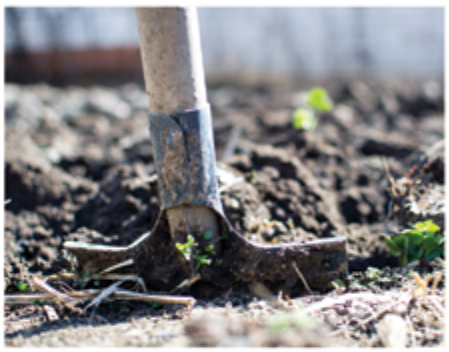

2015

National Education and Training Strategy for Agriculture, Forestry and Fisheries

agriculture, forestry & fisheries
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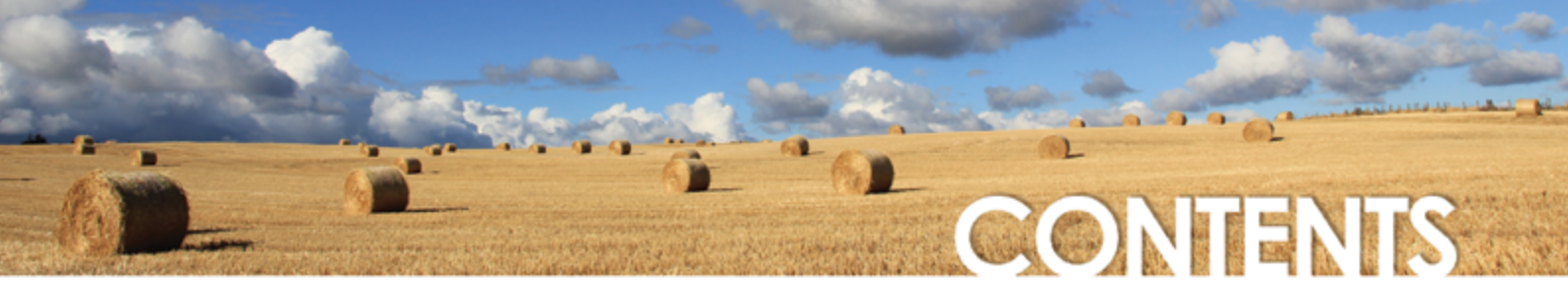

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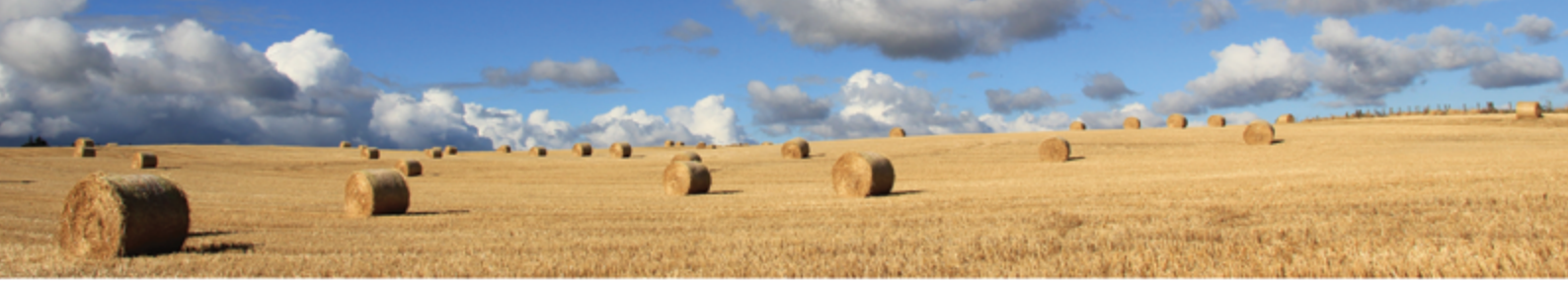
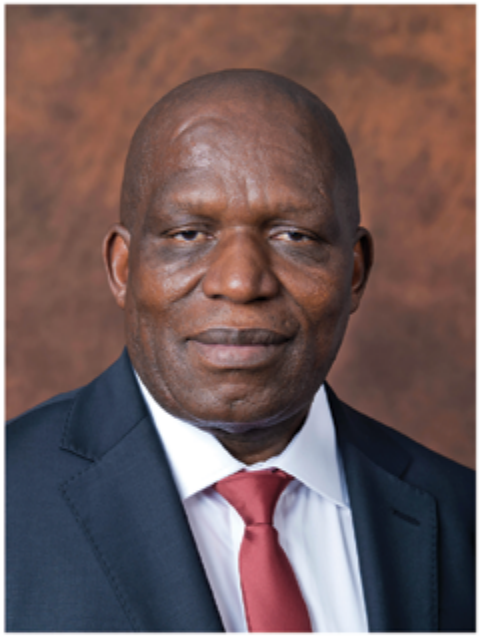


ACRONYMS

AE&T	Adult Education and Training
AET	Agricultural Education and Training
AET	Strategy National Education and Training Strategy of 2005
ASSAF	Academy of Science in South Africa
CBNRM	Community-based Natural Resource Management
CCDP	Contractor Capacity Development Programme
CSIR	Council for Scientific and Industrial Research
DAFF	Department of Agriculture, Forestry and Fisheries
DBE	Department of Basic Education
DHET	Department of Higher Education and Training
ESTAFF	Education and Training Strategy for Agriculture, Forestry and Fisheries
FP&M SETA	Fibre Processing and Manufacturing Sector Education and Training Authority
GDP	Growth Domestic Product
IGDP	Integrated Growth and Development Plan
NDP	National Development Plan
NEMO	National Environment Management of the Ocean
NETFAFF	National Education and Training Strategy for Agriculture, Fisheries and Forestry
NETSAFF	National Education and Training Strategy for Agriculture, Fisheries and Forestry
NTFPs	Non-timber Forest Products
ORI	Oceanographic Research Institute
PETFAFF	Provincial Education and Training Forum for Agriculture, Forestry and Fisheries
SAAMBR	South African Association for Marine Biological Research
SAEON	South African Observation Network
SAFCA	South African Forestry Contractors Association
SAMSA	The South African Maritime Safety Authority
SMEs	Small and Medium Enterprises
TETA	Transport Education Training Authority
TIMS	Timber Industry Manpower Service
TVET	Technical and Vocational Education and Training
UPM	University of Mpumalanga

STATEMENT BY THE MINISTER



Mr Senzeni Zokwana

I am pleased to present the National Education and Training Strategy for Agriculture, Forestry and Fisheries which provides a framework for Agriculture, Forestry and Fisheries education and training in a manner that is consistent, coherent and responsive to the needs of the sector, on the medium term.

The development of the National Education and Training Strategy for Agriculture, Forestry and Fisheries signals our determination as government to give effect to improving skills profile in the sector, combating the challenges facing the provision of education and training in the sector and supporting the objectives of the National Development Plan (NDP) and Agriculture, Forestry and Fisheries Strategic Framework. The NDP Acknowledges marginalisation of the poor as one of the key challenges of rural development. In combating this, the NDP demands change in accessing resources like land, water, education and skills. Although the rural share of poverty fell from 70% in 1993 to 57% in 2008, this is largely due to increases in social-grant transfers and migration to urban areas. Despite the fact that farm workers have greater rights and receive better wages, rural areas are still characterised by pronounced poverty and inequality.

The NDP anticipates that agriculture will be the driving force behind the economy of rural areas. It calls for a comprehensive plan that includes substantial expansion of irrigated agriculture, more efficient dry-land production, the promotion of agro-processing/agro-industry and a fresh effort towards agricultural development and improved land management in the former "homeland" areas. The plan emphasises building capacity of smallholder farmers and doing this in partnership with established agricultural industries and commercial farmers.

To achieve these goals by 2030 will require a significant effort and resurgence in agriculture, forestry and fisheries education and training. Specifically, the plan highlights the need for developing the requisite knowledge skills and institutional capacity among the rural population (particularly among women) to make achievement of the NDP goals possible and sustainable.

The views of the NDP resonates with those of the Agriculture, Forestry and Fisheries Strategic Framework which confirms that the sector has not grown as fast as other sectors over the past few decades, but remains a critical sector for employment and food security among the country's rural poor in particular, and is therefore a sector in which development opportunities should be vigorously pursued and not overlooked. Currently, approximately one-fifth of South African households have inadequate access to food. This needs to be addressed through developing a prosperous sector that provides people with a pathway out of poverty to prosperity.

To give effect to the strategy, I will establish a National Education and Training Forum for Agriculture, Forestry and Fisheries (NETFAFF). NETFAFF will spearhead a programme of action for implementing the interventions documented in the Strategy. Furthermore, NETFAFF will look at the interests and requirements of the sector, and provide public accountability, policy formulation and maintenance, coordination and strategic guidance on all agriculture, forestry and fisheries education and training related issues as outlined in the implementation plan of the Strategy.

I encourage you to read this Strategy which represents our initial effort to strengthen the coherence and relevance of education and training for agriculture, fisheries and forestry, and that through it you may be inspired to contribute to the process through which we can strengthen the capacity of those working in and relying on agriculture, fisheries and/or forestry for their livelihoods.

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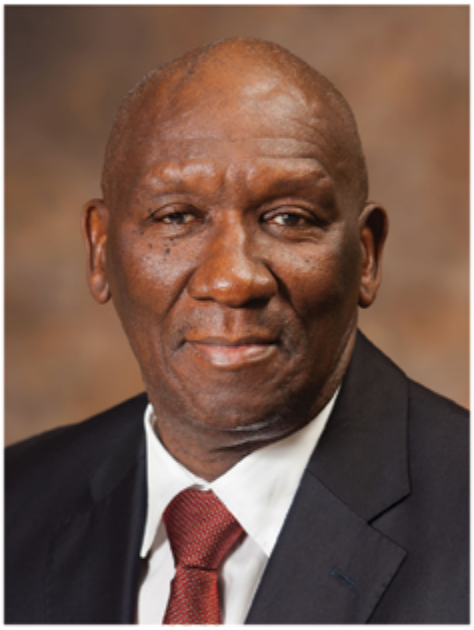
Mr Senzeni Zokwana
MINISTER OF AGRICULTURE, FORESTRY AND FISHERIES

OVERVIEW BY THE DEPUTY MINISTER

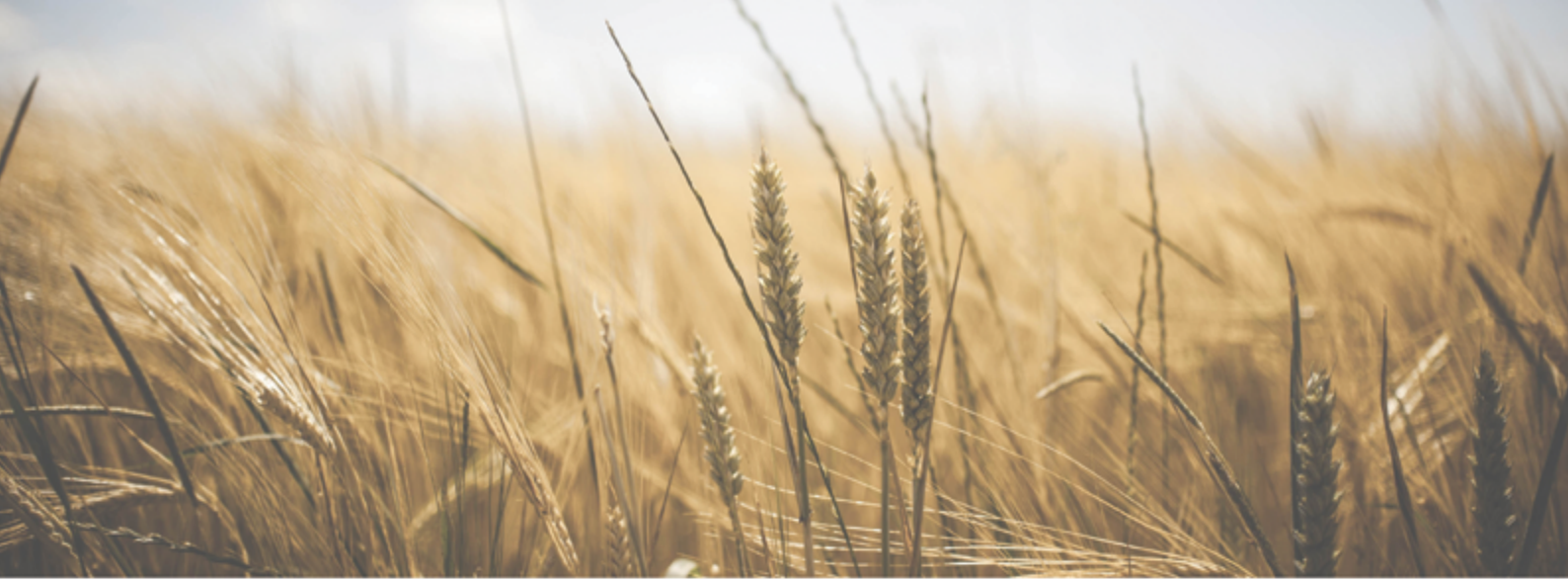


Gen, Bheki Cele, MP

In pursuit of quality and demand driven education and training which is responsive to the needs of the sector, the Department of Agriculture, Forestry and Fisheries (DAFF) has developed the National Education and Training Strategy for Agriculture, Forestry and Fisheries (NETSAFF). The Strategy provides direction and impetus for sound, coherent, well coordinated and relevant education and training in the areas of agriculture, forestry and fisheries. It embraces the agriculture, forestry and fisheries sector as one of the major economic drivers in which the vast number of rural dwellers, who in most cases cannot contribute to the economy in any way, can participate.

South Africa's agriculture, forestry and fisheries sector has not grown as fast as other sectors over the past few decades, but it remains a critical sector for employment and food security among the country's rural poor in particular, and is therefore a sector in which development opportunities like education and training should be vigorously pursued and not overlooked. Economic development cannot be achieved without skills development.

The Strategy further shares the sentiments of the National Youth Policy: 2020 which highlights the need to develop the requisite knowledge and skills and institutional capacity particularly among women and youth. It is through this Strategy that the Department coordinates various programmes like: External Bursary Scheme to support young people who want to pursue careers identified as scarce and critical in the sector, placement of unemployed graduates, the establishment of youth owned and or managed enterprises, development of young entrepreneurs and producers, young researchers and professionals, training and mentorship to subsistence and smallholder farmers.



The Strategy represents the first effort to address sector education and training holistically in a manner that engages all role players to develop and maintain an effective and well coordinated Agriculture, Forestry and Fisheries Education and Training. While the coordination of this Strategy remains the responsibility of the DAFF, it provides roles and responsibilities for Provincial Departments of Agriculture together with their stakeholders for implementation purposes. Furthermore, it provides a foundation upon which government and sector stakeholders can design and provide targeted support to the various stakeholders in addressing the challenges indentified.

I wish to reaffirm the commitment of the DAFF in prioritizing the development of appropriate skills among those previously excluded to ensure equitable participation in the sector.

