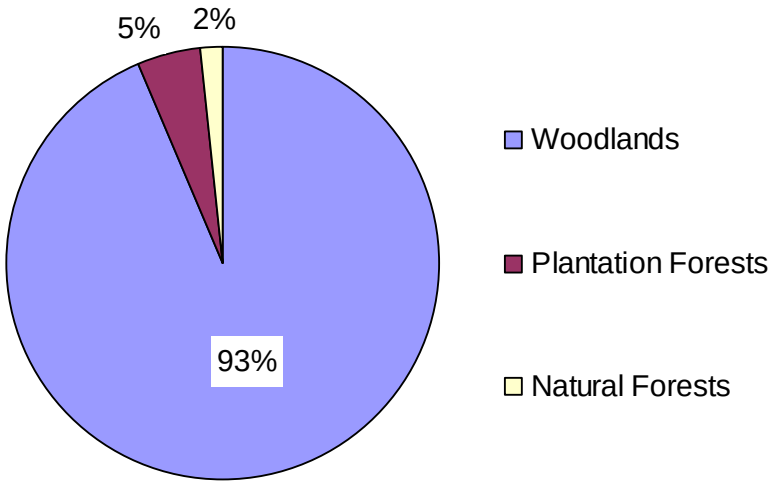
Figure 2.1 Forestry resources and downstream linkages



While elaborated in Chapter Three, an initial discussion of the nature of forestry resources is needed to clarify the scope of the present analysis. Figure 2.2 indicates the comparative size of South Africa's three primary forest types. Woodlands

(savannah) are the main type of vegetation in Africa consisting of woody plants and grasses, in South Africa woodlands cover 29.3 million hectares. Woodlands' timber plays an important role in many rural communities by providing fuel wood and charcoal, construction timber, and craft materials. In addition, woodlands provide an important source of fodder and service income from tourism services. Woodlands also generate a number of non-timber forest products (NTFP). Medicinal plants, mushrooms, nuts and seeds, as well as animal products like honey, beeswax and insects for food are all NTFP produced in woodlands (Pilot State of the Forests Report, 2005).

Figure 2.2 Composition of forest resources by area

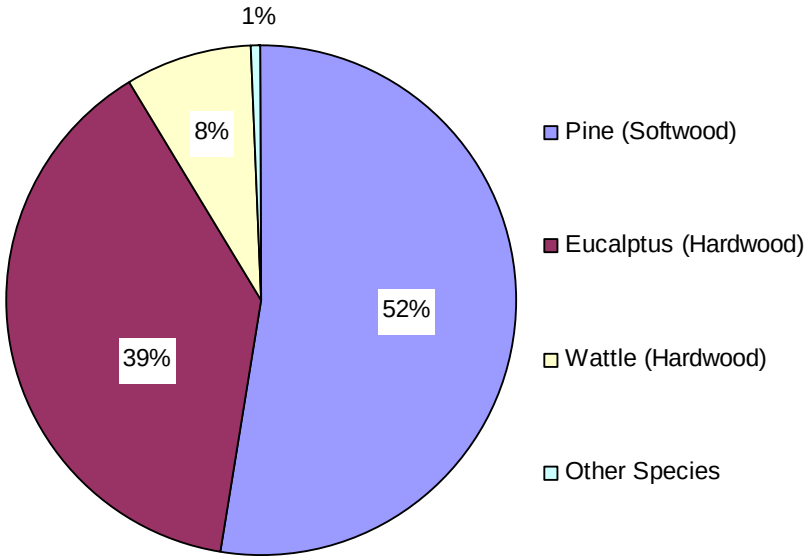


Source: (DWAF, 2007)

Plantation forests are the second largest forest resource in South Africa encompassing 1.3 million hectares. As indicated in Figure 2.3, three species: pine, eucalyptus, and wattle account for 99% of South Africa's plantation forestry resources. In 2005, 82% of South Africa's plantation forests were Forest Stewardship Council (FSC) certified. FSC certification is a voluntary process indicating the forest is responsibly managed based on internationally accepted principles and criteria that require environmentally appropriate, socially beneficial, and economically viable practices (FSC, 2007). The dominant market for South Africa's plantation forestry resources is the pulp and paper industry, accounting for 56% of the resources by management objective in 2004 (FSA, 2006). The wood products sector accounted for an additional 42% of the resources by management objective. Although ecologically less rich than either woodlands or natural forests, plantation forests also generate NTFP, such as ferns, mushrooms, and medicinal plants. Recreational activities like fishing, hiking, mountain biking and off-road routes are also provided in many of South Africa's plantation forests (State of the Forests, 2006).

Natural forests cover 0.5 million hectares, but they support great ecological diversity. Timber is harvested from natural forests for wood products as are a variety NTFP. Fern fronds, bark, bulbs and leaves are some of the more significant NTFP produced from South Africa's natural forests. Smaller scale resource harvesting includes reeds, grasses, indigenous tree fruits, mushrooms, honey, thatch, seeds, and moss (State of the Forests, 2006). Ecotourism is another significant economic activity in natural forests, as well as other recreational activities.

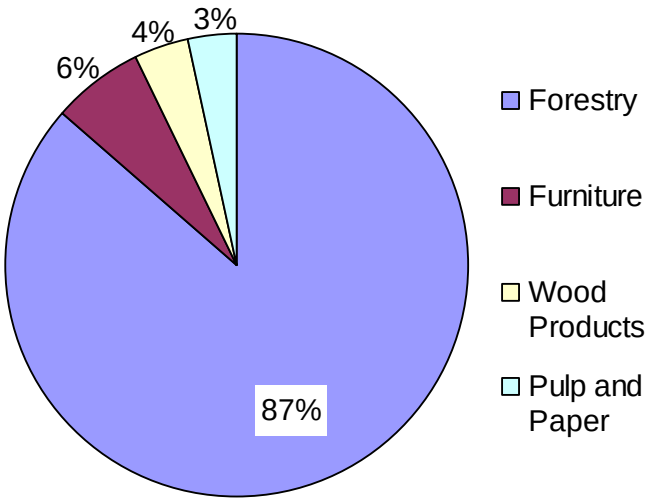
Figure 2.3 Plantation forest species by hectares



Source: (FSA, 2006)

Historically, downstream formal sector linkages have been strongly tied to plantation forest resources. Within the context of the ongoing transformation of forestry there is a good opportunity for natural forests and woodlands to play an increasing role in the value-chain.[1] The division of employment among forestry and other components in the value-chain are reported in Figure 2.4. As indicated, the overwhelming majority of employment occurs within the forestry sector itself. Therefore, this study gives considerable attention to skills in the renewable forestry resource base.

Figure 2.4 Employment composition of WPP industries



Source: (FSA, 2006)

[1] Chapter Three details this change in the structure of forestry.

Within downstream sectors, there is a natural division between products needing inputs from NTFP and products reliant upon timber. Conservation and recreation are tourism services integral to modern forestry management. However, despite the significance of both NTFP and tourism services this analysis focuses upon timber products and downstream activities in which it is a primary input. Therefore, three downstream sectors are considered: wood products, pulp and paper, and wood furniture.

Conclusion

Wood, paper, and pulp industries are an important source of income and employment in South Africa. This study focuses upon skills along the sector's value chain from forest resource management and sustainability through to downstream beneficiation. Significantly, this requires examining skills development within the informal sector and its interdependencies with the formal sector. While not exhaustive, the focus indicates critical challenges and opportunities within the sector.

CHAPTER THREE: PLANTATION FORESTRY SECTOR

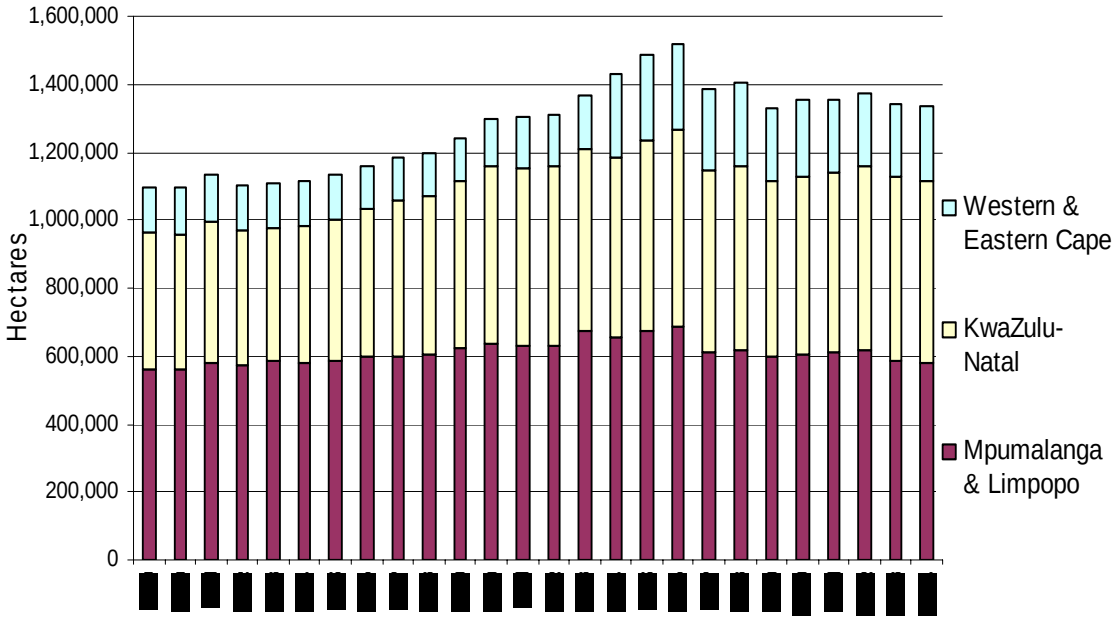
Introduction

South African plantation forestry began in the late 17th century during Dutch Colonial rule in the Cape. However, as addition natural forest resources were discovered development of plantation forests curtailed. The modern era of plantation forestry began in 1876 when a eucalyptus plantation was established in the Western Cape to supply fuel for locomotives travelling to the Kimberley diamond fields (State of the Forests, 2006).

Although there was a small privately run wattle industry in KwaZulu-Natal, plantation forestry in South Africa was primarily a state enterprise until World War Two. The Department of Forestry was established during World War Two to improve management of natural and plantation forests. During the 1950s, private growers were encouraged to enter the plantation forestry sector and by 1960 73% of the 981,640 ha of plantation forests were under private ownership (DWAF, 2007a).

Figure 3.1 shows trends in the size and location of South Africa's plantation forestry sector between 1979 and 2004. Since a peak in 1996 of 1.52 million hectares the size of plantation forests has averaged 1.35 million hectares. Geographically, Mpumalanga accounts 41% of plantation forests. KwaZulu-Natal with 39% has the second largest area of plantation forests. The Eastern Cape has 11% of the national plantation forest area, followed by the Western Cape with five percent and Limpopo with four percent accounting for the remainder.

Figure 3.1 Location of South African plantation forests by area



Source: FSA, 2006 and DWAF, 2007a.

There are three primary species of trees in plantation forest: eucalyptus, pine, and wattle. All three of these species are alien. Pine, which composes 52% of plantations, is a softwood used for sawlogs in the wood products sector and as a pulp for newsprint, magazines, and packaging in the paper and pulp sector. Eucalyptus is a hardwood that accounts for a further 39% of plantations. It is used as a pulp for smoother paper, fluting, and corrugated cartons in the paper and pulp sector. Eucalyptus is also used for poles and mining timber. Wattle is another hardwood used in the paper and pulp sector and accounting for a further eight percent of plantation forests.

There are plantation forests in Swaziland and Zimbabwe tied to the South African industry. Swaziland has 132,400 ha of plantation forests and Zimbabwe has a further 107,231 ha. Angola, Mozambique, Malawi, Tanzania, and the Democratic Republic of the Congo all have areas that are also suitable for plantation forestry, but currently their linkages with South African downstream sectors are limited (Crickmay et al. 2005a). It is possible that a southern African forestry system could emerge with South Africa playing a leading role in its development. However, competitiveness of this African value-chain will have to be increased if the intra-continental transport costs are not to prove prohibitive.

An important advantaged enjoyed by South Africa, and more generally across the Southern Hemisphere, is a comparatively short timber growth cycle. Pine species in South Africa take around 15 years to reach a size viable for pulping. The same species in the Northern Hemisphere will take anywhere between 50 to 100 years to reach this size. Similarly, eucalyptus species require around nine years to reach a size suitable for pulping. These growth rates have contributed to a systemic focus by commercial forestry on plantation grown alien timber species. This focus has enabled South Africa to develop international capabilities in breeding these species (Crickmay et al., 2007b).

The dominance of alien timber species in the forestry value-chain appears to be an example of a path dependent economic process (Arthur, 1994). Contributing to this has been indigenous trees being relatively unknown internationally, slower growth cycles, and an inefficiency for pulping. As a result, indigenous timber has not been used as a plantation species despite inherent advantages over established alien species as a sawn timber in downstream markets like those of the furniture industry.

Producers

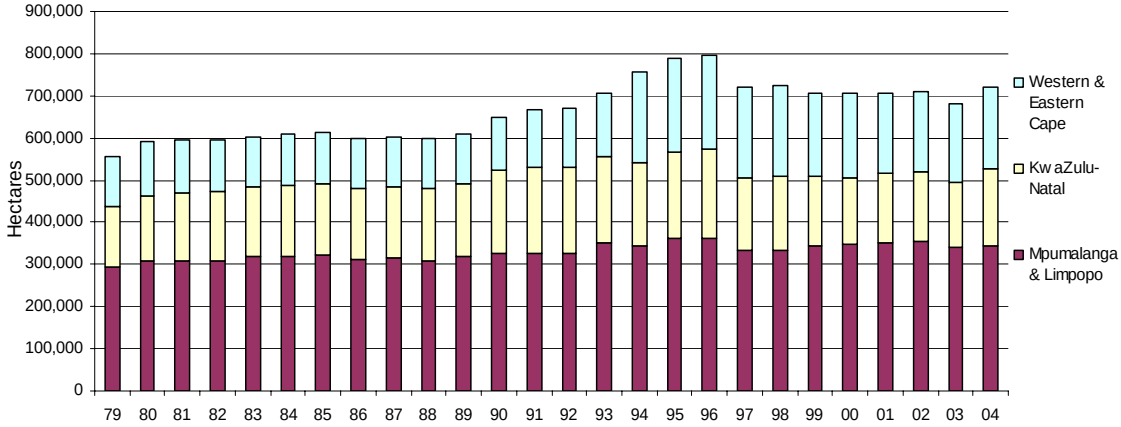
There are three types of plantation forestry growers: corporates, private farmers, and emerging growers. Corporate growers manage approximately 72% of South African plantation forests. Private individuals, partnerships or family trusts account for a further 26% of plantation forests by hectares planted and emerging growers the remaining two percent (DWAF, 2007b and DPE, 2007). Corporate and private growers employ 37,000 individuals in predominately rural areas. These corporate and private growers also include leased state plantation forests. The other major group of growers are emerging growers. Despite their comparatively small proportion of plantation forest area, there are 24,000 emerging growers participating in formal ‘outgrower’ schemes, which are supported by commercial growers and the

government. These emerging growers employ a further 7,500 individuals. Besides the mentored emerging growers, there are reported to be at least another 5,000 individuals working as informal growers (Chamberlain et al. 2005a).

In 1990, the state plantation forests were placed under control of a parastatal, the South African Forestry Company Limited (SAFCOL). Subsequently in 1997, the South African government began withdrawing from plantation forestry. That withdrawal entailed the state retaining ownership, but leasing its holdings. SAFCOL began to unbundle its holdings in 1999 across five geographically defined companies in which SAFCOL retained equity interests. The five companies formed are: 1) Komatiland Forests, 2) Singisi Forests, 3) Mountain to Oceans (MTO) Forests, 4) Amatola Forests, and 5) Siyaqhubeka Forests (DPE, 2004 and DPE, 2007). These plantations are significant players in their own right as they are four of the five biggest sawn timber growers, collectively owning 50% of South Africa's sawlog plantations by area (Crickmay et al. 2005b). Other major plantation forestry growers in South Africa are: Hans Merensky Timber, Mondi Forests, Natal Co-Operative Timber Company (NCT), PG Bison Forests, SAPPI Forests, and York Timber.

Over the last decade, many growers have increased the use of contracting companies. Currently, there are an estimated 30,000 individuals working as contractors for the plantation forestry sector in both the formal and informal economies. This contracting of services reportedly generates some tension as contractors are in a structurally weak position for the silviculture and harvesting services they offer growers. Particularly since the majority of contracted workers are semi-skilled there is concern that a situation of labour broking is emerging that will impede the sector's development (Chamberlain et al. 2005a). This tension is looked at in greater detail in Chapter Nine of this report.

Figure 3.2 Location of pine (softwood) plantation forests by area

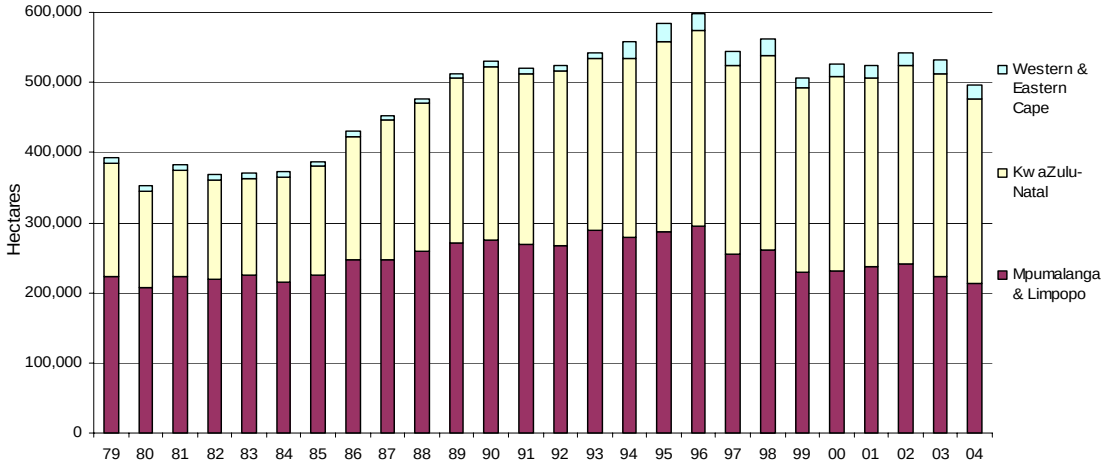


Source: FSA, 2006

The plantation forestry sector also employs an additional 3,000 individuals in primary and secondary transport of timber to the mills or processing plants (Crickmay et al. 2005a). Therefore, in total plantation forestry employs over 100,000 individuals in rural areas where there are often few other employment opportunities.

Historically, plantation forestry occurred in areas that were not wanted for grazing or other agricultural cultivation because of the poor condition of the sites (State of the Forests, 2006: 49). There are marked regional differences in the growing conditions across South Africa that favours certain species of trees over others. An example of this is pine forest plantations primarily occurring in the Mpumalanga province as indicated in Figure 3.2. Over the last few decades pine forest plantation have expanded in the Eastern Cape.

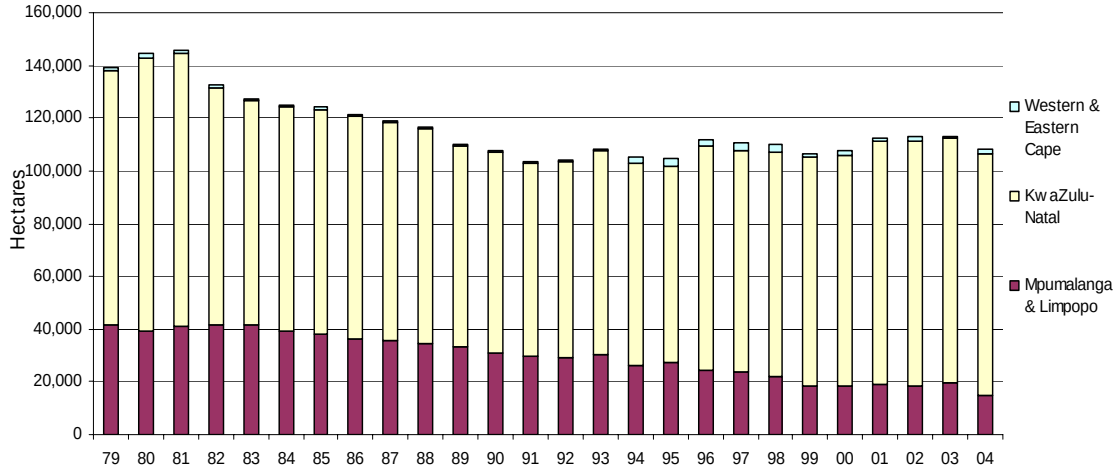
Figure 3.3 Location of eucalyptus (hardwood) plantation forests by area



Source: FSA, 2006

Eucalyptus forest plantations are reported in Figure 3.3. These plantations have increased in KwaZulu-Natal in recent decades with a moderate decrease in Mpumalanga more recently. Figure 3.4 indicates the dominance of KwaZulu-Natal in wattle plantations as well as the general decline in these forests.

Figure 3.4 Location of wattle (hardwood) plantation forests by area

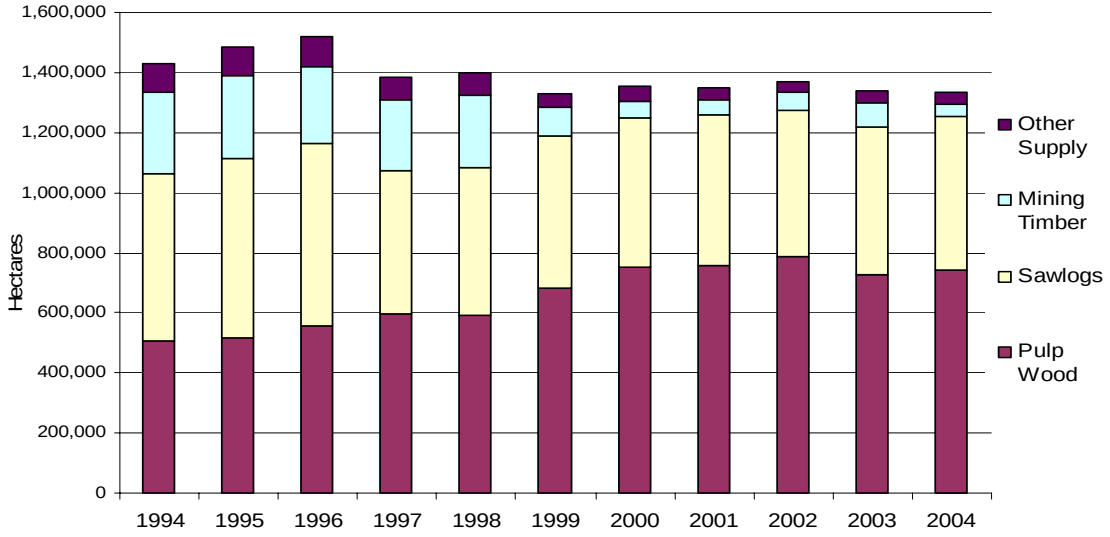


Source: FSA, 2006

Owing to the differing values of growing cycles, plantation forests must be managed towards their intended markets. Figure 3.5 reports trends in management objectives

of plantation forests by area between 1994 and 2004. Accordingly, pulp wood has risen in importance, sawlogs have remained relatively constant, and mining timber has decreased.

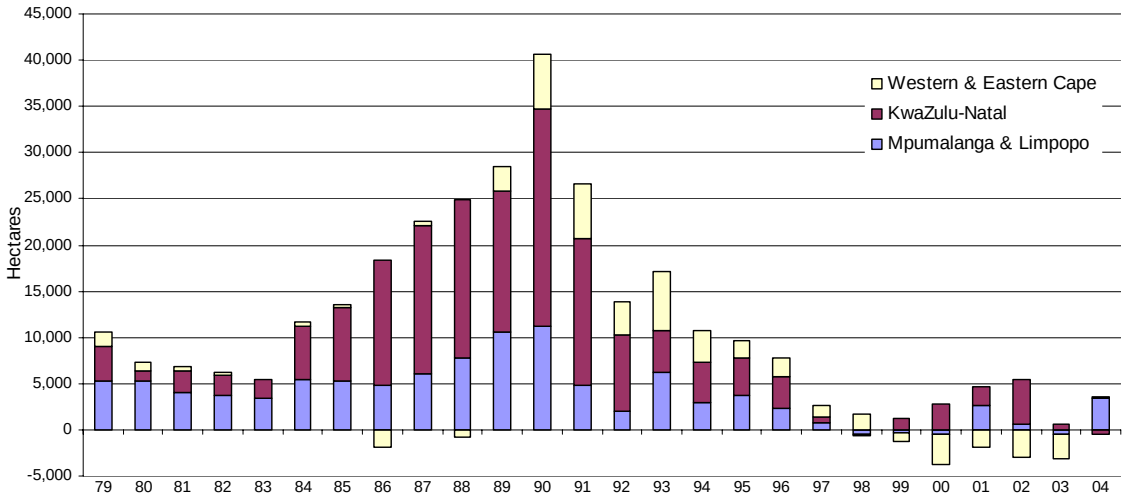
Figure 3.5 Management objectives of plantation forests by area



Source: FSA, 2006

While improved environmental and economic evaluations have led to the removal of several thousand hectares of plantation forests, the promise of additional afforestation has not been realized. Figure 3.6 reports net afforestation in South Africa by region between 1979 and 2004. Despite favourable growing conditions, low afforestation rates over the past decade have contributed to an impending and pervasive sawlog supply shortage (Crickmay et al. 2005b).

Figure 3.6 Net afforestation of plantation forests by area



Source: FSA, 2006

Regulatory burdens appear to be a significant deterrent to afforestation (Zhuwakinyu, 2004 and Godsmark, 2005). However, new entrants are a more systemic challenge

to afforestation. These new entrants are emerging growers expected to develop comparatively small plantation forests in the Eastern Cape and KwaZulu-Natal. Among the more significant challenges they face are the decade plus growth cycle and a lack of holistic skills development to supplement incomes of these frequently impoverished communities while waiting for development of timber resources. These and other barriers are discussed in greater detail in Chapter Nine.

If established commercial forestry practices are retained, another challenge exists in the quantity of suitable land available. The Department of Trade and Industry's (DTI) Industrial Policy Action Plan proposes to increase net afforestation by 100,000 hectare in the Eastern Cape and 40,000 hectare in KwaZulu-Natal (DTI, 2007b). Similarly, the draft Forest Sector Transformation Charter commits to expanding net afforestation by 100,000 hectares (DWAF, 2007c:14). Significantly though, the industry estimates that forestry-restructuring and wetlands adjustments will remove 97,000 hectares of existing plantation forests (Crickmay et al., 2005a).

Analyses indicate that the Eastern Cape and KwaZulu-Natal are the only provinces with land suitable for new afforestation. The Eastern Cape reportedly has 60,000 hectares of land for new afforestation while KwaZulu-Natal possesses another 40,000 hectares. Nationally then there is only an estimated 100,000 hectares available for afforestation (Chamberlain et al. 2005b). While a shortfall from envisioned afforestation polices seems likely it is not inevitable. It is possible to meet and even exceed these afforestation targets, if significant innovations are made in commercial forestry practices.

International and local precedents abound to guide the transformation of commercial forestry practices. An important change would be breaking the large plantation and innovation system paradigm. Production techniques like natural regeneration decrease investment barriers and economies of scale so that the scope for emerging growers, and thereby afforestation, would be vastly expanded (Zwolinski and Groenwald, 2004).

Innovation System

Development of a new forestry production system will require significant innovation upon established practices and adaptation of promising local and international examples. In total there was R163 million spent on R&D in 2003. Forestry R&D spending therefore constituted approximately 1.6% of total South African R&D expenditures (Crafford and Tunzi, 2005 and DST, 2005). The R&D spend consisted of 15% on basic research, applied research 59%, and technological development 26%. Private industry accounted for the greatest share of R&D funding, while government R&D expenditures composed only five percent of expenditures in 2003. In comparison, government funding accounted for 28% of all R&D expenditures in 2003 (DST, 2005).

Mondi Forests and Sappi Forests, as well as SAFCOL through Komatiland Forests and Hans Merensky Holdings are leading private sector investors in forestry R&D. These companies operations are based upon established production practices and their R&D expenditures support them. As a result, there appears to be a gap

between the innovation needs of the new emerging growers system and available resources.

In terms of the innovation system's organisational structure, there is a strong base built in support of established practices. Forest Engineering Southern Africa (FESA) is a co-operative R&D organisation that also offers short-courses in forest engineering. Two national research councils, the Council for Scientific and Industrial Research (CSIR) and the Agricultural Research Council (ARC) also generate forestry related research (State of the Forests, 2006). In 1997, the industry and the South African government began funding the Forestry and Agricultural Biotechnology Institute (FABI) at the University of Pretoria, which provides the forestry industry support in the field of tree pathology and entomology. Stellenbosch University's Department of Forestry and Wood Science also conducts a variety of research for the forestry sector. The University of KwaZulu-Natal hosts the Institute for Commercial Forestry Research (ICFR).

Research is also conducted at the other tertiary forestry programmes in South Africa, which include Fort Cox College of Agriculture and Forestry, Nelson Mandela Metropolitan University's Forestry Programme at the Saasveld campus in George, and the University of Venda's Department of Forestry. In addition, a few other institutions have significant niche expertise for the forestry sector. University of the Western Cape has a centre focused on land reform; Rhodes University has a centre focused on non-timber forest products; and both University of the Witwatersrand and University of Cape Town have expertise in forest ecology.

Given the greater role that communal lands will have in new afforestation it is also important to recognise that a broader socio-economic focus will be needed in future forestry innovations than have occurred previously. Integrating non-timber forest resource management into plantation buffer zones and transition areas might be one approach. Co-operative business development and holistic skills training to support community management of the plantations may also be another rewarding area of innovation within the plantation forestry sector in the future.

Assuming that the innovation needs of established plantations remains unchanged, development of this new production system will require an increase in the R&D workforce to develop and implement the necessary changes. A significant amount of this work involves adapting technologies and overseeing diffusion of practices on a sustained basis among the emerging grower communities. The skills necessary for this type of applied technological development and innovation therefore requires highly skilled individuals, but interactions with recipients suggest that they may best be deployed within a type of extension services model.

Industry and Professional Organisations

The Southern African Institute of Forestry (SAIF) is a professional association for all sciences associated with forestry. SAIF publishes the only professional forestry journal in Southern Africa, the Southern African Journal of Forestry. Forestry South African (FSA) is the largest industry association with a membership of over 26,000 small, medium and large timber growers. FSA was formed in 2002 from the merger of three established forestry associations: the Forest Owners Association (FOA), South

African Timber Growers Association (SATGA), and the South African Wattle Growers Union (SAWGU). FSA seeks to represent all timber growers in South Africa. FSA is a primary source of data about the South African forestry industry as well as representing significant collective bargaining authority.

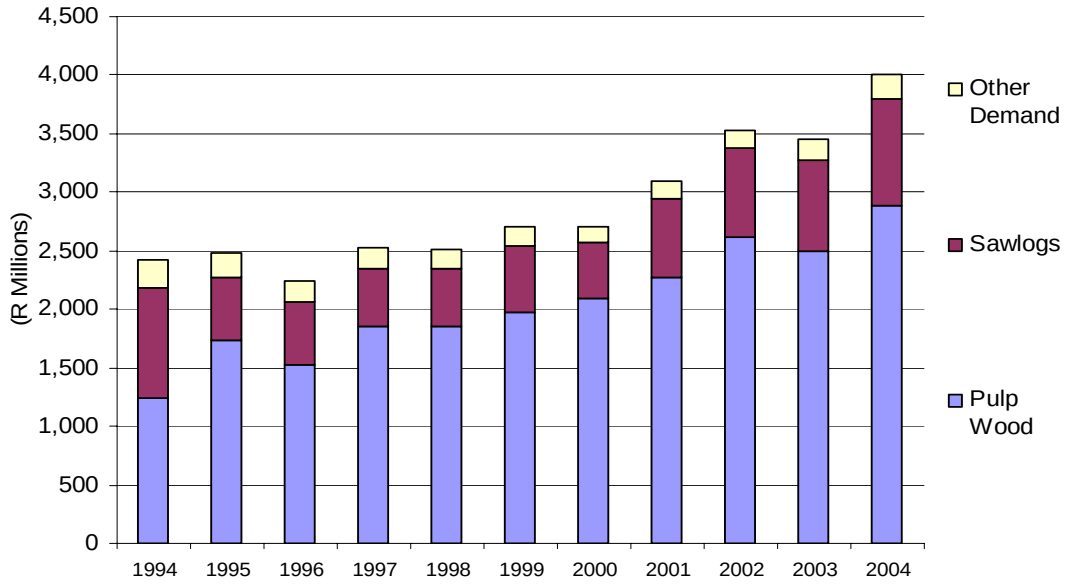
The South African Forest Contractors Association (SAFCA) represents most formal and emerging contractors that work in large plantation forests. SAFCA supplies industry information to its members, business and financial management training, and importantly fire liability insurance. Bukula and Memani (2006) identify several additional growers' associations focused on supporting small and medium growers. These small and medium growers associations emerged since the late-1990s to strengthen capabilities of emerging growers, but they are typically under-resourced.

Markets

Currently, the plantation forestry sector is characterized by a strong degree of vertical integration with downstream sectors. Therefore plantation owners also tend to be significant secondary producers of timber products. This is seen with Mondi and Sappi in pulp and paper, PG Bison in fibreboard, as well as York and Hans Merensky in sawn timber (Chamberlain et al. 2005a). The market for plantation forestry is therefore strongly linked with the downstream processing sector. This section briefly reviews the structure of demand from the processing sector.

Between 1994 and 2004, the compound real annual growth rate of plantation timber was 4.6%. The annual value of timber bought from South Africa's plantation forests is reported in Figure 3.7. During this period pulp wood grew from 47% of market value in 1994 to 68% of market value in 2004. In contrast, sawlogs decreased from 35% of the market value in 1994 to 22% in 2004.

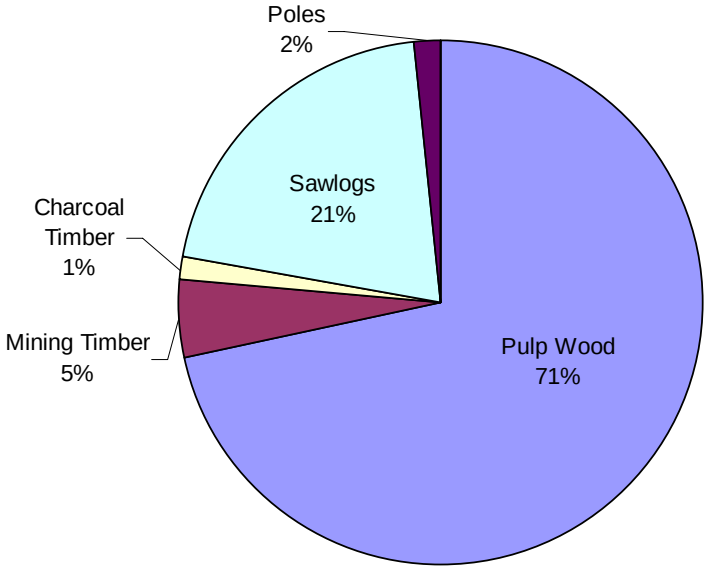
Figure 3.7 Sales of forest timber (Real 2000 values)



Source: FSA, 2006

Demand by volume for South Africa's timber resources between 1994 and 2004 is reported in Figure 3.8. Pulp wood accounted for over 70% of demand for local timber resources. Significantly, in addition to pulp mills, the pulp wood market also consists of board mills and chipping plants. While demand for pulp wood and sawlogs grew between 1994 and 2004, the compound annual growth rate of pulp wood was 5.7% compared to 3.4% for sawlogs.

Figure 3.8 Relative demand for timber by volume, 1994-2004



Source: FSA, 2006

The Sawlog Market

As detailed in Chapter Four, South African sawlogs are softwood (pine) species used in the wood products sector to produce sawn timber for structural timber, packaging and furniture. According to Crickmay et al. (2005b) South African domestic consumption of sawn timber is relatively low by international standards. However, overfelling and increasing demand for sawn timber has created a situation where forecast demand for sawlogs appears to be exceeding supply in the near future. Exports of sawn timber reportedly increased within the context of a weak Rand during the period between 1996 and 2001. Offsetting the increased strength of the Rand until recently has been an environment of low interest rates that has driven unprecedented demand from the domestic building industry. This growth in demand has combined with overfelling of sawlogs in favour of shorter rotation pulp wood to create an environment where limited domestic sawlog production may reduce associated downstream beneficiation.

The Pulp Wood Market

Crickmay et al. (2005a) estimate that within the pulp wood market pulp mills account for approximately 60% of demand by volume, chipping plants 35% and board mills the remaining 5%. Because of the high capital costs, pulp and papers mills tend to increase their demand in a stepwise fashion to capture economies of scale within the mills. Board mills have shared in some demand growth from the domestic building

industry, increasing at a compound annual rate of two percent between 2002 and 2004. As will be discussed in greater detail in Chapter Four, chipping plants emerged in the 1970s to check the duopsonistic domestic buying power of Mondi and Sappi. However, it was only with reintegration of South Africa in the international economy after the fall of Apartheid that demand for wood chips became significant. The value of wood chip exports grew in real terms at a compound annual growth rate of 18.2% between 1994 and 2002. These wood chips are exported almost exclusively to Japan and therefore demand is extremely sensitive to exchange rate changes. Hence, appreciation of the Rand is the likely cause for the 3.1% real decline in the value wood chips in the period between 2003 and 2006.

Policy Environment

There are several significant policies that affect the entire industry, such as the new National Industrial Policy Framework and the Asgisa initiative. Owing to the cross-cutting nature of those policies they were discussed in the introduction. With respect to plantation forestry, two pieces of legislation significantly define the policy and legislative environment: The National Forests Act, 84 of 1998 and The National Water Act, 36 of 1998. Owing to the importance of these pieces of legislation this section focuses upon them.[2]

The National Forests Act of 1998

The act, which replaced all previous Forestry legislation, is administered by the Forestry Directorate within DWAF. It aims to protect and promote all of South Africa's forest resources. Sustainable forest management principles and policies in the act are promoted through a set of criteria, indicators and standards (CI&S) that are reported on a regular basis through the State of the Forests Report. In plantation forestry, the CI&S are already followed to a large extent because of the industry's adoption of FSC certification. The act also established a National Forestry Advisory Council that advises the Minister of Water Affairs and Forestry. Importantly, the act established the commitment to withdrawal the state from the active management of its plantation forestry holdings.

The National Water Act of 1998

The act is administered by the Water Affairs Directorate in DWAF. The act aims to protect, conserve and sustainably manage national water resources. Under the act any water, except that sourced from municipalities, needs to be registered with DWAF. Water resources are then regulated through assessment of available resources across 19 defined water management areas in South Africa. Each water management area corresponds to a distinct catchment (watershed). Based on registered users water use is allocated and prioritised in each of the national water management areas. Activities deemed to have major impact on stream flow are given special treatment through a 'stream flow reduction activity (SFRA) process. Both the

[2] The *Pilot State of the Forest Report 2005* provides a comprehensive review of policies in the plantation forestry sector.

standard licensing and the SFRA licensing process gives DWAF an important role in land use planning (Chamberlain et al. 2005: 122).

