

**HUMAN RESOURCES DEVELOPMENT (HRD)
FINAL PAPER**

Towards a Multi-level Skills Strategy in the Western Cape

HUMAN SCIENCES RESEARCH COUNCIL

DISCLAIMER

The framework for conceptualising human resources development used in this report promotes a multi-pronged strategy to contribute to a micro-economic development strategy in the Western Cape. Such a strategy, it will be argued, can only be fully developed in a 'joined up' manner, between multiple provincial departments, key social partners and the researchers.

Dictated by the nature of the research process, this report was written in isolation from critical research reports on priority economic sectors, and from debate and discussion with representatives of key provincial Departments.

The report must therefore be read in this light – that it can only contribute in a partial way to the task of developing a multi-level skills development strategy. Its conclusions are firm, but its recommendations are only indicative of the kind of strategic intervention that is possible.

Acknowledgements

This report was written by Glenda Kruss, but it is not a single authored work. It is a synthesis of the work of colleagues in the Research Programme on Human Resources Development of the Human Sciences Research Council.

In particular, it draws on three Background Papers commissioned and prepared for the Western Cape Micro-Economic Strategy research project:

Fabian Arends, *The underpinning infrastructure: Public schooling in the Western Cape*, August 2004

Simon McGrath, *The challenges of intermediate skilling in the Western Cape*, August 2004

Glenda Kruss, *The contribution of higher education to a Western Cape regional innovation system*, August 2004

Each of these papers provides a detailed empirical profile of key trends in the Western Cape, relative to national trends. In turn, each of these papers is itself a synthesis of the specialist work of members of the HSRC team. Our researchers have used a provincial lens to mine the national datasets they developed in a series of empirical studies. Taken together, they contribute to a comprehensive and multi-faceted provincial profile. It is important that their original work be acknowledged, in alphabetical order:

Salim Akoojee, Fabian Arends, Mignonne Breier, Jacques Du Toit, Jeanne Gamble, Andrew Paterson, Mariette Visser and Angelique Wildschut

The Background Papers have taken as their starting point, papers commissioned by the Western Cape Department of Economic Development and Tourism to inform a provincial HRD strategy framework. Background Paper 2 has also benefited by the inclusion of research this Department commissioned, on the work of Sectoral Education and Training Authority, SETAs, in the province.

The Research Programme has developed a conceptual approach to understand and analyse human resources development in South Africa, underpinned by the *Human Resources Development Review 2003*. Much of the credit goes to Andre Kraak, as this report draws heavily on the analytical framework he has developed.

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Chapter 1

THE IMPORTANCE OF INTERMEDIATE AND HIGH SKILLS DEVELOPMENT IN THE WESTERN CAPE

The Western Cape provincial government has proposed to develop a micro-economic development strategy to support priority sectors, so that there is a 'better fit' between what the province has to offer in relation to global and domestic markets, which will need to coordinate with the human resources development strategy, amongst others. It is the task of this report to consider ways in which critical human resources development issues can be addressed from within a provincial micro-economic strategy, to facilitate existing initiatives.

Policy consensus in South Africa since 1994 is that the country needs to take a 'high skills' route to development, to be able to rejoin the international community and become a globally competitive player. This thrust is held in creative tension with the need to redress the inequality of the past, and ensure development in the interests of all South Africans. However, while there have been successes arising from this chosen path over the last ten years, recently, concern has been raised at the increasing inequality that results, in a context in which the economy can not generate sufficient jobs, leading to the 'two nations' and 'two economies' that are becoming more sharply unequal than in the past.

Analysts and policy makers have begun to raise questions about the high skills route to economic and social development in South Africa. There is a tendency to assume that the high skills route is an exclusive one, but Ashton (2004 forthcoming) has argued that in fact, all societies have a combination of skills strategies, and what is significant is the way in which skills strategies are balanced - the proportion between low, intermediate and high skills work opportunities in an economy. He argues that in South Africa, what would be more appropriate is a skills strategy that targets jobs with basic skills, as an essential prerequisite to a subsequent rebalancing in the direction of a greater proportion of intermediate and high-level skills jobs.

In a similar vein, Kraak (2004a) has argued against the privileging of a high skills strategy as a single focus. He identifies a differentiated skills system, of low, intermediate and high-level skills needs. A specific economic sector, for instance, may depend primarily on high skills, but it may have significant intermediate and low skills needs at the same time. A multi-pronged skills development strategy that incorporates all three skills bands, and seeks to build on their integrative and inter-locking potential, is more likely to succeed in South Africa than an exclusive focus on the 'high skills route'. Such a strategy requires a mobilisation of resources across government departments, to co-ordinate strategic activities and mutually support a shared vision, if it is to be successful. Kraak (2004) has articulated a strong call for 'joined up' policy activity, for collaboration between and alignment of the strategic initiatives of departments of education, labour, trade and industry, social development, between national, provincial, regional and local tiers of government, and between multiple supply side education institutional sites, to develop and implement such a multi-pronged HRD strategy.

Recently, the Western Cape provincial government shows increasing *awareness* of the need for co-ordinated and mutually supportive strategic action plans and budgets across provincial departments, to ensure alignment with provincial goals. Considerable provincial capacity exists to design policy frameworks and strategies that translate national skills development goals into provincial priorities, in relation to specific provincial contextual conditions. These increasingly propose co-ordination within government, between departments and strategic initiatives, and without, between key provincial stakeholders.

The White Paper, 'Preparing for a knowledge economy in the 21st century' (WCED&T 2001), focused primarily on creating the conditions for a 'high skills' route in the province, based on the core assumption that economic development and higher skills levels are inextricably linked. This continues to inform the policy framework, but more recently, the province has adopted the strategy of 'iKapa Elihlumayo', which shifts the emphasis towards a focus on growth, participation and reducing inequality (WCPG 2003a).

A provincial socio-economic review conducted in 2003 has informed the processes of strategic policy making (WCPT 2003), and describes a situation in which

- Tertiary industries are growing much faster than primary and secondary industries, in particular, the Transport and Communication sectors, and the Finance, Real Estate and Business Services sector
- A labour market that provides decreasing opportunities for unskilled workers, and performs poorly for Africans, hence engendering high poverty gap levels

- High skilled sectors such as the ICT sector and the Finance, Real Estate and Business Services sectors as important drivers in provincial growth and employment
- Despite a decrease, Manufacturing remains the second largest contributor to employment and provincial GDP (after Community Services), and highly labour intensive, relatively less skilled sectors such as Tourism and Construction remain significant.

The 2004-2007 strategic framework for provincial economic development thus began to recognise the need for a multi-pronged skills development route, although it was not explicitly articulated as such (WCPG 2004). The framework recognises that the Western Cape has mature, well developed sectors such as manufacturing and agriculture that continue to employ large numbers of unskilled and semi-skilled workers and at the same time, there is a growing demand from new, globally competitive high skills sectors. The challenge of economic restructuring, it is held, lies in 'achieving a better interface' between these sectors. Here is an awareness of the significance of the kind of balance between skills strategies that Ashton refers to.

The province has developed a policy 'Framework for a Human Resources Development Strategy' (WCPG 2003b), under the leadership of the Department of Economic Development and Tourism, which foregrounds the goal of a Learning Cape at its core, within the paradigm of a 'learning province' in which lifelong learning at all levels enhances global competitiveness. This was presented to a provincial stakeholder summit in November 2003, an attempt to set up a consultative structure in the province to ensure collaboration between provincial government, the private sector, organised labour, and civil society (WCPG 2003c). The articulation of a provincial HRD strategy is currently in process, under the leadership of the provincial Department of Education, to develop specific strategic targets and mechanisms to actualise the agreed upon framework. The draft HRD strategy (WCED 2004) stresses the significance of general education and training as the bedrock for human resources development, followed by specialisation at further and higher education levels.

There is thus evidence of an incipient, if weakly articulated and largely undeveloped, multi-pronged skill strategy emerging in the Western Cape. The report will make the argument, that to strengthen an HRD strategy so that it can contribute to inform and support a micro-economic development strategy in the province, a multi-pronged skills development strategy will need to be clearly articulated. Table 1 demonstrates how each skills band articulates with the formal qualification structure, with the current levels of the National Qualification Framework (NQF), bearing in mind that it is under review and will be revised in the coming year.

Table 1. Skills bands and the NQF 2004

NQF level	Skill band
1	Low skill (Pre-matriculation)
2	
3	
4	Intermediate skill (Equivalent to matriculation and matric plus diploma)
5	
6	High skill (Equivalent to higher education degrees and postgraduate courses)
7	
8	

However, it is beyond the scope of the current report to develop such a comprehensive multi-pronged skills development strategy. A primary reason is because such a task cannot be undertaken in isolation of cross-sectional dialogue and engagement with key strategic sectoral industrial policies and the strategies being developed in the province. A more pragmatic reason is that it goes beyond our current brief and remit.

Instead, the report focuses selectively to consider the capacity, potential and constraints evident at key skills levels, to inform a micro-economic development strategy. The focus is on three key areas within which the province has the power to intervene, and that may have considerable impact on the human resources and skills base it is able to offer:

1. **Schooling as a foundation for skills development.** Current research has established that the Western Cape has almost universal access to primary schooling, and most of that is age appropriate to the relevant grade. However, there is a serious problem with the quality of literacy and numeracy in the foundation phase (Grade 1-3), laying the basis for all future learning. A second problem is poor retention and throughput rates in the secondary schooling system, which are racially imbalanced. High rates of Coloured and African youth drop out of school at Grade 10, or without completing Grade 12. Thus, although the province has the highest matric pass rate nationally, slightly less than half of all those who enrolled in Grade 1 continue to Grade 12. This means that the pool of matriculants is too small, and weakens the skill base of a significant proportion of young people, particularly those who are African and Coloured. Moreover, the number of exemptions is low, and is racially skewed, making the pool of those eligible for higher education too small. Strategies to address these challenges and allow a range of skills development and educational opportunities to flow from the underpinning schooling foundation are key. Chapter Two of the report describes key trends in public schooling, and makes a number of recommendations for deepening current initiatives.

2. **Challenges at the intermediate skills level.** The danger exists of developing highly skilled elites at the one end, and low skills employment opportunities at the other end, with a 'hollowing out of the middle' (Brown, Green and Lauder 2001). In South African in general, there is a potentially serious situation at the intermediate skills level, that is, post General Education and Training Certificate (GETC) schooling, but pre-degree. The key intermediate qualifications with exchange value are at NQF Levels 4 and 5. Sectors that rely on intermediate skills continue to be significant in the economy, but the supply side output is insufficient to support either current economic needs, or an economic surge in the future. A number of Western Cape priority sectors depend on intermediate skills, and these tend to be labour intensive. The research thus focused on profiling current supply-side provision in the Western Cape across a range of institutional sites, and identifying mechanisms to strengthen the intermediate skills band.

3. **Higher education's contribution to regional innovation.** Higher education is a national competence, and institutions are currently engrossed in a demanding process of restructuring, with changes in governance, programmes, curriculum, funding frameworks and institutional mergers. However, there are other opportunities for provincial intervention, in relation to facilitating higher education's contribution to a regional system of innovation. The Western Cape higher education institutions offer a potentially strong resource to provide support for industry and economic development, relative to other provinces. The economic potential of such relationships within the province is yet to be realised. The report focuses on the capacity, potential and constraints of higher education institutions to conduct research in key fields of science and technology, and for engaging in partnerships and networks with industry in key high technology fields. The focus is three cutting edge fields, Biotechnology, New Materials Development and Information and Communications Technology. It considers strategic initiatives and structures that can play a role in mobilising this high technology, high skills potential.

Throughout, the report will consider institutional mechanisms to steer demand and align the supply of intermediate and high skills with provincial strategic development plans.

The report should be read in conjunction with three background papers on which it is based, which provide detailed and more comprehensive empirical evidence in support of the trends described and the arguments made here (Arends 2004, Kruss 2004b, McGrath 2004).

Chapter 2

PUBLIC SCHOOLING AS THE UNDERPINNING INFRASTRUCTURE FOR SKILLS DEVELOPMENT IN THE WESTERN CAPE

The first point that can be made in relation to schooling in the Western Cape is that relative to national trends, the education system is performing satisfactorily. Thus, the province had a growth in total numbers, from 747 964 learners in 1993 to 898 034 in school in 2003. The Western Cape schooling system ensures virtually universal access to schooling for children between the ages of 7 and 14, and on a key exit indicator, its learners have consistently achieved the highest provincial pass rate in the matriculation examination in recent years. However, in absolute terms, there remain significant problems in relation to the efficiency and equity of the system, which have implications for the number and quality of school leavers available to enter the workforce, Further Education colleges and higher education institutions. Chapter 2 will profile schooling in the Western Cape, identifying key trends over the past ten years that indicate inefficiency and inequity, which have implications for the transition of young people through their educational and working lives¹. It will then consider strategies and interventions that may engage with the considerable challenges still faced in the province, if it is to achieve the goals of 'iKapa Elihlumayo'.

ACCESS TO PRIMARY SCHOOLING AS A FOUNDATION

To begin with the primary level, trends reflect a stable pattern of primary enrolment, with almost universal enrolment in Grade 1. The province proudly records that the majority of children aged 7-14 are enrolled in schools at approximately the appropriate grade level. We calculated two standard education indicators of access and coverage that provide an indication of the internal efficiency of the education system, and these are cause for cautious optimism. The Gross Enrolment Ratio (GER) is a measure of access and coverage, measuring the proportion of the relevant population covered by the school system. The GER in the

¹ The chapter should be read in conjunction with a background paper which provides a profile of schooling in the Western Cape. Its conclusions draw on the detailed empirical analysis presented in this paper, which in turn, is informed by prior research commissioned by the Western Cape Department of Economic Development and Tourism.

Western Cape in 2003 for primary schooling shows that 97,2% of the children aged 7-13 in the province are accommodated in schools (Table 2 below). The Net Enrolment Ratio (NER) is a measure of the efficiency of the system, and only measures those learners who are the appropriate age for the relevant phase. The NER in the Western Cape in 2003 shows that 86,2% of learners at the primary level was appropriately aged 7-13. The difference between the two ratios reflects the rates of repetition and hence overage learners in the province. This suggests that there is a problem with repetition and over-aged learners in the primary phase. The calculation of a Gender Parity Index of 0.99 revealed that there is little difference in enrolment between boys and girls in the primary phase, with 1% fewer female learners. Taken together, these trends reflect a potentially sound foundation, in that most children in the province are getting *formal access* to school.

