# Integrating the Environmental Driver into Sector Skills Plans:

## An Enabling Document for All SETAs

environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

**A document produced by DEA and the National Environmental Skills Planning Forum**

**July 2010 – Draft 2**

***NB: The purpose of this document is to facilitate discussion with SETAs during Sector Skills Planning, and to support integration of the environmental driver. It is not prescriptive, but enabling in orientation. It will also be used for review of SSPs by DEA. Comments to improve the document are welcomed.***

# Contents



*NOTE: The proposed new SETA landscape has been used to frame this document. Suggestions can, however, be used within the existing landscape too, and the DEA and NESPF are willing to revise this document and support SETAs working across the changing SETA landscape as required.*

# Introduction

## Why this document?

**There are significant new development opportunities associated with green growth and sustainability.** Issues such as climate change, energy shortages, natural resource degradation and high energy prices are driving the emergence of a sustainable development paradigm, locally and internationally (see Diagram 1 below). In an African context, sustainable development must be tied to poverty alleviation, job creation and new development opportunities, while also ensuring that resources are not over-exploited in ways that undermine future development options and choices. The South African Planning Commission, the Industrial Policy and Action Plan 2, and South Africa's Science and Technology 10 Year Strategic Plan all include a focus on sustainable use of natural resources, and new job creation opportunities associated with sustainable development and a Green Economy. There are new business opportunities (and job opportunities) associated with a low carbon economy (e.g. solar water heater production and installation); new forms of environmental management (e.g. labour intensive formalisation of a recycling industry); and sustainable production and consumption (e.g. expanding local food production through urban agriculture; biotechnology solutions for water pollution problems etc).

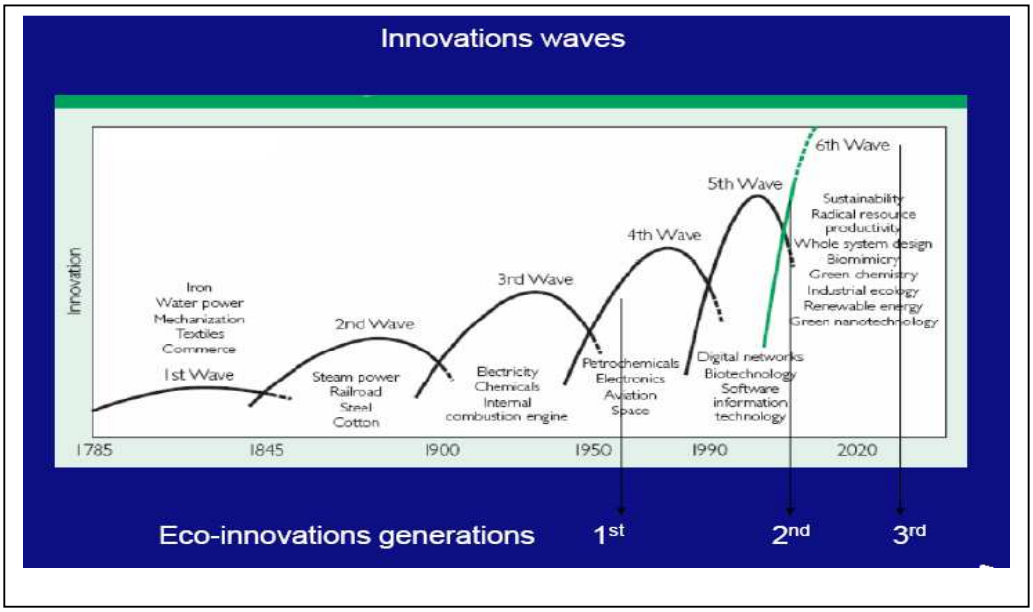


Diagram 1: Trends in development and innovation (Source: Montavaldo, 2009)

Many industrial sectors in South Africa have **environmental compliance obligations, related to the National Environmental Management Act (RSA, 1998) and its associated legislation, and/or the National Water Act** (amongst others). New waste management legislation requires re-skilling across the board to a new waste management paradigm. **Energy and Water efficiency** are also increasingly becoming mandatory within industrial and other economic activities. These objectives are reflected in **government's Medium Term Strategic Framework (MTSF) Objective 9, which focuses on sustainable use of**

**natural resources. Integration of this MTSF goal into the skills landscape has implications for all Sector Skills Plans,** as outlined in this document**.**

## How to use this document

**Environment is a cross cutting concern**, and ideally every SETA needs to undertake specific research to quantify environmental skills needs and related training requirements (DEA, 2010). South Africa's capacity to use new development opportunities associated with the 'sustainable development' paradigm, and our ability to make better use of natural resources through efficiency, risk management and problem avoidance is currently hampered by a **re-active approach to skills development for environmental functions.** A more pro-active approach to skills development can maximise new development opportunities, save resources, ensure greater efficiency in the use of resources, and avoid damage which is costly to recover or rehabilitate, and improve public health and service delivery.

**This document aims to assist SETAS to adopt a pro-active approach to environmental skills development in order to address MTSF Goal 9, and also to maximise new development opportunities and job creation possibilities.** It makes recommendations for EACH SETA on:

- Interventions to address environmental **critical skills** relevant to the sector;
- Interventions to address **scarce skills** needed for a green economy and sustainable use of natural resources;
- **Research and innovation** interventions to strengthen environmental skills development in each sector; and
- Recommendations for **flagship programmes,** that could also form the basis for **partnership development with DEA** and other stakeholders.

**This document is broad in nature, and will require every SETA to consider the information presented here, and to relate it to their own research and in-depth knowledge of the specific sector that they are responsible for, as well as to their Labour Market Analyses work. In considering the environmental driver, SETAs are encouraged to adopt a 'futures thinking' approach as environmental issues often have both long and short term impacts.**

Members of the National Environmental Sector Skills Planning Forum (NESPF) are available to assist SETAs were necessary in integrating the environmental driver, and environmental specialists both within the Department of Environmental Affairs, and within the wider sector can engage with SETAs on a case by case basis, or through a national or sector specific workshop process. For further information or to arrange a meeting / workshop with National Environmental Sector Skills Forum representatives please contact:

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*NOTE: The proposed new SETA landscape has been used to frame this document. Suggestions can, however, be used within the existing landscape too.*

# Terminology

*Some of the more specialist terminology used in this document is explained very briefly here. More formal definitions are available, explanations here are for immediate access purposes only.*

**Cleaner Production** refers to approaches to production that reduce environmental impact and waste production

**Eco-innovations** refers to innovations that reduce environmental and ecosystem impact, and prevent environmental damage.

**Ecosystem services** refers to those goods and services that are provided by ecosystems (e.g. food production; water provisioning; pollination etc.)

**Environment** in this document refers to the interactions between the natural environment, ecosystems, and the social, economic and political context.

**Environmental driver** refers to the influence of environmental factors on the skills development landscape

**Green Economy** refers to economic activities that are also beneficial to the environment as well as to the economy and society.

**Green Growth** refers to a paradigm of development that seeks to grow economic opportunity and benefit without wasting resources unnecessarily, or without causing unnecessary damage to ecosystems and natural life support systems (e.g. water ecosystems).

**Green Jobs** refers to jobs that contribute to environmental improvement.

**Green Procurement** refers to purchasing patterns that are sustainable – socially (e.g. favouring black economic empowerment) and environmentally (i.e. favouring environmental improvement).

**Integrated environmental management** refers to an approach to environmental management that takes society, economy and the natural environment into account. Integrated and **adaptive environmental management** refers to an approach to environmental management that takes changing circumstances into account, thus requiring management approaches to be adapted to these changing circumstances.

**Low carbon economy** refers to an economic system that is oriented to reducing carbon emissions, and its dependence on fossil fuels that produce carbon emissions and other greenhouse gasses.

**Organic** refers to products that are produced using methods that do not damage the environment or use artificial chemicals.

**Sustainability** refers to balancing environment, society and economy.

**Sustainable Consumption** refers to patterns of consumption that seek to reduce negative environmental and social impacts (e.g. fair trade)

**Sustainable Development** refers to a development paradigm that takes account of the social, economic and environmental factors at the same time (often balancing one against the other). It is development that meets the needs of current generations without compromising the ability of future generations to meet their needs.

**SKILLS SYSTEM terminology**, e.g. PIVOTAL, ACCESS, SHORT COURSE etc. is used as in the draft NSDSIII document.

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# Agriculture, Food, Beverage and Forestry SETA

## The Environmental Driver

The environmental driver must be integrated into all Sector Skills Plans, for two reasons. Firstly, government departments hope to pursue a green growth path for the country, that is environmentally sustainable, has a low carbon footprint, and is pro-labour creation. Through a green growth path, South Africa can benefit from the opportunities opened up by global and local green economic activity, eco-innovations and green jobs. Many industries have already seen the opportunity to optimise environmental opportunities and the need to avoid environmental risks.

Secondly, the sustainable use and management of natural resources is a national priority outlined in the Medium Term Strategic Framework, MTSF 2009-2014 (Goal 9). It is a state priority to implement the National Sustainable Development Framework, with attention to the protection and fair distribution of scarce water resources; to food security and rural livelihoods; integrated environmental management and the protection of biodiversity; energy efficiency; and mitigating the risks and impacts of climate change, particularly to the most vulnerable members of society.

## How is a green growth path relevant to Agriculture, Food, Beverage & Forestry SETA?

Agriculture, forestry, food and beverage production are all directly impacted by the environmental driver in ways that involve both opportunities and risks. For example:

- Companies in these industries have started to compete for market shares created by environmental consumer consciousness and by eco-labelling/ accreditation. Forestry obtains eco-accreditation for timber and paper from the Forestry Stewardship Council by following environmental guidelines; food produced according to environmental criteria can obtain eco-labelling (e.g. Organic, Green Choice, Sustainable Sugar, free-range, badger-friendly).

- Industries are aiming to reduce their environmental impact through product stewardship initiatives and use resources more efficiently and sustainably, thus cutting medium and long term costs, and gaining marketing and branding opportunities. For example, Coca Cola International are setting benchmarks by reducing the amount of water wasted during production; locally SA Breweries are striving to become water neutral.

## How is Sustainable Natural Resource Use and Management (MTSF Goal 9) relevant to the Agriculture, Food, Beverage and Forestry SETA?

- Scarce resource - water: Forestry's classification as a Stream Reduction Activity under the new Water Act (Act 36 of 1998) has placed it under more stringent regulations from the Department of Water Affairs. Forestry and environmental managers must now reduce the industry's impact on water sources including wetlands. Agriculture is South Africa's largest user of freshwater. Concerted efforts to maintain production while using water resources (including groundwater) more efficiently and equitably are necessary, as are the skills to support such efforts.

- Other natural resources: Agriculture faces huge natural resource use challenges. Commercial farmers must maintain or improve production and subsistence farmers must sustain livelihoods with dwindling resources (land degradation, soil erosion, drop in water tables, pollution of underground water, threat of climate change). Farmers must find new ways (or revive old ways) to use resources like water, soil and energy efficiently, while protecting the biodiversity (such as pollinators) on which production depends. Research into eco-efficient production, green technologies - such as permaculture, water harvesting, soil conservation measures, optimum grazing regimes and conservation farming must be stepped up, along with research into the potential and risks of using Genetically Modified Organisms (GMOs). Research and technology innovations must be shared to change practice. If successful, the sector can create new green jobs, maintain the jobs and livelihoods of thousands of existing farm-dwelling families, and make a stronger contribution to rural development and the national GDP. If not, the industry is at risk.

- Environmental risks: The environmental justice movement has been linking disease and birth abnormalities to exposure to agricultural chemicals, and asking questions about GMOs. The excessive use of fertilisers has been linked to the contamination of freshwater sources that has resulted in the growth of blue-green algae that renders water unfit for use. The latter is regarded as a global crisis similar in proportion to global warming and is bound to receive increasing attention. Agricultural companies will need to address the risks and opportunities for product stewardship and green innovation.

- Habitat destruction: Converting land for agriculture is a prominent cause of biodiversity loss; government has introduced stewardship initiatives including tax deductions to protect remaining biodiversity on private land, opening up arenas for the creation of skills development associated with sound stewardship practices.

- Product labels: A more eco-and health conscious consumer body means that food and beverage labelling is taken increasingly seriously in South Africa. Producers are likely to be pressured to take a cradle to grave / product stewardship approaches and to make accurate information about nutritional value, additives, packaging etc, available to the public. Accurate labelling, auditing and branding skills with a focus on environmental sustainability would all support this area of growth.

- Education, training and extension: All the above signals the need for innovation and the development of new curricula in forestry, agriculture and related FET and HET programmes, and for stepped-up, up-to-date agricultural extension for both commercial and subsistence farmers.

## RECOMMENDED CROSS-CUTTING PROGRAMMES: CRITICAL SKILLS

**Short Courses/ skills programmes for Skill level 5:** Production/operation managers (Forestry; Agriculture); Environmental Managers; Training Managers; Industrial engineering technologists; Agriculture Extension Officers

- Sustainable Development and Environmental Management Planning: include climate change risk and opportunity assessments
- Sustainable Development and Community Forestry
- Sustainable Development and Community-based Agriculture (local and urban food production)
- Environmental Ethics and Sustainable Business
- Managing biodiversity and ecosystem services in production landscapes
- Wetland delineation, assessment and management
- Water and energy efficiency: new technologies and options
- Environmental Trade Regulations
- Sustainable Production and Consumption
- Sustainable Agriculture and Organic Farming – new business opportunities

**Short Courses / Skills and PIVOTAL programmes for Skill level 1, 2, 3:** Landscape gardeners; Forestry workers; Aquaculture Workers; Agriculture workers; Harvesters / pickers; unemployed (rural and urban)

- FET PIVOTAL PROGRAMME: Indigenous gardening and landscaping (level 3)
- ACCES PROGRAMME: Integrate Basic Environmental Literacy and Environmental Practices Modules into ABET Training in Agriculture and Forestry Industry.
- LEARNERSHIP: Community-based food production (urban agriculture; rural food production)

## RECOMMENDED PROGRAMMES TO ADDRESS SCARCE SKILLS

| OFO Code | Occupation (SCARCE SKILL) | Job titles (Scarce Skills) | RECOMMENDED INTERVENTIONS |
|---|---|---|---|

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|---|---|---|---|
| 222 101 | Commodities trader (skill level 5) | Agricultural procurer, buyer | HET MODULE.<br>Critical skills: Application of environmental ethics and sustainable business; green business journey; product stewardship; environmental risks and opportunities for SA business |
| 224 301 | Economist (skill level 5) | Environmental economist | BURSARIES<br>HET PIVOTAL programme<br>Critical skill: Quantifying the value of biodiversity and ecosystem services in production landscapes |
| 224 402 | Policy analyst (skill level 5) | All, including Risk advisor | BURSARIES<br>HET PIVOTAL programme<br>Critical skills: Climate change forecasting; environmental ethics and sustainable production; environmental risks & opportunities |
| 232 601 | Urban and regional planner (skill level 5) | Natural resource management consultant/ officer/planner, environmental policy planner, land use planner | BURSARIES<br>HET PIVOTAL programme.<br>Critical skill: Integration of conservation and production in land use planning; biodiversity conservation planning;; impact assessment; application of environmental legislation; integration across disciplines; high level communication and advocacy skills |
| 233 902 | Agricultural Engineer (skills level 5) | Natural resources engineer | BURSARIES<br>HET PIVOTAL programme.<br>Critical skill: 'Green engineering' |
| 234 101 | Agricultural consultant (level 5) | Agricultural advisor, extension officer, field officer, farm consultant/advisor etc | BURSARIES<br>FET, HET, PIVOTAL programmes<br>Critical skills: extension; environmental ethics and sustainable production; cooperative extension and social learning; biodiversity and ecosystem services in production landscapes<br>Applicable to commercial & subsistence Farming and Forestry |
| 234 303 | Environmental research scientist (skill level 5) | Conservancy advisory scientist, ecologist, ecological researcher, land degradation analyst | HET PIVOTAL programmes.<br>Critical skills: Ecological research, application in a production landscape; conservation farming; wetland identification and management |

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|---|---|---|---|
| 234 301 | Conservation officer (skill level 5) | Environmental officer, forestry conservationist, landcare facilitator, species protection officer | BURSARIES<br>HET PIVOTAL programmes<br>Critical skills: extension; environmental ethics and sustainable production; cooperative extension and social learning; biodiversity and ecosystem services in production landscapes |
| 234 403 | Earth and Soil Scientist (skill level 5) | Soil conservationist, advisor | BURSARIES<br>HET PIVOTAL programmes.<br>Critical skill: Soil analysis, conservation |

## RECOMMENDED PROGRAMMES: RESEARCH AND INNOVATION

GREEN JOBS STUDY: Undertake labour market analysis to investigate the possibility of new green jobs in the sector (e.g. such as those created in the biodiversity and wine initiative; in organic agriculture; job opportunities associated with local food production e.g. urban agriculture etc.).

HE AND FET CURRICULUM AND PROGRAMME INNOVATION: Integrate conservation farming, sustainability, the green driver into school and HET (Agric) curriculum; Develop a strong Sustainable Agriculture curriculum for FET schools and colleges

COMMUNITY EDUCATION AND TRAINING INNOVATION:

- SHORT COURSES - Sustainable, low-cost, eco-friendly food production (e.g. permaculture);
- PIVOTAL PROGRAMME: Sustainable Agriculture Innovations in Urban and Rural Communities; Community-based forestry (learnerships with entrepreneurship focus)

## PROPOSED FLAGSHIP PROGRAMMES

- CURRICULUM INNOVATION PROGRAMME: *Soil Sciences for Sustainable Production* (Skill level 5) – Partnership with rural universities / agriculture faculties, FET Colleges and Agriculture Colleges
- PIVOTAL programme: *Extension for Environmentally Sustainable Agriculture* (partnership with Dept of Agriculture, Agricultural colleges, universities, NGOs and retailers)
- PIVOTAL programme (e.g. FET College or Unemployed Learnership): *Sustainable urban agriculture and community-based food security innovations* (skill level 1/2/3)
- ENVIRONMENTAL EDUCATION AND TRAINING skills development programme for providers to integrate the environmental driver into the sector.
- CAREER GUIDANCE focussing on sustainable agriculture options, and community-based / urban food security and food production.

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# Bank SETA

## The Environmental Driver

The environmental driver must be integrated into all Sector Skills Plans, for two reasons. Firstly, government departments aim to pursue a green growth path that is environmentally sustainable, has a low carbon footprint, and is pro-labour creation. By pursuing green growth South Africa could benefit from the opportunities opened up by global and local green economic activity, eco-innovations and green jobs. Many industries have already seen the opportunity to optimise environmental opportunities and the need to avoid environmental risks.

Secondly, the sustainable use and management of natural resources is a national priority outlined in the Medium Term Strategic Framework, MTSF 2009-2014 (Goal 9). It is a state priority to implement the National Sustainable Development Framework, with attention to the protection and fair distribution of scarce water resources; to food security and rural livelihoods; integrated environmental management and the protection of biodiversity; energy efficiency; and mitigating the risks and impacts of climate change, particularly to the most vulnerable members of society.

## How is a green growth path relevant to the Bank SETA?

Sustainability and environmental concerns have begun to impact significantly on the Banking sector. For example, the “Equator Principles (EPs)”, a voluntary benchmark standard for determining, assessing and managing the social and environmental risks in project financing, is being adopted by increasing numbers of banks internationally. In South Africa, Nedbank, ABSA Bank, Barklays Bank, FirstRand Bank and Standard Bank have all adopted the EPs and have started to integrate it into their business systems and planning.

There is also a growing banking and finance sector under the National Business Institute (NBI) focusing on financing of renewable energy and climate change (adaption and mitigation) projects, with banks such as Standard Bank becoming more active and vocal in their contributions to such projects. Additionally, Nedbank Group, for example, has become a leader within the South African Carbon Disclosure Project Report Leadership Index,

considered the largest source of disclosure and transparency regarding carbon emissions, indicating a buy-in to carbon and sustainability issues in ways that go beyond financing and translate into core functioning of services.

## How is Sustainable Natural Resource Use and Management (MTSF Goal 9) relevant to the Bank SETA?

- Green Branding - As green consumer awareness and pressure grows internationally, green branding (or eco-branding) is becoming more popular within all sectors, including banking. Nedbank Group, for example, has developed a strong profile as an environmentally conscious bank that does business sustainably, from financing to office management to a CSR investment focus. They have used their environmental orientation to develop niche brands and product ranges for their clients, and continue to leverage their environmental brand within a range of platforms. Developing the understanding and skills to utilise the branding potential of green businesses, and for further developing products and brands filling this need are becoming more important.

- Eco-offices - banks, like many other organisations, have started to integrate sustainability practices into their daily office management. Recycling, waste reduction, energy conservation and conversion to electronic correspondence and banking are areas of particular importance to the banking sector. In addition, some banks have begun to invest in green-building and construction as part of their portfolios of investment. In support of this trend, sustainable office management skills are becoming sought after within the sector, as are green procurement and strategic planning skills. Coupled with this is a need for general staff to develop the everyday knowledge and skills to maintain eco-offices through their daily functioning. For example, although Nedbank has developed an integrated environmental sustainability programme, including greening their branch offices, a skills gap remains in the successful translation of their organisational policy into daily practice.

- E-waste - the generation of e-waste is a growing concern in industries that are largely dependent on electronic communication and networks, with large impacts on biodiversity and ground water health in particular. Globally, e-waste is gaining more attention, with companies experiencing increased pressure to develop and adopt environmentally sound methods of both electronic goods procurement and end-of-life waste disposal, placing pressure on procurement and disposal specialists to integrate sustainability practices into their skills sets.

- Natural resources - as part of the ‘Equator Principles’ that several banks in South Africa (and internationally) have adopted, investment decisions adopted by the banks need to consider the impact of these investments on natural resources. A sound understanding of natural resources and development pressures is needed to enable good decisions and best practice.

- Sustainability reporting - there is a growing demand for diligent sustainability reporting. Global reporting standards have increasingly integrated sustainability practices into their criteria for best practice, and the King III report argues strongly for the full integration of environmental considerations with the economic and social aspects of

sustainability. Companies in a number of sectors, including manufacturing, finance, banking and engineering, as well as mining, are involved in sustainability reporting, and require associated skills.