Plantation forestry is considered a SFRA by DWAF. Licenses are therefore issued through one of the 19 licensing assessment advisory committees (LAAC) in each water management area. The LAACs consists of stakeholders from government, Industry and civil society organisations. The LAACs review scoping reports about the proposed use and in some cases may require a complete environmental impact assessment (EIS). The time and costs vary depending on the size of the plantation forest and the firm's own internal capabilities. SFRA licenses costs range between R8,000 and R50,000 and usually take between 180 and 95 working days (Chamberlain et al. 2005, p.123).

Currently, despite using 10% of the water used in irrigation agriculture, plantation forestry is the only listed SFRA (Chamberlain et al. 2005, p.124). As a result, the industry views the National Water Act as an excessive regulatory burden on their industry (Godsmark, 2005). Since this burden will be enhanced as afforestation spreads to increasingly small and historically disadvantaged communities, it appears that without revisions it may become a major impediment to realizing envisioned afforestation targets.

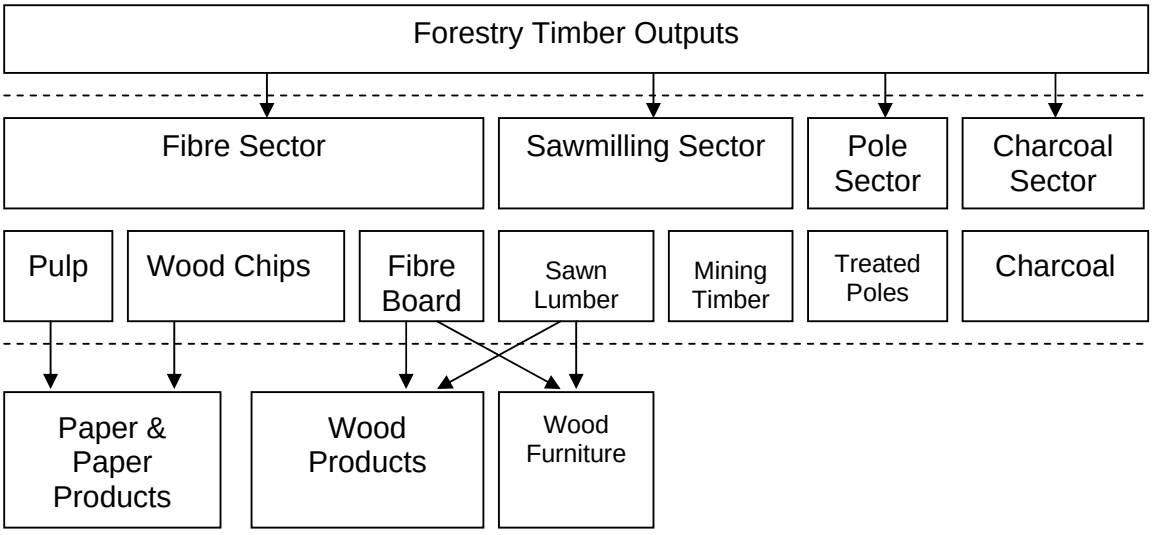
CHAPTER FOUR: PRIMARY PROCESSING SECTOR

Introduction

This chapter analyses primary processing in the wood, paper and pulp sector. Figure 4.1 represents divisions between forestry outputs, primary processing sectors, and secondary beneficiation sectors. Primary processing of timber inputs from forestry are divided among four sectors: fibre, sawmilling, treated poles, and charcoal. The fibre sector consists of the pulp milling sub sector, the wood chip sub sector, and the fibre board sub sector. The sawmilling sector consists of the mining timber and sawn lumber sub sectors.

Between 1994 and 2004, pulp mills accounted for 66% of primary processing output by value, saw mills were a further 12% followed by the wood chip mills, 8%, and board producers 6% (FSA, 2006).[3] Pulp mills are discussed within the context of the pulp and paper sector in Chapter Five. Woodchip mills are a significant percentage of primary processing value added, but they do not represent a major source of employment. Therefore, while woodchip production and its market structure are discussed in brief, attention in this chapter is primarily on the sawmilling sector and its sawn lumber output.

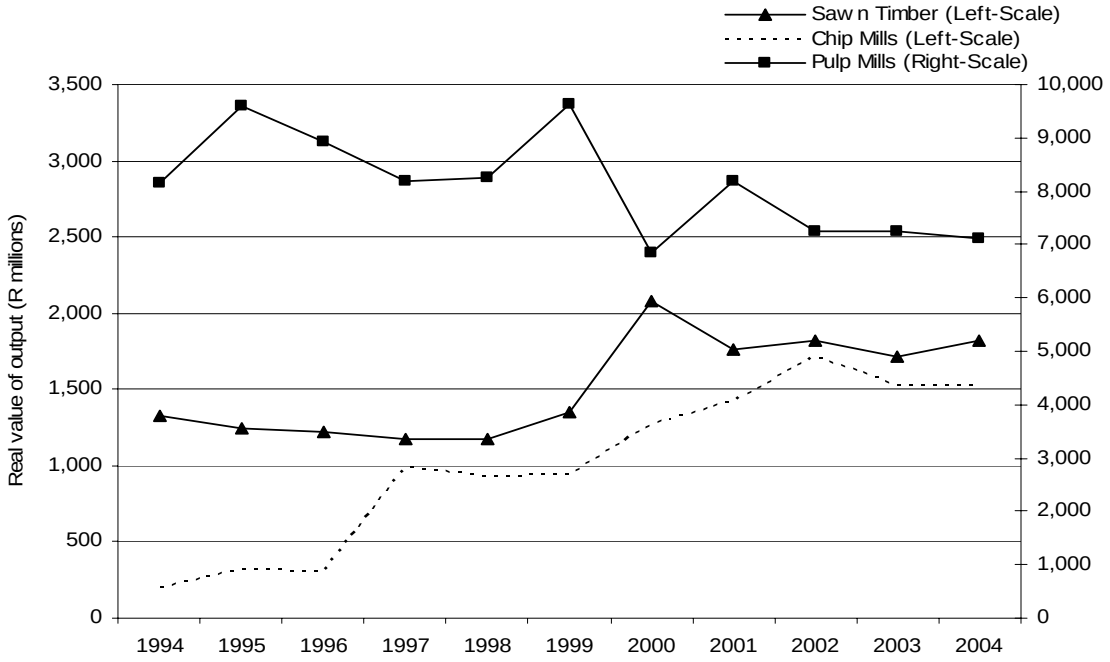
Figure 4.1 Primary processing and secondary beneficiation sectors



Trends in the real value of output from the primary processing sector are illustrated in Figure 4.2. Besides the marked difference in scale, the trends among these three leading components of the primary processing sector are also striking in their contrast. Between 1994 and 2004, the real compound annual growth rate of South African pulp mills declined by 1.4%. In contrast, the real compound annual growth rate of South African saw mills rose by 3.2%. Even more significant was the 20.1% real compound annual growth of South African chip mills.

[3] The other primary processing sectors accounted for the remaining 8% of output by value.

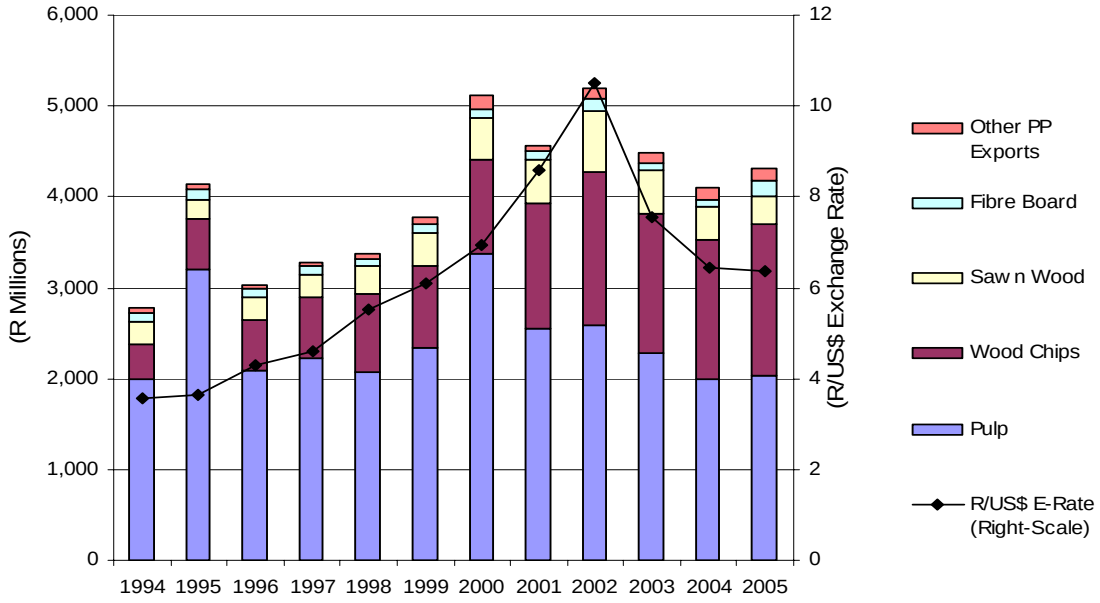
Figure 4.2 Value-added of select primary processing activities 1994-2004



Source: FSA, 2006

The real values of primary processing exports are reported in Figure 4.3. The growth and export focus of wood chip producers can be clearly seen. The relationship of exports and the exchange rate is also apparent.

Figure 4.3 Primary processing exports 1994-2005 (Real 2000 values)[4]

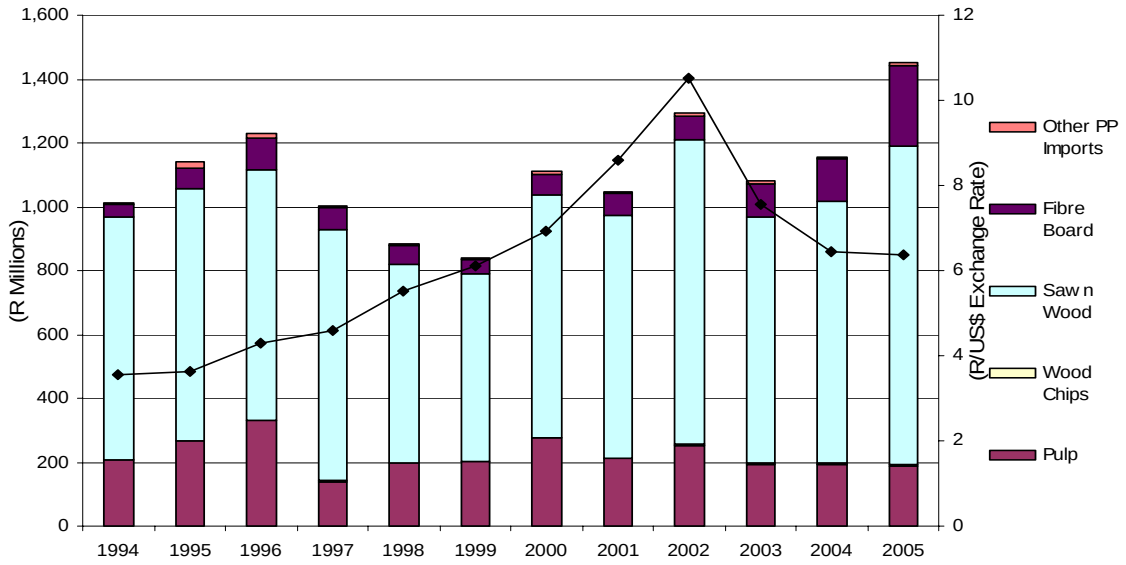


Source: Quantek

[4] See Appendix One for a list of trade sectors included in primary timber processing.

The comparative real value of primary processing timber imports is shown in Figure 4.4. Wood chip imports are negligible, but the growing demand for sawn wood and fibre board imports is clearly seen in the figure.

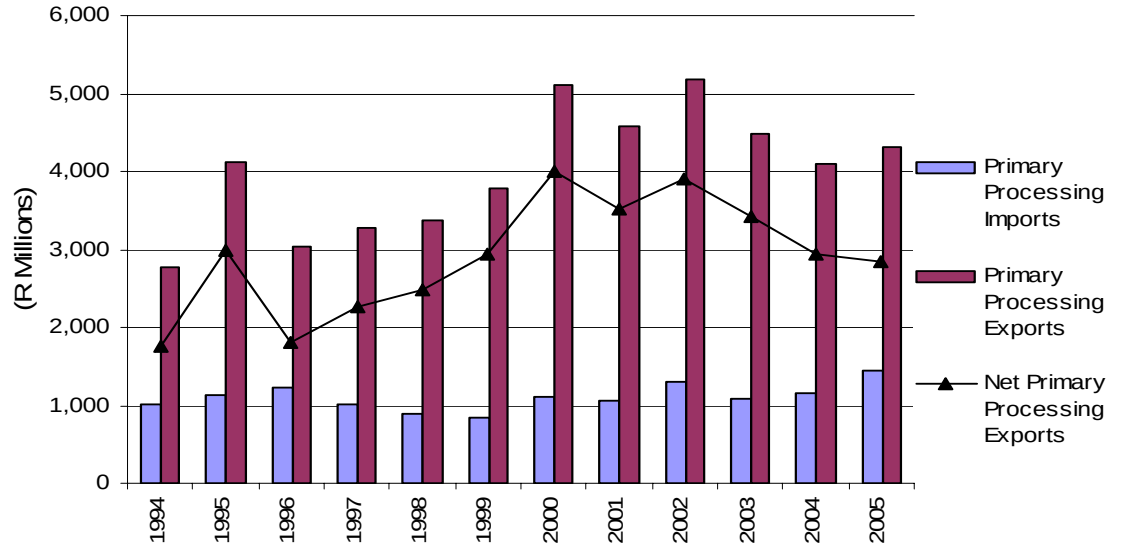
Figure 4.4 Primary processing imports 1994-2005 (Real 2000 values)



Source: Quantek

The real value of primary processing trade is reported in Figure 4.5. The sustained net export balance indicates that South Africa's forestry resources have created an internationally competitive local primary processing timber sector. While the real value of imports has risen marginally, the primary driver of net trade in the primary timber processing sector appears to be the sector's exports.

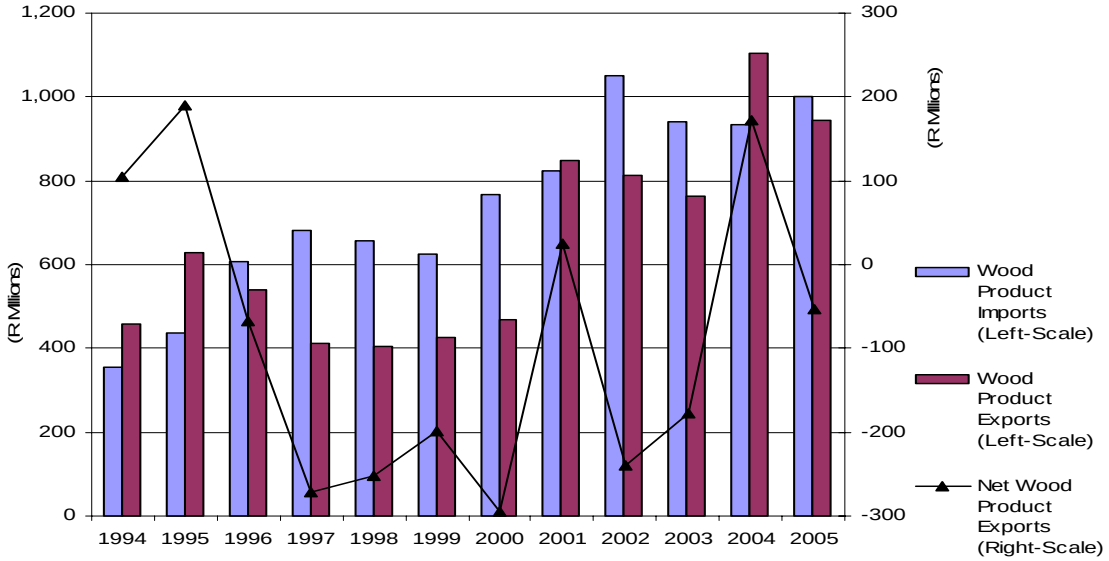
Figure 4.5 Primary processing trade 1994-2005 (Real 2000 values)



Source: Quantek

Competitiveness of secondary beneficiation in paper and wooden furniture are discussed in Chapters Five and Six respectively. However, before analysing the primary processing sector it is worth briefly comparing its trade performance to that of the wood products sector. The trade performance of the wood products sector, Figure 4.5, stands in contrast to that of the primary processing sector.

Figure 4.5 Wood products trade 1994-2005 (Real 2000 values)



Source: Quantek

Between 1994 and 2005, there was a net trade deficit in wood products most years. While the real value of wood product exports has grown at a compound annual growth rate of 6.6%, export growth lost ground to imports, which grew at a compound annual growth rate of 9.4%. The trade statistics indicate obvious competencies in domestic wood product production, but there appears to be a potential danger that these will fall short of fulfilling domestic market growth.

Producers

In 2004, the primary processing sector consumed an estimated 22.6 million tonnes of timber inputs (Crickmay et al. 2005a: 43). Saw logs accounted for 23% of inputs, of which 96.5% were softwood and 3.5% hardwood. The remaining 77% of timber inputs were round wood. Pulp mills consumed 49% of round wood inputs, of which 55% were hardwood and 45% softwood. In addition, pulp mills consumed 1.1 million tonnes of recycled paper and softwood waste. Chip mills consumed a further 30% of round wood supplies. Board mills purchased six percent of round wood and an additional 426,000 tonnes of softwood and hardwood waste. Mining timber demand accounted for a further 4.85% of round wood, followed by treated poles, 4.5%, with the remaining 5.65% of round wood consumed by charcoal plants and direct round wood exports.

Excluding the contribution of pulp milling, which is discussed in Chapter Five, chip mills and saw mills account for over 73% of annual timber consumption. Again

excluding pulp milling, chip and saw mills accounted for 58% of primary processing employment. These two segments are significant components of primary processing and provide an indication of the broader primary timber processing sector.

There are four chipping mills in South Africa; all of them are in KwaZulu-Natal: three are located in Richards Bay and the other in Durban. These mills are located at two of South Africa's primary shipping ports because woodchips are produced for the export market. Woodchip production emerged from an effort by plantation forest owners to break the pricing oligopsony held by South Africa's pulp mills. While the first woodchip mill was established in 1970, it had limited success until the forest industry was integrated with international markets in the 1990s.

Wood chipping is an initial stage in the pulping process, but these chip mills exist as separate production units for the export market (Chamberlain et al. 2005b: 69). The segment developed by non-integrated pulp plantation forest growers,[5] as a means to increase the price received for their timber inputs. The sector has become a significant source of foreign exchange earnings, generating nominal export income of R2.14 billion in 2005 and R1.86 billion in 2006. It also contributed a significant degree of beneficiation, R991 million in GDP in 2003, despite the fact that represents limited beneficiation compared to processing of the woodchips in the domestic pulp and paper industry (Chamberlain et al. 2005a: 64).

Currently, chip milling is not limited to non-integrated growers as it has become an established outlet for round wood supplies that exceed domestic pulp processing capacity. As a result, Mondi operates one of the largest chip mills, but it plans to use this chipping capacity in future pulping. A woodchip mill costs around 4% of the price of a pulp mill (Chamberlain et al., 2005b: 83). Therefore, until timber supplies from new areas of afforestation justify establishment of a pulp mill, woodchip mills are a means to provide some local beneficiation. Nonetheless, woodchip mills are not highly labour absorbing. Employment in the sector is estimated to total just 500 individuals (Chamberlain, et al. 2005a: 64).

Three types of sawmills can be distinguished: formal sawmills, low cost mills, and micro mills. Formal mills have an annual saw log intake of between 15,000 m^3 and up to 250,000 m^3 of timber. Formal mills kiln dry and produce SABS graded timber. These mills produce around two-thirds of South Africa's sawn timber worth about R981 million in 2004. According to Crickmay et al. (2005b) the number of formal sawmills has declined from 188 in 1988 to 45 in 2004. The surviving mills have increased their efficiencies though and by 2004, the 45 mills produced more sawn timber than the 188 mills did in 1988. Mpumalanga has 48% of the formal saw mills. It is followed by KwaZulu-Natal, 18%; the Eastern Cape, 15%; the Western Cape, 13%; and Limpopo, 7%.

Low cost mills are continuously operating, location specific, mills that often kiln dry their timber, but do not necessarily produce SABS graded timber. According to Crickmay et al. (2005b) 230 low cost mills produced around 27% of South Africa's sawn timber. Fifty-two percent of low cost mills are located in the Eastern Cape, 20% in Mpumalanga, 17% in KwaZulu-Natal, and 11% in the Western Cape.

[5] These are growers independent of the two large pulp and paper companies Mondi and Sappi.

Micro mills are mobile processing facilities that often work fire damaged areas. Typically they produce wet or air dried timber for local communities or for pallet and cable drum manufacture. Crickmay et al. (2005b) report the existence of 345 micro mills, producing 7% of South Africa's sawn timber. Thirty-eight percent of micro mills are located in the Eastern Cape, 29% in Mpumalanga, 20% in KwaZulu-Natal, and the remaining 13% in the Western Cape.

In 2003, sawmilling generated R1.33 billion to GDP (Chamberlain et al.2005a: 71). A primary constraint for the sawmilling industry is saw log availability. This growing shortage of saw logs was discussed in Chapter Three. The increasing afforestation in the Eastern Cape and KwaZulu Natal seems to favour low cost and micro mills. However, supplies from emerging growers are currently beset by uncertainties and their eventual significance to the sawmilling industry is unclear.

Innovation System

Industrial round wood processing, *i.e.* pulp milling, accounted for nearly all of primary processing's R66.8 million R&D expenditures (Crafford and Tunzi, 2005). These 2003 investments also had a disproportionate private sector investment similar to that which characterized primary processing. In the public sector, Nelson Mandela Metropolitan University's Wood Science Programme at the Saasveld campus in George and Stellenbosch University's Department of Forestry and Wood Science conduct a research for the primary processing sector. In addition, the University of Pretoria offers technical services for the primary processing sector through its timber testing laboratory.

Besides industrial round wood, significant industry players in the R&D system include Hans Merensky Holdings and Safcol. Hans Merensky has invested in process facility innovations to improve the quality of material output. It also sponsors tertiary education in timber engineering across South Africa to promote the sector's development.

Industry and Professional Organisations

The primary professional and industry association for the sawmilling is the South African Lumber Millers Association (SALMA). As a representative of formal sawmills, SALMA works as an industrial lobby for the sector's interests. SALMA has recently undertaken a low cost mill improvement initiative to enhance overall efficiency in sawmilling as well as the profitability of informal lumber millers. This initiative is discussed further in Chapter Nine.

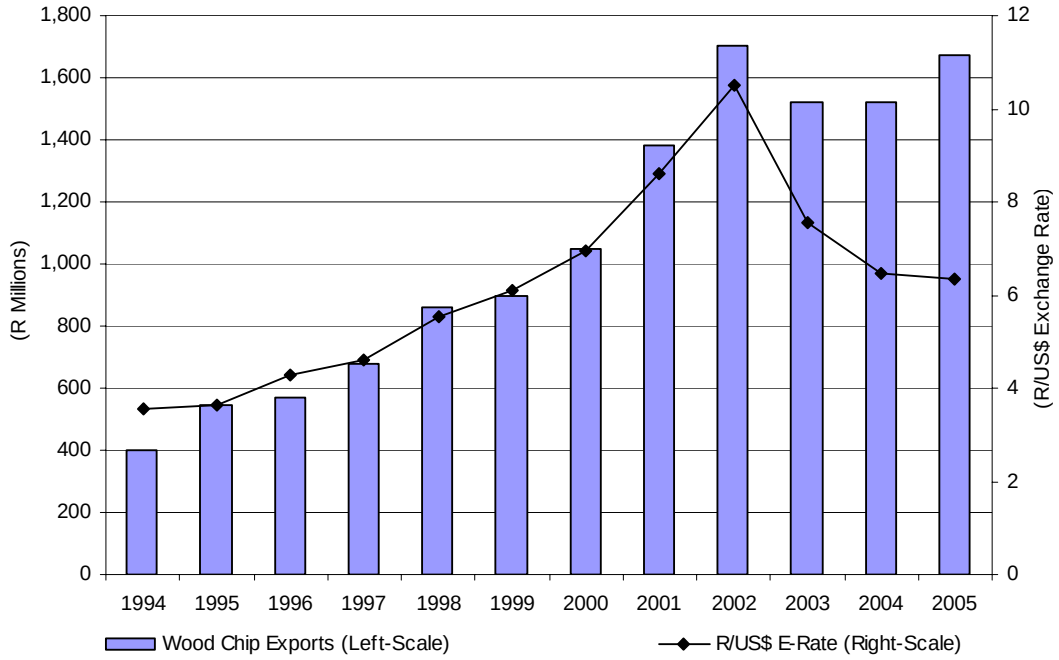
Markets

Because of the comparatively high transport costs primary processing is highly linked to output from local forestry resources. This section provides a brief review of the wood chip market and the sawn timber market. Details about other significant primary processing markets can be found in Chamberlain et al. (2005b).

The wood chip export market

Since wood chipping is part of pulping operations, there are integrated softwood and hardwood chipping facilities at all of South Africa's pulp mills. However, as an independent entity, the South African wood chip market is based solely on hardwood. With its export focus, wood chip demand is strongly related to the relative strength or weakness of the Rand. Figure 4.6 illustrates the relationship between wood chip exports and the Rand value between 1994 and 2005.

Figure 4.6 Wood chip exports 1994-2005 (Real 2000 values)



Source: Quantek

Given the latent demand for wood chips by South African pulp mills, when the Rand appreciates Mondi and Sappi could buy some the hardwood chip currently being exported. Nonetheless, currently Japan is the primary market for South African wood chips. In fact, between 2003 and 2006 Japan purchased 98.6% of all South African wood chip exports. Japan's importing of South African woodchips seemingly stands in contradiction to the influence transport costs are assumed to play in the sector. Nonetheless, shortages of timber resources in Japan make the export of wood chips viable despite the transport costs.

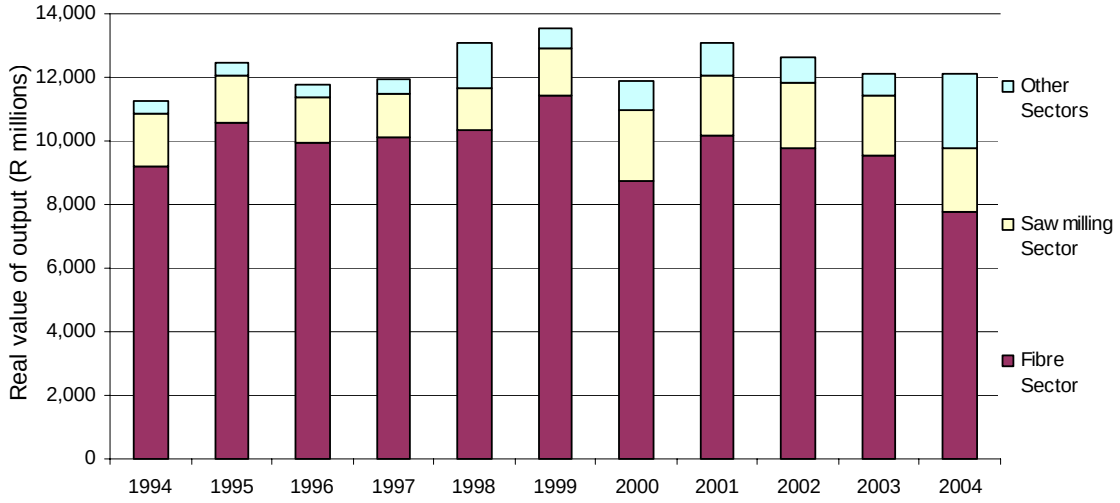
Buyer concentration within the South African domestic market was broken up by the development of the wood chip export market. The Japanese price exceeds the price domestic pulp and paper mills are willing to pay sufficiently to ensure a secure supply of wood chips to the Japanese industry (Chamberlain et al. 2005b: 77).

The sawn timber market

South Africa's sawn timber is primarily produced from dedicated softwood, pine, saw log plantations. Between 1994 and 2004, the real value of the sawn timber sector in

South Africa has grown at an annual compound growth rate of 1.9%. As Figure 4.7 indicates sawn timber is a much smaller component of primary processing sector activity than fibre. The comparative size difference is not surprising though since the fibre sector contains pulp milling, wood chip mills and board mills.

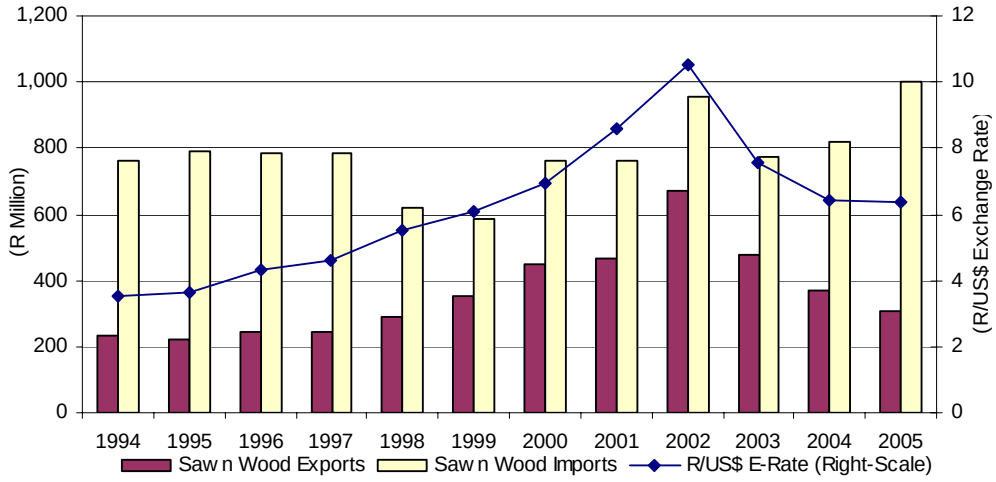
Figure 4.7 Value-added primary processing 1994-2004 (Real 2000 values)



Source: FSA, 2006

Since 1994, the export trade in wood from the sawmilling sector has been strongly correlated to exchange rate changes as is illustrated in Figure 4.8. Notably though the import trade in wood has shown less correlation to exchange rate fluctuations. Demand for output from the domestic sawmilling sector varies according to the type of sawmills producing the output with higher quality wood being produced and demanded by the formal sawmills.

Figure 4.8 Sawn timber trade 1994-2005 (Real 2000 values)[6]

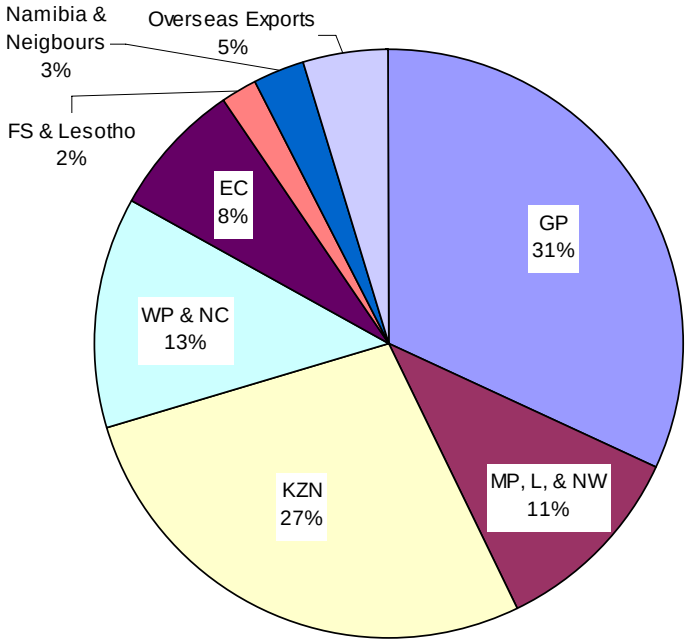


Source: Quantek

[6] See Appendix One for a list of trade sectors included in sawn timber.

The composition of sawmill market demand is represented in Figure 4.9. Accounting for 30.6% of demand, Gauteng is the largest market for the sawmills. Significantly, the local building industry has accounted for an increasing percentage of end-user demand during the 2000s. This increasing consumption by the local building industry has come to replace declining demand from the local wood furniture sector, whose dynamics are discussed further in Chapter Six.

Figure 4.9 Geography of demand for sawn timber



Source: Crickmay et al. 2005b: 13.

Government interventions in the saw log industry led to historically low saw log input prices, which in turn discourage the sawmills to invest in improving production efficiencies. Between the 1950s and the early 1990s, government saw log plantations were the primary supplier of saw logs to the sawmilling sector. During that era, DWAF established long-term contracts with private sawmills. This pricing structure stimulated the establishment of a domestic sawmilling sector, but it effectively prevented private sector plantations from entering the saw log market and discouraged sawmilling efficiencies. Shorter contracting cycles during the 1990s have led to South African sawmills increasing their productivity and increasingly integrated saw log plantation with sawmilling (Chamberlain et al. 2005b: 96).

Policy Environment

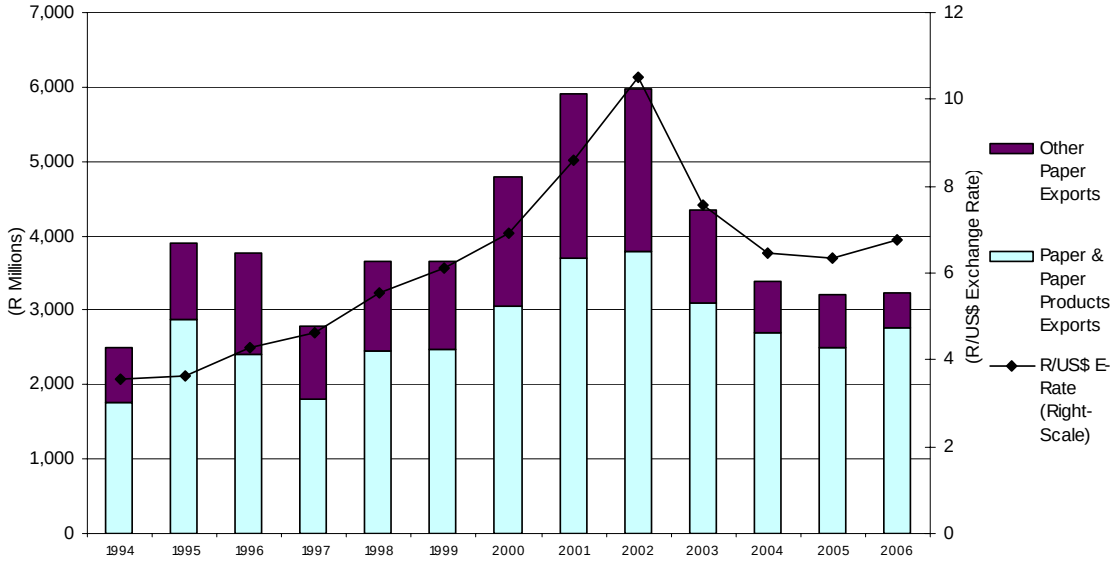
The primary processing sector is not subject to any unique policy forces except those related to pulp and paper manufacturing and therefore discussed in the context of that sector's policy environment. Nonetheless, privatisation of government plantation forests and the shift to emerging growers will significantly impact the sector. The diverse geography of plantations in the Eastern Cape particularly seems to hold potential to foster development of more efficient and competitive low cost mills and micro mills.

CHAPTER FIVE: PAPER AND PULP SECTOR

Introduction

The major paper and pulp enterprises also own plantation forests, therefore the paper and pulp sector effectively spans the value-chain from the renewable resource sector (plantation forestry), to primary processing (pulp milling), and through to secondary beneficiation (paper and paper products). The paper and pulp industry contributed R5.9 billion to GDP in 2003 and employed 13,500 individuals. In addition, another 11,000 individuals were employed in the recovery of paper for recycling (Chamberlain et al. 2005a: 50).

Figure 5.1 Paper exports 1994-2006 (Real 2000 values)[7]



Source: Quantek.

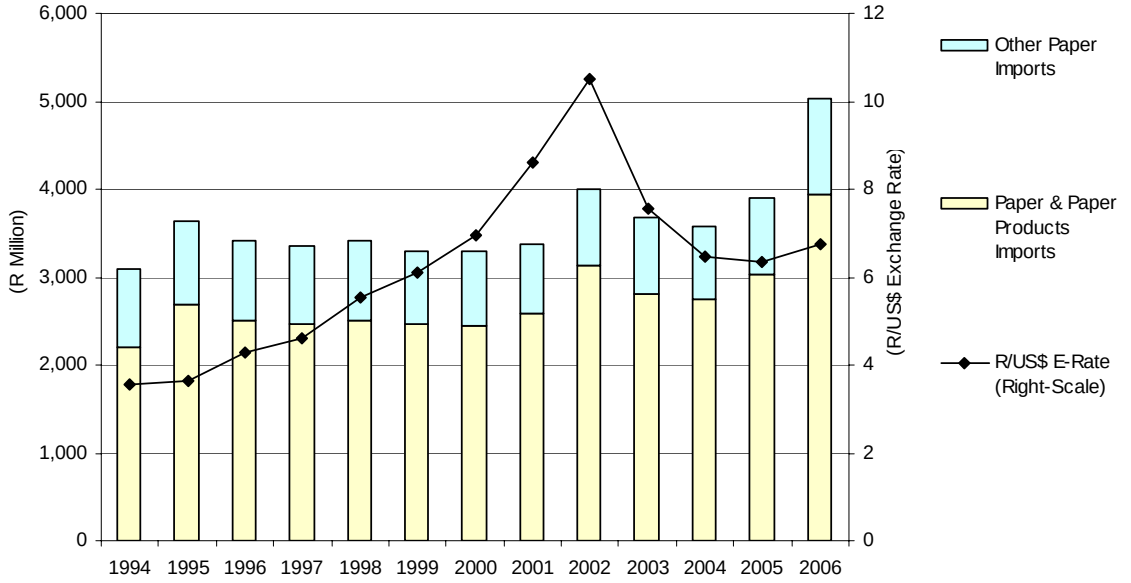
Paper exports and imports are reported in Figure 5.1 and 5.2. Given that domestic paper supplies and consumption have been rising, as discussed below, the positive relationship between exports and the exchange may indicate that South African paper competes on a commodity price basis internationally. The constant growth in paper imports, despite exchange rate fluctuations and growing domestic supply, appears to indicate that paper imports are not a substitute for domestic production. These features suggest that increasing income, as indicated by sustained GDP growth, is a dominant factor in the paper market.

In this context, domestically produced paper products are apparently not a suitable substitute for imported products.[8] While skills and technological capabilities may contribute, high fixed costs associated with establishing new productive capacity may also form a considerable barrier to South African paper manufacturers' ability have to

[7] See Appendix One for a list of trade sectors in the paper sector
[8] See Li *et al*. (2006) for an econometric analysis of a similar pattern identified in China's paper market.

meet this growing demand. However, it was not possible within the scope of the present research to assess the causes for this apparent gap in domestic paper supply capabilities.