Table 2. Indicators of Efficiency and Equity 2000-2003

Year	Gross Enrolment Ratio			Net Enrolment Ratio			Gender Parity Index		
	Primary	Secondary	Total	Primary	Secondary	Total	Primary	Secondary	Total
2000	96%	84%	91%	85,1%	68,1%	78,6%	0.99	1.15	1.04
2001	111%	82%	99%	91.1%	59.2%	77.5%	0.99	1.13	1.03
2002	99.1%	75,4%	89,1 %	90.3%	60.8%	77.9%	na	na	na
2003	97.2%	78%	89,2 %	86.2%	63.6%	76.8%	na	na	na

Source: WC EMIS; Census 2001, Labour Force Surveys 2000 and 2002

Quality of primary schooling

It is good to have the majority of children in primary schooling, but the next critical question is whether that schooling is laying a sound educational foundation. Unfortunately, indications are that in the Western Cape, significant parts of the primary schooling system are not working, and there is a long way to go.

Repetition rates

Of the primary grades, Grade 1 has the highest repetition and the lowest promotion rate, which can be attributed primarily to inadequate preparation or school readiness (Table 3). Some factors that are of relevance in developing countries and may contribute to explaining the repetition rates in primary schools in the Western Cape, are:

- Schooling that cuts young children off from their home language (UNESCO 1998, 2000a and 2000b)
- Children without access to early childhood development in the form of pre-school preparation (Bot 2000, Bot, Gordon and Patel, 2001, UNESCO 1998 and 2000b). In particular, the lack of universal provision of Grade R is a concern.

- Racial inequality and poverty operate, in that African children tended to start school later than White and Coloured children in the province, were more likely to fail or repeat grades, and tended to remain in primary school long past the age when White and Coloured adolescents had moved into secondary school (Western Cape Provincial Treasury 2003).
- Heavy domestic responsibilities for girls, including care of siblings is a possible factor in the higher primary grades, given the slight difference reflected in the Gender Parity index.

Table 3: Promotion, Repetition and Dropout rates, 2000, 2001 and 2002

	Year: 2000-2001			Year: 2001-2002			Year: 2002-2003		
	Promotion Rate	Repetition Rate	Dropout Rate	Promotion Rate	Repetition Rate	Dropout Rate	Promotion Rate	Repetition Rate	Dropout Rate
Gr 1	92.1	5.2	2.7	91.6	5.1	3.3	91.4	5.5	3.1
Gr 2	95.9	4.0	0.2	97.4	3.4	-0.8	95.9	3.8	0.3
Gr 3	96.5	3.6	-0.2	97.2	3.5	-0.6	97.9	3.0	-1.0
Gr 4	93.6	5.6	0.8	95.7	3.7	0.6	95.9	3.8	0.2
Gr 5	94.7	3.8	1.6	95.0	3.3	1.6	96.5	2.9	0.6
Gr 6	95.2	2.6	2.1	95.6	2.4	2.0	95.7	2.7	1.7
Gr 7	97.0	1.3	1.7	94.3	1.5	4.2	94.8	1.8	3.4
Gr 8	79.5	10.8	9.7	90.0	2.8	7.2	89.0	5.9	5.0
Gr 9	82.0	11.8	6.2	83.2	9.0	7.8	85.9	7.3	6.8
Gr 10	70.5	14.3	15.2	68.9	14.7	16.4	64.8	18.2	17.0
Gr 11	77.9	10.6	11.5	77.0	10.9	12.1	75.3	12.7	12.0

Source: WC EMIS

Literacy and numeracy

There are a number of concerns about the quality of the foundations of literacy and numeracy being laid at the primary schooling level, arising out of recent monitoring and evaluation research. The UNESCO Monitoring Learning Achievement international project tested a national sample of Grade 4 learners in literacy, numeracy and life skills in 1999, in conjunction with a number of African countries. A large proportion of Grade 4 pupils scored below 25 per cent for the numeracy task, while only 2 per cent obtained scores in the 75 – 100 per cent range. The Western Cape scores in numeracy, literacy and life skills were well above the national average, at 37.9 per cent, but this was still far from satisfactory. The mark also hid the desperate situation in many disadvantaged schools where the average mark was significantly lower. A Joint Education Trust study of 28 disadvantaged schools in 2000 found that most Grade 3 learners could not handle mathematics at Grade 3 level, and experienced difficulty with mathematics at Grade 1 and Grade 2 levels. A separate study by the German Agency for Technical Cooperation (GTZ) in 2000 found that performance in mathematics declined significantly in disadvantaged schools between Grades 3 and 6 (WCED 2001). Recently the WCED assessed the reading and numeracy levels of Grade 3 learners in all

schools, and found that only 36% of learners performed to age appropriate levels. These studies showed a strong correlation with poverty, in that most children in primary schools in disadvantaged areas are not acquiring the foundational skills they so desperately need for secondary school. The fact that most children in the foundation phase are performing two to three years below the age appropriate level is cause for concern about the future infrastructure being laid for further and higher education, and upskilling of the population. However, because the location, scope and nature of the problem is imperfectly understood, the draft provincial HRD strategy (2004) proposes to conduct diagnostic testing in alternate years at the end of the Foundation phase (Grade 3) and the Intermediate phase (Grade 6). This will enable monitoring of the system, setting of targets and developing of interventions at school and district levels, on a more systematic basis.

SECONDARY SCHOOLING DYNAMICS

When it comes to the secondary schooling system in the Western Cape, once again, relative to the national picture, there is cause for optimism, but in terms of human resource needs for future provincial economic development, there is great cause for concern about the opportunities available for young people, to ensure their futures.

Secondary enrolment in the Western Cape has shown a year-to-year growth of more than 2 per cent on average, which suggests that there are more learners in the school system over time. Grade 12 enrolments seem to fluctuate slightly from year to year, but it is evident that enrolment has dropped relative to overall secondary enrolment. This is graphically illustrated in Figure 1, which shows the learner enrolment in public ordinary schools in the Western Cape by grade in the period 1998 to 2003.

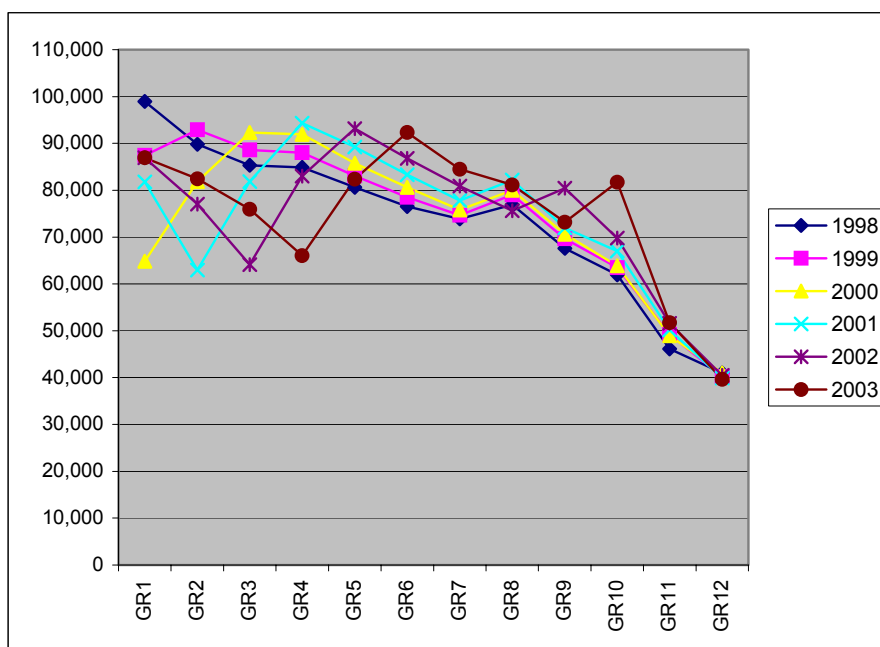


Figure 1: Public Ordinary school enrolment in the Western Cape, 1998 to 2003**A systemic problem after Grade 10**

The most significant trend in the Western Cape secondary schooling system is a substantial drop in learner enrolment after Grade 10. It is calculated that only 45-52 per cent of learners who enrol in Grade 1 reach Grade 12 (Western Cape Government 2003a). Our modelling of the grade progression of pupils who entered Grade 1 in 1993 found that only 44 per cent of these learners are estimated to be in Grade 12 in 2004. The Gross Enrolment Ratio for secondary schooling in 2003 was 78 per cent, and the Net Enrolment Ratio was 63,6 per cent, a large difference reflecting a high repetition rate and the presence of over-age learners in secondary schools (Table 2 above). In contrast to the Gender Parity Index at primary school level, there were 13% more females at secondary school level in 2001, which suggests that the drop out rates for males is higher than that of girls (Table 2 above).

High drop out rates

Declining promotion rates in Grades 10 and 11 from 2000 to 2002 are accompanied by rising repetition and dropout rates, for instance, a 17 per cent dropout rate in Grade 10 and 12 per cent in Grade 11 in 2003 (see Table 3 above). These are evidence of the practice of 'gate-keeping' in schools, in that those who are considered at risk and unlikely to pass are held back in Grade 10 and 11 or discouraged from continuing.

Racial inequality in completion of Grade 12

Again, there is strong racial differentiation in the drop out and repetition rates. Seekings (2002) found that up to the age of seventeen, enrolment in school was almost 100 per cent among White adolescents, while enrolment was lower among African adolescents, and even lower among Coloured adolescents. By the age of 18 years, African and Coloured children were 5 times as likely to have failed a grade than their White counterparts. Significant proportions of African and Coloured adolescents and youths left school without completing matric. African adolescents tended to drop out at older ages (older than 17) having completed Grades 9, 10 or 11, but without completing matric. Young African adults tended to remain in secondary school long past the age when Coloured and White young adults had left, an indication of the strong push towards obtaining credentials. However, a high proportion of over-age learners creates problems for individual schools. Coloured adolescents tended to drop out at younger ages (especially 15 and 16 years), having completed only Grade 7, 8 or 9.

The most commonly cited reasons given for dropping out were economic, and included the family's inability to afford to keep the learner in school or because the learner found a job or wanted to look for a job (Western Cape Provincial Treasury 2003). We need better insight into why 55% of an age cohort does not proceed to complete formal schooling, in order to develop targetted intervention strategies. Yamauchi (2003) argues that grade repetition

induces early transition to the labour force and worsens employment prospects in labour markets. Since those who have repeated and participate in labour markets are young and uneducated, grade repetition deteriorates labour markets, by worsening the quality of labour supply, increasing the unemployment rate and ultimately strengthening downward pressure on wage distribution.

Inequality in Learning Achievement

The high repetition and low promotion rates in the secondary grades suggest that there are severe problems with the quality of education, on a racially differentiated basis. This is evident when key indicators of learning achievement are examined.

The Third International Mathematics and Science Study Repeat (TIMMS-R) was conducted in 1998 and 1999 in 38 participating countries and tested Grade 8 learners in mathematics and science competence. South Africa's test scores in both mathematics and science were significantly lower than all the other countries, with mean scores of 275 and 243 for mathematics and science respectively. The scores are well below the international average of 487 and 488, and below the mean scores the two other African countries, Morocco and Tunisia as well as those of other developing and newly developed countries such as Malaysia, the Philippines, Indonesia and Chile. The Western Cape had the highest scale scores for both mathematics (393) and science (381) of all provinces, and was the only province where girls did better than boys in both mathematics and science (Howie 2001). Nevertheless, provincial scores remain significantly below the international average, and indicate a significant weakness in key subjects that support high skills and technology development, and the progression to higher education.

The matriculation or Senior Certificate examination (SCE) is widely regarded as the main outcome indicator of the education system. Meyer and Motala (1997) argue that as the focus shifts away from the academic bias in our schooling system to vocational education and other exit points from the system, new indicators will have to be developed. Among the major problems with using the matric pass rate as an indicator of performance are, firstly, that many pupils do not get as far as Grade 12, and, secondly, that the pass rate does not indicate how many years the successful pupils took in getting to Grade 12 (Seekings 2002). Nevertheless, the number and profile of learners who sit for and pass the SCE continues to provide an indication of the contribution of schooling to human resource development, to the stock of learners who are eligible to proceed to higher education and training opportunities.

Overall performance in the SCE

Only three provinces (Gauteng, Northern Cape and Western Cape) experienced an increase in the number of candidates writing the examinations between 2002 and 2003. All provinces recorded an increase in their pass rate in 2003. The Western Cape achieved the second highest pass rate, 87 per cent, and had the highest proportion of candidates who passed with university exemption, 27 per cent. Nevertheless, the total number of passes does not represent a sizeable proportion of the cohort that began Grade 1. Substantially more female than male candidates enrolled and passed the SCE, but their pass rate has been poorer than their male counterparts, nationally and in the Western Cape. The relatively poor performance of female candidates is not evident at the top end of the result spectrum, where more than half of the candidates passing with merit and some 60 per cent passing with distinction nationally and in the Western Cape are female. These trends have persisted since 2001 and are a clear indication that barriers to female education attainment in the 'higher quality' parts of the school system are being addressed, either systematically or through the growing confidence of women learners.

Subject results

Examination of enrolment and pass rates of candidates in the key subjects of mathematics and physical science reveal a slight increase in pass rates, but low total numbers. In 2003 for instance, 17 120 candidates passed Mathematics in the Western Cape, but only 3 938 of these on the higher grade. Similarly, 11 449 candidates passed Physical Science, but only 3 892 on the higher grade. Males tended to perform better than females in both subjects. These trends do not bode well for access to higher education and for contributing to the high skills science and technology capacity of the province.

Thus, low numbers of an age cohort progress through schooling to Grade 12, low numbers of this group pass the matriculation examination, even lower numbers achieve an endorsement that enables them to progress to higher education, and fewer still pass the key subjects of Mathematics and Science. There is strong evidence of inequality, that these trends are related to poverty and race. The Further Education and Training phase of schooling in the province is not performing its foundational function well. There is a significant problem for the 55% of an age cohort that leave without formal certification, and concern about what future their schooling has equipped them for.

Migration and movement in schools

A concern in the Western Cape is the high rate of migration into the province's schools, putting pressure on planning, provision and resources. Blanchard (1974) defines migration as driven by economic pressures, where households move in order to seek employment, which produces a secondary movement of school age dependents. Education driven

migration sees the movement of school age students in order to seek school access or access to schools perceived to be of better quality (Paterson and Kruss 1998).

African learners were historically enrolled in former Department of Education and Training (DET) schools, Coloured learners in former House of Representative (HOR) schools, and Indian learners in former House of Delegate (HOD) schools and White learners in former Cape Education Department (CED) schools. In 2003, former DET schools experienced the highest number of inter-provincial transfers, 12 506 learners, probably from the Eastern Cape. The high number of intra-provincial transfers and transfers out of former DET schools, 10 474 learners and 5 632 respectively, is indicative of pupils searching for 'better' schools. Former HOR schools had the largest numbers of learners in terms of intra-provincial transfers (27 351) and learners transferring out of these schools (17 259). There is little movement around former HOD schools, and considerable movement out of former CED schools, probably into private schools (9 192 transfers as well as 9 843 intra-provincial transfers). While it is difficult to track migration on school level data, investigation of the phenomenon suggests that it reflects a strong demand for schooling on the part of learners and their families.

