Agriculture and the Green Economy in South Africa

A CSIR Analysis
Agriculture and the Green Economy in South Africa: A CSIR Analysis

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Preface

The world is currently facing financial, social, and environmental constraints predominantly rooted in sustainable development, including crises relating to food, water and energy security. South Africa faces the same constraints including chronic high unemployment rates, poverty and inequality, and is also grappling with environmental degradation and climate change. However, these challenges can also be perceived as presenting opportunities for change.

The concept of a green economy has emerged as a way of conceptualising the potential opportunities arising from these challenges. A green economy is one that seeks to improve human wellbeing and social equity while protecting the environment, and contributes to sustainable development. South Africa has adopted the principle of a green economy, and agriculture has been identified as one of the sectors that will drive the green economy. In addition, the green economy strategies of Limpopo, KwaZulu-Natal, Western Cape, and Gauteng provinces and the city of Tshwane all list agriculture/food production as one of the drivers of a green economy. South Africa is in the process of transitioning to a green economy.

Agriculture is well placed to be one of the key drivers of a green economy as many agricultural activities potentially offer solutions to the social, economic and environmental challenges humanity are currently faced with. Specifically, there are opportunities for agriculture to provide livelihoods and food security for a rapidly expanding population, address rural poverty and contribute to lowering the risk of climate change.
At the international level, there is consensus on the key role that agriculture has to play in a green economy, as articulated by the United Nations Food and Agriculture Organization (FAO). The key role of agriculture in Africa’s economic development has also been acknowledged by the African Union, in its declaration of 2014 as ‘the Year of Agriculture and Food Security in Africa’. The general consensus on the critical role of agriculture in a green economy provides impetus for individual countries to focus on agriculture as a contributor to the green economy, and potentially provides opportunities for countries to share learning and experiences.

Although agriculture is a well-established sector, the concept of a green economy is relatively new, having emerged in the last five years. While the government of South Africa has produced a knowledge base supporting South Africa’s transition to a green economy, such an information base for an agricultural green economy in particular has not yet been developed.

This report aims to contribute to addressing this gap of information. The Council for Scientific and Industrial Research (CSIR)’s analysis of the capacity of the agricultural sector to contribute to a green economy focusses specifically on crop-based agriculture. The context, principles, opportunities and challenges for crop-based agriculture to contribute to a green economy in South Africa are analysed and recommendations are made regarding research and the development of an agricultural green economy. The document is designed as a general source of background information to support decision making in sectors such as agriculture, economic development, rural development, social development and others. The report is based on a desktop study conducted by the Natural Resources and the Environment (NRE) unit of the CSIR as part of a Parliamentary Grant Project entitled; Prospects for crop-based agriculture to contribute to a green economy in South Africa.
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## Acronyms

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<th>Full Form</th>
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<tr>
<td>CSIR</td>
<td>Council for Scientific and Industrial Research</td>
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<td>DAFF</td>
<td>Department of Agriculture, Forestry and Fisheries</td>
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<tr>
<td>DEA</td>
<td>Department of Environmental Affairs</td>
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<tr>
<td>EDD</td>
<td>Economic Development Department</td>
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<tr>
<td>DTI</td>
<td>Department of Trade and Industry</td>
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<td>DHET</td>
<td>Department of Higher Education and Training</td>
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<td>DST</td>
<td>Department of Science and Technology</td>
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<tr>
<td>GHG</td>
<td>Greenhouse gas</td>
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<td>FAO</td>
<td>Food and Agriculture Organisation</td>
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<td>GAP</td>
<td>Good Agricultural Practices</td>
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<td>IFAD</td>
<td>International Fund for Agricultural Development</td>
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<td>IFOAM</td>
<td>International Federation of Organic Agriculture Movements</td>
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<td>ILO</td>
<td>International Labour Organisation</td>
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<td>IPAP2</td>
<td>Industrial Policy Action Plan</td>
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<td>IPCC</td>
<td>Intergovernmental Panel on Climate Change</td>
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<td>MTSF</td>
<td>Medium Term Strategic Framework</td>
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<td>NDA</td>
<td>National Development Agency</td>
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<td>NDP</td>
<td>National Development Plan</td>
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<td>NEPAD</td>
<td>New Partnership for Africa’s Development</td>
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<td>NGP</td>
<td>New Growth Path</td>
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<td>NPC</td>
<td>National Planning Commission</td>
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<td>NRE</td>
<td>Natural Resources and the Environment</td>
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<td>NSSD</td>
<td>National Strategy for Sustainable Development</td>
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<tr>
<td>OECD</td>
<td>Organisation for Economic Co-operation and Development</td>
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<tr>
<td>SAGEM</td>
<td>South African Green Economy Modelling Report</td>
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<tr>
<td>UNDESA</td>
<td>United Nations Department of Economic and Social Affairs</td>
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<td>UNEP</td>
<td>United Nations Environment Programme</td>
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<tr>
<td>UNCTAD</td>
<td>United Nations Conference on Trade and Development</td>
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<td>WWF</td>
<td>World Wildlife Fund</td>
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1. INTRODUCTION