Figure 5.2 Paper imports 1994-2006 (Real 2000 values)

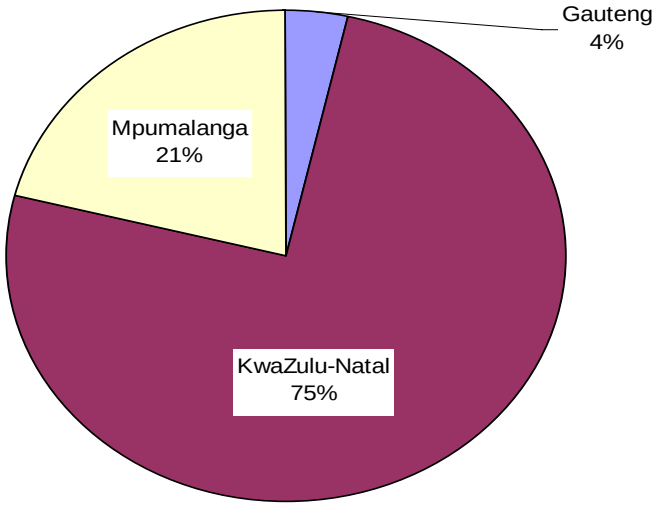


Source: Quantek

Producers

Mondi and Sappi are the only two companies to operate pulp mills in South Africa. In 2005, these pulp mills had a total production capacity of 2.69 million tonnes per year. Sappi's five pulp mills accounted for 60% of that capacity and Mondi's four mills the remaining 40% (PAMSA, 2007: 6).

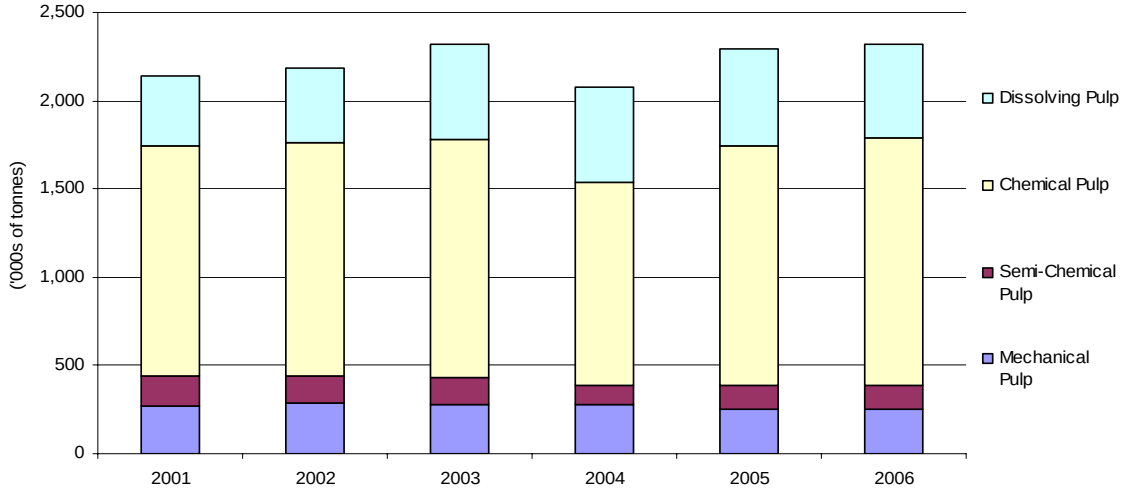
Figure 5.3 Location of pulp milling capacity, 2005



Source: PAMSA, 2007: 6.

The location of pulp milling capacity is reported in Figure 5.3. Three-quarters of pulp milling capacity is located in KwaZulu-Natal, Mpumalanga accounts for just over a fifth, mostly from Sappi's Ngodwana Mill near Nelspruit.

Figure 5.4 Composition of domestic pulp output volume 2001-2006



Source: PAMSA, 2007: 7.

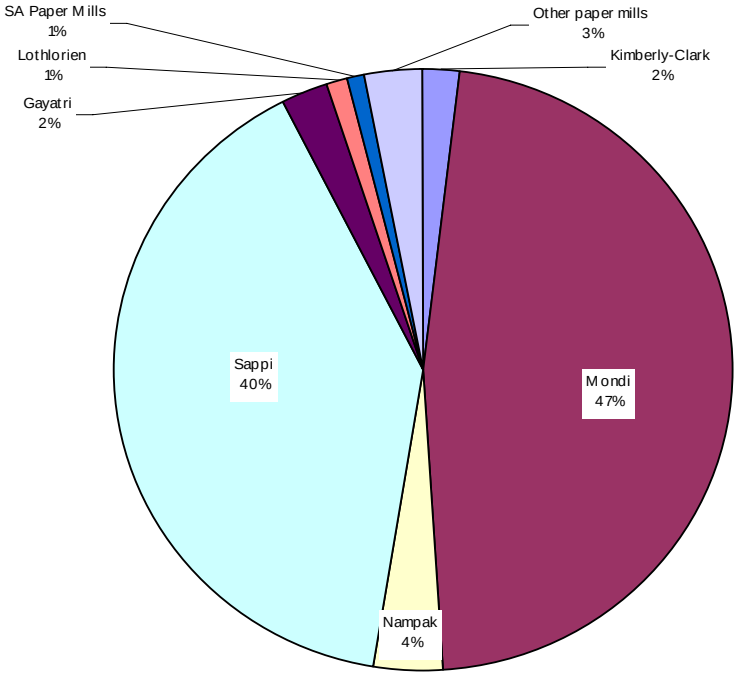
The volume and type of pulp output from South Africa's pulp mills is reported in Figure 5.4. Chemical pulp is the largest proportion of pulp mill output accounting for 59% of all pulp produced between 2001 and 2006. Chemical pulp is made primarily from hardwood, but softwood also contributes to production of this pulp used in kraft paper, carton board and fine paper production. Sappi's Saiccor Mill in KwaZulu-Natal produces all of South Africa's dissolving pulp, which is another 22% of domestic pulp production. Dissolving pulp is primarily exported and is used in the cellulose textile and chemical industries. South Africa's dissolving pulp production pioneered the use hardwood (eucalyptus). Mechanical pulp contributes a further 12% of pulp output. Mechanical pulp is only produced with softwood (pine) inputs and because of its tendency to yellow with age it is used mainly to produce newsprint and magazine grade paper. Semi-Chemical pulp employs a mixture of chemical and mechanical production. Softwood and hardwood inputs are used in the manufacture of semi-chemical pulp that is used to produce linerboard, fluting and low-cost printing paper.

The pulp milling sector is highly integrated, with high barriers to entry because of the fixed plant costs. These barriers encourage the pulp mills' upstream integration to secure fibre inputs (Chamberlain et al. 2005b: 30). In addition, if a new pulp mill were to be established without paper milling capacity it would be competing with the downstream integrated paper operations of Mondi and Sappi, effectively limiting their market to exports or the non-integrated paper mills. Given that most non-integrated mills use low volumes of virgin fibre pulp, new entrants are effectively constrained by the scale of the domestic paper market or must focus on the pulp export market. Notably, NCT Forestry is planning just such an entrance into the pulp export market with an envisioned pulp mill at Richards Bay in KwaZulu-Natal (Barradas, 2007).

South Africa's paper milling capacity is also dominated by Mondi and Sappi, but there are few other companies with significant paper milling capacity. Figure 5.5 reports

paper milling capacity by company. Twenty-one mills, owned by seven enterprises, account for 97% of 2.94 million tonnes of domestic paper milling capacity. The remaining three percent of domestic paper milling capabilities resides in 12 other paper mills.

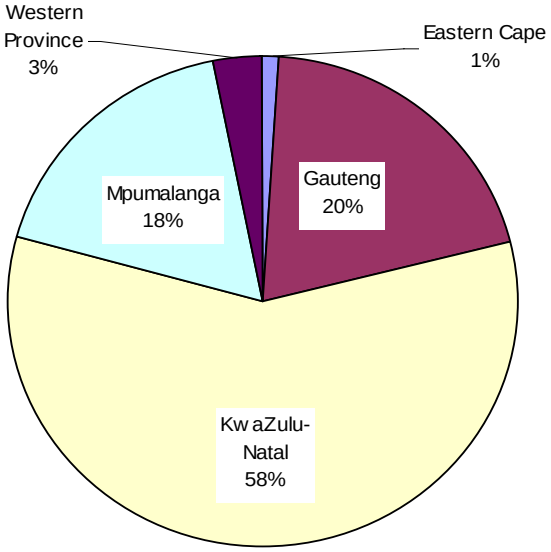
Figure 5.5 Composition of domestic paper milling capacity, 2005



Source: PAMSA, 2007: 7.

Paper milling is concentrated along the KwaZulu-Natal north coast and Gauteng. Figure 5.6 indicates that these provinces and two mills in Mpumalanga together account for 96% of South Africa's paper milling capacity. Paper mills located away from pulp mills tend to use a high recycled paper content in production.

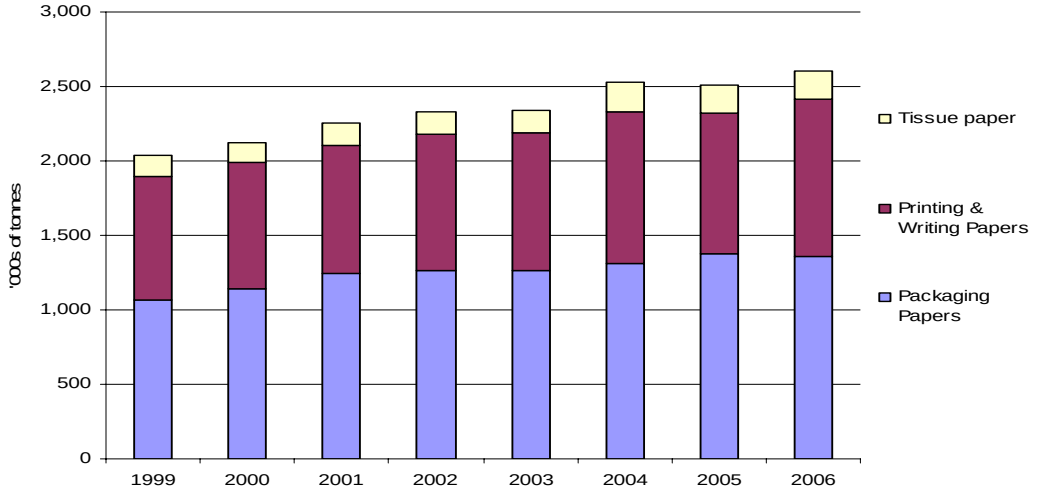
Figure 5.6 Location of paper milling capacity, 2005



Source: PAMSA, 2007: 6.

The relative composition of South Africa's paper production by tonnes of output is given in Figure 5.7. In the seven year period output in all three categories of paper grew at nearly the same rate. Tissue paper grew at a compound annual rate of 3.9%, followed by packaging paper at 3.5%, and printing and writing paper at 3.4%. Over the same period, packaging papers accounted for 53.5% of output, printing and writing papers 39.5%, and tissue papers the remaining seven percent of output.

Figure 5.7 Composition of domestic paper output volume 1999-2006



Source: PAMSA, 2007: 7.

Within the paper milling sector waste paper collection is an important component. Recycled paper is a substantial proportion of fibre input for many of the non-integrated paper mills. In addition to employment for nearly 11,000 individuals the sector has historically led to the establishment of several paper mills with accompanying local value addition (Chamberlain et al. 2005b: 66). In this regard, increasing the recycling rate is very important. The Department of Environmental Affairs and Tourism (DEAT) has planned to provide that support with the 2007 Draft Waste Management Bill, which will compel consumers recycling.

Innovation System

The pulp and paper sector is a major driver of innovation in the wood, paper and pulp industry. A great deal of sectoral R&D investment focuses upon improving fibre quality, but in-house research and development (R&D) supports production at both Mondi and Sappi. The Forestry and Forest Products (FFP) Centre is an industry supported collaboration between the University of KwaZulu-Natal and the CSIR. The FFP offers a range of technical services for the sector as well as focused research expertise for the sector.

Industry and Professional Organisations

The Paper Manufacturers Association of South Africa (PAMSA) has a membership that contains over 90% of domestic paper manufacturing capacity. It is the primary industry association for South African pulp and paper manufacturers. In addition to lobbying and industry information, PAMSA sponsors lecturers and works closely with

the Forest Industries Education and Training Authority (FIETA) to facilitate skill development in the sector. PAMSA's technical committee supports innovation in the sector through development of a sectoral R&D strategy and support for cooperative research projects.

The recycling sector is represented by the Paper Recycling Association of South Africa (PRASA). PRASA promotes development of the South African recycling industry through lobbying and information. The Technical Association of the Pulp and Paper Industry of Southern Africa (TAPPSA) is the primary professional association of the pulp and paper sector in South Africa. TAPPSA publishes a journal and technical articles about the pulp and paper sector as well as hosting a triennial conference.

Markets

The domestic pulp and paper sector is highly integrated like most of the South African wood, paper and pulp sector. Table 5.1 indicates the extent of this vertical integration. On average only about a fifth of the total volume of South African produced pulp is traded domestically. This limited domestic pulp market indicates that the two pulp manufacturers retain the majority of their output for the own paper production. As a result non-integrated domestic paper mills must compete for niche demand or establish a low cost supply of imported pulp.

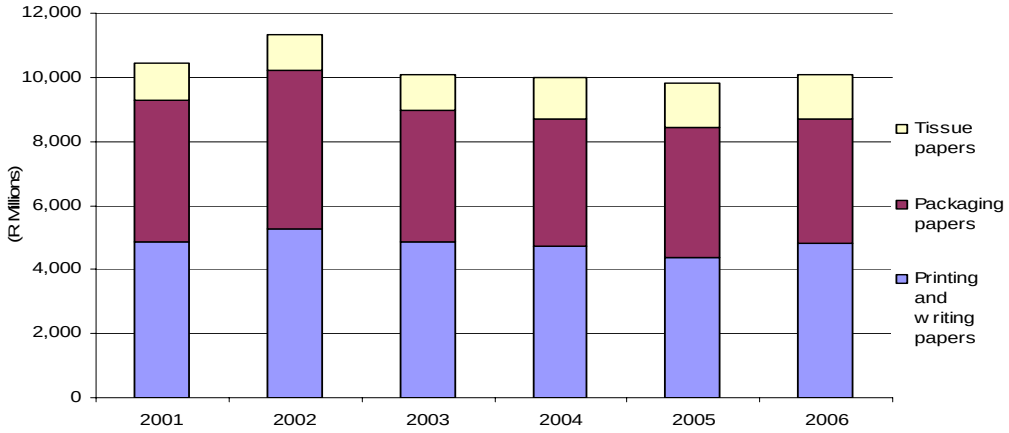
Table 5.1 Domestic pulp market by volume ('000s of tonnes) 2001-2006

	2001	2002	2003	2004	2005	2006
Total domestic pulp production	2,138	2,183	2,317	2,077	2,292	2,321
Total locally traded pulp	379	465	451	398	405	525
Locally traded pulp as % of domestic production	17.7%	21.3%	19.5%	19.2%	17.7%	22.6%

Source: PAMSA, 2007.

The composition of demand for South African paper is presented in Figure 5.8. Again, since demand for paper appears strongly correlated to South Africa's economic growth, continued progress in this regard would be expected to further elevate paper sales.

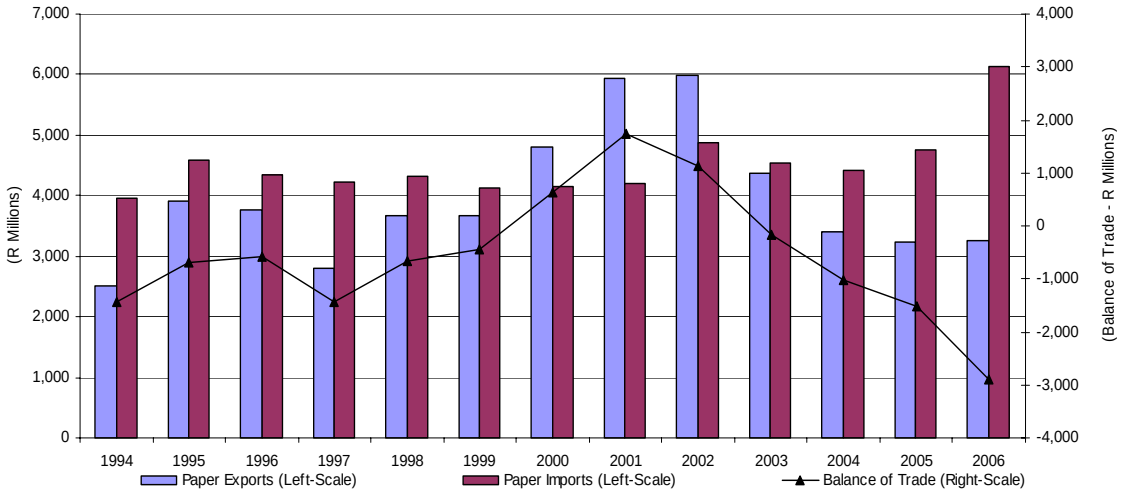
Figure 5.8 Paper sales 2001-2006 (Real 2001 values)



Source: PAMSA, 2007: 10.

Trade in paper and paper products is reported in Figure 5.9. While both imports and exports have experienced growth during this period, the annual compound growth rate for import demand has been 4.8%. As discussed above, the balance of trade reflects growing demand for imported paper and paper products.

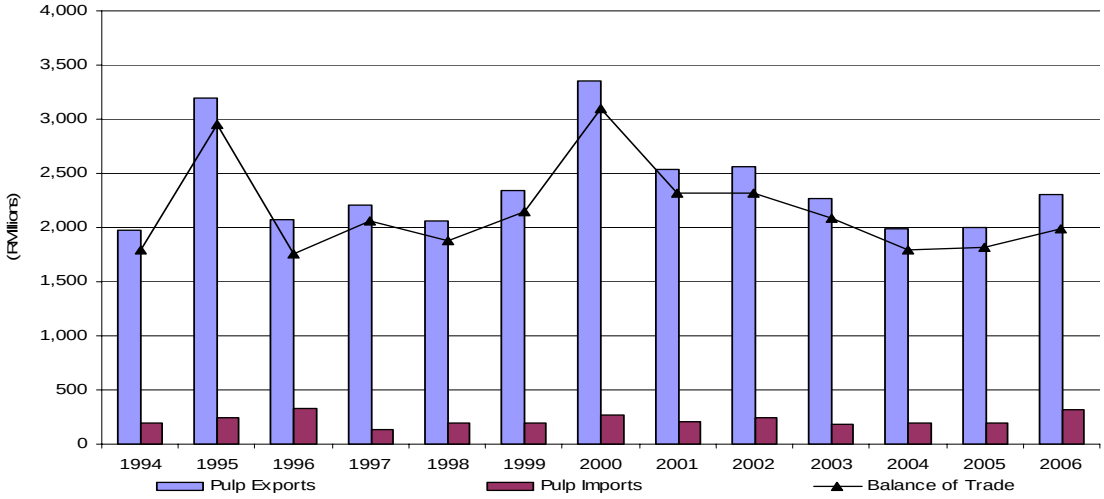
Figure 5.9 Trade in paper 1994-2006 (Real 2000 values)



Source: Quantek

While domestic demand for paper and paper products appears to be outstripping domestic supplies, domestic pulp mills appear to be performing better. Table 5.10 reports the value of pulp imports and exports as well as the balance of trade. While the significant export market of wood chips, discussed in Chapter Four, indicates that inputs from forestry might support more pulp milling capacity, there appears to be a relatively stable trade surplus in pulp.

Figure 5.10 Trade in pulp 1994-2006 (Real 2000 values)



Source: Quantek

Given that the market for pulp and paper is strongly correlated to a country's economic growth and development, the recent sustained economic growth that South

Africa has experienced corresponds to growth in the paper and pulp sector. International demand for paper and pulp is likely to continue growing as a result of China and other nations' economic development. Between 1980 and 1990, Chinese paper demand grew at a compound annual rate of 7.7% by volume. In the decade between 1990 and 2000 Chinese demand grew at compound annual rate of 8.4% by volume and it is estimated that between 2000 and 2010 Chinese paper demand will grow at a compound annual rate of 6% (Chamberlain et al. 2005c: 68-69). If these projections are accurate, annual Chinese paper demand will exceed 55 million tonnes in 2010. By comparison South African demand in 2005 was 2.1 million tonnes. China has embarked on a massive afforestation initiative to meet this demand, but it is likely to outstrip domestic imports. Chamberlain et al. (2005c: 70) therefore conclude that Asian demand provides a strong basis for the continued South African exports of wood chips, but note that comparative efficiencies with low cost pulp producers like Brazil will probably preclude South Africa entering the pulp export market on a large scale.

Policy Environment[9]

In addition to the Draft Waste Management Bill proposed by DEAT, there are two existing pieces of legislation that significantly influence the policy environment: The National Environmental Management Act, 107 of 1998 and the National Water Act, 36 of 1998.

The National Environmental Management Act of 1998

The act is administered by DEAT and integrated all environmental legislation. Pulp and paper manufacturers are required to complete an environmental impact assessment (EIS) report under this legislation if they wish to establish or change milling capacity. The primary concern around this requirement as expressed by the sector is that government's capacity to handle and coordinate the EIS does not appear to be adequate.

The National Water Act of 1998

The act is administered by the Water Affairs Directorate in DWAF. The act aims to protect, conserve and sustainably manage national water resources. Under the act any water, except that sourced from municipalities, needs to be registered with DWAF. Of specific relevance for the pulp and paper sector is the act's requirement that paper and pulp mills obtain integrated licenses for water diversions, storage and discharge. This licensing procedure is designed to reduce the environmental impact of paper and pulp mills' effluent discharges.

[9] See Chamberlain et al. (2005c) for further details of the pulp & paper policy environment (pp. 79-90)

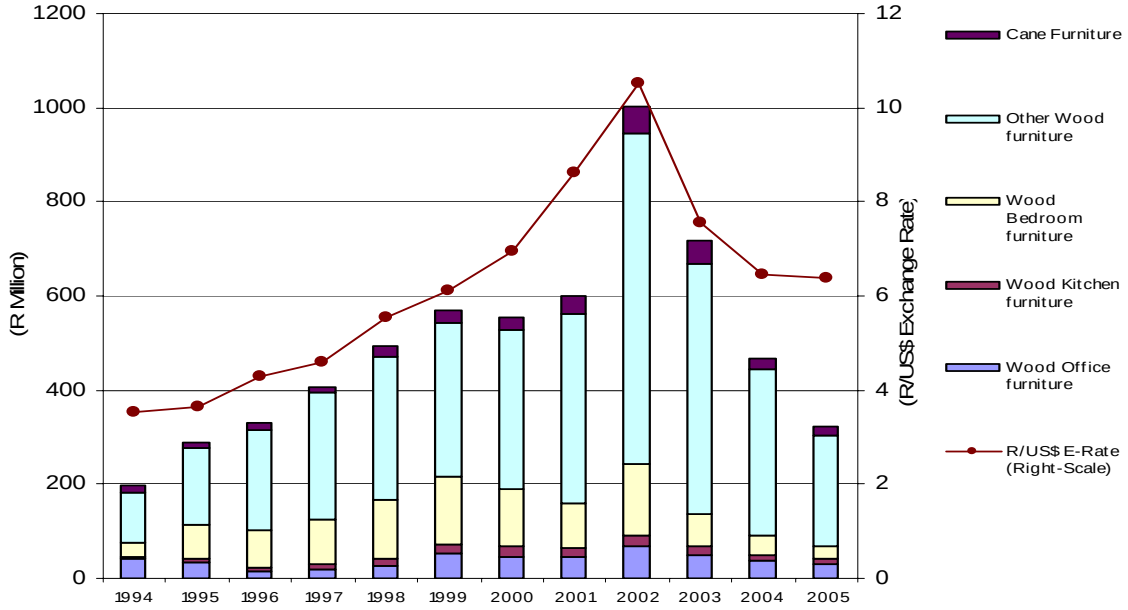
CHAPTER SIX: WOOD FURNITURE SECTOR

Introduction

The wood furniture sector relies on sawn timber inputs from primary processing as well as plastic, metal, leather, and cloth inputs. As a result, it is not purely a secondary wood beneficiation sector but it is directly linked with the sawn timber and forestry industries. In total, the sector employs over 39,000 individuals in 830 enterprises (Erasmus, 2004c: 73). Moodley (2002) reports that the sector contributed R4.7 billion to GDP in 1997.

The real value of wood furniture exports are reported in Figure 6.1. These exports are again closely correlated to exchange rate fluctuations. During the period between 1994 and 2005, the general category of wooden furniture accounted for 66% of all exports by value. Wood bedroom furniture accounted for another 18% of export value during the period, followed by wood office furniture 8%, cane furniture 5%, and wood kitchen furniture 3%. The relative export value of general wooden furniture rose in the period while that of wood bedroom furniture and wood office furniture declined.

Figure 6.1 Wood furniture exports 1994-2005 (Real 2000 values)[10]



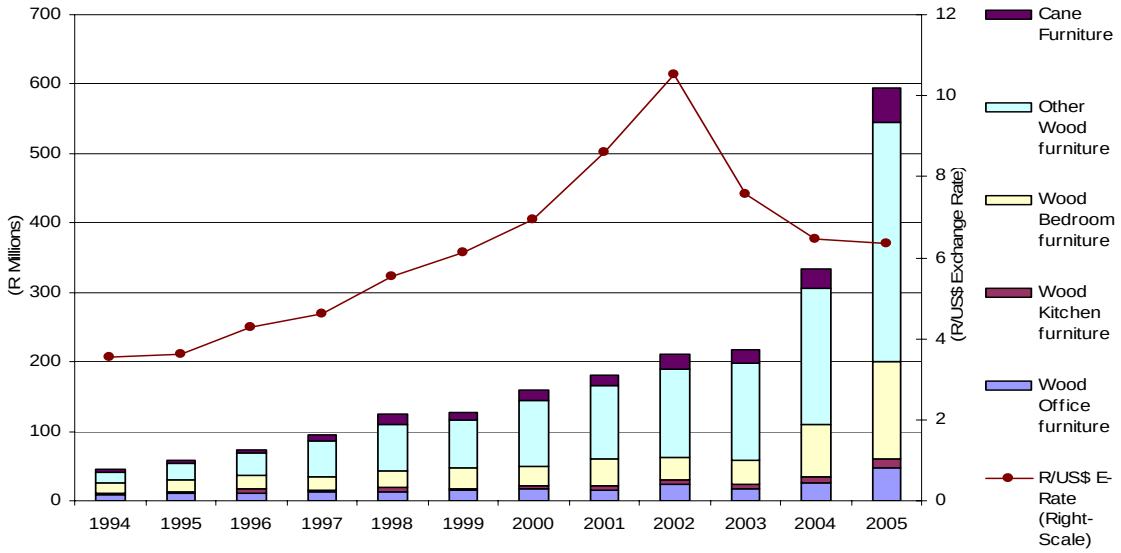
Source: Quantek

The composition of wood furniture imports is shown in Figure 6.2. There is little correlation between imports and the exchange rate, except that Rand appreciation since 2002 appears to coincide with an acceleration of wood furniture imports. Between 1994 and 2005 the value of wood furniture imports grew at a high compound annual rate of 17.6%. The general category of wooden furniture accounted for the largest share of imports, 57%, during the period. Wood bedroom

[10] See Appendix One for a list of trade sectors in the wooden furniture sector.

furniture accounted for another 21% of imports, followed by wood office furniture 10%, cane furniture 9%, and wood kitchen furniture 3%. In parallel to the export trends, the relative share of general wood furniture imports rose during the period and these were offset by relative declines in wood office furniture and wood bedroom furniture.

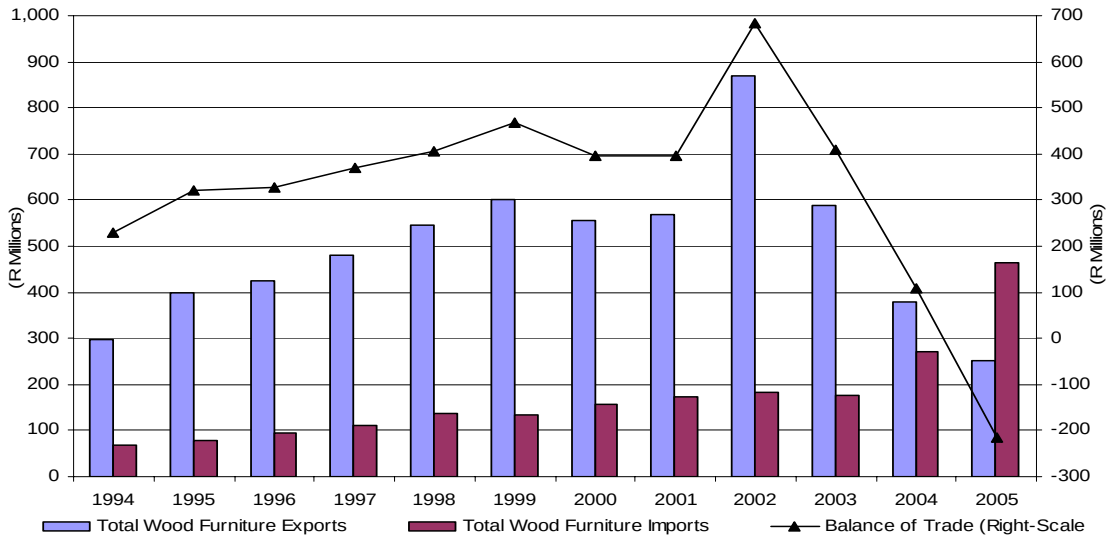
Figure 6.2 Wood furniture imports 1994-2005 (Real 2000 values)



Source: Quantek

The strong growth in imports has led to a rapid decline in the sectoral balance of trade with a trade deficit being registered for the year 2005. The declining balance of trade in wood furniture and aggregate real values of the sectors imports and exports can be seen in Figure 6.3. While not assessed further, these trends in trade parallel those discussed in the paper market and would suggest that domestic wood furniture is an imperfect substitute for imported varieties.

Figure 6.3 Real value of wood furniture trade 1994-2005 (in 2000 Rands)

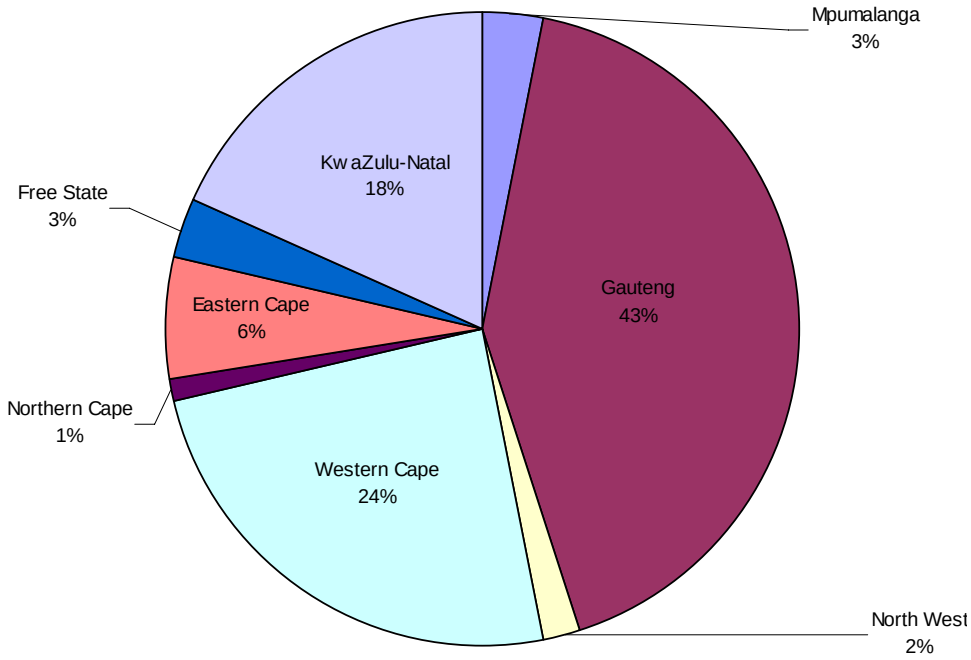


Source: Quantek

Producers

Wood furniture manufacturers are mostly small and medium enterprises. Erasmus (2004c: 68) estimates that 95% of the estimated 1,085 wood furniture companies are small and medium enterprises. These companies are concentrated near urban centres in Gauteng, the Western Cape and Kwazulu-Natal. Figure 6.4 reports on the location of wooded furniture manufacturers. Since, 1994 these producers have transformed from an inward market focus reinforced by trade sanctions to an increasing focus on export markets with higher volumes and variety (Moodley, 2002: 31).

Figure 6.4 Location of wood furniture companies, 2003



Source: Erasmus, 2004c: 67.

The sector can potentially benefit significantly from adoption of information and communication technology in order to facilitate its integration into the global furniture value chain (Moodley, 2002: 31). In this regard, there was a need identified to promote internet-based market access. The potential job creation represented by the SME structure of the industry has encouraged its development by government.

Innovation System

A difficulty with the SME predominance in the sector is that they may find it difficult to commit resources to fund research and development (R&D) activities. Evidence of this is found in the R&D expenditures reported for the furniture manufacturing sector with the 2003/4 National R&D Survey reporting sector R&D expenditures equal to R6.3 million and declining in the 2004/5 survey to R4.2 million (DST 2005 & 2006). That gives the sector an R&D to revenue ratio of 0.09%, nationally South Africa's total R&D expenditures to gross domestic product ratio was 0.87%, and the industrial round wood production and processing sector had an R&D to revenue ratio of 0.65%.

This is not to say that the sector is not innovative. Given there ability to compete on an increasingly international market it is likely that a significant quantity of innovation occurs in these firms, but it is not explicitly established as formal R&D expenditures. This analysis has not identified any research institutions focussed explicitly on wood technology for furniture, but there is significant overlap with other sectoral research institutes and in particular those associated with the sawmilling sector.[11] Discussions with wood furniture manufacturing firms also indicated that technical services were a primary resource from the national system of innovation for their operations.

There is also a furniture manufacturing incubator initiative called the Furniture Technology Centre Trust (Furntech). Furntech has five centres located in Cape Town and George in the Western Cape, Durban in Kwazulu-Natal, Umximkhulu in the Eastern Cape, and White River in Mpumalanga. While a large component of Furntech is focused on skills development it also provides technical expertise for furniture production and an industrial association promoting technology transfer.

Industry and Professional Organisations

In addition to Furntech's activities, there are several employer organisations that represent manufacturers in collective bargaining with unions at an industry level:

- Border Furniture Manufacturers` Association (Eastern Cape)
- Cape Furniture Manufacturers` Association (Western Cape)
- Furniture and Wood Products Manufacturers` Association (KwaZulu-Natal)
- Furniture, Bedding and Upholstery Manufacturers` Association (Gauteng)
- KwaZulu-Natal Furniture Manufacturers` Association (KwaZulu-Natal)
- Midland Furniture Manufacturers` Association (KwaZulu-Natal)

In general, there does not appear to be a significant degree of intra-industry organisation and co-ordination. This lack on internal organisation may be a legacy of the historic inward focus on domestic demand. It would appear that local synergies, particularly in facilitating skills development are critical to the industry's future competitiveness.

Markets

The recent growth of imported wooden furniture appears to indicate strengthen domestic demand. Moodley (2002) notes that there is a general trend in the sector internationally to connect within global value chains that require an export focus. The primary export market for South African wooden furniture is the UK and Germany (Moodley, 2002: 34). In these international markets there is also significant competition from developing nations in Asia and Eastern Europe. In this context international retailers are able to dictate costs, designs, and quality conditions to a much greater extent.

[11] See Chapter Four for details.

Policy Environment

The wood furniture sector is importantly linked to policies in the upstream forestry and primary processing sectors for its wood inputs. Similarly, manufacturing policy directly shapes the furniture sectors policy environment. Moodley (2002) argues that the structure of the industry and its markets require adoption on ICTs and government policy to promote internet-based communication and information exchange. The majority of direct interventions in the sector appear to be focused on skills development.

PART TWO: INDUSTRIES' MARKETS FOR SKILLS

CHAPTER SEVEN: DEMAND FOR SKILLS

Introduction

This chapter profiles the demand for skills in the wood, paper and pulp (WPP) sector. Defining the demand is difficult as sectoral definitions often span a range of activities and data is often not available or accurate at greater levels of detail that would enable one to differentiate. The pulp and paper sector is taken as a single activity, even though pulp milling is a primary processing activity and paper milling involves secondary beneficiation. Table 7.1 highlights these difficulties. Available statistics indicate employment in the forestry sector ranging from 32,000 to over 100,000 individuals. As an estimate, we use the 100,000 figure in this report as it corresponds to the detailed analysis in Chamberlain et al. (2005a: 34).

Table 7.1 Employment in the WPP industries

	Quantec	Chamberlain et al. (2005)	Crickmay et al.(2005a)	Erasmus (2004a)	DWAF (2007c)	Estimated
Forestry	N/A	N/R	67,460	N/R	32,000	N/R
Plantation Forestry*	see Forestry	106,844	see Forestry	N/R	N/R	N/R
Logging	N/A	see PF	see Forestry	N/R	N/R	N/R
Transport	see Logging	see PF	3,000	N/R	N/R	N/R
Total Forestry	**N/A**	**106,844**	**70,460**	**48,447**	**32,000**	**100,000**
Saw milling*	16,534	20,000	21,000	see WP	25,000	16,500
Pulp milling*	see P&P	see P&P	see P&P	see P&P	see P&P	see P&P
Mining Timber	see WP	2,200	2,200	see WP	2,200	2,000
Fibre Board	see WP	6,000	5,400	see WP	6,000	5,500
Wood Chips*	see WP	500	N/R	see WP	500	500
Treated Poles	see WP	5,000	5,800	see WP	5,000	5,000
Charcoal	see WP	5,500	5,500	see WP	5,500	5,500
Total Primary Processing	**16,534**	**39,200**	**39,900**	**N/R**	**44,200**	**35,000**
Wood Products	57,040	N/R	3,800	61,591	N/R	38,000
Pulp and Paper*	43,129	23,981	15,000	21,970	24,000	40,000
Wood Furniture*	N/A	N/R	N/R	46,873	N/R	45,000
Total Secondary Beneficiation	**100,169**	**23,981**	**18,800**	**130,434**	**24,000**	**123,000**
Grand Total WPP Sector	**116,703**	**170,025**	**129,160**	**178,881**	**100,200**	**258,000**

(N/A=Not Available, N/R=Not Reported); *=sectors whose structure was reviewed in Part One of this report.

In primary processing, an estimated total employment of 35,000 excludes pulp milling employment. The estimate is derived from the Quantec sectoral employment data for sawmilling, plus conservative estimates of other primary processing activities from the analyses of Chamberlain et al. (2005a) and Crickmay et al. (2005a). Employment in the secondary beneficiation sectors is estimated at 123,000 individuals. The

estimated 38,000 workers in the wood products sector is derived from the Quantec sectoral data less the employment identified within primary processing. The pulp and paper employment of 40,000 is taken from the Quantec sectoral data. The wood furniture employment of 45,000 is taken from the employment analysis conducted by Erasmus (2004a) and Moodley (2002).

In total, WPP sectoral employment in 2003 was estimated to be 258,000 individuals. Based on growth reported in the Quantec data, employment in 2006 is estimated to be 275,000. In terms of the sector's relative significance, its total employment is 2.3% of total national employment. Forestry accounts for 8.3% of all 'agriculture, hunting, forestry and fishing' employment. The primary processing and associated secondary beneficiation sectors account for 10.2% of 'manufacturing' employment.

Demand for skills is not a strict function of an individual's formal training, as it includes an ability to apply those skills and develop knowledge about the requirements of the work needed to be accomplished with those skills. Nonetheless, technical disciples are often a critical means identify appropriate individuals. Based on interviews with enterprises in the sector for this report,[12] and background sectoral literature, Table 7.2 lists key technical disciplines for the sector.