A recent study on migration in the Western Cape reports on the power of perceptions and how they influence decisions taken by both parents and learners (Cloete 2002). Middle class African township residents tended to be very critical of township schools. The standard of education in the Western Cape is perceived as superior to that offered in the Eastern Cape, schools in formerly Coloured neighbourhoods are perceived to be superior to schools in African townships and schools in formerly White neighbourhoods are yet again perceived to be superior to both. The perceptions are that the Western Cape has a significantly better infrastructure and offers a relatively better quality of life than the Eastern Cape and Northern Cape, from where most of the migrants hail. Concern for children's schooling remains strong in rural Coloured communities, and is capable of affecting migration flows, with learners often lodging with kin to be able to access better schools in the metropolitan area (Mongwe as cited by Cloete 2002). Coloured learners have moved in significant proportions to formerly Indian and White schools. A picture of significant intra-provincial movement of learners between schools in the Western Cape emerges, reinforced by the work of Van der Berg and Achterbosch (2001), who conclude that movement is connected to 'school searching' rather than migration from other provinces, and that consequently, the extent of intra-provincial transfers should be a greater concern.

A high transfer rate and enrolment volatility do not contribute to a stable education environment in the province. The impact of intra-school migration on former DET schools, and those who are 'left behind' in the townships, is considerable. The potential problems caused by intra-provincial school migration require a parallel process of school and urban planning, and the construction of spatial frameworks. On the positive side, these studies

illustrate a strong aspiration on the part of learners and their families to obtain what they perceive to be a good education, and their preparedness to move, at some expense, to pursue credentials, which is a potential lever for change.

INFORMING A MICRO-ECONOMIC DEVELOPMENT STRATEGY

A profile of transition through the public schooling system reveals that while the province performs well relative to the current national trends, if it is to lay a foundation for the development of a skilled and 'learning' population, there remains much work to be done. The provincial education department is striving to improve the quality of schooling and equality of outcomes, in concert with national policy frameworks and initiatives through targeted interventions, in a difficult context, but these take considerable time to have an effect. This section considers alternatives that can deepen such interventions, in relation to two key challenges.

Strengthening the foundation of literacy and numeracy

At the most fundamental level for future growth and human resources development in the province is the need to construct a sound pre-school Grade R sector. Closely linked is the need to develop stronger foundational literacy and numeracy skills, particularly in the first three years of primary schooling.

There is little that can be done by others than the Department of Education at this systemic level. It is best placed to focus on policy and interventions concerned with enhancing education quality, to extend education to all in the Western Cape and to deepen the practice of educators and school managers. A draft HRD strategy in the WC has detailed targets in place to extend Grade R provision by 2014 (WCED 2004), and to improve the quality of numeracy and literacy at the foundation and intermediate phases, through diagnostic testing and redress interventions at school and district level. Although these plans will take time to implement and mature, the strategic direction of the province should be endorsed and supported in the long term future interest. There are however, initiatives in the NGO sector that can be enlisted in support of literacy, reading and numeracy campaigns, and a stronger network underpinning provincial interventions would be significant.

Towards higher rates of school completion

The racialised patterns of dropout and repetition suggest a serious disjuncture in the secondary schooling system in the province. Addressing the disjuncture ultimately requires a joined-up cross-sectoral solution. If employment were to increase, leading to a decrease in

poverty levels, it would lessen the economic pressure on young people and their families to leave school early, improving retention. At the same time, the WCED is best placed to develop strategies to improve the quality of schooling, to address high repetition and poor promotion rates. School change and school improvement is difficult and complex, requires long time frames and educational expertise, in particular, an appropriately qualified cadre of teachers and educators and adequate resources. However, here there is considerable scope to involve the province's social partners, through a micro-economic development strategy.

The WCED draft HRD plan (2004) aims to increase the total number of 16-20 young people obtaining a FET qualification (bearing in mind that the FET certificate will replace the matriculation examination in 2006). The plan also proposes to shift a greater proportion of learners away from a general academic orientation based in schools, and towards general vocational and occupational tracks based in FET colleges. It highlights that the relevance of subject options and the prospect of the FET qualification leading to employment are critical in motivating learners and their parents to pursue education.

There are a number of critical questions to be addressed, in this regard. First, is the difficult issue of funding priorities, in the context of increased number of learners, decreased funding in the MTEF, and the mandate to provide good quality General Education and Training. We would require specific in-depth research on the economic returns to education at different levels, to guide and support such decisions (see Reinikka and Smith 2004 for example). The MEDS will need to problematise and resolve the budgetary constraints to identify a way in which the province can improve GET and *at the same time*, improve retention – and quality – at the FET level.

The Western Cape has an advantage in the high proportion of the school going population already in school, relative to the national picture, and to many other developing countries. The priority now is to convert this to success and retention. It is in the interests of provincial growth to have a larger proportion than 45% of an age cohort with good levels of general education. In the absence of better and more equitable educational achievement in the province, the adequacy of the labourforce is unlikely to improve (WPT 2003: 66). Increasing the proportion of young people with general education can be critical to a MEDS, and there is space for multiple interventions.

For the WCED, the way in which the new Further Education and Training Curriculum is introduced, and the attempt to promote FET colleges as an alternative route, will be critical. Any interventions will need to be carefully managed in terms of the dimensions of culture and values. A high value has been placed traditionally on the matric certificate as a symbol of a high quality academic credential and passport to future employment. In the Western Cape, the high levels of intra-provincial migration to what are perceived to be better schools

is evidence of this aspiration for high status credentials, on the part of parents and learners. Ashton (2004) has pointed to a problem in South Africa, where the typically low status of unskilled and semi-skilled work is intensified by its strong association with racial subjugation and inequality. Vocational education and training in South Africa suffers from a similar dynamic historically, and has had low status. Parents may not choose alternative routes if the quality of the general education offered in FET colleges is not perceived to be credible.

But, again, ultimately, for alternative credential and skills routes to be attractive, they have to be linked to real employment opportunities – and this is beyond the direct control of the WCED. It will involve developing more systematic relationships between other government departments, business and industry, and those involved in schooling.

There is a strong need for evidence-led planning, to identify alternative and differentiated educational routes. Interventions may have to be targeted to overcome racialised patterns to be effective, for instance, many Coloured youth are not seeing the value of credentials, and leaving school early, while many African youth remain in school way beyond age appropriate, in a determined but often ill-fated attempt to obtain credentials. Some suggestions are introducing different curriculum options in schools, offering improved career guidance, offering learning support and enrichment programmes, and motivational programmes to reinforce the value of a good general education. Campaigns with social partners could include meaningful programmes to expose learners to the world of work and job shadow schemes, increasing the number of learnerships or apprenticeships at FET level, or part-time employment schemes targeted at young people. They could provide a critical focus for an expansion of the Learning Cape festival. The Child Support Grant administered by the Department of Social Services and Poverty Alleviation could be leveraged as an incentive for children of school going age to stay in school. NGOs and civil society partners may support those young people who wish to complete the FETC but do not have the financial means, or who may need additional support to do so. Such campaigns could be led by the WCED and conducted in collaboration with the Department of Economic Development and Tourism and provincial Department of Labour, and in partnership with the private sector.

In conclusion, there are provincial efforts to address the key challenges of schooling, which need support and ‘joined up’ action to succeed. There is considerable scope for the social partners in the province to be drawn in to creative programmes led by the WCED, to address the low completion and retention rate in secondary schooling, and contribute to the general levels of education of the provincial workforce, whether young people will then proceed to the workplace, to further or to higher education. The following chapter will explore the alternative options for young people at the intermediate skills level.

Chapter 3

PROMOTING INTERMEDIATE SKILLING IN THE WESTERN CAPE

The danger of an exclusive high skills route in a country like South Africa is that it ignores the 'middle society' so central to social stability in an age of globalisation. There is a tendency to over-exaggerate the shifts towards a knowledge economy, to higher value added production and high skill services in a country like South Africa. Much of the economic activity of the past continues, in the form of an expanded manufacturing sector, a revitalisation of the mines and farms, in the state and in formal SMME activity (Kraak 2004). Intermediate skilling has played a central role in the process of deracialisation and modernisation of the labour market and economy, beginning in the 1980s but especially consolidated since 1994. There is thus a continued dependence in South Africa on intermediate skills. Indeed, the evidence suggests that companies are more likely to experience skills shortages in intermediate level occupational categories such as competent technicians, artisans and operators (HSRC 2000, Kraak 2004). A current skills shortage in the construction industry is reported to impact on major capital engineering projects (Van Heerden and Marais 2003). The shift to a services economy relies on an administrative and clerical labour force with good intermediate skills. A number of key sectors such as the ICT sector also continue to be highly dependent on continuous education and training at intermediate skills level (Moleke, Paterson and Roodt 2003). Thus, a multi-level skills strategy leads us to reinforce the value and significance of sectors that rely on intermediate skills, as an integral component of South Africa's development trajectory.

Improved intermediate skills will rely not only on well-educated school-leavers, including those with Grade 12, but also on the up-skilling of the existing workforce. There are thus a range of institutional sites within which intermediate skills are developed – public and private Further Education and Training colleges, agricultural schools and colleges, enterprise based training, SETA co-ordinated learnerships and skills development programmes. Intermediate skills development is complex, in that it operates at the meeting point of a series of interlocking national and provincial policies (from skills development to qualifications frameworks to sectoral strategies and education and training policy, to name a few), and hence, there are multiple governmental structures involved, reflecting potentially conflicting concerns.

The definition of intermediate skills is currently contested, in that they exist at the inter-face of the Further and Higher Education bands in South Africa (Kraak 2002). The key qualifications lie on the FET band, NQF levels 2-4, but includes Level 5, certificates and diplomas on the HE band. The working definition of intermediate skills adopted is all education and training leading to post-GET certificates but pre-degree qualifications.

The Western Cape has prioritised key labour intensive sectors that rely on intermediate skills, such as manufacturing and agriculture, that were traditional strengths in the province, but that have made a decreasing contribution to economic growth in recent years, as well as new sectors such as ICT that have a critical intermediate skills base. The question is whether intermediate skills provision in the province can meet current and future expanded demand. This chapter provides an overview of supply side capacity, potential and constraints, to map out the multiple sites of provision in the public sector and in the private sector.² It argues for the recognition of a provincial intermediate skills sector, and the importance of co-ordination and alignment between the components.

THE CONTRIBUTION OF PUBLIC SECTOR INSTITUTIONS

The capacity of the public FET college sector in the Western Cape

The Western Cape has six new multi-site public FET colleges, with a concentration in the metropolitan area and a presence in the Boland, West Coast and South Coast regions (Figure 2). As with public schooling, the FET sector performs well in relative terms, when compared with the rest of South Africa.

- In 2002 it was the third largest provider of public FET after Gauteng and KwaZuluNatal, and had the second highest net participation rate, with a steady growth in numbers since 1998 to some 46 000 headcounts and 17 463 FTEs.
- It is very healthy in terms of its efficiency levels, as expressed in a pass rate of 70 per cent in 2002, the highest nationally (57 per cent average), and the average throughput rate of 60 per cent is also the highest nationally (51 per cent average).
- The college sector as a whole is financially healthy, with the second highest investment balance in the country and a higher return on investments than the national average, and was rated by KPMG as a low-to-moderate financial risk – the lowest category of any province in 2002. Note however, that it has the highest class fees nationally.

² The chapter should be read in conjunction with a background paper that provides a profile of intermediate skills provision in the Western Cape. Its conclusions draw on the detailed empirical analysis presented in this paper, which in turn, is informed by prior research commissioned by the Western Cape Department of Economic Development and Tourism
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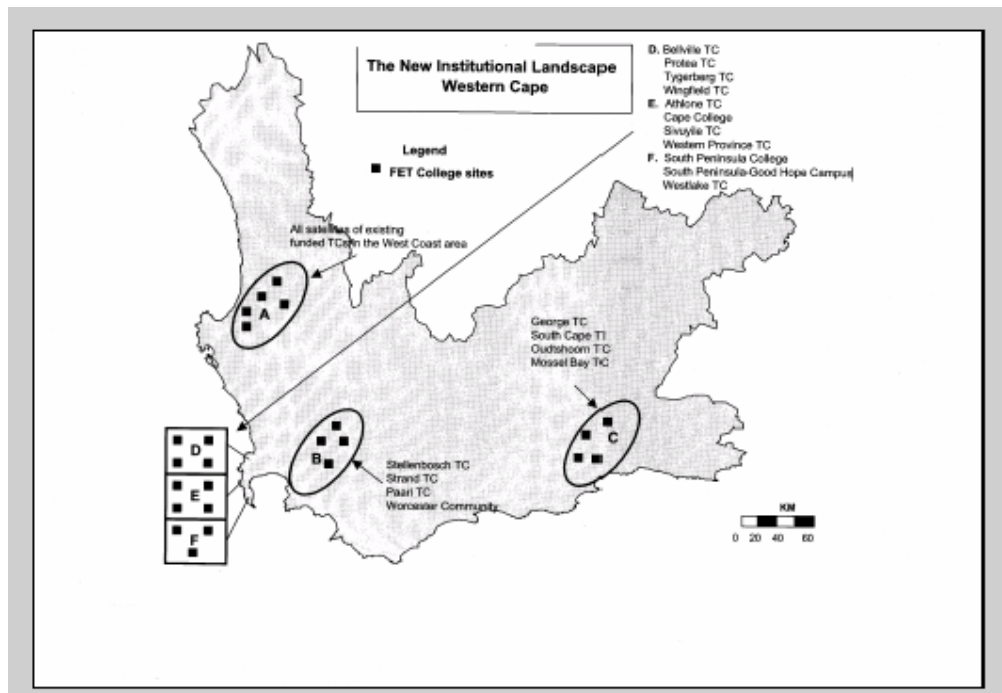


Figure 2. Public FET colleges in the Western Cape

- Its extent of partnerships with industry, government, community organisations, other educational institutions and SETAs is also amongst the best nationally, suggesting a level of responsiveness and an outward looking vision that will be important for the future.
- Likewise, strategic plans show that colleges are growing in awareness of the need to be reflective of local, provincial and national needs, with greater emphasis on diversifying into niche areas focused on local economic priorities.
- The colleges are building a wide portfolio of learnerships, engaging with 16 of 25 SETAs at present, but with surprising absences given provincial priorities. Many learnerships appear to be well articulated with local economic development issues, particularly in the three non-metropolitan colleges.

Nevertheless, following extensive critique of their poor image and quality (Kraak and Hall 1999, NBI 1999, Powell and Hall 2000, Fisher, Jaff, Powell and Hall 2003), all FET colleges nationally are at the early stages of a process of change towards becoming flexible, responsive and high quality providers, framed in terms of national policy goals for the FET sector (Department of Education 2001a). The Western Cape colleges are amongst those making progress, but there are still major challenges.