## RECOMMENDED CROSS CUTTING PROGRAMMES: CRITICAL SKILLS

**Short courses for Skill level 5:** Financial Investment Advisors and Managers; Economists; Finance Managers; Accountants; Investment Dealers; Equity Analysts; Policy Analysts:

- Green Economy and Sustainable Development Principles
- Green Fiscal Reform
- Environmental Risk Assessments
- Sustainability Reporting and King III
- Integrating the 'Equator Principles' into the Banking Sector

## RECOMMENDATIONS TO ADDRESS SCARCE SKILLS

- Sustainability Managers with International Sustainability Trend Analysis expertise
- Environmental / Resource Economists / Investors (with capacity to understand potential and risks associated with carbon markets)
- Climate / Environmental Risk Assessors

## SUGGESTIONS FOR RESEARCH AND INNOVATION

- GREEN JOB SKILLS DEMAND STUDY: Investigate the full scope of environmental occupations and environmental critical skills (environmental skills needed in other occupations) in the banking sector.

## PROPOSED 'FLAGSHIP' PROGRAMME

- Environmental Investments Training Programme

- ENVIRONMENTAL EDUCATION AND TRAINING skills development programme for providers of training to integrate the environmental driver into the sector's skills development system.

- CAREER GUIDANCE on new careers in the banking industry focussing on sustainability and green investments

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# Local Government SETA (LGSETA)

## The Environmental Driver

The environmental driver must be integrated into all Sector Skills Plans, for two reasons. Firstly, government departments hope to pursue a green growth path for the country that is pro-labour creation, environmentally sustainable and which has a low carbon footprint. Through a green growth path South Africa aims to benefit from the opportunities opened up by global and local green economic activity, eco-innovations and green jobs. Many industries have already seen the opportunity to optimise environmental opportunities and the need to avoid environmental risks.

Secondly, the sustainable use and management of natural resources is a national priority outlined in the Medium Term Strategic Framework, MTSF 2009-2014 (Goal 9). It is a state priority to implement the National Sustainable Development Framework, with attention to the protection and fair distribution of scarce water resources; to food security and rural livelihoods; integrated environmental management and the protection of biodiversity; energy efficiency; and mitigating the risks and impacts of climate change, particularly to the most vulnerable members of society.

**Local government is one of the most significant environmental employers in the public sector with an estimated 33 000 employees involved in environmental functions** (DEA, 2010), with most of these being functions related to waste management, water and sanitation management and public greening at skill level 1 or 2. The Environmental Sector Skills Planning research (DEA, 2010) identified three critical issues relevant to skills development for environmental occupations in the LGSETA context:

1) Environmental occupations in Local Government are poorly defined. This is being addressed by the DPLG skills audit and competency framework which indicates that 15% of occupations in Local Government are *environmental occupations.* Due to a neglect of environmental training in the SETA system, there is an urgent need for re-skilling and up-skilling to address competency requirements of the new DPLG competency framework for environmental occupations in LGSETA.

2) The environmental function in Local Government is complex, and in most small to medium sized municipalities, this function is often left up to one or two people at middle management level to execute without adequate orientation, skills or support. Such 'Environmental Management Officers' need to understand and implement a complex legal framework governing environmental concerns, and they often are under-equipped for their function, particularly since environmental legislation has been changing. Specialist technical skills are often also required for aspects of their mandate (e.g. air quality monitoring). Officials 'higher up' in the Local Government System are also inadequately oriented to environmental policy, legislation and mandates, and there is a need for up-skilling in these occupational categories, including up-skilling of ward councillors. Few local governments are engaged with sustainable development planning and many are currently grappling to understand climate change risk and opportunities.

3) Most environmental employees are at elementary occupation level (skill level 1 or 2). To date very little environmental training is being offered to these levels of occupations, even though qualifications do exist (Environmental Practices level 1, 2, and 3).

These issues compound problems of poor service delivery and affect public health.

## How is a green growth path relevant to LGSETA?

Many of the new jobs that can be created by greening South Africa's economy are in waste management, where local government plays a key role. A recent study by the Department of Trade and Industry showed that with appropriate infrastructure and systems, the formalisation of the recycling industry can lead to the creation of up to 140 000 new jobs, many of these at entry level occupations (skill level 1 or 2). Sustainable Development Planning needs to be integrated into existing planning systems to optimise LED opportunities associated with environmental growth opportunities (e.g. conservation farming, recycling industry development etc.).

## How is Sustainable Natural Resource Use and Management relevant to LGSETA?

Local government is key to the following aspects of MTSF Goal 9: Meeting energy efficient targets; safeguarding the availability and safety of water for growth and development strategies; implementing green technologies (like wind and solar technology); and creating new green jobs (see above). Local government also has legal mandates for service delivery in some of these areas, particularly water quality management, waste management and biodiversity management. In addition, local government has responsibilities for air quality management and environmental health, and for management of parks and gardens or public open spaces. Waste collection services are still inadequate for demand, and a new waste management policy focussing on avoidance, participation of the public in avoidance and cradle to cradle approaches to waste management introduces new challenges for skills development.

Sustainable development planning: With increased land use pressure, and the need to plan for sustainable human settlements, local governments are increasingly coming under

pressure to plan using sustainable development principles. This is also necessary to ensure sustainable use of natural resources (e.g. water resources; biodiversity etc.) and to maximise local economic development without degrading soil, land and without reducing future development options and choices. New forms of risk (e.g. drought, water scarcity, sea level rise etc.) are also forcing local governments to consider risk factors related to climate change and other environmental risks in future planning strategies. Some municipalities are beginning to develop sustainable development frameworks and/or local environmental action plans to address this planning need.

- **Sustainability reporting** - there is a growing demand for diligent sustainability reporting. Global reporting standards have increasingly integrated sustainability practices into their criteria for best practice, and the King III report argues strongly for the full integration of environmental considerations with the economic and social aspects of sustainability. Companies in a number of sectors, including manufacturing, finance, banking and engineering, as well as mining, are involved in sustainability reporting, and require associated skills.

## RECOMMENDED CROSS CUTTING PROGRAMMES: CRITICAL SKILLS

**Short courses for skill level 4& 5**: Financial Investment Advisors; Economists; Municipal Managers; Directors; Councillors; Environmental Health and LED Professionals

- Environmental Policy and Legislation: Implications for Service Delivery, Public Health and Sustainable Development Practice
- Sustainable Development Planning and Leadership: Integration of sustainable development principles into Integrated Development Planning
- Environmental risk prediction and management (including climate change risk and opportunity assessment)
- Integrated Environmental Management for Local Government and Improved Service Delivery

**Management –Other new skills required in municipalities in relation to the devolution of regulatory function and developmental approach:**

- Participatory planning, entrepreneurship, community development
- Sanitation – alternative sanitation technologies suitable for SA
- Developmental approach to water provisioning

**Short courses for Skill level 1-3: (Environmental workers)**

- Environmental Practices (greening; waste management; recycling; sanitation management practices etc.)
- Environmental Health & Safety

## RECOMMENDED PROGRAMMES TO ADDRESS SCARCE SKILLS

| OFO Code | Occupation (SCARCE SKILL) | Job titles | RECOMMENDED INTERVENTIONS |
|---|---|---|---|
| 139 902 | Environmental Manager (Skill Level 5) | Conservation Science Manager<br>Contaminated Sites Manager<br>Land Care Manager<br>Land and Water Manager<br>Pollution & Waste Group Manager | Short Course: Environmental Management Inspectors and compliance officers: Technical content related to environmental legislation.<br><br>Short Course: Effluent management; Environmental Impact Assessment; New environmental technologies with a focus on mitigating environmental impacts;<br><br>Short Course: Climate change risk and opportunity assessment<br><br>Short Courses: Sustainable Development Planning |
| 224 402 | Policy Analyst ( skills level 5) | Risk /Planning /Review Analyst | Short Course: Environmental Policy and Legislation |
| 232 601 | Urban and Regional Planner (skill level 5) | Environmental Consent Planner<br>Environmental Policy Planner<br>Land Use Planner<br>Natural Resource Management Consultant / Officer / Planner | Short Course: New environmental technologies with a focus on mitigating environmental impacts;<br><br>Short Course: Sustainable Development Planning / Sustainable Human Settlements |
| 233 201 | Civil Engineer (skills level 5) | Environmental Engineer;<br>GIS and Landuse Management Engineer<br>Transportation and Urban Planning Engineer | Short Course: New environmental technologies with a focus on mitigating environmental impacts, enabling sustainable development and improving service delivery |

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|---|---|---|---|
| 233 202 | Civil Engineering Technologist (Skill Level 5) | Biosystems Technologist<br><br>Environmental Technologist<br>GIS and Landuse Technologist<br>Transportation and Urban Planner Technologist | Short Course: New environmental technologies with a focus on mitigating environmental impacts; enabling sustainable development and improving service delivery |
| 234 302 | Environmental Consultant (Skill Level 5) | Energy Efficiency Consultant<br>Energy Officer<br>Environmental Advisor<br>Environmental Analyst | Short Course: New environmental technologies with a focus on mitigating environmental impacts; sustainable development and improving service delivery<br><br>Short Course: Sustainable Development Planning<br><br>Short Course: Climate Change Risk and Opportunity Assessment |
| 311 903 | Environmental Science Technician (skill level 4) | Conservation Scientific Officer; Ecological Technical Officer; Environmental Technical Officer; | Short Course: Environmental Impact Monitoring and Assessment (focus on waste management technical skills; water quality monitoring; biodiversity monitoring) |
| 599 510 | Environmental Practices (skill level 2) | No defined job titles except waste collectors | PIVOTAL PROGRAMMES: Waste Management Learnerships to support formalizing the recycling industry: Use Environmental Practices ( level 1;2;3;4) qualifications – include focus on environmental entrepreneurship<br><br>(*can be integrated with the suggestion below)*<br><br>PIVOTAL PROGRAMME: Learnership for community-based citizen science, environmental monitoring & education (waste, water, air, biodiversity etc.) – use Environmental Practices Qualifications and target unemployed youth |
| PIVOTAL PROGRAMMES: Local Government **Internships** for (among others):<br>• Air pollution control officer<br>• Landfill designer and manager<br>• Environmental Science Technicians (for water, waste, biodiversity) | | | |

## RECOMMENDATIONS FOR RESEARCH AND INNOVATION

- GREEN JOB STUDY: Investigate the potential for green jobs creation associated with the DTI study on formalising the recycling industry; and sustainable employment creation possibilities associated with environmental science technical skills needed at local government level. Other significant areas of potential employment creation are in the areas of 1) urban agriculture; 2) solar water heater installation (amongst others).

- ENVIRONMENTAL TECHNICAL SKILLS STUDY: Undertake substantive research to establish the exact nature, scope and demand for **environmental technical skills** at local government level. DEA (2010) research indicates a potential shortage of up to 1500 environmental technical skills in South Africa, but this need remains under-differentiated at sectoral level, and according to environmental technical functions (e.g. waste management technicians, water quality technicians etc.).

## PROPOSED FLAGSHIP PROGRAMMES

- SHORT COURSE PROGRAMME & LEARNERSHIPS FOR NEW WASTE MANAGEMENT POLICY IMPLEMENTATION: A programme focussing on new waste management policy approaches is needed for all technical staff involved in waste management in local government (managers, environmental officers and waste collectors); and members of the community to adopt **avoidance approaches** to waste management. Use Environmental Practices Level 1-4 qualifications (and revise if necessary).

- SHORT COURSE PROGRAMME: LOCAL GOVERNMENT LEADERS FOR SUSTAINABLE DEVELOPMENT: Establish a partnership with DEA to provide short courses (within a coherent, high quality framework) for a 'Local Government Leaders for Sustainable Development' Programme focussing on Environmental Sector Priorities (including new waste management policy; air quality management; environmental compliance; coastal zone management, climate change risk and opportunity assessment etc.). This programme should service Local Government Managers, Environmental Officers and Occupations that have environmental competencies (as defined by DPLG competency framework). Form partnerships with MBA programmes and partners such as DBSA to design and deliver the programme.

- CITIZEN SCIENCE AND SUSTAINABILITY PIVOTAL PROGRAMME: LEARNERSHIP FOR UNEMPLOYED YOUTH: In partnership with DEA and other partners (e.g. DST / DPLG), investigate the development of a Learnership focussing on 'Citizen Science and Sustainable Development' for Youth in Municipalities to strengthen service delivery and environmental monitoring functions at community level and youth involvement in societal programmes and actions. Use Environmental

Practices Level 4 or Environmental Management Level 5 qualifications, and provide career guidance to youth to support further learning, job seeking and systems access capacities, as well as entrepreneurial skills. Link this to potential job creation opportunities (e.g. the DTI study that outlines job creation linked to the formalisation of the recycling industry).

- SHORT COURSE FOR UNEMPLOYED - CLEANEST TOWN SKILLS DEVELOPMENT FLAGSHIP PROGRAMME: Establish a partnership with DEA to support the development of skills for implementing the Cleanest Town Programme, focussing on unemployed and youth participation.

- PUBLIC HEALTH AND HYGIENE – WATER, WASTE AND SANITATION: Learnership focussing on Healthy Living / Healthy Environment for Community Learning Facilitators working in rural and urban areas.

- ENVIRONMENTAL EDUCATION AND TRAINING skills development programme for providers to integrate the environmental driver into the sector's skills development system.

- CAREER GUIDANCE focusing on public environmental health and service delivery

environmental affairs
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REPUBLIC OF SOUTH AFRICA

**Integrating the Environmental Driver into Sector Skills Plans:**
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**July 2010**

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# Construction SETA

## The Environmental Driver

The environmental driver must be integrated into all Sector Skills Plans, for two reasons. Firstly, government departments aim to pursue a green growth path that is environmentally sustainable, has a low carbon footprint, and is pro-labour creation. By pursuing green growth South Africa can benefit from the opportunities opened up by global and local green economic activity, eco-innovations and green jobs. Many industries have already seen the opportunity to optimise environmental opportunities and the need to avoid environmental risks.

Secondly, the sustainable use and management of natural resources is a national priority outlined in the Medium Term Strategic Framework, MTSF 2009-2014 (Goal 9). It is a state priority to implement the National Sustainable Development Framework, with attention to the protection and fair distribution of scarce water resources; to food security and rural livelihoods; integrated environmental management and the protection of biodiversity; energy efficiency; and mitigating the risks and impacts of climate change, particularly to the most vulnerable members of society.

## How is a green growth path relevant to the Construction SETA?

Construction is one of the sectors that is directly impacted by the environmental driver in ways that involve both opportunities and risks. For example:

- Companies in these industries have started to compete for market shares created by environmental consumer consciousness and by eco-labelling/ accreditation. Commercial Properties obtain eco-accreditation for design, construction and operation from the Green Building Council of South Africa by following environmental guidelines. The Builders Association, the Green Building Council and a number of other professional organisations offer eco-accreditation and professional development skills points for construction professionals engaging in green design and construction.

- Industries are aiming to reduce their environmental impact through integration of green building technologies into their operational centres, focusing on a reduction on their natural resource consumption and use through more efficient and sustainable use of these resources with a view to medium and long-term sustainability. For example, the second phase of Nedbank's head office in Sandton, Johannesburg has been certified as South Africa's first Green Star Building. This has led to increasing integration of green technologies such as solar heating, integration of grey water systems, use of environmentally friendly paints and construction materials and building designs that passively promote energy conservation, among others.

## How is Sustainable Natural Resource Use and Management (MTSF Goal 9) relevant to the Construction SETA?

- Product labels: A more eco-conscious consumer body means that green building labelling is increasingly taken seriously in South Africa. Construction companies are likely to be pressured to take medium and long-term sustainability outputs into consideration and to make accurate information about efficiency and cost-savings available to consumers, and to accurately report on product performance in terms of environmental viability and functionality.

- Natural resources: Construction faces huge natural resource challenges. Energy and water are particularly significant resources within the sector, linked to outputs that impact on the environment (such as carbon emissions and pollution). Construction professionals and workers must optimise use of available resources, and find new and innovative ways (or re-design and integrate old ways) of increasing efficient use of these resources into the medium and long-term. At the same time, there is an increasing urgency to reduce negative outcomes of design and construction, such as carbon emissions, and resource-intensive operations.

- Procurement: An increasing number of green-products and companies supplying the construction sector have become available, including for example, heating and cooling systems, lighting systems, waste disposal systems and construction, insulation and fittings systems. The need to provide those involved in procurement of products for construction with a sound understanding of the advantages and disadvantages of green-technologies is needed.

- Installation: A large number of the technologies promoting eco-efficiency in buildings require skilled installation, and a basic understanding of green construction principles. Correct installation helps to ensure long-term sustainability of equipment as well as maximum efficacy and life span, and requires specific skills development to promote efficacy and maximise the benefits yielded by such technologies. Labour market data indicates a shortage of skilled people to install such technologies (e.g. solar water heaters).

- Professionals: Planning and design are two of most important areas to ensure the adoption of eco-construction, forming the starting point of green technology integration, innovative resource-efficient design and environmentally economic planning. Of particular significance in South Africa, are water and energy efficiency within buildings.

These professions require a high level of skill and a sound understanding of the principles of green design. Added to this are professionals who are able to ethically implement environmental impact mitigation measures.

- Construction workers: the lowest skills levels are currently almost totally neglected in terms of green building skills, largely due to the often short-term employment nature of construction workers. To ensure implementation of sustainable designs, skilled construction workers are needed, with workers so skilled potentially gaining access to niche market employment opportunities. Basic environmental literacy and basic environmental practices training should be integrated into other training programmes such as those in EPWP programmes.

- Evaluators, inspectors and auditors: Currently, very few standards for green-building are being evaluated and audited, with limited opportunities to develop inspection and standards career paths. These skills are required to assist in maintaining high standards within the sector and for providing accurate input into improvement and upgrading of construction projects. This is potentially a new area of job creation in the sector.

- Green building maintenance: Natural attrition on buildings and the quality and lifespan of installations is a key contributing factor to loss of environmental efficacy within buildings (both residential and commercial). Efficient and skilled maintenance of green buildings, post construction, is important to maintaining the optimal ongoing long-term performance of these buildings. Skills to support accurate and professional maintenance need to be supported within the sector.

## RECOMMENDED CROSS CUTTING PROGRAMMES: CRITICAL SKILLS

**Short Courses for skills level 4 & 5**: Directors; Human Resource Development Managers; Business Training Managers; Construction Project Managers; Civil Engineers; Health and Safety Advisors; Architects; Landscape Architects; Buying Officers; Civil Engineering Technicians; Building Site Managers etc.

- Strategic implications of green building and low carbon economy for planning and growth of the construction sector
- Sustainable Development Planning
- Environmental impact assessment and management;
- Managing energy and water efficiency in the construction industry
- Climate Change (New Energy Future) risk and opportunity assessment for the construction industry;
- Green installations; Cradle to cradle materials sourcing; green procurement; green design integration; Green Building Council / LEED compliance training;
- Environmental impact assessment and management;
- Energy and resource efficiency for the construction industry;
- Green technology installation and use (e.g. solar geysers)
- Cradle to Cradle Waste Management: Avoidance, re-use and waste reduction

## RECOMMENDED PROGRAMMES TO ADDRESS SCARCE SKILLS

| OFO Code | Occupation SCARCE SKILL | Job titles | RECOMMENDED INTERVENTIONS |
|---|---|---|---|
| 233 201 | Civil Engineer (Skill Level 5) | Environmental Engineer;<br><br>GIS and Landuse Management Engineer;<br><br>Water Operations / Resources / Supply Engineer | BURSARIES<br>HET PIVOTAL PROGRAMMES (e.g. internships) |
| 233 202 | Civil Engineering Technologist (Skill Level 5) | Environmental Technologist;<br><br>GIS and Landuse; Technologist | BURSARIES<br>HET PIVOTAL PROGRAMMES |
| 234 302 | Environmental Consultant (Skill Level 5) | Environmental Advisor<br>Environmental Analyst | BURSARIES<br>HET PIVOTAL PROGRAMMES |
| 234 303 | Environmental Research Scientist (Skill Level 5) | Environmental Auditor;<br><br>Land Degradation Analyst | BURSARIES<br>HET PIVOTAL PROGRAMMES |

## PROPOSED INTERVENTIONS FOR RESEARCH and INNOVATION

GREEN JOBS SKILLS DEMAND STUDY: Undertake a study to fully quantify and qualify potential for new green jobs in the construction industry, and related skills requirements. Also identify needs for re-skilling towards a low carbon and energy efficient economy.

SUSTAINABLE HUMAN SETTLEMENTS INFRASTRUCTURE DEVELOPMENT AND SKILLS IN RURAL AREAS: Investigate skills needs for sustainable human settlement development in rural areas (eco-friendly housing, low cost modern sustainable energy, sanitation and water technologies and building designs); and labour intensive development possibilities. (Possible partnership with Department of Rural Development and DEA).

HET PIVOTAL PROGRAMME on low energy construction development; environmental engineering; green procurement and sustainable human settlements.

ACCESS PROGRAMME: Integrate knowledge of basic environmental practices in construction industry into all ABET level programmes.

## PROPOSED FLAGSHIP PROGRAMMES

SKILLS FOR SUSTAINABLE HUMAN SETTLEMENTS IN RURAL AREAS: Develop a pivotal programme with FET Colleges in rural areas to address construction needs in rural areas within a sustainable development paradigm (E.g. *Live and Build Safe and Well*)

HET PIVOTAL PROGRAMME ON CONSTRUCTION AND ENGINEERING DESIGN FOR SUSTAINABLE HUMAN SETTLEMENTS: Environmental Engineering, Cleaner Production; Waste Avoidance and Re-use; Green Procurement; Sustainable design.

ENVIRONMENTAL EDUCATION AND TRAINING skills development programme for providers to integrate the environmental driver into the sector's skills development system.

CAREER GUIDANCE in careers in construction that support sustainable human settlement development.

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# Culture, Sports, Tourism and Hospitality SETA (with Conservation Chamber)

## The Environmental Driver

The environmental driver must be integrated into all Sector Skills Plans, for two reasons. Firstly, government departments aim to pursue a green growth path that is environmentally sustainable, has a low carbon footprint, and is pro-labour creation. Through green growth South Africa can benefit from the opportunities opened up by global and local green economic activity, eco-innovations and green jobs. Many industries have already seen the opportunity to optimise environmental opportunities and the need to avoid environmental risks.

Secondly, the sustainable use and management of natural resources is a national priority outlined in the Medium Term Strategic Framework, MTSF 2009-2014 (Goal 9). It is a state priority to implement the National Sustainable Development Framework, with attention to the protection and fair distribution of scarce water resources; to food security and rural livelihoods; integrated environmental management and the protection of biodiversity; energy efficiency; and mitigating the risks and impacts of climate change, particularly to the most vulnerable members of society.

