

Agricultural education in South African schools: apartheid anachronism or developmental opportunity

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One in five learners writes Agricultural Science in the South African Senior Certificate Grade 12 school leaving examination. What is striking is that the majority of schools where Agricultural Science is currently offered as a subject are located on land that was formerly designated as homeland territory under apartheid. Overall, 91% of South African secondary schools that offer Agricultural Science as a subject were designated as schools for black learners during apartheid. This means that the distribution of opportunity to enroll for Agricultural Science in Grade 12 is still biased towards agricultural curricula for black learners long after the dissolution of apartheid. It would seem that educational structures such as school location and the distribution of educator skills have also conspired to sustain Agricultural Science as a subject to be taught in formerly African schools. This situation raises several fundamental issues. The agricultural curriculum in South African schools still has negative historical associations with unskilled labour. Nevertheless, students perceive the subject as an easy option in order to pass the school leaving examination, but this can be a trap as this choice does not raise employability chances in a labour market where the unemployment rate hovers around 40%. Ultimately the success of the agricultural curriculum is dependent whether it is perceived by students, parents and teachers to be consonant with their needs, and by equal measure on the extent to which such curricula are perceived by the architects of South Africa national development to be consonant with sustainable social and economic development strategies.

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Introduction

As South Africa's colonial and apartheid history has left its imprint on rural people, the majority of whom are Black, it has also influenced the agricultural economy. With historical reference, Feynes et al (1988) argued that the causes of inequality in the agricultural sector lie in differential access to power, markets and resources. Inequality is also a function of discriminatory access to knowledge pertaining to agriculture, whether it takes the form of information, agricultural extension programmes, ordinary school education or training. Territorial segregation and racially discriminatory access to schooling have created racial disparities in the quality and quantity of agricultural education and training in South Africa.

The curriculum area of agricultural education is a potentially important tool at the disposal of development planners to bring about social change even though it appears to be in itself a source of inequality.

This research project focuses on agricultural education opportunities that are offered in the senior secondary schools and Colleges of Agriculture in South Africa. The senior secondary phase is of particular importance because it interfaces between compulsory or general education on the one side and the workplace and higher education on the other side. It therefore serves as an important interlocking mechanism and as an "allocator of life chances"(Department of Education,1998,5).

This article considers the potential contribution of Agricultural Science in the South African senior secondary school curriculum to national development. The article first sets the context by briefly considering:

PART 1:

- the importance of the agricultural curriculum for supporting rural development in South Africa,
- The emphasis of the curriculum in South African after 1994, and
- the various ways in which agriculture is offered in senior secondary schools and agricultural colleges in South Africa.

The article then goes on to discuss various challenges impacting on the agricultural curriculum with reference to the following key factors

PART II

- The colonial and apartheid historical associations of agricultural education
- The dominantly theoretical orientation of the agricultural curriculum in South African Senior Secondary Schools
- The perceptions and aspirations of learners who take agricultural science as a subject

PART I:

The agricultural curriculum in support of rural development in South Africa

Agricultural education faces a number of challenges in addition to the pressing need to redress past discrimination.

The agricultural policy environment has radically altered in terms of: the scrapping of apartheid enactments, new legislation regulating agricultural labour, "liberalisation" of the agricultural marketing system, devolution of agricultural responsibilities from national to provincial levels, transformation of public sector and parastatal institutions serving agriculture directly or indirectly, and the institution of land reform projects and schemes (van Rooyen et al,1996:716-717). Furthermore, the Department of Agriculture has instituted its own programme, "Broadening Access to Agriculture Thrust"(BATAT) which contains a

human resource development component (Stilwell,1995,10-14). The focus of both of these programmes gives emphasis to human capital development and by implication the need to consider agricultural education policy. The cumulative effect of the changes identified here has implications for the increased participation of Black people in the agricultural economy and also for curriculum development.

Pressure on agricultural education and training in South Africa is changing not only in terms of aggregate demand but also in terms of its nature and focus. According to van Rooyen et al "an increase can be expected in the numbers of small scale farmers producing on a full-time and a part-time basis" which is expected to raise demand for agricultural education and extension. At the same time, increases in "high value 'urban' agriculture", and "dramatic and transferable biotechnology innovation" can be expected, which will also have the effect of changing educational requirements (1996:717) For example, the development of biotechnology has contributed to improved productivity by smallholder farmers in the production of crops such as rice coffee, tea, coconuts and sisal (Stilwell and Van Rooyen,1990,364).

Internationally Wallace observes, that there are changes in the concept of "agriculture" which is increasingly viewed in broader notions of renewable natural resource (RNR) management, with an emphasis on integrated systems, sustainable production(Low External Input agriculture) and wildlife conservation and management. At the same time, traditional concepts of teaching and learning in agriculture are being challenged by developments in 'soft systems thinking', in indigenous technical knowledge(ITK), in creating learning organisations in rural development and in participatory rural appraisal(PRA). The effect of these systems views has been to raise awareness of interrelationships between agricultural knowledges and information systems that may be better articulated broadly as "rural knowledge systems". Flowing from this are pressures for responsiveness, adaptation and innovation in the curriculum. (Wallace, 1997,27-28).

Curriculum policy in South African Education after 1994

Policy change in the South African education system itself will have far reaching effects on the provision of agricultural education and training. The generation of policy has touched on virtually all aspects of educational construction but has given particular attention to the challenges of generating equitable access to education, and to integrating education and training (Department of Education, 1995a, 1995b, 1996a, 1996b, 1996c, 1997a, 1997b, 1998a, 1998b, 1998c).