- Curriculum diversification is progressing but is still limited, both with regards to NATED (National Education Department official curriculum for N1-N6) and non-NATED programmes. Non-NATED programmes are customised to client need, or

in response to socio-economic need in the informal sector, such as bricklaying, or road construction. In terms of NATED, the province shows a healthy range of delivery including in niche areas, which compares well with national trends. There is a strong concentration in the two traditional fields of business studies (55 per cent) and engineering (29 per cent), an increase from 2000, followed by utility studies (11 per cent). As regards non-NATED delivery, performance with respect to learnerships is particularly strong, with considerable variation between the fields offered by individual colleges.

- Colleges have seen few shifts towards racial equity, with 27 per cent of learners being African, as opposed to the national trend of 73 per cent African learners. While this reflects the demographic particularities of the province, it is an indication that FET colleges have not been seen as a credible option for African learners in this province. The profile of students showed a shift to White (up to 34 per cent from 27 per cent in 2000) and away from Coloured learners in 2002 (down from 41 per cent in 2000 to 37 per cent). There are significant differences in the racial profile of the six colleges, particularly those based outside the metropolitan area. For instance, West Coast was almost entirely Coloured with 98 per cent, whilst Boland had 56 per cent White learners.
- Although the provincial proportion of female learners is better than the national average, there has been a decline in female learners to 40 per cent in 2002, and the pattern of enrolments is still resolutely traditional with a concentration in utility and business studies.
- The majority of learnerships nationally were registered at the intermediate skills band, some 47 per cent in 2002, and learnerships have grown rapidly, to an absolute number of 1798 learnerships reported in the province's FET colleges in January 2004. Whether this is sufficient in relation to the potential scale of demand from young people, and to contribute to the targets set by the National Skills Development Strategy, of 80 000 learnerships to be registered by May 2005, remains a challenge.
- There are significant differences between colleges, based on historical racialised patterns. Particular challenges face West Coast College, recently formed from a merger of satellites of other colleges in an area of low population density. It is still far weaker than the other colleges, and needs to be assisted in building enrolments and improving throughput rates in the short term, whilst remaining mindful of the importance of relevance to local needs.
- The colleges continue with significant delivery, 41 per cent, at the post-FET level (N4-N6), which is formally included on the higher education band of the NQF. This is despite national policy injunctions, and represents a smaller shift than the considerable national move towards the FET band, with 38 per cent of provision nationally now on the post-FET band, down since 1998 (47 per cent). Whether colleges should continue with provision at Level 5 has been highly contentious, but

there is a strong case to be made that such provision is significant for creating an academic base within the colleges.

Public FET colleges are expected to meet multiple demands, to which is recently added the expectation of the draft HRD strategy (2004) that they will provide an alternative vocational route to the FETC for a significant proportion of the 16-25 year old population, which is not finishing formal schooling on a general academic route. Whether this is a realistic strategy needs to be considered. For instance, current headcount capacity of FET colleges is approximately 45 000 enrolments. In order to meet the proposed target, to increase the number of 16-25 year olds in FET colleges by 40 000 within ten years (WCED 2004), the system would have to virtually double in size. The sector has traditionally catered for those who have already completed the schooling component of the FET band. A focus on younger, less educated and less mature learners has consequences for the type of learning and student support that will be required. The cost to the quality of the FET college system that is so painstakingly being re-constructed may be too high, and the challenge is that such a strategy will need to be carefully resourced and planned.

The contribution of agricultural schools and colleges

Agriculture is a traditionally strong economic sector in the province, which has been prioritised for a micro-economic development strategy. 'Agriculture' is structured into the curriculum in different ways in different institutional sites in the Western Cape:

- *Agricultural Science (Higher Grade or Standard Grade) is offered as a stand alone subject choice in the FET band in an ordinary public high school.* A comparatively low proportion of schools, 38 offer Agricultural Science as a subject in the province, with a relatively small average number of learners per school, 35 in 2003, dropping to an average pass rate of just over twenty (21.3) per school. The Western Cape had the third lowest pass rate of Agricultural Science candidates nationally, which at 62.9% is well below the national pass rate of 74.4%. The key problems experienced are that it is presented purely as a theoretical subject, and learners tend to see it as a soft option.
- *Agricultural Science (Higher Grade or Standard Grade) and Applied Agricultural Science (Standard Grade only) are offered in combination in one of 47 special Agricultural High Schools, together with other subjects in the FET band.* These schools usually have a balanced economic farming unit (a working farm) which provides sufficient agronomic and livestock material for demonstrations and training purposes (Agricultural Digest 2000/2001). The agricultural focus does not disadvantage learners in terms of post FET career or study choices, with the choice of subjects wide enough to enable scholars to obtain a university entrance exemption. The Western Cape has three specialist Agricultural High Schools, with a total enrolment of 175 learners. These schools provide a more balanced experience in which

agricultural theory is linked to practice in a working farm environment, but the institutional cost of providing this experience will be significant.

- *An agricultural science curriculum is offered at a College of Agriculture leading to the award of a three year Higher Certificate in Agriculture or a two year Diploma in Agriculture. Elsenburg College of Agriculture is the only such institution in the Western Cape Province. The College offers advanced agricultural training in the form of Certificate, Higher Certificate and Diploma in Agriculture programmes in various disciplines. Training is aimed at the needs of a broad spectrum of target groups, namely prospective and practising emergent and commercial farmers, and agriculturalists such as extension officers and farmworkers. There are agricultural development centres linked to Elsenburg College situated at Oudtshoorn, George, Vredendal and Moorreesburg. Research is aimed at solving industry related problems and developing plant production (small grain, pastures and alternative crops), and the animal production industries (small stock, dairy cattly, pigs, ostriches and aquaculture). The student enrolment at Elsenberg for the period 1999 to 2002 ranged between 280 and 240 students and appears over a four year period to be reasonably stable. The number of students who completed either the Higher Certificate or the Diploma in Agriculture at Elsenburg College rose from 66 to 91 between 1999 and 2002.*

In general, the Western Cape has a relatively small output of individuals with experience of agricultural education offered at the FET and intermediate skills levels in public institutions. The total number of individuals:

- completing agriculture as a Senior Certificate subject was 881 in 2003
- completing a Senior Certificate with compulsory Agricultural Science and Applied Agricultural Science was approximately 175 in 2003
- completing either a Higher Certificate or a Diploma in Agriculture was 91 in 2002

To what extent does this output of approximately 1150 graduates in 2002/3 match the intermediate skills needs in the Western Cape agricultural sector? This is an easier question to pose than to answer for several reasons:

- First, the potential for learners completing Agricultural Science at Senior Certificate level to enter agricultural occupations is tenuous, since the subject is usually taught without any practise-based component. Agricultural Science need not necessarily be presented as a vocational subject, but this is a matter for policy debate. Furthermore, the national numbers of learners who enrol for Agricultural Science and who also enrol for Mathematics and Physical Science in Grade 12 is low. Therefore, the proportions of high school learners who can convert an interest in Agricultural Science into an Agricultural degree choice is limited.
- Second, only in the specialist Agricultural High Schools and the Agricultural Colleges does the subject incorporate a strong vocational backbone. There are however important curriculum issues around the extent to which programmes are

oriented to skills and knowledge needed in growth agricultural sub-sectors of the Western Cape, such as the wine industry.

- Third, the demand for skills in the agricultural sector is strongly influenced by the impact of technology, which can have a dual effect of forcing losses among low skill occupations and skills shortages in intermediate and high skills.
- Fourth, we need information about other forms of training opportunities that may be provided by employers or agricultural extension officers in the private or public sectors. Agricultural extension services provided by the public sector have waned over the past decade. More important in the Western Cape will be to the extent to which enterprises working in the primary and especially the secondary agriculture sectors, provide workplace training. An allied question concerns the extent to which employers in any way consider job applicants who have Senior Certificate Agriculture to be more employable than those that do not.
- Fifth, human resource development questions in the field of agriculture are also complicated by patterns of rural-urban migration and circulation that are both intra and trans-provincial in nature.

The evidence suggests the potential value of a co-ordinated strategy towards the agricultural sector, which would take into account subject options at secondary and agricultural high schools, vocational programmes at FET and agricultural colleges, and enterprise based training.

The contribution of the technikon sector to NQF level 5 programmes

Technikons have played a crucial role in the provision of intermediate skills at the post-school, pre-degree levels. The main target group is pre-employed youth, school leavers with a matriculation certificate, but not an exemption. With the move from advanced colleges of technology to technikons and now the aspiration to become universities of technology, there have been significant shifts in technikon enrolments nationally that suggest a strong drive towards high-level skilling. Enrolments for certificate qualifications have virtually disappeared to less than 1 per cent of enrolments nationally, in favour of the three-year National Diploma, and increasingly, the B Tech degree. The National Diploma is a three-year qualification, which is designed to provide for 'development of a theoretical knowledge base, high order cognitive and interpersonal skills and broader practical applications, together with a real or simulated work experience, which will allow the student to embark on a career' (CTP 1995:10).

The upward academic drift has not been experienced as strongly in the Western Cape. The two technikons, soon to merge to form a university of technology, are at this point still an important player in delivery at NQF Level 5.

- They are heavily engaged in providing intermediate skills at the National Diploma level, with 81 per cent of enrolments, some 18 768 learners, and 67 per cent of graduates at this level. Nationally, there has been a shift to the BTEch, which now constitutes 31 per cent of national enrolments, nearly double the 17 per cent of Western Cape enrolments.
- The Western Cape technikons have a good proportion of enrolments in Natural Sciences, 55 per cent, as opposed to 32 per cent nationally. Enrolments in Business, Commerce and Management still predominate as the single most popular field of study (32 per cent), but the provincial percentage is far lower than the national figure of 56 per cent, and the province had twice the national average proportion of engineering students (24 per cent).
- Combined, the two technikons make a significant contribution to national enrolments in a number of SET fields, particularly engineering (27 per cent of national total), health sciences (31 per cent), home economics (32 per cent), industrial arts (45 per cent), computer science and data processing (15 per cent). Their contribution to business, commerce and management enrolments, at 8 per cent, is relatively low. The B Tech degree, although increasing in significance, is not necessarily contributing to an increase in science and technology provision in the province with stronger enrolments and graduates in fields of Education and Business, Commerce and Management.
- Technikons have a long tradition of co-operative learning at the heart of the intermediate skilling that they offer, which offers experiential learning through work placements. Current policy imperatives have renewed and expanded their role in career-oriented education and training, and highlight the significance of more effective technikon-industry linkages, particularly in the Western Cape (Lundall 2002).
- The technikons have begun to establish learnership programmes but there are concerns that these should not displace traditional co-operative learning work placements in industry³. Their relationship with SETAs is complex, and mechanisms need to be found to facilitate both greater collaboration and more effective alignment of supply side provision with labour market demand (Lundall 2002).

Through the high levels of provision of the National Diploma, Western Cape technikons contribute to the development of intermediate level science and technology skills both in the Western Cape and nationally.

However, the shift towards universities of technology is likely to place greater emphasis on the higher level qualifications and on research as opposed to teaching, if these institutions are to live up to the expectations traditionally associated with the term 'university' and the

³ An attempt to obtain current learnership statistics was unsuccessful. Neither technikon was able to supply the requested data, which was not centralized.
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example set by eminent international universities of technology which they aspire to emulate. The result could well be an increasing emphasis on theoretical and transferable, general skills rather than career-oriented training, with the B Tech and M Tech acquiring greater significance in relation to the National Diploma. If the Western Cape follows national trends towards degree level programmes in the Humanities, this could lead to a significant intermediate skills gap at NQF level 5. Given the policy injunction to FET colleges to reduce level 5 provision, there is a danger that public provision will increasingly diverge, leaving a gap in the middle. Clearly, there remains a need to explore the interface between further and higher education, which would facilitate articulation and progression.

THE ROLE OF PRIVATE PROVISION AT THE INTERMEDIATE LEVEL

Public FET colleges and technikons concentrate primarily on the young, pre-employed full-time learner, yet to make the transition to the workplace. There are significant other target groups for intermediate skilling who have made the transition to the workplace, the employed who require upskilling. A key issue here is access to training conducted according to standards, so that skills can be accredited, and for the individual to have access to career pathing. FET colleges and technikons are increasingly under pressure to expand provision, particularly to those who are self-employed in SMMEs. However, there is little formal public provision for this constituency, and it remains the preserve of private providers, in multiple sites, whether formal or based at enterprise level.

Private FET provision

Since 1990 there has been a striking surge in private provision at both the higher education and further education levels, largely career and occupationally oriented. A significant number of registered private higher education providers offer specialised credentials at NQF Level 5, in service oriented occupational fields like film and media, health and beauty, ICT as well as the ubiquitous business and management (Kruss 2004a). Unfortunately, we have little data on the extent to which such provision is offered in the Western Cape specifically, but judging from national headcount enrolments of 28 987 in programmes certificated by registered institutions in 2001, the provincial scale is not likely to be very large.

However, we are able to draw on an HSRC study of private pre-registered FET provision at Levels 2-4, to provide a provincial profile (Akoojee 2003, Department of Education 2001c). The Western Cape had the third highest proportion of private FET provision sites (13 per cent), after Gauteng (27 per cent) and KwaZulu-Natal (22 per cent), and was home to the third highest proportion of head offices of private training providers. Provision is highly concentrated in and around the Cape Town metropolitan area, and to a lesser extent, the Boland (Figure 3). The majority of these providers were focused on for-profit provision to

an urban clientele, and this is significant to understanding their contribution to intermediate skilling in the province:

- There is an estimated headcount enrolment of approximately 41 500 at these private providers, but this figure is not remotely comparable to the FTE enrolment figures for public colleges, as the majority are enrolled for shorter courses than typical in the public system. As an indication, nationally, 46 per cent of private FET provision lasted less than a month and only 16 per cent a year or more.
- Further analysis of the level of provision indicates that 60 per cent of learning taking place in the Western Cape was actually at GET level. This raises serious questions about the quality of such intermediate skilling.