## How is a green growth path relevant to the THETA?

South Africa has a good track record of using its protected areas and natural resources for tourism. This important component of the national economy is particularly valuable for creating employment and enterprise opportunities in rural areas, with positive potential for extension, but sufficient management capacity for protected areas is low and requires stepped up skills development. The THETA serves the need for tourism skills, but it is also vital to develop skills for protected area and biodiversity management.

'Green' jobs: In addition to employment in nature-based tourism, there are significant job creation opportunities in programmes that contribute to biodiversity conservation. Examples are the EPWP programmes LandCare, Working for Water, Working on Fire and Working for Wetlands. These have multiple aims including the restoration of habitats for biodiversity and ecosystem services.

## How is Sustainable Natural Resource Use and Management relevant to the THETA?

This SETA is tasked with skills development for conservation agencies such as the Department of Environmental Affairs branches and provincial departments, SANBI, SANParks, semi-independent provincial agencies and local government. These agencies are mandated by the state to conserve biodiversity (wildlife, indigenous plants and ecosystems including those feeding water resources and commercial marine systems) in protected areas and on private land, in terrestrial, freshwater, coastal and marine ecosystems. Just under 50% of biodiversity staff are employed by the state; the remainder are employed in private agencies (such as consulting firms contracting to state departments) and in NPOs. All of them operate in a new conservation paradigm in which the protection of biodiversity and development planning must be integrated, yet few have been trained in this new paradigm. Other aspects of new approaches include adoption of an ecosystem services approach, an international trend which the South African government is also supporting. These new paradigms are however, slow to make their way into the training systems and there is an urgent need for curriculum innovation and re-skilling of conservation educators and trainers. Conservation agencies are chronically under-staffed; have high levels of vacancies particularly among managers and technicians; with skills levels dropping in recent years; and many agencies, particularly at provincial level, struggling to meet their mandate. To date THETA funding has been under-utilised for the development of biodiversity conservation skills. Greening 2010 has also indicated that there is much to be gained from the greening of sports events most notably reduced waste and energy use, reduction fo carbon emissions, and public education. Sustainable management of cultural heritage is also linked to sustainable resource use and management and should not be neglected in the work of this SETA.

## RECOMMENDED CROSS CUTTING PROGRAMMES: CRITICAL SKILLS

**Short courses and PIVOTAL programmes for Skill level 5** (to be integrated into relevant HET programmes): Education or training advisors; Urban and regional planners (land use / conservation planners);

- Ecosystem approaches to conservation management
- Integrated and Adaptive Environmental Management Approaches
- Mainstreaming biodiversity and conservation planning into development planning (for urban and regional planners)
- Conservation leadership
- Integrated Coastal Zone Management (new legislation)
- Marine protected area management
- Internships in agencies for terrestrial, marine & coastal conservation, incl. local government
- Community-based Natural Resource Management
- Co-management approaches to conservation
- Rehabilitation
- Alien vegetation clearance and monitoring
- Cultural Heritage Impact Assessment and Public Participation

- Cultural Heritage Mapping
- Cultural Heritage Management
- Cultural Heritage Education and Training

**Short courses and PIVOTAL programmes for Skill level 4: Environmental Science Technicians (**Conservation Scientific Officer; Ecological Technical Officer; Environmental Technical Officer; Naturalist; Parks and Reserves Technical Officer); Life Science Technicians (Biological, botanical, marine biological, zoological technician).

- Learnership in biodiversity research, monitoring, management and conservation technical skills (up-skilling)
- Short courses in critical skills: Environmental legislation, biodiversity monitoring and management, conservation extension/stewardship; Ecosystem service approaches to conservation management; Integrated Coastal Zone Management; Community-based Natural Resource Management; Fire arm handling; Fire Management

Short courses and PIVOTAL programmes for skill level 1-3 (Animal behaviourist/ trainer / attendant / zookeeper, including animal rescue workers; Tour guide, Hunter (game trackers, trapper, shooter)).

- Animal handling (aquaria), animal handling (marine mammal and sea bird rescue), animal handling (zoos, shelters)
- Learnership in game and nature guiding
- Fire arm handling
- Fire management
- Environmental Practices (e.g. coastal zone monitoring and cleaning; alien vegetation clearance; rehabilitation)
- Cultural Heritage Management Practices

## RECOMMENDATIONS FOR ADDRESSING SCARCE SKILLS

| OFO Code | Occupation (SCARCE SKILL) | Job titles (Scarce Skills) | Recommended Interventions Based on Scarce & Critical Skills |
|---|---|---|---|
| 224 103 | Statistician (skill Level 5) | Biometrician, data quality officer, demographer, population and statistical analyst, methodologist, modeller, GIS specialist | BURSARIES<br>HET PIVOTAL programmes including programmes that combine statistician skills with biological/ biodiversity/ ecological/ environmental/ conservation skills.<br><br>Career guidance |

| | | | |
|---|---|---|---|
| 224 202 | Curator (skill Level 5) | Curators of physical and research, biological and cultural collections | BURSARIES<br>HET PIVOTAL programmes for curators of plant, animal and cultural heritage collections, physical and research (database) collections<br><br>Career guidance |
| 224 301 | Economist (Skill Level 5) | Environmental economist / Natural resource economist | BURSARIES<br>HET PIVOTAL programmes in natural resource economics; environmental economics (bursaries at under-graduate and post-graduate level, internships)<br>Career guidance |
| 234 504 | Biotechnologist (Skill Level 5) | Biodiversity Researcher<br><br>Plant Molecular Biologist | BURSARIES<br>HET PIVOTAL programmes in appropriate disciplines (bursaries at under-graduate and post-graduate level, internships)<br><br>Career guidance |
| 234 505 | Botanist (Skill Level 5) | Plant Biologist<br>Ecologist<br>Environmental Biologist | BURSARIES<br>HET PIVOTAL programmes in appropriate disciplines (bursaries at under-graduate and post-graduate level, internships) |
| 234 508 | Zoologist (skill level 5) | Animal Physiologist<br>Animal Scientist<br>Mammologist | BURSARIES<br>HET PIVOTAL programmes in appropriate disciplines (bursaries at under-graduate and post-graduate level, internships) |
| | | Cultural Heritage Impact Assessor and Manager | HET PIVOTAL programme to develop capacity for Cultural Heritage Impact Assessment and Public Participation and Education; and Cultural Heritage Management |

## PROPOSED RESEARCH AND INNOVATION INTERVENTIONS

GREEN JOBS SKILLS STUDY: The conservation and environment sector has potential to provide new green jobs in various conservation practice and monitoring contexts (e.g. working for water; working for the coast; working for climate change; working for fire). It is projected that 350 000 work opportunities (100 day contracts) can be created in Phase 2 of the Expanded Public Works Programmes with an estimated 3.4 million training days (calculated at 2 training days per 22 days worked). Despite this significant investment, current skills programmes are inadequate for ensuring **sustainable employment**. **Research needs to be undertaken to establish how training in EPWP programmes can be extended, e.g. through learnerships and apprenticeships (i.e. PIVOTAL PROGRAMMES) to enhance sustainable employment opportunities.**

CURRICULUM INNOVATION IN UNIVERSITY CONSERVATION TRAINING PROGRAMMES: Foster innovation in university (including but not limited to Universities of Technology) training of conservation officers (e.g. incorporate urban conservation, adaptive management, systems approach, 'new paradigm' conservation planning; ecosystem services approaches; community-based natural resource management approaches; stewardship approaches; and a stronger people-environment conservation ethic as well as field and research skills). Improve quality of environmental education modules in these conservation training programmes.

HET RELEVANCE RESEARCH: Research the scope and adequacy of multi- and interdisciplinary courses for biodiversity research and management (B and M level)

ACCESS programme for urban and rural unemployed – include focus on Youth: Develop a range of biodiversity monitoring and stewardship courses or a CITIZEN SCIENCE AND SUSTAINABILITY LEARNERSHIP to create opportunities for monitors and stewards like baboon monitors, shark monitors, beach cleaners, river guardians (NQF Level 4).

## PROPOSED FLAGSHIP PROGRAMMES

- HET CURRICULUM INNOVATIONS for Conservation Degrees and Diplomas and Cultural Heritage Impact Studies; with CAREER GUIDANCE

- CITIZEN SCIENCE AND SUSTAINABILITY LEARNERSHIP ACCESS PROGRAMME: Learnership for unemployed youth and other community members particularly in rural and coastal areas: In partnership with DEA, SANParks, Oceans and Coast (formerly MCM), NGOs and other partners to strengthen biodiversity monitoring and youth and community involvement in biodiversity conservation and management programmes and actions. Use Environmental Practices Level 4 or Environmental Management Level 5 qualification; provide career guidance and links to internships to support access to further learning and job access, with CAREER GUIDANCE

- 'Ecological Empowerment' rotational INTERNSHIP for third year/pre-honours students in the life sciences to encourage further studies and career uptake in conservation and biodiversity management. In partnership with DEA, SANBI, Oceans and Coast (formerly MCM), conservation agencies like East Cape Parks and Tourism Board, KZN Ezemvelo Wildlife, SANParks, and NGOs.

- TRAINING FOR GREENING SPORTS AND TOURISM EVENTS (Building on lessons learned in Greening 2010; Greening the Arts Festival etc. – possible partnership with Indalo Yethu? And focussing on how training can create employment opportunities / entrepreneurship opportunities for youth).

- ENVIRONMENTAL EDUCATION AND TRAINING skills development programme for training providers to integrate the environmental driver into the sector's skills development system.

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# Education, Training and Skills Development SETA (ETSD SETA)

**The Environmental Driver**

The environmental driver must be integrated into all Sector Skills Plans, for two reasons. Firstly, government departments aim to promote a green growth path that is environmentally sustainable, has a low carbon footprint, and is pro-labour creation. By pursuing green growth South Africa could benefit from the opportunities opened up by global and local green economic activity, eco-innovations and green jobs. Many industries have seen the need to both optimise environmental opportunities and to avoid environmental risks, and require associated skills.

Secondly, the sustainable use and management of natural resources is a national priority outlined in the *Medium Term Strategic Framework*, MTSF 2009-2014 (Goal 9). It is a state priority to implement the *National Sustainable Development Framework*, with attention to the protection and fair distribution of scarce water resources; to food security and rural livelihoods; integrated environmental management and the protection of biodiversity; energy efficiency; and mitigating the risks and impacts of climate change, particularly to the most vulnerable members of society.

## How is a green growth path relevant to the ETSD SETA?

South Africa's education and training systems in South Africa are impacted by the green economy driver because environmental opportunities and risks are affecting a wide range of economic activities, as outlined in this document, with resultant skills needs. For example:

- In response to dwindling natural resources, industries that rely heavily on natural resources like land, water and energy need to reduce resource use and 'do more with less'. To this end they need skills to identify, research, develop, produce and use (at all levels in organisations) eco-efficiency innovations. Examples are agriculture, mining, forestry, food and beverage production, and the energy sector.

Trainers with appropriate environmental education background and competence are needed to provide training in these areas.

- In order to capture market shares and compete both nationally and internationally South African producers, manufacturers and retailers are seeking to produce and sell environmentally friendly and eco-accredited products (e.g. FSC accredited or recycled paper, renewable batteries, organic foods, etc.). A responsible business ethic requires that companies apply product stewardship or cradle to grave initiatives. Thus, across the value chain from R&D to marketing, new knowledge and 'green skills' are required.

- New green technologies like green buildings, energy efficient technologies and renewable energy producing devices are central to research and innovation agendas within the country, and the skills supporting the development, management and implementation of such innovations are increasingly sought after across sectors. More lecturers with the knowledge and competence to offer education and training in these new specialist areas are needed, particularly in FET Colleges (where environmental technical skills are presently under-represented), and in Universities of Technology, where curriculum innovation is needed.

- **These new skills require innovation and the development of new curricula for existing and new FET and HET programmes**, and for stepped-up, up-to-date training on related issues for employees and for education and training professionals including FET and HET lecturers.

## How is Sustainable Natural Resource Use and Management (MTSF Goal 9) relevant to the ETSD SETA?

- Sustainable development and the wise use of natural resources like water, energy, ecosystems, marine and coastal resources, indigenous plants and wildlife is a government priority, aimed at improving the quality of life for current South Africans, particularly the most impoverished and vulnerable communities, and at ensuring that ecosystem services and the natural resource base for future generations and future development is not compromised. This is reflected in long-standing legislation such as the *National Environmental Management Act* (NEMA, 1998) as well as more recent indications of state priorities, such as the *Medium Term Strategic Framework* for 2009-2014. The state sees **environmental education and training at all levels and in all phases of the education and training system, for all sectors of society** as a vital contributor to achieving sustainable development (see e.g. *White Paper on Education and Training*, 1995; and NEMA, 1998).

- As a result the National Curriculum Statements include a healthy environment, and environmental justice, as cross-curricular principles, and related environmental content, concepts (both scientific and social), values and attitudes, across all subjects. Critical cross-field outcomes that foreground sustainable use of natural resources, have been identified as underpinning for all qualifications in South Africa; among them are "seeing the world as a set of related systems" and "using science and technology showing responsibility for the environment". **Teachers and FET**

**lecturers are however generally poorly prepared to teach the environmental content and concepts of the curriculum.** A critical intervention is required in this regard, as teachers' environmental education knowledge and skills affect the foundations for environmental learning required further on in the human capital development pipeline, as well as the public's ability to participate in environmental decision-making (e.g. impact assessments) and vulnerable communities' ability to avoid or effectively respond to environmental issues and risks.

- Most South African universities and universities of technology have started to offer environmental training programmes to develop higher level skills. The demand at many institutions is higher than the ability to train and there is a need to develop more lecturers with teaching skills in specialist areas and supervision skills. There is also a need for basic knowledge of environment and sustainability issues and practices across all knowledge fields in higher education, given the inter-disciplinary and integrated nature of environmental and sustainability education. There is a particular need for **curriculum planning skills** for inter and trans-disciplinary courses, across the natural, earth, social, economic and political sciences. In some institutions there is **a need for curriculum innovations** to reflect more up-to-date understandings of the integrated nature of ecological and social concerns and the new management approaches taken to addressing them.

- There is a dearth of environmental course development and delivery as well as resource development expertise in the FET college sector, and despite the importance of FET level training in environmental skills, reflected in this document, the current FET curriculum does not reflect this concern adequately (e.g. Sustainable Agriculture.)

- There is also a dearth of expertise to make use of the skills development system (e.g. designing quality accredited courses and learnerships) as this requires specialised education and training course design and assessment competence, which has not been widely developed in the environmental education sector as most tertiary environmental education programmes tend to focus on schools or the conservation sector. This has substantive implications for developing the capacity needed to service green skills development for a green economy. **The DEA Environmental Sector Skills Planning research identified the development of Education, Training and Skills Development Practitioners for the Environmental Sector as a priority for intervention** (DEA, 2010) – there is a need to build capacity for providing the training necessary for a green economy and for implementing the National Strategy on Sustainable Development, and SA's complex environmental policy regime – because it affects all sectors (as shown in this Enabling Document).

To address these educational skills needs, the SETA should consider three kinds of interventions:

- Interventions that contribute to the **re-skilling and up-skilling** of teachers, lecturers and trainers, to provide them with a sound understanding of socio-ecological/ environmental issues and risks and sustainability practices, and the ability to teach

related content and concepts in a contextually relevant and level-appropriate manner.

- Interventions that **address scarce skills** e.g. high quality maths and science teachers and FET lecturers with a strong environmental background, lecturers able to teach across social and natural sciences, socio-ecological research teaching and supervision skills, among others. Environmental Educators and Trainers that can design and deliver quality environmental training within a wider context of skills development and delivery are also needed (e.g. trainers to develop the recycling industry; trainers to support sustainable development planning in local government etc.).

- Research and innovation interventions in curriculum development, quality education and training, and skills provisioning to meet the above needs.

## PROPOSED CROSS CUTTING PROGRAMMES: CRITICAL SKILLS

Short courses and PIVOTAL programmes for skill level 5 (Business Training Managers; ECD Practitioners; Foundation Phase Teachers; Natural Science Teachers; Economic and Management Science Teachers; Life Orientation Teachers; Geography Teachers; Life Sciences Teachers; Technology Teachers; Agricultural Science Teachers; Career Councellors; School Principals and Curriculum Implementors; Educational Managers)

- CEPD Programmes focussing on Environmental Education and Training; Environmental Ethics and Action in Educational Environments; Sustainable Development Business Practices; Environmental Health in schools and educational institutions; Sustainable Schools; Environmental content knowledge for various school disciplines.
- CEPD TRAINING on Healthy School Environments for District Officials; School Managers and Eco-School / School Environmental and Health Promotion Programme Teachers and Co-ordinators
- HET PIVOTAL PROGRAMME: Integration of Module on Healthy School Environments / Sustainable Schools into School Leadership and Management Training Programmes (ACE ELM).
- FET PIVOTAL: environmental careers
- HET: Post graduate specialist careers in environmental sector

## INTERVENTIONS TO ADDRESS SCARCE SKILLS

Note: Most educators in South Africa have been trained to teach for the schooling system. Teaching and offering training programmes to a wider context (i.e. across the NQF) requires re-skilling. Scarcity is therefore **relative,** and is related to the emergence of new occupations for environmental educators and trainers, who work with schools, but also in a wide range of other education, training and skills development contexts (including conservation, business, government, local government etc.).

| OFO Code | Occupation (SCARCE SKILL) | Job titles | Recommended Interventions Based on Scarce & Critical Skills |
|---|---|---|---|
| 223 301 | Training and development professional (skill level 5)<br><br>*RELATIVE SCARCITY: ENVIRONMENTAL TRAINING AND DEVELOPMENT PROFESSIONALS* | Learnership manager; Training advisor, Training and development practitioner, Training materials developer | HET PIVOTAL Programme: Learnership / Advanced Diploma in Environmental Educatin, Training and Skills Devleopment ; BED (HONS) and Masters Degree in Environmental Education, Training and Skills Development<br><br>To develop adequate competence in planning, coordinating, facilitating/delivering, and assessing environmental learning interventions, and resource development, to provide environmental and sustainability education at a variety of levels and in a variety of education, training and skills development contexts. |
| 223 303 | Assessment Practitioner (skill Level 5) | | SHORT COURSE:<br>Competence to assess environmental learning - environmental knowledge, skills and values – in a range of contexts and at appropriate levels. |
| 249 101 | Education or Training Advisor (Skill Level 5)<br><br>*RELATIVE SCARCITY: ENVIRONMENTAL EDUCATION TRAINING ADVISORS AND SPECIALISTS* | Curriculum specialist, Education / training consultant or specialist, Education / training methods specialist, Education / training verifier, Education and training quality assurance (ETQA) officer / manager | HET PIVOTAL PROGRAMME: Learnership/ Advanced Diploma in Environmental Education, Training and Skills Development ; B.Ed (Hons) and Masters Degree in Environmental Education, Training and Skills Development<br><br>To develop adequate competence in planning, coordinating, facilitating/delivering, and assessing environmental learning interventions, including full curricula and resource development, to provide environmental and sustainability education at a variety of levels and in a variety of contexts. |

| | | | |
|---|---|---|---|
| 249 102 | Education or Training Reviewer (Skill Level 5) | Education Review Officer Moderators | SHORT COURSE:<br>Short course to develop competence in moderating environmental and sustainability education at a variety of levels and in a variety of contexts |

## RECOMMENDATIONS FOR RESEARCH AND INNOVATION

NEW OCCUPATIONAL STUDY: **The occupation 'Environmental Educator / Trainer' is not yet reflected in the formal Occupational Categories, even though these professionals do exist, and are in increasing demand. This is due to the fact that environmental skills issues and related environmental education and training needs were not included in NSDS 1 and 11, and are cross cutting (and thus often get lost). Environmental Sector Skills Planning Research (DEA, 2010) has, however, noted that these skills are scarce, and are needed to build capacity for the range of environmental education and training programmes that are needed to support green growth and sustainable use of natural resources.**

This means that this ought to be a key area of innovation for the ETSD SETA. Qualifications exist for Environmental Education, Training and Development Practices on the NQF, and these have been used in Learnership and Short Course format, but have to date not been integrated into the SETA Planning and funding framework, despite demand.

ENVIRONMENTAL EDUCATION AND TRAINING DEMAND and SYSTEMS STUDY: A research project is needed to fully integrate these occupational categories into the OFO System, and to develop a more accurate understanding of this emerging educational specialist area – it is significant because it crosses all phases and stages of the formal education and training system, and involves public education, as well as business education and training contexts.

FET COLLEGE LECTURERS for development of Environmental Technical Skills is also an area that needs urgent attention. DEA ESSP research indicated a shortage of up to 1500 environmental technical skills in the public sector alone, with similar shortages being reported in the private sector. DEA ESSP research (DEA, 2010) also indicated that environmental technical skills are under-represented in FET College curricula, and thus also in FET college lecturer capacity. This would have implications for University of Technology lecturer capacity development too, as a low carbon economy will require new technological innovation in UoTs. A comprehensive study into this issue needs to be undertaken.

## PROPOSED FLAGSHIP PROGRAMMES

HET PIVOTAL PROGRAMME: Integration of a module on Healthy School Environments into the ACE/ ADE Training Programme for Educational Leaders and Managers run by the Department of Education.

CEPD PROGRAMME FOR TEACHERS: *Environment in the Curriculum*, to develop the background knowledge, values and skills required for implementing and teaching the

environmental content in different curriculum Learning Areas / Subjects – for ALL TEACHERS in ALL PHASES.

ENVIRONMENTAL EDUCATION, TRAINING AND SKILLS DEVELOPMENT LEARNERSHIP to build capacity for designing and delivering high quality environmental practices training for EPWP programme and other short courses / skills programmes (as recommended in this document for other SETA contexts).

HET CURRICULUM INNOVATION: ADVANCED DIPLOMA IN ENVIRONMENTAL EDUCATION, TRAINING AND SKILLS DEVELOPMENT and MASTERS DEGREES IN ENVIRONMENTAL EDUCATION, TRAINING AND SKILLS DEVELOPMENT to support curriculum innovation; new lecturer training; course design and adequate responses to the skills demands of a green economy and sustainable development of South Africa. This area is currently neglected in the Education and Training System. Most environmental education qualifications in HETs only focus on schooling, and curriculum innovation is needed to broaden capacity to offer environmental education in other contexts to adequately service the breadth of the NQF.

ENVIRONMENTAL EDUCATION AND TRAINING SKILLS PROGRAMMES (e.g. environmental course design, environmental education methods and approaches; environmental issues and risks etc.) for sector training providers to integrate the environmental driver into various sector skills programmes.