Central to these aims is the National Qualifications Framework(NQF) which facilitates linkages between multiple qualifications that are located in various Education and Training pathways in order to facilitate learning as a lifelong process. The basic structure of the NQF consists of the General Education and Training(GET), Further Education and Training(FET) and Higher Education and Training(HE) bands. With ten years of free and compulsory education for all, the end of the GET becomes the first possible exit point from the formal education system.

The FET is designed: to provide intermediate to higher level skills and competencies, to promote the integration of education and training, and to enhance learner mobility and progression at the critical point between GET, entry to HE and the workplace. In this sense, it is "an important allocator of life chances"(Department of Education, 1998, 5) within the framework provided for lifelong learning and open learning systems. The question here would be: In what ways can or should the curriculum be designed at the FET level to encourage the achievement of competencies within an agricultural orientation in order to facilitate career pathing in the field? The significance of this phase for agricultural education is that it should optimally provide for learners to select from a flexible set of programmes that would enable them: to generate the skills and competencies that are appropriate for working

as small farmers; or to enter the job market in the agricultural sector, or to enter the HE band where they would pursue professional and occupational qualifications possibly in the agricultural sector.

In its developed state, the FET system is intended to provide education and training within a differentiated framework to a variety of learners that includes out of school youth, young adults and the broader adult population. This means that the system aims to provide for both initial and second chance opportunities in terms of the imperatives of life long learning.

The introduction of Curriculum 2005 and Outcomes Based Education and Training (OBET) seeks to emphasise a learner centered rather than teacher centered approach, and problem solving and transfer of skills rather than memorisation of content in the classroom. In developing these curriculum goals OBET seeks to recast the social relationships of the classroom. This has important implications for all curriculum areas. These innovations are congruent with international changes in perceptions of learning in agricultural education which are adopting a more learner centered, experiential learning and interdisciplinary approach. The reversal of education from being a top-down, or expert-driven process is observed by Wallace as follows: "Rather than force feeding the facts, future agriculturalists learn for themselves how to become efficient seekers and processors of information" (Wallace, 1997, 30). Agriculture offers scope for the development of activities within an OBET approach, even though it has been taught in most Senior Secondary schools in South Africa as a theoretical subject.

The institutional forms for agricultural curriculum provision

Introduction: high school and immediate post-school agricultural education opportunities

Agriculture is structured into the curriculum in different ways in different institutions in South Africa. In summary a learner can be exposed to the agricultural curriculum where:

- 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.
- Agricultural Science (Higher Grade or Standard Grade) and Applied Agricultural Science (Standard Grade only) are offered in combination in a special Agricultural High School together with other subjects at the senior secondary level.
- Agricultural Science (Higher Grade or Standard Grade) is offered as a stand alone subject choice at senior secondary level in an ordinary public high school.

This overview will briefly introduce the reader to the size and shape of the three different forms in which agriculture is offered in post-compulsory public learning environments in the South Africa.

Colleges of Agriculture

South Africa has 11 agricultural colleges. The current responsibility for Agricultural Colleges lies with the national or provincial Departments of Agriculture, but there is negotiation with the view to transferring the Colleges into the responsibility of the Department of Education.

Prospective farmers, extension officers, animal health and engineering technicians are trained at the colleges of agriculture. Practical training takes up approximately 50% of the student time, while the balance is devoted to lectures and demonstrations. The Colleges offer 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.

The student enrolment at Agricultural Colleges for the period 1999 to 2002 ranged between 2 049 and 1 543 students and shows a gradual decline in enrolment over the four-year period (Table 1).

Table 1: National Enrolment at Agricultural Colleges, 1999 – 2002

	Enrolment				Total growth over previous year %		
	1999	2000	2001	2002	1999-2000	2000-2001	2001-2002
1st-year	731	697	652	696	-4.7	-6.5	6.7
2nd-year	818	678	569	555	-17.1	-16.1	-2.5
3rd-year	500	512	385	292	2.4	-24.8	24.2
Total	2,049	1,887	1,606	1,543	-7.9	-14.9	-3.9

Source: Personal communication, Dr A Van Niekerk, Association of Principals of Agricultural Colleges.

Table 2 shows the student enrolment according to qualifications in the provinces where the agricultural colleges are situated. A Higher Certificate (HC) in Agriculture is a two-year course accredited by the Certification Council for Technikon Education (SERTEC) and a Diploma in Agriculture course is a three-year course (within which the Higher Certificate constitutes the first two years of study).

Table 2: Qualifications obtained at Agricultural Colleges, 1999 – 2002

Province	Number of Agricultural Colleges	1999		2000		2001		2002	
		HC	Diploma	HC	Diploma	HC	Diploma	HC	Diploma
Eastern Cape	2	42	95	17	93	26	85	21	84
Free State	1	34	14	18	7	15	5	15	5
KwaZulu-Natal	2	67	50	96	58	36	45	58	37
Limpopo	2	0	70	0	79	0	116	0	106
Mpumalanga	1	64	36	45	34	33	36	39	48
North West	2	71	86	54	88	72	98	63	42
Western Cape	1	51	15	58	12	67	20	62	29
Total	11	329	366	288	371	249	405	258	351

Source: Personal communication, Dr A Van Niekerk, Association of Principals of Agricultural Colleges.

Table 3 shows the provincial share of the national total of graduates of Colleges of Education for both a Higher Certificate and a Diploma in Agriculture for the years 1999 to 2002 respectively as a percentage.