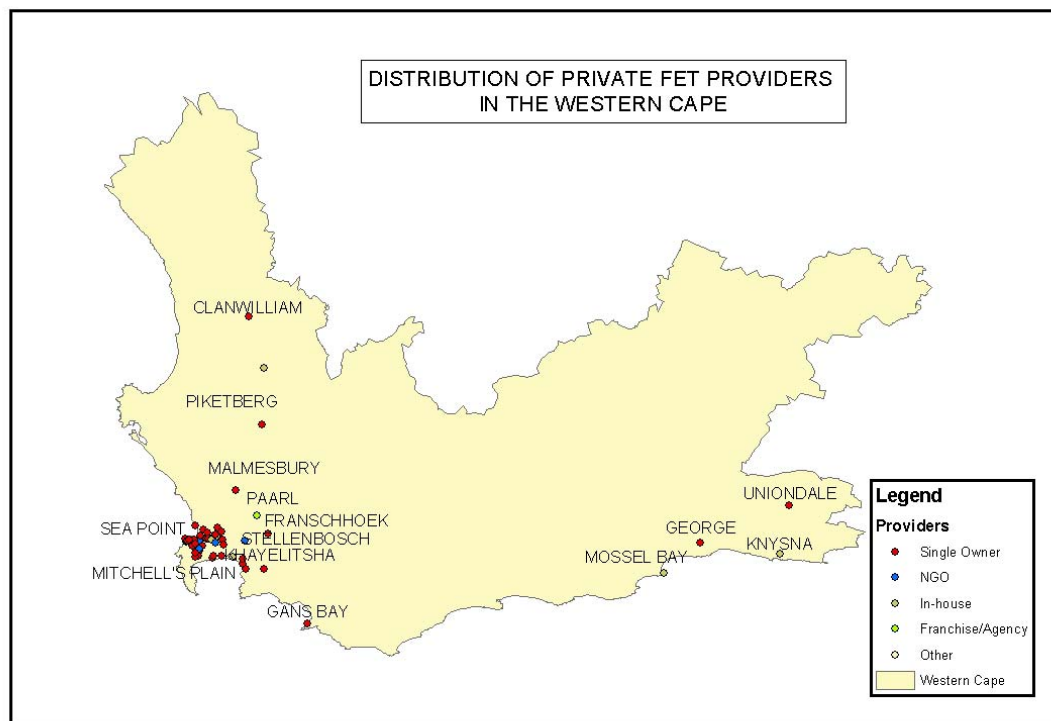


Figure 3. Private FET providers in the Western Cape

- The fields of focus are narrow, and the range of programmes largely reflects the national and international trend for private provision to concentrate on low cost, high demand fields of business, ICT and education.
- The learner profile was striking, again reflecting that providers in the Western Cape have not Africanised to the same degree as the rest of the country. The learners are predominantly male (75 per cent), Coloured (73 per cent), over-25 (73 per cent) and employed (92 per cent).

- The staffing profile was predominantly White (50 per cent), together with a large Coloured and small Indian complement, and only 11 per cent African staff, against a national average of 46 per cent.

At present, there is a limited role for private FET provision in the Western Cape in relation to the upskilling of mature students already in employment, in a limited range of fields. It is highly likely that if we were able to calculate FTE enrolments, the scale of provision would not be significant. The question remains why the sector attracts such a specific target group, employed Coloured males, who have identified the need to pursue intermediate credentials. There is clearly a perception at work here, that upgrading skills is necessary for promotion or improving employment status.

In that it is targeting a different constituency to that of public FET, the private sector may offer complementary intermediate skills provision. However, at present, there is little to indicate that the for-profit private FET sector is attuned to either growth or equity strands of the provincial strategy, especially outside of the metropolitan area. The sector remains unregulated, and it is likely that once a proposed national regulation process unfolds, it may reveal serious concerns about the quality of provision. The challenge is for the province to engage with this sector to draw on its expertise in upskilling those in employment.

Enterprise training: an employers' perspective

Nationally, there is evidence of a decline in enterprise training from 1986 to 1998 (Kraak et al 2000), which reflects a historically evolved enterprise culture unconvinced of the value of training. The policy and strategies initiated under the umbrella of the National Skills Development Strategy have to begin to reconstruct a 'learning society' off this low base.

A recent HSRC national survey of skills practices in small, medium and large enterprises (Paterson, McGrath and Badroodien 2004) suggests a continued employer reluctance to recognise the value of training and invest in it, but that there are indications of progress which can be exploited to deepen skills development strategies:

- The national data paints a picture in which South Africa is neither particularly strong nor weak in terms of expenditure on training or participation rates.
- However, it shows little progress towards high performance workplace practices and very uneven, but largely unsatisfactory, performance on equity.
- Enterprises in the Western Cape do not necessarily feel that there is any particular occupational category that needs skills upgrading to a great extent.
- There is no skill identified as particularly lacking, but there are indications that the most serious skills concern in the Western Cape relates to IT skills, both professional and general user.

- There are encouraging signs that enterprises in the Western Cape would increase training in response to increased demand for their products and services, and to meet productivity targets, which suggest that they see prospects for growth.
- There is major reliance on informal 'on the job' training and 'in-house' courses conducted by enterprise staff themselves in the Western Cape.
- There is relatively little focus on learnerships or apprenticeships, the least common training modes. Employers in the province were more positive about their intentions, which suggest a propensity to initiate learnerships that can be exploited by SETAs.
- A very low proportion of employees trained in the Western Cape were trained in accordance with local or international standards, only 16.1 per cent, and only one quarter of these qualifications were NQF aligned.

Evidence from the National Skills Survey 2003 suggests that much of skills development within the province will continue to take place informally within enterprises. It is questionable whether enterprise training is sufficient in scale and quality of provision to support current economic needs, and even less so, future economic growth. The challenge for the province is articulation between what takes place inside enterprises in terms of training, and the value that can be added by both public and private providers to address this intermediate skills deficit.

Enterprise training: a SETA perspective

The National Skills Survey 2003 noted glimmers of potential, in employers' expressed willingness to support learnerships and skills programmes in the future. An alternative perspective on workbased learning in this regard is available from the government established Sector Education and Training Authorities (SETAs) operating to co-ordinate and drive skills development in the province. SETAs operate in terms of national economic sectors, with national competence, but skills provision takes place in provincial sites of learning, leading to an information and hence planning gap. It is critical to have a sense of the work of SETAs on a provincial basis, to inform provincial strategies.

A recent study commissioned by the Western Cape Department of Economic Development and Tourism profiled the provincial programmes of the SETAs (WCDED&T et al 2004). A database was compiled, setting out provincial skills priorities and provision against national and provincial sector profiles, where available.

The learnerships data trends largely confirm the concern of the Minister of Labour about the efficacy and performance of SETAs, and the slow pace in meeting the national target of 72 000 learnerships by 2004. Targets for learnerships largely remain national. Seven SETAs do not intend to set provincial targets, while four have yet to do so. Significant numbers of

learnerships, a thousand or more, have been targeted by only a few SETAs, such as MERSETA (manufacturing sector). Targets for the remaining SETAs are within the range of 74 to 470 learnerships, many for the unemployed. A sample of learnerships that have already been set up in the province suggests that the majority of SETAs have very small numbers currently involved, relative to the targets and to the potential pool of unemployed and employed workers available for upskilling.

While there is considerable variation between SETAs, it is noticeable that few are providing significant numbers of learnerships or skills development programmes in the province at present. There is however, a wide range of innovative projects at various levels, including ABET programmes, which it is hoped will be effective in future. Such projects need time to mature and develop to accommodate a larger scale of employed and unemployed learners. There is also evidence in some SETAs of growing expertise in identifying sectoral needs on a provincial basis, and in developing partnerships to guide, support and implement their programmes. The challenge for the province is to articulate the SETA's growing expertise on sectoral skills development needs, particularly those in key provincial priority sectors, with providers, employer organisations, government departments and development agencies.

The SETAs themselves have identified constraints and challenges, which will be useful to inform future engagement to improve the situation and enhance the implementation of plans. These can be organized into four areas of concern:

1. Constraints related to employers and the nature of the workplace. The major concern was a lack of buy-in on the part of employers, and lack of willingness to host learnerships. A second concern was the need to target programmes to meet the specific needs of SMMEs, the majority of workplaces in the province, more effectively.
2. Constraints related to learners. Identifying learners was often difficult, as was placing them at the appropriate level. Some sectors have an extremely low skills base with a huge need for ABET across many occupational categories, which makes learnership implementation difficult. Conditions that make it difficult and more demanding to balance training with work schedules, such as suitable mentors, language of learning materials, and time constraints all need greater attention.
3. Constraints related to the training itself. There is a huge need for accredited and suitable providers, particularly outside of urban areas, and with the capacity to develop materials. Incentives to workplace providers are seen to be inadequate, and public providers are reported to be slow in adjusting to the new skills development framework, and have a poor relationship with private providers.
4. Constraints related to policy and planning environment. In general, SETAs reported a poor understanding and grasp of the new education and training policy environment. Employers, providers and learners do not adequately understand the

concept of the NQF or learnerships, for example. Planning is hampered because many SETAs do not have provincial offices, and in fact, only eleven do. There is little co-ordination or linkage between SETAs especially in relation to quality assurance. SETAs have not allocated sufficient amounts to create credible provincial capacity, especially for monitoring learnership implementation.

These constraints suggest a huge need for advocacy and capacity building around skills development, with public, private or workbased providers, with employers, particularly in SMMEs, and with some SETAs themselves.

STRATEGIC ENGAGEMENT TO DEVELOP INTERMEDIATE SKILLS LEVELS IN THE WESTERN CAPE

Potential and constraint

It is evident that there is a considerable skills gap at the intermediate level nationally, in terms of the scale, focus and quality of both public and private provision. The Western Cape province fares well relative to the national picture, in that it has public FET colleges that are beginning to display greater responsiveness and sound quality, it has a very small sector that provides agricultural education, with potential for expansion, it has a technikon sector that offers a good proportion of SET programmes, a private FET sector that addresses a segment of upskilling, learnerships are beginning to take off and there is growing awareness of the significance of upskilling at enterprise level.

Equally so, there are considerable constraints and gaps. The first major constraint is that the level of provision is not extensive in absolute terms, particularly to support future growth surges and moving up the skills chain. A second major constraint is that on the supply side, there are a number of institutional sites for provision targeting specific segments of the workforce. The public FET colleges are currently faced with multiple demands:⁴

1. Their traditional role to provide post-schooling career-oriented further education at NQF Levels 4 and 5 to pre-employed youth, to enhance employability, which is potentially significant as an alternative route into the work place or higher education.
2. Traditionally, they also provided a route to a 'second chance' matric, but there is now a new task proposed in the provincial HRD strategy (2004), to provide an alternative high status general vocational route to schooling equivalent to Grade 10-

⁴ These demands are potentially conflicting, evident for example in considerable debate about the appropriate entry age and qualifications, related to pathways after the GET certificate.

12, as a means of addressing high dropout rates and lowering youth unemployment in the province.

3. Another new role, from a new constituency, the employed, is to provide for upskilling in established enterprises and entrepreneurship training for SMMEs, both formal and informal.

A great deal is expected of FET colleges, which traditionally have been regarded as the 'cinderella' of the education system. These multiple demands come at a point in time when they are beginning to display success in reconstructing themselves. For instance, it is difficult to envisage how colleges will simultaneously supply the educational ethos required for the development of young people within the context of schooling, and provide a satisfactory post-schooling educational experience for a more mature target group.

Other public and private institutional sites of provision in the province largely address a single demand, each with their own potential and constraint:

1. Agricultural schools and colleges provide a small number of pre-employed youth with a specific vocationally oriented set of qualifications to enhance employability in the key sector of agriculture, but there is concern about the degree of 'fit' with priority growth sub-sectors in the province
1. Public technikons provide post-schooling SET programmes at level 5 to pre-employed youth to enhance employability, but there is a danger of upward drift leading to a gap at Level 5
2. Private FET colleges provide unregulated upskilling in business and IT to a narrow group of the employed, with the potential for niche oriented, complementary provision
3. Enterprise based training provides for up-skilling in a largely non-formal, non-standardised way

The SETAs face the demand to co-ordinate meaningful structured learnership experiences and accredited skills development programmes, drawing on this supply-side expertise.

The evidence thus suggests that there is a need for greater prioritisation and clarity about the roles of FET colleges specifically, and in general, about the appropriate sites for developing intermediate skills for distinct target groups, if multiple demands are not to become a constraint. There is not a great deal of policy debate in the national education sector on these critical questions, and the province would be taking the lead.

Intermediate skilling and a micro-economic strategy

The first step for a provincial micro-economic strategy would be to recognise that intermediate skilling could make a critical contribution to economic growth in the province, in key priority sectors.

The second step is to recognise the value of greater cohesion between the key forms of provision on the supply-side. The very notion of a coherent provincial intermediate skills sector and strategy does not exist at present, and provision is highly fragmented. Provision for intermediate skilling in the province needs to be re-visioned, including, but going beyond, the public FET colleges.

A third critical step, beyond the remit of this paper, is to understand the requirements on the demand side. For instance, what are new growth sectors, where are employment patterns continuing, what is the experience of first time entrants to the labour market, and in which sectors? A micro-economic strategy will need to map skills needs in priority sectors, to be able to consider the ways in which they are aligned – or as is strongly suggested here – not sufficiently aligned with current provision.

The fourth step required then, is a concerted provincial effort to develop intermediate skilling provision across these multiple institutional sites, harnessing public and private providers to target the pre-employed, employed and unemployed, in a way that ensures coherence and progression, and is responsive to regional economic priorities and skills needs.

A lack of or insufficient alignment is rarely reducible to one institution or policies of one government department. Kraak (2004) argues that if key institutions are not aligned with the dynamics and needs of other institutions, an environment of contradiction and disconnection is created. Addressing the mismatch between supply and demand at this level will require co-operation between the state, employers and civil society, to work towards commonly agreed social outcomes in a synergistic way. This requires ‘joined up’ policy making and implementation in the form of cross-sectoral and inter-dependent action.

A major challenge for a micro-economic development strategy is thus to facilitate the optimal achievement of ‘joined-up’ action in addressing the intermediate skills gap in the province. A few possibilities are considered below, in conclusion.

The need for improved information systems

Chang (1994, 1998) argues that one of the reasons that institutional subsystems become incoherent and fail to interlock is because of the absence of reliable and up-to-date information upon which governments can act. Without appropriate information, it is difficult to co-ordinate these vast subsystems across multiple social sectors. The lack of reliable and constantly updated information about all sites of intermediate skills provision is a major fetter on coherent co-ordination. A strengthened FET management information system, or more significantly, a comprehensive intermediate skills management information system, that is accurate, up-to-date and accessible to all relevant stakeholders will be a basic mechanism. The SETA database currently being developed by the Department of Economic Development and Tourism, in association with the FET Directorate of the WCED, and the Department of Labour Western Cape is a good example of what can be done. Such a database will provide a key resource to be mined in sectoral and institutional planning. Formal mechanisms to distribute research beyond the commissioning department, to inform the planning of cognate departments, are another simple but highly effective device. It will be essential to co-ordinate such supply side data with demand side sectoral data. For example, current sectoral profiles are compiled by Wesgro (Wesgro 2004), or may be compiled by key directorates of the Department of Economic Development. The alignment of reliable information on the supply and demand side can lay the basis to begin integrated and detailed sectoral planning.

National and provincial co-ordination

There is a strong case for encouraging a good degree of systemic vision and coordination of activities. Intermediate skills development it was argued is located at the center of a web of policies and strategic initiatives that have been introduced since 1994. The overall direction of public FET provision lies with the national department of education, and coordination of private provision lies with an array of national structures (DoE, DoL, SAQA, Umalusi and SETAs). There is a sense that, as with schooling, the FET and skills development plans need more time to become grounded and take root in new practice.