CAREER GUIDANCE focussing on environmental education and training career opportunities

environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

**Integrating the Environmental Driver into Sector Skills Plans: An Enabling Document for All SETAS**
**July 2010**

***Prepared by the DEA and its National Environmental Skills Planning Forum for discussions with SETAs within the currently changing SETA landscape. The focus is to clarify, with SETAs, what the implications of government priorities (MTSF Goal 9 – sustainable use of Natural Resources) are for Sector Skills Planning under NSDSIII***

# Finance, Accounting, Management Consulting & other Financial Services SETA (FASSETA)

## The Environmental Driver

The environmental driver must be integrated into all Sector Skills Plans, for two reasons. Firstly, government departments aim to promote a green growth path that is environmentally sustainable, has a low carbon footprint, and is pro-labour creation. By pursuing green growth South Africa could benefit from the opportunities opened up by global and local green economic activity, eco-innovations and green jobs. Many industries have seen the need to both optimise environmental opportunities and to avoid environmental risks, and require associated skills.

Secondly, the sustainable use and management of natural resources is a national priority outlined in the *Medium Term Strategic Framework*, MTSF 2009-2014 (Goal 9). It is a state priority to implement the *National Sustainable Development Framework*, with attention to the protection and fair distribution of scarce water resources; to food security and rural livelihoods; integrated environmental management and the protection of biodiversity; energy efficiency; and mitigating the risks of climate change, particularly to the most vulnerable members of society.

## How is Sustainable Natural Resource Use and Management (MTSF Goal 9) relevant to the FASSET SETA?

With increasing resource shortages, recognition of the climate change related risks, and awareness of global environmental disasters, the financial sector is actively including environmental risk assessments and analysis in their core functioning. Climate change adaption and mitigation considerations in particular are coming to the fore in many business decisions. Environmental considerations are regarded as relevant to auditing and asset management, and more stringent reporting processes documenting environmental due diligence are coming to be expected. Organisations such as KPMG are contributing to climate change debates and financing, and are joining others in running internal sustainability training programmes. There is increasing pressure for organisations within the sector to consider international initiatives such as the ‘Equator Principles’; these have

already been adopted by five of South Africa's leading banks. Clearly, companies in the sector are starting to recognise that environmental sustainability is a key concern, not only as a state priority, but also in terms of core business endeavours of finance, both locally and abroad, and this creates new skills needs.

### How is a green growth path relevant to the FASSET SETA?

- Green Branding - As green consumer awareness and pressure grows internationally, green branding (or eco-labelling) is becoming popular in many sectors, including finance. Nedbank Group, for example, has developed a strong profile as an environmentally conscious bank that does business sustainably, from financing to office management to its CSR investment focus. These companies are using their environmental orientation to develop niche products and services, and leverage their environmental brand within a range of platforms. Developing the understanding and skills to utilise the branding potential of green business is thus becoming important.

- Sustainable asset management - Sustainable asset management practices are becoming increasingly important considerations, as are the risks associated with natural assets in particular. Governance, taxation and risk assessment are all impacted by global environmental trends and events, and asset managers and risk assessors are placed under more pressure to meet the adoption of these practices.

- Eco-offices - Financial institutions, like many other organisations, have started to bring sustainability practices into their daily office management. Recycling, waste reduction, energy conservation and conversion to electronic correspondence are areas of particular importance to the financial sector. In support of this trend, sustainable office management skills are becoming sought after within the sector, as are green procurement and strategic planning skills. Investec, for example, has adopted a 'green-office' plan, integrating sustainability practices into their daily functioning. Coupled with this trend is a need for staff with the basic knowledge and skills to maintain eco-offices on a daily basis. Managers and office staff must gain the skills to efficiently maintain these systems and to translate organisational policy into practice; this in turn requires environmental training skills on the part of in-house trainers and consultants.

- E-waste - The generation of e-waste is a growing concern in industries that are largely dependent on electronic communication and networks. Globally, e-waste is gaining more attention, with companies being under increasing pressure to develop and adopt environmentally sound procurement decisions and end-of-life waste disposal practices.

- Sustainability indexes - There is an emerging awareness within many companies of issues of transformation and sustainability, and the need to consider and align with international best practice targets. To meet the need to measure successful adoption, sustainability indexes have begun to emerge, ranging from tools such as the international 'Equator Principles' impacting on the banking sector, to the Socially Responsible Investment Index developed by the JSE in South Africa.

- Sustainability reporting - There is a growing demand for diligent sustainability reporting. Global reporting standards have increasingly integrated sustainability practices into their criteria for best practice, and in South Africa the King III report argues strongly for the full integration of environmental considerations with the economic and social aspects of sustainability. Companies in a number of sectors, including finance and banking, are involved in sustainability reporting, and require associated skills.

### RECOMMENDED CROSS CUTTING PROGRAMME: CRITICAL SKILLS

**Short courses and HET Module Innovations for Skill Level 5:** for Directors; CEOs, Entrepreneurial Business Managers; Business Training Managers; Training and Development Professionals; Risk Assessors; Environmental Consultants and other relevant occupations.

- Module in MBA programme: Environmental ethics and sustainable development business practices
- Short course: Sustainability reporting; SRI; GRI; Carbon Disclosure; King III
- Short course: Green Fiscal Reforms
- Short course: Environmental Auditing
- Short course: Green investment; Carbon Trading and Environmental Economics
- Short course: Climate change risk and opportunity assessment
- Short course: Eco-office and e-waste management and green procurement

## INTERVENTIONS TO ADDRESS SCARCE SKILLS

| OFO Code | Occupation (SCARCE SKILL) | Job titles | Recommended Interventions Based on Scarce & Critical Skills |
|---|---|---|---|
| 224 301 | Economist (Skill Level 5) | Development finance project analyst, Environmental economist, Labour market economist, Research economist; Resource economist (including Natural resource economists). | HET Pivotal programme: Environmental / resource economics |
| 224 103 | Statistician (Skill Level 5) | Statistical Analyst | HET Pivotal programme: Environmental statistics analyst |
| 221 205 | Auditor (Skill level 5) | Environmental auditor, compliance officer | HET: Environmental auditing |

## RECOMMENDATIONS FOR RESEARCH AND INNOVATION

CARBON TRADING IMPLICATIONS FOR SKILLS DEVELOPMENT IN THE FASSETA CONTEXT: Little is known of the possible implications of carbon training for the financial services sector in South Africa. Mechanisms for using carbon trading benefits are poorly understood and require a more sophisticated understanding. The skills that are required to participate critically in the carbon trading system, in ways that benefit the South African people, need to be more fully understood. A research project focussing on skills needed to participate in the carbon trading economy will be important to position South African financial services organisations in this rapidly emerging, complex and contested terrain.

ENVIRONMENTAL ECONOMICS FOR GREEN GROWTH: There is a need to understand the scope and extent of the need for environmental economists in South Africa, as explained by this paragraph from the Treasury (submitted to inform this Enabling Document):

> "*One of the critcal skills needed is Environmental Economics. Although the strategy identifies modelling impacts of environmental change as a gap, a step before this is the need for understanding market failures. Pollution is an example of a market failure as the costs of pollution are not included in the price of polluting goods and services. Hence, economic policy instruments such as taxes and tradable permits may be used to factor in these costs and influence producer and consumer decisions. These policy instruments are covered in courses on environmental economics".*

## PROPOSED FLAGSHIP PROGRAMMES

HET CURRICULUM INNOVATION AND PIVOTAL PROGRAMME: ENVIRONMENTAL ECONOMICS TRAINING: Undertake an investigation to establish the scope of provision for training environmental economists in South Africa (supply); and establish projected demand for environmental economists. Offer bursaries and curriculum innovation programme for the development of environmental economics as discipline in South African HET. This may require lecturer training.

ENVIRONMENTAL EDUCATION AND TRAINING skills development programme for providers to integrate the environmental driver into the sector's skills development system.

CAREER GUIDANCE focusing on environmental economics; natural resource economics and green fiscal reform careers (e.g. environmental taxes)

environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

# Integrating the Environmental Driver into Sector Skills Plans: An Enabling Document for All SETAS

**July 2010**

***Prepared by the DEA and its National Environmental Skills Planning Forum for discussions with SETAs within the currently changing SETA landscape. The focus is to clarify, with SETAs, what the implications of government priorities (MTSF Goal 9 – sustainable use of Natural Resources) are for Sector Skills Planning under NSDSIII***

## Energy (and Water) SETA

### The Environmental Driver

The environmental driver must be integrated into all Sector Skills Plans, for two reasons. Firstly, government departments aim to promote a green growth path that is environmentally sustainable, has a low carbon footprint, and is pro-labour creation. By pursuing green growth South Africa could benefit from the opportunities opened up by global and local green economic activity, eco-innovations and green jobs. Many companies have seen the need to both optimise environmental opportunities and to avoid environmental risks, and they require associated skills.

Secondly, the sustainable use and management of natural resources is a national priority outlined in the *Medium Term Strategic Framework*, MTSF 2009-2014 (Goal 9). It is a state priority to implement the *National Sustainable Development Framework*, with attention to the protection and fair distribution of scarce water resources; to food security and rural livelihoods; integrated environmental management and the protection of biodiversity; energy efficiency; and mitigating the risks of climate change, particularly to the most vulnerable members of society.

### How is a green growth path relevant to the Energy (and Water) SETA?

Energy and water management in South Africa are directly impacted by the environmental driver in ways that involve both opportunities and risks. For example:

- Given the significant risk of being unable to adequately provide for the South Africa economy's energy needs, the Department of Minerals and Energy have set reduction of energy demand at 12% by 2015. Renewable and alternate sources of energy, coupled with an emphasis on energy efficient building design have become key priorities in this sector. Examples include Gas to Electricity Generation Projects which extract gas from landfill sites to help generate electricity (e.g. eThekwini Municipality). The required innovations require new skills: in research and development; new technologies (production and application); procurement, generation and management.

- Industries and businesses aiming to reduce their environmental impact by minimising their waste stream or carbon footprint, becoming water neutral, or simply reducing production (water and electricity) costs, are becoming significant drivers of a shift towards green energy and the search for eco-technologies and innovations to 'do more with less'. **Energy and water efficiency** requires re-skilling across all occupations, and large companies are implementing programmes to involve all occupations in reducing energy and water use and consumption.

- A shift towards clean and renewable energy and a low carbon future is a key component of greening the economy, as it requires substantial investment (in people, research and financial resources) in new technologies and systems. As such it has creates new economic and job creation opportunities, and it has significant skills requirements (e.g. skills to design, develop, produce, install and service renewable energy generation plants or energy efficient devices, as has been shown by the need for technical skills necessary for solar water heater installation in South Africa).

## How is Sustainable Natural Resource Use and Management (MTSF Goal 9) relevant to the Energy (and Water) SETA?

- Scarce natural resource - Through the processes of energy generation, strain is exerted on scarce water resource (used in coal fire stations). Freshwater is also affected by acid rain caused by the sulphur and nitrous oxides that are of by-products of coal fire power generation. These by-products, along with CO2 and others, also contribute to the accelerated greenhouse effect and associated climate change, which may have far reaching effects on economic activities and the livelihoods of vulnerable groups in society. Various industrial activities from mining to agriculture reduce the quality of South Africa's freshwater resources. While these development activities have an impact on the natural resource base, such impacts can be minimised with improved management practices, and new technologies (e.g. biotechnology is being used to treat waste water in the mining industries, and some mines are recycling and re-using this water after such treatment). Solutions do exist, and they provide new opportunities for development, job creation and innovation towards a more sustainable approach to development where end-of-pipe problems are anticipated and reduced. Government is therefore encouraging industries to reduce their carbon emissions, and to be more energy efficient, and to use manage their use of water resources to prevent pollution, and contamination of water sources. Systems of cleaner production are being encouraged, and the Department of Trade and Industry and Science and Technology are, for example supporting research to produce cleaner production innovations.

  Water is a particularly scarce resource in South Africa and already a constraining factor in development. While many Water Management Areas in the country have already allocated all available freshwater resources, there are also many households without easy access to a regular supply of potable water. In addition, there is need for an Ecological Reserve in order to keep freshwater systems in rivers, wetlands and estuaries intact, so that they can keep supporting livelihoods, economic activity and biodiversity, in the long run. The Department of Water Affairs has conceptualised an approach to water management that foregrounds the importance of managing **water for development** in

South Africa. Without adequate management of water resources, development will be compromised. With innovative water management approaches, development opportunities can be expanded.

- Research into eco-efficient energy production, green technologies such as wind farms, water harvesting, soil conservation measures, and carbon trading must be stepped up, along with research into the potential and risks of using nuclear energy, biofuels and other alternate energy sources. Research and technology innovations must be shared to change practice. If successful, the sector can create new significant numbers of new 'green' jobs.

- Environmental risks - South Africa remains one of the highest emitters of Greenhouse Gas $CO_2$ per capita in the world. $CO_2$ and smoke emitted are of serious concern to residents living near industrialised areas, e.g. Vanderbijlpark in Gauteng. Alternate and cleaner fuels and cleaner energy production methods need to be sought to reduce gas emissions, and to ensure the health of vulnerable communities living in polluted areas. Air quality management and monitoring has been identified as a 'scarce skill' by the DEA. Household air pollution caused by the heavy reliance on wood, paraffin and other sources of energy, particularly in poor households, creates a significant health risk, and environmental health education is needed, together with alternative energy resource innovations.

- Sustainability reporting - there is a growing demand for diligent sustainability reporting. Global reporting standards have increasingly integrated sustainability practices into their criteria for best practice, and the King III report argues strongly for the full integration of environmental considerations with the economic and social aspects of sustainability. Companies in a number of sectors, including manufacturing, finance, banking and engineering, as well as mining, are involved in sustainability reporting, and require associated skills.

## PROPOSED CROSS-CUTTING PROGRAMMES: CRITICAL SKILLS

Short course and PIVOTAL programmes for Skill Level 4 & 5 (Director; Business Training Managers; Mechanical, Civil and Environmental Engineers; Sustainability Managers; Project Managers; Research and Development Managers; Policy Analysts and Statisticians (modellers); Environmental Scientists; Earth and Atmospheric Sciences Technicians (Water and Soil Technician; Waste Water Treatment Officer / Technician; Water Resources Technical Officer); Environmental Science Technicians.

Energy and Water:

- Sustainable Development Principles and Planning
- Climate Change Risk and Opportunity Assessment
- Integrated and Adaptive Environmental Management
- Risk modelling and managing for uncertainty

Energy:

- Innovations to reduce household air pollution and health risks
- Business opportunities for a low carbon economy
- Alternative Energy Technologies (e.g. Solar; Biofuels etc.) potential; risk; investment; returns
- Carbon reduction, capture and storage; carbon trading – risks and benefits
- Energy efficiency
- Air Quality Monitoring (for environmental officers / environmental science technicians in local government and relevant industries)

Water:

- Leadership and Management: strategic, financial and developmental skills are required in municipalities. Developmental skills relate to municipalities' role in LED and poverty reduction.
- Water for Development – Integrated, Sustainable and Adaptive Management Approaches
- Water quality monitoring (for environmental science technicians in local government and relevant industries).
- Water treatment plant operation
- Water use and setting reserves: water resources management
- **Research skills –** effective ways to deliver potable water to a growing population, environmentally friendly sanitation services, sustainable water resource management and governance

Short course for Skill level 2 (Water Inspector; Community Health Facilitators):

- Water quality monitoring and reporting
- Health and Hygiene (water, household air quality)

## RECOMMENDED PROGRAMMES TO ADDRESS SCARCE SKILLS

| OFO Code | Occupation (SCARCE SKILL) | Job titles | Recommended Interventions Based on Scarce & Critical Skills |
|---|---|---|---|
| 224 301 | Economist (Skill Level 5) | Environmental Economist | BURSARIES<br>HET PIVOTAL PROGRAMME |
| 233 101 | Chemical Engineer (Skill Level 5) | Energy Engineer;<br><br>Energy Services Engineer;<br><br>Environmental (Water, Air, Soil) Engineer | HET CURRICULUM INNOVATION & HET PIVOTAL PROGRAMMES:<br>Solar power and renewable energy technologies: Solar Water Heater Production and Installation; Clean coal technologies, Carbon Capture and Storage; Energy options for a low carbon economy<br>Energy efficiency technologies<br>Water quality management and pollution control |

| | | | |
|---|---|---|---|
| 233 102 | Chemical Engineering Technologist (Skill Level 5) | Energy Technologist; Environmental (water, air, soil) Technologies | BURSARIES<br>HET PIVOTAL PROGRAMMES AND CURRICULUM INNOVATION |
| 233 201 | Civil Engineer (Skill Level 5) | Biosystems Engineer;<br><br>Environmental Engineer<br><br>Water engineers | BURSARIES<br>HET PIVOTAL PROGRAMMES AND CURRICULUM INNOVATION<br>Clean energy technologies - Biofuel development<br><br>NOTE: In 2007 3000 civil engineers were required for the water sector |
| 233 202 | Civil Engineering Technologist (Skill Level 5) | Biosystems Technologist;<br><br>Environmental Technologist | BURSARIES<br>HET PIVOTAL PROGRAMMES AND CURRICULUM INNOVATION<br>Clean Energy Technology;<br>Biotechnology |
| 234 303 | Environmental Research Scientist (Skill Level 5) | Air Pollution Analyst | BURSARIES<br>HET PIVOTAL PROGAMMES<br>Smart meters and monitoring tools (critical skill) |
| | Water Scientists (Skill Level 5) | Microbiologist<br>Biochemists<br>Analytical chemists<br>Liminologist<br>Hydrologist hydraulics, hydrogeology and geology; water purification sciences | BURSARIES<br>HET PIVOTAL PROGRAMMES (particularly to place and retain graduates in public sector): **Microbiology** (*study microbes in relation to water quality*), biochemistry, analytical chemistry, **limnology** (*true scarcity – skill to determine how much water can be extracted so there is still an ecological reserve*), **hydrology** (*to predict flow regimes e.g. in relation to climate change*), hydraulics, hydrogeology and geology; water purification sciences. |
| 234 903 | Meteorologist (Skill Level 5) | Atmospheric Scientist;<br>Climate Scientist;<br>Climatologist; | BURSARIES<br>HET PIVOTAL PROGRAMMES<br>Long range modelling skills (critical skill) |

| | | | |
|---|---|---|---|
| 311 901 | Earth and Atmospheric Science Technician (Skill Level 4) | Air Quality Technician<br>Water and Soil Technician<br>Waste Water Treatment Officer / Technician<br>Water Resources Technical Officer | BURSARIES<br>HET PIVOTAL PROGRAMMES<br>HET Innovation – especially at Universities of Technology<br>FET Curriculum Innovation in Environmental Practices (to provide foundational programmes for this occupational category in UoTs).<br><br>4000 water technicians and artisans are required urgently |
| 311 903 | Environmental Science Technician (Skill Level 4) | Conservation Scientific Officer;<br><br>Environmental Technical Officer | BURSARIES<br><br>HET PIVOTAL PROGRAMMES<br><br>HET Innovation - to develop energy and water related technical skills<br><br>FET College Curriculum and Programme Innovation - Environmental Practices |
| 312 907 | Chemical and Biochemical Engineering Technician (Skill Level 4) | Energy Technician | HET INNOVATION – especially at Universities of Technology |
| | Health and Hygiene Practitioners and Educators / Facilitators (level 2-4) | | This scarcity is acute in Rural Areas.<br><br>HET PIVOTAL PROGRAMME (level 2-4) Learnership for Public Environmental Health (Citizen Science and Sustainability / Healthy Living / Healthy Environment) in Rural Areas as development programme for Youth |

## PROPOSED RESEARCH AND INNOVATION INTERVENTIONS

HET CURRICULUM INNOVATION – PARTICULARLY IN FET COLLEGES AND UNIVERSITIES OF TECHNOLOGY: to address water and energy technical skills gaps

NEW ENERGY TECHNOLOGY / GREEN ENERGY JOBS SKILLS ASSESSMENT: Undertake a full study to assess the skills development demands associated with a low carbon economy and the emergence of new energy technologies – link this to Green Economy studies on new energy future development opportunities

## PROPOSED FLAGSHIP PROGRAMMES

HET PIVOTAL PROGRAMME SKILLS FOR CLIMATE MODELLING AND MONITORING – emphasis on long range modelling, risk assessment and reporting

HET PIVOTAL PROGRAMME: ENGINEERS FOR A NEW ENERGY FUTURE

HET PIVOTAL PROGRAMME: ENGINEERS FOR SUSTAINABLE WATER MANAGEMENT

ENVIRONMENTAL TECHNICAL SKILLS DEVELOPMENT PROGRAMME – WITH UNIVERSITIES and UNIVERSITIES OF TECHNOLOGY focussing on water quality management / water plant operation management – ensure long term offering of qualifications for these technical skills

FET CURRICULUM INNOVATION: Environmental Practices Level 1, 2 and 3 Qualifications – for Energy and Water Technologies (linked also to waste, pollution control and biodiversity technical skills).

ACCESS PROGRAMME: HEALTHY LIVING, HEALTHY ENVIRONMENT LEARNERSHIP for community health workers and community learning facilitators on environmental health, hygiene and sustainability practices, with components such as:

- Build and live safe
- *Clean hands/ sanitation*
- Feeding the family/optimum nutrition/hygiene/food gardening
- Fuel safety in the home/living with electricity
- *Healthy environment, healthy community*
- Keeping the air clear
- *Ways with waste, etc*

Implement this programme in partnership with Dept of Health, Dept of Environmental Affairs, Dept of Water Affairs, municipalities and NGOs for Skill level 2, 3. **Note**: This programme must be supported by skills development for **Environmental Health Practitioners** to supervise the Community Health and Hygiene Workers.

ENVIRONMENTAL EDUCATION AND TRAINING skills development programme for providers to integrate the environmental driver into the sector's skills development system.

CAREER GUIDANCE focusing on low carbon development careers and water management careers

environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

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# Manufacturing, Engineering and Related Services SETA (MERSETA)

## The Environmental Driver

The environmental driver must be integrated into all Sector Skills Plans, for two reasons. Firstly, government departments aim to promote a green growth path that is environmentally sustainable, has a low carbon footprint, and is pro-labour creation. By pursuing green growth South Africa could benefit from the opportunities opened up by global and local green economic activity, eco-innovations and green jobs. Many industries have seen the need to both optimise environmental opportunities and to avoid environmental risks, and require associated skills.

Secondly, the sustainable use and management of natural resources is a national priority outlined in the *Medium Term Strategic Framework*, MTSF 2009-2014 (Goal 9). It is a state priority to implement the *National Sustainable Development Framework*, with attention to the protection and fair distribution of scarce water resources; to food security and rural livelihoods; integrated environmental management and the protection of biodiversity; energy efficiency; and mitigating the risks and impacts of climate change, particularly to the most vulnerable members of society.