Table 7.2 Key technical disciples in the WPP sector

Artisans	Biochemistry	Civil Engineering	Accountancy
Draughts people	Biology	Chemical Engineering	Behavioural Sciences
Electrical Technicians	Botany	Electrical Engineering	Business Sciences
Engineering Foreman	Chemistry	Environmental Engineering	Communication Sciences
Instrument Technicians	Ecology	Industrial Engineering	Finance
Machine operators	Environmental Science	Mechanical Engineering	Health Sciences
Mechanics	Forestry	Process Engineering	Information Technology
Paper Technologists	Genetics	Project Engineering	Legal studies
Pulp Technologists	Geography	Section Engineering	Logistics
Process Technicians	Microbiology	Computer Science	Marketing
Project Technicians	Paper Science	Mathematics	
Transport drivers	Pulp Science	Statistics	
	Wood Science	Physics	

This chapter's review of the demand for skills across the WPP sector presents a summary of the state skills in our four sub-sectors. A contextual description of the nature of their respective skill demands is also used to highlight areas of particularly important skills and skills shortages. Wherever possible the geography of skills demand is highlighted. The geography of skills demand is significant in the sector given the natural resource base concentration in the provinces of Mpumalanga, KwaZulu-Natal, and the Eastern Cape. Timber transport costs are a critical factor in the sector's economic viability, so it is not surprising that downstream beneficiation of these timber resources tends to follow urban centres near the resources or in areas of concentrated downstream demand, such as Gauteng.

[12] Stakeholders interviewed for this report are listed in Appendix Two.

Demand for Skills in Forestry

Total employment in the forestry sector and the occupational composition of that workforce is reported in Table 7.3. At 21% of the workforce, operators are the largest occupational category listed, but within the other occupations a further 37% of workers are labourers. Agricultural workers account for a further 8% of the total labour force, with technicians and associate professional accounting for 9% a rate similar for administrative staff composition.

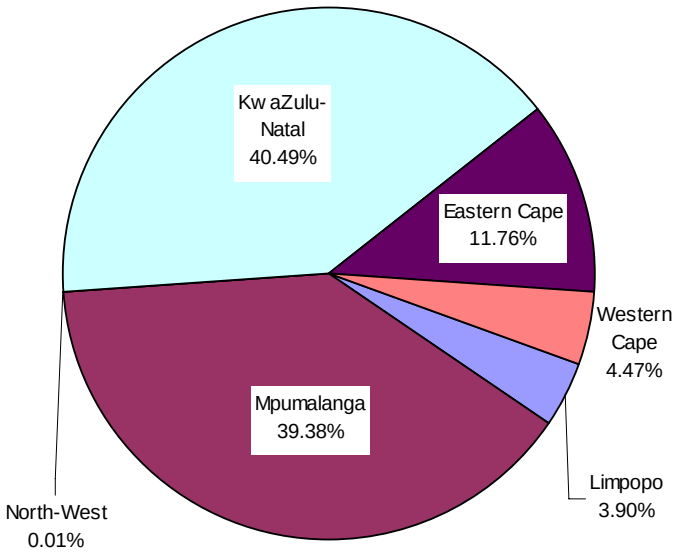
Table 7.3 Forestry employment and occupations

	Employment
Total Forestry employment	100,000
Occupations	%
Managers & Senior officials	2%
Professionals	5%
Associate Professionals	9%
Administrative & Secretarial	9%
Skilled trades/Artisans	7%
Sales & customer service	1%
Transport/machine operators	21%
Other occupations	45%

Source: Erasmus, 2005 and Chamberlain et al. 2005a.

The location of demand for forestry skills depends primarily on the location of the forest resources. Figure 7.1 indicates the primary areas of plantation forestry resources. As discussed in Chapter Three, KwaZulu-Natal and Mpumalanga are the most important provinces for plantation forestry resources. Increased afforestation planned in the Eastern Cape will likely raise its relative importance and the associated demand for skills.

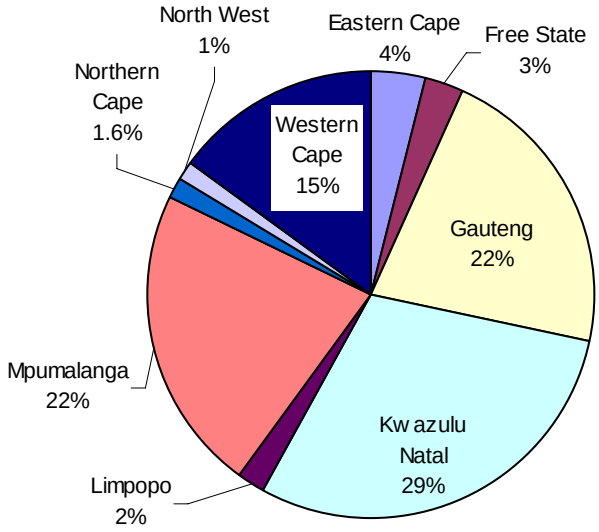
Figure 7.1 Geography of plantation forestry resources 2004/2005



Source: DWAF, 2007a

In contrast to the location of the forestry resources, forestry companies are distributed across all of South Africa's provinces. This distribution is reported in Figure 7.2. The most notable difference between the two indicators of industry location is the large numbers of enterprises located in Gauteng and the small number in the Eastern Cape. This is the result of corporate headquarters being located in the Gauteng area as well as the fact that some primary processing activities included in the Seta defined forestry sub-sector also occurs in Gauteng.

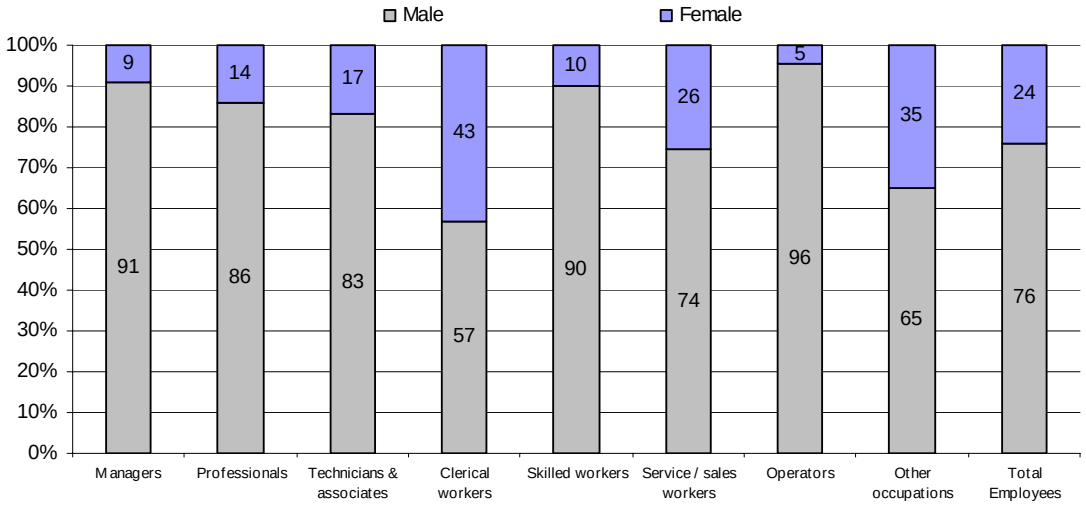
Figure 7.2 Location of plantation forestry enterprises



Source: Erasmus, 2004: 49.

The composition of the workforce by gender is reported in Figure 7.3. In aggregate 76% of the workforce is male, but that figure varies from 96% amongst operators to 57% amongst clerical/administrative staff. Men are also major features amongst management, 91%, and skilled worker positions, 90%.

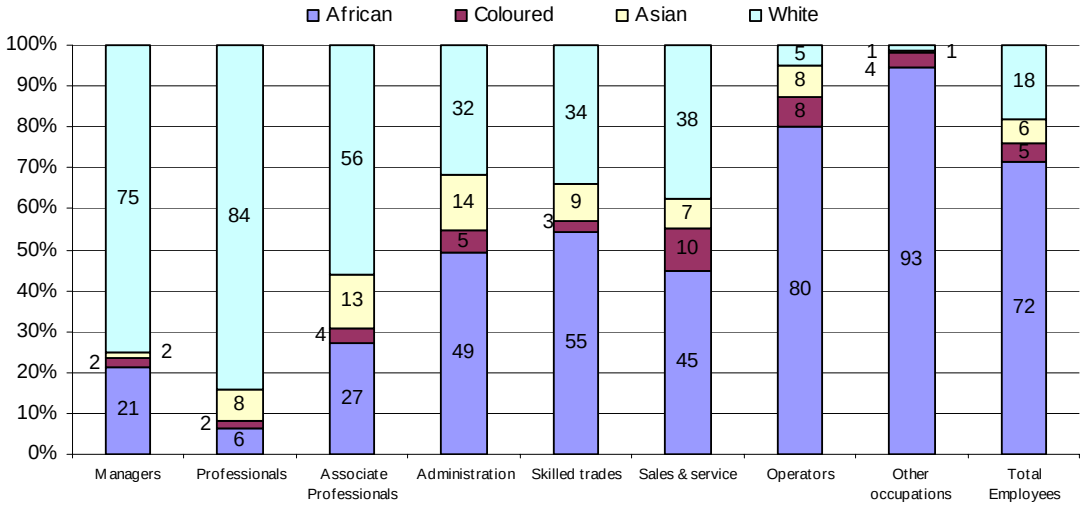
Figure 7.3 Gender of forestry employment



Source: Erasmus, 2004: 52.

The racial composition of employment is reported in Figure 7.4. While only accounting for 18% of the entire workforce, white workers compose 75% of management, 84% of professionals, and 56% of associate professional in the sector. A disproportionately large number of Asians are seen in administration and associate professional occupations. There are also a relatively large number of coloureds in sales and service. Africans are large components of the operators, labourers and agricultural workers within the sector.

Figure 7.4 Racial composition of forestry employment



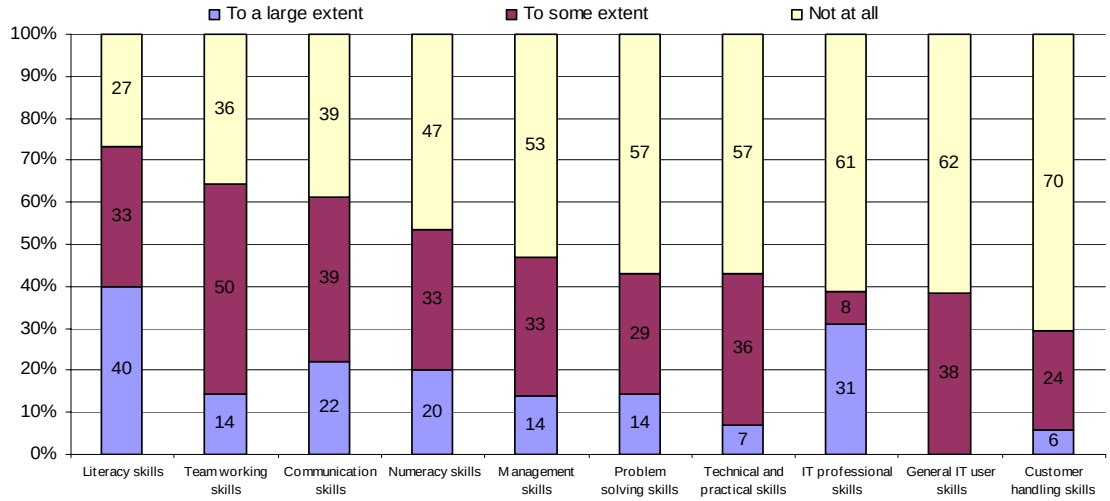
Source: Erasmus, 2004: 52.

The increased role of small plantations in the new areas of afforestation initiatives would appear to entail some transformation of the composition of racial and gender composition of the forestry sector workforce. In addition, the industry's own commitments to transformation imply that the structure of the work force will change.

Existing Workforce Skill Demand

Demand for increased skills within the forestry workforce is reported in Figure 7.5. Literacy skills were identified by nearly three-quarters of enterprises surveyed in the sector as needing to be largely enhanced or enhanced to some extent. Given the rural nature of forestry sector employment it is not surprising that customer handling skills were seen as needing the least development within the sector. Despite the structural needs discussed previously, within the existing production system there is not significant demand for skilled individuals to design and plan the transformation of plantation forestry. As a result, while established competencies with the innovation system remain supported there does not appear to be a drive at present to for additional highly skilled individuals to undertake what appears to be needed innovations in the production system. Despite the apparent need for a cadre of skilled mentors to support the emerging growers, as yet demand for these skills remains speculative rather than tangible.

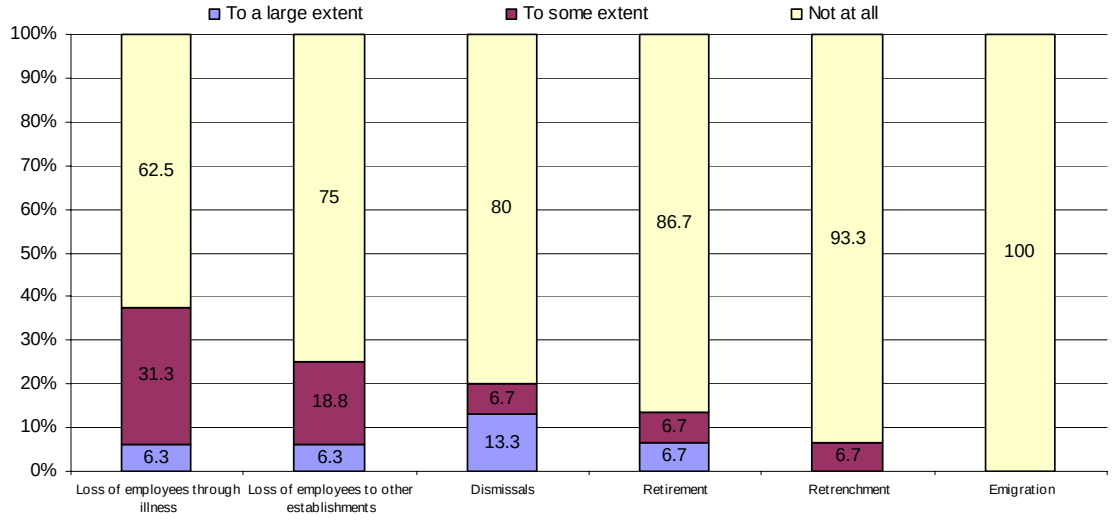
Figure 7.5 Workforce skills demand



Source: Erasmus, 2004: 54.

The loss of an employee is effectively a depletion of an enterprise's skills and an interruption to formal and informal skills development strategies. Figure 7.6 provides information about the reasons for staff turnover amongst firms in the forestry sector. Illness is the most frequently cited reasons for staff turnover. Erasmus (2004: 47) notes that it is likely HIV/AIDS is associated with the significance of illness for staff turnover, particularly because of the disease's high incidence in rural-based industries. Employer competition for staff, dismissals, and retirements are other significant causes of staff turnover.

Figure 7.6 Reasons for workforce turnover



Source: Erasmus, 2004: 57.

Future Influences on Skills Demand

A critical influence on the demand for skills in forestry will be the change net national afforestation of plantation forests. According to the Draft State of the Forests Report (2005: 33), one job is created among the small growers for every eight hectares they

plant and one additional job is created in the primary processing timber companies for every 1,000ha of small grower plantation forest. Therefore, if the planned net addition of 100,000ha of plantation forest is achieved there will be an additional 12,500 jobs in the sector. Realisation of this transformation of forestry is far from given and significant innovations to established production systems appear necessary.

Small plantation forests are qualitatively different from the large scale plantations traditional to the sector. Given the central role played by small plantation forests envisioned in the future, among some notable changes in skills that will be demanded by the sector:

- Basic business skills need to be developed among the small growers.

- With communal holdings important resources for afforestation, co-operative governance and management skills are likely to be increasingly important.

- In order to support the long growth cycles of plantation forest timber resources, the associated non-timber forestry resource industry could play an increasingly significant role in short-term livelihood improvements and reduce the risk of losing timber resources. However, business and entrepreneurial skills will need to be developed if non-timber forest resources are to bridge the first economy. Even if non-timber forest resources remain local features of the second economy, there significance will also depend on skills to grow nurture and sustain these natural resources.

- Competitive pressures within forestry contractors will require increased training of their workforces' skills in silviculture and harvesting and the business management skills of the companies' managers.

Demand for Skills in Primary Processing

Total employment in the primary processing sector and the occupational composition of that workforce is reported in Table 7.4. Skilled trades and artisans account for a third of the sector's employment and is the largest occupational component. Operators are the second largest occupational category with a further fifth of the workforce.

Table 7.4 Primary processing employment and occupations

	Employment
Primary Processing	35,000
Occupations	%
Managers & Senior officials	6%
Professionals	1%
Associate Professionals	3%
Administrative & Secretarial	4%
Skilled trades/Artisans	33%
Sales & customer service	2%
Transport/machine operators	22%
Other occupations	29%

Source: Quantec.

The aggregate division of employment by skill level is reported in Table 7.5. The occupational distribution of skill levels is also reported in the table. According to these classifications managers, professionals and associate professionals are the highest skilled occupations. Nonetheless, only about a tenth of individuals in these occupations are classified as high skilled. The largest component of employment, skilled trades, contains a majority of workers within the intermediate skills band. Another significant occupation, operators are concentrated in the low skills band. Based on this evidence it appears that intermediate and low skilled individuals form a critical component of primary processing employment.

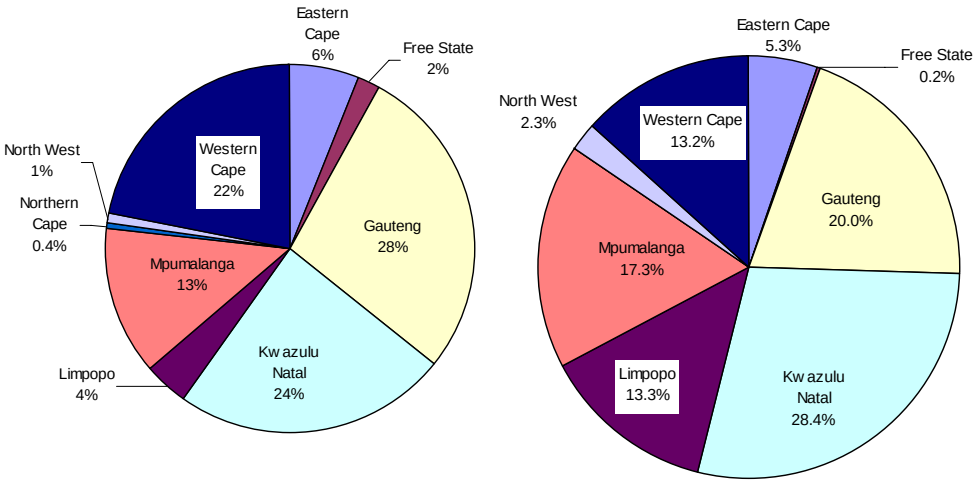
Table 7.5 Primary processing employment and occupations by skill level

Primary processing skills		Low skilled	Intermediate skills	High skilled	Cumulative
Occupations	No.	%	%	%	%
Managers & Senior officials	1,994	35.5%	52.5%	11.9%	100.0%
Professionals	256	34.6%	53.7%	11.7%	100.0%
Associate Professionals	945	35.5%	52.5%	11.9%	100.0%
Administrative & Secretarial	1,465	34.6%	53.7%	11.7%	100.0%
Skilled trades/Artisans	11,677	35.3%	64.7%	0.0%	100.0%
Sales & customer service	689	48.3%	48.2%	3.4%	100.0%
Transport/machine operators	7,681	74.6%	23.6%	1.8%	100.0%
Other occupations	10,292	64.8%	27.8%	7.5%	100.0%
Total	**35,000**	**72.7%**	**25.3%**	**2.0%**	**100.0%**

Source: Quantec

The location of demand for primary processing skills is indicated in Figure 7.7.

Figure 7.7 Location of primary processing employment and enterprises



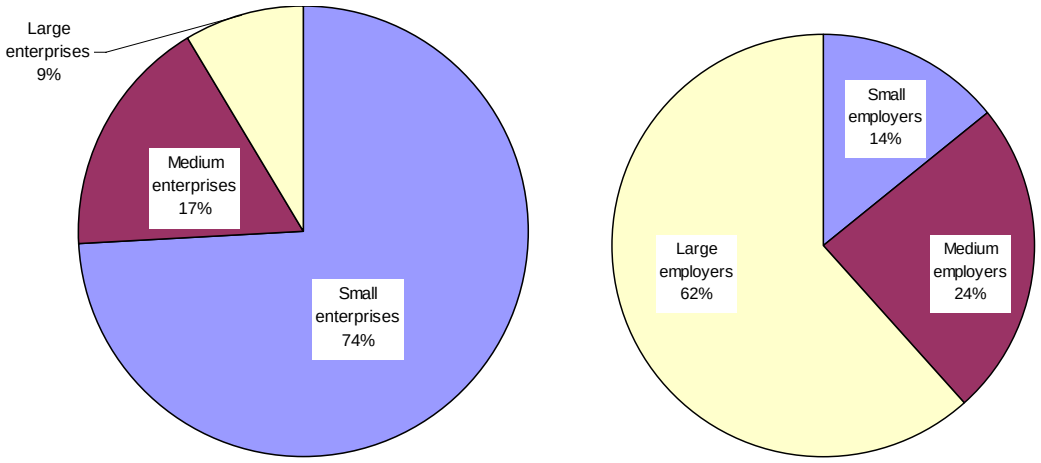
Enterprise Location **Employment Location**

Source: Erasmus, 2004: 115

KwaZulu-Natal is the largest location of sectoral employment, with 28.4% of employment. Somewhat surprisingly, Gauteng is the second largest location of employment, 20%, and the Eastern Cape is only the sixth largest provincial location of employment, 5.3%. These apparent anomalies are likely related to the location of

secondary beneficiation activities and demand. As a result of their urban centres the Western Cape and Gauteng both have a higher proportion of enterprises than sectoral employment.

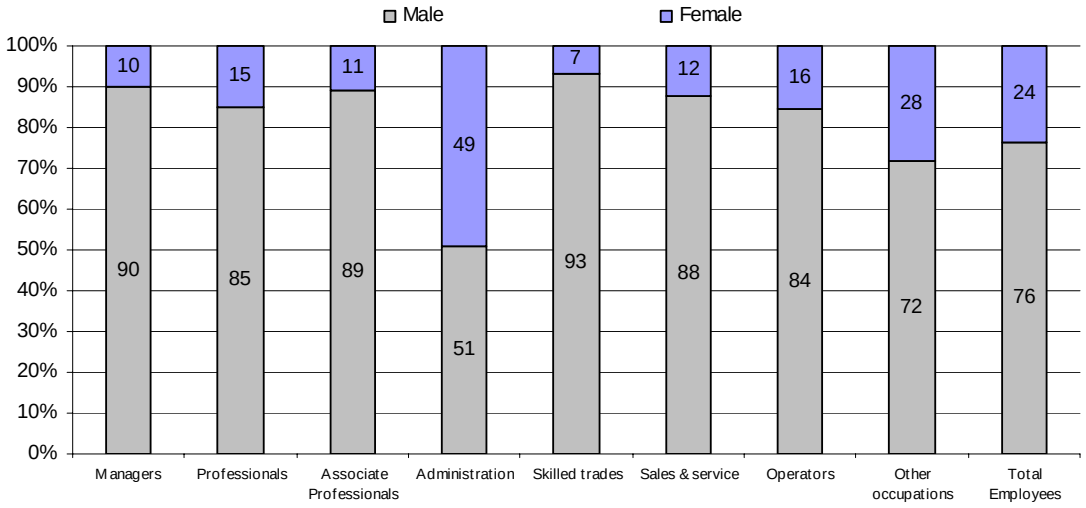
Figure 7.8 Composition & employment by size of firms in primary processing



Source: Erasmus, 2004: 114

The division of enterprises and their employment according to size is reported in Figure 7.8. As shown in the left of the figure, small enterprises account for nearly three-quarters of all firms in the sector. However, the right side of the figure shows that those small enterprises account for only 14% of sectoral employment. In contrast, large firms account for over 60% of employment but only nine percent of the sector's enterprises.

Figure 7.9 Gender of primary processing employment

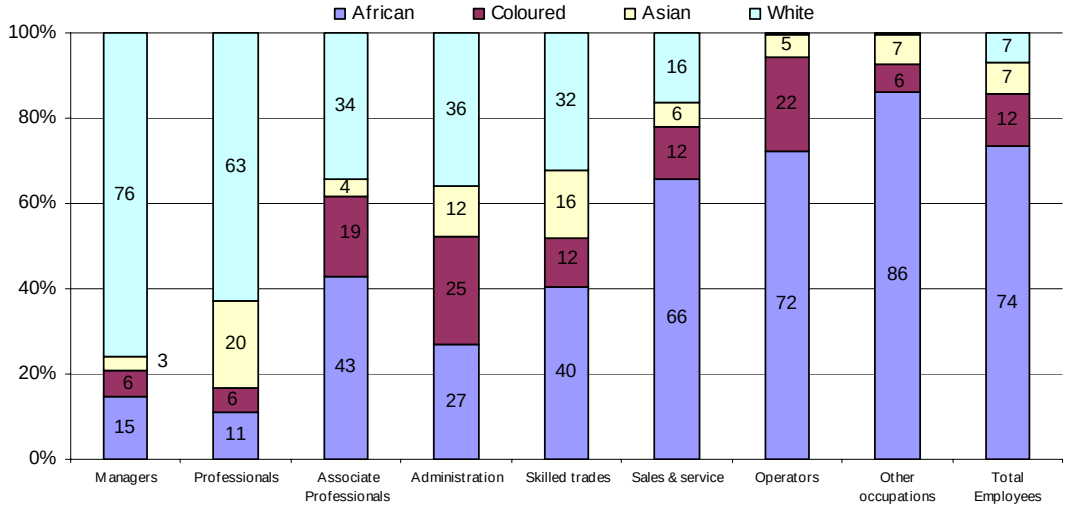


Source: Erasmus, 2004: 117

The composition of the workforce by gender is reported in Figure 7.9. In parallel to the forestry sector, 76% of the entire primary processing workforce is male. Administration is the only sector with nearly an equal number of men and women.

Management employment is 90% male, professionals 85% male and associate professional 89% male. The occupation with the highest percentage of male employees though is skilled trades with 93% of the workforce.

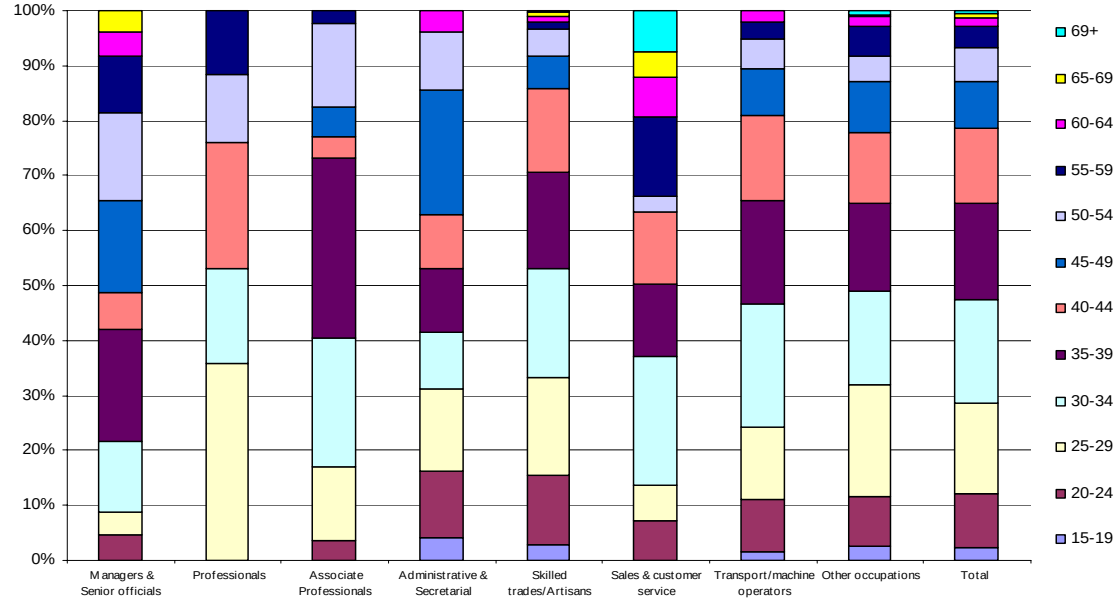
Figure 7.10 Racial composition of primary processing employment



Source: Erasmus, 2004: 117

The racial composition of employment is reported in Figure 7.10. A disproportionate number of whites are found within management and professional occupations. While only accounting for 7% of the entire workforce, white workers accounted for 76% of management and 63% of professional occupations. A similar discrepancy is found between the total number of Asians in the workforce, 7%, and their employment in the professional, 20%, and skilled trades, 16%. Coloureds account 12% of the total workforce but are 25% of administrative employees and 22% of operators.

Figure 7.11 Age composition of primary processing employment



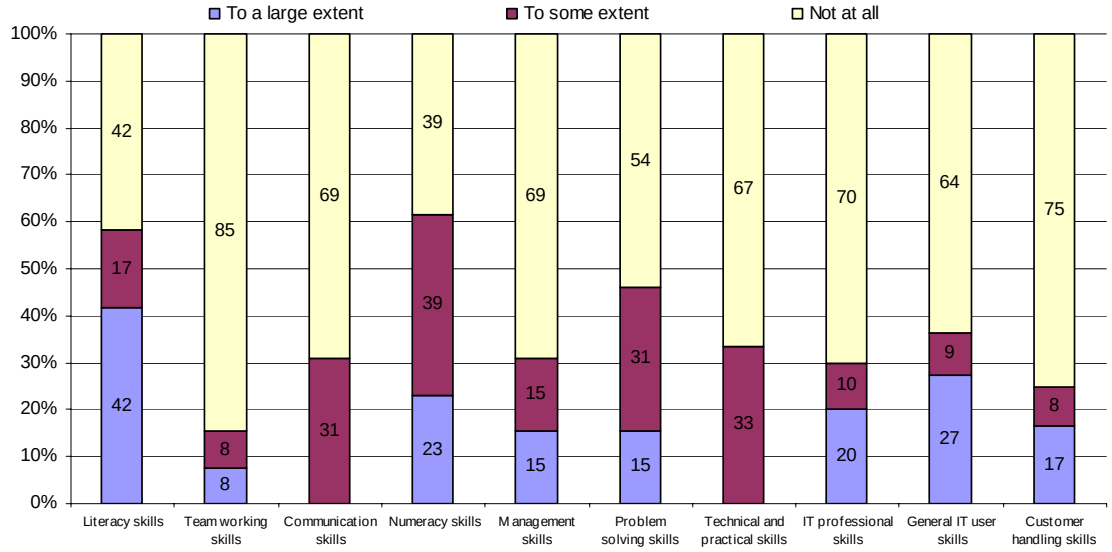
Source: Quantek

The aggregate distribution of employees by age and the occupational breakdown by age is shown in Figure 7.11. In total, over 60% of the workforce is less than 40 years and less than five percent is more than 60 years. Amongst sales and customer service employees there are nearly 20% over the age of 60 and within management nearly 10% are over 60 years. Within the professional category over 50% of employees are between 25 and 34 years, with the remainder between 40 and 59 years. The skilled trades have a marginally larger proportion of employees less than 34 years and over 95% of employees are less than 54 years.

Existing Workforce Skill Demand

Demand for increased skills within the forestry workforce is reported in figure 7.12. While literacy skills were again identified as being the skill needing the most development, numeracy skills were actually rated as needing more fostering in total. The higher level of industrialization in the sector might account for the differences between identified skills in this sector compared to forestry. Nonetheless, only in literacy and numeracy skills did a majority of firms surveyed for the National Skills Survey identify an underdevelopment of skills within the workforce.

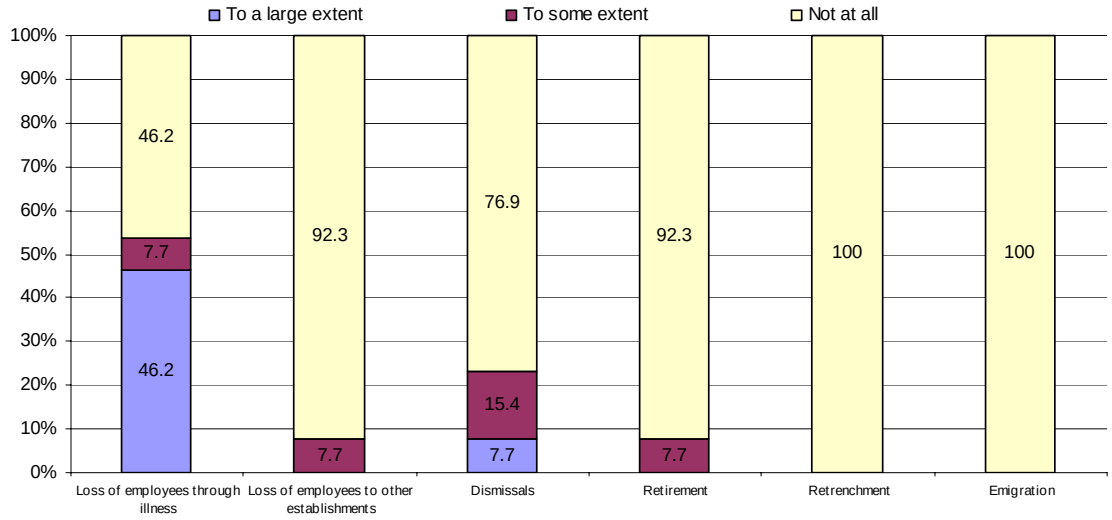
Figure 7.12 Workforce skills demand



Source: Erasmus, 2004: 118-119.

The loss of firms' skills because of turnover is reviewed in Figure 7.13. Turnover resulting from employee illness is again identified as being the primary cause of turnover. The significance of HIV/AIDS must again be assumed to play a leading role in this factor's contribution to turnover. Amongst surveyed firms 54% identified illness as being a significant or moderate contributor to their staff turnover. Dismissals were also identified as being another reason for staff turnover, with 23% of surveyed firms mentioning them as contributing to their staff turnover.

Figure 7.13 Reasons for workforce turnover



Source: Erasmus, 2004: 121.

In comparison to the forestry sector, turnover to other firms were a much less significant factor with only eight percent of firms reporting that as a cause. Retirements were also reported as being a less significant contributor to turnover, with only eight percent of surveyed primary processing firms reporting it as a factor in turnover compared to 14% of firms in the forestry sector.

Future Influences on Skills Demand

Outside of pulp milling and the associated wood chip export market a critical influence on skills demand in the primary processing sector is the future supply of sawn timber. The privatisation and transformation of historically State owned sawn timber plantations is thereby fundamental to the future demand for skills in the sector. As mentioned above, the Pilot State of the Forest Report (2005: 33) estimates that for every 1,000ha net addition of plantation forests an additional job is created in the primary processing sector. As a result, plans to increase the net afforestation by 100,000ha would create an additional 100 jobs if no further beneficiation to the timber occurred within primary processing or secondary beneficiating sectors.

Increasing production efficiencies within the over 500 small and medium saw mills could be another potentially important source of demand for skills in the primary processing sector. While these efforts are discussed in more detail in Chapter Nine, it will be necessary to enhance the business skills and technical skills in these saw mills are to ensure competitiveness in the first economy and avoid relegation to a marginal role within the second economy.

The sector's ability to improve its general efficiency and develop diverse responses to the variety of alternative materials will also play an important role in the future demand for skills. Besides formal research and development skills this dynamic will also require entrepreneurial skills and innovation amongst primary processors.

Demand for Skills in Paper and Pulp

Total employment in the paper and pulp sector and the occupational composition of the workforce is reported in Table 7.6. In addition, the table reports on the incidence and division of vacancies, the number and division of those vacancies that are hard to fill (HtFVs), as well as the number and division of those HtFVs that result from skill shortage vacancies (SSVs). In terms of the occupational division of the workforce, operators are the largest occupational category accounting for over a third of sectoral employment. Labourers in the other occupations category account for a further fifth of the labour force. Vacancies within the sector indicate a need for additional skills. In this regard, with over a third of the total, skilled trades people and artisans account for the greatest proportion of vacancies in the sector. Associate professionals account for a further 28% of vacancies within the sector.

Table 7.6 Paper & pulp employment, occupations, and skill needs

	Employment	Vacancies	HtFVs	SSVs	% Vacancies that are SSVs	SSVs per 1,000 employees
Total Pulp & Paper employment	40,000	741	285	228	31%	6
Occupations	%	%	%	%	%	No.
Managers & Senior officials	8%	3%				
Professionals	3%	16%	29%	27%	70%	41
Associate Professionals	7%	28%	33%	27%	40%	66
Administrative & Secretarial	10%	5%				
Skilled trades/Artisans	9%	35%	34%	42%	57%	25
Sales & customer service	1%	3%				
Transport/machine operators	34%	7%	4%	4%	17%	0.5
Other occupations	27%	3%				

Source: Quantec and surveys completed by interviewed organisations (see Appendix Two)

Nearly two-fifths of all vacancies reported by surveyed firms were considered HtFVs. Only four occupational categories had significant contributions to these HtFVs. In descending order these were: 1) skilled trades people/artisans 2) associate professionals 3) professionals and 4) operators. Four-fifths of the HtFVs were considered to be related to skill shortages in the market. Skilled trades people/artisans were the largest proportion of the reported SSVs, 42%, followed by professional and associate professional occupations each with 27%.

When we consider the incidence of SSVs compared to the overall vacancy rate for an occupation, the significance of skill shortages in the various occupations becomes more apparent. Fully 70% of all professional vacancies are SSVs, with 57% amongst the skilled trades people/artisans, and 40% of associate professionals. In terms of the incidence of SSVs as a proportion of the respective occupational workforce, associate professionals have the highest incidence with a rate of 66 SSVs per thousand employees. Professionals report a lower but still significant rate of 41 and skilled trades people/artisans have a rate of 25. Noticeably, the only other occupational category with an appreciable number of vacancies, operators have a relatively low rate of just 0.5. Given the greater number of operators in the workforce the aggregate rate of SSV employees is therefore only six per thousand employees.

The aggregate division of employment by skill level is reported in Table 7.7. The occupational distribution of skill levels is also reported in the table. According to these classifications professionals possess a disproportionately large number of highly skilled employees. With 55% of all professional being categorized as highly skilled only associate professional, 13%, managers, 12%, and sales/service, 8% have any significant proportion of highly skilled staff and even then these other occupations are far lower than the proportion of professionals. Among the other occupations administrative employees have the highest proportion of intermediate skills. Noticeably, despite the reported skill shortages in operator vacancies 65% of the operator workforce is classified as low skilled.