Table 3: Qualifications obtained by Province, 1999 – 2002

Province	Number of Colleges	1999		2000		2001		2002	
		HC	Diploma	HC	Diploma	HC	Diploma	HC	Diploma
		%	%	%	%	%	%	%	%
Eastern Cape	2	13	26	6	25	10	21	8	24
Free State	1	10	4	6	2	6	1	6	1
KwaZulu-Natal	2	20	14	33	16	14	11	22	11
Limpopo	2	0	19	0	21	0	29	0	30
Mpumalanga	1	19	10	16	9	13	9	15	14
North West	2	22	23	19	24	29	24	24	12
Western Cape	1	16	4	20	3	27	5	24	8
Total	11	100	100	100	100	100	100	100	100

Source: Personal communication, Dr A Van Niekerk, Association of Principals of Agricultural Colleges.

Note: HC is for Higher Certificate

Special Agricultural Schools

There is a small category of 47 special Agricultural High Schools in South Africa. 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).

It is compulsory for learners to take Agricultural Science as a subject on either the Standard or the Higher Grade and also to take Applied Agricultural Science which is offered only on the Standard Grade. In most of these Agricultural High Schools, the choice of subjects is wide enough to enable scholars to obtain a university entrance exemption and does not disadvantage learners in terms of post school career or study choices.

These schools are supposed to provide a balanced experience of agricultural science to learners in which agricultural theory is linked to practice in a working farm environment, but the institutional cost of providing this experience will be significant.

The 2003 Senior Certificate Examinations database only provides information for 43 specialist Agricultural High Schools, with a total enrolment of 1,924 learners. However, one of these schools does not provide an agricultural subject at the SCE level. Table 4 shows the distribution of specialist Agricultural High Schools per province.

It is apparent from Table 4 that largely rural provinces such as the Eastern Cape and KwaZulu-Natal are underrepresented in terms of specialist Agricultural High Schools. A concern in the Eastern Cape is the lack of commercial farmers in strategic areas and declining learner enrolment in specialist schools.

Table 4: Special Agricultural High Schools, 2003

Province	Number of Centres		Agricultural Science HG		Agricultural Science SG		Animal Husbandry HG		Animal Husbandry SG		Applied Agricultural Science SG		Farm Mechanics SG		Field Husbandry HG		Field Husbandry SG		Practical Agricultural Science SG	
	Centres	Candidates	Centres	Candidates	Centres	Candidates	Centres	Candidates	Centres	Candidates	Centres	Candidates	Centres	Candidates	Centres	Candidates	Centres	Candidates	Centres	Candidates
Eastern Cape	3	3	23	3	76						3	73								
Free State	11	6	42	6	52								6	83					11	235
Gauteng	1										1	18	1	10						
Kwazulu-Natal	3	1	2	1	1	3	47	3	31						3	42	3	37		
Limpopo	8	2	88	1	57	4	140	4	58	3	39	2	15	3	28	2	32			
Mpumalanga	7	3	32	2	18	1	2	1	11	5	152	4	82			1	15			
North West	4	1	28	1	27	2	13	2	25	2	19	3	43	1	5	2	22			
Northern Cape	2	2	14	2	28														2	31
Western Cape	3	3	89	3	62						3	142								
Total	42	21	318	19	321	10	202	10	125	17	443	16	233	7	75	8	106	13	266	

Source: Department of Education 2003

Ordinary high schools offering Agricultural Science as a subject choice

It is immediately apparent that the Gauteng, Western Cape and Northern Cape schooling systems have comparatively low proportions of schools where Agricultural Science is offered as a stand alone subject (Table 5). Gauteng, which is a predominantly urban population, has the smallest proportion of schools offering Agricultural Science. The distribution of schools offering Agricultural Science is to some extent a product of the homelands system, with the result that the provinces which incorporate former homelands territories contain the largest populations of schools which offer Agricultural Science.

Table 5: Schools offering Agricultural Science as a Subject in the Senior Certificate Examinations, 2003

Province	Number of centres offering Agricultural Science as a Senior Certificate Examinations (SCE) subject				All SCE Centres	Agricultural Science centres as a percentage of all SCE centres
	Both HG an SG	HG	SG	Total		
Eastern Cape	223	4	358	585	910	64.3
Free State	31	1	32	64	337	19.0
Gauteng	7	1	8	16	640	2.5
Kwazulu-Natal	288	54	121	463	1,483	31.2
Limpopo	395	54	611	1,060	1,373	77.2
Mpumalanga	66	2	159	227	415	54.7
North West	62	4	113	179	389	46.0
Northern Cape	6	0	7	13	105	12.4
Western Cape	19	2	17	38	383	9.9
Total	1,097	122	1,426	2,645	6,035	43.8

Source: Department of Education 2003

Note: HG is Higher Grade, and SG is Standard Grade

Within the 2,645 schools offering Agricultural Science to Senior Certificate level, there are a relatively small average numbers of learners per school. The average number of learners per school who enrolled was 32 in 2003 (Table 6), dropping to an average pass rate of just over twenty (21.3) per school. A substantial number of learners enrol for Agricultural Science which is an optional or elective subject. Nearly one in five Senior Certificate Examinations candidates - 19.1% all candidates - register for Agricultural Science mainly on the Standard Grade.