However, improved co-ordination between national and provincial structures is critical to deepening this process. The Western Cape has a strong FET College directorate, and has taken a proactive role in engaging with sectoral coordination issues. For instance, the WCED has probably been the most dynamic provincial department in building linkages between the public colleges and SETAs. The provincial College Curriculum Committee could also potentially play a role in making programme and learnership decisions across the sector.

Strengthening coordination across education and training departments and different levels of provision at provincial level will be equally significant for greater alignment, particularly given the intersecting new strategy initiatives like the HRD strategy, SMME and BEE

prioritisation, and now the MEDS. The Department of Economic Development, WCED and the Provincial Treasury at the least will need to be key departments driving alignment and co-ordination. The province has less direct influence on technikons, workplaces or private providers, but there is scope for strategic engagement and co-ordination. Likewise, strengthening the regional presence of SETAs, particularly in priority sectors, would be important. Programmes to enhance the capacity of departments, directorates and key co-ordinating institutions would be useful.

A specific recent provincial development that deserves consideration is the establishment of a Centre for Extended Learning to co-ordinate workplace training on the part of public FET colleges and higher education institutions, and facilitate collaboration with employers. The feasibility of such a co-ordinating mechanism between supply side institutions, training in the workplace and employers, has recently been established (NACWC 2004). Further research is currently in the pipeline to research the extent of current and projected involvement of public institutions in learnerships and skills programmes, to facilitate linkages with the provincial HRD strategy (Coetzee 2004). The vision for the CEL is that it would broaden target audiences to include employed, pre-employed and unemployed learners. The mandate could be extended to include private provision, whether formal or informal, and to co-ordinate with SETAs and NGOs. It is proposed that such a CEL would be autonomous and take the role of a 'broker' in order to minimise inter-institutional competition and enhance the capacity for workplace learning. In this sense, it is a potential vehicle for enhancing 'joined up' implementation.

Overcoming the tendency to low skills equilibrium

An appropriate mechanism will be needed to incentivise employers to participate in accredited intermediate skills training and learnerships, to achieve greater buy-in to current upskilling strategies. There is a danger of becoming locked into a 'low skills equilibrium', where there are few intermediate or high skills jobs available, so there is little incentive for workers to undertake training (Finegold and Soskice 1988). But then employers are faced with a low skilled workforce, giving little incentive to enter higher value-added markets, and hence, do not invest in training. For instance, in the Western Cape construction sector there is a perception of a skills shortage, but the sector seems to have locked itself into a low skills equilibrium in which sub-contracting and intense competition on price rather than quality undermines the capacity to build the skills that the sector sees are necessary for future delivery on major infrastructure projects. Without a change in the sector's mode of work organization, it is difficult for intermediate skill providers on the supply side to play a role to address the sectoral skills shortage.

In this regard, the provincial Growth and Development Strategy could prioritise the issue of intermediate skills development as one key focus of a multi-level skills strategy, and the

Provincial Skills Development Forum of the Department of Labour could play a critical advocacy and co-ordinating function.

On the opposite side of the coin is the tendency to under-value vocational and career-oriented education and training, and the complex challenge to raise the status of intermediate skills and their key provider institutions. Of course, here again is a potential impasse, as providers can do little to address this in isolation, unless other factors are also in place encouraging a higher demand for intermediate skills on the part of employers and pre-employed learners. Two existing mechanisms that may be useful are the Learning Cape Festival and the development of an Advocacy and Marketing strategy for the provincial FET sector. It may also help to look to the past for inspiration. The Western Cape is traditionally strong in trades, and trades training through the mechanism of apprenticeships, in which employers continue to express great faith. It may be useful to explore the features that made apprenticeship work, in order to inform learnerships, and to exploit the previous faith in apprenticeships to enhance their status.

The case of SMMEs deserves special mention, given their predominance and strategic priority in the province. SMME development is seen as an important way of building broad-based black empowerment and of reducing unemployment and poverty in the province. As an indication, recently R50million has been allocated to fund strategic intervention programmes with SMMEs, such as incubators and a loans scheme. The experience of SETAs has been that SMMEs have specific challenges, such as the considerable impact on a small business in terms of time, effort and expertise required to manage learnerships or skills programmes (Department of Economic Development and Tourism et al 2004).

Training interventions are more likely to have a more efficient and effective impact on the development of those already employed in existing SMMEs. Current research suggests that promoting SMMEs as a strategy for the pre-employed should be approached with caution, particularly amongst the youth. Successful self-employment is most likely when a number of factors are in place, including capital, networks and experience. Unemployed youth or pre-employed FET college leavers are unlikely to succeed due to the lack of these factors (McGrath and King 1995; King and McGrath 2002, Provincial Socio-economic Review 2003). The employed already engaged in SMMEs have fewer barriers to sustainability, they come with practical experience, with specific skills needs and greater motivation. The key priority then, is to grow this already established SMME sector, which can lead to increased jobs that in turn, offer employment to young people. Education and training provision for the employed in SMMEs will need to be carefully targeted, for instance, to be practically oriented, affordable and delivered at convenient times and locations.

A specific forum to prioritise and plan targeted interventions with SMMEs, drawing together expertise and co-ordinating the current programmes of SETAs, Department of Labour, Department of Economic Development and Wesgro amongst others, may be able to have greater impact. It may be appropriate that such a forum could be a sub-body of a proposed Centre for Extended Learning.

Creativity and coherence

In conclusion, the intermediate skills level is complex and messy, with many positive but potentially conflicting initiatives, which should not be allowed to undermine its development and potential contribution to a development trajectory in South Africa. Exceptional clarity, creativity and coherence are required to engage with the myriad challenges.

The primary challenge is to envisage a coherent intermediate knowledge and skills sector, to raise the status of such a sector, and to link it to ongoing educational opportunities.

Chapter 4

THE CONTRIBUTION OF HIGHER EDUCATION TO A WESTERN CAPE REGIONAL INNOVATION SYSTEM⁵

The focus of the report now shifts tack, firstly, away from the intermediate skills level to the high skills domain. Secondly, it shifts away from an emphasis on the transition of individuals through key stages of the human life cycle, from the school into education and work, and through the workplace. It shifts towards a focus on institutional settings related to the life cycle of a national economy, to the system of science and innovation that supports a move up the global value chain. A national system of innovation is seen as critical to the achievement of social, economic and political goals in South Africa, in a context of competing national demands for global economic competitiveness, sustainable development and equity. It involves networks and collaboration between multiple players, multiple levels and sources of funding, intersecting policy frameworks, education and training, and mechanisms for research utilisation and technology transfer.

Third, the focus shifts to higher education as but one amongst many supply side institutions involved in a system of innovation, including science councils, government funded R&D laboratories, and enterprise based R&D laboratories. It may be asked why the higher education sector should be a focus for a micro-economic strategy in the province, given that higher education is a national competence, and the province has little leverage to shape what universities and technikons do.

Higher education has three traditional functions – teaching, research and community outreach. A case will be made that the province has little control over the function of teaching, in relation to the way in which universities in the province produce a high skills labour force. Nevertheless, the provincial government can play a role in better harnessing

⁵ This chapter draws extensively on an HSRC study, 'Investigating the Network Society. Higher Education-Industry partnerships in South Africa', co-funded by the Carnegie Corporation of New York. The statements made and views expressed are solely the responsibility of the author.

the resources of the higher education institutions – particularly research - in the interests of provincial economic development or community development.

National R&D and Science and Technology policy stresses the need to strengthen a national system of innovation, in order to move up the global value chain. South Africa faces many challenges to develop its high skill Science and Technology capacity to compete globally and harness the promise of technology for human development. Technology achievement problems, summed up in the notion of an ‘innovation chasm’ between local industry, local research and international technology sources, present a specific set of challenges nationally and in the province. The province has a role to play in steering institutions to develop critical mass in niche areas, and to link these more effectively with provincial and national priorities.

It will be demonstrated that the five higher education institutions in the Western Cape are a potential regional resource, although not equal to international benchmarks for Science and Technology, they are *relatively* well placed to contribute to the challenge. Significantly for a provincial micro-economic development strategy, there is evidence that these institutions have largely untapped research and innovation potential to contribute to regional economic development, to the building of new technology platforms in the province. It is in the strategic interest of the province to facilitate a shared vision in which higher education institutions are seen to have a vital role in strengthening the system of innovation, nationally and regionally.

Fourth, the focus is on the emergence and potential of research partnerships, collaboration and networks between higher education institutions and industry, promoted globally as a key mechanism of harnessing the potential of higher education. The chapter will provide an overview of partnership activity in the five institutions, in three critical niche areas – Biotechnology, Information and Communications Technology (ICT) and New Materials Development. The provincial challenge is to understand current partnership practice, to inform the creation of stronger connections and to deepen linkages between higher education, government, industry and business, in order to build technology platforms. Developing stronger networks can release the evident potential of provincial higher education sector to contribute to a regional – and national - system of innovation.

HIGHER EDUCATION’S CAPACITY TO SUPPORT A REGIONAL INNOVATION SYSTEM

Relative to national trends, the Western Cape is well endowed with five strong institutions. Two historically advantaged White universities, University of Stellenbosch (US) and University of Cape Town (UCT), have long established research capacity in Science,

Engineering and Technology, with pockets of international excellence. One historically disadvantaged university, the University of the Western Cape (UWC) has significant emergent capacity, in a number of cutting edge research centres, particularly if considered relative to other historically black universities. The two technikons, Peninsula Technikon (PenTech) and Cape Technikon (CapeTech), are soon to merge to form the Cape Peninsula University of Technology (CPUT). Given their very recent applied research agenda, they are only beginning to develop research capacity and an institutional research culture, but are beginning to display encouraging signs. There clearly are differences between the two advantaged universities and the other three institutions, which need to be born in mind throughout the following discussion.

A profile of university and technikon students and staff

Both students and staff of the five institutions are a potential asset in terms of providing a firm basis for research in Science and Technology in the province. Relative to national trends, they appear strong, although in comparison to international benchmarks, and to the future R&D needs of South Africa, there is great scope for expansion:

- Analysis of the provincial student profile revealed a good proportion of the total student cohort of 53 684 students in 2002 enrolled and graduating in the Natural Sciences. For instance, a high 40 per cent of enrolments in 2002 were in Natural Sciences (35 per cent in universities and 52 per cent in technikons) as compared with 26 per cent nationally, and exceeding the 30 per cent target set by the National Plan for Higher Education. These proportions are relatively well sustained in provincial graduation rates, where for instance in 2002, 32 per cent of university graduates were in the Natural Sciences, 22 per cent in Business and Management, and 46 per cent in the Humanities and Social Sciences.
- The province has a higher proportion of post-graduate students (22 per cent) than the national average (16 per cent), with a high 31 per cent of university enrolments at postgraduate level in 2002. Doctoral enrolments comprised 3 per cent of total enrolments in the province, and the Western Cape institutions contributed a high 23 per cent of the national total of doctoral enrolments in 2002.
- While the Western Cape remains above the national average, the adequacy of post-graduate completion is questionable, particularly graduation rates in the Science fields in order to support future growth of the science system.
- The teaching and research staff is formally well qualified with a high proportion of doctorates at the universities, particularly at UCT (59,8 per cent) and US (52,9 per cent), well above the national average of 41 per cent. At the technikons almost two thirds of staff has a university qualification, 60,1 per cent at Cape Tech and 14 per cent at PenTech, but with low numbers of masters and doctoral qualifications, representing 30 per cent and 14 per cent of staff respectively.

- There has been little shift in unequal racial patterns, with 93,5 per cent of professional staff at US categorised as White, as are 84,3 per cent at UCT. At UWC, given its history, 42,6 per cent of professional staff are coloured, and 38,6 per cent White, with 12,1 per cent African. Historical patterns of privilege are equally evident at technikons, with 89,9 per cent of staff at Cape Tech being White and 60 per cent at Pentech being Coloured with 30 per cent White. These trends reinforce national calls for shifts in the staffing profile of universities and technikons, and for developing a more representative cadre of young research professionals.
- Nationally there is concern at the ageing scientific work force, with little significant evidence of a new younger cohort emerging to replace current levels of expertise, and there are no signs that the Western Cape institutions are markedly different.
- The institutions lag seriously behind in achieving equity in the profile of both staff and students, and in producing 'new blood' for the regional science system, in the face of a scientific workforce that is largely White, male and ageing.

Research capacity in Science and Technology

South African higher education, business and government together only spend a low 0,76 per cent of GDP on research and development. South Africa is not yet reaching its target of 1 per cent of GDP, an indication of the strong national need to develop research intensity. It was evident that taken together, the Western Cape higher education sector has one of the strongest capacities for research nationally, particularly in key fields of Science and Technology. The challenge remains to increase research intensity in absolute terms.

- There is evidence of considerable investment in research. The universities in particular have substantial research budgets. Sources of research income have diversified from the higher education subsidy and national funding agencies like the National Research Foundation, towards a high percentage of contract income (largely from business and industry) and a growing contribution from government incentivisation schemes such as THRIP and IF. The technikons relied more heavily on traditional sources of funding.
- The long history of well resourced research development at the two historically White universities in particular is evident in their high research productivity, relative to all other institutions nationally as well as in the Western Cape, on a number of indicators.
- The Western Cape institutions contributed a significant 26,6 per cent of national accredited research output in 1993, but this slightly decreased in 2002 to 25,3 per cent, in a context of virtually no growth nationally. Over a ten year period, UCT's output remains highest but has tended to decrease, while US and UWC have increased their output steadily with a degree of fluctuation. Off a small base and with fluctuations, the two technikons are slowly increasing their output, which may

be accounted for by patents and artefacts and technological publications to a greater extent than the articles in accredited journals.

- Some 37 per cent of NRF rated scientists are based at Western Cape institutions. UCT in particular stands out as the home of 16 of the country's 44 A-rated scientists, those who are leading internationally recognised researchers, of a total of 213 rated scientists, representing 17 per cent of the national total of 1265 in 2003. US stands out for steadily increasing the number of rated promising young researchers, which contributes to the fact that the Western Cape institutions accounted for supporting some 41 per cent of promising young researchers nationally (45 of 109). This suggests increasing attention to build a future cadre of researchers.
- Six Centres of Excellence were awarded by DST through the NRF in 2004, aimed to stimulate sustained distinction in research while simultaneously generating highly qualified human resource capacity to impact on key national and global areas of knowledge. Three were awarded to the Western Cape institutions, one to US (Invasion Biology) and 2 to UCT (Biodiversity conservation and Catalysis).
- There is evidence that this research capacity can be turned to the service of innovation. Shifts towards strategic and applied research are evident in the growth of THRIP and Innovation Fund funding, which depends on strategic partnerships with industry. UCT and US are amongst the very few research universities awarded funding from the Innovation Fund, together accessing some R7 487 882 of a total of R 36 203 369 in 2002/3 (HSRC 2003).
- South Africa has a low rate of international patents, with few higher education institutions as patentee organisations. There is evidence that Western Cape institutions are slowly attempting to pursue patents, on a small scale and primarily South African, although the option of licencing is increasingly seen as a more attractive and affordable option.
- The two technikons have benefited from capacity building schemes to develop applied research, technology transfer and innovation, funded by foreign governments, private donors and national funding agencies. For instance, PenTEch has been awarded one of the Tshumisano Technology Stations, an initiative of DST co-funded by the German Agency for Technical Co-operation (GTZ), to strengthen technological innovation activities and skills upgrading to increase the competitiveness of SMMEs, in this case, in the clothing and textiles industry.