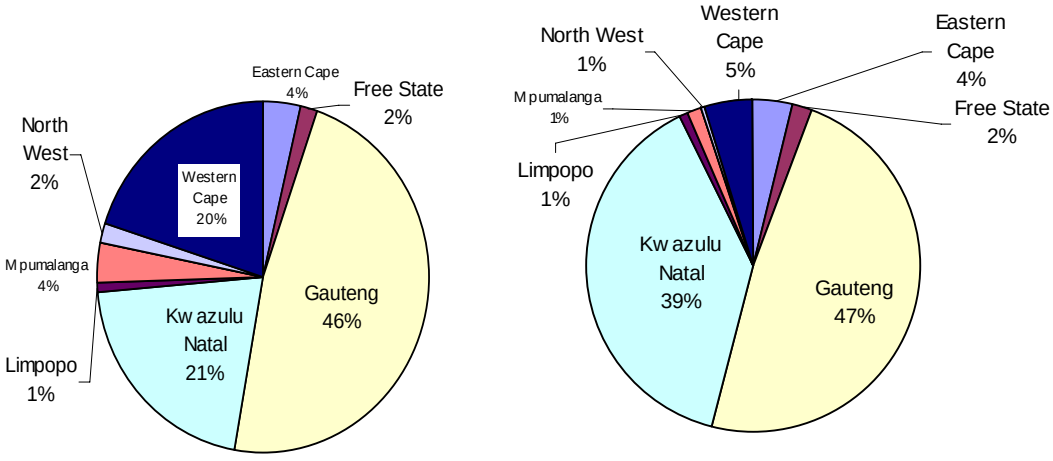
Table 7.7 Paper & pulp employment and occupations by skill level

		Low skilled	Intermediate skills	High skilled	Cumulative
Occupations	No.	%	%	%	%
Managers & Senior officials	3,127	31.2%	57.1%	11.7%	100%
Professionals	1,382	6.4%	38.4%	55.2%	100%
Associate Professionals	2,849	29.2%	57.8%	13.0%	100%
Administrative & Secretarial	4,051	35.2%	64.8%	0.0%	100%
Skilled trades/Artisans	3,796	62.3%	37.2%	0.6%	100%
Sales & customer service	577	43.9%	48.1%	8.0%	100%
Transport/machine operators	13,581	65.2%	34.3%	0.5%	100%
Other occupations	10,637	76.4%	23.6%	0.0%	100%
Total	**40,000**	**57.3%**	**38.6%**	**4.1%**	**100%**

Source: Quantec

The location of demand for paper and pulp skills is indicated in Figure 7.14. Gauteng with 47% and KwaZulu-Natal with 39% of employment are by far the largest employers in the sector. As with the primary processing sector, the Western Cape has a disproportionate number of firms based there, which again is like the product of the province's urban areas. Gauteng has nearly an equal proportion of firms and employment.

Figure 7.14 Location of paper & pulp employment and enterprises

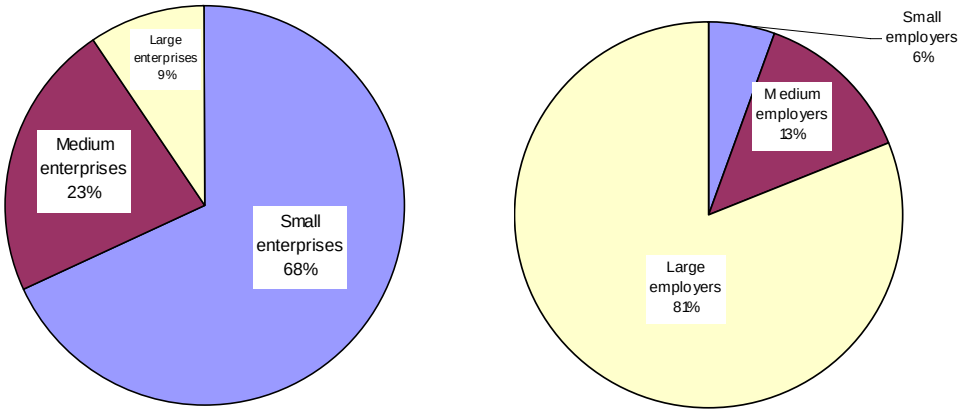


Enterprise Location **Employment Location**

Source: Erasmus, 2004: 98.

The division of enterprises and their employment according to size is reported in Figure 7.15 (Erasmus, 2004: 96). A pattern of employment dominance by a relatively few number of large firms is again seen in this sector as it was in primary processing. The composition of firms by size is shown in the left of the figure, small enterprises account for 68% of all firms and large firms nine percent. The right side of the figure shows that those few large firms account for over four-fifths of sectoral employment. However, small firms account for just six percent of employment among the sector's enterprises.

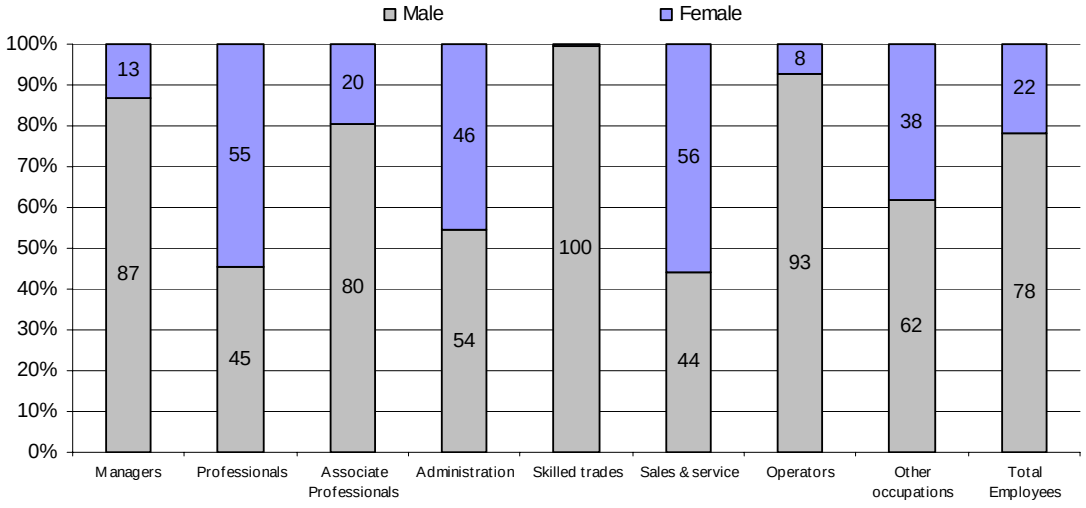
Figure 7.15 Composition & employment by size of firms in paper & pulp



Source: Erasmus, 2004: 96.

The structure of the workforce by gender is reported in Figure 7.16. Once more, men make up the overwhelming majority of employees. According to available statistics, effectively all of the workers in skilled trades are men. In contrast to forestry and primary processing there are slight majorities of women in both professional and sales occupations. In administration there is also near gender equality.

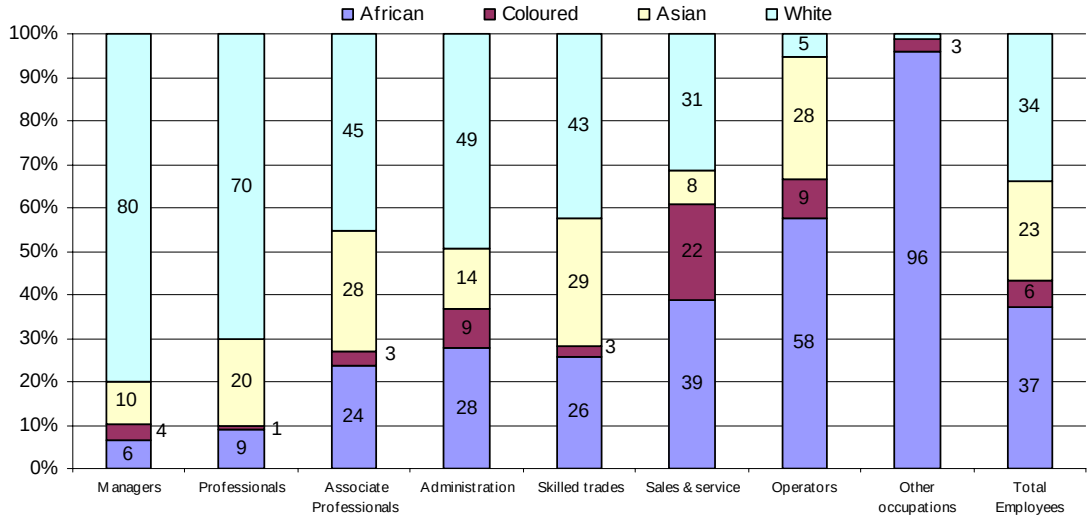
Figure 7.16 Gender of paper & pulp employment



Source: Erasmus, 2004: 100.

The racial composition of employment is reported in Figure 7.17. There is a higher aggregate proportion of whites, 34%, in the paper and pulp workforce than in either forestry or primary processing. Despite this there remains a disproportionate number of whites in management, 80%, and professional occupations, 70%. There is also a relatively large Asian component in the workforce, 23%, compared to the other sectors. Coloureds compose 6% of the workforce, but 22% of sales and service workers. The aggregate proportion of Africans is 37%, but they account for 96% of the labourers and agricultural workers in the 'other' occupational category.

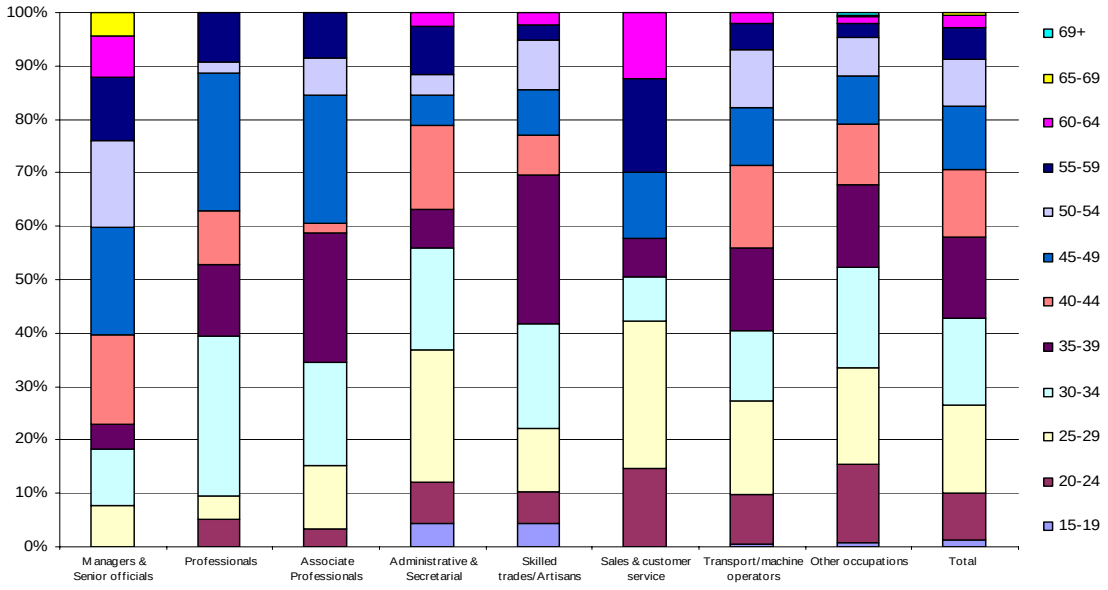
Figure 7.17 Racial composition of paper & pulp employment



Source: Erasmus, 2004: 100.

The aggregate distribution of employees by age and the occupational breakdown by age is shown in Figure 7.18.

Figure 7.18 Age composition of paper & pulp employment



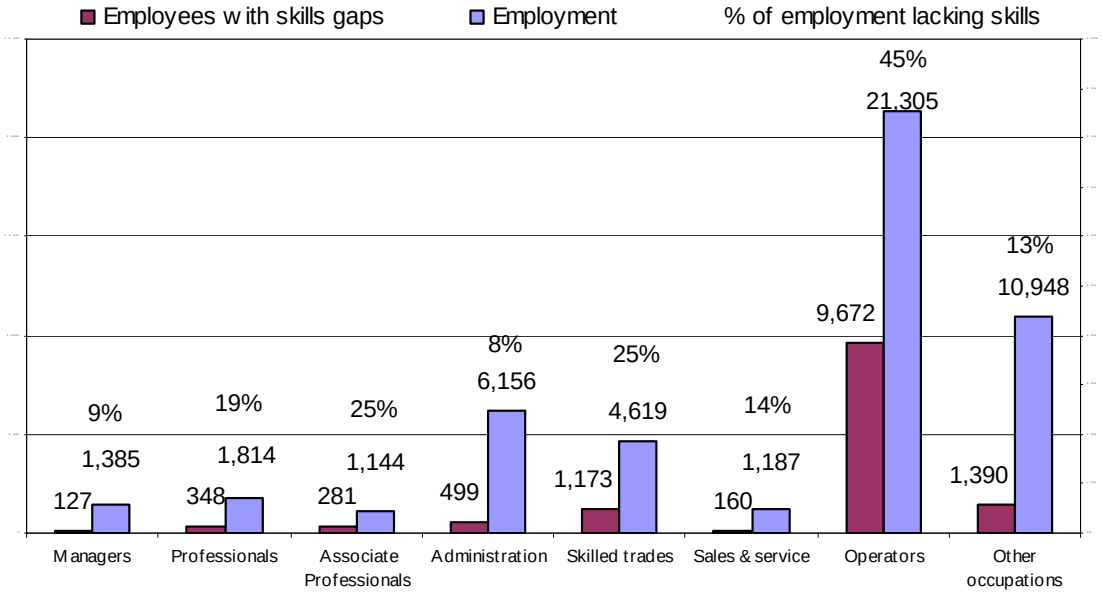
Source: Quantec

In total, over 70% of the workforce is less than 40 years and less than three percent is more than 60 years. Sales and customer service as well as management again have the largest proportion of staff over the age of 60. Similarly, the skilled trades have the largest proportion of employees less than 40 years.

Existing Workforce Skill Demand

The incidence and estimated number of employees with some skill gaps are reported in Figure 7.19. Operators have the highest proportion of skill gaps, 45%, followed by skilled trades, 25% and associate professional, 25%. Notably, operators and skilled trades also contained the highest proportions of low skilled workers as in Table 8.7 above. This correspondence appears to coincide with a general effort, discussed in greater detail in Chapter Nine, by the sector to increase skills as a means to enhance competitiveness.

Figure 7.19 Workforce skills gaps



Source: Skill surveys completed by interviewed organisations (see Appendix Two)

Among the skills identified in interviews with key sectoral players, technical skills were identified as having the greatest scope for development across occupational categories. Management skills were the second most significant reported skills need. Information technology, problem solving, team working, and written communication skills were also identified as needing development across occupational categories. Lastly, customer handling and numeracy skills were mentioned as needing development within specific occupations.

Future Influences on Skills Demand

Paper and pulp is a critical component in South Africa's WPP sector. Directly and indirectly many of the general sectoral development initiatives discussed in the introduction directly generate potential demand for skills in paper and pulp.

Significantly, as the sector seeks to affirm and develop its international competitiveness it is also being driven by an internal dynamic to develop technical and managerial skills.

Nonetheless, as highlighted in the sectoral profile in Chapter Five, even given the envisioned net increases in plantation forest supplies there is probably only enough timber input to support one or two additional pulp mills. Increased paper recycling and State support in this regard will likely increase the potential for paper production and associated entry of new players in that sub sector whose emergence will create and require business and management skills as well as a host of technical and engineering skills.

Demand for Skills in Wood Furniture

Total employment in the wood furniture sector and the occupational division of that workforce is reported in Table 7.8. Operators account for the largest proportion of employees with two-fifths of all employees in that occupation. Labourers in the 'other' occupational category were the next most significant group accounting for just over 30% of the workforce. Both professional and associate professional occupations are a very small percentage of the workforce accounting for only two percent each.

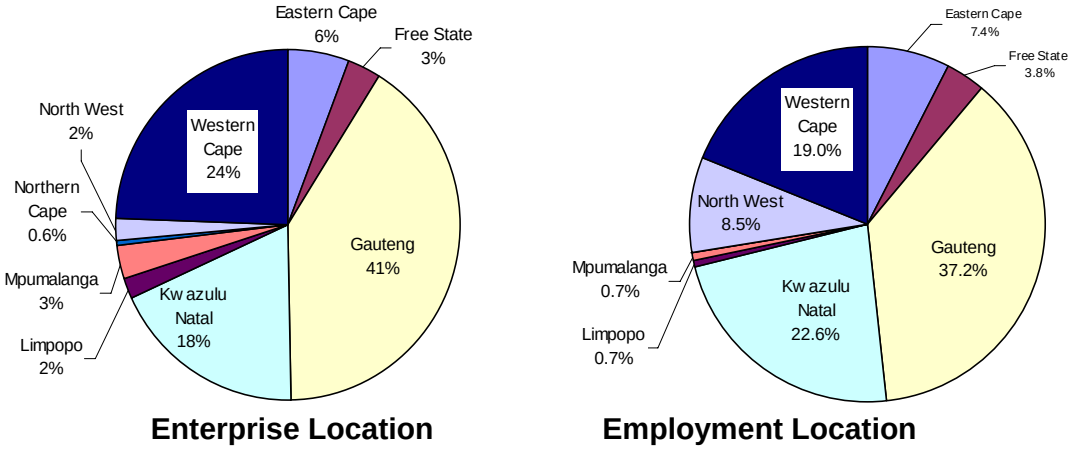
Table 7.8 Wood furniture employment and occupations

	Employment
Total Wood Furniture	45,000
Occupations	%
Managers & Senior officials	6%
Professionals	2%
Associate Professionals	2%
Administrative & Secretarial	8%
Skilled trades/Artisans	8%
Sales & customer service	3%
Transport/machine operators	40%
Other occupations	32%

Source: Erasmus(2005) and Chamberlain et al. 2005a

The location of demand for wood furniture skills is indicated by the location of sectoral employment by province in Figure 7.20. In contrast to the other sectors, wood furniture has a higher correlation between the provincial location of firms and employment, which is probably a result of the number of SMEs in the sector. Gauteng again reports the highest percentage of employment, 37%, and firms, 41%. KwaZulu-Natal ranks second in employment with 23%, but is third amongst the proportion of firms, 18%. The Western Province is third in employment, 19%, but second in terms of the number of firms, 24%. The Eastern Cape and the Free State have similar shares of employment and firms, at about 6.5% and 3.5% respectively. The Northwest Province reported 8.5% of employment, but only two percent of firms. Mpumalanga and Limpopo both reported employment at less than one percent each, but their share of firms were three percent and two percent respectively.

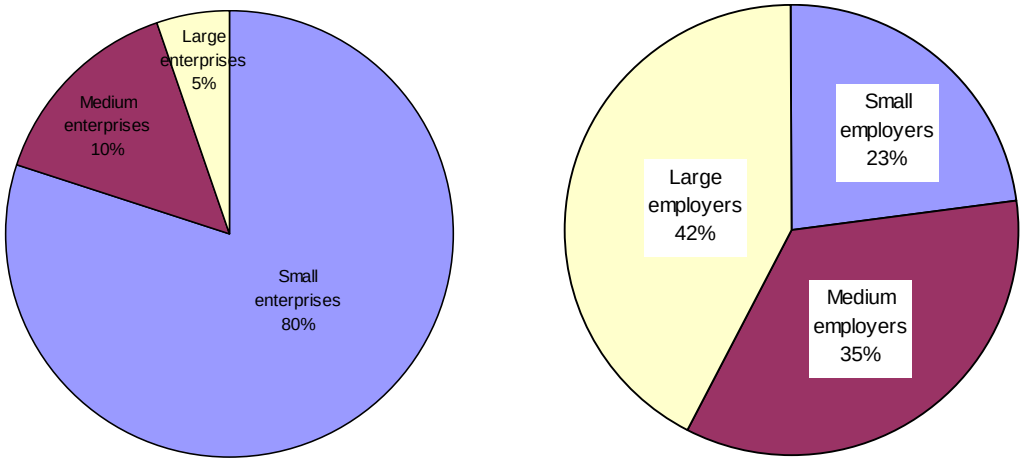
Figure 7.20 Location of wood furniture employment and enterprises



Source: Erasmus, 2004: 73.

The structure of enterprises by size and their associated employment is reported in Figure 7.21. The proportion of employment in large firms is once more the largest of the three firm sizes at 42% and again the share of large firms is relatively small at five percent. However, compared to the other sectors, the share of large firm employment is relatively small and is less than half that of the share of employment in the paper and pulp sector. This reflects the fact that SMEs are a significant component of the wood furniture sector accounting for 58% of sector employment and 90% of all enterprises.

Figure 7.21 Composition & employment by size of firms in wood furniture

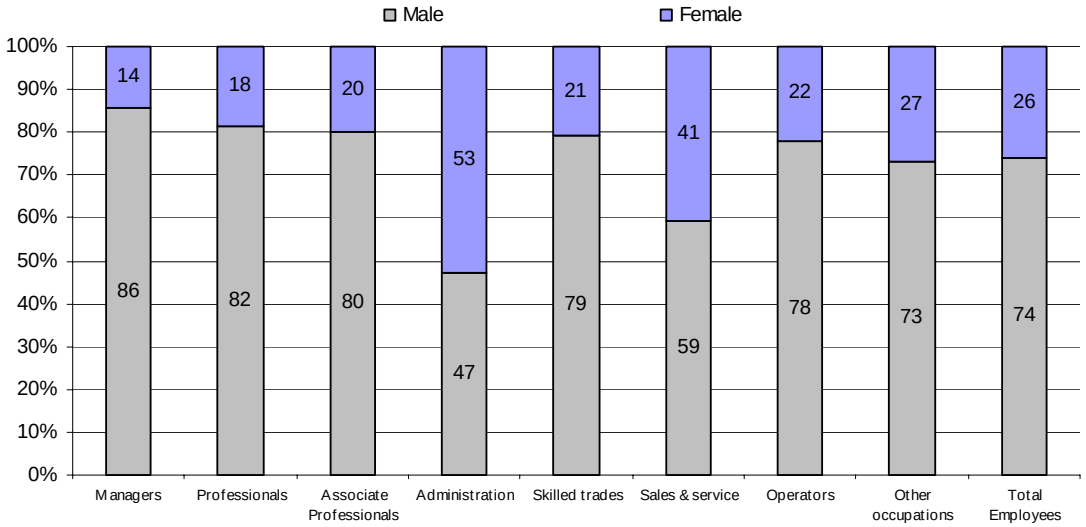


Source: Erasmus, 2004: 70.

The structure of the workforce by gender is reported in Figure 7.22. The total division is similar to the other sectors of WPP, with men accounting for just fewer than three-quarters of the workforce. Men are higher proportions in management, 86%, professional, 82%, associate profession, 80%, skilled trades, 79%, and operators,

78%. Equality is only attained in administrative occupation where 53% are women and it is approached in sales and service where 41% are women.

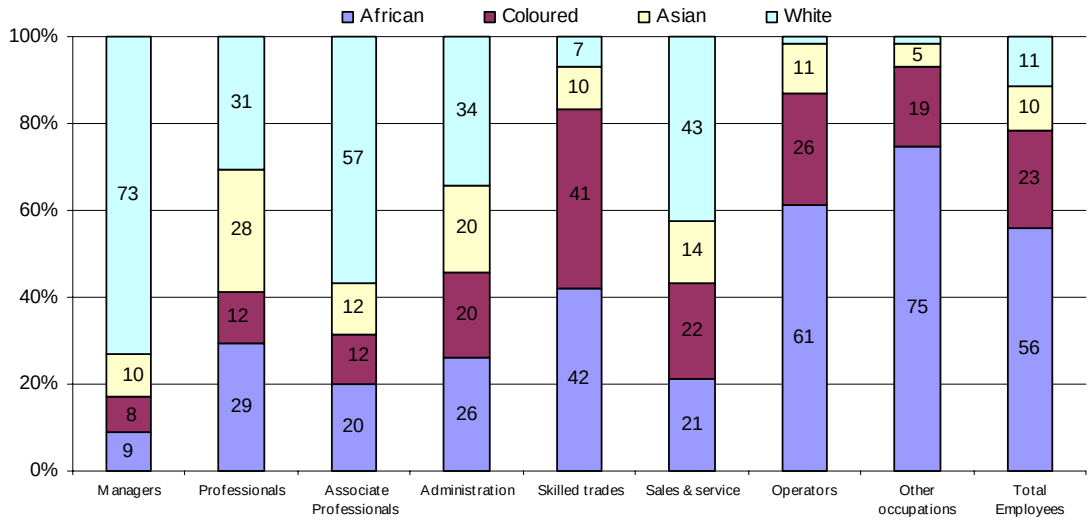
Figure 7.22 Gender of wood furniture employment



Source: Erasmus, 2004: 75.

The racial division of employment is reported in Figure 7.23. The relative number of whites is only about a tenth of the workforce in total, but it is again accounts for a disproportionate portion of management, 73%. Africans once again are a larger proportion of labourers, 76%, and operators, 61%, than their share of total employment, 56%. Composing a comparatively large 23% of the total workforce, coloureds form a significant proportion, 41%, of skilled trades people. Asians form the remaining tenth of the workforce in total, but are significantly larger components of professional, 28%, and administrative, 20%, occupations.

Figure 7.23 Racial composition of wood furniture employment

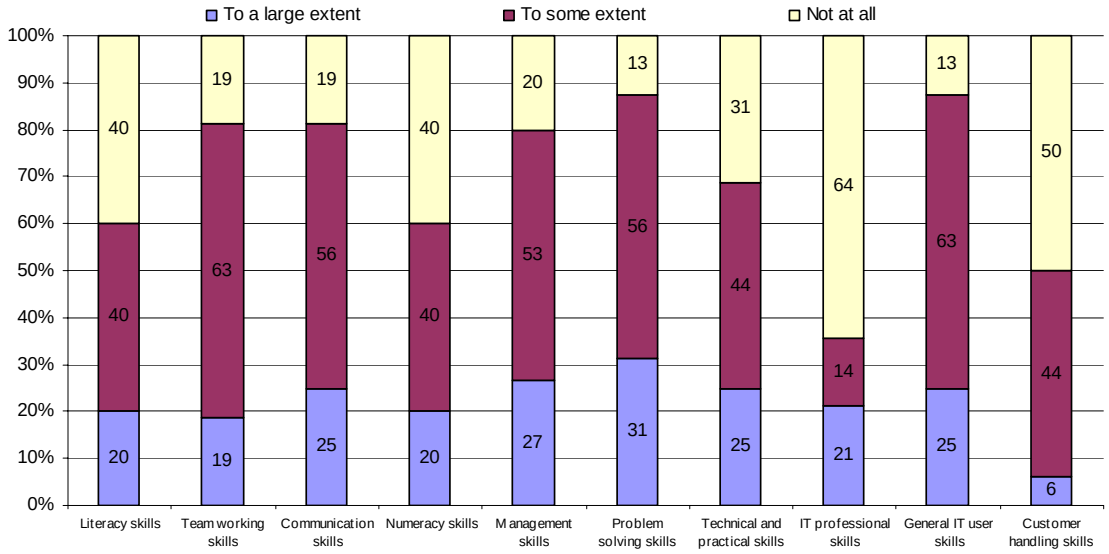


Source: Erasmus, 2004: 75.

Existing Workforce Skill Demand

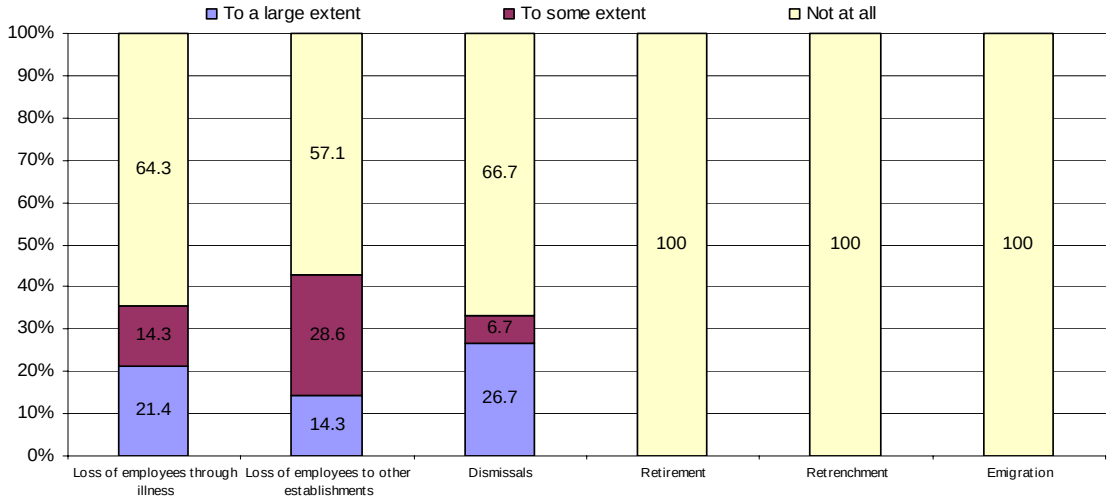
Demand for increased skills within the wood furniture workforce is reported in Figure 7.24. Based on the responses of firms surveyed in the sector it appears that there is a wide ranging demand for enhancing the wood furniture sector's skills base. Out of the ten categories of skills investigated a majority of firms reported that at least some improvement was needed in nine of the categories. The most frequently reported skill in need of development was problem solving and general IT skills. Four-fifths of respondents mentioned team work, communication, and management skills. Seventy percent of those surveyed mentioned technical skills as needing development. Three-fifths mentioned literacy and numeracy skills. Half want to develop their staff's customer skills. Only professional IT skills were identified by a minority of respondents, with only a third citing a need for their development.

Figure 7.24 Workforce skills demand



Source: Erasmus, 2004: 77.

Figure 7.25 Reasons for workforce turnover



Source: Erasmus, 2004: 80.

The loss of firms' skills because of turnover is reviewed in Figure 7.25. While turnover resulting from employee illness is again identified as being significant, loss to other establishments is listed as the primary cause of turnover. Dismissals are also reported to be a significant cause of employee turnover. While HIV/AIDS is again an important force, the presence of the other factors combined with the broadly reported deficiencies in the workforces skills would suggest that intra-industry competition for available skills is high and that many of the employees do not have adequate skills.

Future Influences on Skills Demand

Sawn timber inputs, their quality and price are obviously important influences on the wood furniture sector's international competitiveness. As illustrated in the sectoral analysis in Chapter Six, the wood furniture sector was able to find export markets for its products in an environment of Rand depreciation, but since its appreciation early in the 2000s sectoral exports have declined sharply. At the same time robust domestic economic growth has increased demand for wood furniture, but trade statistics suggest that a significant proportion of this increased demand is being met by imports.

Ensuring that the sector is competitive therefore requires that the sector enhance its skills simultaneous to it positioning itself to fulfil domestic demand and entrench a position in the export market. A range of technical skills will be required if the industry is to achieve this. Given potential intra-sectoral competition for the scarce skills that are available options into the collective provision of these additional skills would appear beneficial to the sectors overall competitiveness. Efforts and potential institutional structures to achieve this are discussed in Chapter Nine.

CHAPTER EIGHT: SUPPLY OF SKILLS

Introduction

This chapter considers the supply of skills available to the wood, paper, and pulp (WPP) sector. It begins with a brief review of the system of skills development in South Africa. That review looks at general trends in relation to the WPP sector from the schooling system, the higher education system, and the industrial skills development system. Institutional features and initiatives are then examined in a more detailed review of skills across the four sub-sectors.

The Schooling System

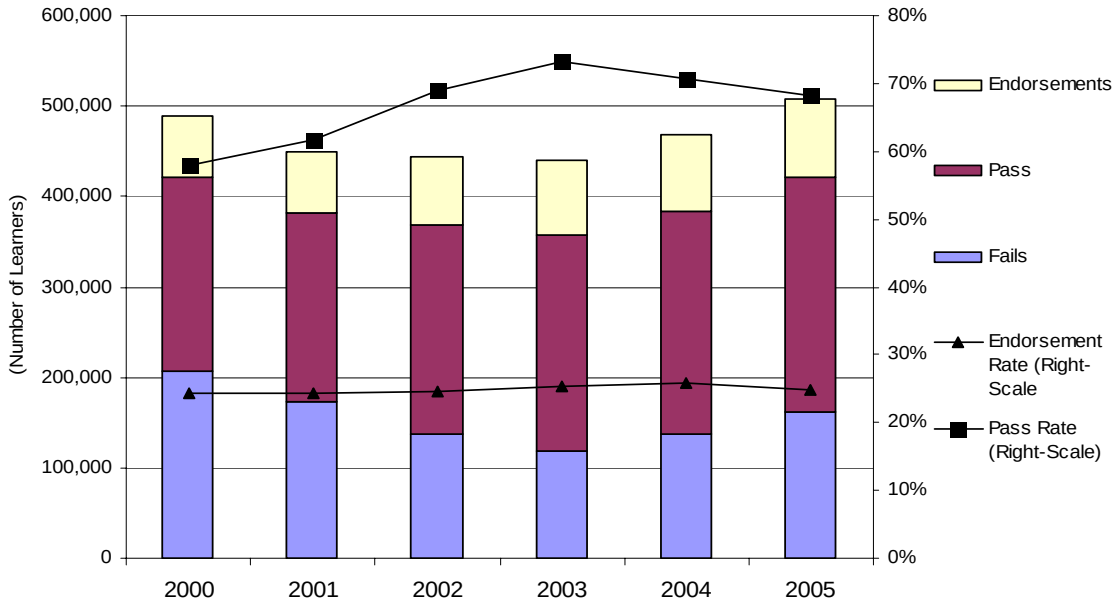
While an influx of learners in the 1990s marked the transition to democracy, since 2000 the schooling system has grown at a compound annual growth rate of just 0.2% from 11.6 million learners in 2000 to 11.7million learners in 2005 (DOL, 2006: 26). There is a stark division between rates in the primary phase of education, grade R to grade 7, and the secondary phase of education, grade 8 to grade 12. Between 2000 and 2005, learners in the primary phase declined from 7.5 million to 7.3 million or a compound annual decline of 0.6%. In contrast, between 2000 and 2005, learners in the secondary phase increased from 4.1 million to 4.4 million at a compound annual growth rate of 1.7%. Given stable gross enrolment ratios across both the primary and secondary phases it is reasonable to assume that the decrease in primary phase enrolments is indeed associated to structural adjustments in school participation following democracy (DOL, 2006: 27).

Given the learning foundation established in the schooling phase of education the quality of that education and the amount of learners completing the schooling phase are important indicators of the general availability of skills in South Africa's economy. An indicator of educational quality is the ratio of learners per educator. In this respect educator attrition has been a troubling feature of the South African schooling system (Shindler, 2007). Nationally, the total number of educators has declined from 363,343 in 2000 to 362,598 in 2003. That decline has meant that the learner to educator ratio has grown from 32.8 learners per educator in 2000 to 33.2 learners per educator in 2003 (Shindler, 2007: 16).

Another indicator of educational quality is learning achievement. South Africa's participation in the international trends in international mathematics and science study (TIMSS) provides both international context and an indication of trends in educational quality since it was given to South African grade eight learners in 1999 and again in 2003. This assessment reflected a poor quality of achievement amongst South African learners. Out of the fifty nations that participated in the 2003 study, South Africa scored the lowest average marks for any nation in both mathematics and science (Shindler, 2007: 21). In addition, between the 1999 and 2003 tests, the average mathematics score declined by 4.1%. During the same period, the average science score did report a marginal increase of 0.4%.

The senior certificate examination (SCE) or Matric occurs at the end of grade 12 and provides an indicator of the number of learners who are qualified to proceed with additional training and education opportunities. Figure 8.1 reports South African SCE results for the period between 2000 and 2005. Between 2000 and 2003, there was a decline in the number of candidates writing the SCE, but there was a simultaneous rise in the SCE pass rate. Since 2004, the number of candidates writing the SCE has risen, but the pass rate declined. Students who receive an endorsement on their SCE qualify to enter the higher education system. The annual number of students with endorsements has risen from 67,000 learners in 2001 to 86,000 in 2005, equating to an annual compound growth rate of 6.1%.

Figure 8.1 Senior certificate results, 2000 to 2005



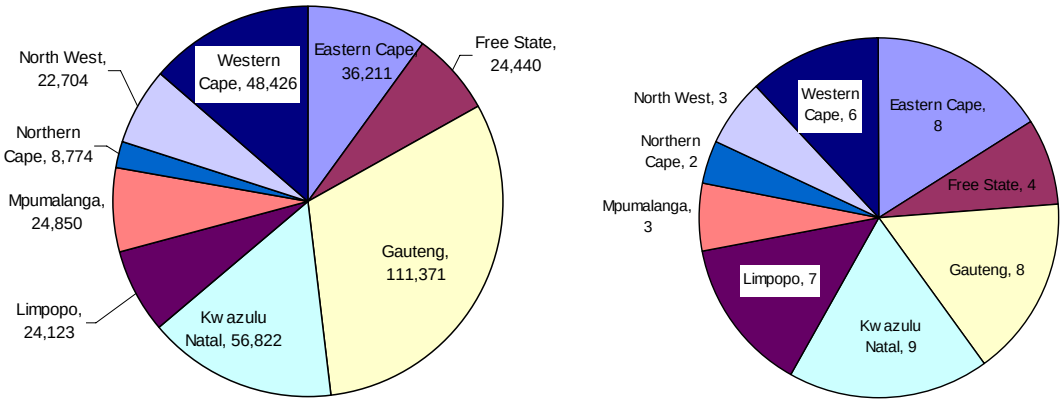
Source: DOL, 2006: 29.

Despite the progress in generating increasing numbers of learners qualified for higher education, available indicators suggest that the supply of skills from the schooling system is disappointing. Particularly given the development challenges that South Africa faces, the output and quality of education from the schooling system appears to be significantly underperforming the national demand.

The Further Education and Training College System

In 2004, there were 50 public further education and training (FET) colleges offering courses formally recognised by the Department of Education as well as courses offered in association with SETAs, the Department of Labour and employers. In 2004, there was a total enrolment of 357,721 individuals at public FET colleges. The distribution of the FET colleges and the enrolments are indicated in Figure 8.2 below. Gauteng accounted for nearly a third of total FET college enrolment in 2004, followed by KwaZulu-Natal with 16%, and the Western Cape with 14%.

Figure 8.2 Geography of FET colleges and enrolments, 2004

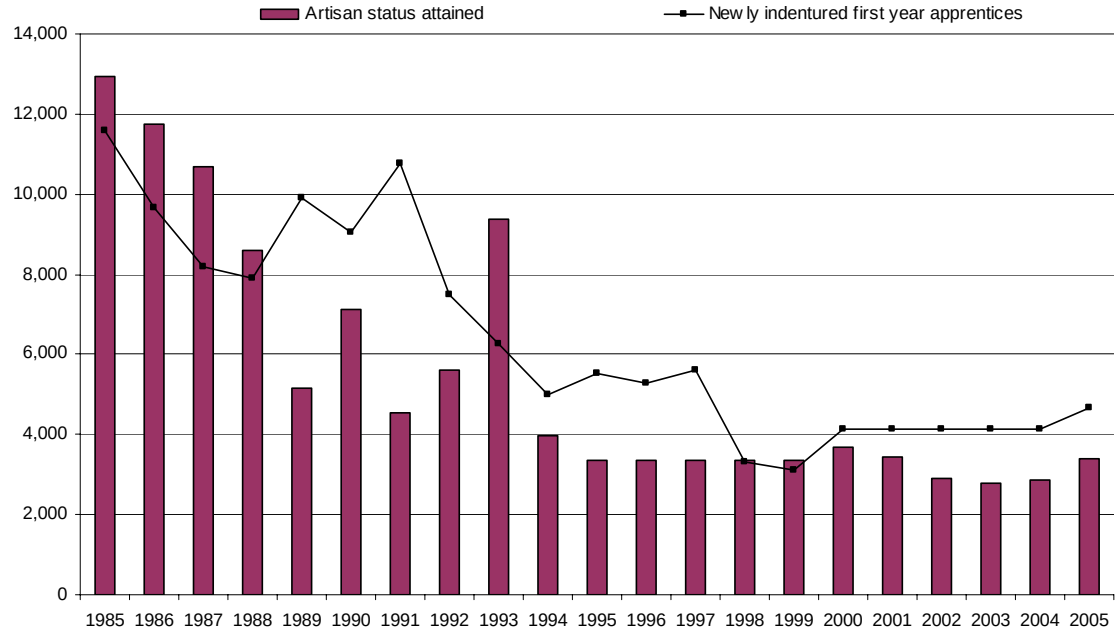


FET Enrolment Location **FET College Location**

Source: DOL, 2006: 31.