Africa has seen exponential economic growth in recent years with an average Gross Domestic Product (GDP) growth of 3.1 - 6.6% between 2004 and 2013 (African Economic Outlook, 2014). This rapid growth is expected to continue in 2014, with average projected GDP growth at 5.3% (World Bank, 2013). Although most African countries experience economic growth, they continue to face challenges related to urbanisation, changing climatic conditions, globalisation and declining agricultural output. The United Nations Economic Commission for Africa (UNECA, 2012) highlights that internal challenges facing African countries include persistent poverty, unemployment, and degradation of the natural resource base which underpins economic activity; due to factors such as deforestation, soil erosion, desertification, loss of biodiversity, and the effects of climate change.

With a projected GDP growth of 2.7% for 2014 and 3.4% for 2015 (World Bank, 2014), South Africa is faced with many of the issues the rest of the continent faces. The African Development Bank (2014) notes that South Africa continues to face the triple challenges of chronic high unemployment, poverty and inequality, amid a slow and volatile domestic and global economic environment.

Moreover, South Africa is also grappling with environmental degradation and climate change. The challenges related to attaining economic growth while maintaining the integrity of the environment and addressing social issues are not unique to Africa, but affect the whole world. However, these challenges can also be perceived as presenting opportunities for change. The concept of a green economy has emerged as a way of conceptualising the potential opportunities that arise from these challenges.
1.1 What is a Green Economy?

A green economy has been defined as ‘one that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities (UNEP, 2012a). A green economy has to be low-carbon, resource efficient, socially inclusive, reduce pollution and waste, and prevent biodiversity degradation and the loss of ecosystem services (UNEP, 2011a). Since the global financial crisis of 2008, and in particular, the lead up to the June 2012 United Nations Conference on Sustainable Development (UNCSD) in Rio de Janeiro (Rio+20), the term “green economy” has featured prominently in the international discourse on the environment and development. The prominence of the debate on the green economy can partially be attributed to optimism that the green economy offers ‘win–win’ solutions for overcoming the global financial, social, and environmental crises facing mankind; including crises relating to food, water and energy security (Mersseli et al., 2012). It is argued by a number of

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**Box 1.1: A green economy does not only focus on present needs**

‘A green economy focuses on improving human wellbeing and reducing social inequity over the long term, while not exposing future generations to significant environmental risks and ecological scarcities. It seeks to do this by increasing investment to ensure that the environment can continue to be used for the benefit of current and future generations; and by basing strategies for economic growth on the sustainable use of natural resources and the environment’.

A green economy generates the long-term jobs and wealth that are needed to help eradicate poverty.

international institutions that the transition to a green economy is fundamental for addressing the social, economic and environmental pillars of sustainable development (UNEP, 2011a; OECD, 2011; World Bank, 2012).

A term related to the green economy is that of ‘green growth’ (OECD, 2011; World Bank, 2012). Like the green economy, the term green growth signifies an alternative development path that simultaneously pursues socio-economic progress and environmental conservation (Negra, 2013). In its 2012 report, the Commission on Sustainable Agriculture and Climate Change recommended making sustainable, climate-friendly agriculture central to green growth (Beddington et al., 2012).