Table 6: Senior Certificate Agricultural Science Candidates per province (HG & SG), 2003

Province Name	Total Entered	Total Wrote	Total Passed	Subject Pass %	Average number of learners per centre
Eastern Cape	20 303	19 129	13 199	69.0	35
Free State	1 047	1 015	723	71.2	16
Gauteng	269	263	131	49.8	17
Kwazulu-Natal	12 414	11 849	9 241	78.0	27
Limpopo	30 733	30 068	24 813	82.5	29
Mpumalanga	10 767	10 380	7 301	70.3	47
North West	6 775	6 593	3 702	56.2	38
Northern Cape	227	225	191	84.9	17
Western Cape	1 353	1 289	811	62.9	36
Total	83 888	80 811	60 112	74.4	32

Source: Department of Education 2003

Note: HG is Higher Grade, and SG is Standard Grade

It is clear from the overview presented above that Agricultural Science as it is taught to the Senior Certificate school leaving level as a stand alone subject is the largest vehicle for providing learners with the opportunity to learn about agriculture. The extent to which the experience of Agricultural Science meets individual needs and rural development needs is central to the thrust of this article.

PART II: The context of the agricultural curriculum

Agricultural education from the 1930s to the 1950s

The original 1920s justification given for enforcing an agricultural curriculum in African schools, that of equipping African learners to produce on their own lands for their own communities. But the plan was undone by changes in the labour market and urbanisation. Even though the colonial departments continued to support agricultural elements into the mission school curriculum, during this period the pattern of employment of Africans in the labour market was changing. While the employment of African males as farm workers on white farms remained constant, the most notable changes between 1936 and 1951 were: a significant increases in the proportions of African males finding work opportunities as general labourers in the urban areas; and a corresponding decline in the numbers of African males employed as peasant farmers (Table 7).

Table 7: Employment of African Males older than 15 in the labour market (from Hurwitz 1964: 44-45,77-78).

	1936	%	1951	%
Peasant farmers	814 282	34.0	437 807	16.2
Other Farm Workers	621 002	25.9	722 508	26.8
Mining	388 894	16.2	438 029	16.2
General labourers	189 790	7.9	477 947	17.7
Domestic Workers	114 502	4.8	145 168	5.4
Not economically occupied	95 649	4.0	155 234	5.8
Other	174 015	7.3	321 188	11.9
Total	2 398 134		2 697 881	

After 1948 the National Party implemented its policy of Bantu Education to counter the threat of black urbanisation. Under Bantu Education, significant growth in enrolments took place. Enrolments increased from 882 700 in 1953 to 1 898 600 in 1965 - in effect producing a doubling of the school population within one decade. As a result, primary school enrolments increased to 49% and 78,8% of the population of children aged 4-14 between 1960 and 1970 (Unterhalter 1991: 39).

There were two critical characteristics of Bantu Education of relevance to this account of the agricultural component in the African school curriculum. First, the massive enrolment increases observed were restricted to the Lower and Higher Primary school levels (Sub-Standard A to Standard 5) to the extent that even in the mid-1960s, 96,6% of all learners at school were located in the Primary phases. This meant that African learners would only be exposed to rudimentary skills in the agricultural domain at the Primary school level.

Second, despite the sharp enrolment increase, expenditure on African schooling did not rise proportionately, contributing to a decrease in expenditure per pupil from R17.08 in 1953 to R12.70 in 1965 (Unterhalter 1991: 37-48). Such a growth path could only be sustained through raising pupil-teacher ratios and implementing double sessions, where two different sets of learners and educators used the same school building at different times of the day. This inevitably produced degradation in school quality.

It was in these conditions that the Bantu Education curriculum gave renewed emphasis to agricultural experience for learners in the school syllabus (Nutt 1957: 75-88). At the primary school level, African children were exposed to agriculture through the subject known as "Gardening", which consisted of a basic practical curriculum dealing with the establishment of flower beds lawns and vegetable production.

The Department of Bantu Education was able to implement agriculturally-oriented curricula more efficiently than the disparate mission schools had hitherto been able to. In 1957, a "garden master" described the intent in the Department to implement gardening:

.... with such a detailed syllabus and garden tools and seeds coming from the Department at such speed and in such volume, coupled with the strictness of the Inspectorate in seeing to it that funds are not expended for nothing (Leboho 1957: 41-42).

Gardening in the primary school was practiced into the 1990s. According to a report produced by the Department of Education and Training in 1990, some 1,67 million students in 5 680 schools were taking gardening as a primary school subject. The actual number was probably much larger given that the statistic cited did not include agriculture students from

the former homelands of the Transkei, Bophuthathswana, Venda and Ciskei (Department of Education and Training Annual Report, 1991).

Agricultural schooling in the homelands

In the previous section agricultural education was discussed with particular reference to the primary school curriculum. This reflects the fact that the overwhelming majority of African learners were only exposed to primary education until the 1970s. However, the situation changed when the opportunities for African learners to continue their studies to high school opened up in the South African bantustans. The process of territorial segregation begun in 1913 culminated in the grand apartheid homeland system with ten "independent" and "self-governing" territories proclaimed between 1963 and 1981. The so-called "homelands" were territories designated to each of the different ethnic communities in South Africa as part of apartheid separate development.

As a result of official policy to develop the homeland education systems, thereby forestalling urban drift, between 1960 and 1987, the proportion of African primary school enrolments in the homelands in relation to all African schools in South Africa increased from 47,7% to 70,9%. The overwhelming majority of homeland students were registered in the primary school. Only 3% of learners who enrolled in Standard 1 in 1965 reached Standard 10 a decade later, and the enrolment of pupils in the Senior Secondary school phase (Standard 9 – Standard 10) did not exceed 1% of total enrolments until after 1975 (Unterhalter 1991: 41-42). Thereafter, enrolments grew rapidly into the 1980s as the apartheid government attempted, under political pressure, to expand access to high school opportunities in the homelands.