## How is a green growth path relevant to the MERSETA?

Manufacturing, engineering and all related services associated with MERSETA are all directly impacted by the environmental driver in ways that involve both opportunities and risks. For example:

Companies have started to compete for market shares created by environmental consumer consciousness. For example, the focus on South Africa's Electric Car, and the introduction of green-technologies and vehicles (such as the Toyota Prius, and the recently introduced Honda Civic Hybrid) into the local and export markets are growing, with increasing public pressure and desire for more affordable green solutions.

With the increasing international focus on automotive export in the country, and growing demand for eco-friendly vehicles internationally, local skills are needed to meet and reflect this need. This need is already reflected in the inclusion of the productions of South Africa's Electric Car in the Industrial Policy Action Plan (IPAP), identified as a key driver within the sector. An extension of this is the production of green-components, which South Africa already has the capacity to produce.

Green-motoring skills are relevant to contributing to four of the major driving programmes identified in the IPAP2 and through the National Tooling Initiative (NTI), including:

- Skill and expertise development (particularly skills associated with design and manufacturing of green-components and associated with South Africa's Electric Car);
- Capacity Expansion, SMME and BBBEE Structuring (providing potential new niche businesses and focus areas for new and growing companies);
- Technology re-capitalisation (offering opportunity for innovative design and production of new green technologies); and
- Competitiveness improvement and export development (tapping into the rising international trend towards green technologies).

Skills to meet these key areas have already been identified as critical skills shortages, especially in the high-end skills ranges, concerned with development, innovation, design and engineering. This is mirrored, for example, by the development and allocation of professional development points within membership organisations such as the Engineering Council for green design and development of technologies, as well as through implementation of green-approaches in engineering professions.

The retail Motor Industry Strategy mirrors these demands by highlighting the need for innovation and an increase in corresponding skills development.

## How is Sustainable Natural Resource Use and Management (MTSF Goal 9) relevant to the MERSETA?

With an increasing focus on climate change and ways to reduce carbon emissions internationally, the automotive industry has been placed under pressure to develop technologies and processes that address carbon emissions issues. South Africa has set ambitious emission reduction targets.

Waste minimisation and resource efficiency: Industries are aiming to reduce their environmental impact through product stewardship initiatives that use resources more efficiently and sustainably, thus cutting medium and long term costs, and gaining marketing opportunities. ISO14000 standards are widely used, and foster international competiveness, where environmental concerns, are reflected in trade regulations. Cleaner production approaches, and industrial ecology approaches (where waste is minimised through re-use innovations) are expanding in South African industries. New waste management policy requires that South Africa move towards a zero waste future, through avoidance approaches to waste management. This requires re-skilling, as most waste management to date has been focussed on solving end-of-pipe problems.

Sustainability reporting: There is a growing demand for diligent sustainability reporting. Global reporting standards have increasingly integrated sustainability practices into their criteria for best practice, and the King III report argues strongly for the full integration of environmental considerations with the economic and social aspects of sustainability. Companies in a number of sectors, including manufacturing, finance, banking and engineering, as well as mining, are involved in sustainability reporting, and require associated skills.

## RECOMMENDED CROSS CUTTING PROGRAMMES: CRITICAL SKILLS

Short courses for skill level 4/5 (Managers, Safety, Health and Environmental Managers, Business Training Managers; Research and Development Managers; Resources Managers; Industrial designers and engineers; Sustainability Managers)

- Sustainable Production and Consumption (including Cleaner Production)
- Environmental / Green Technology Research – new trends
- Waste Minimisation and Re-use (Industrial Ecology)
- Integrated and Adaptive Environmental Management
- Sustainable Development Planning and Climate Change Risk and Opportunity Assessment for Manufacturing and Retail Industries
- Sustainability Reporting and Trade Benefits – Export Development in a low carbon development environment
- Green Procurement

Short courses for skill level 1-3

- Environmental Practices and Environmental Health and Safety
- Waste Minimisation and Energy Efficiency

## RECOMMENDED PROGRAMMES TO ADDRESS SCARCE SKILLS

| OFO Code | Occupation (SCARCE SKILL) | Job titles | RECOMMENDED INTERVENTIONS |
|---|---|---|---|
| 233 102 | Chemical Engineer (skill level 5) | Energy Engineer;<br>Energy Services Engineer;<br>Environmental (Water, Air, Soil) Engineer | BURSARIES<br>HET PIVOTAL PROGRAMMES – for Water and Environmental Engineers: Cleaner Production / waste water treatment / biotechnology |
| 233 102 | Chemical Engineering Technologist (Skill Level 5) | Energy Technologist<br>Environmental (water, air, soil) Technologist | BURSARIES<br>HET PIVOTAL PROGRAMMES: Cleaner Production; Industrial Ecology; Energy Efficiency and Waste Minimisation / re-use |
| 233201 | Civil Engineer (skill level 5) | Environmental Engineer; | BURSARIES<br>HET PIVOTAL PROGRAMMES – Green Technologies / Renewable Energy Technology / Sustainable Design (critical skills) |

| | | | |
|---|---|---|---|
| 139 902 | Environmental Manager (Skill Level 5) | Pollution & Waste Group Manager | HET Curriculum Innovations (including Universities of Technology)<br>• Waste Minimisation, re-use and avoidance technologies |
| 233 504 | Industrial Engineering Technologist (Skill Level 5) | Value Engineering Technologist<br>Process Design Technologist<br>Manufacturing Logistics Technologist | BURSARIES<br>HET PIVOTAL PROGRAMMES<br>Low energy design and green technology innovations;<br>Waste minimization and re-use innovations – linked to SMME development<br>Cleaner Production and Sustainable Consumption Designs and Processes |
| 234 303 | Environmental Research Scientist (Skill Level 5) | Air pollution Analyst; Water Quality Analyst; Environmental Auditor | BURSARIES<br>HET PIVOTAL PROGRAMMES<br>Industrial Environmental Management & Cleaner Production / Energy, Water and Waste Efficiency |

## PROPOSALS FOR RESEARCH AND INNOVATION

**GREEN JOBS ANALYSIS:** Undertake a comprehensives study to scope new green jobs in the manufacturing and services sector, with emphasis on skills required to service the value chain associated with new product development.

**SKILLS FOR RESOURCE EFFICIENCY, WASTE MINIMISATION AND RE-USE:**
Scope the skills development requirements to support resource efficiency, waste minimization and re-use capacity in the manufacturing and services sector, with specific emphasis on skills for entrepreneurship and SMME (BEEE) development opportunities. Quantify savings to companies associated with resource efficiency, waste minimization and re-use, making the business case for such skills development.

## PROPOSED FLAGSHIP PROGRAMMES

- NEW PRODUCT DEVELOPMENT (e.g. GREEN CAR) SKILLS DEVELOPMENT VALUE CHAIN: Assess the skills needs for Green Car development all along the value chain and put 'joined up' skills development strategy in place for this – including short courses, HET pivotal programmes and HET curriculum innovations.
- RESOURCE EFFICIENCY, WASTE MINIMISATION AND RE-USE SKILLS DEVELOPMENT WORKPLACE LEARNING TRAINING PROGRAMME (CROSS CUTTING ACROSS MANUFACTURING AND SERVICES SETA): Short course programme for all companies, with monitoring and evaluation strategy to assess impact of skills programme on company 'bottom line' savings to demonstrate the value of environmental training and resource efficiency in the sector, with CAREER GUIDANCE
- ENVIRONMENTAL EDUCATION AND TRAINING skills development programme for providers to integrate the environmental driver into the sector's skills development system.


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# Health SETA

## The Environmental Driver

The environmental driver must be integrated into all Sector Skills Plans, for two reasons. Firstly, government departments aim to promote a green growth path that is environmentally sustainable, has a low carbon footprint, and is pro-labour creation. By pursuing green growth South Africa could benefit from the opportunities opened up by global and local green economic activity, eco-innovations and green jobs. Many industries have seen the need to both optimise environmental opportunities and to avoid environmental risks, and require associated skills.

Secondly, the sustainable use and management of natural resources is a national priority outlined in the *Medium Term Strategic Framework*, MTSF 2009-2014 (Goal 9). It is a state priority to implement the *National Sustainable Development Framework*, with attention to the protection and fair distribution of scarce water resources; to food security and rural livelihoods; integrated environmental management and the protection of biodiversity; energy efficiency; and mitigating the risks and impacts of climate change, particularly to the most vulnerable members of society.

## How is a green growth path relevant to the Health SETA?

**The value of knowledge** - Protecting environmental health requires that we develop a better understanding of the relationship between environmental conditions and health outcomes. Medical treatment alone does not equate to a sustainable public health policy, especially if environmental exposures that are associated with health risks are not also addressed and prevented. Integrating an understanding of environmental conditions impacting on public health broadens the scope of information available to identify and implement prevention strategies. Understanding the links between a healthy environment and a healthy public will enable higher levels of public well-being.

**Mitigating the health impact of industrial activity** – Industries like agriculture, transport, mining, chemical manufacturing and energy production create jobs and wealth but also

impact the health of workers and in some instances the public, and as a result they also have cost implications. These costs have in the past been externalised (i.e. not borne by the company), but increasingly measures like sustainability reporting and environmental costing/accounting are putting pressure on companies to account for these environmental health impacts; SHE regulations to safeguard worker health are complemented by environmental laws such as the National Environmental Management Act, Air Pollution Act and National Water Act. Companies not complying with these can face charges and a reduction in share values if their environmental health impacts become public. Skills in workers training, management, monitoring, compliance and enforcement are required.

**Reducing risk and the cost of health care** – Air pollution, water borne diseases and pathologies associated with exposure to toxic substances like pesticides, cost the country millions of rands each year in direct medical costs and lost productivity. Implementing polices and enforcing legislation aimed at protecting the workforce and the general public has the potential to reduce health costs significantly. This requires adequate numbers and levels of skills in the enforcement not only of health regulations, but also of environmental laws and environmental health regulations.

Skills to develop and implement innovative environmental health strategies offer the opportunity to pre-empt disease and illness outbreaks, and provide a pro-active means to support general good health before the onset of disease. Engaging with environmental health through focusing on environmental health of resources, including water and air quality, provide an opportunity to build resilience within the public, and to provide a stronger health base from which to fight disease.

## How is Sustainable Natural Resource Use and Management (MTSF Goal 9) relevant to the Health SETA?

**HIV/AIDS** - There are multiple links between natural resource use and HIV/AIDS. Limited access to and degradation of natural resources make rural women and children more vulnerable to exploitation that can lead to HIV/AIDS infections; families living with the disease may be forced to put greater pressure on natural resources as this may become their only source of income and/or survival; communities affected by HIV/AIDS are also not able to provide adequate stewardship of their natural resources (e.g. preventing soil erosion) as this requires the strength and knowledge of healthy adults; this in turn puts food security at greater risk.

**Food security** - There are similar ‘vicious cycle’ links between the vulnerability of rural, displaced and urban-edge communities and the degradation and depletion of natural resources like water, soil, medicinal plants and trees used for fuel. Climate change and the predicted increase in extreme events (more droughts and fires, more floods) is an additional consideration reducing food security and increasing vulnerability to destitution and ill health. Skills are needed to husband the soil and other natural resources, protect water sources, and grow food crops with low-cost methods, with due adaptation to the risks of climate change. These skills are necessary to increase families’ food security, reduce the vulnerability of women and children in particular, and build resilience to disease among all.

**Water and disease** - The impact of polluted water on public health is an ongoing concern in South Africa. The impacts of water pollution and contamination on public health have been well documented, with effects ranging from diarrhoea – a major source of death among children under five - to the rapid spread of cholera which affects all ages. Conversely, clean water is an acknowledged promoter of good health and disease prevention. Skills to prevent pollution and maintain clean water supplies, and skills to educate the public in doing so, are therefore key contributors to an integrated approach to maintaining good public health.

**Air quality** - Poor air quality poses significant risk to public health and costs the country millions each year in health care. This is especially true in impoverished communities whose respiratory health is impacted by burning wood, low grade coal and waste as sources of fuel and warmth. Public education skills are necessary to build a better understanding of air pollution to create an informed public enabled to make changes to their daily lives.

**Waste** - Incorrect disposal of waste is an important contributor to health risks affecting the public. Good waste management is imperative to good health, and requires a range of progressive and innovative skills. This is especially true in the context of limited municipal waste disposal services in many areas in South Africa, but the health risks from poorly maintained landfill sites, or the indiscriminate disposal of hazardous waste like batteries, are also significant. There are an increasing number of green waste disposal companies emerging in larger urban areas, and an emerging focus on recycling and reusing of waste. Additionally, new innovations for green waste management are starting to appear in the local market. For example, large supermarket chains such as Pick'N Pay have begun to facilitate disposal of hazardous e-waste, batteries and LED lights. Skills to facilitate public practices in good waste management are needed to optimise the benefits from these innovations, as are corresponding skills for waste manager and health workers.

**Education, training and extension** - All the above signals the need for innovation and the development of new curricula in health and related FET and HET programmes, and for stepped-up, up-to-date health extension for all sectors of the public.

## RECOMMENDED CROSS CUTTING PROGRAMMES: CRITICAL SKILLS

Short courses for skill level 4/5 (for Safety, Health and Environmental Managers; Managers; Quality Assurance Officers and Auditors; Training Practitioners; Health workers and Community Health Workers)

- Environmental Health and Safety – risk reduction and prevention (waste, water, pollution, air pollution etc.)
- Integrated and adaptive environmental management for environmental health and safety
- Environmental Quality Control and Risk Management
- Community-based environmental health practices for healthy living
- Environmental health and well being – pro-active approaches to ensuring well being
- Environmental Policy and Legislation for Public Health and Well-being

## RECOMMENDATIONS TO ADDRESS SCARCE SKILLS

| OFO Code | Occupation (SCARCE SKILL) | Job titles | RECOMMENDED INTERVENTIONS |
|---|---|---|---|
| 251 301 | Environmental Health Officer (Skill Level 5) | Health Inspector<br>Health Surveyor | HET PIVOTAL PROGRAMMES:<br>Environmental Policy and Legislation<br>Environmental Health monitoring and compliance |
| 312 601 | Safety Inspector (Skill Level 4) | Safety Health Environment Quality Inspector | HET INNOVATION:<br>Environmental Health and Well-being<br>Environmental legislation and compliance monitoring and enforcement |
| 599 510 | Environmental Practices Inspector (Skill Level 2 | | FET PROGRAMME:<br>National Certificate Environmental Practices ( level 2;3;4) – Competence in identifying localised environmental health problems e.g. inadequate household water and sanitation and indoor air pollution, and effective responses |
| | Environmental Educators (relative scarcity) | Community environmental educator / learning facilitator | ACCESS PROGRAMME / LEARNERSHIP<br>Environmental Education / Environmental Health Practices Learnership focusing on Public Environmental Health issues and responses. |

## RECOMMENDATIONS FOR RESEARCH AND INNOVATION

Research implications of climate change on environmental health, and associated skills development needs

COMMUNITY-BASED ENVIRONMENTAL HEALTH EDUCATION and FACILITATION PROGRAMMES. Research the scope and range of community-based environmental health issues in different contexts – rural and urban, and the scope and numbers of community environmental educators / learning facilitators / health practitioners working on these issues, and their skills development needs. The ESSP research (DEA, 2010) indicated that large numbers of Not for Profit Organisations are working in this area (with up to 33 000 employees), but little is known of their skills development needs.

## PROPOSED FLAGSHIP PROGRAMMES

ACCESS PROGRAMME: HEALTHY LIVING, HEALTHY ENVIRONMENT LEARNERSHIP for community health workers and community environmental health learning facilitators on environmental health and sustainability practices, with components such as:

- Build and live safe
- Clean hands/sanitation
- Feeding the family/optimum nutrition/hygiene/food gardening
- Fuel safety in the home/living with electricity
- Healthy environment, healthy community
- Keeping the air clear
- Ways with waste, etc

This programme can be developed in partnership with Dept of Health, Dept of Environmental Affairs, Dept of Water Affairs, municipalities and NGOs. Skill level 2, 3.

ENVIRONMENTAL EDUCATION AND TRAINING skills development programme for provisioning of training to integrate the environmental driver into the sector's skills development system.

CAREER GUIDANCE focussing on environmental health careers

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# Chemical Industries SETA (CHIETA)

## The Environmental Driver

The environmental driver must be integrated into all Sector Skills Plans, for two reasons. Firstly, government departments aim to promote a green growth path that is environmentally sustainable, has a low carbon footprint, and is pro-labour creation. By pursuing green growth South Africa could benefit from the opportunities opened up by global and local green economic activity, eco-innovations and green jobs. Many industries have seen the need to both optimise environmental opportunities and to avoid environmental risks, and require associated skills.

Secondly, the sustainable use and management of natural resources is a national priority outlined in the *Medium Term Strategic Framework*, MTSF 2009-2014 (Goal 9). It is a state priority to implement the *National Sustainable Development Framework*, with attention to the protection and fair distribution of scarce water resources; to food security and rural livelihoods; integrated environmental management and the protection of biodiversity; energy efficiency; and mitigating the risks and impacts of climate change, particularly to the most vulnerable members of society.

## How is a green growth path and MTSF Goal 9 relevant to the CHIETA?

The chemical industries are directly impacted by the environmental driver in ways that involve both opportunities and risks. The CHIETA Sectoral Analysis indicates that various roleplayers have recognised this, and the need to develop environmental skills in the sector has been clearly identified, as follows.

- **Resource sustainability at risk** - A large percentage of chemical industries are directly dependent on sourcing and sustaining natural resources (liquid fuels, organic chemicals, rubber, glass and other components used in production). Ensuring sustainable availability and consumption of natural resources is becoming an ever-increasing challenge within the local and international markets, with much effort being focused on reducing impact and increasing sustainability and life span of resource sources. Specific skills are needed

to manage access and consumption processes affecting these resources, as well as strategic planning and impact reduction skills to optimise extracted resources.

- **Cleaner production** - Skills for developing and implementing cleaner production cycles have been identified, for example in the petroleum sub-sector.
- **Recycling and carbon emission reduction** - Skills associated with reducing carbon emissions, as well as increasing end product recycling have been highlighted by the glass sub-sector. Both of these integrate with scarce resource procurement and management, especially linked to resources such as clean water, coal and natural gasses.
- **Green brands** - A more eco-conscious consumer body means that green cleaning agents, green fuels and safe and anti-animal cruelty cosmetics are in increasing demand in both the local and export markets. Pressure on these sub-sectors is increasing as demand for 'eco-products' grows. Already there are multiple ranges of cleaning and cosmetic ranges offering 'green-product ranges. Currently these products are poorly regulated or regulated by private green labels only.
- **Green jobs** – There is a need to support skills associated with the emergence of 'green jobs', including specialised roles linked with environmental health and for environmental quality monitoring.
- **Sustainability reporting** - there is a growing demand for diligent sustainability reporting. Global reporting standards have increasingly integrated sustainability practices into their criteria for best practice, and the King III report argues strongly for the full integration of environmental considerations with the economic and social aspects of sustainability. Companies in a number of sectors, including manufacturing, finance, banking and engineering, as well as mining, are involved in sustainability reporting, and require associated skills.

## CROSS CUTTING RECOMMENDATIONS: CRITICAL SKILLS

Short courses for Skill level 5: Directors; CEOs; SHE managers; Sustainability Managers; Environmental Consultants; Business Training Managers; Engineering Managers; Project Managers; Specialist Professionals

- Principles of Sustainable Development and Cleaner Production
- Green Engineering, Green Chemistry and Green Technology – trends and new opportunities
- Biotechnology and NanoTechnology for Sustainable Development
- Climate Change Risk and Opportunities Assessment
- Environmental risk and impact: prevention and management
- Toxic Waste: Minimisation, Treatment and Avoidance

## RECOMMENDED PROGRAMMES TO ADDRESS SCARCE SKILLS

| Code | Occupation & Skill Level | Job titles (Scarce Skills) | Recommended Interventions Based on Scarce & Critical Skills |
|---|---|---|---|
| 233 101 | Chemical Engineer (Skill Level 5) | Environmental (Water, Air, Soil) Engineer<br>Crude Oil, Coal and Petrochemicals Engineer<br>Catalytic Processing Engineer<br>Biochemical Engineer | BURSARIES<br>HET PIVOTAL PROGRAMMES<br><br>Green Chemical Engineering; Biotechnology; Effluent management; impact mitigation and reduction |
| 233 102 | Chemical Engineering Technologist (Skill Level 5) | Biochemical Technologist<br>Environmental (water, air, soil) Technologist<br>Petrochemicals Technologist | BURSARIES<br>HET PIVOTAL PROGRAMMES<br><br>Green Engineering Technical Skills; Cleaner Production; Biotechnology; Effluent management; impact mitigation and reduction |
| 312 907 | Chemical and Biochemical Engineering Technician (Skill Level 4) | Biochemical Technician<br>Catalytic Processing Technician<br>Energy Technician | BURSARIES<br>HET PIVOTAL PROGRAMMES<br><br>Effluent management; impact mitigation and reduction |
| 139 902 | Environmental Manager (Skill Level 5) | Pollution & Waste Group Manager<br>Contaminated Sites Manager<br>Land and Water Manager | BURSARIES<br>HET PIVOTAL PROGRAMMES<br><br>Risk prediction; impact assessment, effluent management, sustainable resource sourcing ; green procurement; cleaner production; waste minimization |
| 234 303 | Environmental Research Scientist (Skill Level 5) | Environmental Auditor<br>Environmental Scientist<br>Environmentalist | BURSARIES<br>HET PIVOTAL PROGRAMMES<br><br>Risk prediction; cleaner production; impact assessment; green procurement; waste minimization |

| | | | |
|---|---|---|---|
| 311 903 | Environmental Science Technician (Skill Level 4) | Environmental Technical Officer | BURSARIES<br><br>HET PIVOTAL PROGRAMMES<br>Environmental monitoring (chemical pollution etc.) |

## PROPOSALS FOR RESEARCH AND INNOVATION

Implications of new green chemistry, nanotechnology and biotechnology developments for skills development programmes.

## PROPOSED FLAGSHIP PROGRAMMES

GREEN CHEMICAL ENGINEERING AND SUSTAINBLE DEVELOPMENT HET PIVOTAL PROGRAMME & HET INNOVATIONS PROGRAMME: To address scarce skills in new engineering and product development areas.

CLEANER PRODUCTION, WASTE MINIMISATION AND RISK AVOIDANCE TRAINING PROGRAMME FOR ALL INDUSTRIES AFFILIATED TO CHIETA

ENVIRONMENTAL EDUCATION AND TRAINING skills development progrmame for providers to integrate the environmental driver into the sector's skills development system.