The five institutions display evidence of a sound base for Science and Technology research, with potential for research utilisation and technology transfer, particularly relative to national capacity. Relative to international benchmarks and to national strategies to enhance research and technology intensity and hence competitiveness, there is considerable room for improvement. If positive trends continue as projected, the higher education institutions have considerable potential to support a regional innovation system.

HIGHER EDUCATION-INDUSTRY RESEARCH PARTNERSHIPS

Forms of partnership

Nationally there is an increasing push towards 'partnership' between higher education and industry, as a means of technology transfer and research utilisation to address the 'innovation chasm'. Higher education increasingly experiences a financial imperative to pursue partnerships with industry, which is often in tension with its academic imperatives to contribute to new knowledge. Industry increasingly experiences an imperative to invest in research in collaboration with other companies in a sector, drawing on the knowledge and technology of higher education to ensure its on-going competitiveness in a changing global economic context, which is often in tension with its financial imperatives to increase and sustain company profit. A number of different forms of research partnership thus result, that are more or less knowledge intensive and more or less shaped by financial imperatives (Kruss 2004c forthcoming).

A single institution is likely to have a range of forms of partnership co-existing, in different faculties, departments and research programmes, with a mix of different forms of partnerships to meet distinct purposes. There is evidence that some partnerships do add academic, social, and economic value, by contributing to local and regional development goals and significant advances in technology. However, not all of these forms are equally likely to foster innovation and promote a contribution to knowledge. Innovation forms of partnership, or 'networks', are mutually beneficial knowledge intensive relationships between academics, departments or units and industry that involve collaboration in knowledge generation, diffusion and/or application that will ultimately contribute to innovation. These are found on a very small scale in the three universities, as are 'commercialisation' forms of partnership, particularly at US. Here, entrepreneurial researchers attempt to commercialise prior intellectual work, in the form of a spin-off company or in collaboration with an existing company. These forms of partnership stand in stark contrast to the dominant forms of partnership found nationally, namely consultancies and contracts. 'Consultancy' partnerships are where a researcher in higher education acts in an advisory capacity to address the immediate problems of a single company, involving primarily a financial transaction, usually the benefit of the individual researcher, and with little knowledge generation. 'Contract' partnerships are closely related, but are driven by the desire to find new ways to maintain traditional academic activities, to fund a research programme, center or to fund and attract post-graduate students, but with a clearly defined product or 'deliverables' for industry, usually an individual company (see Kruss 2004c forthcoming for elaboration of these forms of partnership).

Forms of partnership can contribute to a regional system of innovation in different ways, some by strengthening the research base with little immediate return to industry, others by meeting industries' immediate needs with little long-term return to the higher education research base, and others with a potential long term return to both industry and higher

education. The big question becomes – how then to encourage a balance of forms of partnerships that can contribute to a regional system of innovation and to economic development?

Partnership practice in three cutting edge high technology fields

As a first step, an attempt was made to understand current partnership practice in relation to three high technology fields at the cutting edge of new developments in the ‘knowledge economy’, identified as critical to future competitiveness in national foresight studies in South Africa – ICT, biotechnology and New Materials Development.⁶ All three fields are potentially significant in the Western Cape. ICT has been identified as a priority service sector industry for support and development. There are national attempts to foster the fledgling biotechnology industry, and the Western Cape has shown evidence of being a front-runner in the field, also a provincial priority sector. New Materials Development has the potential to contribute to the technological upgrading and competitiveness of key manufacturing priority sectors such as metals and engineering, oil and gas. There is evidence that at institutions like UCT and US but also at UWC, the research contribution in these fields is such that it has global potential, beyond the bounds of the regional and national economy.

One aim of the HSRC study (Kruss 2004c forthcoming) was to identify what facilitates partnership potential and what acts as constraints to block research institutions’ contributions to regional development. The ways in which higher education institutions themselves facilitate or constrain partnerships with a potential long term return was also considered.

There are more innovation forms of partnership and networks in the five institutions evident in the field of Biotechnology than in ICT or NMD, which appears to be facilitated by a number of conditions:

- The cross-cutting nature of Biotechnology as a knowledge field that encourages multi- and trans-disciplinary networks
- The long history of partnerships with industry in South Africa in relation to first and second generation biotechnology
- The existence of strategic policy and funding incentivisation at a national and especially provincial level
- The existence of fundamental research expertise and facilities in the five institutions, particularly in third generation biotechnology, in fields such as genomics and bioinformatics.

⁶ In some cases, institutions have significant partnerships in fields other than the three fields of focus, which are relevant to Western Cape priorities, but will not be covered here.

These conditions create the potential for encouraging the forms of partnership that can contribute to innovation, as they mature over time. Constraints are the small number and size of biotechnology companies, the lack of sufficient venture capital, and sufficient critical mass required for long-term sustainability. Research in this high technology field has strong potential to contribute to regional economic development in the future.

In contrast, the enabling nature of ICT and the global structure of the industry mean that in South Africa, it operates primarily as a service industry. There is little imperative for companies to engage in collaborative research and development as a strategy to enhance competitiveness (Kruss, Paterson, Klerck and Godfrey 2004 forthcoming). Research partnerships are strongly driven by the short term needs of industry, in the form of consultancies and contracts. There is a small scale of cutting edge work in the universities in telecommunications related research, in remote sensing and so on. There is a strong science base in the province, but thus far, it has not been sufficiently exploited in applied research and strategic partnerships. This regional expertise may prove vital to current national DST bids to house significant international telescope projects in the Northern Cape, such as the Square Kilometre Array, and a NASA satellite station. There are encouraging platforms emerging for collaboration in the province, in the work of the Telkom Centres of Excellence and the Cape Higher Education Consortium on the higher education side, and the Cape Information Technology Initiative on the industry side, but these have yet to realise concrete outcomes.

The strategic importance of research and innovation partnerships in NMD in terms of Western Cape priority sectors is unquestionable, in the goal of expanding value-added export markets in the future. Knutsen (2002) has argued that there were more new materials research partnerships in South Africa during the 1980s than there are at present, given the strategic emphasis on materials research during the apartheid era, which promoted a good skills base. Since 1994, many established industry higher education partnerships have disappeared, the existing materials capacity was significantly eroded, and the research community largely scattered in fragmented pockets of activity. The majority of partnerships in the Western Cape institutions tend to be 'contracts' between two parties, although they may be medium term and have a degree of collaboration between industry based and higher education based researchers, particularly in the form of student projects. US researchers at the Institute for Polymer Science are involved in a number of network, commercialisation and contract partnerships that stand out. A lack of industry involvement and a lack of inter-institutional collaboration are identified as key constraints, but there are glimmers of activity that may be encouraged and supported in future. The Cape Initiative in Materials and Manufacturing, a collaboration between the five institutions and iThemba Labs, was formalised as a Section 21 company in January 2004 and received funding from the provincial government to promote regional collaboration between research and industry.

There is thus evidence of demonstrable excellence in key areas of Science and Technology. There are indications of significant research strengths that fell outside of the scope of the HSRC study, that also relate to provincial priorities. There is also evidence of the emergence of innovation forms of partnerships, alongside large numbers of consultancy and contract partnerships with industry, whether based in the Western Cape, nationally or increasingly internationally.

It is evident that innovation forms of partnership were more successfully encouraged when a complex combination of conditions were present:

- The nature of the knowledge or technology field itself lends to cross-cutting trans-disciplinary work.
- There exists a sufficiently sustainable and large 'critical mass' of expertise in individual institutions and in terms of scientific collaboration between the institutions in a region.
- There exists a supportive strategic policy and funding incentivisation environment, both nationally and in the province.
- There exist regional fora based on collaboration that can drive advocacy and promotion of research and partnerships in the field.
- Institutions themselves are organised to promote research, partnership and innovation, which itself involves a complex set of micro-institutional dynamics.

Facilitating industry partnerships: institutional interface structures and mechanisms

What can higher education institutions themselves do, that facilitates partnership, and what are the constraints within institutions themselves that militate against partnerships?

The five Western Cape higher education institutions all have the strategic aspiration, but evidence of varying capacity, to develop forms of partnership that can contribute to innovation. Management of the institutions have set in place policy and structures, framed in different ways, but with different degrees of success in practice. In particular, research managers have proposed and set up dedicated internal and external interface mechanisms, which provide levers for intervention. Institutions like UWC, CapeTech and Pentech tend to have a decentralised approach to partnership, leaving much of the initiative to be driven by individual academic 'champions' on an ad hoc basis, while others, like US and UCT, have strongly centralised initiatives and formally established structures.

A number of structures and mechanisms are typically set up with the intention to facilitate research activity and partnership:

- Internal research structures and mechanisms. These aim to create and consolidate a culture and climate of research within the institutions, and to ensure that a pool of skilled scientists and researchers are created and maintained. This potentially provides the foundation on which partnerships with industry can be built.
- Internal interface structures. These are intended to promote and support partnership research specifically within institutions, such as industry advisory boards, dedicated management posts, research groups, centres and units with a clear identity, and dedicated structures to manage intellectual property and contracts.
- External industry interface structures. These are typically established in an attempt to facilitate and manage the relationship with industry, to provide a point of contact with the institution, such as technology transfer or industrial liaison offices, or university owned companies.

While an institution may have formally adopted policies and developed implementation structures and mechanisms, the extent to which these had taken root in faculty and departmental structures and were reflected in the experience and daily practice of individual academics, varied within and between institutions. Policy may have been formally adopted at a management level, but not permeated down through the institution, to faculty, departmental and research program level, causing disjuncture and a lack of coherence between the levels of the institution. Each institution's history and culture impacted on the success of interventions. For instance, a long tradition of academic freedom at UCT militated against attempts to develop central co-ordinating mechanisms and drivers. There is considerable conflict evident between research management, Faculty Deans and project leaders, about the value and role of partnership with industry and the best way to support them. Clearly, at present, the ideal and the reality within institutions do not always meet. Indications are that most are very young initiatives that have not had sufficient time to prove themselves as structures to engage with industry systematically, at the time of the research in 2003. The challenge is to deepen their impact on daily academic practice, if the four institutions are to facilitate the province's strategic interests, and harness their scientific knowledge and expertise in the service of regional development.

HIGHER EDUCATION AS RESOURCE FOR REGIONAL INNOVATION

If the evidence is accepted, that the Western Cape higher education sector is a potential resource for a regional system of innovation, how can a micro-economic strategy promote the realisation of this potential?

Creating a shared vision

Creating a shared vision of the potential role of higher education institutions in a regional system of innovation is a first step. The push towards greater responsiveness, and the

articulation of a new role for higher education in economic development, beyond its traditional role in teaching and research, is widely contested within universities. Many researchers and research managers in the Western Cape institutions have been convinced that it is possible to do academically rigorous work that can be harnessed in the interests of economic development, without undermining scientific integrity, or succumbing to the dictates of the market. Indeed, the most successful cases of network partnerships relied entirely on a strong base of fundamental research. Academics had a clearly defined role to contribute to a project in the form of basic research, which was taken forward in the form of applications oriented research by researchers in other research institutions or in dedicated laboratories, with industry partners playing a role in prototyping and design.

In turn, industry partners may have to be convinced of the longer term value of collaboration with higher education research, which is often seen as too 'academic' or taking 'too long' and thus not able to meet the immediate needs of a company. It requires acceptance of the principle of dynamic co-operation to enhance the competitiveness of many companies within an industrial sector. The product of knowledge intensive innovation partnerships are more likely to be of value to an entire sector than short term consultancies that solve immediate problems. The evidence is that different forms of partnership have specific benefits, and hence, specific uses. The trick is to facilitate a balance of forms of partnership that acts in the long-term interests of both industry and higher education, and hence, provincial economic development.

Coordination with national and provincial initiatives

National policy initiatives to strengthen the Science and Technology base, and in particular, to facilitate research utilisation and technology transfer, are an important starting point for provincial efforts. Strategic initiatives emerge from a range of national departments, such as DST and DTI, and may be implemented by a range of agencies, such as NACI and the NRF. There are also sectoral proposals, for instance, the technikon sector has proposed a National Strategy for Innovation and Technology Transfer that would guide the technikons' role in stimulating economic development (CTP 2003). Strong co-ordination between a web of national, provincial, local, regional, sectoral and cross-departmental policy and strategic initiatives will be important. Strategies need to be interpreted in terms of provincial strengths and priorities, and integrated into provincial strategic plans where appropriate.

The case of the provincial Biotechnology Regional Innovation Centre is indicative. The national Biotechnology strategy has secured funding, which was allocated to stimulate innovation and a regional biotechnology industry. Researchers and industry players in the province were already collaborating and organised into the Cape Biotechnology Initiative, which set it in an advantageous position to be awarded one of the first BRICs. Ongoing provincial support for the BRIC, and its insertion into provincial development programmes,

can enhance the critical mass emerging. In other high technology fields, there are regional advocacy and collaboration bodies, such as the Cape Information Technology Initiative (CITI), and the Cape Initiative in Materials and Manufacturing (CIMM), which could be supported more systematically. Support for the CIMM for instance, could position the province advantageously as the location of one of the centres of innovation proposed in the Advanced Manufacturing Strategy (2003).

Information sharing and advocacy

A major constraint identified in the province was industry unwillingness to invest in R&D, and to enter into collaboration with universities to meet their knowledge and technology needs. Technikons in particular reported a negative perception of their research capacity on the part of industry, as a major constraint. Industry needs to know what the research strengths of universities and universities of technology are, and how they can enter into mutually beneficial partnerships. Cutting edge research units and programmes may support or feed into provincial priority economic sectors, and information about these needs to be disseminated. The simplest bridging mechanism that can operate at a number of levels is information sharing and advocacy:

- Institutions with external interface mechanisms such as technology transfer and industrial liaison offices (whether established or fledgling) are relatively well placed to facilitate such communication on an individual basis, but can be supported to do so more systematically and effectively.
- SARIMA, a national association of higher education research managers, has a strong presence in the province and provides a potential support for strengthening such industrial liaison mechanisms.
- The Cape Gateway is an existing electronic portal that can be accessed to facilitate information sharing between industry and higher education.
- A regional higher education body such as Cape Higher Education Consortium is well placed to play a greater advocacy and information-sharing role. It has developed a vision and principles for regional collaboration and begun to develop proposals for governance structures and processes that can give substance to, and implement, a shared vision (CHEC 2002). The trick is to move to substantive action around specific projects that are seen to be of mutual benefit.
- In other countries, various forms of industry-higher education forum have been established, to formalise co-operation, facilitated by government (CHE 2002). This has been mooted in South Africa, but perhaps more modest regional initiatives could be more effective (see Lundall 2002 who explores possibilities in this regard). A Western Cape regional initiative could be based on or integrate existing collaborative forums, such as Cape Information Technology Initiative or Cape Biotechnology Initiative.