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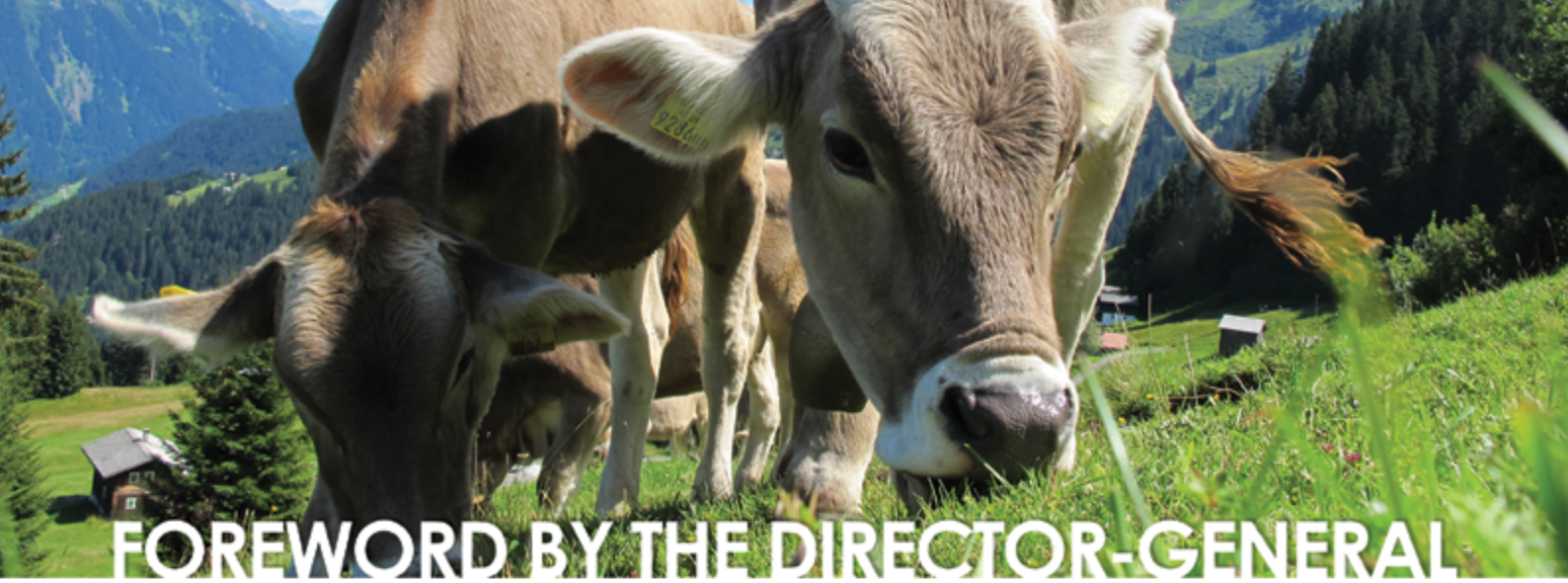
Gen, Bheki Cele, MP
DEPUTY MINISTER: AGRICULTURE, FORESTRY AND FISHERIES



FOREWORD BY THE DIRECTOR-GENERAL

Mr M. M. Mlengana

The government of South Africa, through the National Development Plan (NDP), has identified capacity building/human resource development as a strategic priority for the country. The response of the Department of Agriculture, Forestry and Fisheries (DAFF), together with other stakeholders and partners to the call to build capacity in the sector, has been the development of the National Education and Training Strategy for Agriculture, Forestry and Fisheries (NETSAFF) to address human resource challenges in the sector.

The development of the NETSAFF was a consultative process aimed at ensuring optimal participation by all stakeholders. An independent Reference Group was established to work alongside the DAFF drafting team during the strategy development process. This Reference Group comprised of representatives from Department of Higher Education and Training (DHET), Department of Basic Education (DBE), FoodBEV SETA, AgriSETA, Food Processing and Manufacturing (FP&M) SETA, Academy of Science of South Africa (ASSAF), Food, Agriculture and Natural Resources Policy Analysis Network (FANRPAN), Human Science Research Council (HSRC), South African Agricultural Teachers Association (SAATA), Higher Education South Africa (HESA), Association of Principals of Colleges of Agriculture (APAC) and Agriculture Research Council (ARC). The Strategy was also validated by key stakeholders consulted during strategy development process.

This document represents the first endeavour to address agricultural, forestry and fisheries education and training holistically. It engages all role players to develop and maintain an effective and well coordinated Agriculture, Forestry and Fisheries Education and Training that is integrated at all levels and responding effectively to the needs of the sector.

As the agriculture, forestry and fisheries sector, we are faced with a challenge of bringing on board those sectors of the community, which have been limited or excluded from participating in the sector. We can only do so, by ensuring that we have a system that is accessible to all South Africans and assists us in achieving the broad goals of poverty alleviation, wealth creation and accelerated growth in our country.

The strategy resonates with the NDP which identified agriculture as one of the major economic growth and job creation drivers. It further recognises the potential contribution of education and training in agriculture, fisheries and forestry to South Africa's economic competitiveness and overall societal well being.

This strategy represents a renewed effort in the identification of approaches that will yield critical performance outcomes. It maintains that reflection, evaluation and adjustment will be required on a regular and systematic basis. Such a review would be aimed at refining focus and strategies as more understanding of the impact of interventions proposed in this strategy is gained.

The implementation of the strategy remains the responsibility of the Department. However, the success in meeting the goals outlined above requires a joint effort with all the other stakeholders who have an interest in agricultural, forestry and fisheries growth and development.

I would like to thank all the stakeholders who participated in the broad consultation process, which has provided us with a solid foundation for sustained dialogue with the aim of continuing to benefit from stakeholders' input during reviews and further refinement of the strategy.

I would also like to acknowledge the invaluable contribution of Cape Institute of Agricultural Training (Elsenburg) and Cedara College of Agriculture, for availing their facilities during consultation process with stakeholders.

I hope you benefit from reading the strategy and will find a way to contribute to its implementation.

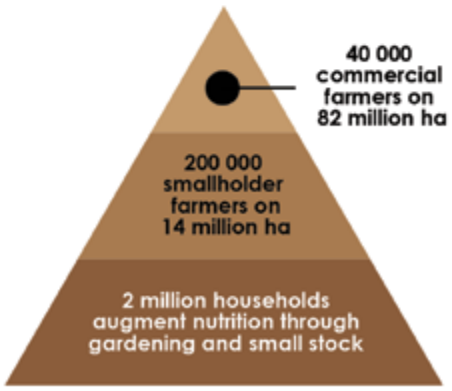
Mr M. M. Mlengana
DIRECTOR-GENERAL: AGRICULTURE, FORESTRY AND FISHERIES

INTRODUCTION

This document sets out a broad-strokes strategy to continue and expand the work undertaken under the aegis of the National Education and Training Strategy for Agriculture and Rural Development in South Africa (AET Strategy) launched in 2005. In addition to updating the policy in terms of its original objectives and the issues it was designed to address, this new policy statement expands on the original to address education and training in the fields of fisheries and forestry subsectors, which in terms of national governance, now reside, along with agriculture, within the same national Ministry (the Department of Agriculture, Fisheries and Forestry established in 2009).

This National Education and Training Strategy for Agriculture, Forestry and Fisheries (NETSAFF) firstly provide an overview of the current landscape of each of the subsectors which it addresses: Agriculture, Forestry and Fisheries. These three sectors, although newly conjoined in government administration, have long shared a common history and context in terms of the issues the people engaged in these sectors face as South Africa evolved socially and economically over the last 150 years. Not surprisingly, the sectors share similar economic, structural and social profiles and face similar transformational challenges, and contend with similar human resource and capacity issues.

All three subsectors are economically dominated by a relatively small percentage of people, entities and organisations that control the majority of their respective resources. There are a few big players at the top of the economic pyramid commanding the greatest share of the wealth generated by the sectors; there is a slowly growing middle sector of small-scale operators struggling to establish themselves as "for profit", market oriented producers and processors commanding a smaller share of the wealth; and there is a large number of very small-scale producers and resource users (farmers, foresters, fishers) who operate at subsistence level. For this latter group, farming, fishing and forestry is their sole source of daily sustenance or forms an important part of a more complex livelihood strategy which often includes social grants. In terms of education and training, the levels, extent and relevance cascade in a similar way. Those at the top are generally better trained and educated, both in general and in their specific livelihoods, while those at the bottom tend to be less formally educated, less trained—and if trained only in discrete functions for defined activities.



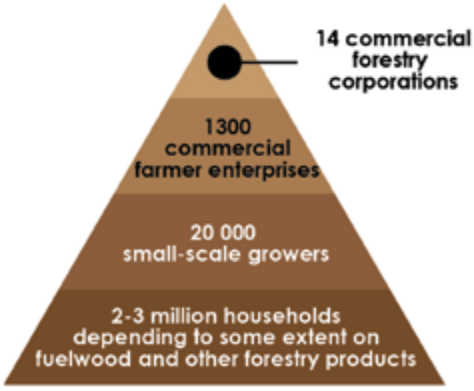
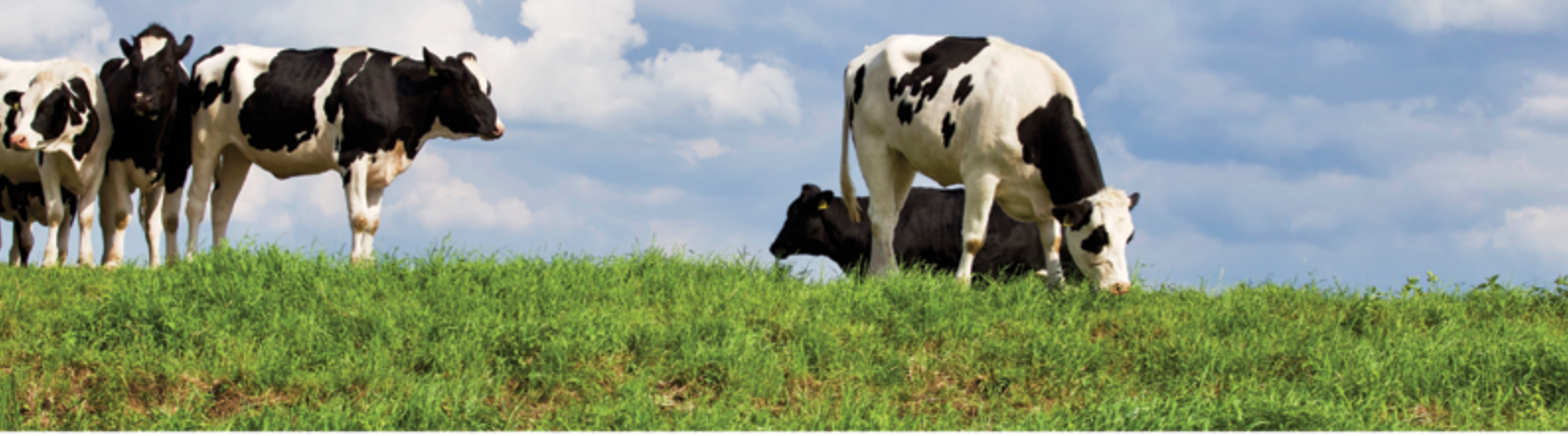


Figure 1: The South African Agricultural and Forestry Pyramids



PART ONE: AN OVERVIEW OF THE AGRICULTURE, FORESTRY AND FISHERY SECTORS

Agriculture, Forestry and Fisheries, collectively, form an important part of South Africa's culture and economy. They generate billions of Rands to the economy and provide income for millions of South Africans.

As outlined in the IGDP, South Africa's Agriculture, Forestry and Fisheries sectors has not grown as fast as other sectors over the past few decades, but remains a critical sector for employment and food security among the country's rural poor in particular, and is therefore a sector in which development opportunities should be vigorously pursued and not overlooked. According to the Constitution, every citizen has the right to have access to sufficient food and water, and the State must, within its available resources, avail to progressive realisation of the right to sufficient food. Currently, approximately one-fifth of South African households have inadequate access to food. This needs to be addressed through developing a prosperous sector that provides people a pathway out of poverty to prosperity. At the same time the direct reliance of the sector on South Africa's natural resources, means that we have tremendous responsibility to maintain the balance between achieving rural development within the constraints required for assuring ecological sustainability.

Furthermore, to engage successfully in agriculture, fishing or forestry requires much more than only the desire to farm, fish or produce timber. Farmers, fishers and foresters need finance and financial expertise, relevant technologies, access to markets, production inputs, etc. in order to succeed. Beyond this, they need a wide range of knowledge and skills as well.

In each of these areas of endeavour, producers and operators overcome enormous difficulties, including climate challenges, market fluctuations, input supply challenges, and they compete in international markets where farmers from other countries enjoy government protection and subsidies.

Despite their small direct share of the total gross domestic product (GDP), agriculture, forestry and fisheries are vital to South Africa and its economy. These sectors furnish some of the most important material needs of South Africans such as food and fibre, while providing large numbers of employment and self-employment opportunities. However, there is a widespread perception that these sectors are not fulfilling their potential, particularly in terms of job creation. What constrains these sectors from meeting their potential? Indeed, what accounts for the fact that employment in some of these sectors continues to decline, and what can be done about it? Clearly, one of the key factors is education and training focused on scarce skills and capabilities at all levels of learning and placement.

1.1. The current South African agricultural landscape

While the primary agriculture sector contributes about 3% to the country's gross domestic product (GDP), it represents about 7% of formal employment. If the entire value chain of agriculture is taken into account, its contribution to GDP reaches about 12%. Agricultural activities range from intensive crop production and mixed farming to cattle-ranching and sheep-farming. About 12% of South Africa's surface area can be used for crop production. High-potential arable land comprises only 22% of total arable land. Some 1,3 million hectares (ha) are under irrigation.

The vision for agriculture, forestry and fisheries, as identified in the Integrated Growth and Development Plan (IGDP, 2012), is to achieve equitable, productive, competitive, profitable and sustainable agriculture, forestry and fisheries subsectors that are growing to the benefit of all South Africans. Agriculture, forestry and fisheries have been identified among the sectors with the highest potential to make an immediate and sustainable contribution towards job creation in rural areas (DAFF, 2013). Since 1994, efforts have been made in all three subsectors to address the disparities and inequities, to create broader access to services and markets. Land reform, targeted economic empowerment programmes, credit schemes and several other initiatives were instituted to attempt to bring equity and more broadly based prosperity. Various Acts addressing agriculture, forestry and fisheries were passed and implemented. While progress has been made, the agrarian system still reflects the disparities of the past with many rural people remaining on the economic margins.

Since promulgating the 2005 AET strategy, there have been significant changes in agriculture as a sector of the South African economy and in the structure of the agencies supporting the sector. There has been substantial movement toward more collaboration and integration of activities along the entire value chain—from production to post-harvest to retail. We have witnessed the emergence of a number of public-private partnerships. Some of the highlights are as follows:

Some 7,2 million hectares of agricultural land have been redistributed through both land redistribution and restitution processes. Concerns continue to be raised about the post-settlement success of land reform. The knowledge and skill base of the beneficiaries are generally below that which is required to create sustainable livelihoods from the reallocated land, and, as a result, the farmers and their farms remain disenfranchised from the formal agricultural market economy.

There has been expansion in the citrus sector, which has also seen substantial redistribution of orchards. However, 70% of these redistributed orchards are in distress. There have been similar changes in the grape industry. Production in subtropical fruit has declined. Demand for vegetables has grown some 30% over the last decade, but production cannot meet demand. While there are many factors contributing to the current state of affairs, preliminary investigations suggest that inadequate knowledge and skills is a significant factor.

Further, there has been a continued decline in the number of so-called "commercial" farmers and a corresponding increase in the average size of a farm. Farm employment has also continued to decline. Conversely, there has been a continuing increase in the number of "smallholder" households. The pattern of increasing farm size and declining farm employment is occurring in the difficult reality of increasing rural unemployment, suggesting declining farm employment is not a function of labour finding work elsewhere, but economising in terms of farm production. Both these trends highlight the need for AET institutions to maintain close ties with the sector to ensure that their programmes are adjusting to the changing demand for knowledge and skills – in particular to be able to cater for the knowledge and skills demand created by increasing modernisation and mechanisation (driven by economising) and the different knowledge and skills demands created by drive toward market orientation of existing and new-entrant smallholder individual and cooperative farmers.