Furthermore, the green economy concept has focussed attention on transforming the current world economic model into one which is better aligned with sustainable development. This focus raises the important question of how different the concept of the green economy is from that of sustainable development. The green economy has been framed as a “means for achieving sustainable development”, and is therefore not synonymous with sustainable development (UNDESA, 2012). There is consensus by governments of many United Nations (UN) member states that the transition towards a green economy is an important tool for achieving sustainable development. This aspect is specifically reflected in the Rio+20 outcome document; The future we want (UN, 2012), which recognises that the green economy is not aimed at replacing the concept of sustainable development, but should rather be used to contribute to, or advance, this broader agenda (UNDESA, 2012).
1.2 What are the attributes of a green economy?

The transition to a green economy requires changes within all the sectors of an economy. In order for a sector (for example agriculture) to fully engage with the green economy, it is necessary for the sector to understand and apply the basic principles of a green economy. This is crucial for ensuring that the sector operates in a way that supports the values of a green economy. In the case of agriculture, this is crucial for addressing the question, ‘how can agriculture support the transition towards a green economy?’

In the lead up to Rio+20, several organisations (e.g. the Green Economy Coalition [2012]; the Stakeholder Forum, BioRegional and Earth Charter Initiative [2012]; International Chamber of Commerce [2011]) published green economy principles of which the United Nations Department of Economic and Social Affairs (UNDESA, 2012) identified and consolidated the most common green economy principles from a review of eight such published sets of principles. These principles clearly highlight that the focus of the green economy is not simply on the link between the economy and the environment (as the term ‘green economy’ might imply), instead, the green economy places equal emphasis on the social, economic and environmental dimensions of sustainable development. Through its multiple social, economic and environmental objectives, the green economy incorporates human well-being factors such as livelihoods\(^1\) which are not considered in economic measures such as Gross Domestic Product (GDP).

\(^1\) In this context a livelihood is defined as a person’s means of securing the basic necessities of life such as food, shelter etc.
Box 1.2: Principles of a green economy

1. The Green Economy is a means for achieving sustainable development;
2. The Green Economy should create decent work and green jobs;
3. The Green Economy is resource and energy efficient;
4. The Green Economy respects planetary boundaries or ecological limits or scarcity;
5. The Green Economy uses integrated decision making;
6. The Green Economy measures progress beyond GDP using appropriate indicators/metrics;
7. The Green Economy is equitable, fair and just – between and within countries and between generations;
8. The Green Economy protects biodiversity and ecosystems;
9. The Green Economy delivers poverty reduction, human well-being, livelihoods, social protection, and access to essential services;
10. The Green Economy improves governance and the rule of law. It is inclusive; democratic; participatory, accountable, transparent and stable; and

1.3 What is South Africa’s position on a green economy?

South Africa has adopted the principle of green economic growth, with the green economy being prioritised as one of the key economic drivers in South Africa’s Medium Term Strategic Framework (MTSF) 2009-2014. Several sectors and subsectors of the South African economy have been identified as fundamental to a green economy transition. These include agriculture, food production and forestry, and resource conservation and management. The transition to a green economy in South Africa is linked to many policies, strategies and plans including, amongst others, the Green Economy Accord, the National Development Plan, the New Growth Path, the National Climate Change Response Policy, the Industrial Policy Action Plan and more recently, the South African Green Economy Modelling (SAGEM) report (UNEP, 2013b). The SAGEM report was produced by the Department of Environmental Affairs and UNEP, which highlights potential opportunities and options to promote a green economy, with a focus on natural resource management, agriculture (crop production), transport, and energy (production and demand). This analysis of agriculture and the green economy in South Africa is closely aligned to these plans and policies.

One of South Africa’s priorities in developing a green economy is the creation of ‘green’ jobs (EDD, 2011). Green jobs are defined as work in, amongst others, agricultural, manufacturing, research and development, administrative and service

**DID YOU KNOW?**

Moving towards a Green Economy is one of five strategic priorities in South Africa’s National Strategy for Sustainable Development and Action Plan.