- Wesgro utilises its networks to disseminate strategic research information, on Biotechnology for example, and this can be extended.

An intellectual property framework

The absence of an intellectual property framework is increasingly foregrounded as a constraint on partnership and innovation. A lack of clarity on the distribution of intellectual property rights can lead to considerable conflict and breakdown of a partnership. Wolson (2002) has argued for an enabling national policy framework to strengthen the South African intellectual property system, and notes the crucial role of institutions in developing expertise and capacity to manage intellectual property. Higher education institutions nationally and in the Western Cape are attempting to develop substantive institutional policy. There is a concern that the potential tensions related to intellectual property rights are resolved, and that the risks for knowledge creation and dissemination inherent to the conditions imposed by industry should be carefully managed.

In general, the three universities in the Western Cape propose that partnerships should be structured and designed in such a way that they are able to generate research from which the academics can derive a publications record, which does not compromise the commercial interests of the industry partner, and which benefits the institution rather than the individual. Institutions are developing policy that makes provision for ownership of intellectual property and distribution of income:

- Typically, full copyright and legal ownership of IP produced will be vested in the university or technikon. Formula for the distribution of income from commercializing knowledge propose that in general, a portion of the gross income is recovered for indirect and direct costs, and then a portion of the net income is allocated to the inventor/researcher as personal income, a portion is allocated to the research environment (research programme, department and faculty) and a final portion to the university to be used for academic and research purposes.
- Institutions are increasingly pursuing patents, but the evidence suggests that this process is costly, time consuming and requires high levels of legal expertise.

Attempts to implement such policy are accompanied by considerable contestation and tension within institutions, and the process is still incomplete.

Provincial co-ordination of these efforts would be useful to ensure parity between institutional frameworks, and that they can contribute to the exploitation of intellectual property in the broader interest, rather than to individual benefit. The costs of patents may be too high for individual researchers, research units, or even institutions, raising the possibility of provincial co-ordination and support for patenting.

Facilitating commercialisation

Commercialisation forms of partnership need more complex support both within higher education institutions and in the external environment, if they are to facilitate the growth of enterprises and job creation. International experience suggests a number of mechanisms that can be investigated, that may be present in the Western Cape but that will need considerable support to become viable in future:

- Science Parks, in allowing for proximity between industry and higher education and facilitating partnerships, can contribute to diversifying the nature and base of the economy, to job creation and technology commercialisation (OECD 1997). There are initiatives in the Western Cape such as TechnoPark Stellenbosch, and the Capricorn Business and Technology Park near Muizenberg (see Rogan 1998). Whether these are effective levers in the local context will require thorough research.
- Likewise, the role of incubators is promoted as key to regional development. A number have been established nationally through the Godisa programme to support SMMEs, and the Western Cape houses a number in high technology fields. The trick however, is to make incubators viable and effective. The extent of involvement and collaboration with researchers from the five institutions in practice is not known, but indications are that there is considerable scope for greater participation.
- Given their technological expertise, some universities of technology have set up centers for prototyping and testing, offering design solutions to industry. These 'design solution' centres can form the nucleus for applied research and technology transfer in the future.

There is a propensity to 'jump on the bandwagon' and promote such mechanisms that have apparently worked in other countries, regardless of local context. Careful provincial strategic planning that connects such initiatives with real research and business opportunities will be required.

Higher education's responsibility

Over the past few years, higher education institutions have faced a barrage of new policy frameworks, funding mechanisms and governance changes. The historical legacy of each institution shapes the ways in which it is able to respond, and clearly, there are still distinct differences in the Western Cape between universities and technikons, and between the two historically advantaged universities and 'the rest'. Restructuring of the higher education system has been a major focus, and will continue to absorb the energies of the two technikons, possibly to the detriment of developing emergent pockets of research capacity, and widening historical research divides, at least in the short term. Institutions like UCT and US face significant challenges of internal transformation, and adding provincial pressure can be of benefit to the development of a future research workforce that shifts past inequalities.

However, relative to other provinces, three of five institutions have been spared merger, which provides a window of opportunity to move forward rapidly.

Higher education institutions in the Western Cape have a responsibility to sharpen their own institutional policy and practice, to ensure greater coherence across all institutional levels, and that their own structures do not inhibit their potential:

- Enterprising initiatives within institutions should be encouraged and supported, not stifled through administrative inefficiency or bureaucracy that delays and undermines partnerships with industry.
- Managing each form of partnership requires specific mechanisms and allocation of institutional resources, and an overemphasis on one form may prevent support to other more desirable forms of partnership. Institutions need to think more strategically about the balance of forms of partnership that are desirable to promote and support, in terms of their own institutional mission and scientific capacity, national and provincial economic development goals.

Realising the potential?

The province does not have a great deal of 'control' over higher education, but it is in its strategic interest to facilitate a critical mass of research and stronger relationships with regional higher education institutions. Currently, there are weak institutional relationships between the provincial and metropolitan administrations, and higher education institutions. These will need to be strengthened, to realise potential. For the evident capacity in the Western Cape higher education institutions to be mobilised to contribute to a regional system of innovation will require a consolidated vision of networks and collaboration, strategic policy co-ordination, information sharing and advocacy, and considerable creative support structures and interface mechanisms.

Chapter 5

CREATIVE VISIONING, JOINED UP SOLUTIONS, INFORMATION SHARING AND INTERFACE MECHANISMS

The Western Cape has entered into a social compact that commits government, labour business and civil society to jointly pursue economic development goals for all citizens. The dual economic strategy includes high skill, high end activity aimed at moving up the value chain and improving export sectors, as well as low-end, more labour intensive, low skill activities aimed at generating employment and combating poverty.

This report has endorsed the value and necessity of a multi-pronged skills development strategy. Such a strategy is increasingly evident in provincial frameworks and strategic documents. It is necessary to clearly and more systematically articulate a multi-level human resources development strategy, aligned with strategies that promote industrial sectors that rely primarily on low, intermediate and high skills.

The report has been silent on low-end, low-skill activities, which was outside of our brief. It has focused extensively on one critical aspect of high-end activity over which the province has strategic influence, on the contribution of higher education institutions to a regional system of innovation. It has built up a strong case for prioritising 'the middle', to envision and support an intermediate skills sector, based on the considerable supply side provision currently available. And it has gone back to examine the ways in which the schooling system lays a foundation for both intermediate and high end activity.

Throughout, it is evident, there is cause for cautious optimism. Relative to national trends, at all levels of the education and training system that support human resources development, the Western Cape performs well. Nevertheless, the province's poor record to date on shifting the inequitable relations of the past requires urgent attention, if it is not to become a fetter on

development. More significantly, relative to international benchmarks, and relative to demand, particularly to support future growth surges, there remains much to be done.

Common to each level is the need for creative visioning, to create a shared understanding of current capacity, potential and strategic direction. Likewise, the need for 'joined up' solutions, working across national and provincial departments, educational institutions, industry, sectoral organisations and development agencies, has been promoted. Critically, working in this way requires sound information to inform strategic planning and implementation on the part of multiple agents. An attempt has been made to identify existing structures, mechanisms and agents that can facilitate working in a 'joined up' manner.

The report has identified a number of levers for intervention through a micro-economic strategy. These primarily relate to advocacy, co-ordination, dissemination of information, and addressing critical challenges. To translate these to firm and detailed strategic goals and initiatives will require in the first instance, a process of dialogue and negotiation between key provincial players, in the Departments of Education, Economic Development, Labour, Agriculture and Treasury as a minimum. It requires developing working relationships between and across provincial departments, their directorates, sub-directorates and branches, in relation to the primary competence of each, focused on targeted projects.

The table below takes key recommendations arising out of the empirical data, and makes suggestions as to how they articulate with existing provincial strategies, or, where provincial strategy will need to be developed, who could conceivably be involved. Then, it considers what additional strategies could be promoted outside of provincial government, by social partners in business, labour and civil society.

If the possible interventions in relation to schooling seem more straightforward, it is because it is firmly a provincial competence that primarily falls within the line function of a single department. There is less call for 'joined up solutions' at this level, and more call for public campaigns that can enhance and deepen the work of the province. If the possible interventions at the intermediate level seem more general and unspecific, it is because of the very recent attempts to promote the significance of the intermediate sector, and the complexity of working with multiple providers in relation to multiple forms of demand.

Table 4. An indicative table of interventions

AN INDICATIVE TABLE OF STRATEGIC INTERVENTIONS		
Goal	Provincial strategy existing or required	Additional strategies by social partners
SCHOOLING AS INFRASTRUCTURE		
Extend access to Grade R	Targets already set in draft HRD strategy 2004. Need to develop implementation plans.	Support from ECD NGOs, Department of Social Services
Deepen quality of literacy and numeracy as a foundation in the primary school	Fundamental to the task of the WCED	Draw on civil society and NGOs working in literacy organisations, READ, etc around notion of Learning Cape
Address the high rate of dropout after Grade 10	Retention targets set in draft HRD strategy 2004. Need to develop implementation plans. Proposal to shift balance towards new alternative general vocational route in FET colleges. Need to develop implementation plans	Targeted campaigns to identify alternative routes drawing on business and civil society; Department of Social Services and Child Support Grant Advocacy to raise the status and value of alternative routes drawing on communities, business and civil society
PROMOTING INTERMEDIATE SKILLING		
Clarify priority role for FET colleges and role of other public and private providers in an intermediate skills sector	WCED FET Directorate, DoL, DED&T, Agriculture, PSDF, PDC would need to be involved.	FET colleges, Technikons, agricultural colleges, private providers, SETAs would need to participate.
Create a comprehensive intermediate skilling information management system	Develop FETMIS Co-ordinate with HEMIS for Technikon Level 5 data Consolidate private FET	Mechanisms to enhance compliance from providers and employers are needed.

	<p>database</p> <p>Maintain SETA database initiated 2004</p>	<p>Distribution mechanisms to make data available for strategic planning are needed.</p> <p>Co-ordination with Wesgro supply side data</p> <p>Further research on sectoral supply side data</p>
Facilitate national and provincial co-ordination	Identify overarching and co-ordinating mechanism such as PSDF, or PDC, or Growth and Development Summit working groups	
Align provincial initiatives and strategies	<p>Identify mechanisms to facilitate alignment and communication</p> <p>Enhance capacity of departments, directorates and key co-ordinating institutions</p>	
Facilitate supply and demand side co-ordination	Proposed Centre for Extended Learning 2003. Need to develop implementation plans.	<p>Involve SETAs, employer organisations, industry sectoral organisations, public and private providers, NGOs.</p> <p>Wesgro sectoral data and connections to be mined.</p>
Incentivise employers to participate in accredited training opportunities	Growth and Development Summit or PSDF to lead advocacy campaign.	SETAs, industry sectoral organisations and employer organisations.
Raise the status of intermediate skills as viable alternative route	Advocacy and Marketing strategy already developed for public FET.	<p>Learning Cape festival to be expanded.</p> <p>Campaigns with business and industry.</p>
Prioritise and plan targeted interventions with SMMEs	<p>SMME Development directorate of DED&T to co-ordinate.</p> <p>Need to link with CEL.</p>	SETAs, employer organisations, industry sectoral organisations, development agencies to be involved.

THE CONTRIBUTION OF HIGHER EDUCATION TO A REGIONAL INNOVATION SYSTEM		
Create a shared vision of a regional system of innovation and higher education's role	Create a node point to align with provincial development strategy.	Higher education institutions, employer organisations, science councils, government laboratories.
Co-ordinate national and provincial initiatives	Create leverage to access national strategic funding.	Use sectoral collaboration bodies such as CITI, CIMM, CBI.
Facilitate information sharing and advocacy	Cape Gateway as electronic portal. Investigate possibility of business-higher education forum.	Interface with institutional technology transfer offices and work with SARIMA to strengthen capacity. Cape Higher Education Consortium to play an active role. Wesgro to disseminate sectoral information.
Develop an intellectual property framework	Co-ordinate and develop provincial framework and support expertise. Explore support for patents.	Implement institutional policy frameworks. Higher education, DTI, DST, SARIMA to be involved. Fund for patents.
Facilitate commercialisation	Investigate potential of Science Parks. Facilitate participation in incubators. Can involve SMME development directorate. Promote 'design solution' expertise at technikons.	Local government, business, higher education institutions, national incubators, DST to be involved.
Strengthen higher education institutional policy, structures and mechanisms	Build institutional links with provincial and metropolitan government.	Higher education institutions, SARIMA, CHEC to be involved.

Who steers?

A 'joined up' policy solution requires careful steering and management. It requires a 'champion' committed to steering the common vision, and putting in place the necessary co-ordinating structures and strategic implementation mechanisms.

The province has proposed a Provincial Development Council as the primary platform for social dialogue and consensus seeking amongst the key social partners, and to enhance co-ordination and communication between government and its social partners. This is one distinct form of institutional steering, a 'champion' that will play an advisory consultative role.

A second form of regulation will reside within the state itself, within provincial government, and must be premised on information, coordination and planning expertise. The 'champion' – whether an individual, unit, department or supra-departmental body – will have to be firmly inserted within existing provincial governance structures, and their visible and invisible webs of power, to have the credibility needed to steer a joined up process. The provincial champion will need the political authority to push through the necessary decisions and ensure the necessary levels of co-ordination across participating departments, if joined up solutions are to be effective. The precise location of such a 'champion' and whether a unit with supra-departmental authority is required, remain issues for debate within the province.

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Cape Biotechnology Initiative	http://www.cbi.org.za
Cape Gateway	http://www.capegateway.gov.za
Cape Higher Education Consortium	http://www.chec.ac.za
Cape Initiative in Materials and Manufacturing (CIMM)	http://www.cimm.tlabs.ac.za
Cape IT Initiative (CITI)	http://www.citi.org.za
Cape Technikon	http://www.ctech.ac.za
Catalyst Innovation Incubator	http://www.catalystii.net
Innovation Fund	http://www.nrf.ac.za/if
National Research Foundation	http://www.nrf.ac.za
Peninsula Technikon	http://www.pentech.ac.za
SARIMA	http://www.sarima.co.za
SAUVCA	http://www.sauvca.org.za
South African Nanotechnology Initiative	http://www.SANI.org.za
Technopark Stellenbosch	http://www.technopark.co.za

THRIP	http://www.nrf.ac.za/thrip
University of Cape Town	http://www.uct.ac.za
University of Stellenbosch	http://www.sun.ac.za
University of Western Cape	http://www.uwc.ac.za