The National Development Plan (NDP), launched in 2013, further elaborates on the agricultural landscape. The plan acknowledges that one of the key challenges in rural development has been dealing with the marginalisation of the poor. "Combating this," the report states, "required changes in access to resources (land, water, education and skills), and improved rural infrastructure and other government services." Although the rural share of poverty fell from 70% in 1993 to 57% in 2008, this is largely due to increases in social-grant transfers and migration to urban areas. Despite the fact that farm workers have greater rights and receive better wages, rural areas are still characterised by pronounced poverty and inequality. In many instances, rural households continue to engage in subsistence or even sub-subsistence level agricultural activity with little or no skills enabling them to participate meaningfully in the agricultural economy that remains just beyond their reach.

The NDP anticipates better integration of the rural areas into the wider economy. This is to be accomplished through "successful land reform, infrastructure development, and job creation and poverty alleviation." The NDP further

anticipates that agriculture will be the driving force behind the economy of rural areas. The NDP calls for a comprehensive plan that includes substantial expansion of irrigated agriculture, more efficient dry-land production, the promotion of agro-processing/agro- industry and a fresh effort toward agricultural development and improved land management in the former "homeland" areas. The plan emphasises building capacity of smallholder farmers and to do this in partnership with established agricultural industries and commercial farmers.

The NDP targets job creation in the upstream and downstream industries in the agricultural value chain as a key strategy. Similarly, strategies are to be developed to give smallholder farmers access to the value chain, also in partnership with established players.

To achieve these goals by 2030 will require a significant effort and resurgence in agriculture, forestry and fisheries education and training. Specifically, the plan highlights the need for developing the requisite knowledge,skills and institutional capacity among the rural population (particularly among women) to make achievement of the NDP goals possible and sustainable. Education and training will be required in production, farm management, business management, resource management and entrepreneurship—as well as in extension and agricultural development for those charged with implementing these programmes in the field.

1.2. Overview of forestry in South Africa

Timber plantations cover 1,28 million ha, about 1% of South Africa's total land area. The forestry subsector (forestry and forest products) contributes about 1,2% to the GDP. Forestry plantations provide employment for an estimated 95 000 people, including some 40 000 small growers and their workers. The pulp and paper industry provides approximately 13 200 direct and 11 000 indirect employment opportunities. Some 20 000 workers are employed in sawmilling, 6000 in the timber board and 2200 in the mining timber industries, while a further 11 000 workers are employed in miscellaneous jobs in forestry.

However, employment on large-scale commercial plantations is decreasing significantly as a result of mechanisation. Mechanisation follows in the wake of industry-wide labour outsourcing that took place in the late 1990s and early 2000s. Labour outsourcing has been accompanied by a decrease in real wages, working conditions and job security for forestry workers. Concerns have also been raised about decreasing worker productivity, safety and skill levels.

Considerable potential has been identified for expansion of forestry plantations in rural areas in the former homeland areas, particularly in the Eastern Cape and to a lesser extent in KwaZulu-Natal. In these areas, forestry has potential to become a catalyst for development; providing a source of revenue and employment and an entry point into the formal economy. As mentioned, achieving this potential requires considerable investment in developing knowledge, skills and institutional capacity among rural residents.

Support is also required for land reform beneficiaries on freehold plantation land, as well as for communities taking over former state owned plantations in former homeland areas. Access to improved education and training is of particular importance to emerging black growers.

Timber processing offers considerable opportunities for value added and industrial development in impoverished rural areas. The pulp and paper industry is a major employer and has experienced remarkable growth, continuously outstripping the performance of the manufacturing sector domestically and the pulp and paper industry worldwide. The main opportunity for SMMEs is within paper waste recycling. In 2013, 1,2 million tons of waste paper was recycled, creating an estimated 100 000 income generating opportunities1. The sawmilling industry provides around 30 000 jobs, mainly in rural areas. Unlike the pulp and paper industry, sawmilling is dominated by independent producers who collectively own 55% of the market share. Pole and charcoal production also offer opportunity for enterprise development and employment creation in rural areas; potential that is directly linked to the expansion of plantations in areas where potential for this still exists.

Rural households make use of a wide range of NTFPs derived from plantations, forests and woodlands. These include firewood, building and craft materials, medicinal and food plants, honey and fruit. Insufficient attention has been paid to the role these resources play in sustaining rural livelihoods and as a safety net for vulnerable households. Limited support is available for community- based resource management and sustainable harvesting practices. In addition to direct household provisioning, certain NTFPs are commercially exploited and form the basis for enterprises, many spanning over formal and informal sectors. There is a considerable amount of potential to develop, expand and formalise trade and manufacturing enterprises based on non-timber forest products.

1.2.1. Summary of key trends and skills development priorities in forestry

Sub sectors	Features and trends	Skills Development Priorities
Timber growers	Ownership and value chain domination by large corporates Labour outsourcing Low contractor viability and high turnover Declining labour productivity and skills Mechanisation Small grower stagnation and decline New entrants through land reform, Black ownership opportunities: Land reform, BBBEE, new afforestation and State plantation transfer	Contractor support, mentorship and training Support, extension and training for small growers and new entrants (small growers, land reform beneficiaries, new afforestation, transfer of state owned plantations) Education and training for forestry staff at all levels (Managers, Specialists, Supervisors, Workers)
Saw millers	High sawlog prices and insecure and inadequate sawlog supply Many sawmills operating sub-optimally Opportunities for new businesses using waste material	Technical and specialised training in sawmilling Financial and business support and training for small operators Education and training for sawmill staff at all levels
Pole Producers	Regulatory requirements present a barrier to entry by smaller producers Vibrant trade in informal markets served by 'twilight treaters' Inferior treatment plants Lack of entrepreneurial expertise	Technical and specialised training in pole treatment and pole selection Financial and business support and training for small operators Education and training for staff at all levels
Charcoal	Domestic demand greater than supply Suited to small enterprises Abundant raw material from alien invasive clearing	Management support, mentorship capacity building and training for small charcoal producers
Medicinal plants	Unsustainable harvesting High domestic and international demand for cosmetic and medicinal products Commercial cultivation, processing product development, patenting & marketing is of high priority	Participatory and adaptive research, extension and training for sustainable harvesting from the wild and domestication. Further education for Forest Managers and Forest Scientists

Sub sectors	Features and trends	Skills Development Priorities
Honey production	High demand, domestic supply shortfall High potential for SMME development Need to scale up beyond 'project approach' to provide access to the necessary specialised technical knowledge, expertise and equipment	Training in Beekeeping for small and medium producers Education and training for support staff in Government and NGOs
Forest conservation & management	Indigenous forests and woodlands Government has legal obligations but lacks expertise and capacity to implement these effectively	Participatory and adaptive research, extension and training for sustainable forest management Further education to post-grad level for Forest Managers and Forest Scientists

1.3. An Overview of the South African Fishery Subsector

South Africa has a well-established fishery sector, comprising two components: wild capture fisheries and an aquaculture component, which is under development. Wild capture fisheries currently include three distinct components (commercial, small-scale and recreational fisheries), each of which requires specific research and management interventions. The commercial fishing sector can be further broken down into highly industrialised capital intensive fisheries, which generally operate in deep water (e.g. hake trawl and pelagic purse seine fisheries) and near shore fisheries, where both the commercial and small-scale fishing activities takes place) that are more easily accessible and use more traditional types of gear (line fishery and near shore rock lobster hoop net fishery).

Marine living resources are mostly fully utilised and many high value species (abalone and rock lobster) are overexploited. In 2005, long-term rights have been allocated in 22 fishing sectors, with just over 2900 Rights Holders and about 1788 vessels. Total annual production is more than 600 000 tons, valued at R5,8 billion and forms 0,5% of the gross domestic product. Fisheries is important for the Western Cape Province as it contributes 2% of the gross geographic product (GGP); the large- scale capital sectors (hake and small pelagic) are capital intensive (i.e. vessels and factories) and dominated by the big fishing companies. The hake fishing sectors contribute approximately 70% of the total value of the fishing industry as most of the catches are exported (60%). In rock lobster, squid, tuna and demersal longline sectors, almost all of the total production is exported. The commercial fishing industry currently employs approximately 27 000 people directly and approximately 100 000 indirectly. The NDP 2012 calls for a review of fisheries' policies to determine the best way to allocate rights to maximise employment. On the other hand, the NDP 2012 promotes strategies for economic cooperation that give poor producers greater collective market power in value chains and improved access to information. Such economic cooperation will also allow them to achieve the minimum supply volumes required for participation and empower them to negotiate improved terms of participation; allocate economically viable fishing rights and review fisheries' policies to determine the best way to allocate rights to maximise employment.

1.3.1. Small-scale fisheries

A policy for small-scale fishing was developed and adopted by Parliament in 2012 for the recognition, allocation and management of small-scale fishing rights. Small-scale and artisanal fishers have relatively small, low-cost operations, but often fish high-value resources. At coastal areas, marine fishing is important for small-scale operations and employment. They are largely dependent on low- cost resources that are important for their livelihoods and food security and have a long history of dependency on these resources. There are approximately 147 fishing communities, 28 338 fisher households with an estimate of about 30 000 fisher folk.

1.3.2. Aquaculture & aquaculture production

Current production level is 3 543 tons per annum (worth R218 million) that focused mainly on high value products (abalone, oysters and mussels). This sector, which employs around 1800 people on farms, has the potential for expansion and could increase to over 90 000 tons (worth R2,4 billion) over the next 10–20 years. Most marine aquaculture is capital and skills intensive—it requires strategies to enable participation of the poor (options for small-scale, low capital investment marine aquaculture to be investigated). This sector needs investment in state hatcheries to stimulate development.

1.3.3. Potential for growth

Capture fisheries introduced new fisheries that included large pelagic longline, Patagonian toothfish and an experimental fishery for octopus. Horse mackerel and round-herring have potential for expansion, but more research in the form of research surveys is required to improve population estimates. There is potential for value added and job creation in, for example, the pelagic fishery for anchovy, but an implementation strategy and incentives are needed to stimulate its development. However, most growth potential lies in aquaculture but with huge capital investment.

Operation Phakisa is an initiative of the Presidency and is aligned with the NDP and the White Paper on National Environmental Management of the Ocean (NEMO). It focuses on increasing technical capacity "to better understand and utilise ocean resources and opportunities" and strengthening research into dealing with "changing environment, including the impacts of climate change such as increases in sea-surface temperature, sea-level rise and ocean acidification." Operation Phakisa focuses on the blue growth of the oceans, noting that oceans have the potential to contribute up to R177 billion to the country's GDP, while creating up to 1 million new jobs by 2033. South Africa's location and expertise positions the country to increase its share of the global marine manufacturing market, including shipbuilding and repair, and oilrig repair and refurbishment. They would also look at capturing the benefits of growing volumes of cargo handling, and supporting activities such as storage and warehousing. The underdeveloped aquaculture sector is one of the work streams Operation Phakisa intends to develop to provide food security and promote rural development, especially for marginalised coastal communities. Twenty-four aquaculture projects will be implemented and is expected to grow the sector's revenue from R500 million to R1,4 billion in 2019.

Small-scale community based aquaculture has not realised its potential in South Africa and in the Western Cape. The development of rural based aquaculture can significantly contribute to the economic benefits for South Africa and the Western Cape by increasing export income and reducing imports. At a rural and microeconomic level, aquaculture creates substantial opportunities for generating acceptable financial returns. In addition, aquaculture provides diversity to a region's economic base and creates demand for technology, training, extension services, infrastructure and local goods.

PART TWO: OVERVIEW OF THE 2005 AET STRATEGY AND THE STATUS OF EDUCATION AND TRAINING IN AGRICULTURE, FORESTRY AND FISHERIES

2. THE 2005 AET STRATEGY AND THE CURRENT STATE OF EDUCATION AND TRAINING IN AGRICULTURE

The goal of publishing the National Education and Training Strategy for Agriculture and Rural Development in South Africa in 2005 was to provide direction and impetus for sound, coherent, well- coordinated and relevant education and training in the conjoined areas of agriculture and rural development. At all levels of government, concern had been raised over the fate of rural families and communities, for the majority of whom agriculture formed a significant element of their livelihoods. At the same time, having emerged from global isolation, South Africa needed to reposition itself in the highly competitive international agricultural market. And, as outlined in agricultural policies adopted since 1994, people previously excluded and marginalised needed to be provided with access and support to participate in the sector.

Various national policies and programmes were developed and implemented to address transformation issues around such aspects of agriculture, for example land, markets, credit and business. The AET strategy was designed to build and otherwise strengthen human capacity needed to ensure the successful transformation and advancement of the agricultural sector. Clearly, attaining the goals set for the agricultural sector would require greatly expanded knowledge and skills in agriculture and related fields. To achieve the necessary levels and extent of learning would, in turn, require substantial improvements, along various fronts, to the Agricultural Education and Training (AET) system in South Africa.

Specifically, AET faced six key challenges:

- fragmentation and lack of coordination
- poor and inconsistent quality control
- an ineffective and non-responsive system
- poor access to AET by emerging farmers and new entrants into agriculture
- agriculture's negative career image
- a shortage of critical skills.

As its contribution to advancement along the three fronts of rural development, repositioning agriculture on the international stage, and transformation of the sector, and to address the key challenges, the AET strategy set out to achieve three strategic goals, each with its corresponding objectives:

Development and maintenance of an effective and well-coordinated AET that is integrated and responds appropriately to South African Agriculture to:

- ensure that policy and curriculum development are coordinated and harmonised
- ensure that AET delivery at provincial level is well coordinated

- ensure that AET learning is mobile and transferable from one AET institution to another and articulates with hierarchies of AET qualifications
- ensure alignment of AET curricula with urgent challenges facing South African agriculture (e.g. sustainable development and land care, food security and water harvesting and rural wealth creation) and ensuring these are incorporated into the formal AET system.

Enhancement of equitable access and meaningful participation in AET for all South Africans to:
- develop and recommend a systematic plan to identify, prioritise and remove access barriers to AET
- improve the image of agriculture as a career and livelihood choice: develop and implement a high-impact public education programme that promotes the image of agriculture, particularly among children and the youth
- encourage higher-level studies (Masters and PhD) in the Agricultural Sciences (especially those sought-after skills that the majority does not possess) to produce highly qualified Scientists who add value to the agricultural science knowledge base.

Ensuring the application of an effective quality assurance of AET at all levels to
- ensure that AET at all levels is accredited and resourced, with the appropriate number of teachers and trainers with relevant skills.

Each of these goals and objectives gave rise to a host of interventions implemented primarily under the agency of the Sector Education Training Directorate of the Department. Key initiatives under the AET Strategy included review and alignment of curricula; establishing common curricular frameworks to facilitate articulation; broadening curriculum beyond primary production to include aspects relevant to pre- and post-harvest activities as well as business management, economics and finance; creating programmes to support learning and training teachers and extension staff in sustainable agriculture, food security, water harvesting, land care and rural wealth creation on all levels of learning; removal of barriers to access to AET; implement programmes to change the image of agriculture as a career; and strengthen, support and help implement accreditation processes relevant to AET.

Over the intervening years, the Department has overseen and otherwise contributed both directly and indirectly to a range of research and implementation activities in its effort to implement the strategy. A summary of these activities is set out below. The information presented is drawn from Departmental investigations, consultancy reports, and formal research conducted both under the aegis of the Department and independently.

2.1. Strategic goal 1: Development and maintenance of an effective and well-coordinated AET that is integrated and responds appropriately to South African Agriculture

2.1.1. Ensuring that policy and curriculum development are coordinated and harmonised

This objective forms a critical element of strengthening AET at all levels. Since launching the AET Strategy, efforts have been made to understand and improve the quality, range and veracity of AET curricula at various levels.