CAREER GUIDANCE focussing on green chemistry; environmental biotechnology, nanotechnology etc.

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# Mining SETA

## The Environmental Driver

The environmental driver must be integrated into all Sector Skills Plans, for two reasons. Firstly, government departments aim to promote a green growth path that is environmentally sustainable, has a low carbon footprint, and is pro-labour creation. By pursuing green growth South Africa could benefit from the opportunities opened up by global and local green economic activity, eco-innovations and green jobs. Many companies have already seen the need to both optimise environmental opportunities and to avoid environmental risks, and they require associated skills.

Secondly, the sustainable use and management of natural resources is a national priority outlined in the *Medium Term Strategic Framework*, MTSF 2009-2014 (Goal 9). It is a state priority to implement the *National Sustainable Development Framework*, with attention to the protection and fair distribution of scarce water resources; to food security and rural livelihoods; integrated environmental management and the protection of biodiversity; energy efficiency; and mitigating the risks and impacts of climate change, particularly to the most vulnerable members of society.

## How is a green growth path relevant to the Mining SETA?

Mining can benefit from eco-efficient innovations and other green technologies, to improve energy efficiency and to reduce the risks associated with its waste stream. Green technologies produce cost savings for the sector in the longer term, and can reduce its environmental footprint. These are the innovations which make up ‘the green economy’ and by supporting them, the mining sector can once again be an important driver of economic and skills development in South Africa. The sector needs to tap into existing programmes but must also drive eco-innovations to ensure that they serve the needs of the mining sector. Examples are use of biotechnologies to treat contaminated water; and to use rehabilitation activities for value adding products/ SMME development. Climate change adaptation and mitigation actions may affect coal and uranium mining and the sector needs to participate in

an informed manner in related strategic planning. The SETA needs to investigate associated skills needs for research, management, technician and entry-level worker occupations.

### How is Sustainable Natural Resource Use and Management (MTSF Goal 9) relevant to the Mining SETA?

Mining is a backbone industry and employment creator in South Africa, but the sector has also been noted for its environmental footprint ranging from biodiversity loss (due to habitat destruction), to air, land and water pollution (e.g. acid mine drainage). Developing South Africa's natural resources in a way that is sustainable and does not degrade environmental quality in an unwarranted manner, are state priorities reflected in the *National Sustainable Development Framework*. Legislation exists for environmental impact assessments (to inform new developments), waste stream reduction and pollution control, rehabilitation of mined areas and the restoration of spent mines. Adhering to this legislation has cost implications but also creates opportunities for employment and employment re-direction (new green jobs and greening existing jobs). The associated skills needs are important considerations for this SETA.

In addition, there is a growing demand for diligent sustainability reporting. Global reporting standards have increasingly integrated sustainability practices into their criteria for best practice, and the King III report argues strongly for the full integration of environmental considerations with the economic and social aspects of sustainability. Companies in a number of sectors, including manufacturing, finance, banking and engineering, as well as mining, are involved in sustainability reporting, and require associated skills.

## PROPOSED CROSS CUTTING PROGRAMMES: CRITICAL SKILLS

***Short courses for Skill Level 5:*** *Managers; Sustainability Managers; Environmental Scientists and Constultants; Training Managers;*

- New technologies (e.g. environmental biotechnology) for environmental management, rehabilitation and waste water treatment
- Environmental policy, ethics and sustainable development business practices (including sustainability reporting; carbon disclosure etc.)
- Energy and resource efficiency measures
- Mine rehabilitation and restoration, disaster management and environmental risk mitigation
- Climate change risk and opportunity assessment

***Short courses for Skill level 1-3:*** *Workers and operations managers*

- Environmental Health and Safety and basic environmental literacy
- Basic environmental practices; including energy and resource efficiency; risk prevention and mitigation

## RECOMMENDED PROGRAMMES TO ADDRESS SCARCE SKILLS

| OFO Code | Occupation (scarce skill) | Job titles (Scarce Skills) | Recommended Interventions Based on Scarce & Critical Skills |
|---|---|---|---|
| 234 303 | Environmental Research Scientist (Skill level 5) | Environmentalist; Environmental auditor; Environmental scientist; Land degradation analyst Climate change specialists | BURSARIES<br>HET PIVOTAL PROGRAMMES<br>Waste Water treatment (using biotechnology); Acid mine Drainage; Risk predictions and modeling systems; Climate Change specialists; Biodiversity & Rehabilitation Specialists |
| 234 401 | Geologist (Skill level 5) | Geo-Scientist; Geomorphologist; Hydro-Geologist | BURSARIES<br>HET PIVOTAL PROGRAMMES<br>Acid mine Drainage; environmental modeling |
| To be further investigated. Given the reduction in environmental staff in the mining sector, the assumption is that there are no related scarce skills. However, scarce skills *servicing the mining sector* may remain a problem. For example there appears to be a scarcity of climate change risk and opportunity assessment skills; biotechnologists with capacity to deal with waste water and rehabilitation problems in the mining sector etc. The mining sector has also indicated a lack of capacity in public sector staff for approving environmental management plans. | | | |

## PROPOSED RESEARCH AND INNOVATION

Environmental biotechnology skills for addressing mine waste water problems, and rehabilitation issues.

Public sector skills programmes for assessing and approving environmental management plans (EMPRs) in the mining sector.

## PROPOSED FLAGSHIP PROGRAMMES

PUBLIC SECTOR PROGRAMME: Skills programme for public sector employees to assess environmental management plans and requests in the mining sector

ENVIRONMENTAL BIOTECHNOLOGY SKILLS for new innovations in the mining sector

RESOURCE EFFICIENCY TRAINING integrate energy and resource efficiency into mining practices; including new waste management legislation training

ACCESS PROGRAMME: Basic environmental literacy, environmental practices and environmental health training for workers

ENVIRONMENTAL EDUCATION AND TRAINING skills development programme for trainers to integrate the environmental driver into the sector's skills development system.

CAREER GUIDANCE on environment and sustainability management options in mining

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# Wholesale and Retail SETA (W&R SETA)

## The Environmental Driver

The environmental driver must be integrated into all Sector Skills Plans, for two reasons. Firstly, government departments aim to promote a green growth path that is environmentally sustainable, has a low carbon footprint, and is pro-labour creation. By pursuing green growth South Africa could benefit from the opportunities opened up by global and local green economic activity, eco-innovations and green jobs.

Secondly, the sustainable use and management of natural resources is a national priority outlined in the *Medium Term Strategic Framework*, MTSF 2009-2014 (Goal 9). It is a state priority to implement the *National Sustainable Development Framework*, with attention to the protection and fair distribution of scarce water resources; to food security and rural livelihoods; integrated environmental management and the protection of biodiversity; energy efficiency; and mitigating the risks and impacts of climate change, particularly to the most vulnerable members of society.

## How is a green growth path relevant to the W&R SETA?

Many companies have already seen the need for environmentally sustainable business practices, to optimise environmental opportunities and to avoid environmental risks. The eco-labelling/ eco-accreditation of produce and products are used for marketing purposes, e.g. organic cotton, organic foods, low emission vehicles and appliances, energy efficient electric goods, bio-friendly chemicals, sustainably produced paper and recyclable packaging, to name a few. With this growing range of ‘green goods’, growing niche markets are captured. The skills implications encompass the entire value change and include suppliers, marketing and advertising staff, procurement and point of sale staff, service divisions and management. Trade regulations also have a big impact on environmental goods and services production.

## How is Sustainable Natural Resource Use and Management (MTSF Goal 9) relevant to the Wholesale & Retail SETA?

There is pressure on companies to show that they use resources like water and energy efficiently and sustainably, that they are minimising waste and lowering their contributions to climate change (emissions of greenhouse gases). Companies listed on the JSE are reporting on their triple bottom line (sustainability reporting). This includes the eco-footprint of their suppliers (cleaner production, cradle to grave and product stewardship approaches). Companies are also starting to consider the eco-footprints of their transport fleets and retail outlets, e.g. refrigeration, lighting and packaging. Sustainability reporting is taking on increasing prominence locally and globally. Thus there are widespread skills implications across the business value chain. New waste management legislation requires that companies adopt a waste avoidance approach. This requires value chain re-skilling as waste management approaches in South Africa have previously been oriented towards end of pipe waste problem solving, rather than avoidance, reduction, and re-use approaches.

## RECOMMENDED CROSS CUTTING PROGRAMMES: CRITICAL SKILLS

Short courses for Skill level 4/5: for Directors; CEOs; Managers; Entrepreneurial Business Managers; Commodities traders; Advertising, marketing and sales managers; Marketing and Communications Strategists; Supply and distribution managers; Training and Development Practitioners; Occupational Instructors:

- Green growth, the emerging green economy and green trade regulations
- Sustainable production and consumption
- Environmental ethics and sustainable business practices
- Integrated and adaptive environmental management in the wholesale and retail sector
- Environmental entrepreneurship and new niche business development opportunities
- Climate change risk and opportunity assessment

## RECOMMENDED PROGRAMMES FOR SCARCE SKILLS

Learnership environmental enterprise development; including recycling enterprise development

## RESEARCH AND INNOVATION

GREEN JOB STUDY, focusing on environmental enterprise development and new niche area development (for SMMEs)

## RECOMMENDED FLAGSHIP PROGRAMMES

Learnership for environmental enterprise development, including recycling enterprise development (skill level 2-4), with CAREER GUIDANCE in this area

Training programme on new waste management policy and avoidance approaches

ENVIRONMENTAL EDUCATION AND TRAINING skills development programme for training providers to integrate the environmental driver into the sector's skills development system.

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# Insurance SETA (INSETA)

## The Environmental Driver

The environmental driver must be integrated into all Sector Skills Plans, for two reasons. Firstly, government departments aim to promote a green growth path that is environmentally sustainable, has a low carbon footprint, and is pro-labour creation. By pursuing green growth South Africa could benefit from the opportunities opened up by global and local green economic activity, eco-innovations and green jobs. Many industries have seen the need to both optimise environmental opportunities and to avoid environmental risks, and they require associated skills.

Secondly, the sustainable use and management of natural resources is a national priority outlined in the *Medium Term Strategic Framework*, MTSF 2009-2014 (Goal 9). It is a state priority to implement the *National Sustainable Development Framework*, with attention to the protection and fair distribution of scarce water resources; to food security and rural livelihoods; integrated environmental management and the protection of biodiversity; energy efficiency; and mitigating the risks and impacts of climate change, particularly to the most vulnerable members of society.

## How is the environmental driver relevant to the INSETA?

Environmental issues such as climate change and associated natural disasters such as floods, droughts and wild fires are vital considerations to the insurance industry.

Companies and individuals who invest in sustainable natural resource use (reduction in waste, pollution, greenhouse emissions and water and energy use) are likely to be more profitable and secure, particularly in the longer term. For example a hotel or guesthouse that invests in alternative energy sources (solar heaters) and water and energy saving devices are less likely to be adversely affected by water restrictions and electricity cuts. Businesses and individuals who on the other hand ignore environmental legislation, by-laws

and guidelines present a high risk. For example, building a restaurant or residence within the 10 year flood line, is a high risk investment that should only be insured at high cost. Farmers who take climate change predictions into account and invest in drip irrigation (for example) are more likely to succeed than those who don't. Property owners who fail to clear highly flammable invasive alien trees from their land expose themselves and others to increased risk of damage by runaway fires.

The insurance industry can play a vital role in educating the public and businesses about environmental risks and natural disasters and how they can affect their properties and profits. The industry can also form partnerships with suppliers of green technologies that save natural resources and reduce risks, as well as research groups involved in forecasting climate change trends and informing adaptation and mitigation measures.

Increasing numbers of organisations are also placing more focus on sustainability reporting and indexes, with the public becoming more concerned with the environmental risk, prediction and mitigation. Reflecting this, global reporting standards have increasingly integrated sustainability practices into their criteria for best practice. For example, the South African Institute of Chartered Accountants (SAICA) and various business schools offer sustainability reporting training accredited by the Global Reporting Initiative (GRI). Similar trends are reflected into a variety of other sectors, including mining, finance, banking, manufacturing and engineering.

## RECOMMENDED CROSS CUTTING PROGRAMMES: CRITICAL SKILLS

**Short courses and/or PIVOTAL PROGRAMMES for skill level 5:** Directors; CEOs; Managers; Actuaries, statisticians, modellers; Financial investment advisors and managers; Marketing advisors and managers;

- Environmental risk and vulnerability assessment, modelling and mitigation planning
- Natural disasters: Prediction, Prevention, Management, and Disaster Impact Reduction
- Climate change risk and opportunity assessment
- Environment and Sustainability practices and risk reduction
- Sustainability Reporting
- Environmental policy, legislation and bylaws

Access and Short course programmes for skill level 1-3:

- Alien invasive clearing, coastal zone protection and disaster reduction environmental practices training (e.g. water wise and fire wise contractor training)
- Fire and disaster management workers
- Wetland and riverine rehabilitation worker training for flood damage control and water security

## PROGRAMMES TO ADDRESS SCARCE SKILLS

BURSARIES AND HET PIVOTAL PROGRAMMES FOR

- Environmental Economists and Natural Resource Economists
- Climate Change Specialists and Long Range Modellers
- Environmental Risk Assessors (with integrated and adaptive environmental management expertise)
- Disaster Managers, with Sustainability Management Skills

LEARNERSHIPS FOR FIRE AND DISASTER MANAGEMENT WORKERS and OPERATIONS SUPERVISORS – for skill level 1-3

## PROPOSED PROGRAMMES FOR RESEARCH AND INNOVATION

Study to assess skills needs for longer term, sustainable approaches to environmental risk reduction, mitigation and management (including climate change risks and natural disasters)

## PROPOSED FLAGSHIP PROGRAMME

SKILLS PROGRAMME for skill level 5: environmental risk assessment, modelling, prevention and response

PIVOTAL HET PROGRAMMES: Natural disaster prediction, mitigation and response training and internships

LEARNERSHIP for fire and disaster management workers (skill level 1-3)

ENVIRONMENTAL EDUCATION AND TRAINING skills development programme for training providers to integrate the environmental driver into the sector's skills development system.

CAREER GUIDANCE to promote careers in environmental risk reduction and management


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**July 2010**

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# Information, Communications & Technology (ICT) SETA

## The Environmental Driver

The environmental driver must be integrated into all Sector Skills Plans, for two reasons. Firstly, government departments aim to promote a green growth path that is environmentally sustainable, has a low carbon footprint, and is pro-labour creation. By pursuing green growth South Africa could benefit from the opportunities opened up by global and local green economic activity, eco-innovations and green jobs. Many industries have seen the need to both optimise environmental opportunities and to avoid environmental risks, and they require associated skills.

Secondly, the sustainable use and management of natural resources is a national priority outlined in the Medium Term Strategic Framework, MTSF 2009-2014 (Goal 9). It is a state priority to implement the National Sustainable Development Framework, with attention to the protection and fair distribution of scarce water resources; to food security and rural livelihoods; integrated environmental management and the protection of biodiversity; energy efficiency; and mitigating the risks and impacts of climate change, particularly to the most vulnerable members of society.

## How is a green growth path relevant to the ICT SETA?

**Driving and serving eco-innovation** - Developing eco-innovations and new green technologies for cleaner production, renewable energy sources, energy efficiency, water saving devices, and 'doing more with less', requires research, design, product development, new software, hardware, information management and associated skills. For example, producing electronic motor vehicles, requires new computer programmes and systems. Developing more energy-efficient computers, that produce fewer toxic waste products upon disposal, can form an important element of the anticipated global wave of eco-innovations.

South Africa needs to participate in this global trend, both as consumer and as producer. *It will require a massive investment in associated skills to do so optimally*. Already there is a considerable shortage of ICT staff. The green economy could provide the innovation drive and employment boost that would warrant greater investment in ICT skills production.

**Green IT management and procurement** - Strategies for green business management and procurement are becoming increasingly important to companies in the sector, both locally and internationally. For example, IBM corporation has developed and adopted a Sustainability Procurement programme, which takes a wide-lens approach to supply chain management that includes reducing water use, waste, energy use and the use of toxic materials. In addition, IBM has integrated sustainability practices into their daily operations, adopted regulatory requirements guiding sustainability practices, engaged in biodiversity stewardship programmes and adopted e-waste reduction processes. These processes are similarly reflected by companies such as Microsoft, who are engaging in best practice initiatives to mitigate the environmental impacts of the sector on natural resources globally. King III includes a focus on Green IT.

### How is Sustainable Natural Resource Use and Management (MTSF Goal 9) relevant to the ICT SETA?

**Monitoring and managing natural resources** - Improving the protection and management of natural resources such as energy, water, land, marine and coastal resources (such as fishing stocks) requires research and monitoring for adaptive management and regulation. Such monitoring and research activity require high and intermediate level ICT skills. *The combination of environmental knowledge and ICT knowledge is a recognised scarce skill* (e.g. in biodiversity monitoring and research). Among the skills required are: climate change modelling and forecasting; ecosystem modelling; modelling of natural resource use (e.g. stocks of marine and coastal resources) and forecasting; biodiversity monitoring, database development and information management; curation of research collections; software developers and systems analysts for all the above.

**E-waste** – South Africa's National Sustainable Development Framework and National Environmental Management Act (NEMA) emphasise the constitutional principle of an environment not detrimental to human health, and the need to reduce the waste stream. The generation of e-waste is a growing concern in industries that are largely dependent on electronic communication and networks. Globally, e-waste is gaining more attention, with companies placed under increasing pressure to develop and adopt environmentally sound methods of both electronic goods procurement and end-of-life waste disposal. Industry leaders such as Microsoft and Hulett Packard have begun to implement e-waste programmes within the sector. An opportunity exists to re-skill and up-skill local communities to specialise in e-waste disposal and processing.

## RECOMMENDED CROSS CUTTING PROGRAMMES – CRITICAL SKILLS

Short courses for Skill level 4/5: ICT systems analyst and programmers; Multimedia specialists and web developers; Software and applications programmers; Database and systems administrators; Miscellaneous Sales; ICT managers

- Sustainable development business principles and ICT
- Environmental research and support from ICT professionals (including conservation and sustainability monitoring, modeling and statistical mapping using ICTs)
- Short course - Safe disposal and reclamation of e-waste
- Eco-innovation & Green ICT – design, software, hardware and management (e.g. low energy designs)
- Career guidance: Focus on careers that combine environmental and ICT skills, and associated study opportunities

## RECOMMENDED PROGRAMMES FOR SCARCE SKILLS

| Code | Occupation & Skill Level | Job titles | Recommended Interventions Based on Scarce & Critical Skills |
|---|---|---|---|
| 261 101<br>261 102 | ICT systems analyst and programmer (Skill level 5) | Systems analyst / designer, data analysis advisor, data management advisor / specialist, GIS analyst, project manager methods consultant | PIVOTAL programmes (HET) to develop these scarce skills including programmes that combine environmental courses with ICT courses<br>Career guidance: Careers that combine environmental & ICT skills, and associated study opportunities |
| 261 202 | Multimedia specialists and web developers (Skill level 5) | Information architect software and hardware | PIVOTAL programmes (HET and FET) including programmes that combine environmental courses with ICT courses<br>Career and study guidance as above. |
| 261 302 | Software and applications programmers (Skill level 5) | Programmer, applications developer, data architect / modeler / miner, database architect, database developer, software developer / programmer, systems operator | PIVOTAL programmes (HET and FET) to develop these scarce skills including programmes that combine environmental courses with ICT courses<br>Career guidance: Careers that combine environmental & ICT skills, and associated study opportunities |
| 261 303 | Software and applications programmers (skill level 5) | Software engineer, applications integrator, systems integration manager, GIS technician, database designer, information services specialist, computing engineer | PIVOTAL programmes (HET and FET) to develop these scarce skills including programmes that combine environmental courses with ICT courses<br>Career guidance: Careers that combine environmental & ICT skills, and associated study opportunities |
| 262 101 | Database and systems administrators (skill level5) | Database operator, data management facilitator, ICT knowledge manager | PIVOTAL programmes (HET and FET) including programmes that combine environmental courses with ICT courses<br>Career and study guidance as above. |

## PROPOSED RESEARCH AND INNOVATION PROGRAMMES

New HET programmes that combine environmental and ICT skills – particularly ICTs for monitoring; modeling and statistical mapping of issues

## PROPOSED FLAGSHIP PROGRAMMES

ACCESS PROGRAMME: Safe disposal and reclamation of e-waste (Skill level 1, 2, 3)

PIVOTAL HET PROGRAMME: Interdisciplinary programme in Earth and ICT Sciences (Skill level 5)

PIVOTAL HET PROGRAMME: Interdisciplinary programme in Life and ICT Sciences (Skill level 5)

ENVIRONMENTAL EDUCATION AND TRAINING skills development programme for training providers to integrate the environmental driver into the sector's skills development system.

CAREER GUIDANCE to promote ICT and environment career options


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# Transport SETA (TETA)

## The Environmental Driver

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## How is a green growth path relevant to the TETA?

Transport operations at local and national levels are directly affected by the environmental driver in ways that involve both opportunities and risks. For example, road networks and effective public transport systems play a major role in South Africa's socio-economic development, but also give rise to environmental risks such as ecological disruption, public health risks (associated with vehicle emissions in built-up areas) and accelerated climate change (through greenhouse gas emissions). Environmental impact assessments are required for all new roads and maintenance of road developments. Public transport systems help to alleviate congestion and over-production of emissions in urban areas. Such systems require new governance systems, sustainable urban and transport planning and longer term strategic planning, as well as skills to manage public transport networks efficiently and sustainably. Martime (ocean) transport also has a high environmental impact, particularly in

carbon emissions, as well as pollution risks (e.g. oil spills). This requires an understanding of maritime legislation and disaster and pollution risk management. To engage with these risks, transport companies have started to integrate environmental management systems into their daily operations. Transnet, Metrorail and Avis are examples of such companies.

**Habitat destruction and biodiversity loss** - toxic and other hazardous substances transported by sea, rail or road pose threats not only to human health, but also to ecological systems such as grasslands, rivers, wetlands and the ocean. Oil spills can have devastating effects on marine ecosystems and affect fisheries, coastal resources and tourism facilities. It is also very costly to mitigate and 'clean up' the impacts. Construction of new roads can compromise biodiversity and ecosystem services linked to other socio-economic sectors such as eco-tourism and food production, as well as human health, water quality and so on. Environmental Impact Assessment (EIA) regulations aim to protect against unwarranted impacts and it is thus vital that they are well understood and effectively applied in the transport sector.