It is important to note that a significant quantity of FET training is not provided by FET colleges. FET training may be provided by external service providers at work or employers may provide their own FET training to staff. Within this context an important skill within the workplace is that of artisans. Figure 8.3 below reports trends in artisan training.

Figure 8.3 Entering and qualifying artisans, 1985 to 2005[13]



Source: DOL, 2006: 89-90.

The dramatic decline in entering and qualifying artisans is readily apparent from the figure. While there has been a relatively steady number of qualifying artisans since

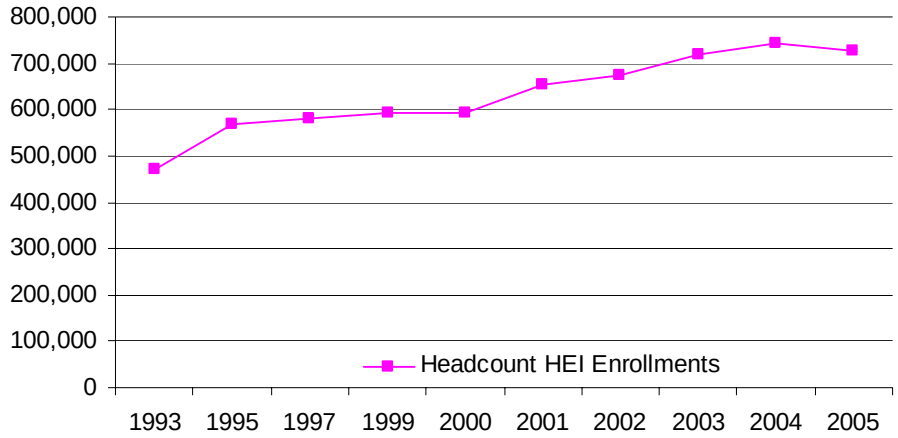
[13] Figures for 1985 to 1999 are for first year indentured apprentices, while those from 2000 are based on learnerships. Reporting difficulties required estimates to be used for the annual number of qualifying artisans between 1995 and 1999. Similarly, estimates were used for newly indentured artisans between 2000 and 2004.

1995, there is general consensus that the supply is grossly under national needs. In this regard, JIPSA has targeted 12,500 qualifying artisans per year, which would return output to the levels in the mid-1980s.

The Higher Educations System

Higher education institutions (HEIs) are critical components in the development of higher-level skills nationally. As indicated in Figure 8.4 enrolment in South African HEIs has been grown steadily since the 1990s from a total of 473,000 learners in 1993 to 727,664 learners in 2005. That translates into a compound annual growth rate of 3.6%. In response to the growing enrolments, the Department of Education has begun to cap total enrolments in order to increase efficiency within the existing system and ensure adequate resources were available to HEI learners.

Figure 8.4 HEIs headcount enrolments 1993 to 2005



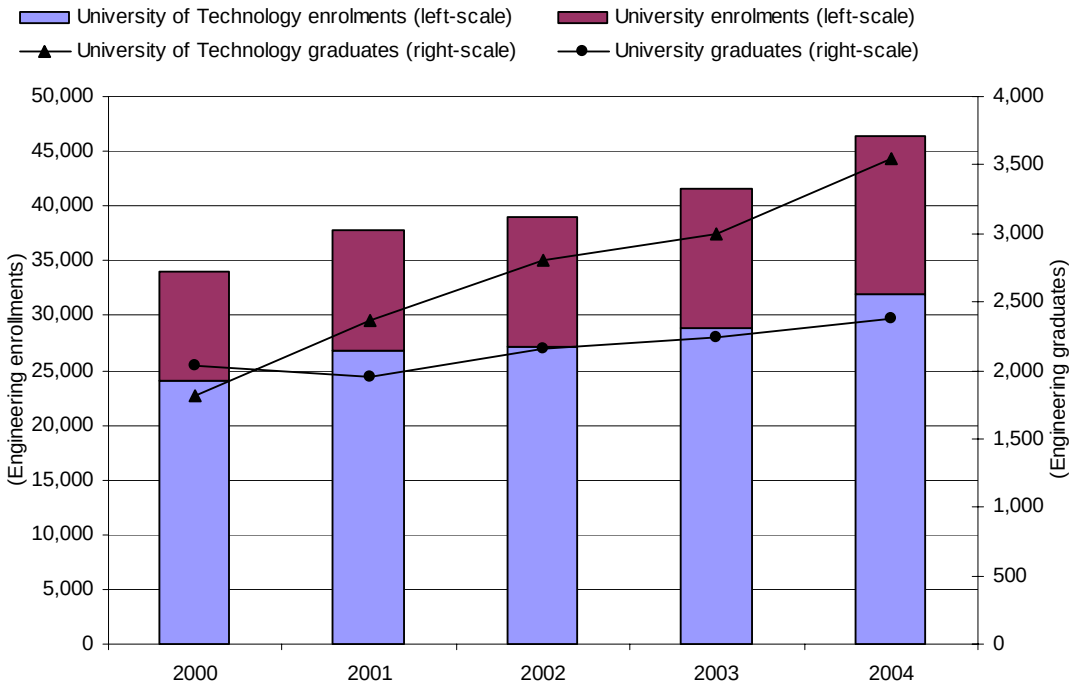
Source: DOL, 2006: 32.

Within HEIs the increasing enrolment of postgraduate students is a positive indicator of higher-level skills development. This level has risen from 94,756 postgraduate learners in 2001 to 120,036 postgraduate learners in 2005 or an annual compound growth rate of 6% (DOL, 2006: 34). In aggregate, postgraduates account for approximately 15% of total enrolments. Another indicator of the HEIs contribution to skills development is the number of graduates. Between 2000 and 2004, the number of HEIs graduates rose from 88,250 to 116,447 at an annual compound growth rate of 7%. Notably, during the same period, the graduation rate rose slightly from 14.4% to 15.6% (DOL, 2006: 26).

Engineering skills are an important sub-component of skills development within the higher education system. Figure 8.5 reports recent trends in engineering enrolments and graduation. In terms of the composition of enrolments, universities of technology accounted for 70% of the total. Engineering enrolments demonstrated a compound annual rate of growth equal to 7.7% between 2000 and 2004. The number of engineering graduates also rose during the period from 3,859 in 2000 to 5,923 in 2004. While the number of graduates grew at universities and universities of technology, the growth of was much greater amongst the universities of technology. Between 2000 and 2004 the universities' annual compound growth rate of

engineering graduates was 3.8%, but at universities of technology the rate was 16.6%.

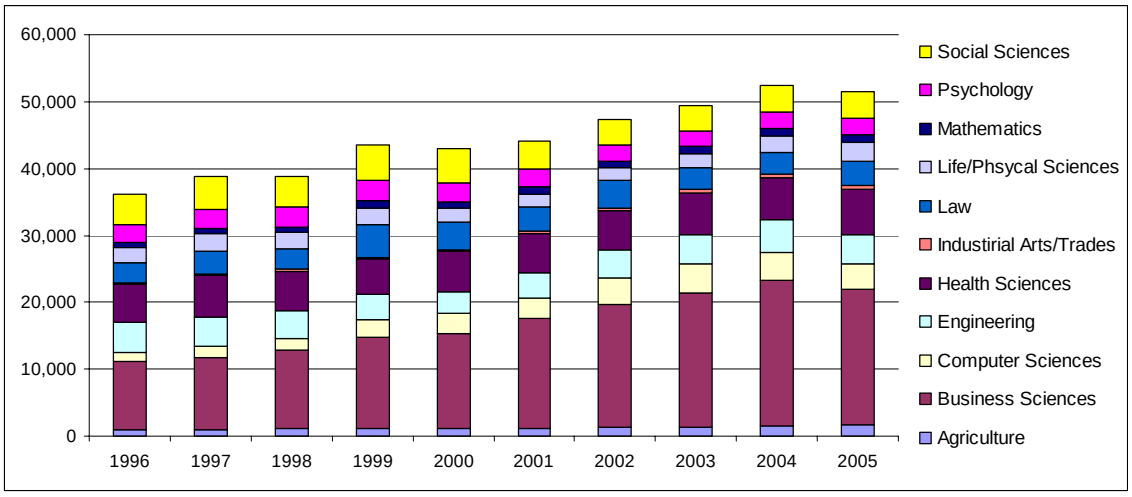
Figure 8.5 HEIs engineering headcount enrolments and graduates 2000-2004



Source: DOL, 2006: 83.

In Chapter Seven, several higher education qualifications relevant to the WPP sector were identified.[14] Under-graduate studies completed in eleven fields related to those qualifications are presented in Figure 8.6 below. Between 1996 and 2005, the annual number of qualified under-graduates rose from 36,186 to 51,491. This increase equated to a compound annual growth rate of 3.9%.

Figure 8.6 Under-Graduate qualifications for the WPP Sector

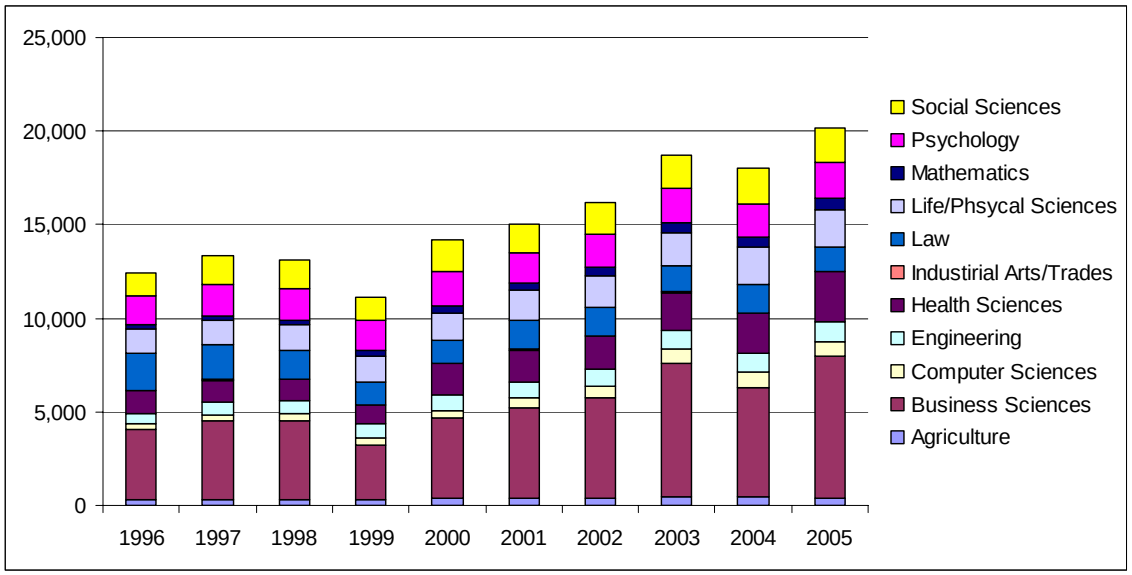


Source: DoE - HEMIS

[14] See Table 7.2.

Figure 8.7 reports similar data on the annual composition of post-graduate qualifications. Between 1996 and 2005, the annual number of qualified post-graduates increased from 12,442 to 20,206 equating to an annual compound growth rate of 5.4%. In total, the number of all graduates increased from 48,628 in 1996 to 71,697 in 2005.

Figure 8.7 Post-Graduate qualifications for the WPP Sector



Source: DoE - HEMIS

Three fields of study experienced a decrease in the annual number of qualifications at the undergraduate level: social sciences, -15%; psychology, -4%; and engineering -2%. However, increased post-graduate qualifications in psychology and engineering led to aggregate growth in those fields. Besides social sciences, the only other field to register a decline in the annual number of qualifications was law where a 35% decrease in post-graduate qualifications contributed to a three percent aggregate decrease in graduates.

Several areas of study experienced rapid undergraduate and postgraduate growth. Qualifications in computer sciences rose at a compound annual growth rate of 11% from 1,675 in 1996 to 4,482 in 2005. Business sciences grew at a compound annual rate of 8% from 13,914 to 27,871. Similarly, industrial arts/trades grew at a rate of 8%, but this was from a base of 225 graduates in 1996 to 472 in 2005.

In fact, industrial arts/trades contributed the smallest proportion of graduates during this period, 0.6%. Business Sciences were the largest component of graduates in aggregate, accounting for 34% of all qualifications between 1996 and 2005. Life/physical sciences had the highest share of postgraduates, 41%, but it was followed closely by psychology, 40%, and law, 30%. Industrial arts/trades had the lowest share of postgraduates, eight percent, followed by computer science, 15%, and engineering, 17%.

The Industrial Skills Development System

The South African industrial skills development system began the important process of transformation with the National Training Strategy Initiative (NTSI), which adopted a unified vision of education and training within a national qualifications framework and aimed at individual empowerment as well as improved quality of life (Barry et al. 2007: 50). Following on the NTSI proposals and recommendations, the Skills Development Act of 1998 led to the establishment of Sector Education and Training Authorities (SETAs) in 1999, which were responsible for developing and implementing sectoral skills plans, collecting and paying skills development levies, and establishing and reviewing learnerships for their respective sectors. Previous Industry Training Boards were replaced by the SETAs. The wood, paper and pulp sector falls within the Forest Industries Education and Training Authority (FIETA).

In 2000, within this new policy environment learnership, defined within the National Qualifications Framework (NQF), replaced training structures. The NQF divides skills development programmes across eight levels and two bands. NQF Level 1 is the equivalent of a learner completing grade 9 and does not fall within either of the two bands. The further education training (FET) band covers NQF levels 2 to 4. These FET levels correspond to grades 10-12 in the school system and are also the levels focused upon by the FET colleges that were discussed above. The higher education training (HET) band covers NQF levels 4 to 8. These HET levels progress from the diploma level up to the doctorate level.

Training at any of these levels varies considerably by sector and sub-sector. According to Kraak et al. (2000: 45), in 2000 24.9% of the people employed in the WPP sector received training. That rate is significantly below the national average of 44.9% and appears to be related to the large number of SMEs in the sector. Table 8.1 reports the occupational structure of training among all South African enterprises in the year 2000.

Table 8.1 National enterprise training by occupation, 2000

Occupations	%
Managers & Professionals	10.9%
Associate Professionals	11.1%
Administrative & Secretarial	23.2%
Skilled trades/Artisans	11.4%
Sales & customer service	14.4%
Transport/machine operators	14.4%
Other occupations	14.9%

Source: Kraak et al. 2000: 42-46.

There is a relative uniformity of training among occupations in firms nationally. With the exception of the higher proportion of administrative and secretarial occupations, the relative proportion of training by occupation differed by only four percent across, ranging between eleven and fifteen percent of the workforce. It will be evident from the detailed reviews below that within the WPP sub-sectors there is not a similar homogeneity of training supply.

Generally, the education system seems to be increasingly responsive to supplying the skills needed to facilitate the envisioned national growth and development. However, there does appear to be a broad constraint faced by the supply of skills from the schooling system and in particular the maths and sciences ability of the school leavers. Economic growth and increased international competition is placing a strong demand for skills that will challenge HEIs transformation and development for years to come. This demand for skills is not limited to HEIs, FET colleges also need to generate a real sustained increase in the skills they supply as indicated by national trends in the number of qualifying artisans.

Supply of Skills in Forestry

The forestry sector is one of the largest employment components of the WPP sector. The second economy is significant in the sector, therefore the supply of skills to informal sector is an important feature. The first part of this sub-section reviews the generation of skills within the second economy. The supply of skills within the first economy workplace is then analysed. Lastly, forestry skills provided by FET colleges and HEIs are discussed.

Skilling Initiatives within the Second Economy

Provision of skills in forestry needs to encompass more than a narrow focus on plantation forestry. As discussed in Chapter Three, a critical aspect of increasing afforestation policies is the increasing role of small growers who are often in communal property. Education and training of individuals that have not historically participated in the forestry sector can build up critical non-timber livelihood benefits to these rural and frequently impoverished communities (Shackleton, 2004). This training needs to be focused on individuals who are frequently unskilled and not directly employed in the formal economy. However, providing this type of skills development is a challenge particularly given that the learnership and skills programmes in the sector education and training authorities (SETAs) are often highly inflexible and centrally managed, which limits their uptake within the informal sector (DOL, 2007: 15).

Nonetheless, efforts to realize skills development within the broader forestry sector have an institutional champion in DWAF's Directorate of Forestry Development. Tasked with supporting the sustainable use of forest and forest resources to serve the livelihoods of the poor, the directorate supports a range of programmes aimed at fostering enterprise development within the sector. A few projects have already been initiated by the directorate that have led to the establishment of community gardens, medicinal plant nurseries, and beekeeping projects (SFR, 2006: 31). In the Eastern Cape, Participatory Forest Management Projects were also initiated, but these projects appear to have failed to play a major role in the several communities where they have been piloted so far. On the whole therefore, these programmes do not appear to have yet developed a large and systemic scale.

In Shackleton's analysis of the forestry sector's contribution to rural livelihoods, the ad hoc nature of local skill development initiatives was highlighted as a key constraint (2004: 34). Rather than building on and identifying existing skills and initiatives new projects and organisational structures were created by agencies trying to assist

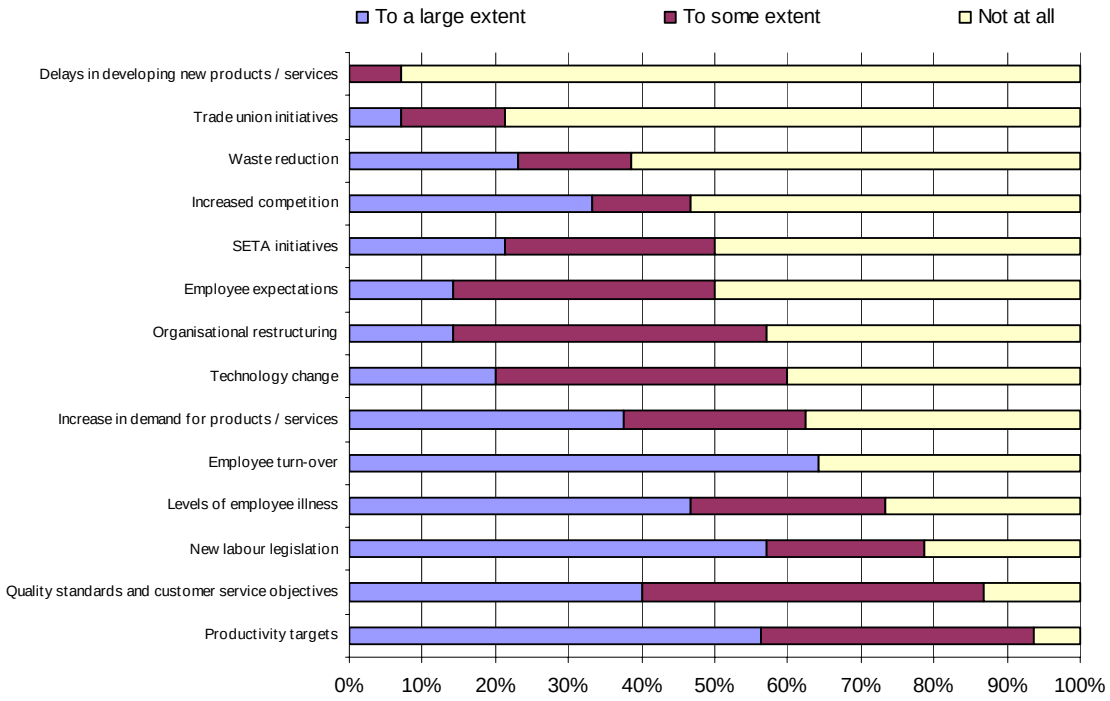
development of the informal sector. If this pattern is pervasive, which indications are that it is the misallocation of resources and discontinuities created are additional challenges rather than benefits to development of the informal forestry sector.

The informal sector is envisioned to play a large role in the WPP sector in the future. If this is to make a significant difference to the rural communities it is intended there needs to be a large sustained and systematic skills development initiative. Currently, the FIETA is developing several learnerships for the forestry sector, but these are focused on the formal sector. In addition, DWAF's Directorate of Forestry Development appears to be committed to ad hoc project interventions. A coordinated effort between the Directorate and FIETA to develop learnerships for the second economy appears to be a highly desirable focus for future skills development. Such an initiative would need to look at the interaction between forestry, non-timber forest products, and complementary agricultural products that could be produced in the adjoining forest transition areas.

Skilling Initiatives within the First Economy

Reasons for forestry sector firms providing training and skills development of their employees are listed in Figure 8.8. Productivity targets were the most frequently reported reason for training and developing employees' skills among the surveyed firms. Ensuring that quality standards and legislated requirements were also frequently identified causes for enterprise training. However, employee turnover was cited as the reason having the largest influence on skills development. The significance of turnover in training decisions also corresponds to its significance in sectoral demand for skills.

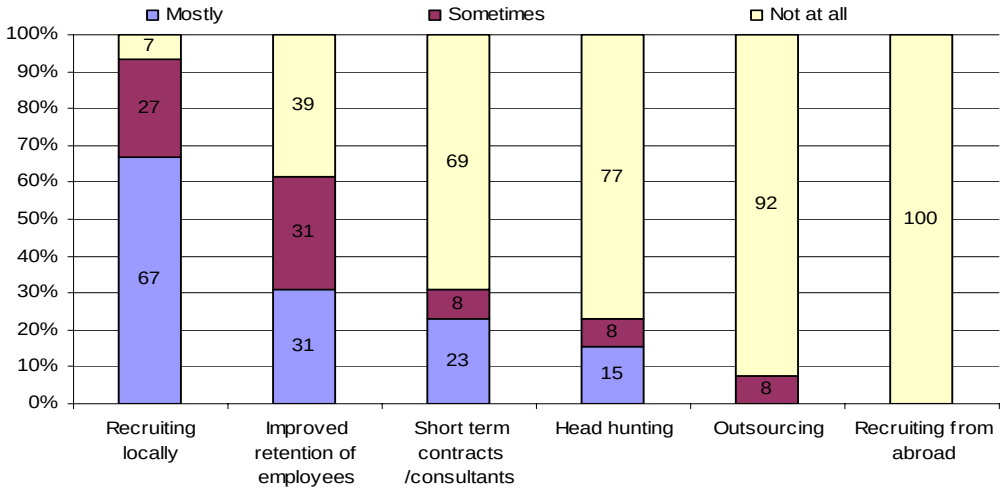
Figure 8.8 Reasons for skills development in forestry



Source: Erasmus, 2004: 56.

Methods to supply needed skills into forestry enterprises are reported in Figure 8.9. This information was drawn out from the 2003 National Skills Survey, which asked firms to indicate activities used to recruit staff or to meet their skill needs. Local recruitment was the primary mechanism used to augment skills in forestry. Enhanced retention of existing employees was the second most significant mechanism. Head hunting, short-term employment and outsourcing were also used to increase the skills available to the industry.

Figure 8.9 Methods to acquire needed skills in forestry



Source: Erasmus, 2004: 53.

Erasmus (2004) uses the percentage of levy paying firms as an indicator of the sector's commitment to workplace training. Further, the percentage of levy paying firms that actually claim skill grants by submitting a workplace skills plan (WSP) is used as a further indicator of the sector's participation in workplace training. Table 8.2 reports these indicators for the forestry sector.

Table 8.2 Forestry sector training compliance and participation

Company size	Active companies	Levy paying	%	Submitted WSP	%
Large	42	34	80.7	12	35.4
Medium	122	99	81.1	23	23.2
Small	629	477	75.9	11	2.3
Total	793	610	76.9	46	7.5

Source: Erasmus, 2004: 59.

In general, large and medium sized companies have higher rates of compliance and participation. Three-quarters of all firms are estimated to be in compliance with national skill training legislation, but only 7.5% of those firms participated in the system. While a third of large firms claimed skill training grants on two percent of small firms, 11 out of the estimated 629 active companies, claimed their training grant. It is important to note the limitations of this indicator as a measure of training as many small and medium sized firms find the administrative burden a significant barrier to claiming back their grants.

While the workplace skills plan may be doubtful in terms of its representation of the sector as a whole, but it provides us some unique information regarding the nature of skills training. Table 8.3 uses the workplace skills plans to indicate the occupational focus of skills training in the forestry sector.

Table 8.3 Forestry sector training by occupation

Occupations	%
Managers & Senior officials	0.5%
Professionals	1.3%
Associate Professionals	1.5%
Administrative & Secretarial	1.5%
Skilled trades/Artisans	40.4%
Sales & customer service	1.6%
Transport/machine operators	13.7%
Other occupations	39.5%

Source: FIETA, 2006: 36-37.

Skilled trades and artisans are the largest proportion of sectoral training efforts, with nearly two-fifths of all planned training focused on those individuals. Labourers in the 'other' occupational category account for just under two-fifths more of the sector's planned training. While the proportion of labourers who are planned to be trained roughly equals their representation in the labour force, skilled trades and artisans account for only seven percent of the labour force despite receiving nearly 40% on planned training. This would suggest that the shortage of artisans and associated skills are also a significant constraint in the forestry sector.

Currently, there are two learnerships registered with SAQA/Department of Labour. There is a General Education and Training Certificate in General Forestry (NQF Level 1) and there is a National Certificate in Silviculture (NQF Level 3). In addition FIETA has created six learnerships that lead to a National Certificate in Forestry: Timber Harvesting (NQF Level 3). These learnerships are:

- Cable Yarding
- Feller Buncher
- Forwarder
- Harvester
- Skidder
- Tractor

Further Education and Training Colleges

Accredited further education training institutions in the forestry sector are listed in Table 8.4. These providers are located primarily in the Western and Eastern Cape as well as Mpumalanga. Despite growing afforestation initiatives there is only one FET college in the Eastern Cape. The South African Forestry Training College (SAFTC) is an example of training providers in the forestry sector. A private institution established with funding by Sappi, SAFTC provides training at its college in Crammond 20 kilometres from Pietermaritzburg in KwaZulu-Natal. SAFTC also trains groups anywhere in South Africa with its instructors travelling to meet local demand.

There are around two hundred courses offered covering management, health and safety, fire fighting, silviculture, harvesting, and extraction equipment operation.

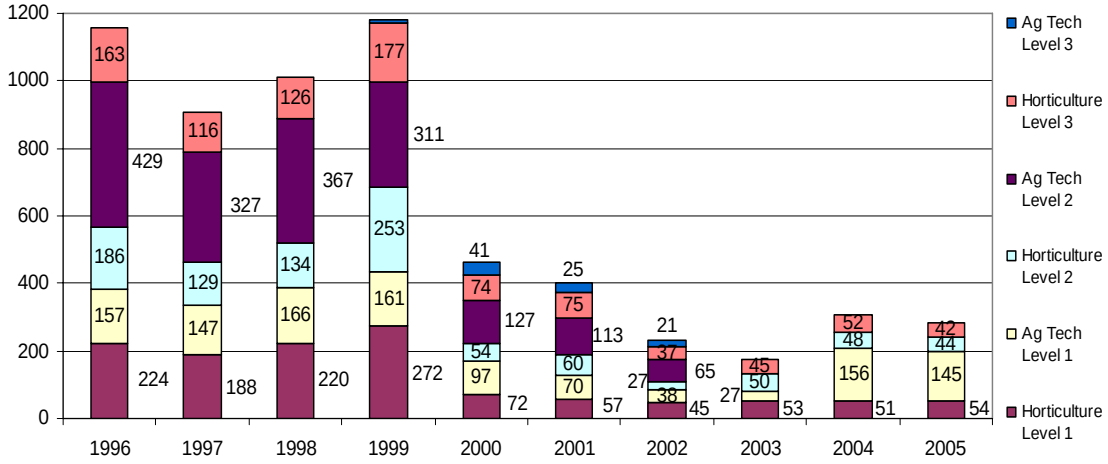
Table 8.4 Forestry sector training providers

Aquila Training	Mpumalanga
Concordia Forestry Skills	Western Cape
Fire Tech	Western Cape
Kwamahlati Training Services CC	KwaZulu-Natal
Invader Plant Specialists CC	Western Cape
Lottenburg Edu-Farm	Mpumalanga
New Skills Development	KwaZulu-Natal
Ntaba Ecological Services	Western Cape
Platorand Training Centre	Mpumalanga
Practical Solutions	Western Cape
Skills for Africa	Gauteng
Singisi Forest Product	KwaZulu-Natal
South African Forestry Training College	KwaZulu-Natal
Stop Fire	Eastern Cape

Source: FIETA: 2007

Figure 8.10 shows enrolment trends at the FET colleges between 1996 and 2005. The data indicates a dramatic decline in enrolments from 1,159 in 1996 to 285 in 2005. Through this period the pass rate of trainees was 48%, which followed a similar trend as the enrolments with 594 students passing enrolled training in 1996 and 147 in 2005.

Figure 8.10 FET colleges training in forestry[15]



Source: EMIS

There remains a need for training of SME contractors in the forestry sector. The under training of contractors is not only contributing to the limited efficiencies in the forestry sector, but it also is enhancing occupational health and safety dangers (FIETA, 2004: 59). Given the structure of the industry it is difficulty to monitor and evaluate safety levels amongst contractors in the sector, but efforts to identify indicators would assist in tracking the influence of training on the safety and health of workers in the sector.

[15] See Appendix Three for instructional offerings included in each occupation level.

Higher Education Institutions

According to the State of the Forests Report (2006: 10), South Africa pioneered forestry education in Africa with the establishment of the Tokai Forestry School in 1905. Today, there are five higher education institutions (HEIs) in South Africa that offer forestry qualifications:

- Fort Cox College of Agriculture and Forestry, King William's Town, Eastern Cape
- Nelson Mandela Metropolitan University (NMMU), Forestry Programme in the School of Natural Resource Management, George Campus Saasveld, George, Western Cape
- University of KwaZulu-Natal (UKZN), Forestry Programme in the Faculty of Science and Agriculture, Pietermaritzburg Campus, KwaZulu-Natal
- Stellenbosch University, Department of Forest and Wood Science in the Faculty of Agricultural and Forestry Sciences, Stellenbosch, Western Cape
- University of Venda for Science and Technology, Department of Forestry in the School of Agriculture, Rural Development and Forestry, Thohoyandou, Limpopo

Table 8.5 reports recent forestry enrolments and graduates at these HEIs. In undergraduate training, Saasveld had the greatest number of learners and graduates. University of KwaZulu-Natal reported a large number of learners enrolled, but a comparatively small number of graduates. Fort Cox reported a relatively large number of undergraduates. Postgraduate training is dominated by Stellenbosch University.

Table 8.5 HEIs training and graduates 2003-2005

Undergraduates	2003 Enrolled	2003 Graduates	2004 Enrolled	2004 Graduates	2005 Enrolled	2005 Graduates
Fort Cox College	25	13	20	17	20	14
NMMU	203	38	202	39	202	47
Stellenbosch	40	4	48	9	46	5
UKZN	142	2	142	2	142	2
University of Venda	5	1	11	0	5	1
TOTAL UNDERGRADUATES	**415**	**58**	**423**	**67**	**415**	**69**
Postgraduates	2003 Enrolled	2003 Graduates	2004 Enrolled	2004 Graduates	2005 Enrolled	2005 Graduates
NMMU	7	0	9	0	9	3
Stellenbosch	59	12	66	7	49	13
UKZN	-	1	-	-	-	-
TOTAL POSTGRADUATES	**66**	**13**	**75**	**7**	**58**	**16**

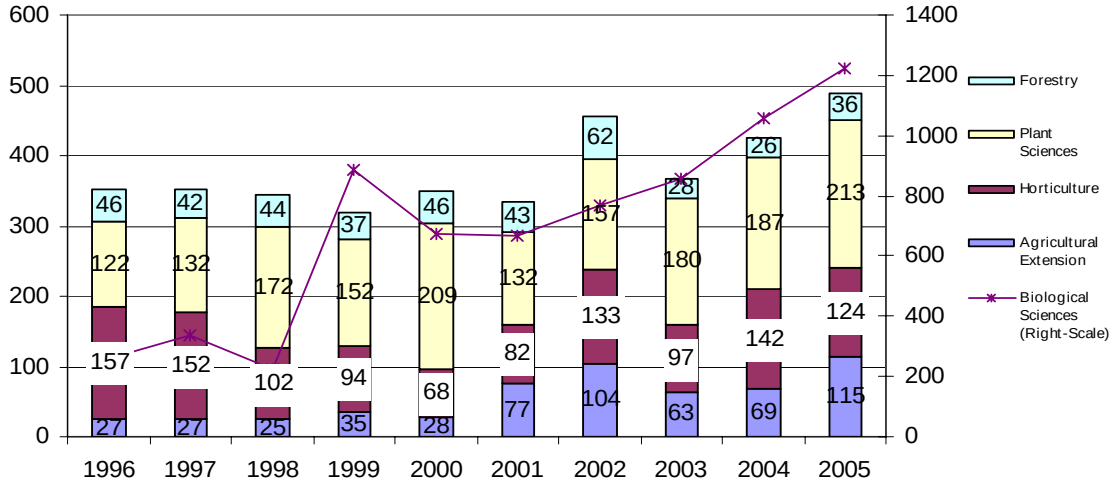
Source: SFR, 2006: 76.

Fort Cox College offers a diploma (NQF Level 5) in Social Forestry, which is focused on community forestry that is increasingly being promoted in the afforestation efforts in the Eastern Cape and KwaZulu-Natal. NMMU offers a range of forestry qualifications, from a certificate (NQF Level 4) to a Doctorate Technology (NQF Level 8). The NMMU programme at Saasveld is the direct decedent of the Tokai forestry training programme established in 1905 and transferred to Saasveld in 1932. In addition to the formal qualifications, NMMU also offers short courses to meet the needs of the industry. Stellenbosch University offers a Bachelor of Science degree (NQF Level 6) in Forestry and Natural Resource Management with options in forest management, forest science and conservation forestry. Stellenbosch also offers short courses to the industry. The UKZN programme is focussed on timber production

within tree plantations and offers qualifications from the diploma (NQF Level 5) to the doctorate (NQF Level 8). University of Venda offers a Bachelor of Science in Forestry Sciences (NQF Level 6) with a focus on community forestry similar to that of Fort Cox.

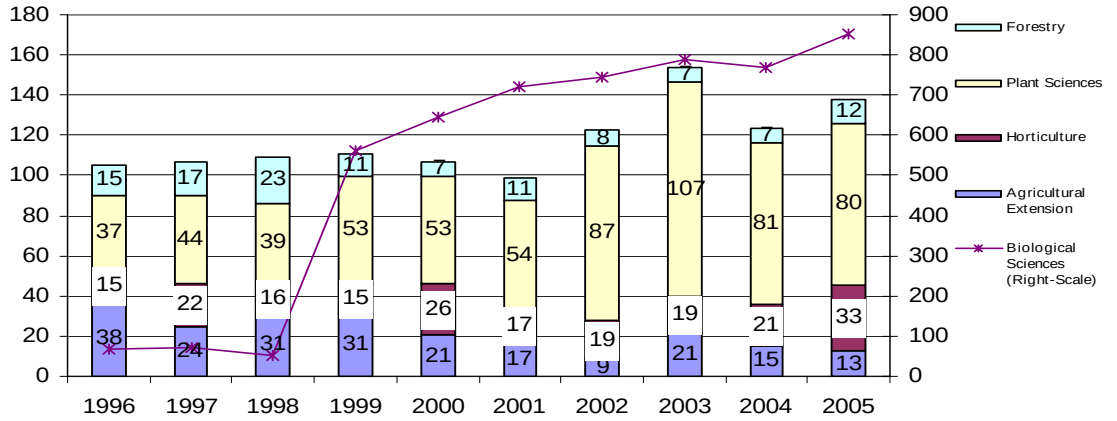
Recently, Stellenbosch and NMMU collaboratively pioneered distance education in forestry with courses in Forest Engineering, Forest Transport and Forest Ergonomics being offered via the internet. In response to the emergence of under qualified contractors in the 1990s Stellenbosch joined with the South African Forestry Contractors Association (SAFCA), Forestry South Africa (FSA), and the Forest Industry Education and Training Authority (FIETA) to create a holistic training and skills development programme for contractors. The programme entitled ForestInfoNet (www.forestinfonet.co.za) combines distance learning with hands-on training tailored to contractors need in priority areas like forest engineering, business skills, and machine costing. There is also annual contractors' workshop and a virtual community of practice that is designed to share knowledge and skills development among members via the internet.

Figure 8.11 HEIs undergraduate training in forestry related fields



Source: HEMIS

Figure 8.12 HEIs postgraduate training in forestry related fields



Source: HEMIS

Trends in undergraduate degrees granted in fields with particular relevance for the forestry sector are reported in Figure 8.11 and postgraduate degrees in those fields are reported in Figure 8.12. While qualifications at both levels are rising, biological and plant sciences are key fields of increase. The forestry graduation rates reported in the State of the Forest Report and presented in Table 8.5 are much higher than those recorded in the DoE's HEMIS system. Based on the two figures above, the number of postgraduate and undergraduate degrees in forestry has been relatively constant. Agricultural extension has been the field with the greatest increase in output at the undergraduate level although it has declined somewhat at the postgraduate level.

Supply of Skills in Primary Processing

Primary processing also has a significant proportion of employment in the second economy. The first part of this sub-section reviews the generation of skills within the second economy. The supply of skills within the first economy workplace is then analysed. Lastly, primary processing skills provided by FET colleges and HEIs are discussed.

Skilling Initiatives within the Second Economy

Low cost mills and Micro mills account for the majority of second economy skill needs in primary processing. In order to improve these lumber mills the SALMA, DTI and NPI launched a joint initiative in 2002. Training and education was a major aspect of the project. Specifically, the project sought to develop informal lumber millers' basic business skills and enhance their staff's technical skills. In total 26 mills participated in the programme which lasted until 2004. Currently, despite accounting for approximately a third of the workforce there are not any apparent programmes that are focused on the skills development of the informal sector in the primary processing sector.