2.1.1.1. Evaluating AET Curricula in South Africa

The Department's evaluation was an extensive study of AET curricula in the country to identify specific areas of intervention to improve responsiveness to the changing agricultural sector.

The study found that there has been substantial change in AET curricula to widen learning to include a wider range of agricultural context instead of a singular focus on capital-intensive production. It was also found that even within a production framework; curricula are becoming more holistic by expanding the key learning areas by including issues of farm management, entrepreneurship and social contexts. In terms of coordination of AET, the study found that there has been an increased level of cooperation among higher education AET institutions—particularly the agricultural colleges and FET level.

In the FET sector, coordination and standardisation policies, forums and mechanisms have brought about considerable standardisation, the most notable of which is a common setting and assessment guidelines for the subject of primary agriculture which will be implemented at all the FET Colleges offering AET programmes. This has, in turn, strengthened the AET offerings in this sector.

At the HE level, particularly among the universities, there is still need for greater collaboration around curricula, particularly around generic qualifications such as the Bachelor of Agriculture to allow horizontal mobility of students (together with their learning) between HE institutions.

From 2007, intensive consultations have been held with the 11 agricultural colleges to assess their current situations and to map out ways forward for them. This range of initiatives has resulted in the leveraging of substantial funding to upgrade the infrastructure of these colleges, revising curricula and training lecturing staff. Through the implementation of a system of norms and standards, several of the colleges have now regained their accreditation to offer higher education diplomas in agriculture. The way forward is being paved in the drafting of a new Act that will strengthen the position of these colleges in the AET higher education sector. Through the processes related to these consultations, a common framework for the NQF6 agricultural diploma has now been proposed and adopted by most of the accredited agricultural colleges.

Agricultural extension provides a potential instrument of leverage for achieving many of the aims of the National Development Plan, the Agricultural Policy Action Plan and the Integrated Growth and Development Plan for Agriculture, Forestry and Fisheries. The curriculum study found that, while there are a number of HE curricula for agricultural extension, the quality of programmes vary considerably, and there is still urgent need to give attention to both the occurrence and content of agricultural extension curricula in HEIs. Extension as a subject of learning is rarely included in mainstream agricultural qualifications such as the Diploma in Agriculture and the Bachelor of Science in Agriculture and is a concern.

A second independent study, also through the University of KwaZulu-Natal into extension curricula found that, despite policy changes to develop a single integrated extension service serving the full spectrum of farmers, most HEIs offering agricultural programmes still have capital-intensive commercial agriculture as their primary focus. The study also found that issues related to smallholder farming, food security, rural livelihoods and sustainable agriculture, with a few exceptions, hardly feature in the agricultural curricula. It also found that existing extension qualifications follow the traditional approach and philosophy of extension where the focus is on production related knowledge and skills, technology transfer and negotiation/persuasion and subsequent behavioural change to adopt and implement new technology. They do little to foster learning capacity among farmers.

2.1.1.2. Understanding AET at high school

According to the 2006 report (published shortly after the implementation of the AET strategy) addressing the development of human resources for agriculture through SAQA accredited HEIs, there were 42 Agricultural High Schools that offer a learning programme up to Senior Certificate level—but not all of them offered the full suite of agricultural subjects. The currently running ASSAF study indicates that that number has decreased and some 29 schools call themselves Agricultural High Schools. These schools offer one or more of agricultural sciences (science related to producing and processing agricultural commodities), agricultural management practices (application of production, economic and management principles in agriculture), and agricultural technology (technology used in agriculture).

The ASSAF study also indicates that agriculture is the 10th or 11th most popular subject in the National Senior Certificate. Some 83 000 pupils wrote in 2013—the majority of these being in the rural provinces of Eastern Cape, Limpopo, KwaZulu-Natal and Mpumalanga. The study confirms the continuing low pass rates for agricultural subjects; while 70% pass with more than 30%, only about half of the students pass with 50% or more.

An independent case study was conducted in KwaZulu-Natal (through the University of KwaZulu- Natal) exploring various dimensions of AET in high schools offering agricultural science. The study sought to shed further light on the low pass rate of agricultural science students in matric exams, specifically investigating attitudes of teachers and students towards the high school AET curricula, and the factors influencing them.

Broadly, while the study confirmed that teachers and students are able to complete the curriculum in the prescribed time, the study also confirmed that the majority of agricultural science teachers have no formal training in agriculture and that this demotivates them. The study found that a significant percentage of schools that offer AET do not have any land on which to conduct practical learning; the absence of such land and learning opportunities negatively influenced student attitudes toward the subject. For both teachers and students, opportunities to discuss and exchange ideas about agriculture contributed to more positive attitudes and better teaching and learning. Those students who understood the career options in agriculture were more positively disposed toward learning the subject.

Creation of information sharing networks, ensuring that teachers are appropriately trained and qualified, and ensuring that any school that offers AET has appropriate land for practical learning are all essential elements for improving pass rates of agricultural science students. Also important is creating greater awareness of the career options for agriculture—something that the 2005 AET strategy also included.

2.1.2. Ensuring that AET delivery at provincial level is well coordinated

One of the first initiatives stemming from the AET Strategy was to build on the structures created to develop the national strategy and use them to facilitate better communication and coordination within the AET sector nationally, and especially provincially. The National AET Forum and the nine provincial forums were put into operation early in 2008. The National Forum was able to function with some regularity, however, the provincial forums struggled due to administrative capacity issues and funding shortages. Efforts to locate the administration of the forums outside government were not successful. The work achieved was useful, particularly in KwaZulu-Natal where sessions involving all levels of institutions offering AET programmes managed to begin to coordinate their work, including recruiting and selecting students and articulating between educational institutions. The coordination process is still weak and intermittent.

2.1.3. Ensuring that AET learning is mobile and transferable from one AET institution to another and articulates with hierarchies of AET qualifications

In terms of articulation, the CAPS curriculum provides the "general pathway" from high school into HE. Agricultural Sciences (not the other agricultural subjects) is recognised by most HEIs offering AET as equivalent to Physical or Life Science in terms of access to not only AET qualifications, but to other science qualifications as well. However, no HE AET curricula give credits for having completed agricultural science, nor for the other agricultural subjects, therefore there is no particular advantage for having written any of them as opposed to other subjects that facilitate access to HE programmes. The one advantage comes with the more practical Diploma in Agriculture with its high level of experiential learning; students who studied agriculture at matric level cope somewhat better at the onset than students without agriculture.

The "general vocational pathway" has largely achieved a standardisation of curricula with the implementation of the National Certificate (Vocational) (NC (V)) Primary Agriculture. However, the agricultural component plays less of a role in articulation to tertiary AET programmes (particularly Bachelor of Science programmes) than maths and science embedded in the certificate. And again, no credit given for the agriculture learned.

Similarly, the trade, occupational and professional pathway has achieved portability between relevant unit standards with the NQF4 NC (V) offered by different Technical and Vocational Education and Training (TVET) (FET) colleges. However, these qualifications rarely facilitate access to an HE degree programme in agriculture.

Within the HE AET sector, portability and articulation are very uncertain. While the HEQC guidelines create the framework for portability and articulation, most HEIs closely guard their academic space and do not "automatically" accept qualifications and learning at a different HEI. Admissions policies often involve an assessment of competence before accepting a student. For the high school student with an NSC, the traditional universities place additional requirements, such as minimum pass levels for maths and science to gain access to AET programmes. For transferring credits, no standardised formal system of matching learning exists to facilitate offering credit for work completed at another institution. These and related factors continue to limit access to tertiary AET programmes. It is less of an inhibitor when moving or articulating from an agricultural college to a university of technology or comprehensive university or when moving between the two types of universities. Consequently, this remains an important issue for AET policy.

2.1.4. Ensuring alignment of AET curricula with urgent challenges facing South African agriculture and their incorporation into the formal AET system

Despite the intention of the AET strategy, agriculture per se is still not formally part of the GET curriculum.

The curriculum study found that vocational curricula in the FET sector, specifically the FET colleges were found to be fairly responsive and have incorporated issues, such as land reform and water harvesting into their respective curricula. The study also found that there has been considerable movement at high school levels through the consolidation of learning around the three agricultural subjects (agricultural sciences, agricultural management practices, and agricultural technology)— these being considerably more relevant to the current requirements in the sector. However, key issues facing agriculture in South Africa such as water harvesting, land reform and rural wealth creation are still not being incorporated into the CAPS curriculum.

Although there has been some movement at HE level, particularly by aligning curricula to industry needs, with one or two exceptions, there is no conscious and structured effort on the part of HEIs to ensure that the challenges of water harvesting, land reform and rural wealth creation are addressed within their curricula.

2.2. Strategic goal 2: Enhancement of equitable access and meaningful participation in AET for all South Africans

2.2.1. Identifying and removing access barriers to AET

Access to AET is bound up with issues of access to education in general. Therefore, in the years intervening since the launch of the 2005 AET strategy, there has been a number of changes in education policy and structuring in South Africa that have facilitated access across all educational streams. In particular articulation with HE has been significantly changed; the pass and articulation criteria have changed, easing the requirements for access to studying a degree at a university, resulting in a move from a low of 15% of matriculants (out of approximately 600 000) being endorsed for studying a degree in 2007 to 24% (out of approximately 500 000) in 2011. In that same year, 75% of all matriculants gained access to either a diploma or a degree. As high as that number appears, only 12% of black school leavers access higher education due to substandard schooling and poverty.

However, despite the substantial increase in the overall number of students qualifying to study at a university, the number of students who gained entry into a science, engineering and/or technology (SET) qualification (of which agriculture is a part) has not substantially increased. In 2005, the total number of students in SET was 211 069, in 2010 this increased to 251 334, and in 2012 it increased to 273 282—representing an overall increase of 29% compared to an overall increase of 94% over the same period for humanities qualifications.

Further, historically, agriculture has formed a small part of the total SET enrolments; approximately 5% of the total enrolments. In 2003, 11 196 students were enrolled in agricultural degree programmes. In 2010 this number increased to 14 514; again an increase of 29%.

The curriculum and barriers studies commissioned by the Department identified a number of key barriers that remained after launching the AET strategy. These fall into two basic categories: educational and socioeconomic barriers. Chief among the educational barriers are the maths, science and English proficiency entrance requirements. All of these are a function of the quality of learning opportunities at primary and secondary school. Also among the educational barriers identified was poor academic guidance leading to poor subject choices in grade 10—which sees most black students opt out of core maths and science.

The socioeconomic barriers are equally as uncompromising. Lack of funding for HE prevents many potential learners from joining tertiary AET programmes; it is a chronic problem. There is also a lack of knowledge amongst prospective students regarding the network of AET providers, who they are, where they are located, what they offer and what recognition and accreditation their programmes enjoy. This lack of knowledge, coupled to the relatively poor image of agriculture among a large proportion of the black population, reduces the uptake of available AET opportunities and is therefore viewed as an access barrier.

2.2.2. Improving the image of agriculture as a career and livelihood choice

The barriers study confirmed that the generally negative image of agriculture as a career option persists. This is reflected in the relatively slow increase in agricultural registrations at HEIs over the last 10 years. Youth – the obvious target of AET – have a particularly low image of agriculture as a career.

Of the matric students who sat in 2011's agricultural sciences examination, 71,3% achieved a pass rate of 30% or higher, up from 51,7% in 2009. The rise is not cause for celebration though, according to several teachers and principals. At issue is the fact that the number of students who sat the exam in 2011 was 77 719; less than 90 136 in 2009.

It is also noted, that where there is interest in studying agriculture in the HE sector, the most popular choice is either agricultural economics or agricultural management. Both these options represent "clean" agriculture—agriculture that does not require getting one's hands dirty.

The following table gives an indication of interest in agriculture in comparison to other career choices based on student enrolment at HEIs in South Africa in 2010.

Major field of study	Number of Students	%
Agriculture	14 514	1,6
Business, Management and Law	325 923	36,5
Education	145 411	16,3
Health Sciences	50 614	5,7
Humanities	170 247	19,1
Science, Engineering and Technology	186 203	20,9
Total	892 912	

** Source: Adapted from SARUA; a profile of Higher Education in SADC, 2013*

These figures suggest that there is still much work to be done to elevate the image of agriculture as a career choice. In part, this is linked to the Department's bursary scheme to fund high school scholars.

2.2.3. Encouraging higher-level studies (Masters and PhD) in the Agricultural Sciences

The Department of Agriculture and the NRF have provided substantial bursaries and other funding schemes for students wanting to study agriculture at the postgraduate level. Most AET universities also have funding schemes, primarily remission of fees for full-time students to encourage students to study at the postgraduate level.

Enrolment and graduation data for postgraduate qualifications in agriculture is scarce. Some data is available through the Southern African Regional Universities Association. The data published by the CHE and other agencies in HE are not disaggregated to the level of agricultural disciplines; agriculture is generally included in the wider category of Science, Engineering and Technology as distinguished from Education, Humanities, etc. In some instances, data is disaggregated to Natural and Agricultural Sciences.

The following table, compiled from various sources, gives an indication of how the number of postgraduate enrolments in agriculture-related disciplines has changed from 2000 to 2010 (the last year for which disaggregated data is available).

Year	Honours (or equivalent)	Masters	PhD	Total
2000	704	1707	500	4911
2005	1119	2447	700	6271
2010	3270	1794	467	7541

It was noted, that while there has been an overall increase in postgraduate studies in agriculture, a significant percentage of these registrations are students from outside South Africa—particularly from other African (primarily SADC) countries.

2.3. Strategic goal 3: Ensuring the application of an effective quality assurance of AET at all levels

2.3.1. Ensuring that AET at all levels is accredited and resourced, with the appropriate number of teachers and trainers with relevant skills.

Accreditation, resourcing and quality assurance are both goals and processes that are closely interlocked. Accreditation, once achieved, is subject to regular review and is significantly influenced by resourcing and quality assurance processes and systems. A number of initiatives have been undertaken in pursuit of this objective.

2.3.1.1. Profiling of agricultural science teachers and other teaching professionals at FET and HET Institutions.

A study was conducted among 47 high schools, 14 FET (TVET) colleges, 11 agricultural (HE) colleges, 10 universities and 6 universities of technology with AET programmes. The aim was to obtain a clear understanding of the strengths and weaknesses of the human resources actively involved in AET to provide a basis for introducing capacity building initiatives. The study found that within the high school and FET (TVET) learning levels, while most educators have educational qualifications, as many as 40% of the teachers do not have an agricultural-related qualification and very few have any practical agricultural experience. Conversely, within the HE learning level, all of the educators have an agricultural-related qualification, but the majority have no educational qualification. The AET sector is male dominated (although not evenly so across the country or within specific learning levels). HE institutions tend to be populated by older educators; High Schools and TVET (FET) colleges have a more even distribution of ages—offering greater security for succession planning.

As noted by the principal of a prominent Agricultural High school, "A recurring issue with agricultural schools is difficulty in sourcing qualified young staff equipped to teach agricultural science, management and technology…. a lot of commitment is expected of agriculture teachers. In addition to a full teaching load, they have sport commitments, some run farm sections, and most have hostel duties. They work weekends, evenings and holidays."

The South African Agricultural Teachers Association, established through the agency of the heads of agricultural schools, tackles various issues related to teaching agriculture. They meet annually with government and organised teacher meetings to solve issues ranging from textbooks to sourcing experts to developing resource material.

Universities with AET programmes are particularly vulnerable to aging academics and the generally static registration for agriculture among South Africans. Over the last decade, many universities have resorted to hiring non-South Africans to fill their senior academic posts. In response to this, many have also adopted a "grow your own timber" approach to recruitment and selection, resulting in short-term decline in the depth of capacity as younger South African academics are being groomed for senior academic positions currently held by retirement age (often white and male) academics. It is a difficult balance made all the more difficult due to the less financially attractive career that academia offers in comparison to the private and public sectors.