2http://www.environment.gov.za/?q=content/projects_programmes/greeneconomy/about.
activities that contribute substantially to preserving or restoring environmental quality. This includes jobs that help to protect ecosystems and biodiversity; reduce energy, materials, and water consumption through high efficiency strategies; decarbonise the economy; and minimise or altogether avoid generation of all forms of waste and pollution (DEA, undated). In Africa, the importance of natural resource-based sectors such as agriculture, forestry, and fisheries in supporting green economic growth is underscored by the fact that these sectors continue to remain large job providers, and together with the mineral resources sector account for 80% of employment (UNECA, 2012). In developing countries, agriculture is seen as a crucial sector for contributing towards the green economy (FAO, 2012a), while in South Africa, agriculture has been identified as one of the key sectors that will contribute towards the green economy (DEA et al., 2010).

### 1.4 Agriculture and the green economy

The agricultural sector has a key role to play in a green economy. The sheer size of the sector (in terms of land area and use of resources such as water), its impacts on the environment, and its direct role in the well-being of people, places it at the centre of the green economy globally and in South Africa. Agriculture currently uses 12% of the world’s land surface for crop production (arable land and land under permanent crops), and accounts for 70% of all freshwater withdrawn from aquifers, streams and lakes (FAO, 2012b). About 80% (100 million hectares) of the land area of South Africa is used for agriculture, but only approximately 11% of the total area of South Africa is arable (suitable for cropping) (DEAT, 2006; World Bank, 2013). Agriculture is a key water user in South Africa, with about 62% of the country’s surface water being used for irrigation (Statistics South Africa, 2010). Globally, the agriculture sector as a whole provides livelihoods for 40% of the world’s population (CGIAR, 2012). In South Africa, the primary agricultural sector contributes about 3% to the country’s gross domestic product (GDP) and provides about 7% of formal employment (DAFF, 2010).
Agriculture is well placed to contribute to a transition towards a green economy as many agricultural activities potentially offer solutions to the social, economic and environmental challenges that humans are currently faced with. Specifically, there are opportunities for agriculture to provide livelihoods and food security\(^3\) for a rapidly expanding population, reduce the risks from climate change, and meet increasing demands for energy in the face of dwindling reserves of fossil fuels (Jensen et al., 2012). The relationship between agriculture and the green economy has been summarised by the United Nations Food and Agriculture Organisation (FAO) (FAO, 2012a) in a concept note prepared for the Rio+20 conference as; “The single largest sector using 60% of the world's ecosystems and providing livelihoods for 40% of today's global population, the food and agriculture sector is critical to greening the economy. There will be no green economy without agriculture”. Furthermore, given the increasing demand for food and other commodities for a burgeoning human population, expected to reach nine billion by 2050, it is imperative that the efficiency of agricultural systems improve.

To improve efficiency, the agricultural sector has to investigate how best to meet demands for increased outputs in a way that is more efficient in its use of resources, and less damaging to the environment (i.e., to decouple agricultural production from resource use and environmental degradation). In addition, agriculture should also create sustainable livelihoods\(^4\) for farmers and others along the supply chain (Farming First, 2013). It is critical to investigate how the sector can best contribute towards a green economy, through agriculture-based green economy initiatives, i.e., initiatives in the agriculture sector which can support a green economy.

\(^3\) “Food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life” (FAO, 2003)

\(^4\) A livelihood is sustainable when it can cope with and recover from stresses and shocks, maintain or enhance its capabilities and assets, while not undermining the natural resource base (Chambers and Conway, 1992).
Within the context of a green economy, it is important to distinguish the concept of agriculture-based green economy initiatives, which are required if the sector is to contribute towards a green economy, and which are the subject of this report; from the narrower concept of ‘green agriculture’. UNEP (2011c) defines agriculture based on sustainable farming practices and technologies as ‘green’. However, agriculture-based green economy initiatives are broader than simply green agriculture. Whereas green agriculture focuses on maintaining or increasing productivity and profitability, minimising environmental damage and rebuilding ecological resources (UNEP, 2011c), agriculture-based green economy initiatives have to incorporate both the principles of green agriculture and the principles of a green economy. As such, given that the green economy incorporates both an environmental and social dimension, an assessment of the role of agriculture in a green economy has to consider not only environmental factors, but also a number of key social factors in an integrated and holistic manner including greening agricultural practises.
1.5 Why this report?