It is important to acknowledge that some programmes offered within FIETA's Wood Chamber are applicable to the second economy. In particular, programmes in charcoal manufacturing should have application within the second economy. However, this and other training programmes are not examined within the present analysis because they fall outside the scope of this analysis.[16]

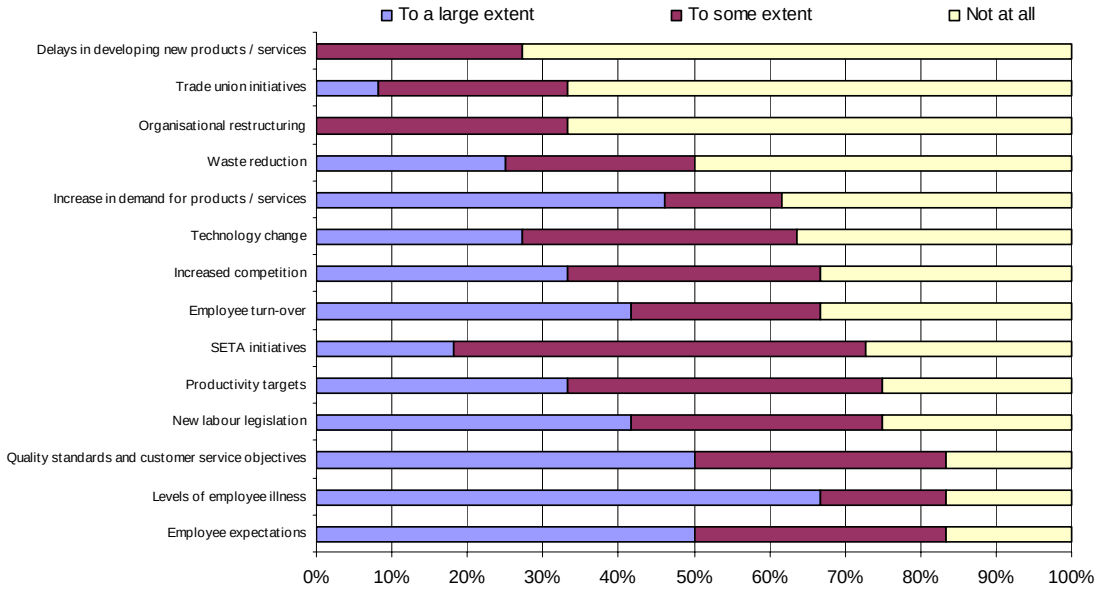
Skilling Initiative within the First Economy

Reasons for primary processing firms training and development of skills are listed in Figure 8.13. Productivity targets were considered important reasons for training as in the forestry sector. However, the most frequently reported reason for training was employee expectations. Employee illnesses were cited nearly as frequently as employee expectations and were considered the most important reason for training. This focus training because of illness was also seen in Chapter Seven were employee illness was citied as the most important reason for workforce turnover. Hence, the HIV/AIDS pandemic appears to be playing a significant role in the primary

[16] For details of the wood products processing training programmes see FIETA (2004: 42).

processing skills system. Other prominent reasons cited for training included the need to achieve quality standards and legislated requirements. The least important reported reason for training was delays in new product development. Trade unions and organisational restructurings were also among the least significant reasons cited for employee training. SETA initiatives were cited as a contributory reason some of the time, but it was not a dominant reason for primary process training.

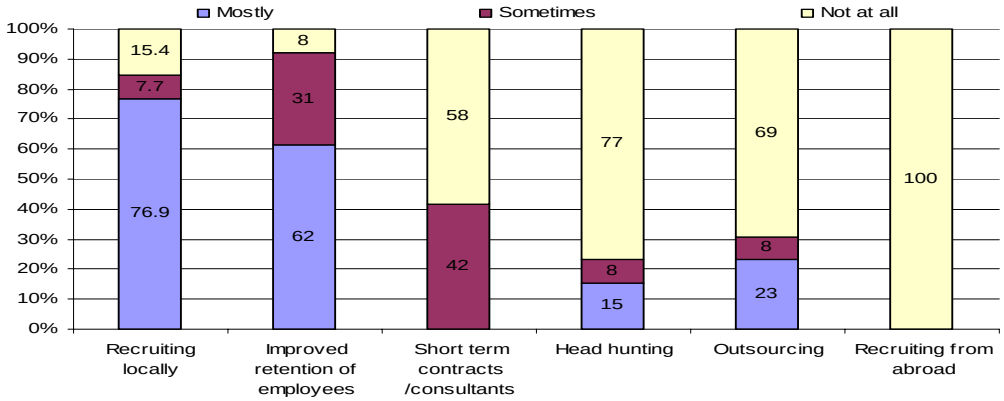
Figure 8.13 Reasons for skills development in primary processing



Source: Erasmus, 2004: 120.

Methods to supply needed skills into primary processing companies are reported in Figure 8.14. In total, enhanced retention of existing employees was the primary mechanism to enhance primary processing sector skills. Local recruitment was not as important as retention in total, but rated higher in the reported frequency. Short-term contraction of skills was reportedly used sometimes by two-fifths of surveyed companies. As with forestry, outsourcing and head hunting were also used to increase the skills available to the industry.

Figure 8.14 Methods to acquire needed skills in primary processing



Source: Erasmus, 2004: 118.

Again following Erasmus (2004), the percentage of levy paying firms can be used as an indicator of the sector's commitment to workplace training and firms that claim skill grants indicates their participation in workplace training. Table 8.6 reports these indicators for primary processing. A similar pattern of compliance and participation is found to that in the forestry sector. Large and medium sized companies again have much higher participation and marginally higher compliance rates than small firms. Nearly three-fifths of all primary processing firms complied with national legislation. Overall participation was again well bellow ten percent of all firms, but ranging from nearly a quarter of large firms to just under three percent of complying firms or a mere 16 firms out of the 718 estimated small firms in the primary processing sector.

Table 8.6 Primary processing training compliance and participation

Company size	Active companies	Levy paying	%	Submitted WSP	%
Large	78	65	83.3	16	24.6
Medium	151	130	86.1	22	16.9
Small	718	561	78.1	16	2.9
Total	947	756	79.8	54	7.1

Source: Erasmus, 2004: 122.

Workplace skills plan are again utilised in Table 8.7 as an indicator of the occupational focus of skills training. In sharp contrast to the experiences reported in the forestry sector skilled trades and artisans are among the smallest proportion of sectoral training efforts, four percent, this is despite their comprising a third of employees in the sector. Operators and unskilled labourers comprise disproportionately large shares of training. Unskilled labourers are envisaged to receive over two-fifths of all training, but comprise about a quarter of the workforce. Operators receive another third of all training, but comprise only a fifth of the workforce.

Table 8.7 Primary processing sector training by occupation

Occupations	%
Managers & Senior officials	4.6%
Professionals	1.0%
Associate Professionals	2.8%
Administrative & Secretarial	6.7%
Skilled trades/Artisans	4.1%
Sales & customer service	5.0%
Transport/machine operators	32.4%
Other occupations	43.4%

Source: FIETA, 2007: 40-42.

Currently, there are five learnerships from the primary processing sector registered with SAQA/Department of Labour.[17] The SALMA led the sector in establishing a range of learnerships through the Lumber Milling Standards Generating Body (FIETA, 2004). Within four learning programmes qualifications are offered that range from NQF Level 1 to NQF Level 4.

[17] There are two other qualifications from FIETA's Wood Chamber that are registered with the Department of Education, but they fall within the wood products sector and are not considered in the present analysis.

The four programmes are:

- Lumber Drying
- Dry Lumber Processing
- Saw Doctoring
- Green Timber Processing

Further Education and Training Colleges

Currently, no accredited further education training institutions exist in the primary processing sector. There are three accredited providers in the associated wood products sector and they are listed in Table 8.8. Given the relatively well developed learnerships that exist in the sector it would appear that there is a significant gap between training design and availability. Unfortunately, the reason for this gap did not emerge in discussions with industry experts for this analysis or in the literature review.

Table 8.8 Wood product training providers

CHEP SA	KwaZulu-Natal
Masonite Africa Ltd	KwaZulu-Natal
Mitek Sa Pty Ltd	Gauteng

Source: FIETA, 2007

Higher Education Institutions

There is a subset of two HEIs offering forestry qualifications that also offer primary processing qualifications. These institutions are:

- Nelson Mandela Metropolitan University (NMMU), Forestry Programme in the School of Natural Resource Management, George Campus Saasveld, George, Western Cape
- Stellenbosch University, Department of Forest and Wood Science in the Faculty of Agricultural and Forestry Sciences, Stellenbosch, Western Cape

NMMU offers two wood technology qualifications as a National Diploma (NQF Level 5) and a Bachelor of Technology (NQF Level 6). Stellenbosch University offers an array of qualifications in wood product science ranging from a Bachelor of Science degree (NQF Level 6) to a Doctor of Philosophy (NQF Level 8).

Supply of Skills in Paper and Pulp

The first part of this sub-section reviews the generation of skills within the second economy. The supply of skills within the first economy workplace is then analysed. Lastly, paper and pulp skills provided by FET colleges and HEIs are discussed.

Skilling Initiatives within the Second Economy

The high fixed investments associated with paper and pulp mills do not preclude a role for the informal sector. An important informal component in this sector is found in

paper recycling. Informal paper recyclers form a large base that often supports and contains bridges to formal sector paper recycling. While State waste management policy appear to support future growth in paper recycling there has been no clear strategy or policy designed to enhance the skills of informal recyclers to take advantage of the policy support.

Based on the experience of paper recyclers who have already succeeded in developing their informal or small formal sector recycling businesses to higher value added companies, basic business skills and equipment costing skills would appear to be needed as an integral part of informal sector skills development in paper and pulp. However, to date there has not been any skills development initiative focused on informal sector paper recyclers.

Skilling Initiatives within the First Economy

Table 8.9 Paper and pulp training compliance and participation

Company size	Active companies	Levy paying	%	Submitted WSP	%
Large	14	14	100	3	21.4
Medium	34	28	82.4	5	17.9
Small	101	69	68.3	0	0
Total	149	110	73.8	8	7.3

Source: Erasmus, 2004: 102.

Using the percentage of levy paying firms as an indicator of the sector's commitment to workplace training and firms' claiming skill grants as an indicator of sectoral participation in workplace training, Table 8.9 reports on the paper and pulp sector. While composed of smaller number of firms a similar pattern of compliance and participation is found to that of both forestry and primary processing. Notably, all large firms in the sector are in compliance with national legislation. Nonetheless, only a fifth of these large firms claimed their skills grant and medium sized companies again have much higher participation and marginally higher compliance rates than small firms. None of the small firms claimed their skills grant, which indicated a relatively small and select group of firms within the sector who supply skills training. Given the economic importance of a few of the sector's key firms they are able to generate a significant supply of skills in this environment of comparative isolation.

Table 8.10 Planned paper and pulp training by occupation

Occupations	%
Managers & Senior officials	2.9%
Professionals	4.3%
Associate Professionals	5.8%
Administrative & Secretarial	5.1%
Skilled trades/Artisans	5.5%
Sales & customer service	6.1%
Transport/machine operators	22.7%
Other occupations	47.5%

Source: FIETA, 2006: 42-44.

Workplace skills plan are again utilised in Table 8.10 as an indicator of the occupational focus of skills training. In terms of this planned training, unskilled labourers are disproportionately expected to receive training, with their quarter share of the labour force accounting for over two-fifths of all planned training. However,

information from a survey of proportionally large employers in the sector allows us to compare 2006/07 planned training levels to the actual levels

Table 8.11 Estimated paper and pulp training by occupation

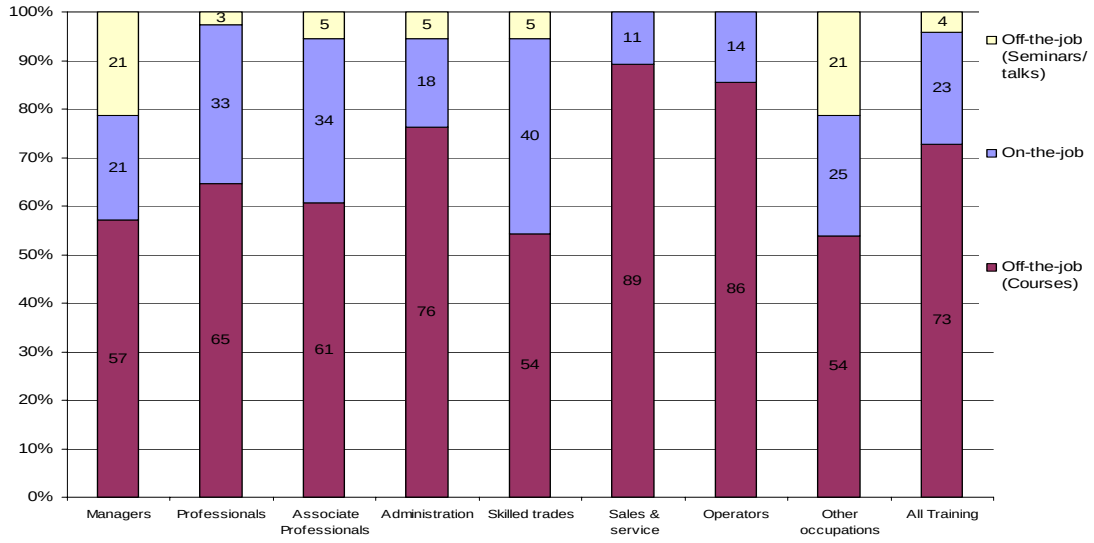
Occupations	%
Managers & Senior officials	1.1%
Professionals	5.2%
Associate Professionals	11.9%
Administrative & Secretarial	8.6%
Skilled trades/Artisans	16.7%
Sales & customer service	1.7%
Transport/machine operators	46.9%
Other occupations	7.8%

Source: Skill surveys completed by interviewed organisations (see Appendix Two)

Table 8.11 presents estimated training for the sector based on industry supplied data. Accordingly, the greatest proportion of training, nearly half, actually went to operators rather than unskilled labourers. Despite this significant level of operator training it was well below the estimated 70% required share of training need for this group that Figure 7.19 reported.

Again in contrast to the levels of training planned for, skilled trades people and artisans received nearly a fifth of actual training although accounting for only about a tenth of identified training demand. Associate professionals had the largest discrepancy between supplied training and that reportedly needed. While associate professional reportedly needed about a two percent share of aggregate skills training, they received 12% of actual training provided.

Figure 8.15 Nature of paper and pulp training



Source: Skill surveys completed by interviewed organisations (see Appendix Two)

The nature of training provided within the pulp and paper sector are reported in Figure 8.15. In aggregate, the vast majority of training, nearly three-quarters, is provided through off-the-job courses. Nearly another quarter is provided through on-

the-job training and a small residual involves off-the-job training through seminars and talks.

The nature of training delivery varies across occupations. Off-the-job seminars and talks account for nearly a quarter of training given to managers and unskilled labourers. Sales and service occupations as well as operators did not receive any off-the-job training. On-the-job training accounts for two-fifths of the training given to skilled trades people and artisan. Off-the-job courses account for nearly 90% of training offered to sales and service occupations as well as operators.

There are currently seven learnerships from the paper and pulp sector registered with SAQA/Department of Labour. The relatively extensive supply of skills training in the paper and pulp is discussed in Chapter Nine, but it is worth noting that the sector's duopolistic structure appears to have facilitated this development of learnerships. The uniqueness of the sector's learnerships is perhaps best illustrated by its development of SAQA/Department of Labour registered a National Diploma in Pulp and Paper Technology (NQF Level 6). Conventionally, registered learnerships do not extend beyond NQF Level 5. Nevertheless, within the sector's commitment to enhance its skills base, the NQF Level 6 qualification was developed despite it also requiring registration and recognition from the Department of Education.

A National Certificate in Pulp and Paper Technology (NQF Level 5) complements the diploma as another registered learnership. There is also a FET Certificate in Paper, Board or Tissue Making (NQF Level 4). The FET Certificate in Chemical Pulp Manufacturing (NQF Level 4) contains three learnerships: 1) Batch Digester 2) Horizontal Continuous Digester and 3) Vertical Continuous Digester. Similarly, the FET Certificate Pulp and Paper Chemical Recovery (NQF Level 4) contains three learnerships: 1) Convert Magnesium Sulphite organic and inorganic pulping by-products 2) Convert Kraft organic and inorganic pulping by-products 3) Convert Spent organic and inorganic pulping by-products. A National Certificate in Pulp and Paper Woodyard Operations (NQF Level 3) is another registered learnership. Lastly, there is a registered National Certificate in Pulp and Paper Manufacturing (NQF Level 2).

Further Education and Training Institutions

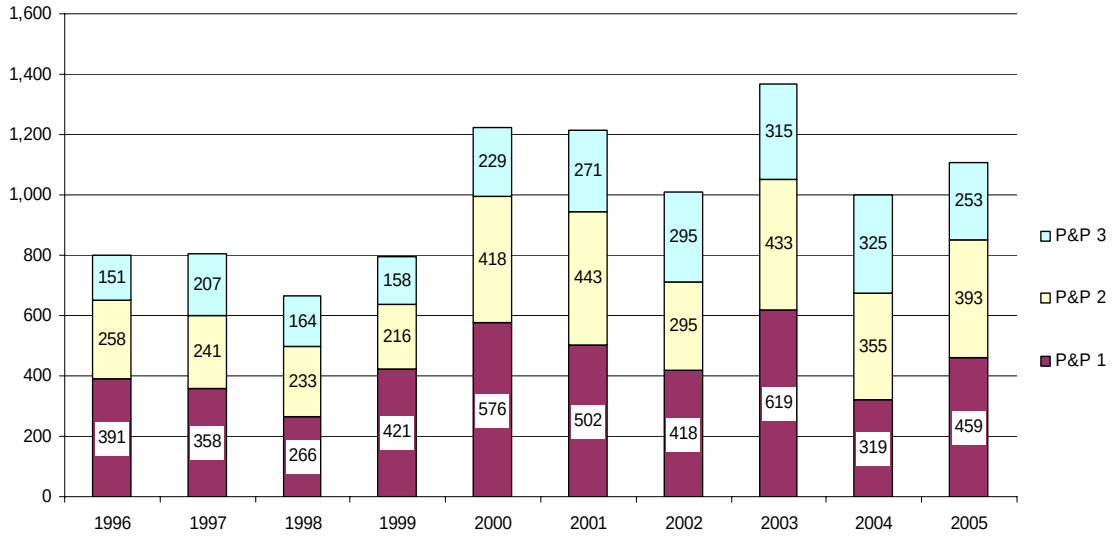
Table 8.12 Paper and pulp product training providers

Kimberly-Clark Of South Africa Pty Ltd	Gauteng
Mondi GTU	KwaZulu-Natal
Mondi Kraft	KwaZulu-Natal
Mondi Packaging SA	Gauteng
Sandusky Africa	Gauteng
Sappi Adamas	Eastern Cape
Sappi Enstra	Gauteng
Sappi Ngodwana	Mpumalanga
Sappi Regional Learning Centre	Gauteng
Sappi Cape Kraft	Western Cape
Sappi Management Services	Gauteng
Sappi Tugela	KwaZulu-Natal
Sappi Stanger	KwaZulu-Natal
Sappi Saiccor	KwaZulu-Natal

Source: FIETA, 2007

Mondi and Sappi are the two primary FIETA accredited providers of FET in paper and pulp, each have several facilities. In addition, as indicated in Table 8.12, Kimberley-Clark and Sandusky provide training for the sector.

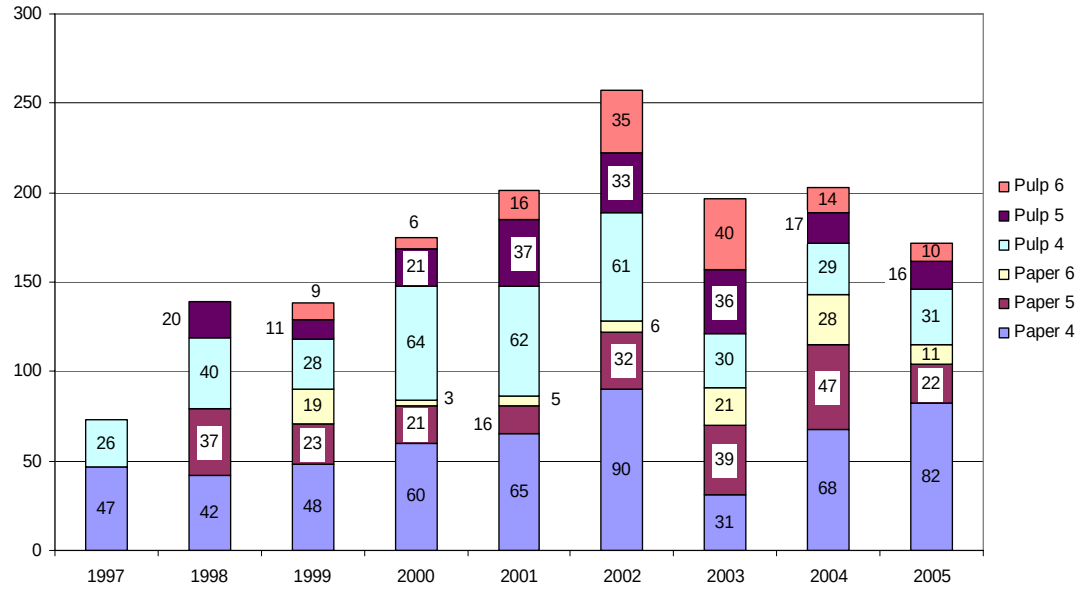
Figure 8.16 FET college entrants in pulp and papermaking theory



Source: EMIS

An indicator of the skills supplied to the paper and pulp sector is the input and output of learners at South African FET colleges. Figure 8.16 shows recent trends in enrolments for NQF Level 1 to 3 training in pulp and papermaking theory. Between 1996 and 2005 there was an average of 1,000 learners entering these programmes annually and 450 graduates. While there was a modest growth in learners entering the programmes over this period, graduations were basically constant.

Figure 8.17 FET college entrants in pulpmaking and papermaking



Source: EMIS

Figure 8.17 shows enrolment for NQF Level 4 to 6 training in pulpmaking and papermaking. The NQF Level 4 qualification only became available in 1997, followed by the NQF Level 5 qualification in 1998, and finally the NQF Level 6 qualification in 1999. At NQF Level 4 between 1997 and 2005, there were an average of 60 learners entering the papermaking programme and 40 learners in pulpmaking annually. The failure rate was comparatively higher in the paper programme, with an annual average of 14 graduates compared to 13 graduates in the pulp programme with its smaller number of entrants.

For the NQF Level 5 programmes, there were an average of 30 learners entering the papermaking programme and 25 in pulpmaking. Again, the failure rate was higher in the paper programme with an average pass rate of entering students equal to 21% between 1998 and 2005 compared to 43% in the pulp programme. The NQF Level 6 programme in paper had an annual average enrolment of 13 and pulp 20. For the NQF Level 6 programmes the pass rates were similar with a 55% pass rate of entering students in the paper programme and 52% in the paper programme.

Higher Education Institutions

As mentioned at the outset there are many HEI qualifications needed in the paper and pulp sector, the majority of which are not specific to the sector. Nonetheless, three HEIs offer specific qualifications for the paper and pulp industry. These institutions are:

- Durban Institute of Technology, Department of Paper and Pulp Technology in the Faculty of Engineering, Steve Biko Campus, Durban, KwaZulu-Natal

- University of KwaZulu-Natal (UKZN), School of Chemical Engineering in the Faculty of Engineering, Howard College Campus, Durban, KwaZulu-Natal

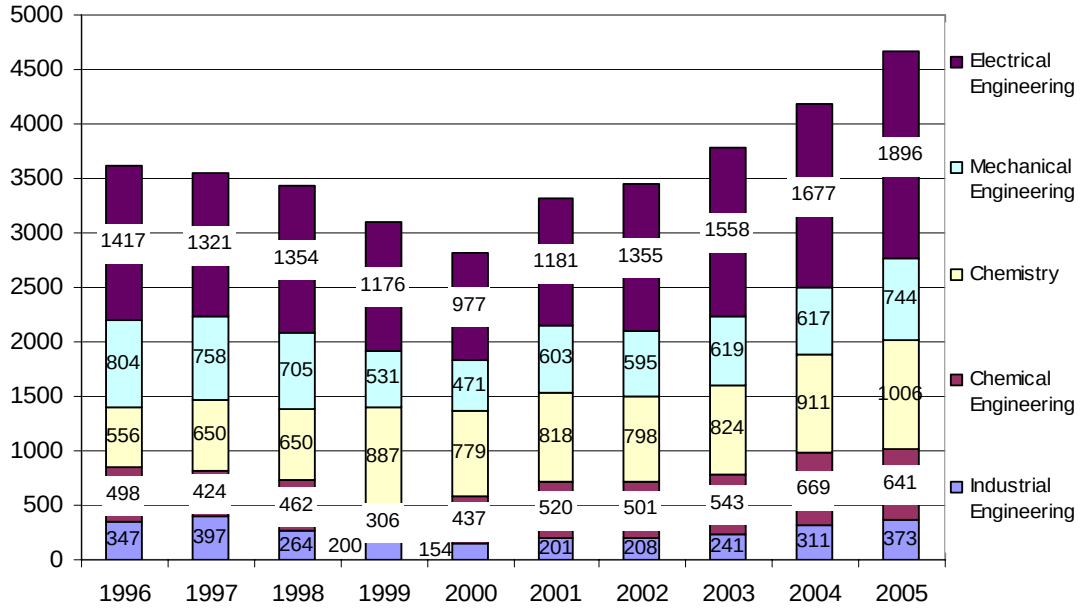
- University of South Africa (UNISA), Correspondence through the College of Science, Engineering and Technology.

All of these programmes receive grants from the industry to support them. UNISA hosts the National Diploma (NQF Level 6) programme in pulp and paper technology. This programme is run co-operatively through the member institutions of PAMSA, drawing on UNISA's distance learning infrastructure to ensure training is accessible to staff in all geographic areas. Durban Institute of Technology offers the successor qualification, a Bachelor of Technology (NQF Level 7) in pulp and paper technology. UKZN includes several pulp and paper courses in its Chemical Engineering Bachelors in Science (NQF Level 7) programme.

Trends in undergraduate degrees granted in fields with particular relevance for the forestry sector are reported in Figure 8.11 and postgraduate degrees in those fields are reported in Figure 8.12. While qualifications at both levels are rising, biological and plant sciences are key fields of increase. The forestry graduation rates reported in the State of the Forest Report and presented in Table 8.5 are much higher than those recorded in the DoE's HEMIS system. Based on the two figures above, the number of postgraduate and undergraduate degrees in forestry has been relatively

constant. Agricultural extension has been the field with the greatest increase in output at the undergraduate level although it has declined somewhat at the postgraduate level.

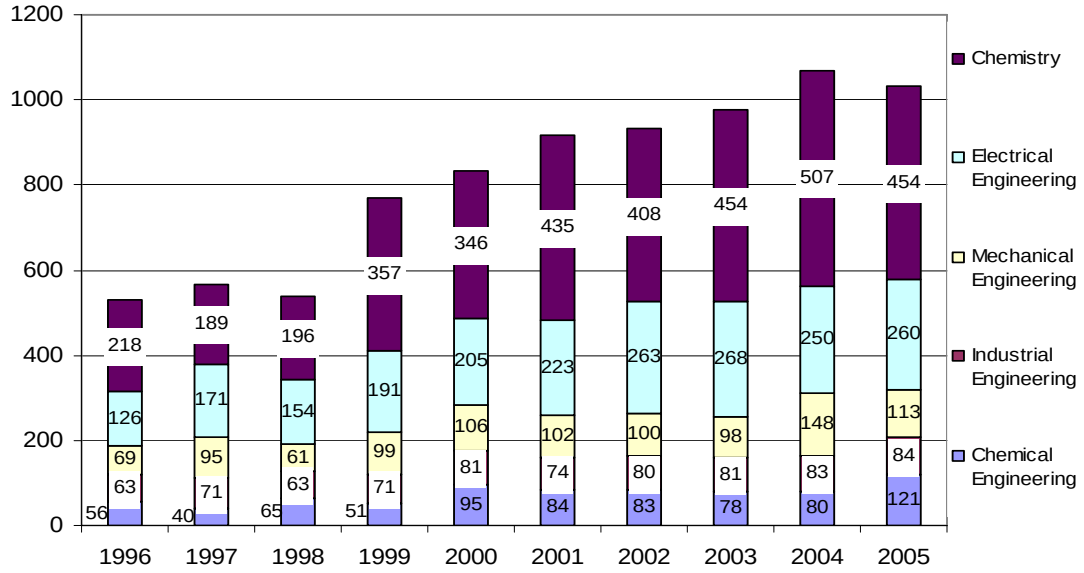
Figure 8.18 HEIs undergraduate training in paper and pulp related fields



Source: HEMIS

Trends in undergraduate degrees granted in fields related to paper and pulp manufacturing reported in Figure 8.18 and postgraduate degrees in those fields are reported in Figure 8.19.

Figure 8.19 HEIs postgraduate training in paper and pulp related fields



Source: HEMIS

At the undergraduate level, the annual number chemical engineering degrees granted increased substantially between 1996 and 2005. Increases were also seen in electrical engineering and chemistry with the other fields graduation rates remaining fairly constant during the period. At the postgraduate level an increase in graduates was seen across all of the fields, with the highest relative increases occurring in chemical engineering, chemistry, and electrical engineering.

Supply of Skills in Wood Furniture

The first part of this sub-section reviews the generation of skills within the second economy. The supply of skills within the first economy workplace is then analysed. Lastly, skills provided by FET colleges and HEIs for the wood furniture sectors are discussed.

Skilling Initiatives within the Second Economy

The demand for furniture skill training by the informal economy is significant and enduring. Several of the registered learnerships in the Furniture Chamber of FIETA reflect this demand for skills among SMEs in the sector. In response to the needs and potential developmental impact of skills training in the sector, FIETA has run two projects targeting SMEs. These projects were:

- Furniture Manufacturing Skills Development Project (FMSDP)
- Shintsha Furniture Project

While these projects were not exclusive to informal enterprises, they explicitly accommodated informal sector skills training needs. The Shintsha project ran for two years between 2003 and 2004, while FMSDP operated in 2004 and 2005. These projects and their relationship to broader skills needs in the sector are discussed in Chapter Nine. Since these projects concluded, support for skills training in the informal sector has primarily returned to the learnerships and the accredited FET colleges that provide them.

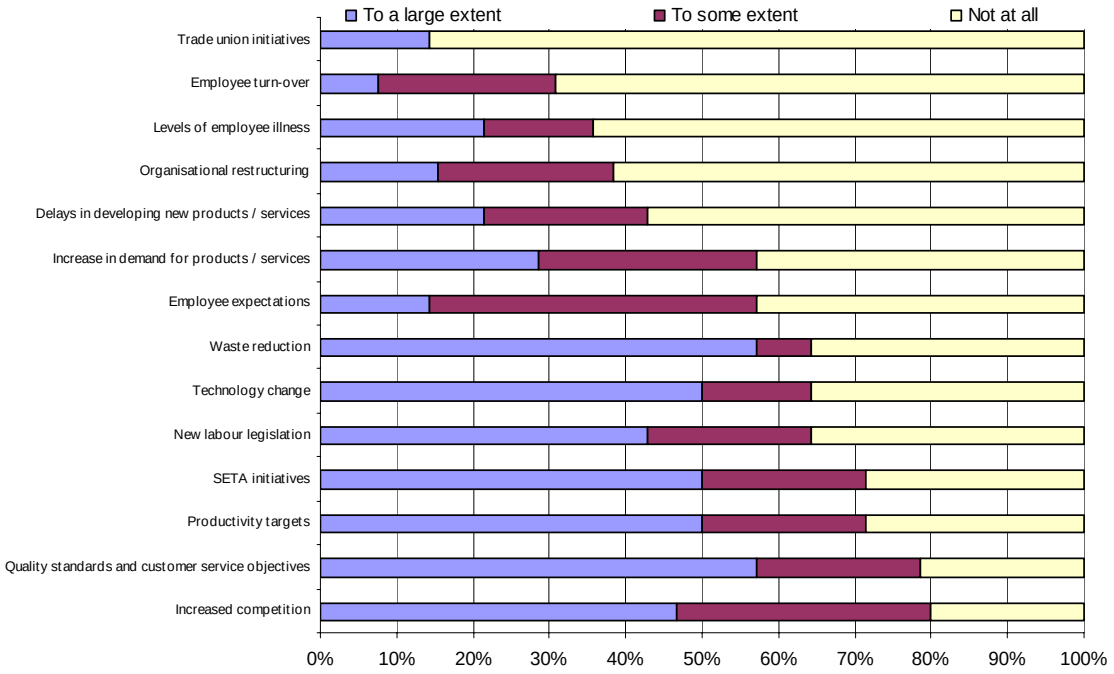
Given the endemic need for skills development in the informal economy, the finite project based structure of these initiatives would appear inadequate. Informal sector wood furniture manufacturing potentially offers a substantial opportunity to enhance the livelihoods of the urban poor. However, if this potential is to be realized initiatives similar to these will be need at a systemic level.

Skilling Initiative within the First Economy

In Chapter Six, the increased competitive pressures on the wood furniture sector from globalisation were highlighted. Evidence of these challenges is also reflected in the firms' decisions to provide skills training. Figure 8.20 reports reasons surveyed wood furniture enterprises undertook skills training. The motivations for training between wood furniture companies and the other WPP sectors contrast. Increased competition was the most frequently cited reason for firms' training. In both forestry and primary processing competition was among the lower motivations for training. The second most frequently cited reason for training was to meet customer quality expectations. In terms of priority, these quality standards were reported as the

biggest motivation in training. Decreasing waste and productivity targets were also frequently cited, suggesting concerns with their competitiveness.

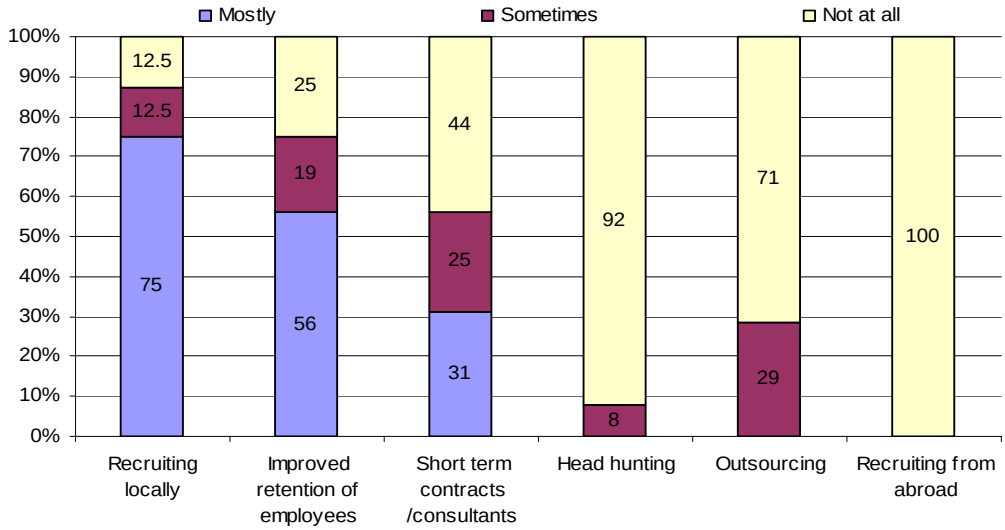
Figure 8.20 Reasons for skills development in wooden furniture



Source: Erasmus, 2004: 79.

The way wood furniture companies supplied their needed skills are related in Figure 8.21. In this the wood furniture sector was very similar to the pattern found in forestry and primary processing. Local recruitment was the principal mechanism used to augment skills. Enhanced retention of existing employees was the second most significant mechanism.

Figure 8.21 Methods to acquire needed skills in wooden furniture



Source: Erasmus, 2004: 76.

Sectoral commitment and participation in workplace training is reported in Table 8.13. In comparison to the other WPP sectors, wooden furniture had the highest number of firms paying levies and submitting work plans. Nonetheless, the general pattern of compliance and participation follow closely that of the other sectors.

Table 8.13 Wooden furniture training compliance and participation

Company size	Active companies	Levy paying	%	Submitted WSP	%
Large	56	50	89.3	17	34
Medium	160	128	80	26	20.3
Small	869	655	75.4	20	3.1
Total	1085	833	76.8	63	7.6

Source: Erasmus, 2004: 81.

Planned training by occupation is reported in Table 8.14. There is remarkable consistency between the proportion of workers by occupation and their respective proportion of training planned. The only significant divergence between the relative size of the occupation and training is in administrators and operators. While administrative occupations are eight percent of the total workforce they received 15% of all planned training. Operators were two-fifths of the workforce, but only just over a third of training recipients.

Table 8.14 Wooden furniture sector training by occupation

Occupations	%
Managers & Senior officials	5.2%
Professionals	3.1%
Associate Professionals	2.7%
Administrative & Secretarial	15.0%
Skilled trades/Artisans	6.6%
Sales & customer service	2.5%
Transport/machine operators	33.8%
Other occupations	31.1%

Source: FIETA, 2007: 38-40.

Currently, there are twelve registered learnerships in the wooden furniture sector. At the entry level, there is an FET Certificate in Furniture Making (NQF Level 1). Following that initial qualification there is a National Certificate in Wood Furniture Machining and Cabinet Making (NQF Level 2).

Building on the machining and cabinet making introductory learnership, there are specialized learnerships in Wood Machining or Cabinet Making each leading to a National Certificates at NQF levels three and four. There are also learnerships specializations in upholstery or wood finishing each leading to National Certificates at NQF levels two to four.

Further Education and Training Institutions

There are a large number of accredited training providers in the wooden furniture sector as indicted in Table 8.15. This supply of skills training in wooden furniture is tied to its popularity among many development focused non-governmental

organisations (NGOs) and donor funding agencies. While there are many well designed programmes amongst these FET colleges, they are typically driven by a supply focus on skill development priorities. Therefore, as a support mechanism promoting the establishment of SMEs in furniture manufacturing it seems that substantial progress has been made. However, the FIETA projects supporting this development and the NGO and other donor agencies' funding does not appear to have linked up substantially with established manufacturing capacity in the sector.