2.3.1.2. Supporting the accreditation of AET providers and the registration of AET programmes

DAFF does not have direct authority over the accreditation and registration processes. These processes are adequately handled through the agency of the relevant Departments of Education, SAQA, Agri-SETA, the CHE and HEQC. However, DAFF has vested interest in the processes and products emanating from formal educational institutions. Specifically, DAFF has an explicit oversight function with respect to the 11 public sector Agricultural Colleges, one of which reports directly to DAFF. In this space, based on initial investigations conducted in 2005-2006, substantial work has been done with these colleges across the following fields:

- Infrastructure and facilities
- Accreditation
- Reorientation and retraining of academic staff
- Governance
- Curriculum Review.

The interventions with these colleges resulted in upgraded infrastructure, improved and more harmonised curricula, upgrading of staff qualifications and the reaccreditation of all those colleges that had lost their accreditation to offer at least one diploma. These interventions also have resulted in preparing the way for the colleges to be moved formally into the HE sector from their current operational bases within the provincial Departments of Agriculture as anticipated in the White Paper for Post-School Education and Training. We have witnessed the strengthening of academic ties between colleges and their sister universities, including the creation of a new qualification offered in a unique partnership between Cedara Agricultural College and the University of KwaZulu-Natal, and the absorption of Lowveld College of Agriculture into the newly created University of Mpumalanga.

More recently, the Academy of Science in South Africa (ASSAF) has been commissioned to conduct an in-depth consensus study which, among other investigations, is looking at curricular offerings through the AET sector with particular reference to HE curricula. The ASSAF study reflects much of the work initiated by the 2005 AET strategy, including: governance reform; relevant and realistic curricula; reaching beyond the classroom; developing staff skills; harnessing the power of ICT and social media; cultivating partnerships; and positioning of the AET system to ensure that it is African responsive and contributes to capacity development broadly on the continent. A unique aspect of this study is the need to enhance supranational collaboration and collective action.

Late in 2014, the University of Mpumalanga (UMP) was established, adding another public HE institution offering AET programmes in South Africa. UMP is a comprehensive university currently offering a Diploma in Agriculture and

a Bachelor of Agriculture in Agricultural Extension; plans are to add a Bachelor of Science in Agriculture, Honours, a Masters and a PhD in various aspects of agriculture. It will also offer a suite of advanced diplomas in agriculture-related disciplines.

2.3.1.3. Evaluating AET curricula

AET curricula are offered at High Schools, in the TVET (FET) colleges and at HE institutions. The High School AET curriculum was clarified in 2008 to include Agricultural Management Practices, Agricultural Sciences and Agricultural Technology, with Agricultural Science being the subject accepted for studying agriculture (and other sciences) at university. From the Curriculum Assessment Policy Statement (CAPS) (gazetted in 2011), we note that learning is meant to be fostered through practical investigation, research and simulation and that the curriculum is generally aligned with the scope of agricultural learning a student would encounter in an HE AET programme. The curriculum review study found that while most of key challenges identified in the 2005 AET strategy are covered sufficiently, others (such as globalisation) are not addressed at all and, therefore, recommended that these shortfalls be addressed. Further, there is some question about the capacity of teachers and schools to effectively deliver the curriculum.

The SAQA registered Unit Standard Programmes (most of which were developed after the release of the 2005 AET strategy) incorporate most of the key challenges in agriculture and most of the key challenges are addressed by the range of Unit Standards on offer. However, there is some concern about the responsiveness of these programmes to changes in the challenges faced by agriculture.

As noted earlier, extensive work has been done on harmonising the curricula at the Agricultural Colleges which now, for the most part, use a common framework of Agricultural Production, Farm Business Management, Farm Engineering and Natural Resource Management. As with the High Schools, capacity of teachers and colleges, while improving, still requires attention to ensure the required quality of learning.

HE AET curricula are wide ranging and the evaluation thereof difficult to present in brief. However, what the study learned is that there is vigorous debate about aligning long-standing agricultural curricula with the present-day and changing agricultural landscape. While commercialised agriculture still tends to dominate HE AET curricula, there is growing inclusion of other production systems in the learning programmes. Most HE institutions acknowledged the need to align their AET curricula, but also maintained the need to protect the academic freedom of individual institutions, so as to avoid creating curricula that lack their cutting-edge differences so necessary to higher education.

2.4. Education and Training in Forestry

2.4.1. Education and Training for the Forestry Industry

Forestry education and training in South Africa was developed to serve the needs of the industry, and in 1994, comprised a well-established network of further and higher education institutions and training centres. There was a well-developed network of occupational training centres established by the State and industry for in-service training. These included Government (Platorand, Concordia and Baynesfield), and Industry (Sappi in Ngodwana, Mondi in Sabie, HL&H in Piet Retief) training centres. Timber Industry Manpower Services (TIMS) was established by the Forestry Council to train trainers for these training centres in forestry and sawmilling. TIMS also conducted some worker training, but the centre was closed in 1992.

The established education and training system has undergone reorganisation in response to the new policies and frameworks of Government and changes within the industry itself in the post 1994 period.

Certificates and Diplomas: Forestry as a subject is not included in the GE curriculum. Certificates and Diplomas in Forestry are offered at HE Colleges, namely Saasveld Forestry College, now incorporated into NNMU, and Fort Cox Agricultural College. The curricula of both colleges are designed primarily to service the needs of the commercial

forestry industry.

Higher Education
Three Universities have forestry-specific degree and postgraduate programmes:

- The Department of Forestry and Wood Science at Stellenbosch University
- The Department of Forestry at the University of Venda
- The Forest Science Postgraduate Programme at the University of Pretoria.

Occupational Training: The established system for in-house occupational training in forestry more or less collapsed post 1994; and has been largely replaced by outsourced independent training providers. The countrywide network of Government and company training centres has significantly diminished as a result of privatisation of the State forest plantations and company labour outsourcing. All of the company owned training centres were closed in the wake of labour outsourcing. It took some years for the impact of the near collapse of the previous occupational training system to become evident and receive attention. In this time, labour productivity plummeted and accident and injury statistics soared. In recent years, the subsector has implemented various initiatives to improve worker level training.

Sappi and Mondi formed the Contractor Capacity Development Programme (CCDP) as a means to improve worker training amongst their contractors. Planning, coordinating and monitoring of contractor training was outsourced to the CCDP; a unit within SAFCA (South African Forestry Contractors Association). Training deficits amongst contractors remain a problem for the industry.

Occupational Qualifications Development: The forestry and forest products industry fall under the Fibre Processing and Manufacturing Sector Education and Training Authority (FP&M SETA). FP&M SETA officials are working with training specialists from the industry to develop a qualification and career path framework for the industry.

Non-formal training (Forestry extension and non-certified training): Emerging small growers/ outgrower were previously well serviced through company-run outgrower schemes, but this support has largely been withdrawn leaving a support vacuum for small growers. Forestry extension support from government has never been adequate to meet the needs of emerging growers in Tribal Authority areas. Prior to 1994 the main focus of the Department was on direct management of state forests; both natural forests and plantations. The forestry support role of government is emphasised in post 1994 forest policy and strategies with emphasis placed on an enabling and coordinating role. The ranks of black growers have rapidly expanded as a result of government land reform programme. There is an urgent and growing need for post-settlement support to land reform beneficiaries now in possession of plantation land. The DAFF Forestry SMME Strategy sets out emerging grower support needs and service delivery options throughout the project cycle, including management support, extension and formal training. The policy also sets out service delivery needs and strategies for emerging businesses in wood processing sectors (saw millers, pole and charcoal producers and forestry contractors).

2.4.2. Education and Training for Sustainable Forest Management and Non-timber Products

The use, management and protection of natural forests and woodlands largely fall outside of the scope of the formal industry and have more in common with conservation and rural development sectors. There are few linkages with the forestry industry outside of the responsibility to conserve high conservation value forests that occur within the boundaries of forest plantation estates. DAFF remains the legal custodian of natural forests countrywide, performing mainly a regulatory function, but with a residual direct management role in State Forests where management has not been assigned or delegated to other conservation bodies. Forest managers, primarily those employed by DAFF and other state conservation bodies including SANParks and Provincial Parks/natural conservation agencies, are the main target for forest management education and training. Local communities, forest user groups and forest-based enterprise owners and employees have related and specific education and training needs.

2.4.3. Research, Education and Training in Fisheries

Education and Training in Fisheries has strong connections to research. Therefore this section discusses all three facets. The key issues in the fisheries sector are:

- The industry is limited by catch volumes which depend on fish stocks, which vary naturally and/or are subject to depletion from overexploitation.
- Inshore species, especially, tend to be in a state of stock depletion due to increasing illegal fishing and poaching, and increasing demand for access to the finite marine resources.
- Promote transformation in the sector by modifying its licensing regime as per the Small-scale Fisheries Sector Policy in South Africa.

Research, especially in the fields of marine biology, population dynamics, stock assessment and ecosystem dynamics is crucial to generate knowledge required for effective management. The NDP, 2012 calls for a sophisticated scientific research and monitoring system that is essential to this.Traditional fishers must be afforded better opportunities and support. All role players must be subjected to stringent compliance measures that are effectively enforced. Expanded or new fisheries must be sought where ecologically possible. But this research needs to be contextualised in the demographics and socioeconomics of the sector as well as the transformational issues on the state agenda for fisheries.

Training in fishing and maritime techniques is often conducted by fishing companies, not government. Some NGOs are also active, for example WWF in ecosystem-related issues. More emphasis is required on training and even education in all sectors of the fishing industry, i.e. product development and processing, marketing, conservation as well as science itself. There is often a disconnection between the training offered and the people in the industry standing in the greatest need of training (i.e. small-scale fisher entrepreneurs.

The knowledge and skill base among commercial and recreational fisheries is high, but low among small-scale fisheries. The exact capacity is not clear, as data collection in the sector is difficult; innovative approaches are needed to assess subsistence and very small-scale fisheries. Approaches and funding to make more effective use of traditional knowledge are also required. Support and extension services are urgently required to support small-scale fishers.

2.4.4. Required Research skills development

Postgraduate qualifications in Marine Science in South Africa: The bulk of South Africa's marine science research community is in the Western Cape and in the South-Western Cape, largely because the South African west coast was the focus of marine research in the early 20th century aligned with the high economic value of the fisheries there.

The leading tertiary institutions in South Africa focussing on marine science are the University of Cape Town, Rhodes University, and the University of KwaZulu-Natal. Other tertiary institutions offering marine research include the Marine Research Group, set up by the Council for Scientific and Industrial Research (CSIR) at the Stellenbosch University, and the International Ocean Institute based at the University of Western Cape. In the Eastern Cape, the Coastal and marine research is also offered at Nelson Mandela Metropolitan University. In KwaZulu-Natal the South African Association for Marine Biological Research (SAAMBR) was established as a self-funded marine research organisation to generate knowledge focused on marine and coastal resources and working through the Oceanographic Research Institute (ORI), relying initially on the Oceanarium to provide research funding. South African Environmental Observation Network (SAEON) established in 2002 splits its marine science nodes between Cape Town and the East Coast to create a regional balance.

There have been many policies, legislative and institutional changes since 1994 to which research in the marine and coastal environment has responded. There has been a resistance within the marine science community to the shift

to a more applied and relevant science, along with calls for the continuity of traditional paradigms of disciplinary research in the post-apartheid period. In the past, marine science was generously funded and scientists could follow their curiosity, with little recognition of the broader context of social inequality (Scott, 2013).

From the 1990s, Fisheries management has relied on collaboration between fisheries managers and scientists, with the managers increasingly willing to listen to scientific advice, mainly from UCT. Currently, it appears that that marine science in South Africa is in crisis. Several departments and HE institutions have been closed and many vacant posts remain unfilled. Access to ships' time and research equipment has declined, hampering research. There is a continuing loss of skills and the number of publications on marine science has dropped.

In addition to this, in line with national and international trends, there is a need for more integrated research and the broadening of the research focus on the marine and coastal environment to include the social sciences, economics, law and humanities.

Transformation in marine science research: Apart from the transformation of the fishing industry through the reallocation of fishing rights, the management and research structures have changed to accommodate persons from previously disadvantaged backgrounds. However, while the number of young, black and female scholars in marine science has slowly increased, the industry remains largely in the hands of a white male oligarchy; research is still dominated by a positivist paradigm. Despite the continued publication of research articles in scientific journals and despite NRF policies and efforts, the NRF SeaChange programmes appear to have failed to shift the racial and gender profile of researchers.

2.4.5. Technical training for Fisheries

Numerous programmes are in place to develop skills within the fishing industry training and education structures formalised through the TETA (Transport Education Training Authority)—a compulsory (subsidised) programme aimed at developing skills in the fishing industry (such as survival at sea, fish processing etc.). NGOs such as WWF are also making considerable efforts to train fish workers in the Responsible Fishing Alliance with established fishing companies.

The South African Maritime Safety Authority (SAMSA) was established on the 1st April 1998 under the SAMSA Act 5 of 1998. SAMSA's mandate is to ensure safety of life and property at sea, to prevent and combat pollution from ships in the marine environment, and to promote South Africa's maritime interests. Maritime is made up largely of shipping (maritime transport and logistics) and the oceanic and marine environment. These are the 2 sides of the maritime sector that underpin international trade and commerce and are driven largely by marine competencies (both seafaring and ocean knowledge and skills). The existence of other maritime areas, such as ports and marine services, logistics support, ship repair and shipbuilding, oil and gas, as well as living marine resources, security and defence, etc., also depends on the seafaring skills and competence supplied by the shipping industry and ocean studies.

PART THREE: EDUCATION AND TRAINING STRATEGY FOR AGRICULTURE, FORESTRY AND FISHERIES

The aim of this section of the Strategy is to provide an annotated framework for guiding Education and Training for Agriculture, Forestry and Fisheries in a manner that is consistent and coherent and aligned with the National Development Plan and other key policies and legislation. It is developed from a review of the progress made since 2005; research conducted into various aspects of education and training (particularly in Agriculture), consultation with key stakeholders in all three subsectors and reflects on the implication of a range of national policies addressing the future of these subsectors.

Specifically, the strategy will address the following:

- The focus and direction required for education and training for Agriculture, Forestry and Fisheries
- Alignment with other policy guiding Agriculture, Fisheries and Forestry and Education
- Building capacity on scarce knowledge and skills
- Barriers and other issues related to education and training in agriculture, forestry and fisheries
- Research required to keep the process alive to adaptation as the AFFET system develops over the next 15 years
- The role of the National and Provincial Departments relevant to Agriculture, Forestry and Fisheries
- Strategic Objectives, interventions and indicators
- Implementation of the strategy.

Given the requirement to provide direction and guidance for ET in all three sectors, this section will first address themes in a general way as they apply across all three sectors. Separately, these same themes will be discussed in greater detail for each of the three sectors.

3.1. The focus and direction required for education and training for Agriculture, Forestry and Fisheries

First and foremost, this strategy seeks to underscore the fundamental importance of education and training. It seeks further to ensure that NETSAFF contributes to the threefold purpose of education: to provide those who are trained and educated with knowledge and skills that will enable them to engage in useful, honourable and remunerative occupations (whether trades or professions) conducted in a spirit of service; to promote good citizenship based on conscious contribution to the betterment of the sector, society and the economy; and to foster the practice of good ethical behaviour in all undertakings (Worth, 2014).

Within this broad framework for education and training, the key function is to build human capacity. Education and training, while often specific to performing specific tasks, should also foster a desire for life-long learning, have an "advancing" quality that deliberately positions the learner for another level of learning, and contribute to critical thinking (as opposed to rote learning).