**Air Quality -** According to the World Health Organisation vehicle emissions are a significant contributor of urban air pollution. As urbanisation increases, more sustainable transportation option will be necessary to reduce pressure on the roads, and to reduce air quality impacts from increases in emissions that become more extensive as vehicle traffic increases. Examples are the *Gautrain*, and the MetroRail networks. These require operation skills, sustainable transport planning skills.

**Atmospheric changes** - It is estimated that global road transport contributes approximately 14.6% of total Greenhouse Gas emissions via vehicle exhaust fumes. The accumulation of Greenhouse Gases in the atmosphere is the primary driver of the accelerated Greenhouse Effect and associated global climate change, which place ecosystems and weather patterns at indeterminate but serious risk. Road vehicles aside, aircraft emit massive amounts of $CO_2$ per flight and release other gases that have disproportionate but short-term effects on the planet's climate. The transport sector is thus a key player alongside agricultural and other industrial sectors which are already pioneering new technologies and practices to mitigate impacts. Examples are public vehicles that use biofuels. Experience in places such as India have shown that running public transport (e.g. buses) on clean technology fuels significantly improves the air quality in urban areas where traffic congestion is high.

## RECOMMENDED CROSS CUTTING PROGRAMMES: CRITICAL SKILLS

Short courses for Skill level 4/5: General Manager Public Service; Business Training Managers: Policy and Planning Manager; Research and Development Manager; Programme or Project Manager; Engineering Manager; Transport Engineers; Urban Planners; Municipal Managers

- Sustainable Development Planning
- Sustainable Urban Planning (emphasis on sustainable transport systems planning)
- Climate Change risk and opportunity assessment for the transport sector ]
- Environmental impact management and alternative technologies for the transport industry

- Sustainability reporting
- Air and water quality control and monitoring; resource efficiency
- Environmental risk assessment, prevention and mitigation

Short courses for skill level 1-3

- Environmental literacy and environmental practices for the transport industry

## RECOMMENDED PROGRAMMES TO ADDRESS SCARCE SKILLS

| OFO Code | Occupation (SCARCE SKILLS) | Job titles | Recommended Interventions Based on Scarce & Critical Skills |
|---|---|---|---|
| 233 201 | Civil Engineer (Skill Level 5) | Transportation and Urban Planning Engineer, Transport Engineer | HET PIVOTAL PROGRAMMES:<br>Modules/short courses:<br>Environmental impact management,<br>Integrated environmental management,<br>Environmental planning and design,<br>Environmental Risk assessment |
| 233 202 | Civil Engineering Technologist (Skill Level 5) | Transportation and Urban Planner Technologist | Modules/short courses:<br>Environmental impact management,<br>Integrated environmental management,<br>Environmental planning and design,<br>Environmental Risk assessment,<br>Air and water quality control and monitoring |
| 234 303 | Environmental Research Scientist (Skill Level 5) | Environmental Advisor | Modules (HET):<br>Sustainable transport systems<br>Air and water quality control and monitoring<br>Climate change impacts<br>Environmental impact management |

## RECOMMENDATIONS FOR RESEARCH AND INNOVATION

- Research options for sustainable transport development and associated skills development needs

## PROPOSED FLAGSHIP PROGRAMMES

- SKILLS PROGRAMME: Sustainable transport systems skills programme for leaders and managers in the transport industry
- SKILLS PROGRAMME: Environmental impact management for the transport industry
- ENVIRONMENTAL EDUCATION AND TRAINING skills development programme for training providers to integrate the environmental driver into the sector's skills development system.
- CAREER GUIDANCE to support environmental management and sustainable transport system development and management careers

environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

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# Manufacturing SETA

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Secondly, the sustainable use and management of natural resources is a national priority outlined in the *Medium Term Strategic Framework*, MTSF 2009-2014 (Goal 9). It is a state priority to implement the *National Sustainable Development Framework*, with attention to the protection and fair distribution of scarce water resources; to food security and rural livelihoods; integrated environmental management and the protection of biodiversity; energy efficiency; and mitigating the risks and impacts of climate change, particularly to the most vulnerable members of society.

## How is a green growth path relevant to the Manufacturing SETA?

Manufacturing is directly impacted by the environmental driver in ways that involve both opportunities and risks. For example:

- The drive for green goods creates significant new opportunities for manufacturers who have the skills to produce green technologies (such as solar heaters and catalytic converters), energy efficient and low-emission appliances and other electronics, recyclable goods, renewable batteries, and more. This drive consists of the need to be internationally competitive, to meet the demands of increasingly discernable customers, to meet environmental legislation requirements, to benefit from growing green and ethical investment trends, and to capture a slice of the national and global green economy.

- Manufacturers are increasingly competing for market shares created by environmental trade agreement pressures, changes in consumer patterns and by eco-labelling and accreditation programmes, and by environmental compliance. Manufacturers are pressurised by retailers who want to source products with a lower environmental footprint (product stewardship or cradle to grave approach) and products with eco-labelling, which create marketing and branding opportunities. Many manufactures have started to develop eco-ranges of products as well as pay more attention to sources, with a focus on greener/cleaner production and more responsible source harvesting and waste management. Examples include SAPPI's range of Triple Green products, and Woolworths' Organic Cotton and Bamboo textiles. International green labels such as Fair Trade and the Forest Stewardship Council (FSC) are increasingly significant to international and South African retailers and consumers. Eco-branding has become a way to create distinctive and niche product ranges providing manufacturers with a perceived business edge. Skills all along the value chain, from R&D to production and marketing, to optimise the development and manufacturing of green technologies and products, and to effectively market them, are thus very relevant for the sector.

- The recession combined with environmental pressures are motivating companies to cut medium and long term costs and comply with environmental legislation by reducing their environmental impact through product stewardship and the more efficient use of resources such as water and energy. Companies are finding that resource efficiency (reduction in energy and water use) is affecting the bottom line positively. Some companies are implementing company-wide energy and water efficiency education and training programmes.

### How is Sustainable Natural Resource Use and Management (MTSF Goal 9) relevant to the Manufacturing SETA?

- Many industries depend on a steady and affordable supply of water and energy consumption for production and manufacturing. The threat of water scarcity (higher demand) and rising costs of energy pose challenges to the sector in terms of increasing sustainability. Research into eco-efficient production and implementation of green technologies is a growing need, and the skills to support these approaches will need to be integrated into future skills development foci.

- A growing body of environmental legislation, under the umbrella of the National Environmental Management Act (NEMA), requires businesses to operate in an environmentally sustainable manner, to use the country's natural resources wisely and to limit negative environmental, health and social impacts. Complying with these principles and regulations, even when they are not adequately enforced, are examples of ethical business practice.

- Sustainability reporting – Global reporting standards have increasingly integrated sustainability practices into their criteria for best practice. In South Africa the King III report outlines the need to fully integrate environmental sustainability with the social and economic components of business.

## RECOMMENDED CROSS CUTTING PROGRAMMES: CRITICAL SKILLS

**Short courses for skill level 4/5:** Director; CEO; Managing Director; Entrepreneurial Business Manager; Research and Development Manager; Importer or Exporter; Manufacturer/ Factory Managers; Production Managers; Production Operations Supervisors; Industrial Engineers; Industrial Engineering Technologists; Training and Business Training Managers; Industrial Research Technician; Industrial researchers; Industrial line Management Technicians.

- Climate change risk and opportunity assessment
- Sustainable Development Planning and Reporting
- Strategic Environmental Management and Impact Assessments
- Green technology innovations and cleaner production
- Green Procurement
- Waste Minimisation and New Waste Management Policy
- Energy and resource use efficiency

## PROGRAMMES TO ADDRESS SCARCE SKILLS

HET PIVOTAL PROGRAMMES AND BURSARIES for Environmental Economists; Environmental Engineers; Cleaner Production Technologists

## RECOMMENDATIONS FOR RESEARCH AND INNOVATION

GREEN JOBS AND GREEN ECONOMY NICHE AREAS: skills development study – investigate new environmental niche areas and associated green jobs potential (e.g. manufacturing of solar water heaters; low energy cookers; etc.)

If the motor manufacturing industry is to be integrated with this SETA, a special programme is required to develop skills in the production of electric vehicles should be developed.

## PROPOSED FLAGSHIP PROGRAMMES

CROSS CUTTING SKILLS PROGRAMME: Energy and Water efficiency and waste avoidance approaches in the Manufacturing Sector

SKILLS PROGRAMMES on ECO LABELLING AND GREEN TRADE: Niche areas, opportunities and risks

LEARNERSHIP: ENVIRONMENTAL ENTREPRENEURSHIP and ENVIRONMENTAL ENTERPRISE DEVLEOPMENT for Youth and Unemployed (including recycling industries)

ENVIRONMENTAL EDUCATION AND TRAINING skills development programme for training providers to integrate the environmental driver into the sector's skills development

CAREER GUIDANCE to promote environmental careers in manufacturing


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# Safety and Security SETA (SASSETA)

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Secondly, the sustainable use and management of natural resources is a national priority outlined in the *Medium Term Strategic Framework*, MTSF 2009-2014 (Goal 9). It is a state priority to implement the *National Sustainable Development Framework*, with attention to the protection and fair distribution of scarce water resources; to food security and rural livelihoods; integrated environmental management and the protection of biodiversity; energy efficiency; and mitigating the risks of climate change, particularly to the most vulnerable members of society.

## How is a green growth path relevant to the SASSETA?

South Africa is struggling to meet the imperatives of development that is both socially just and environmentally sustainable. While economic liberalisation and deregulation have injected vitality into production, manufacturing and services, they have also created some environmental challenges, issues and risks. The degradation and/or depletion of environmental resources ultimately reduce economic development opportunities, and there is thus a need for appropriate legislative and enforcement mechanisms. South Africa has an sophisticated environmental policy and legislative framework, most of which is 'new' legislation following the promulgation of the National Environmental Management Act (1998). Compliance is therefore an important part of development, and all companies in South Africa have compliance responsibilities. The SASSETA needs to support pro-active

skills development to effectively and efficiently monitor and enforcement environmental legislation with long term (sustainable) development and social justice in mind.

### How is Sustainable Natural Resource Use and Management relevant to the SASSETA?

South Africa has an emerging legal framework that protects its natural resources such as clean air and water, indigenous medicinal plants, marine and coastal resources animals, and many more. It also has waste management legislation, pollution control legislation and air quality management legislation to protect public health. However, a barrier to effective management of environmental regulations is the skills for implementing, monitoring and enforcing laws and regulations. Officials at various levels in the Safety and Security sector are responsible for inspections, issuing of permits and other law enforcement functions, often without the necessary environmental knowledge. **Environmental management inspectors and environmental compliance officers** have been identified as a scarce skill in South Africa. There is inadequate training provision for these skills in the education and training system, and HET curriculum innovation is required. **Environmental lawyers** were also identified as being in scarce supply.

These officials need critical skills in applying provincial and national environmental legislation (e.g. waste and pollution regulations) as well as international laws (e.g. CITES, regulating trade in endangered species); in identifying species and in where to source information to solve environmental crimes. Accurately identifying the species of wildlife in trade, particularly when it is being transported as parts or processed derivatives, is notoriously difficult. Issues range from the vast uncontrolled domestic trade in indigenous medicinal plants, to the poaching of marine resources off the South African coast, and the activities of large industries. To make environmental law enforcement more effective a skills base is necessary with some basic technical environmental knowledge, and extensive knowledge of a range of environmental laws, combined with investigation, inspection and enforcement skills.

## RECOMMENDED CROSS CUTTING PROGRAMMES: CRITICAL SKILLS

Short courses for skill level 4/5: Solicitors; Lawyers, Attorneys; Detectives; Police Officer; Environmental Lawyers; Environmental Management Inspectors; Environmental Compliance Officers.

- Environmental policy and legislation
- International environmental conventions
- Compliance and environmental law enforcement
- Border policing
- Species identification & knowledge of endangered species
- Environmental trade laws

Short courses / PIVOTAL programmes for skill level 3:

- Environmental policy and legislation
- Community-based compliance monitoring and reporting

- Species identification and knowledge of endangered species and trade regulations

## PROGRAMMES TO ADDRESS SCARCE SKILLS

**NB: Environmental Compliance Officers; Environmental Management Inspectors; and Environmental Lawyers** are not included in the current OFO system, yet they are occupations that are in high demand.

BURSARIES, HET INNOVATION AND HET PIVOTAL programmes are needed to train an adequate supply of:

- Environmental Lawyers
- Environmental Management Inspectors
- Environmental Compliance Officers

(Form partnership with DEA who are already working on the training of Environmental Management Inspectors and Environmental Compliance Officers – to ensure that these initiatives are integrated into the systems of training provisioning within sustainable funding streams).

## PROPOSED RESEARCH AND INNOVATION INTERVENTIONS

OFO STUDY – undertake a study to include these occupations in the OFO list.

SUPPLY STUDY – undertake a comprehensive study to establish the extent to which HEIs are providing environmental law and compliance training. This should be integrated into law faculty offerings.

## PROPOSED FLAGSHIP PROGRAMMES

HET INNOVATION and HET PIVOTAL PROGRAMME for Training of Environmental Compliance Officers and Environmental Lawyers (skill level 4/5)

LEARNERSHIP: Environmental rangers / Community-based environmental compliance monitors with monitoring and law enforcement components, in partnership with DEA, Oceans and Coasts (formerly MCM), conservation agencies, municipalities, border police services, possibly FET colleges, Skill Level 3.

ENVIRONMENTAL EDUCATION AND TRAINING SKILLS DEVELOPMENT programme for legal trainers / lecturers to integrate / develop new specialist capacity to offer high quality environmental law and compliance training.

CAREER GUIDANCE to promote environmental law and compliance careers


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# Services SETA

## The Environmental Driver

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## How is a green growth path relevant to the Services SETA?

The services SETA is directly impacted by the environmental driver in ways that involve both opportunities and risks. For example:

- Green branding - Companies in the service industries have started to compete for market shares created by environmental consumer consciousness and by eco-labelling/ accreditation. Niche Green Services have started to emerge, with socio-environmental sustainability as a key branding strategy, as an emerging consumer consciousness starts impacting on the sector. Marketing services, general cleaning and beauty services, and events and conference services are examples of niche companies with a focus on green brands and eco-consciousness. There is a growing consumer interest in these products, and skills associated with innovative sustainability strategies will assist the

sector in further developing niche green brands. (See EcoFirms and Enviropaedia, two examples of green services directories.)

- Reducing resource-use - The Services SETA Pestel Analysis highlights the 'Green Revolution' as a sector-specific change driver. There is a shift towards eco-compliance within management. Companies are aiming to reduce their environmental impact through transforming their business and management practices. The more sustainable use of natural resources is providing a competitive edge within the sector. Recycling and eco-friendly products in particular are being adopted into best practice models within various sub-sectors, for example Printing and Eventing.

- Globalisation – There is a growing international concern for environmental sustainability, a global desire for green innovations in business and service provision, and a need to meet global standards while also addressing local needs, such as poverty alleviation and development; all these require a consideration of the skills needed to achieve levels of sustainability and eco-competence that adequately meet global standards and will enable South African companies to compete internationally while addressing and prioritising local sustainable development demands.

- Emerging 'green jobs' - There are growing calls for green advisory services, especially within a consultant capacity, indicating a need to support skills development to meet a growing need for professional input into greening strategies to service the sub-sectors. The ESSP research (DEA 2010) indicated that environmental services (SMMES) are a huge employer of environmental skills. Environmental services include conducting EIAs, supporting companies with green technology development; environment and sustainable development strategies; sustainability innovations and environmental enterprise development; environmental sciences; environmental training; recycling and waste management; risk assessments and many similar functions. This is burgeoning and fast growing area of the services sector.

## How is Sustainable Natural Resource Use and Management (MTSF Goal 9) relevant to the Services SETA?

- Sustainability reporting – Global reporting standards have increasingly integrated sustainability practices into their criteria for best practice. In South Africa the King III report outlines the need to fully integrate environmental sustainability with the social and economic components of business.

- Large numbers of service organisations are providing support for natural resources management functions such as rehabilitation; waste water treatment; recycling; energy efficiency and green technology development and installation. Environmental Impact Assessments are also a key service provided by SMMEs to all development organisations, and represent a significant employment category in the environmental field. The Environmental Goods and Services Forum projects a three fold growth in the Environmental Goods and Services Sector over the next five years (from current 1.2% of GDP). Environmental enterprise development, at SMME level, is therefore a growing area for new development and green jobs.

- Areas such as environmental journalism, environmental public education programmes and social marketing are also growing.

## RECOMMENDED CROSS CUTTING PROGRAMMES: CRITICAL SKILLS

Short courses for skill level 4/5: Advertising and public relations managers; Business training mangers; research and development managers; events managers; campaign organisers; photographers; print, radio and television journalists; technical writers; environmental consultants; environmental enterprise managers; marketing and communications strategists.

- Environmental ethics and public action
- Green branding and niche branding design
- Environmentally responsible social marketing
- Events greening and environmental enterprise development (e.g sustainable procurement; waste management and recycling; product development; public education etc.)
- Environmental enterprise development

Short courses for skill level 1-3:

- Community-based environmental journalism and reporting
- Events greening enterprise development
- Community learning facilitation (linked to greening of events, sustainable development issues in communities e.g. waste management)

## RECOMMENDATIONS FOR ADDRESSING SCARCE SKILLS

PIVOTAL PROGRAMME / LEARNERSHIP FOR SKILL LEVEL 2, 3, 4; ENVIRONMENTAL ENTERPRISE DEVELOPMENT focussing for example on initiatives to re-use waste, green events, community-based services (e.g. tree planting) etc.

## RECOMMENDATIONS FOR RESEARCH AND INNOVATION

GREEN JOBS STUDY – investigate the potential for green jobs in the Services Sector. Give attention to the possible need for new skills in the printing industry, where new printing technologies, new inks and various green paper formats are being used; as well as possibilities for green enterprise development linked to new practices such as events greening (consider greening of 2010 as example case).

## PROPOSED FLAGSHIP PROGRAMMES

SKILLS PROGRAMMES / LEARNERSHIP: Environmental Enterprise Development linked to Greening / Sustainability of Events (with focus on BEE, SMME and youth development opportunities)

HET INNOVATIONS: Environmental journalism modules in journalism qualifications

ENVIRONMENTAL EDUCATION AND TRAINING skills development programme for training providers to integrate the environmental driver into the sector's skills development system

CAREER GUIDANCE to promote environmental enterprise careers and green events management


**Integrating the Environmental Driver into Sector Skills Plans:**
**An Enabling Document for All SETAS**
**July 2010**

***Prepared by the DEA and its National Environmental Skills Planning Forum for discussions with SETAs within the currently changing SETA landscape. The focus is to clarify, with SETAs, what the implications of government priorities (MTSF Goal 9 – sustainable use of Natural Resources) are for Sector Skills Planning under NSDSIII***

# Social Welfare and Development SETA

## The Environmental Driver

The environmental driver must be integrated into all Sector Skills Plans, for two reasons. Firstly, government departments aim to promote a green growth path that is environmentally sustainable, has a low carbon footprint, and is pro-labour creation. By pursuing green growth South Africa could benefit from the opportunities opened up by global and local green economic activity, eco-innovations and green jobs. Many companies have seen the need to optimise green economic opportunities and the need to avoid environmental risks, and they require associated skills.

Secondly, the sustainable use and management of natural resources is a national priority identified in the *Medium Term Strategic Framework*, MTSF 2009-2014 (Goal 9). It is a state priority to implement the *National Sustainable Development Framework*, with attention to the protection and fair distribution of scarce water resources; to food security and rural livelihoods; integrated environmental management and the protection of biodiversity; energy efficiency; and mitigating the risks of climate change, particularly to the most vulnerable members of society.

## How is a green growth path relevant to the Social Welfare and Development SETA?

Environmental management processes and associated job opportunities and career paths are beginning to emerge across all sectors in South Africa. The country is seeing the emergence of programmes supporting the development of green skills within communities, and with youth in particular. These range from the development of e-waste recycling skills in the ICT sector, to eco-tourism and guide training within the tourism sub-sector, to developing green auditing and monitoring skills within the construction sector, to name a few.

Formalising the recycling industry and the reduction of the waste stream is one important element of South Africa's green economy. Investments in recycling will create thousands of new jobs, many of which can benefit people with entry-level skills. It can thus provide a

lifeline to the destitute members of society. This investment needs to be driven as a social (community) development driver, as much as an economic driver.

### How is Sustainable Natural Resource Use and Management relevant to the Social Welfare and Development SETA?

South Africa needs to develop new approaches to development, that meet the twin objectives of poverty alleviation and environmental sustainability. Sustainable development is a process that needs to be configured on an ongoing basis. Extensive research is necessary, in the social, political, economic and environmental sciences. So is extensive education, training and social learning processes, whereby various communities and groups in society can work out new sustainability practices. For example, rural communities who depend on natural resources for their livelihoods, need to develop ways to sustain these resources for the next generation, while improving their current quality of life. Efforts are necessary to work out carrying capacity, optimum harvesting rates, etc. Governance systems that enable the sustainable use of communal resources is a particular research and development need. These processes require skills that are not yet widespread in the South African society, and this hampers our progress towards socially just, equitable and ecologically sustainable development.

## RECOMMENDED CROSS CUTTING PROGRAMMES: CRITICAL SKILLS

**Short courses for skill level 4/5:** Directors, CEOs, Managers, Programme and Project Managers, Economic Development Facilitators including LED officers; Community development worker;

- Sustainable Development and the National Sustainable Development Framework
- HET Innovation in MBA programmes: Sustainable Development and the NSDF
- Business and development opportunities in environmental restoration, rehabilitation, conservation, monitoring
- Environmental sustainability practices: Sustainable food gardening; healthy environments and healthy communities; wealth from waste
- Environmental enterprise development (e.g. wealth from waste; biodiversity economy etc.)

## PROGRAMMES TO ADDRESS SCARCE SKILLS

| Code | Occupation & Skill Level | Job titles (Scarce and Critical Skills) | Recommended Interventions |
|---|---|---|---|
| Unit Code: 2724 | Social science professionals (Skill Level 5) | Political scientist, sociologist, geographer, historian, anthropologist, economic scientist, with skills in sustainable development and related research, integrated understanding across social and natural sciences | PIVOTAL programme (HE): Cross disciplinary courses in Earth, Society and Sustainable Development sciences at Bachelors and Masters levels |
| 132 602 | Programme / project manager (Skill level 4) | Programme or project manager | Project/programme management course with sustainable development module |
| | Economic Development Facilitators | LED officer | HET Pivotal Programmes: Environmental Enterprise Development |

## PROPOSED ACCESS, RESEARCH AND INNOVATION INITIATIVES

SUSTAINABLE DEVELOPMENT SKILLS STUDY: To research the scope of occupations and work undertaken in rural areas to establish how sustainable development training can strengthen environmental enterprise development, food security, access to clean and potable water, and reduction of environmental health risks.