This raises the question as to what extent the curriculum in the homeland schools reflected an agricultural orientation, as high school education boomed in the late 1970s and 1980s. Paterson and Arends recently conducted an analysis of the subject "Agricultural Science", which is part of the South African Senior Certificate Examination (SASCE). The SASCE is the major school leaving examination for South African learners at Standard 10 (now Grade 12) level. It provides an important view of the relative importance of agricultural subjects among prospective school leavers. A significant number of learners still choose to take Agricultural Science as one of their compulsory subjects. In the SASCE of 2001, 93 905 or 19,9% of a total number of 471 821 candidates entered the Agricultural Science Examination, and 58 481 or 21,1% of 276 470 passed Agricultural Science. These figures show that a significant proportion of all learners reaching Grade 12 elect to take Agricultural Science. What is striking about the set of schools that currently offer Agricultural Science to Grade 12 is their distribution, which is overwhelmingly in the former apartheid homelands (Table 4). Fully 82% of all schools where Agricultural Science was taught in 2001 are located on land formerly designated as homeland territory.

What this means is that the distribution of opportunities to enroll for Agricultural Science in Grade 12 is uneven. It is a subject that is most commonly offered in former apartheid homeland system schools, which, years after the dissolution of the homelands, are still predominantly attended by African learners. This suggests that there is a remarkable durability in the shape and distribution of curriculum "choice" within South African rural schools. It would seem that educational structures such as school location and the distribution of educator skills have also conspired to sustain Agricultural Science as a subject to be taught in African schools.

At high school level, there was continuity in the racial typing of the curriculum. The majority of students taking the subject Agricultural Science to Senior Certificate level were Black, amounting to 84 597 students in 1991 (Department of Education and Training Annual Report, 1991).

Table 8: Distribution of Schools offering Agricultural Science at the SASCE by location inside or outside of the former Homelands, 2001

Province	Total Number of Schools Offering Agricultural Science	Schools Located outside Homelands	Schools Located inside former Homelands	% in the former Homelands
Eastern Cape	581	72	509	88
Free State	66	48	18	27
Gauteng	28	28	0	-
Kwazulu-Natal	368	47	321	87
Limpopo	1 040	71	968	93
Mpumalanga	227	100	127	56
Northern Cape	13	13	0	-
North West	170	31	139	82
Western Cape	34	34	0	-
Total	2 527	444	2 083	82

Source: Paterson and Arends (2002: 5)

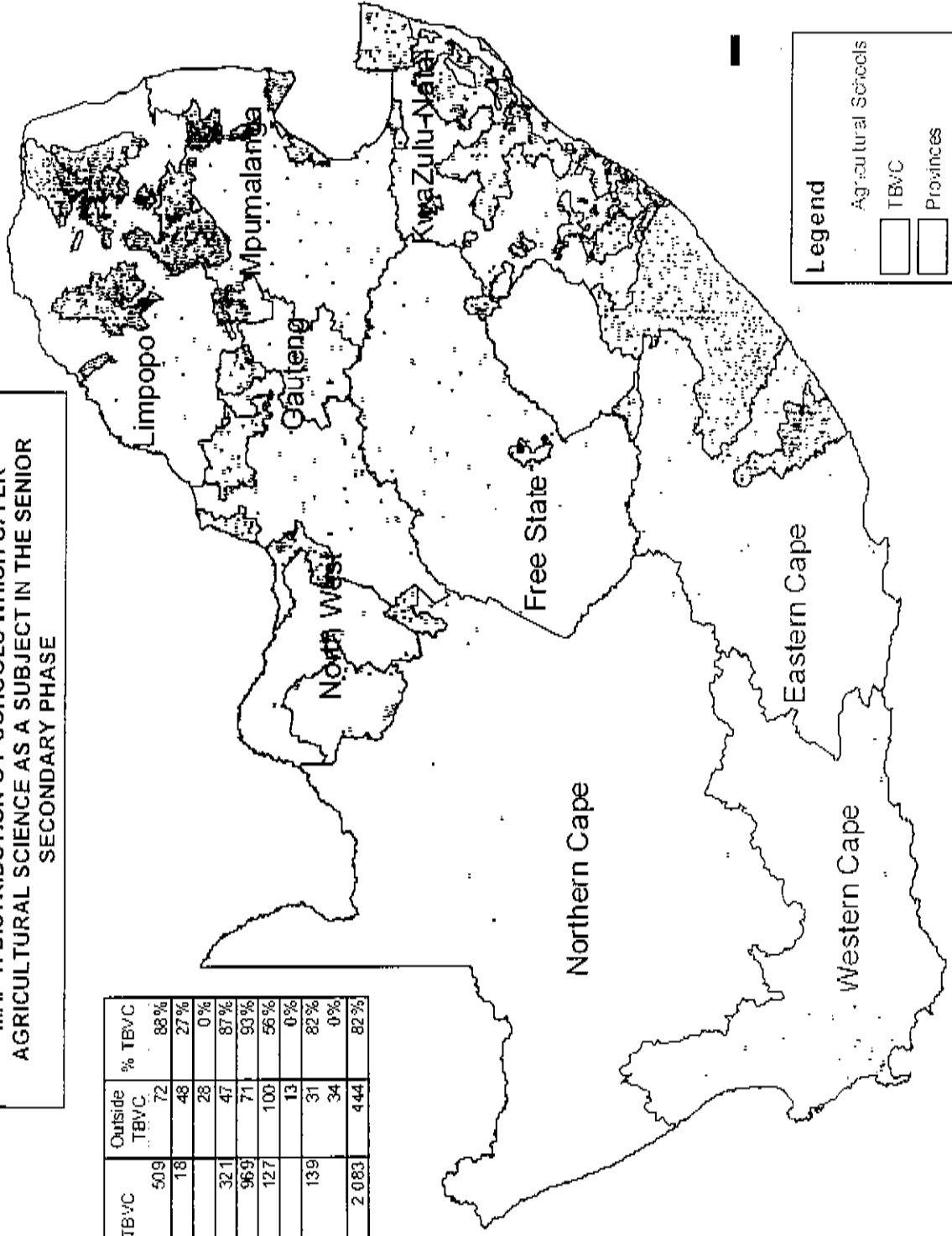
Furthermore, out of the 444 schools offering Agricultural Science that were not located in the former homelands (Table 8), half of these are schools, or 223, were formerly administered by the Department of Education and Training (DET), the education department responsible for administering the education of Africans who were resident outside the homelands in "white" South Africa under apartheid. This means that, in 2001, of the total number of schools that offered Agricultural Science to Grade 12 in South Africa, 91% were schools that were formerly designated for Africans under Apartheid (Map 1).