This report analyses the capacity of the agricultural sector to contribute to a green economy, focussing specifically on crop-based agricultural initiatives in a production context. The focus on crop-based agriculture in this instance was dictated by resources that were available to conduct the study and in no way implies that livestock farming has no role to play in a green economy. The report is intended to provide relevant information for supporting South Africa’s transition to a green economy for the agriculture sector and other interested parties. The report is based on a desktop review and analysis conducted by the Council for Scientific and Industrial Research (CSIR)’s Natural Resources and the Environment Unit. The green economy is an emerging concept both in South Africa and globally, and currently there is insufficient information to adequately support green economy policy making and more importantly, implementation. South Africa’s plans for, and commitments to a green economy spell out the priorities and commitments for a green economy in broad terms. However, what is lacking is the detail to guide the implementation of the identified priorities. This report seeks to contribute to this gap in guiding the implementation of green economy priorities.

Specifically, it has become clear that relevant information on agriculture and its role in the green economy is required in order for the sector to support South Africa’s transition to a green economy. Policy and practical information on how to implement and support green economy initiatives in the agriculture sector are lacking. This report identifies the context, principles, opportunities and challenges for crop-based agriculture to contribute to green economy initiatives in South Africa. It then synthesises the findings and makes some recommendations regarding research and other needs going forward.
2. AGRICULTURE IN SOUTH AFRICA’S GREEN ECONOMY: LEGISLATIVE, POLICY AND STRATEGIC CONTEXT

2.1 Agricultural legislation and policy

Agricultural initiatives linked to the green economy will invariably be guided by existing legislation. In particular, initiatives which are aligned with legislation pertaining to sustainable agriculture provide real opportunities for a green economy. Currently, a key statute in South African legislation governing agriculture as it would relate to a green economy is the somewhat dated Conservation of Agricultural Resources Act (CARA) 43 of 1983. The objective of the CARA is to provide for the conservation of natural resources for the purposes of agriculture, including protection of the production potential of land, the integrity of water sources, and the control of weeds or alien vegetation. This Act therefore provides an important foundation for the protection of natural resources in agricultural production systems.

More recent developments in agricultural policy and legislation have seen the publication of the White Paper on Agriculture in 1995 (Department of Agriculture, 1995), the 1998 Agricultural Policy for South Africa (NDA, 1998), the 2002 Strategic Plan for South African Agriculture (NDA, 2002), as well as the draft Sustainable Utilisation and Protection of Agricultural Resources (SUPAR) Bill of 2003 (NDA, 2003), which has yet to be passed by Cabinet. In contrast to the CARA, a significantly expanded vision for agriculture is provided for in this group of legislative and policy instruments. In particular, there is recognition of the closely related economic, social and ecological challenges facing agriculture. For example, in the 1998 Agriculture Policy, broader needs are addressed. In addition to (1) protection of the natural resource base, (2) prevention of degradation of soil and water and (3) conservation of biodiversity, the following are also provided for: (4) contribution to the economic and social wellbeing of all, (5) ensuring a safe and high-quality supply of agricultural
products, and (6) safeguarding the livelihood and wellbeing of agricultural workers and their families (Scotcher, 2009).

As is the case for the green economy in general in South Africa, there is as yet no legislative or policy framework at national level providing specifically for agriculture and the green economy. Many of the provincial governments have, however, already taken the initiative and developed green economy plans or policies. The DBSA (2011) has identified the need to create “enabling environments” for the implementation of green economy initiatives through, inter alia, the provision of the

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**Box 2.1:**
Existing agricultural legislation of potential relevance to agriculture in a Green Economy

- Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) and subsequent amendments, which will be repealed in their entirety if/when the Sustainable Use of Agricultural Resources Bill (2003) is passed into law.
- Fertilizer, Farm Feeds, Agricultural Remedies and Stock Remedies Act, 1947 (Act No. 36 of 1947), which controls the inputs to farming and agricultural enterprise.
- Many other statutes not necessary for only addressing agriculture, but for example, issues of resource efficiency (e.g. the National Environmental Management Act - NEMA).
necessary legislation and policy, as well as governance. It is pertinent to note that at the time of compiling this report the national Department of Agriculture, Forestry and Fisheries (DAFF) is not yet using the term ‘green economy’ on its official website or in any of its programmes or projects.