Education and Training, while needing to be more practical and occupational specific, needs also ensure that it widens rather than narrows a learner's perspective. Whether dealing with a specific technical activity or an ill-defined abstract concept, education and training should strive always to fit learning into a broader context. It needs ultimately to reinforce and orient learners toward learning as a form of knowledge management that – as outlined in the SAQA level descriptors – sees knowledge growing from discrete and finite at lower levels of learning to fluid and contested at higher levels of learning.

The human capacity built through the collective AFFET system needs to simultaneously address tangible and immediately applicable knowledge and skills and increase the capacity of learners to learn. What has emerged from the process leading to this strategy is that education and training needs to be addressed on three levels: immediate meanings and definitions; real-world application; and the implications of what is being learned.

Education and training needs to result in concrete learning that enables the learner to clearly and accurately describe and articulate the immediate meaning of the knowledge or skill being learned. It needs also to result in the ability to consider the application of learning in a practical space and where relevant, to correctly apply the knowledge and skill acquired. Education and training then need to result in the learner being able to understand how the knowledge and skill acquired impacts on actions and thoughts not immediately related to what is being learned.

3.2. Alignment with other policy guiding Agriculture, Fisheries and Forestry and Education

It is critical that ET strategies, plans and programmes are aligned with relevant agricultural, fisheries and forestry policy as well as with educational policy. Of the former, the key policies with which to align this strategy include:

- National Development Plan
- The White Paper for Post-School Education and Training
- Medium Term Strategic Framework
- Industrial Policy Action Plan
- Agriculture, Forestry and Fisheries Strategic Framework
- Agricultural Policy Action Plan
- The DAFF Extension Policy (Draft)
- The Forest Sector Charter
- National Forests Act of 1998 and its 2013 amendment
- Key Issue Paper on Forestry and Poverty in South Africa (2005)
- Marine Living Resources Act, 18 (1998)
- Biodiversity Act (2004)
- Integrated Coastal Management Act (2009)
- Small-scale Fisheries Policy for South Africa (2012)
- Amended Marine Living Resources Act 5 (2014)
- White Paper National Environmental Management of the Ocean (2014)
- South African Maritime Safety Authority (SAMSA) Act 5 of 1998
- Aquaculture Bill Concept Document, 2015.

3.3. Building capacity on scarce knowledge and skills

The concept of scarce skills is a common feature in government level education and training policy. In the original AET strategy, the scarce skills were identified in the form of specific "jobs" or what could be referred to as whole disciplines. Five "scarce skills" were identified, and the policy leveraged funding to support learning in those particular areas.

Investigations leading to this revised Education and Training Strategy clarified the concepts of critical and scarce skills. Using the Agri-SETA framework, scarce skills are those skills that are in short supply. Critical skills are those skills requiring "top-up" towards a specialisation.

Further, the concept of a "skill" can be viewed from the occupational perspective or from a competency perspective. The value of the former is that it permits the identification of specific occupations that are scarce and/or critical. However, there can be such a fluctuation of scarcity over any given period of time, there is danger in being overly rigid in such identifications as they can tie up bursary funding. Due consideration needs to be given to regular updating and amending of such scarce "occupations" lists to enable funding to flow where needed as circumstances change.

The new understanding is that within many occupations there are specific knowledge and skills that may be critical and/or scarce. Therefore, this strategy needs to ensure that such knowledge and skills are addressed in policy and in funding, even if the particular occupation is not scarce or critical.

The second aspect is the need to build capacity at specific levels in all three of the Agriculture, Forestry and Fisheries sectors. In all three sectors the research found that, in the pursuit of the various policy strategies to develop the sectors to be more market-driven, efficient and competitive, while at the same time broadening access and participation, special attention will need to be given to education and training within three stakeholder groups: Industry workers (occupational); Producers/Operators (with a focus on small and medium enterprises, small growers/farmers/fishers and land reform beneficiaries); and Public Sector officials responsible for service delivery.

3.3.1. Industry worker stakeholders

The fundamental concern here is that without appropriate training and education these stakeholders will likely be left behind as the sector develops and progresses. The research found that there is a tendency to provide E&T in a way that, unwittingly, does not advance the prospects of worker-level stakeholders. While there is much emphasis on worker-level training, particularly at levels below TVET (and GET), the training offered does little to provide these workers with opportunities to advance beyond the "worker" level.

The research also found that this level of learner finds it difficult to access education and training programmes that facilitate advancement through the E&T system within their careers. Programmes tend to be occupational specific, but do not generally provide the broader training required by accredited learning programmes—particularly English and maths. The lowest NQF-level formal programmes (i.e. in the TVET learning level) that could provide opportunities to advance are out of reach for the worker-level stakeholders.

3.3.2. Small-scale producer stakeholders

In all three sectors, small-scale producers, land reform beneficiaries, fishers, processers, contractors and the like, often lack the financial and time resources to participate in E&T programmes that would enable them to advance in their livelihoods. Further, the assumptions made in the E&T programmes are often not relevant to the level of operation of small-scale operators. They rarely take into account the extent to which the economic activities of these stakeholders are integrated in a mix of livelihood strategies and with more complex household and social systems.

3.3.3. Public sector service provision stakeholders

There are two broad concerns with regard to the public sector: Servicing the worker and small-scale stakeholder; and grounding the technical capacity in a developmental framework. Concern was raised that those charged with services to these two stakeholder groups are themselves inadequately trained to provide the range and quality of support required. To address this will require specialised E&T programmes, targeting specific knowledge and skills, as well as a greater emphasis on postgraduate qualifications for senior level officials charged with implementing complex and visionary policies and strategies. (Note: There are no existing public sector extension services for Forestry and Fisheries, but there are officials who are responsible for implementing development plans.)

3.3.4. Scarce and Critical Skills in Agriculture, Forestry and Fisheries

Occupational skills: Agri-SETA has identified scarce and critical occupational skills in agriculture across a broad range of occupations grouped into eight categories: managers; professionals; technicians and trade workers; clerical and administrative workers; sales workers; machinery operators; and elementary workers. We note that the scarcest occupations are agricultural managers in general and specifically in the fields of livestock, crop and horticultural production in the Higher Certificate and Diploma range. Of these, agronomy and livestock managers in the

Higher Certificate range present the greatest need for topping-up with a specialisation – in other words are the most critical. Both the managerial occupation and managerial specialisation are most needed among land reform beneficiaries. This would generally apply to the Forestry subsector. In Fisheries, the scarce skills (occupations) are social scientists and economists, and the critical skills (within occupations) are "soft skills" such as economics and management.

Education and Training for Transformation: In keeping with the Agri-SETA list, the AET revision consultations identified that there is an urgent need to build capacity to implement and see through to fruition transformational policy in all three sectors. In agriculture, as suggested by Agri-SETA, the need is to top up managerial capacity and extension capacity directly related to land reform. In fisheries and forestry, the need is to actually establish non-existent capacity in extension and to top up managerial and operational capacity among small-scale operators.

Managerial capacity: Beyond the transformational space, knowledge and skills in management were found to be both important and critically lacking in all occupations in all three sectors. We noted a curricular focus on technical capacity and a general lack of capacity in the knowledge and skills related to management.

Critical thinking: Investigations found that in the focus on occupational focused training, learners are increasing their capacity to do their technical tasks, but are not concurrently increasing their critical thinking about those tasks. This is widening the divide between workers and managers and lessening the opportunities for career advancement; and rather unwittingly trapping skilled labour at operator level. Incorporated with critical thinking are systems thinking, reflective learning, cause and effect, and ethics. Each of these serves to provide meaning, value and purpose to whatever knowledge or skill is being learned. This appears to apply equally to all three subsectors.

Entrepreneurship: Common to all three sectors is a growing tendency to seek employment rather than creating employment set against the need to create entrepreneurial focus and energy in these sectors. This is closely linked to managerial capacity and critical thinking.

Social context for technical science: Similarly, most higher education and training in agriculture, fisheries and forestry is grounded in technical sciences and is devoid of academic exposure to the social context within which that science is conducted. Adapting relevant curricula and learning programmes to include relevant social sciences and development theory seems critical to ensuring that science and technology are developed, implemented and otherwise contextualised in the socioeconomic and transformational realities of present-day South Africa.

Skills development in sustainable natural resources management: Knowledge and skills in this area varies considerably within the three subsectors. Within fisheries, there are many specialists with capacity to provide custodianship of the fishery-related natural resources associated; these tend to be found at high levels. These skills are less evident on the ground. Agriculture is secure in this regard as these knowledge and skills are generally part of the educational background of both specialists and front-line workers. However, a severe deficit in appropriate skills and knowledge exists amongst Public Sector officials charged with custodianship of natural resources including natural forests and woodlands. Local users and rights holders also lack appropriate skills and knowledge.

In all three subsectors, an adaptive, participatory and integrated approach to research, extension and training is most appropriate, given the lack of established practice, the complex nature of managing multiple resource use, and the social dimensions of community and user involvement. In-service training that includes a strong emphasis on practical implementation and participatory action research should be provided for both field-level practitioners/managers and senior officials and specialist scientists in the public sector.

3.4. Barriers related to education and training in agriculture, forestry and fisheries

3.4.1. Accessing learning levels

There are technically four learning levels: Adult Education and Training, GET, TVET and HE. There is meant to be straightforward articulation from one learning level to another. In practice, from the vocational perspective, there are three groupings of learning – Training below TVET, TVET and HE. Articulation among these is problematic in all three subsectors.

Specifically, there is a shortage of NQF5 qualifications owing to the fact that TVET is meant to stop at NQF4 and HE focuses on NQF6 and upwards.

As discussed earlier in the section, updating progress since releasing the 2005 AET Strategy, although the situation has improved, academic and socioeconomic barriers still inhibit access. Investigations found that articulation the first levels of TVET is limited. Part of the problem appears to be, that even the lowest level learning programmes (NQF 1), because of literacy and numeracy requirements, are not accessible by the very people who most need that access. Further, investigations also found that (particularly in Fisheries), recognition of prior learning is not effected as a means of accessing E&T programmes; this is in part due to literacy and numeracy requirements.

The result is that we are seeing others, from outside the industry, but who have the literacy and numeracy requirements taking up E&T opportunities.

The role of Adult Education and Training in resolving this is crucial. In addition, there is opportunity to structure skills training programmes such as those offered through Provincial Departments of Agriculture to include the requisite literacy and numeracy training to enable these marginalised people to participate in accredited E&T in their respective fields.

It is noted that the Department of Higher Education and Training (DHET) has launched an initiative to establish NQF level 5 higher and advanced certificate in science, economics and management that will be relevant to articulating to other NQF 5 and 6 qualifications in agriculture, forestry and fisheries.

3.4.2. Marginalising the "weak"

Similar to the discussion on critical thinking and accessing learning levels, investigations indicate that training at the worker level is industry specific and sometimes "tool" specific, thereby reducing the transferability of skills from one sector to another. The most affected by this are the lowest level workers who are more likely to have less overall E&T and be less numerate and literate. This is exacerbated by the continuing domination (particularly in forestry and fisheries) by a few large players and casualisation of work through labour outsourcing.

3.4.3. Gap in business management training for new business owners

Skills development funding across the three sectors overall heavily tends towards technical training. Expenditure on developing entrepreneurship skills and promotion of the dynamic SMME sector is minimal. In view of the challenges facing SMME in the sector a much higher proportion of funds should be spent on developing entrepreneurial/management skills. Training in business management and corporate governance has also been identified as a priority for land reform beneficiaries.

Despite the bias in funding towards technical training, formal training opportunities for forestry, agriculture and fisheries entrepreneurs remain limited and available courses are not well aligned with their specific needs and circumstances. The development of accredited short courses, learnerships and apprenticeships and small/emerging business owners must be prioritised.

3.5. Research required to keep the process alive to adaptation

As the AFFET system will develop over the next 15 years, it must be guided by research. Studies such as those which informed the initial AET Strategy and which have directly informed this revision, and studies such as the Consensus Study, currently underway through ASSAF, will provide valuable and much needed data that will provide insights into continuing adaptation of education and training for the agriculture, fisheries and forestry sectors. Rather than creating a monolithic single directional policy, research will enable the policy to stay alive to changes affecting the sectors that will require appropriate policy responses.

The required research can be grouped into the following broad categories: Curriculum; Delivery; and Governance.

Research must embrace all four educational learning levels (Adult Basic Education and Training, GET, TVET, and HE) with particular attention being given to Occupational Specific Education and Training, and Service Provider Education and Training).

3.5.1. Curriculum

One of the key elements of good education and training policy is the need to ensure that curricula are rigorous, flexible and relevant to the sector and puts learners on a pathway that fosters their advancement educationally as well as in terms of their livelihoods.

Within each E&T learning level, regular research needs to be conducted to ensure that AFFET curricula are:

- relevant and comprehensive with integrated learning and clear goals for learning
- employing a variety of instructional approaches sufficiently varied to engage various learning styles and requirements and actively involve all learners
- developmentally appropriate
- grounded in research and theory.

Research should also provide evidence to determine the degree to which the curriculum works and achieves its intended learning. In this same vein, research should provide evidence about the accreditation of curricula through the relevant accreditation body.

In particular it was noted that there are still articulation gaps, particularly when moving from TVET into HE. A similar problem was identified for fisheries with the added challenge of those most needing E&T in fisheries are not academically equipped to access the E&T programmes offered within their livelihood focus.

Also found in forestry and fisheries, E&T is dominated by private sector providers that are also main stakeholders in the respective sectors. This suggests that the E&T programmes offered are leaning towards the interests of the providers and dominant players in the value chain.

3.5.2. Delivery

Research related to delivery and service provision should also be carried out on a continuing basis to provide insight into the strengths and weaknesses of AFFET delivery mechanisms in each E&T learning level.

According to a study currently being conducted by Polepole (undated), delivery speaks to

- institutions in terms of how well they are equipped and resourced to deliver E&T programmes
- teaching and support staff in terms of qualifications, experience and currency of their practice
- the learning environment
- learner support and development
- access and registration
- quality control.

Each of these, individually and severally, requires thorough investigation at all E&T learning levels.

As noted elsewhere in this strategy, research conducted by Kidane (2014) into provision of AET at high schools revealed that a substantial percentage of educators teaching agricultural sciences are not qualified to do so. It also determined that performance is directly related to the availability of land for practical learning. These factors, among others identified in the study, directly affect the ability to deliver AET programmes.

Similarly, studies such as the profiling research undertaken as a part of the initial AET Strategy helps with planning longer-term strategies for strengthening capacity to deliver, and with succession planning to ensure that AET offerings.

3.5.3. Governance

Governance refers to the overarching activities that support the two key E&T elements of curricula and delivery. While many initiatives have been undertaken to bring greater coherence and coordination to the E&T system for agriculture, there still remains much work to be done. The task is now increased with the inclusion of E&T processes for forestry and fisheries.

The experiment attempted with the National and Provincial AET Forums bore some practical fruit in terms of some basic coordination and strengthening the lines of communication but it also highlighted the need for such coordination processes to be better resourced and better managed. Similarly, research done with respect to the positioning and functioning of the public sector Agricultural Colleges resulted in an entirely new approach to their governance, strengthening their overall position in the AET sector and providing them with specific legislation to secure their future as providers for the public. The establishment of the new university in Mpumalanga (initiated outside the provision of the AET Strategy) was, in fact, supported by the coordination processes emanating from the strategy. Their first agricultural qualification was established and accredited through the agency of a framework for a three-year degree in agricultural extension crafted through cooperation between a university (UKZN) and an agricultural college (Cedara).

On the basis of these modest gains, the NETSAFF will continue to pursue, through deliberate research, these two avenues: creating, resourcing and empowering structures to facilitate coordination of independent but allied E&T providers; and searching for creative ways to provide coherent governance for logical groupings of stakeholders.