The results of this analysis of the spatial location of South African high schools that offered Agricultural Science to Grade 12 in the year 2001 show that agricultural curricula were well entrenched in the homelands education systems, and furthermore that the pattern of provision is still visible long after the dissolution of apartheid. This shows that there was continuity in curriculum content between the primary and high school phases. The allocation of agricultural elements in the primary school curriculum from the 1930s to the 1960s was extended by the designers of the curricula for homeland high schools in the 1970s and 1980s. Based on this evidence it appears that the homelands system sustained the implementation of agricultural forms of education among black South Africans at school. In practice, however, agricultural curriculum components at the primary and high school levels have escaped the subversion of their original purpose.

This racial and spatial typing of the curriculum holds important implications for the options that learners can choose from in determining their subject combinations. Recently, the Department of Education announced revisions to the national Further Education and Training curriculum, which involved a reduction in the number of subjects on offer from about one hundred and sixty to thirty five subjects. After the compulsory subjects (including languages are removed from the list of thirty-five, learners have to select three subjects from a set of approximately twenty. But their choice will be restricted by the availability of subjects taught in the school where they are registered. Many may therefore be obliged to select Agricultural Science as one of these choices. For many learners taking agriculture as part of their subject choice combination, this in effect constrains particular career choices.

MAP 1: DISTRIBUTION OF SCHOOLS WHICH OFFER AGRICULTURAL SCIENCE AS A SUBJECT IN THE SENIOR SECONDARY PHASE

Province	Agricultural Schools	TBVC	Outside TBVC	% TBVC
EC	581	509	72	88%
FS	56	18	48	27%
GA	28	28	0%	0%
KZ	368	321	47	87%
LP	1 040	969	71	93%
MP	227	127	100	56%
NC	13	13	0%	0%
NW	170	139	31	82%
WC	34	34	0%	0%
Total	2 527	2 083	444	82%



The dominant theoretical orientation of Agricultural Science in South African senior secondary schools

The teaching and learning of agricultural science in senior secondary schools is strongly theory based with minimal experiential opportunities. This is on account of two key factors. First, the mode of teaching and learning is based on teacher dominance. Second, the schools offering agricultural science are poorly served with facilities and infrastructure that can enable practical and hands-on experience

In the contemporary period, the pedagogical approach of teachers of Agricultural Science in the majority of high schools is based on teacher dominant "chalk and talk" methods (Njobe 2001). Further, the subject is characterised by limited time allocations for practical experimentation and an overwhelmingly theoretical approach (Mamabolo 1997).

The subject is by all accounts still taught in the classroom on a theoretical basis since no practical work is required (Mamabolo,1997). Data from a comparatively recent study by Mamabolo of Agricultural Science at High Schools in the Northern Province shows a decline in enrolment in the subject at the Senior Certificate level, which is ascribed to: inadequate facilities, poorly maintained or nonexistent school gardens, lack of access to inputs such as implements, seed, insecticides and fertiliser, limited time allocations to practical experimentation, and an overwhelmingly theoretical approach. Mamabolo also identifies , low levels of career awareness and career guidance, lack of role models, lack of career incentives in agriculture, poor links with extension services of other government departments, and lack of entrepreneurial and management skills building as serious shortcomings. He recommended improved grounding in experimental methodology, improving competencies in technology and improving local relevance in the curriculum(Mamabolo,1997,3,7,19,21,24).

Many of the schools offering agricultural science as a subject do not have facilities or infrastructure to enable the subject to be presented with practical and hands-on opportunities. This is because out of the 2 645 schools offering the subject, only 1704 have access to onsite water, only 1 981 have proper fencing and only 727 have science laboratories. Overall only 607 schools have water available to irrigate plants or to water livestock.; have fences to protect their project work and have laboratories to carry out experiments. Thus the physical environment of the school seems to play an important role in limiting the extent to which practical work can realistically be undertaken.