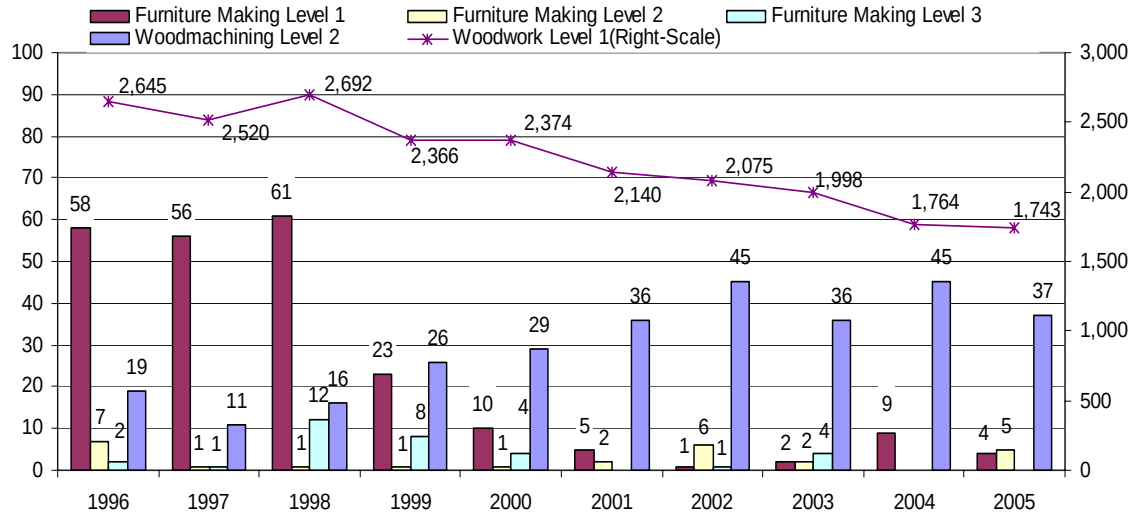
Table 8.15 Wood furniture training providers

Bluff Improvement Centre	KwaZulu-Natal	Kwathintwa School for the Deaf	KwaZulu-Natal
Boksburg Correctional Services	Gauteng	Learn to Earn	Western Cape
Coastal KZN College	KwaZulu-Natal	Leeuwkop Correctional Services	Gauteng
College of Cape Town	Western Cape	Majuba Technology Center	KwaZulu-Natal
C V Shopfitters & Joiners	KwaZulu-Natal	Masi-Akhaneng	Gauteng
Drakenstein Correctional Services	Western Cape	Mopani South East FET College	Limpopo
East Cape Training Centre	Eastern Cape	Motheo FET College	Free state
Ekurhuleni East College For FET	Gauteng	Northern Cape Urban FET College	Northern Cape
Esayidi FET College	KwaZulu-Natal	Orbut FET College	NorthWest
Espin Manufacturing	Gauteng	Phatsiphatsi Furniture CC	Gauteng
Ethembeni Education & Training	KwaZulu-Natal	Port Elizabeth FET College	Eastern Cape
Furniture Technology Centre Trust (Furntech) Durban Centre	KwaZulu-Natal	Pretoria Correctional Services	Gauteng
Furniture Technology Centre Trust (Furntech) George Centre	Western Cape	Prestige Home Centre	Mpumalanga
Furniture Technology Centre Trust (Furntech) Umzimkhulu Centre	KwaZulu-Natal	Protech Training CC	Gauteng
Furniture Technology Centre Trust (Furntech) White River Centre	Mpumalanga	Sekhukhune FET College	Limpopo
Furniture Technology Centre Trust (Furntech) Cape Town	Western Cape	Sikelela Training cc	KwaZulu-Natal
Furniture World Training Centre	Gauteng	Skills to Furnish International	Gauteng
Furntrain Training Centre	NorthWest	South Cape College	Eastern Cape
Gerber Fastening Systems	Gauteng	Tirhani Skills Training Pty. Ltd.	Mpumalanga
Goldfields FET College	Free state	Umbuso Training Services	Gauteng
Highveld Technikon	Gauteng	Umgungundlovu FET college	KwaZulu-Natal
Industries Educational and Training	Gauteng	Unique Training Solutions	Free state
Jala Peo Trust	Free state	Yorkcorp Training Centre	Limpopo

Source: FIETA, 2007

Figure 8.22 shows enrolment trends in wood furniture related programmes at the FET colleges between 1996 and 2005. The data indicates a trend similar to that reported in forestry, with enrolments in constant decline from 2,731 in 1996 to 1,789 in 2005 although NQF Level 1 training in furniture making did dominate enrolments. Through this period the pass rate of enrolled trainees was 34%, translating into a total of 7,866 total qualifications in wood furniture being granted between 1996 and 2005.

Figure 8.22 FET colleges training in wood furniture



Source: EMIS

In the *Survey of Furniture Manufacturing SMMEs* (Gewer et al. 2004: 34-41) only a quarter of enterprises reported receiving any information about skills development from the FIETA and only five percent reported participation in the FIETA structures. Administrative capacity to systematically support and participate in skills training reportedly formed a significant barrier to many enterprises willingness and/or ability to engage with FIETA's and the FET colleges initiatives.

Therefore, it appears that there is a need to enhance the capacity of the enterprises' organisational abilities to complement the productive skills training in place. This type of training might focus on development of productive networks amongst the SMEs to leverage their competitiveness. Effectively increasing the uptake and especially the participation in the FIETA is a critical challenge faced in most of the sectors we have analysed. In this instance it must be a special priority as the supply of FET colleges generating skills needs to be complemented by a competitive wooden furniture sector capable of absorbing these learners.

Higher Education Institutions

There are no specialized qualifications in wooden furniture offered by South Africa's HEIs. However, the wood technology qualifications offered by NMMU and the wood product sciences qualifications offered by Stellenbosch University both have strong linkages to the wooden furniture sector.[18] The larger wooden furniture companies obviously need a range of qualified individuals for HEIs. Even SMEs will draw on engineering and other technical skills that are developed among South Africa's HEIs.

[18] For further details on these HEIs programmes see the discussion of HEIs in the Primary Processing section above.

CHAPTER NINE: THEMATIC PRIORITY AREAS

Introduction

This chapter reflects on some critical dimensions of the system of skills in the wood, paper, and pulp (WPP) sector. The topics have been identified from conversations with industry stakeholders, but the views represented are the author's and not necessarily those of the consulted stakeholders.[19] In the forestry sector, skills development among emerging growers and contractors are the focus. Attention in the primary processing sector is on the skill training system for development of the small-scale sawmilling sector. In the paper and pulp sector we focus on the industry's efforts to increase it stock of intermediate skills to enhance its international competitiveness. Lastly, in wooden furniture attention is on SME skills market and its relationship to the overall competitiveness of the sector.

Forestry

Emerging Growers

If South Africa's afforestation policy is realized, there will be an important shift in plantation forestry from large corporate plantation to small community owned plantations. This transformation will require a range of skills training at the community level. There is a need for a long planning horizon despite fast natural growth rates. Timber for the pulp and paper sector requires at least a fifteen year growing cycle and another decade or more is required if the timber is to be used as sawn lumber. In either case there must be real value from the plantations before the growing cycle is completed if the typically impoverished communities are to research harvestable maturity.

Non-timber forest products (NTFP) and sustainable resource-based exploitation of the non-forest transition or buffer zones around these small plantations will be critical components in these efforts. These activities have relatively low barriers to entry compared to other sources of livelihood and they thereby form an important safety-net as well as conserving scarce cash resources (Shackleton and Shackleton, 2004). Besides subsistence for the communities themselves craft industries, traditional medicines, and associated agricultural products are basic resources associated with the forestry sector (Shackleton, 2004).

Bridging the primary informal sector activities into the primarily formal sector activities is necessary if these NTFP are to be transformed from a safety net to meaningful platforms for development. Whether built around the plantation forest resources, associated NTFP, or some combination the sector offers significant opportunities for SME development. Howard et al. (2005) reviews the impacts that SME timber production has had so far in poverty reduction in South Africa.

A range of constraints are faced by these SMEs. Lewis et al. (2004: 21-22) highlight that especially in environments where NTFP are not naturally occurring access to

[19] See Appendix Two for a list of stakeholders consulted for this project.

skills, finance, and equipment are frequent barriers as is their higher transportation costs. Even when successful their study indicated that these SMEs found it difficult to meet increasing demand because they were developed on constrained resources and without coherent sales and marketing plans.

Commercial forestry is not a single solution to the poverty faced by many of the rural communities entering plantation forestry. The timber from these plantations can form a valuable asset to these communities, but its long growth cycle clearly prevents it offering an overnight solution. However, plantations can support development of skills, other natural resources, financial capital, equipment stocks, and social capital (Mayers et al. 2001: 113-115). Linking these other resources to form a livelihood for the communities thereby reduces the risks and uncertainties otherwise associated with the small grower schemes.

Developing this type of symbiosis between forestry and associated sectors requires that skills development is aware of the inter-relationship. For instance, business skill training in the communities must highlight the benefits and potential risks of interdependencies among these activities. Similarly, forest management skills offered to the communities must not be focussed on the plantations alone as they have traditionally been. A real need exists for extension services that foster development of general business management skills among across the small growers' communities. Some of the established HEIs are already focusing on providing these skills in their forestry programmes, but it is not currently being supported in a systematic fashion by the policy environment.

At a practical level responsibilities are placed on the communities without building their capacity to address these responsibilities. Similarly, NGOs, the State, or companies that undertake to support small growers frequently have limited coordination among themselves. This occurs within the various agencies as well as between them and effectively fragments their efforts (Mayers et al. 2001: 115-116).[20]

Owing to limited commercial experience in many of the communities, it is also possible that co-ordination among the communities might be limited. Enhancing coordination and partnership development also needs to consider the intra-community cooperation.[21] While potentially useful in realising economies of scale for productive equipment, in terms of skills development it can create a critical pool of know-how and development of specialized skills to enhance their productive capacity.

Co-operatives are already important players in the forestry sector as it was the Natal Co-Operative Timber Company that pioneered the wood chip export industry. Building similar institution among the community growers will require some adaptation of the established model.[22] Another fundamental requirement to realize the vision of community growers is enhanced co-ordination among the spheres and agencies of the State this is especially true of lead agencies like DWAF, DEA, DTI, and the DoL. It is also critical that other funding agencies and development

[20] For descriptions see: Zingel (2000) and Cairns (2000).
[21] For a description of the current role of associations in the sector see Bukula and Memani (2006).
[22] For a review of international experience see Macqueen et al. (2006).

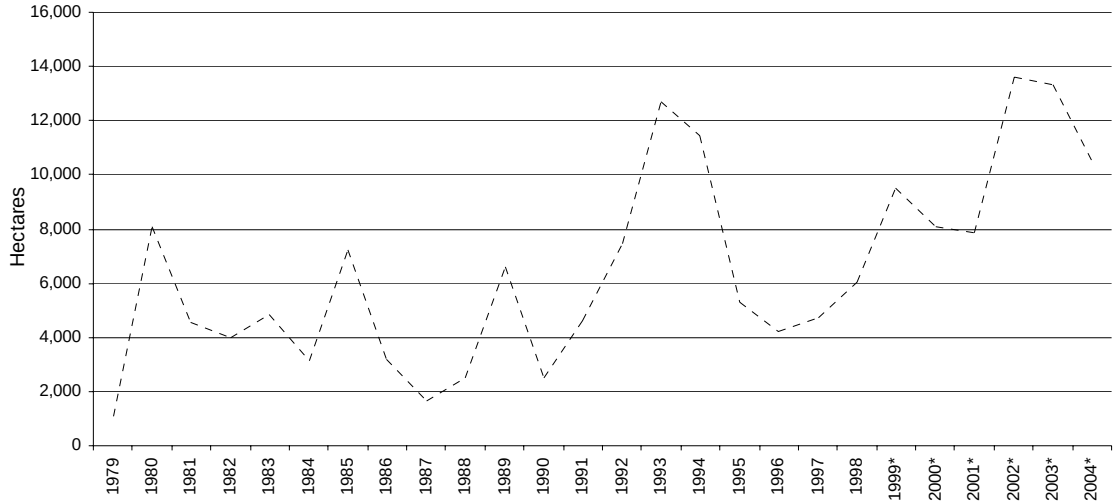
organisation work within a common framework and vision for the sector's development while making otherwise potentially distorting contributions.

Forestry Contractors

Forestry contractors compose nearly a third of all employment in the forestry sector. Historically these contractors were part of the plantation forest owners companies and their respective downstream organisational structure. During the 1980s forestry operations such as harvesting, silviculture and transport were increasingly outsourced. Effectively transforming a permanent workforce into a contracted workforce, competition among the contracting firms has supported market authority over the contractors by both growers and primary processors (Khosa, 2000).

This casualisation of the labour force created an environment where many workers felt that they were doing the same work for the same people, but for lower pay. Labour loyalty declined and alienation among this workforce was significant. The disappointment in the transformation of the industry is also reportedly manifest in arson attacks on the plantation forests (Mayers et al. 2001: 110).

Figure 9.1 Plantation timber destroyed by fire[23]



Source: FSA, 2006

Figure 9.1 reports annual losses of plantation timber by fire. There is no conclusive evidence of this destructive form of protest by alienated contractors. However, there are two distinct periods where the quantity of timber destroyed by fire demonstrated marked increases. The first begins in the early 1990s and then drops considerably in the mid-1990s. The second upward trend begins in the late 1990s and appears to still be continuing.

While originating in a global context of outsourcing, competition among enterprises for the limited opportunities results in new entrants having to further reduce their prices and perpetuating their structural weakness. This situation is further

[23] Figures for timber destroyed by fire were not reported after 1998. Therefore, the value reported are estimates based on the historic (1979 to 1998) ratio of damaged to destroyed timber.

complicated by ongoing transformation efforts, since black entrepreneurs tend to be the newer entrants caught in a drive to ever lower margins than their white counterparts as sectoral investment declines across all enterprises (Clarke and Isaacs, 2005: 14-20). Unfortunately, the bargaining power of the contractors will continue to limit their ability to improve wage levels unless contracting companies are motivated to increase their margins.

High variability of primary processing demand is another challenge to the contractors as it makes hiring and equipment planning difficult. New firms in the sector are usually formed from employees in established contracting firms, as a result these new entrants tend to have limited business skills and financial training. Contractors, especially SMEs, typically lack land or other fixed assets that they can use a collateral for new equipment outdated and poorly functioning equipment is often retained further contributing to inefficiencies and potential health and safety dangers (Lewis et al. 2004: 22-24).

Given this situation, forestry contracting has severely constrained opportunities. Workers have little authority over their wages or working conditions and even the sectoral association SAFCA has had limited success in effecting structural change (Clarke and Isaacs, 2005: 23). As such currently, contracting does not appear to be an area that holds great potential for livelihood development. Nonetheless, contractors are important to over all sectoral productivity. Identifying the contribution that contractors can make to sectoral efficiency is important to transform the rather onerous operating environment. Skills development will remain primarily supply driven until some of the structural transformation occurs, but there are areas such as business and financial skills that can be meaningfully developed even with this market bias.

Primary Processing

In sawmilling there are two categories of small scale sawmills: low cost mills and micro mills. There relative contributions to sawmilling and primary processing as a whole were discussed in Chapter Four. Broadly speaking low cost mills belong to the formal sector with their output demanded locally for secondary beneficiation as industrial timber. The micro mills tend to operate at least partially in the informal sector with their output focused on short-term geographically dispersed and localised demand. Despite these differences both types of small scale sawmills face uncertainties with regard to access to sawn timber resources. They also share limited intra-industry networks and have constrained administrative capacity to meet legislative requirements (Meyers et al. 2001: 110).

Opportunities for entry of additional small scale sawmills are extremely limited by these constraints. Nonetheless, a collaborative initiative by the largest industry association, SALMA, the DTI and the NPI was undertaken between 2002 and 2004 to enhance the efficiency of the small scale sawmills. While 26 organisations participated in the programmes there are over 700 firms operating within the projects targeted beneficiaries (Erasmus, 2004: 113). Despite the programmes' design and implementation it clearly was well short of the needs that exist among small scale sawmills.

Systematically and sustainably providing the skills training that the low cost mill improvement initiative targeted in its pilot exercise needs to be carefully considered if it is desirable to retain many of the firms and jobs currently existing as small scale sawmills. Currently, little has been done to target these mills' linkages to additional secondary beneficiation in areas like furniture or building products. Skill shortages and limited networks are reportedly important reasons not developing these potential opportunities (Heyl et al. 2000:11).

While ensuring a viable supply of sawn timber is available to these sawmills is critical, more needs to be done if they are to have a significant role in the future. Despite its small relative productive output, small-scale sawmilling is a critical source of income and employment in many rural areas in South Africa (Horn, 2000). It appears therefore that the necessary skills support for the sector needs to be explicitly supported or an alternative plan for livelihood support be implemented in the areas that will effected the greatest by what seems to be an otherwise inevitable decline of the sector.

Paper and Pulp

South Africa's paper and pulp industry was established during the Second World War and its subsequent development, until the 1980s was largely characterised by a domestic market focus. Particularly following democratization in 1994, the sector has rapidly transformed into a significant global player under its two primary producers Mondi and Sappi. The sector has thereby rapidly found itself in a highly competitive international environment. In this context the industry has identified skills training as a critical dimension to develop their South African operation's competitiveness. Attention is therefore given here to some of the sector's initiatives around skills development and some of the systemic challenges those efforts have confronted.

There are three occupations that paper and pulp industry has identified as having critical skill scarcities. These occupations are:

- Professional and Associate Professionals
- Artisans/skilled trades
- Machine operators

We begin with a review of efforts by the industry to enhance the inflow of these skills. In professional occupations, the sector has established bursaries for undergraduate studies at a number of programmes nationally. In the last few years the industry has also supported scholarships for students to undertake honours and masters studies at the University of KwaZulu-Natal (UKZN). Most of these scholarships are connected to research projects with the CSIR/University of KwaZulu-Natal Forestry and Forest Products Research Centre.

The paper and pulp sector competes directly with mineral industries and petrochemicals in attracting professionals. These competing sectors are presently enjoying strong demand and the associated salaries they are able to pay are relatively high. Mondi and Sappi no longer have formal operational linkages to mineral resource enterprises, which makes co-ordinating action around these skills difficult as well.

In terms of artisan development, besides development of artisans in their own training initiatives, the sector has worked within broader national initiatives to increase the availability of these skills. In particular, the industry has supported the national skills fund and Asgisa's efforts increase the supply of these skills. Both Mondi and Sappi are members of the National Business Initiative (NBI) which is targeting development of artisanal skills along with other skilled personnel. The NBI is working to develop partnerships with FET colleges to accelerate the supply of artisans for the national economy.

Historically, the industry had a strong dependency on parastatals such as Iscor and Eskom to generate the supply of operators that they needed. As the parastatal training system collapsed the industry began to further develop its own training programmes. An early initiative in this regard began in the late 1980s at Natal Technikon, which is now part of the Durban Institute of Technology (DIT). Both Mondi and Sappi collaboratively supplied staff to teach the programme at Natal Technikon. This programme appears to have been a great success, but that actually became its downfall. The skills developed in operators trained at the Natal Technikon programme led to their rapid promotion out of operator occupations. While a testament to the sector's ability to collaboratively provide high quality training, the programme was discontinued in the early 1990s in an environment of changing labour legislation.

With the advent of the Skills Development Framework the sector's training programmes were institutionally vested as learnership within a sector education training authority, the paper and pulp chamber of FIETA. In contrast to many of South Africa's other capital intensive sectors, paper and pulp did not have an industry training board, so FIETA's pulp and paper chamber was the sector's first institutional training agency.

Currently, two programmes are descendants of the collaborative training initiative developed at Natal Technikon. The first is the direct descendant of the original training programme at Natal Technikon. Targeting a higher qualified entry level learner than the original programme, the DIT now offers a Bachelor of Technology degree in Pulp and Paper Technology at NQF Level 7.

The other programme is a learnership modelled on and designed around the collaborative training and distance based structure of the Natal Technikon qualification. Using a pool of instructors from both Mondi and Sappi lectures are offered in pulp and paper centres across the country in support of the primarily correspondence based programme. Institutional administration of the programme and exams are run through the University of South Africa (UNISA) where this National Diploma qualification is registered.

While there were some bureaucratic difficulty noted in all the learnership that the sector has developed, the UNISA programme was reportedly highly problematic because of the co-ordination it required between the Department of Labour and the Department of Education. The industry's drive to increase the knowledge intensity of its production led to it targeting this qualification at the National Diploma level or NQF Level 6. As a learnership the programme had to be recognised and registered by

both the Department of Labour and the Department of Education. In effect two distinct systems of skills development appear to exist rather than an integrated system. Besides the bureaucratic challenges, the systemic change to outcomes based education required substantial review and revision to the established programmes' curriculum. As a result there was a long period needed to developed learnership that could be registered.

In the context transformation, economic integration and challenges from globalisation; it has been difficult for the paper and pulp industry to ensure that the supply of skills from these training initiatives are used by their intended beneficiaries. Within the outcomes based system, mentorship is a critical component to learning. As a phenomenon these challenges in the new approach to skills development is not limited just to the priority areas of skills mentioned above, but it is a pervasive challenge crossing most occupations. There were three kinds of challenges described in this regard.

First, mentorship is premised upon an existence of social capital between instructor and learner. In the context of equity based advancement and transformation there is a shortage of social capital to underpin the trust and common cause that facilitates effective mentorship. The racial division that characterized the occupational hierarchy in South Africa before democratization is a primary cause of this disfunctionality. These divisions developed a predominately white hierarchy who are now expected to mentor individuals who were historically treated as occupational advisories socially and institutionally. Added to these inherited prejudices are contemporary policies, aimed at addressing these historic inequities, these policies give preferential occupational advancement to historically disadvantaged populations. Understandably, there is some resistance to mentor individuals who one may eventually be forced to compete against or work under. Particularly, given historically and racially perpetuated social discontinuities between these groups this environment severely constrains the role of social and occupational good-will that facilitates effect mentorship.

Second, within the modern learning environment knowledge and practice are intertwined. Improved knowledge around the delivery of competencies has shortened the time in which one is expected to demonstrate a learned competency. This expectation however conflicts with traditional systems whereby an individual was often expected to serve their time in a particular job regardless of their capabilities to move on to another role. As a result of these traditional approaches to learning knowledge transfers from mentor to learner are withheld until inherited 'sentences' in certain roles or occupations are completed.

Lastly, there is an inherited belief that knowledge development and practical skills are rightfully separate activities. Conflating learning and practice is met with resistance in this by both mentors and learners. In an outcomes based learning environment it is critical that this divided is bridged as fundamentally it is what mentoring is designed to accomplish. Having inherited this culture of dividing 'book learning' from practice then obvious limits the effectiveness the intended learning environment. It is important to acknowledge however that the mentors' role of examiner places an additional and unexpected burden on them as a result of their expected recall of learned facts rather than just established practices. This added responsibility for an

established mentor to go back and relearn the facts behind their practices creates a disincentive to mentor that is difficult to overcome.

Combined these factors severely constrain the uptake of outcomes based education and thereby the current learnership and skills development initiatives undertaken by the paper and pulp industry. Despite these impediments the industry has managed to develop a well coordinated and coherent skills development system. The duopolistic structure of the industry has obviously facilitated this development. Nonetheless, the industry can not force its learners to learn nor can it force the owners of tacit knowledge, spread throughout production processes, to mentor. Developing solutions to these challenges will be critical to the sectors ability to realize its envisioned enhanced knowledge intensity in production.

Wood Furniture

The large number of diffused predecessors is a critical challenge to skills training in the wood furniture sector. Despite the numerous learnerships targeting skills development in the sector, there does not appear to be strong linkages with these and established or emerging predecessors in the sector. Given that a significant portion of skills training originates within the context of development policies and donor aid it appears that this focus on supply of skills to potential workers targets these beneficiaries' own enterprise development. A large portion of skills training in this sector therefore seems unaligned to the needs of the numerous existing SMEs and smaller number of large enterprises.

However, it is important to recognize that the needs of wood furniture SMEs are not rejected out of turn, but rather there tends to be a feeling of paternalism from skills suppliers towards the sectors' firms. The Furniture Manufacturing Skills Development Project (FMSDP) for instance explicitly targeted skills training for informal and formal SMEs in the wood furniture sector. However, the project was designed to offer a specific type of training that promoted the manufacture of low cost compact furniture rather than responding to the skills needs identified by the firms in the sector. The Shintsha Furniture Project also targeted its skills training at the low cost compact furniture. While not trying to dismiss the need for this type of furniture and skills for its manufacture, it is important to recognize that this market may not have the envisioned growth and employment potential.

The structure of the wood furniture SME sector creates major challenges in identifying skill demand. There is little co-ordination among the SMEs and there are not any significant industry associations that represent their interests. Trying to address this difficulty, the Shintsha Furniture Project was in fact trying to address these challenges by building complementary business skills within the SMEs and their training providers that facilitated future inter-firm co-operation.

A Furniture Industry Industrial Training Board previously oversaw skills training for larger and more established producers in the sector. These firms currently provide significant guidance within the wood furniture chamber of the FIETA. There are six principle occupations that are needed in these established firms:

- Wood machinist

- Cabinet-maker
- Frame-maker
- Furniture-polisher
- Carver
- Upholsterer

Skills training in these trades used to be offered directly through centres run by the training board, but currently they have been transferred to learnership at FET Colleges. As with general skills development in manufacturing many of these firms are working to establish a market niche for their products in the global environment. This is a challenge because of competition from better resourced, skilled and equipped manufacturers in more economically developed countries and lower priced labour from other economically developing nations. These factors combine to create severe challenges for all segments of the wood furniture industry.

CHAPTER TEN: CONCLUSION

Introduction

South Africa's WPP sector is a competitive and well established sector capable of making a significant contribution to national economic development. Significantly, it has substantial direct and indirect linkages with the informal sector. It is therefore an important component of many poor South African's livelihoods and in the context of the sector's promotion it offers a critical opportunity to demonstrate how pro-poor development can be achieved. In the context of the present analysis it also offers an opportunity to establish precedents in skills training and education that can facilitate the integration of the informal economy with the formal economy while at the same time promoting formal economy's competitiveness.

The sector is largely structured geographically around the location of timber resources, although significant beneficiation also occurs around urban centres in Gauteng and the Western Province. Envisioned expansion of afforestation in the Eastern Cape and KwaZulu-Natal will potentially play a critical role in those provinces rural development. The sustainable growth of timber inputs is critical to the future of the WPP sector's competitiveness. The paper and pulp sector has clearly established competitive advantage and a coherent skills development policy to ensure this competitiveness is sustained. Similarly, there are relatively large firms in primary processing and secondary beneficiation sector that are well positioned competitively for the near future.

There are a multitude of small and medium enterprises (SMEs) in the sector whose existence appears to be tenuous with prospects of either marginalised subsistence or withdrawal being likely for many of these firms. This uncertainty around the SMEs future is strongly tied to similar uncertainties about timber supplies and the system of skills development. Despite these concerns the sector has benefited from a large rise in domestic demand in recent years. Domestic demand for products from the WPP sector is a competitive advantage for many domestic producers. However, competition from abroad continues to grow especially as other countries with similarly favourable growing environments undertake export promotion.

Key challenges

A critical challenge facing the sector is its ability to produce the necessary timber supplies for primary processing and secondary beneficiation. In terms of markets, timber supplies are allocated either to fibre (round wood) or sawmilling (saw logs). The transformation of growers to increasing small-scale community growers is a challenge to both round wood and saw log supplies. In terms of saw log supplies, the increased role of community growers appears to threaten output as a result of the growing cycle being about two-thirds longer than round wood. With the withdrawal of the state from saw log production there is a real threat that South Africa will not have an adequate supply of saw logs for its existing downstream sectors, let alone any additional beneficiation based on saw logs. Community growers are also a challenge

for round wood supplies as linkages between the fibre sector and the growers are limited leading to potential uncertainty of feedstock.

Among the larger scale commercial timber growers increasing outsourcing of work to contractors has created a range of challenges. It has contributed to a highly competitive and increasingly marginalised workforce and firms who are unable and unwilling to invest in skills training and equipment to increase their efficiencies. As a result, both round wood and saw log supplies are reduced.

Directly linked to the supply of timber is the competitive advantage of companies in the WPP sector. Without competitively priced timber inputs a substantial competitive advantage of the sector will be lost. Transformation of skills levels in the paper and pulp sector is another key aspect of the sector's challenge to ensure competitiveness in the future. Increasing knowledge intensity of the workforce has therefore become a critical priority within the sector.

A challenge identified in training the workforce to enhance its skills is the outcomes based learning approach. This approach requires mentorship which is resisted within the workforce and adds considerable work to translate the existing curriculum. The uptake of learnership opportunities has therefore been constrained. If this is not to play a significant role in the future their needs to be increasing acceptance of the mentorship and integrated learning environment espoused by outcomes based education.

Another challenge facing the sector in attracting skills is its domestic competition with the large and well developed non-renewable resource sector. International scarcities in engineer and other technical skills heightens this competitive environment in which enterprises in the WPP sector must compete against local and international inter-sectoral demand for priority skills.

Related to the difficulties in mentorship based training is the historic division of the workforce. Social capital and common cause is often limited between racial and occupational components of the workforce. This lack of social capital also appears to characterise the lack of networks and effective associations among SMEs in the sector. Development of social capital would appear to be a key area to support the sector's general competitiveness and its ability to respond to future challenges.

Lastly, there appears to be a large number of supply driven training initiatives in the wood furniture sector. While opportunities do appear to exist in this part of the WPP sector, many of these programmes do not appear to have examined the requisite skills around market analysis, procurement, and general demand profiling. As a result skills appear to be being developed that are not aligned to the sector's broader needs and development dynamics.

Needs from the skills training system

Among the needs for development in the skills training system are programmes focused on facilitating the transition from the informal to the formal sectors of the economy. Activities such as non-timber forest product development and recycling may take place primarily by members of the informal sector. There are experience

has shown that many opportunities do emerge within these activities that can lead to these informal sector business becoming part of the formal sector. However, to facilitate this transformation a sustained and systematic skills development and SME support programme is need that assists in training not just in production, but in broader business skills like marketing, transport and finance. This type of programme will also assist in skills alignment in sub-sectors like forest contractors where it will identify growth constraints.

There also appears to be a need for more responsive and management focused skills development among all levels of skills. This is needed in the context of a dynamic international productive environment, which although more pronounced in relatively integrated international sectors like paper and pulp is a feature in most WPP markets. Developing skills training which increases this autonomy within jobs while recognising and making each worker aware of their interdependencies with other parts of the production value chain can facilitate low skilled and intermediate skilled jobs contribution to the sector's competitiveness. It will also likely create awareness of business opportunities that might not be apparent within the top-down highly skilled focused management paradigm.

The largest need within the skills training system appears to exist within the sector's SMEs. Their limited resources and lack of strong associations has meant that the skills training available to them is typically supply driven rather than aligned to their demand. As a result, collaborative initiatives to develop skills training from the SMEs themselves appear highly advantageous. These initiatives could be aligned through facilitators like a large scale extension service or business support programme. While many local and international prototypes for this support work exist they do not appear to have diffused sufficiently to make a significant contribution to the South African WPP sector.

Recommendations

The WPP sector spans a range of activities with differing priorities and interventions. The three interventions identified below are an initial attempt to facilitate the alignment of skills training to the broader strategic priorities and growth of the sector.

Sustainable and Empowering Resource Base

A critical challenge facing the WPP sector is transforming the historic production system. Ultimately success equates to meaningful output of timber from community based growers. Largely marginalised communities will then be integrated in to an international market. However, if the decades long growth cycles characterising plantation timber are not be a barrier, harmonizing livelihoods need to support long-run plantation timber cultivation. Realising this will require development of a new holistic timber production paradigm.

This holistic forestry production system would view traditional timber growth for downstream markets as complementary to shorter-cycle timber growth for other uses, such as fuel wood. In addition, non-timber products and services would form another basis of complementary livelihood. In order to realise this holistic production paradigm a concerted and systematic skills development programme must be

established. These skills would ensure the communities are able to grow timber for traditional markets, but at the same time develop complementary livelihoods with business, marketing, and other production skills.

Currently, a range of development programmes are working on ad hoc interventions to develop these kinds of complementary skills (Shackleton 2004: 34). However, transformation of the timber production system requires sustained development of skills and other productive resources. Identifying and delivering these resources can not be done without ongoing consultation with the communities themselves (Tyler, 2006). The development of complementary business support is critical in this regard. While a community might develop some NTFPs their impact will me minimised unless the communities have business support (Kapila and Mead, 2002).

A new extension service model appears to offer considerable promise in delivering these skills and other services in a sustained manner. Such an extension service would be perform a range of roles beyond narrow tree growing and focus on local specifics rather than formulated answers. This type of extension services is increasingly common internationally and would form a critical vehicle for monitoring, evaluating and learning from the experience of the community based growers (World Development Report, 2007: 172-176).

Complementing and related to the skills development and extension services for the segments transformation is the need for co-ordination among the communities. Enhanced coordination and partnership development should also be encouraged through initiatives like diffused production competencies where complementary business skills are developed and fostered across a network of communities. Economies of scale for productive equipment could also be realised through this network. These community based cooperatives could also foster social capital among communities and facilitate increased market co-ordination and authority.

Entrenching Monitoring, Evaluation and Learning Systems

Many of the key challenges facing the WPP sector are recognised and most are being addressed through one or more interventions. Nevertheless, the interventions are often not coordinated despite focusing on the same challenges. Frequently these interventions are also ad hoc and supply driven, leading to solutions being pursued that are ineffective or even destructive. Further, there are difficulties associated with well designed interventions impacting differently than intended as well as inadequacies in resources, especially skills, for implementation.

Monitoring, evaluation, and learning (MEL) systems are a critical tool to address these difficulties and ensure lessons from interventions become part of a learning process. There are key challenges in each segment of the forestry value-chain where entrenching an integrated MEL system could deal with this critical dimension of implementation. In the resource base, an MEL system would seem to be a priority in guiding the transformation of plantation forestry and its associated increased usage of community based growers. It would facilitate assessment on long-term development impacts as well as ensuring the expected timber supplies are being delivered. The MEL system would also provide a critical source of information and feedback for the interventions to learn and improve their performance.

In primary processing, an important area is ensuring low cost and micro mills develop their production processes and business capabilities. Success in this regard is necessary if they are to remain viable in the forestry value-chain and if they are not to become further marginalised from a production system that is increasingly consolidated around large scale saw mills. In this regard, an MEL system would complement on going initiatives by creating a coordinating institution that diffuses information and builds awareness of these efforts relative success and failure. The MEL system would also facilitate identification of gaps in initiatives addressing these challenges.

There are two areas in secondary beneficiation where MEL systems hold significant promise. In the wood furniture sector, an important challenge exists in ensuring the skills supplied are meeting the demands from existing producers. Within wood furniture there is also a critical challenge in ensuring that complementary business skills are developed to support the current focus on production skills.

Paper and pulp is the other area that an MEL system could make an important contribution to the sector's challenges generally, but especially in skills development. Despite resources and intra-industry co-ordination skills development remains a large concern for the sector. An MEL system would make a significant contribution in addressing the challenges of skills development by building and diffusing information and learning amongst key agents in the skills system.

Systemic Development of Critical Skills in Priority Segments

The paper and pulp industry is a critical feature across the entire WPP sector. Therefore, its current efforts to enhance training and skills development must be supported and obstacles removed to ensure its competitiveness. A collaborative skills planning model would mark a major step forward in this regard. Focusing on critical skills needed in pulp and paper as a pilot exercise in priority skill delivery this model should be useful for skills development across the WPP sector.

Innovating around established planning and strategy software this initiative would bring key agents across the skills system together to codify the structure of the skills system, identify critical delivery nodes, and prioritise interventions needed to enhance delivery. The model would also improve the skills development network by bringing together labour, the private sector and the public sector to develop evidence-based policies supported by their coordinated efforts. Premised on an evolving understanding of the skills system, with an inherent ability to up-date and re-design underlying relationships, the planning model would have flexibility and utility uncommon in traditional forecasting models.

By design it would also incorporate systematic communications flow among stakeholders to facilitate consensus around priorities and challenges. The inclusive nature of the model's development and refinement thereby supports knowledge transfer to all stakeholders. Paper and pulp offers a terrific opportunity in this regard because of the concentrated ownership structure and evident commitment from the sector to pursue practical solutions for skills development. Many challenges like overcoming barriers resulting from mentorship and needing to realise greater

coordination across the skills system are concerns beyond the paper and pulp sector. Hence, the lessons from the initiative will be significant for a much broader audience interested in dynamic issues of skills provision and policy formulation.

The growth and development potential of the WPP sector is tremendous, but not unlimited. Strong leadership is needed if the ongoing transformation is to become a favourable development rather than corrosive. Currently, many initiatives appear to be pulling resources within the sector a variety of directions to the detriment of each.

Interventions around the skills system identified in this analysis appear to be important steps forward in securing this promising future. If South Africa can succeed in these efforts it can offer a renewable resource model that is inherently inclusive and dramatically in contrast to exclusive enclaves that historically feature in the region's development experience.

APPENDICES

Appendix One: Trade Categories

Wood and Wood Products Sector

H4401: Fuel wood, wood in chips or particles, wood waste
H4402: Wood charcoal (including shell or nut charcoal)
H4403: Wood in the rough or roughly squared
H4404: Hoopwood, split poles, pile, pickets and stakes
H4405: Wood wool, wood flour
H4406: Railway or tramway sleepers (cross-ties) of wood
H4407: Wood sawn, chipped lengthwise, sliced or peeled
H4408: Veneers and sheets for plywood etc <6mm thick
H4409: Wood continuously shaped along any edges
H4410: Particle board, similar board, wood, ligneous material
H4411: Fibreboard of wood or other ligneous materials
H4412: Plywood, veneered panels and similar laminated wood
H4413: Densified wood, in blocks, plates, strips or profile
H4414: Wooden frames for paintings, photographs, mirrors etc
H4415: Wooden cases, boxes, crates, drums, pallets, etc
H4416: Wooden casks, barrels, vats, tubs, etc
H4417: Tools, broom handles, bodies, etc, of wood
H4418: Builders joinery and carpentry, of wood
H4419: Tableware and kitchenware of wood
H4420: Ornaments of wood, jewel, cutlery caskets and cases
H4421: Articles of wood, nes

Pulp and Paper Sector

Pulp
H4701: Mechanical wood pulp
H4702: Chemical wood pulp, dissolving grades
H4703: Chemical wood pulp, soda or sulphate, not dissolving
H4704: Chemical wood pulp, sulphite, not dissolving grade
H4705: Semi-chemical wood pulp
H4706: Pulps of other fibrous cellulosic material
H4707: Waste or scrap of paper or paperboard
Paper
H4801: Newsprint
H4802: Uncoated paper for writing, printing, office machines
H4803: Paper, household, sanitary, width > 36 centimetres
H4804: Uncoated kraft paper and paperboard
H4805: Uncoated paper and paperboard nes
H4806: Glazed transparent, translucent papers
H4807: Composite paper and board, not coated or impregnated
H4808: Paper, board corrugated creped embossed perforated nes
H4809: Carbon, self-copy paper etc, width > 36 cm
H4810: Paper, board, clay, inorganic coated at least one side
H4811: Paper, board, etc coated, impregnated, coloured, nes
H4812: Filter blocks, slabs and plates, of paper pulp
H4813: Cigarette paper
H4814: Wallpaper and similar wall coverings etc of paper
H4815: Floor coverings with a base of paper or of paperboard
H4816: Carbon, copy, duplicating, stencil, offset plate paper
H4817: Envelopes for mail, cards, writing compendiums, etc
H4818: Household, sanitary, hospital paper articles, clothing
H4819: Paper, board containers, packing items, box files, etc
H4820: Office books, forms, exercise books, folders, binders
H4821: Paper or paperboard labels including printed labels
H4822: Bobbins, spools, cops etc of paper pulp, paper, board
H4823: Paper and paper articles nes

Wooden Furniture Products

Wooden Furniture Sector
H940330: Office furniture, wooden
H940340: Kitchen furniture, wooden
H940350: Bedroom furniture, wooden
H940360: Furniture, wooden

Appendix Two: Stakeholders Consulted and Surveyed

Organisation	Completed Skills Survey
Council for Science and Industrial Research	No
Forest Industry Education Training Authority	No
Furniture Bedding and Upholstery Manufacturers Association	No
Hans Merensky Timber	No
Mondi	Yes
Paper Manufacturers Association of South Africa	No
Paper Recyclers Association of South Africa	No
Salinga Furniture	No
Sappi	Yes
Southern African Institute of Forestry	No
U-Niche Furniture	Yes

Appendix Three: Offerings included in forestry occupations

Occupation	NQF Level	Instructional offering name	EMIS Subject #
Horticulture	1	BOTANY: HORTICULTURE	1050001
	1	HORTICULTURE SCIENCE	15030121
	1	HORTICULTURE THEORY	1050041
Horticulture	2	BOTANY: HORTICULTURE	1050012
	2	HORTICULTURE SCIENCE	15030102
	2	HORTICULTURE THEORY	1050052
Horticulture	3	BOTANY: HORTICULTURE	1050073
	3	HORTICULTURE SCIENCE	15030113
	3	HORTICULTURE THEORY	1050063
Agriculture Technicians	1	PRINCIPLES OF PEST CONTROL	1060001
	1	CROP PRODUCTION	1060061
Agriculture Technicians	2	FUMIGATION	1060012
	2	AERIAL APPLICATION	1060022
	2	WEED CONTROL	1060042
	2	WOOD PRESERVATION	1090002
Agriculture Technicians	3	TIMBER PRODUCTION	1090013

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