3.6. The role of the National and Provincial Departments relevant to Agriculture, Forestry and Fisheries

One of the challenges facing this revised Strategy is the separation of national and provincial competencies within the conjoined sectors of Agriculture, Fisheries and Forestry. Agriculture works on a framework of national level policy and provincial level implementation. Fisheries and Forestry operate entirely from a national level, but with decentralised offices.

Further, agriculture is far more resourced in terms of staff, equipment, processes and other resources. Agriculture also has a broader range of professionals dealing with various social, technical and practical aspects related to the sector. The provincial departments of agriculture each have a dedicated training unit with long experience in both non-formal skills development and farmer training; and formal education and training through their respective agricultural colleges.

This current strategy will seek ways to bring collaboration among the three Public Sector agencies closer. This will, no doubt, require expanding the presence of Forestry and Fisheries on the ground; but that is beyond the scope of this strategy.

See page 47 for details of implementing the Strategy.

3.7. Strategic Objectives, interventions and indicators

For the purpose of continuity this aspect of the revised Strategy will follow the same general format as the 2005 Strategy and it will retain the basic over strategic objectives, as they are still valid. Therefore, this Strategy has 8 strategic objectives:

Strategic Objective 1: Harmonising and coordinating E&T policy
Strategic Objective 2: Harmonising and coordinating E&T curricula
Strategic Objective 3: Coordinating delivery of E&T programmes
Strategic Objective 4: Making learning mobile and transferable
Strategic Objective 5: Aligning curricula with urgent and longer-term challenges faced by the sectors
Strategic Objective 6: Addressing barriers to access
Strategic Objective 7: Improving the image of the sector as a livelihood choice
Strategic Objective 8: Encouraging higher education and postgraduate studies in Agriculture, Forestry and Fisheries

The general pattern of discussion will be to present the general direction required, key knowledge and skills to be developed, and possible actions and processes. Where relevant, these will be divided by the individual sectors as well as by the framework of work-level stakeholders, small-scale stakeholders and Public Sector service provision.

3.7.1. Strategic Objective 1: Harmonising and coordinating education and training policy

There is no coherent, comprehensive education and training policy for agriculture, forestry and fisheries, either separately or collectively, that consciously accommodates the vision of the National Development Plan and the aims of the White Papers relevant to the three subsectors. All of these plans and strategies suggest the need for knowledge and skills that are technically sound, and grounded in development theory.

DAFF has a leadership role to play in the development of E&T policy for all three subsectors. Careful attention should be paid to linkages and synergies with existing national and provincial education and training policies and initiatives, in particular those of the Department of Higher Education and Training (DHET) and the Department of Basic Education (DBE)

Each of these, individually and severally, requires thorough investigation at all E&T learning levels.

As noted elsewhere in this strategy, research conducted by Kidane (2014) into provision of AET at high schools revealed that a substantial percentage of educators teaching agricultural sciences are not qualified to do so. It also determined that performance is directly related to the availability of land for practical learning. These factors, among others identified in the study, directly affect the ability to deliver AET programmes.

Strategic Objective 1: Harmonising and coordinating education and training policy

Intervention	Outputs	Indicators
Review existing E&T policy in all three subsectors against the provisions of the NDP and more generally against development theory to identify specific knowledge and skills required to ensure successful delivery of the Plan's objectives for the three subsectors	Compilation of E&T policy of relevant E&T service providers Review panel broadly representing service providers and development E&T experts Policy framework for each of the sectors outlining the knowledge and skills required for the sectors to meet the objectives of the NDP Detailed E&T policy for each sector. An E&T policy review mechanism.	Review is conducted collaboratively with public and private sector service E&T providers and development agencies Published framework document outlining the direction and scope of E&T for each sector until 2030 with clear evidence of the incorporation of development theory and principles Published policy statement approved by the Minister A working review system that reviews policy at least every three years
Review the E&T policies as they pertain to industry workers in the context of potential advancement in the each of the three subsectors	Specific E&T policy directed at developing the capacity of industry workers that facilitates their advancement in the industry 3-5 yearly skills development strategy Mechanism to review application of policy and advancement of industry workers	Published policy statement including implementation programme approved by the Minister Strategy is developed against skills audits A working review system that reviews policy at least every three years
Review the E&T policies in all subsectors as they pertain to small-scale producers in the context of potential advancement in each of the three subsectors	Specific E&T policy directed at developing the capacity of small- scale producers that facilitates their advancement in the industry 3-5 yearly skills development strategy Mechanism to review application of policy and advancement of industry workers	Published policy statement including implementation programme approved by the Minister Policies are in keeping with the White Paper on Post-School E&T Strategy is developed against skills audits A working review system that reviews policy at least every three years
Review the E&T policies as they pertain to relevant DAFF officials in the context of the knowledge and skills required to shepherd the successful achievement of the objectives of the NDP for each of the three subsectors	Specific E&T policy directed at developing the capacity of DAFF officials to deliver on the objectives of the NDP 3-5 yearly skills development strategy Mechanism to review application of policy and advancement of industry workers	Published policy statement including a framework of qualifications and career paths and an implementation programme approved by the Minister Strategy is developed against skills audits A working review system that reviews policy at least every three years

Intervention	Outputs	Indicators
Improve communications related to E&T among the three DAFF departments	Forums for collaboration and collective planning and reflection established and operational	Leadership and operatives from all three departments are active participants Forums meet at least quarterly Proceedings are published timeously

3.7.2. Strategic Objective 2: Harmonising and coordinating education and training curricula

Substantial progress has been made by harmonising and coordinating curricula in the agricultural sector, and this work will continue over the course of the next 15 years. Very little has been done to actively engage with harmonising and coordinating curricula for forestry and fisheries, therefore, this will be a central focus of this Strategy.

In the forestry sector, the main concerns are that there are very few institutions that offer relevant forestry qualifications outside of technical training at the TVET level. Articulation to higher levels of learning is limited, as is career advancement for industry workers. E&T programmes for small-scale producers and operators focus almost exclusively on technical forestry and largely ignore "soft" skills and business management skills that would contribute to fostering the establishment and growth of profitable enterprises.

Similarly, there are very few E&T service providers in fisheries and most of these are dominated by the large corporates that provide training to suit their corporate objectives. Skills training are also focused on technical content and little E&T is given to enable small-scale fishers and operators to expand or advance within the sector.

Strategic Objective 2: Harmonising and coordinating education and training curricula

Intervention	Outputs	Indicators
Engage TVET service providers and the relevant SETAs in each sector to explore development of a common TVET framework for career-linked TVET qualifications in agriculture, forestry and fisheries for industry workers	Common curriculum framework for career linked E&T within the TVET offerings that supports technical excellence and provides elective learning that supports career advancement for industry workers E&T Programmes and Industry requirements are aligned (e.g. SAMSA & TVET fishery qualifications)	Participating service providers are fairly representative and give due voice to smaller service providers Published documents approved by the relevant SETAs and subscribed to by TVET service providers and are in keeping with the White Paper on Post-School E&T Framework adequately addresses NQF level descriptors Framework adequately addresses work integrated learning

Intervention	Outputs	Indicators
Engage TVET & HE service providers together with relevant development agencies to explore adapting curricula for small-scale producers to ensure they include elements such as management, critical thinking and entrepreneurship to promote sustainability and advancement in each of the three subsectors	Common E&T curriculum framework within the TVET & HE offerings that provide holistic learning for small-scale producers that supports viability, sustainability and advancement in each of the three subsectors E&T Programmes and Industry requirements are aligned (e.g. SAMSA & TVET fishery qualifications)	Participating service providers are fairly representative and give due voice to smaller service providers Published document approved by the relevant SETAs and subscribed to by TVET service providers and are in keeping with the White Paper on Post-School E&T Framework adequately addresses NFQF level descriptors Framework adequately addresses work integrated learning
Review DAFF in-house training programmes for staff engaged in implementing programmes related to the NDP and other sector specific development policy	Essential skills inventory addressing non-technical skills relevant to implementing programmes Semi-annual skills audit against essential skills inventory Annual skills development plan Revised training programmes implemented	Inventory is vetted by development education experts in the relevant sector Training programmes reflect non- technical training relevant to development work of officials Training programmes approved by the Minister
Review bursary policy for DAFF staff to ensure that qualifications pursued are relevant to the development work in which they are engaged	List of approved qualifications and institutions with relevant learning content Revised bursary policy incorporating new learning requirements	Learning content is consistent with the essential skills inventory as identified in the skills audit Policy document approved by Minister A working review system that reviews policy at least every three years

3.7.3. Strategic Objective 3: Coordinating delivery of Education and Training programmes

Since the launch of the 2005 AET strategy, there has been a marked increase in the level of collaboration and planning among the AET providers. However, there is still much work to be done to strengthen coordination, particularly with regard to common learning frameworks, entrance requirements and transferability of credits from one institution to another.

Within the Forestry sector, largely through the agency of the FP&M SETA, a fair amount of coordination has taken place. They have developed comprehensive training profiles and plans, particularly for forestry workers. Access (with language and numeracy being the primary barriers) is still a considerable challenge.

In fisheries there is little active coordination of TVET E&T programmes. There are specific areas of disconnection over technical qualifications (e.g. between SAMSA and TETA). SAMSA has strong links with Provincial Governments, Industry and Agencies to raise awareness about maritime careers and set up a network of maritime high schools in port cities and strengthen the existing maritime high schools. SAMSA also has strong links with Universities of Technology (Durban and Cape Town) offering seafaring maritime studies through scholarships, and topping up salaries of lecturing staff to attract high-quality staff.

Strategic Objective 3: Coordinating delivery of Education and Training programmes

Intervention	Outputs	Indicators
Create working partnerships between E&T service providers to create synergy, increase delivery efficiency, to strengthen portability and articulation between institutions and NQF levels	Forums for collaboration and collective planning and reflection established and operational Contractual agreements on delivery of relevant E&T programmes where relevant	Participation in forums is representative Progress is reflected in annual reports Signed contracts
Ensure E&T programmes are in place for all industry worker categories in each of the three subsectors	Comprehensive list of industry worker categories in each of the three subsectors Accredited TVET and occupational programmes relevant to all industry worker categories	Published list, updated every 3 years. Curricula in line with common curricula framework for industry workers Programmes developed in collaboration with relevant SETA and industry authority (e.g. SAMSA) and are in keeping with the White Paper on Post-School E&T Enrolment and throughput data published annually and audited every three years
Ensure that relevant E&T programmes for land reform beneficiaries are in place	List of land reform projects in the pipeline Accredited programmes relevant to land reform beneficiaries across all levels of learning	Published list, updated every 3 years Curricula in line with common curricula framework for industry workers Programmes developed in collaboration with relevant SETA and industry authority Enrolment and throughput data published annually and audited every three years
Review forestry's Contractor Capacity Development Programme (CCDP) and other approaches to worker-level training within the industry with a view to making recommendations for improved training provision	Recommendations for forest Industry worker training within the CCDP	Document confirmed by industry (South African Forestry Contractors Association)
Ensure coherent E&T programmes for small-scale fisheries are in place	Accredited TVET programmes relevant to small-scale fishery operators	Curricula in line with common curricula framework for small-scale producers/operators Programmes developed in collaboration with relevant SETA and industry authority Enrolment and throughput data published annually and audited every three years

Intervention	Outputs	Indicators
Explore the viability of establishing a public sector institute dedicated to E&T for fisheries	A viability report	Report addresses all learning levels Report conforms to standards of the relevant E&T authority
Explore the role of Agricultural Colleges and Universities of Technology in the provision of E&T programmes for forestry and fisheries	A suite of TVET certificates and HE diplomas relevant to forestry and fisheries available at logical locations	Fisheries: at least one college or university offers a programme in each coastal province Forestry: at least one college or university offers a programme in each forestry province Curricula in line with common curricula framework for small-scale producers/operators Programmes developed in collaboration with relevant SETA and industry authority Enrolment and throughput data published annually and audited every three years
Address the issue of E&T for full-time employed fishery workers and fishers	Relevant distance learning programmes Specific and targeted bridging programmes to help applicants meet entrance requirements	Curricula in line with common curricula framework for small-scale producers/operators Programmes include e-learning formats Programmes developed in collaboration with relevant SETA and industry authority Enrolment and throughput data published annually and audited every three years

3.7.4. Strategic Objective 4: Making learning mobile and transferable

Educational policy has greatly improved the possibility of mobility and transferability of learning. What is required is for the relevant E&T institutions to create greater facility for implementing policy. Currently, the onus is largely on the transferring student to provide evidence toward affecting a transfer from one institution to another or from one programme to another. Increased collaboration, even to the point of formal agreements, between E&T institutions operating in common educational spaces, will contribute greatly to easing the pathway for students to transfer.

Structurally, however, there are articulation gaps that are still apparent. The most common example of this is the difficulty learners have in moving from NQF4 TVET qualifications into suitable HE qualifications. There is a lack of NQF5 qualifications in all three sectors.

Strategic Objective 4: Making learning mobile and transferable

Intervention	Outputs	Indicators
Address the articulation gaps between TVET and HE programmes	Review of learning outcomes and entrance requirements (learning assumed to be in place) for logically linked qualifications. Suite of NQF5 qualifications for each sector	Learning outcomes of lower qualifications aligned with entrance requirement of higher qualifications Qualifications logically and academically linked to NQF4 and NQF 6 qualifications Curricula in line with common curricula framework for small-scale producers/operators and industry workers Programmes developed in collaboration with relevant SETA and industry authority Enrolment and throughput data published annually and audited every three years
Address the transferability of learning from one institution to another	Partnership agreements between E&T institutions with similar programmes Shared academic database system for related E&T service providers	Agreements address: - Entrance requirements - Exemption with/without credit Database secure but accessible

3.7.5. Strategic Objective 5: Aligning curricula with urgent and longer-term challenges faced by the subsectors

Experienced gained in the last 10 years of implementing the AET Strategy has informed us that the longer-term challenges are dynamic. What becomes essential is the capacity to read the reality of the sectors and to adapt curricula and programmes accordingly while maintaining academic rigor and integrity. This is linked to the issues of scarce skills (i.e. occupations), issues of scarce skill sets (i.e. across and within occupations), the inclusion of "soft" skills, and the application of NQF level descriptors—the latter to create flexibility of learning programmes at NQF6 and above.