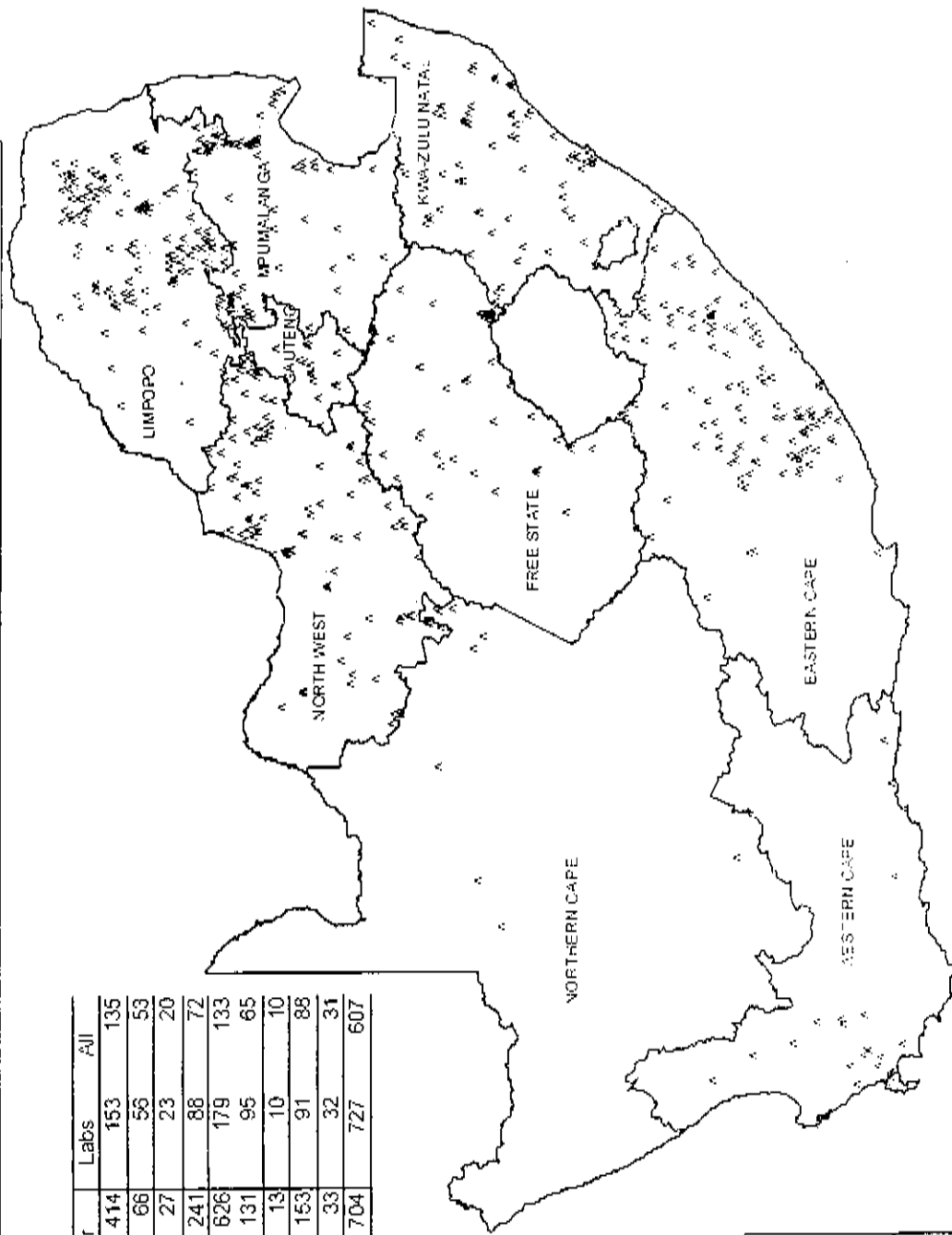
In addition, of the 2 645 schools offering agricultural science, only 1 987 schools offered mathematics and science as subjects in 2002. This problem will be partially resolved with the implementation of the new curriculum where all learners will register at least for a "Mathematics Literacy" programme.

Nevertheless, the 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 a Agricultural degree choice is limited. This means that ironically, learners who do not take Agricultural Science at school but do take Mathematics and Science have a better chance of studying agriculture in a higher education institution.

It has been observed that the subject is selected by a large percentage of school leaving candidates, but is acknowledged to be a soft option, which students take in order to obtain a school leaving certificate, without any intention to work in agricultural careers.

MAP 2: DISTRIBUTION OF SCHOOLS OFFERING AGRICULTURAL SCIENCE AS A SUBJECT IN THE SENIOR SECONDARY PHASE THAT HAVE THE FOLLOWING FACILITIES: WATER, FENCE, LABORATORY

Province	Fencing	Water	Labs	All
EC	435	414	153	135
FS	60	66	56	53
GA	23	27	23	20
KZ	309	241	88	72
LP	813	626	179	133
MP	137	131	95	65
NC	12	13	10	10
NW	161	153	91	88
WC	31	33	32	31
Total	1 981	1 704	727	607



Legend

- ▲ Selected Agricultural Schools
- SA PROVINCE

Student perceptions of the value of agricultural curricula

The place of agricultural curriculum forms in South African education is a highly emotive one. This is because "agriculture" or "gardening" activities undertaken by African pupils are associated with impoverished curricula under colonialism and apartheid.

Popular distrust of agricultural curricula is not unique to South Africa, but is a characteristic of attempts to install agricultural curricula elsewhere. In newly independent Africa, agriculturally based rural school curricula were promoted as synergistic with national development programmes and socialist political and economic ideals. Yet even these plans for agriculturally driven rural development in a sympathetic political climate failed to mature.