## PROPOSED FLAGSHIP PROGRAMMES

COMMUNITY-BASED NATURAL RESOURCE MANGEMENT TRAINING in rural areas to strengthen access to, and sustainable use of natural resources for health and well being.

EPWP TRAINING PROGRAMMES – Integrate introductory environmental practices training into training of Wetland Construction Workers; Working on Fire Workers; Working for the Coast Workers; Working for Water Workers; Working for Waste Workers; and offer extended training opportunities (post EPWP) in the form of ENVIRONMENTAL PRACTICES AND SUSTAINABLE DEVELOPMENT LEARNERSHIPS for environmental enterprise development and sustainable employment creation, to maximise selected development opportunities (e.g. fire wood sales from Working for Water; or Recycling businesses from Working for Waste).

ENVIRONMENTAL EDUCATION AND TRAINING skills development programme for training providers to offer quality EPWP training, learnerships, and CBNRM training in rural areas.

CAREER GUIDANCE for careers in sustainable rural and urban development.


**Integrating the Environmental Driver into Sector Skills Plans:**
**An Enabling Document for All SETAS**
**July 2010**

***Prepared by the DEA and its National Environmental Skills Planning Forum for discussions with SETAs within the currently changing SETA landscape. The focus is to clarify, with SETAs, what the implications of government priorities (MTSF Goal 9 – sustainable use of Natural Resources) are for Sector Skills Planning under NSDSIII***

# Public Service SETA

## The Environmental Driver

The environmental driver must be integrated into all Sector Skills Plans, for two reasons. Firstly, government departments aim to promote a green growth path that is environmentally sustainable, has a low carbon footprint, and is pro-labour creation. By pursuing green growth South Africa could benefit from the opportunities opened up by global and local green economic activity, eco-innovations and green jobs. Many companies have seen the need to optimise green economic opportunities and the need to avoid environmental risks, and they require associated skills.

Secondly, the sustainable use and management of natural resources is a national priority identified in the *Medium Term Strategic Framework*, MTSF 2009-2014 (Goal 9). It is a state priority to implement the *National Sustainable Development Framework*, with attention to the protection and fair distribution of scarce water resources; to food security and rural livelihoods; integrated environmental management and the protection of biodiversity; energy efficiency; and mitigating the risks and impacts of climate change, particularly to the most vulnerable members of society.

### How is a green growth path relevant to Public Service SETA?

The public sector is a significant employer of environmental skills in South Africa. Effective governance of environmental assets, concerns and resources requires a skilled public services sector.

South Africa has an abundance of natural resources that contribute significantly to the county's economy, both at a primary level, including for example, fishing, mineral mining, agriculture and game farming, and through secondary means such as eco-tourism. With natural resources becoming increasingly scarce and more sought after globally, it is becoming more urgent to manage the harvesting and utilisation of these resources in a manner that is both equitable and just, and that ensures the longevity of these resources into South Africa's future.

The PSETA is in a unique position of employing professionals from across all sectors, as well as needing to coordinate and function at a national scale. Therefore, the environmental driver is particularly important to the PSETA in two key areas:

- Through integrated skills development for the professionals and skilled workers in employed in the sector - each of the other sector summaries above outline key strategic areas through which the environmental driver impacts of professionals and innovations within each sector, and all of which impact on the workforce employed within the public realm; and

- Through the implementation of social governance strategies that consider and integrate sound environmental management principles into their implementation. With the PSETA supporting a workforce that administers and helps to govern South Africa's natural resources, they have the potential to impact positively or negatively on the environment.

**How is Sustainable Natural Resource Use and Management (MTSF Goal 9) relevant to the Public Service SETA?**

- Environmental legislation in South Africa requires all government entities to comply and to develop Environmental Management Plans. The National Strategy for Sustainable Development commits all government departments to a sustainable development pathway.

- The table below shows the environmental responsibilities of all government departments in South Africa, showing that environmental training ought to be included in PSETA as a cross cutting concern.

| Department | ENVIRONMENTAL RESPONSIBILTY (as per legislation overseen by these departments) | Skills development demands |
|---|---|---|
| Agriculture, Forestry and Fisheries | Agricultural resources, pests, regulation of fertilisers, farm feeds and agricultural remedies, GMOs, pesticides, GHG impacts (up to 50% of total GHG) and alternatives to fossil fertilisers and chemicals; promote diversion of organics (green materials and sewage sludge) to food production; improve the local production of food as a GHG response and MTSF response; promotion of nutritious food security; alien species, system integration, SD as policy; Sustainable Bio/agrofuels, Veld, Forests and Forestry, Mountain ,; Catchments, sustainable fisheries, integrate research with SANBI. | Sustainable Agriculture Skills<br>Natural Resource Management Skills<br>Conservation Stewardship Skills<br>Climate Change Projection, Planning and Management Skills |
| Basic Education | Include SD in the curriculum | Environment and Sustainability Education Skills<br>(amongst all 300 000+ South African teachers) |
| Communications | Share the SD vision and mission throughout government, mainstream. | Environment and Sustainable Development Knowledge and Communications Skills |

| | | |
|---|---|---|
| Cooperative governance and Traditional Affairs | Traditional respect of environment as strength to build on. Mainstreaming environmental governance across all departments of government and all spheres of government. | Integrated Environmental Management and Sustainable Development Skills<br>Skills to mediate community participation |
| Defence and Military veterans | Responsibility for toxic and hazardous military wastes.<br>Monitoring and policing pollution and wastes at sea, monitoring and checking marine resource harvesting, dedicated environmental officers on large ships, monitor conditions within the marine environment. | Integrated Environmental Management Skills<br>Specialist technical skills for hazardous waste management<br>Environmental Inspection and Compliance Monitoring Skills |
| Economic Development/ Tourism | Determining the shape and form of a Green Economy.<br>Impact of development path on social and environmental arenas, sustainable development mainstreamed.<br>Valuation of environmental services as part of integrated production costs. Reduce externalisation of industrial impacts as policy. | Resource and Environmental Economics Skills<br>Integrated Environmental Management Skills<br>Sustainable Development Planning Skills |
| Energy | Move away from fossil fuels and toward sustainable energy, in line with MEAs, and NFSD. | Green Technology Development Skills<br>Specialist scientific and engineering skills |
| Water and Environment | Lead agency for environmental management on cross cutting issues as well as air quality, pollution control and waste management, environmental impact management, biodiversity conservation, marine and coastal management and water management, Water resources, water services waste management, | Specialist environmental policy and management skills in air quality and climate change, pollution control and waste management, biodiversity conservation, marine and coastal management, water resources, water services and water quality management<br>Integrated environmental management skills<br>Sustainable Development Planning Skills<br>Inspection and compliance monitoring skills<br>Communication, education and public engagement skills |
| Finance | As per treasury stipulations on tracking fiscal responsibility on environmental management. Ringfencing environmental funds as in MLRF and others. | Environmental Economics Skills<br>Sustainable Development Planning Skills |
| Government Communications | Communicate the SD message internally and to the public | Environment and Sustainable Development Knowledge and Communication Skills |
| Health | Hazardous Substances, Medical waste, Impacts of GHGs and pollution; and full cost accounting of health impacts; monitoring of various environmental pollutants; GMO labelling and tracking, | Specialist technical skills for hazardous waste management, climate change and for GMO management<br>Environmental Health Skills |
| Higher Education and Training | Integrate environment and SD into curriculum | Environment and Sustainability Education and Training Skills (for lecturers and trainers) |

| | | |
|---|---|---|
| Human settlements | Human settlements constructed along SD lines, mainstreaming integrated resource management. | Sustainable Development Planning skills<br>Resource and Environmental Economic Skills<br>Specialist technical and scientific skills<br>Communication, education and public engagement skills |
| International Relations and Cooperation | Oversight and integration of MEA's etc with other bi and multilateral agreements. | Skills for international negotiations and for integration of MEAs into national systems |
| Justice and Constitutional development | Develop environmental courts and body of jurisprudence in line with complex environmental legislation – along with police and other justice branches. | Skills for environmental law and compliance adjudication<br>Environmental inspection and compliance monitoring skills |
| Labour | Worker health; jobs; sustainable and decent livelihoods; responsibilities of oversight on companies as part of triple bottom line; just transition to Green Jobs. | Environmental health monitoring skills<br>Environmental economics skills<br>Green Jobs labour market analysis skills |
| Mining | Mine waste, pollution, energy use, water pollution, EIAs. | Integrated Environmental Management Planning, Assessment and Monitoring Skills<br>Specialist technical skills for water resource management, recycling, reduction and energy efficiency<br>Rehabilitation Skills |
| Public service and administration | Mainstream environmental management throughout administration under guidance of DEA. | Environmental Management Skills including Green Procurement Skills and Resource Efficiency Skills |
| Public works | Environmentally friendly and sustainable infrastructure and built environment, energy reduction, SD, care of public land, EPWP. | Green Procurement Skills<br>Sustainable Development Planning Skills<br>Natural Resource Management and Energy Reduction Skills<br>Elementary Environmental Practice Skills (EPWP)<br>Environmental Training Skills (EPWP) |
| Rural development and land reform | Management of rural land, protection of water resources, shifts towards SD food security and food production; promotion of decentralised development models | Community-based Natural Resource Management Skills<br>Sustainable Development Planning Skills |
| Science and technology | Need to include SD as technological thrust within research and education, with an emphasis on pollution avoidance, sustainable technologies and green business and industry; direct research towards local sustainable energy, food and water options, remediation of mine waste and pollution (non-toxic approaches), water remediation, alien infestation, global warming, etc. | Green Technology Development Skills<br>Earth System Sciences Research<br>Sustainability Innovations Research and Development Skills<br>Sustainable Energy Research and Development<br>Biotechnology Research Skills<br>Cleaner Production Research and Development Skills |
| SA Police service | Develop knowledge of environmental law, green scorpions, develop contact points for environmental crime; | Environmental Compliance Monitoring Skills<br>Environmental Inspection and Prosecution Skills |

| | | |
|---|---|---|
| SA revenue service | Issues of ring-fencing funds - As in MLRF as a precedent, pollution levies, fines, confiscations, taxing pollution according to user pays principles, can be implemented for cost recovery and funding. | Skills for planning, implementing and monitoring Green Fiscal Reforms<br>Environmental Economics Skills |
| State security | Intelligence gathering around illegal resource use, international criminal cartels, linked to green scorpions | Environmental Compliance Monitoring Skills<br>Environmental Inspection and Prosecution Skills |
| Social development | Mainstreaming healthy living standards and healthy built and natural environment; limitation and avoidance of negative health and other social impacts, | Environmental Health Skills<br>Sustainable Urbanisation Skills |
| Statistics SA | Maintenance of comprehensive and accurate green statistics in relation to treasury goals; improved measurement of effectiveness, outcomes and impacts. | Environmental Sector Statistics<br>Management, Monitoring and Evaluation |
| The Presidency and Ministers in the Presidency | There must be a SD/ green central communication and capacity building person within the presidency if environment is to be mainstreamed. | Sustainable Development Planning Skills |
| Tourism | Green tourism accreditation, good transport, maintain parks and natural areas, improve direct and financial local community and PDI benefit; reduce negative impacts on environment. | Eco-Tourism Development Skills<br>Community-based Natural Resource Management Skills<br>Integrated Environmental Management Skills |
| Trade and industry | Mainstream SD, analyse all bi and multilateral agreements in light of MEAs, trans-boundary transport of waste, pollution, dangerous substances; development and promotion of a Green Industrial Development Process | Sustainable Development Planning Skills<br>Green Economy Skills (Environmental Economics)<br>Integrated Environmental Management and Strategic Environmental Management Skills |
| Transport | Develop green transport options and pubic transport, energy saving in transport, reduce transport GHGs, | Energy reduction skills<br>Cleaner Production and Green Technology Development Skills<br>Sustainable Development Planning Skills |
| Land Affairs | Development of principles governing land development, Land Use, Aquaculture. | Sustainable Land-use Planning Skills<br>Resource Economics Skills |
| Minerals | Access to minerals and petroleum resources and related EIAs , nuclear energy, Mine related health and safety, mine drainage/ pollution, air quality, underground air quality; | Geo-prospecting skills<br>Sustainable Development Planning Skills<br>Integrated Environmental Management Skills<br>Environmental Health and Safety Skills<br>Air Quality Assessment, Monitoring and Management Skills |
| Provincial and Local Government (dplg) | Municipal Planning, Integrated Development Plans, EIAs, EIRs, municipal service delivery, Disaster Management, Coastal management, GHG impacts; waster, waste, air, built and natural environments improve capacity At local level on environmental mandates. | Sustainable Development Planning including sustainable rural and urban planning<br>Integrated Environmental Management<br>Specialist technical skills (e.g. waste management, water and sanitation, air quality management) |

| | | |
|---|---|---|
| Transport | Maritime Law, Movement of Substances, Harbours, hazardous substances, pollution control, GHG reduction plan, promotion of sustainable and public transport | Integrated Environmental Management Skills<br>Specialist Technical Skills<br>Energy Efficiency Skills |
| DTI | The trade policies and Bi and multilateral agreements managed. Economic Development policies that reduce negative impacts on social and environmental health; develop and promote green jobs, local jobs; improving local stakes in local environment as a developmental approach. | Environmental Economics Skills<br>Environmental Trade and Industry Development Skills<br>Skills for greening the economy<br>Green labour market analysis skills |
| Treasury | Use treasury stipulations as means of measurement of outcomes and impacts, as per audited responsibilities and budget programmes to monitor environmental efficiency and true cost analysis, full life cycle analysis,<br>Require fiscal reform to fast track and implement the removal of subsidies to unsustainable products and processes, and moving such to sustainable products and processes – also to implement Polluter Pays; Life Cycle Cost Recovery; Extended Producer Responsibility.<br>Take into account cluster issues with regard to the MTSF | Sustainable Development Planning Skills<br>Environmental cost accounting and monitoring skills<br>Green fiscal reform skills<br>Environmental Economics Skills |
| Public works | Energy efficiency, working towards mainstreaming environment through EPWP, encouragement of localised economy. Green buildings, energy reduction, solar heating in all govt buildings, | Energy Efficiency Skills<br>Green Jobs Development<br>Green Procurement and Green Building Design<br>Green Technology Application Skills |

## RECOMMENDED CROSS CUTTING PROGRAMMES – CRITICAL SKILLS

Short courses for skill level 5: Chief Directors; Directors; Deputy Directors; Operational officers and professionals

- Environmental law , policy and compliance
- Integrated and adaptive environmental management
- Sustainable Development Planning for a Developmental State
- Climate Change Risk and Opportunity Assessment
- Green Procurement and Construction Planning
- Environmental ethics and sustainable development principles
- Environmental Economics and Environmental Trade and Industry Development Skills
- Energy efficiency and new environmental technologies
- Environmental Education, Training and Public Participation
- Sustainability reporting and corporate governance
- Integrative skills (integrating social and technical; social and biophysical; theory and practice etc.)

**PROPOSED PROGRAMMES TO ADDRESS SCARCE SKILLS**

| OFO Code | Occupation | Job titles | Recommended Interventions Based on Scarce & Critical Skills |
|---|---|---|---|
| 139902 | Environmental Manager (Skill Level 5) | Land and Water Manager<br><br>Pollution & Waste Group Manager<br><br>Conservation Science Manager | BURSARIES AND HET PIVOTAL PROGRAMMES, INCLUDING HET CURRICULUM INNOVATION<br>Ecosystem service approaches<br>Adaptive Environmental Management<br>Sustainable Development Planning<br>Climate change risk and opportunity assessment;<br>Sustainability reporting; environmental innovation and environmental resource governance<br><br>Effluent management; Environmental Impact Assessment; Cleaner Production; New environmental technologies with a focus on mitigating environmental impacts;<br><br>PIVOTAL programme: Internships in agencies for terrestrial, marine & coastal conservation, incl. local government<br>PIVOTAL programme: HET<br><br>Green procurement |
| 224103 | Statistician (Skill Level 5) | Statistical GIS Specialist<br><br>Statistical Modeller | BURSARIES<br>HET PIVOTAL programmes including programmes that combine statistician skills with biological/ biodiversity/ ecological/ environmental/ conservation skills.<br><br>Career guidance<br><br>PIVOTAL PROGRAMME: Risk modeling for the energy sector |
| 224301 | Economist (Skill Level 5) | Environmental Economist | BURSARIES<br>HET PIVOTAL PROGRAMMES<br>Green Fiscal Reform<br>Green Taxes<br>Natural Resource Economics<br>Equator principles<br>Green procurement |
| 224402 | Policy Analyst (Skill Level 5) | Risk / Planning / Review / Analyst | BURSARIES<br>HET PIVOTAL PROGRAMMES<br>Environmental law; sustainability reporting; sustainability index monitoring and evaluation;<br><br>Short Skills prog : Climate risk modelling and Energy efficiency targets |

| | | | |
|---|---|---|---|
| 232101 | Architect (Skill Level 5 | Conservation Architect | BURSARIES<br>HET PIVOTAL PROGRAMMES<br>Green design and planning; energy and water efficiency; sustainability planning; mitigating environmental impacts through design and construction innovation;<br><br>Eco-systemic buildings and infrastructure.<br>• Renewable energy and materials.<br>• Biotechnology for construction.<br>• Recycling resources<br>• Green construction materials and installations. |
| 234 302 | Environmental Consultant (Skill Level 5) | Environmental Advisor<br>Environmental Analyst | BURSARIES<br>HET PIVOTAL PROGRAMMES<br>Effluent management; Environmental Impact Assessment; CPD New environmental technologies with a focus on mitigating environmental impacts;<br><br>Environmental innovation<br><br>Environmental Law |
| 234 303 | Environmental Research Scientist (Skill Level 5) | Environmental Auditor;<br><br>Land Degradation Analyst | BURSARIES<br>HET PIVOTAL PROGRAMMES<br>Specialist technical scientific kills (environmental monitoring; climate change specialists; soil scientists; liminologists; biotechnologists; biodiversity scientists; hydrologists; oceanographic sciences). |
| 234 403 | Earth and Soil Scientist (Skill Level 5) | Soil Conservationist | BURSARIES<br>HET PIVOTAL PROGRAMMES |
| 234903 | Meteorologist (Skill Level 5) | Climatologist<br><br>Climate Scientist | BURSARIES<br>HET PIVOTAL PROGRAMMES<br><br>Meteorological Trainers |
| 271301 | Solicitor (Environmental Lawyer) & Environmental Management Inspector / Compliance Officers<br><br>(Skill Level4/ 5) | | BURSARIES<br>HET PIVOTAL PROGRAMMES<br>Environmental law<br>Environmental Compliance Officer Training |

| | | | |
|---|---|---|---|
| 311901 | Earth and Atmospheric Science Technician (Skill Level 4) | Air Quality Technician<br><br>Water and Soil Technician | BURSARIES<br>HET PIVOTAL PROGRAMMES<br><br>FET COLLEGE CURRICULUM INNOVATION |

## RESEARCH AND INNOVATION

Development of indicators to assess how environmental training programmes contribute to improved service delivery.

ENVIRONMENTAL TECHNICAL SKILLS STUDY: The ESSP research showed that up to 1500 environmental technical skills are needed in the public sector – for water, waste, air quality, energy and biodiversity monitoring (includes parastatals and local government). These are, however, poorly understood, and provisioning for these skills seems to be reactive, without sustainable systems of supply. This requires curriculum innovation in FET and HET training systems, career pathing and adequate skills development.

### PROPOSED FLAGSHIP PROGRAMMES

ENVIRONMENTAL CRITICAL SKILLS SHORT COURSE PROGRAMME FOR THE PUBLIC SECTOR focussing on the programmes outlined above

ENVIRONMENTAL TECHNICAL SKILLS DEVELOPMENT HET PIVOTAL PROGRAMME

ENVIORNMENTAL SCIENCES HET PIVOTAL PROGRAMME

ENVIORNMENTAL LEADERSHIP TRAINING PROGRAMME

ENVIRONMENTAL COMPLIANCE OFFICER TRAINING PROGRAMME

ENVIRONMENTAL EDUCATION AND TRAINING skills development programme for providers to offer high quality environmental training.

CAREER GUIDANCE – environment and sustainable development careers in the public sector

# A note on the quality of training

Throughout the ESSP research process (DEA, 2010), the **quality of training** was noted as being a very significant factor in enabling learning and development, as expressed in these perspectives which are relevant to all SETAs. All of these point to the need to develop *skilled, knowledgeable trainers,* hence ENVIRONMENTAL EDUCATION AND TRAINING skill development programmes have been listed as a flagship programme for all SETAS. Some of the issues (with quotes from interviews to illustrate the points) relate to:

- **Inability to integrate theory and practice in training programmes**

"Many of the environmental training staff members do not have any practical experience in putting the legislation into practice. They are well versed in theory, but have never had to practically apply the theory. We need tutors who are skilled in both theory and practical issues, or we need to find tutors who can work together to train people properly … academic training needs to be contextualised in the real world" (ESSP Interviewee)

- **Inadequate attention given to foundational skills necessary for practice**

"Training is provided, but it becomes useless as people don't have the actual knowledge of how to write a good report" (ESSP Interviewee)

- **Trivial / irrelevant training**

"Training needs to help people to consider and implement *meaningful environmental options in the development process,* it should not be trivial and focus on unnecessary or irrelevant issues." (ESSP Interviewee)

- **Cost of training**

"Training should be priced more reasonably so that it can be more accessible to all professionals in the field. Training programmes are too expensive, and do not deliver – there is not enough value for money. Costs are exorbitant with very little real added value" (ESSP Interviewee)

- **Inability to contextualise training and adapt it to particular learner groups and professional tasks**

"There is a belief that 'one size fits all' can work in training programmes. This leads to a belief that the training for all professionals working in the environmental management field should be the same and that writing or reviewing the same document takes the same level and type of skill … there is inadequate attention given to the diversity of skills required to undertake environmental management tasks, or the combinations of skills" (ESSP Interviewee)

- **The focus of training is inadequate, or narrowly conceptualised**

"There is a lack of information and experience with regards to strategic issues and cumulative impacts. Environmental issues and assessments are usually considered from a perspective of legal compliance only, or from a perspective of the current status of the issue. There is a need to develop good understanding of how biophysical and social aspects are interrelated to ensure that impacts are understood from an integrated perspective". (ESSP Interviewee)