Strategic Objective 5: Aligning curricula with urgent and longer-term challenges faced by the sectors

Intervention	Outputs	Indicators
Scarce Skills (Occupations): Promote and establish bursary and other funding programmes relevant to scarce occupations in each of the three subsectors	Scarce occupations for each subsector identified and published annually At least one operational bursary or funding programme for each learning level for scarce skills in each subsector	List is updated annually in consultation with the relevant SETA and industry authority List of bursary and other funding programmes, criteria and application procedures published annually Annual report of programmes, uptake and throughput
'Soft' skills: Ensure the inclusion of 'soft' skills relevant to the transformation objectives of the NDP	Codify soft skills requirements per sector Annual discussion forum among E&T institutions and industry Review of curricula to ensure the inclusion of 'soft' skills Adjust bursary programmes to reward programmes that include 'soft' skills	Codification is vetted by development education experts in the relevant sector Published annual report or proceedings At least 10% of earned credits dedicated to 'soft' skills Bursaries awarded only for those programmes that meet the 10% criterion
Ensure the inclusion of critical thinking, management, and entrepreneurship in all TVET and diploma curricula	Review of curricula to ensure the inclusion of critical thinking, management, and entrepreneurship Adjust bursary programmes to reward programmes that include 'soft' skills	At least 10% of earned credits dedicated to critical thinking, management, and entrepreneurship Bursaries awarded only for those programmes that meet the 10% criterion
Ensure the inclusion of humanities and development in HE qualifications	Review of curricula to ensure the inclusion humanities and development Adjust bursary programmes to reward programmes that include 'soft' skills	At least 10% of earned credits dedicated to critical thinking, management, and entrepreneurship Bursaries awarded only for those programmes that meet the 10% criterion
Create awareness within the three subsectors of the longer-term challenges faced by the sectors amongst industry leaders, scientists, public service managers and front-line officers	Semiannual conference/symposium for each subsector Semi-annual 'state of the industry (subsector)' report Short courses for industry leaders	Programme provides opportunity to discuss and debate challenges Conference participants to include public and private sector leaders and frontline officers Reviews challenges and actions Report widely distributed Courses developed and delivered by experts in development education

Intervention	Outputs	Indicators
Improve awareness and application of NQF Level Descriptors in all E&T programmes for each of the three subsectors	Information and training workshops for relevant E&T institutions Curricula that reflect level descriptors relevant to their respective NQF levels	Workshops are offered with respect to all learning levels Programme and module templates that explicitly articulate the application of level descriptors applicable to the programme and/or module

3.7.6. Strategic Objective 6: Addressing barriers to access

Many of the barriers identified in the original AET strategy have been overcome by superseding educational policy. They are further addressed in the White Paper on Post-School Education and Training. Nevertheless, there remain a number of practical barriers limiting access to E&T programmes in all three sectors. Of note is a gender barrier that prevents women from entering the three sectors other than in specific spaces, with the knock-on effect of preventing them from accessing E&T programmes.

Other barriers are mostly academic, centring on language, numeracy and science. This influences three areas. First is access to the lowest level NFQ programmes where specific levels of language and numeracy are required. The result is that the very people who are already in the industry and who would most benefit from training cannot access E&T programmes and spaces are taken up by others. Similarly, many skills development programmes set at various NQF levels provide only the technical component and not the foundation learning that would enable learners to advance. The third is weak performance in Maths and Science at High School, blocking access to scientific qualifications, particularly at universities.

Strategic Objective 6: Addressing barriers to access

Intervention	Outputs	Indicators
Address language and numeracy barriers affecting industry workers and small-scale producers/operators in all three subsectors	Joint strategy and implementation plan to promote uptake and access to Adult Education and Training amongst industry workers and small producers/operators	Strategy developed through a consultative process engaging relevant TVET institutions, relevant SETAs and DHET Strategy links where possible with community colleges (i.e. avoid duplication of service provision)

Intervention	Outputs	Indicators
Promote the E&T among women in all three sectors	Expanded bursary programmes, targeting women in all three sectors Consultative forums established within each industry (with special emphasis on fisheries) to explore gender barriers to entering the industry and relevant E&T programmes (e.g. facilities on fishing vessels; social barriers)	50% of the bursaries, by count, are for TVET qualifications 25% of the bursaries, by count, are for undergraduate HE qualifications (including Diplomas, Advanced Diplomas & B Techs) 25% of the bursaries, by count, are for postgraduate HE qualifications (including Honours, Masters and PhD) Meetings held at least annually Proceedings formally published and distributed Participation includes interested women, leadership, frontline staff and representatives from industry workers and small-scale producers/operators
Address academic access barriers among High School learners	Expanded bursary programme for High School learners to study Core Maths, English as a first language and Science Funding leveraged bridging programmes at selected E&T institutions to facilitate meeting entrance requirements	Details of the programme (criteria, procedures, etc.) developed in consultation with selected high schools and universities At least 100 bursaries awarded annually At least 50% of bursaries awarded to girls At least 50% of bursaries awarded to non-white learners
Strengthen the application of Recognition of Prior Learning as a means of gaining access to E&T programmes	Common framework for RPL policy regarding language, numeracy, knowledge and skills assumed to be in place All E&T institutions have functional RPL policy	Framework is the product of a consultative process with E&T institutions Framework is in keeping with the White Paper on Post-School E&T, SAQA and CHE requirements Audit shows that RPL policies are in place and provide reasonable access

Intervention	Outputs	Indicators
Address access barriers limiting articulation from occupational and TVET NQF4 qualifications to NQF6 qualifications	NQF4 qualifications as alternate routes to accessing NQF6 Diplomas established at TVET and Agricultural Colleges	Qualifications are a product of a consultative process between industry and E&T institutions Curricula in line with common curricula framework for small-scale producers/operators and industry workers Programmes developed in collaboration with relevant SETA and industry authority Enrolment and throughput data published annually and audited every three years
Improve utilisation of funding mechanisms for E&T programmes with particular reference to TVET programmes	Action plans to improve access to skills development levy funding and discretionary grants in place and implemented for each sector	Plans developed through a consultative process between funding agencies, the industry and the relevant SETAs (e.g. Agri-SETA, FP&M SETA, TETA) Annual progress reports showing uptake and throughput
Review existing occupational training provision in forestry and fisheries to identify barriers, challenges and opportunities in the light of outsourcing and phasing out of forestry occupational training centres	Joint strategy implemented to broaden access and increase the number and quality of training opportunities available to workers in the forestry and fisheries	Strategy developed through a consultative process engaging E&T providers, industry and the relevant SETAs Strategy linked to creating relevant qualifications at Agricultural Colleges and Universities of Technology

3.7.7. Strategic Objective 7: Improving the image of the sector as a livelihood choice

All three sectors continue to suffer from a poor image as a career choice. All three are associated with poverty and low living standards, part of which is reinforced by the difficulty experienced by industry workers and small-scale producers/operators to advance.

Strategic Objective 7: Improving the image of the sector as a livelihood choice

Intervention	Outputs	Indicators
Elevate the profile and capacity of Agricultural High Schools	Funding to Agricultural High Schools mobilised	Funding addresses imbalances among dedicated Agricultural High Schools Funding targets provision of practical learning spaces

Intervention	Outputs	Indicators
Improve AET programmes at High Schools	Database of agricultural subject educators established and maintained Corps of agricultural subject educators appropriately qualified	Database is updated annually Database includes academic qualifications of AET educators Annual progress report Pass rates of agricultural subjects at Matric increase annually at least 60% of the students pass the subject with at least 50%
Create career paths for industry workers	Career paths for industry workers linked to qualifications are established in each sector	Career paths are developed through a consultative process involving industry and the relevant SETAs
Growth plans for small-scale producers/operators in all three subsectors	Growth plans for small-scale producers/operators lined to qualifications are established in each sector	Growth plan are developed through a consultative process involving industry and the relevant SETAs Specific attention is paid to growth paths for small-scale fishers, small- scale forestry producers, land reform beneficiaries and small-scale value-adding enterprises.
Awareness campaigns among children and youth	Multimedia programmes advocating careers in each of the three sectors are developed and widely implemented.	Programmes are developed in collaboration with professional marketing specialists Programme formats are relevant to the target audiences

3.7.8. Strategic Objective 8: Encouraging higher education and postgraduate studies in Agriculture, Forestry and Fisheries

This Strategy will support the three sectors in keeping pace with the burgeoning concept of "growing our own timber". While many more South African school leavers are entering Higher Education, still a small percentage of them go into Agriculture, Fisheries and Forestry. It is also noted that within the Public Sector, many senior positions can be obtained with undergraduate qualifications and often with qualifications not related to the work of the respective department. Further, there is family, social and economic pressure on learners to start earning an income. Cost of Higher Education (particularly first degrees) is extremely high—relative to the income base of the target community. Connected to this is the disproportionate number of women in higher education in Agriculture, Forestry and Fisheries—particularly at Masters and PhD level.

Science qualifications are generally devoid of any development theory and humanities learning content. Subsequently, graduates who are employed in both the public and private sector remain ignorant of the real-world dynamics of the spaces they are hired to serve or manage. This has contributed to the disconnection between transformation policy and implementation on the ground. This is evident in land reform, agricultural extension, small-scale fisheries development, and forestry transformation programmes among others.

Similarly, scientific research tends to be single-discipline focussed, with technical sciences being more highly valued

than other areas of research. As argued in the NRF call for "Transformations for Sustainability Programme," "Research on global environmental change and sustainability goes hand- in-hand with calls for deep social change." This principle applies to every transformation frontier including the changes outlined in the NDP and other policies for Agriculture, Forestry and Fisheries.

Finally, while many African nationals from outside South Africa study and conduct research in South Africa, scholarly collaboration within the African continent, where South Africans are studying and conducting research in other parts of Africa, are rare. In a similar vein, many of the academic staff at universities (particularly in Agriculture) are not South African, both enriching the academic learning environment and underscoring the need to attract South Africans into academia in agriculture, forestry and fisheries.

Strategic Objective 8: Encouraging higher education and postgraduate studies in Agriculture, Forestry and Fisheries

Intervention	Outputs	Indicators
Creating awareness of the values of higher education from Grade 8	Targeted campaigns to reach Grade 8-12 learners are designed and implemented	Campaigns are developed and implemented in collaboration with the nearest HI institutions Campaigns formats are relevant to the target audience
Broadening postgraduate Science qualifications to include Development and Humanities	Accreditation of specialised postgraduate qualifications consciously constructed to be transdisciplinary with development science and humanities	Qualifications are developed in collaboration with industry and experts in development education At least one Honours and one coursework Masters
Broadening the Science Research Agenda to include Development and Humanities	Funding formats and programmes established for transdisciplinary research that integrates technical science, development theory and the humanities	Formats and programmes developed in collaboration among universities, public and private research agencies (e.g. NRF, ARC) At least 10 fully funded Honours level research projects in each sector annually At least 5 fully funded Masters level research projects in each sector annually At least 5 fully funded PhD research projects in each sector annually
Contributing to the generation of scientific knowledge	Symposia and conferences for young academics and researchers in Agriculture, Forestry and Fisheries are held annually Young researchers published in DHET accredited journals related to Agriculture, Fisheries and Forestry	At least one event annually for each sector At least 5 articles annually by different researchers in at least relevant journal for each sector (i.e. at least 15 articles annually)

Intervention	Outputs	Indicators
Strengthening professionalism	Registration of qualifying new South African graduates with the relevant professional body (e.g. SACNASP) facilitated and funded on a merit basis	Criteria and merit system developed in collaboration with HE institutions and the relevant professional body The awarding system is transparent and fair At least 50% of the awards given to women At least 50% of the awards given to non-white graduates At least 10% of the awards are given to people with disabilities
South Africa learning in Africa	Funded and implemented exchange programmes (including sponsored postgraduate qualifications, research and sabbaticals) that send South African postgraduate candidates to study or research in other African countries	Exchange programmes (including funding frameworks) developed in collaboration with HE institutions and public and private research agencies (e.g. NRF, ARC), and where possible with international organisations such as IFPRI, FAO, GFRAS, etc. At least five funded exchanges per year per sector

PART FOUR: IMPLEMENTATION OF NETSAFF

4. NETSAFF STRUCTURES

NETSAFF will be implemented in two ways: through the agency of the Directorate: Sector Education and Training, in DAFF; through a revised formation of the AET forum network established in then 2005 AET Strategy. Rather than create separate governance structures, there will be a single structure covering all three sectors to facilitate coherence and collaboration.

4.1. National Level Forum and Networking: National Education and Training Forum for Agriculture, Forestry and Fisheries (NETFAFF)

The NETFAFF forum will, with the support of the Directorate: Sector Education and Training spearhead a programme of action for implementing the interventions documented in the 2015
Education and Training Strategy for Agriculture, Forestry and Fisheries (ESTAFF)

The structure of NETFAFF will be built strongly on provincial input provided through a hierarchy of representation from provincial and national level to facilitate dialogue, exchange of information and shared learning to assist implementation, review and adjustment of the strategy (ESTAFF).
The aim is to achieve wide-ranging representation from many stakeholders, particularly at provincial and service delivery level, while retaining a high degree of efficiency and flexibility for implementation.

The overall forum structure will consist of:

- A National Forum
- A National Executive Committee
- A National Secretariat
- Nine provincial forums, each with a Secretariat

The National Forum will be appointed by the Minister and will be drawn from a diversity of people representing educational institutions operating nationally in all three subsectors and from all learning levels and representing key national role-players in each of the subsectors. It will further comprise representatives from the Provincial Forums on a rotational basis as well as one permanent member from DAFF.

The National Executive will be elected from the membership of the National Forum.

The Directorate: Sector Education and Training will serve as secretariat for the National Forum, including calling meetings, handling logistics, preparing documentation and presentations and managing finances. NETFAFF will also appoint ad hoc Task Teams to spearhead specific initiatives.

4.2. Provincial Level Forum and Networking: Provincial Education and Training Forum for Agriculture, Forestry and Fisheries (PETFAFF)

Each province will establish a Provincial Forum (PETFAFF) – the membership of which will be drawn from a diversity of people representing educational institutions operating provincially in all three subsectors and from all learning levels and representing key provincial role-players in each of the subsectors.

The role of the Provincial Forum is to maintain constructive dialogue among forum members and other E&T stakeholders with a view to meeting the objectives of NETSAFF by:

- facilitating the implementation of relevant programmes and projects in each province
- monitoring, reviewing and reflecting on programmes and projects in each province
- providing feedback and making recommendations to the National Forum on adjustments to the NETSAFF and about potential new initiatives.

The overall structure of each Provincial Forum will consist of:

- a Provincial Executive Committee
- a (permanent) Provincial Secretariat (funded by the Directorate: Sector Education and Training; may be contracted to a service provider)
- ad Hoc Working groups.

4.3. Implementation Budget

Budgeting for the AET strategy is divided into three basic categories: running costs, staff remuneration, and programme costs.

Running costs: DAFF will carry the running costs for the National and Provincial Forums. However, Provincial structures are expected to provide staff to carry out the functions of the forum, executive committee and administrative support. The anticipated running cost to implement the Strategy to support the work at provincial level is R 20 000 000.

Staff remuneration: Staff (whether permanent or contract) will be needed to run the secretariat that will provide administrative support and coordination—particularly at Provincial level. Such posts will be funded through the Directorate: Sector Education and Training.

Honoraria and travelling costs: DAFF is conscious of the reality that many stakeholders who should be a part of the processes of this strategy will be unable to do so unless their time and costs are covered. This is accepted in principle and such costs will be covered by the budget set aside to implement this strategy. The levels of payment will be subject to prevailing public sector policies and will be announced as and when required.

Programme costs: These costs are for investigating, planning, designing, implementing, and reviewing specific interventions and lines of action. Some preliminary costs and estimates for some of the work to be done are included in the framework that is presented at the end of this document. In a number of cases, information is either outstanding, or programmes are too complex to address within the parameters of this submission. In the latter cases, funds are needed to appoint an external agent to develop the more detailed plans, including comprehensive budgets. In other cases, 'seed' money is proposed to start selected initiatives.

The overall initial budget for proposed interventions is R 20 000 000

Details of Provisional Budget 2016/17-2018/19

Budget Item	Initial Allocation (R) 2016-2017	Projected Allocation (R) 2018-2019
National Forum and Secretariat	R 2000 000	R 3000 000
Provincial Forums and Secretariats	R18 000 000	R19 000 000
Strategic Objective 1: Harmonising and coordinating E&T policy		
Strategic Objective 2: Harmonising and coordinating E&T curricula		
Strategic Objective 3: Coordinating delivery of E&T programmes		
Strategic Objective 4: Making learning mobile and transferable		
Strategic Objective 5: Aligning curricula with urgent and longer-term challenges faced by the sectors		
Strategic Objective 6: Addressing barriers to access		
Strategic Objective 7: Improving the image of the sector as a livelihood choice		
Strategic Objective 8: Encouraging higher education and postgraduate studies in Agriculture, Forestry and Fisheries		
Total	R20 000 000	R22 000 000