Why learners and communities positively or negatively evaluate rural or practically oriented curricula is a complex issue which has a long historical lineage. This question resonates with the literature on the 'adapted curriculum' of the colonial period, and with Philip Foster's (1965) seminal work on the vocational school fallacy. In somewhat different ways, both refer to instances of how a 'rural' and vocationally oriented form of education was considered by its intended recipients to be antithetical to their interests. Forms of education that were 'adapted' or 'localised' in particular rural or agricultural environments were resisted because they were perceived to have a negative effect on future life chances. Whereas in contrast parents and learners are more concerned with the 'relevance' of the curriculum to their aspirations for modern or public sector employment in an urban environment. In this case any 'ruralised', 'localised' or 'practical' curriculum can be perceived as undesirable or entrapping (Wallace,1992,60; King,1976). What was preferred was modern sector, white collar and urbanised employment - and by association the theoretical, bookish kind of education that enhanced the chances of achieving that goal.

Unfortunately, the terms such as 'relevant', 'localised' or 'practical' are likely to be interpreted in quite different ways by different interest groups. Educational policy makers and planners might design what they consider to be 'relevant' curricula with respect to rural needs and situations. For example, the South African Skills Development Act requires that FET institutions "launch and sustain programmes that would attract support from the National Skills Fund, *directed towards rural skills needs* and the learning requirements of the long term unemployed (emphasis added)"(Education Department,1998a,17). Here is explicit recognition that programmes will differ in accordance with context where rural curricula will be suited to ascribed rural needs.

One of the chief reasons why adapted curricula failed was because people sought academic forms of education. Yet the recent FET White Paper goes against historical experience in stating: "that the core business of FET institutions...should not be allowed to suffer as a result of 'mission drift' or academic emulation"(Department of Education,1998a,20). This statement reveals the intention in FET policy to transgress the theory-practise divide that has characterised past curriculum structures in South Africa which carry deeply ingrained association of academic education with superiority. Translated into curriculum terms, this implies that theoretical knowledge should be contextualised as part of a process that emphasises learning outcomes rather than content acquisition, and where emphasis is placed on practical problem solving and transfer of skills.

Clearly practical agricultural, and industrial, activities represent an enduring paradox for curriculum policy makers and rural communities alike. This can be expressed in the following two conflicting perceptions:

on the one hand education is perceived as failing to contribute to the satisfaction of the local economic needs of the community, and on the other as failing to provide access to the higher status and knowledge that would enable young people to move out of the rural situation into a world of greater opportunities (Hartshorne 1989: 6).

Agricultural curricula are dependent to greater or lesser extent on their perceived value among the student populations and social groups to which they are made accessible. The future of the agricultural curriculum in South African schools will depend on the extent to which such curricula are perceived by students, parents and teachers to be consonant with their needs, and by equal measure on the extent to which such curricula are perceived by the architects of South Africa national development to be consonant with sustainable social and economic development strategies.

Conclusion

Through the periods of colonialism and apartheid, Black students were streamed into an agricultural orientation in accordance with the hegemonic vision of White policy makers. The agricultural curriculum prepared Blacks to serve as labourers or as domestic workers (such as gardeners) in the industrial heartlands, or remain as subsistence farmers in the Homeland territories. This in part explains why in the past, potential Black farmers shunned agriculture as a dead-end career option, and why in the present, there is such a wide human capital gap between Black and White at all graduate-levels in South Africa pertaining to agricultural programmes.

The current perceptions and attitudes of learners towards the agricultural education field are vital. What must be investigated is: what the current attitudes of learners are to agricultural education; how learners enrolled for agricultural studies perceive differentiated programmes; how they might respond to curricula that are made 'relevant' to rural contexts; and how they react to curricula that are made less theoretical and more practical.

It has been noted that in Sub-Saharan Africa, Agricultural Education and Training has suffered from a lack of knowledge of the training needs of its target groups and of the labour market in the rural sector (Wallace, 1997, 31) and furthermore, that "for most countries there is no coherent policy framework for Agricultural Education and Training. One of the main reasons is that the normal pattern for responsibility for the sector is to be shared amongst various implementing ministries"(Wallace, 1997, 33). In South Africa, the field of agricultural education lies at the intersection of the jurisdiction of the Departments of Education, Labour, and is also functionally linked to policy developments in Trade and Industry, Agriculture and Land Affairs. Yet it is notable that the Inter-Ministerial Committee on Human Resources Development referred to in the FET White Paper does not include the Minister of Agriculture or the Ministry of Land Affairs (Department of Education, 1998, 7).

There is clearly a difference between the policy intentions and the reality in which agriculture is taught in South African senior secondary schools. At the heart of the situation are debates around: whether agricultural science should be infused with a strongly vocational approach or whether it should be taught as a general formative subject, and about the extent to which the curriculum should reflect the social and developmental needs of the environment in which learners and their communities live. It would seem that this discussion in reference to agricultural education has stalled, and the default mode of teaching and learning in agricultural science has fallen on an academic approach.

One of the most important variables at stake here is the impact of student perceptions of the curriculum and beliefs concerning its market value. The supply of adequate human resources within the agricultural sector is dependent on such perceptions. It is clear that research is needed to uncover how learners in South Africa view the links if any between their choice of agricultural subjects or programmes and their future employment and career prospects. The importance of such research lies in its potential to shed some light on the variable of student choice and volition which must be taken into account in analysis of the relationship between education and sectoral labour markets.

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