There are at least two agricultural policy documents addressing sustainable farming practices and sustainable development which are still in existence but whose original drafts pre-date mainstream use of the concept of a green economy by several years. One is the Draft National Policy on Organic Production, originally tabled in 2005, with the 8th Draft being published for comment (as per Notice 418 of Government Gazette 34394) on 1 July 2011. The aim of the policy is to create a broad framework for the development of an organic sector that is inclusive, produces high quality and safe organic products, protects consumers against false claims, improves human and environmental health and ensures compliance with organic standards. The Draft Policy, which has been revised based on comments received over the years, and will likely be tabled in Parliament during 2014, would provide an important framework for organic production and would, through its alignment with some of the green economy principles support the development of an agricultural green economy.

Secondly, following the World Summit on Sustainable Development held in Johannesburg in 2002, the previous National Department of Agriculture embarked on a process of developing a Policy on Agriculture in Sustainable Development to incorporate “the principles and objectives of sustainable development into the ethos of the agricultural sector” (NDA, undated: 2). The purpose of the policy is: “…to facilitate a coordinated approach towards achieving an ecologically, socially and economically sustainable agricultural sector in South Africa that supports the government’s commitment towards poverty alleviation, food security and economic development. This emphasises the creation of a prosperous agricultural sector while protecting the national biological and physical resource base, as well as enhancing human health and wellbeing.”
This policy would address a number of key issues for government, farmers and conservationists in the agricultural sector. Furthermore, it would likely contain specific provisions for food security, poverty, human health, unemployment and equity in the sector. In addition, the management of soil resources, water use efficiency, biodiversity and genetic resources for food and agriculture, global competitiveness, biotechnology and various aspects of production systems and approaches would also potentially be addressed. The existence of such a policy would provide a substantive foundation for redirecting agriculture in the country towards sustainability, and would also provide a strong policy base for the development of the green economy in agriculture. Unfortunately, the current status of this potentially far reaching policy is unknown.

In the remainder of this chapter, a number of existing strategies, plans and programmes at different levels of government which could provide foundations for the development of agricultural initiatives in a green economy are outlined. This listing does not purport to cover every existing strategy, but highlights some of the key ones. An overview of these strategies, plans and programmes is provided in Figure 1.
Figure 1: Foundations for Agriculture in the Green Economy in strategy, plans and programmes at different levels of government

- National Strategy for Sustainable Development (NSSD)
- New Growth Path & Green Economy Accord
- National Development Plan (NDP)
- Medium Term Strategic Framework (MTSF)
- National Skills Development Strategy
- National Climate Change Response White Paper

- Strategic Plan for the DAFF (2012/13 - 2016/17)
- Land Redistribution for Agricultural Development Programme (LRADP)
- Comprehensive Agricultural Support Programme (CASP)
- National LandCare Framework Programme
- Strategic Plans of the Dept of Rural Development & Land Affairs, Dep of Economic Development, Trade & Industry
- Biofuels Industrial; Strategy (Dep of Energy, 2007)

- KwaZulu-Natal
- Gauteng
- Western Cape
- Limpopo
- City of Tshwane
2.2 National strategies, plans and programmes

Currently, the enabling environment for the green economy in South Africa is being provided for at the level of plans, strategies, and programmes rather than in legislation. Specific legislation for the green economy has not yet been enacted.

Several sources of broad strategic guidance could be deemed to be providing the foundation for agriculture in the green economy in South Africa. The following sections discuss these strategies.

2.2.1 National Strategy for Sustainable Development and Action Plan (NSSD1 2011-2014) (Department of Environmental Affairs)

Transitioning to a green economy is one of five strategic priorities in the National Strategy for Sustainable Development and Action Plan (NSSD). The objective of Priority 3: Towards a green economy is: “A just transition towards a resource-efficient, low carbon and pro-employment growth path”.

One of the goals that have been set to achieve this objective is to “implement and upscale green economy programmes,” of which agriculture, food production and forestry are key areas of intervention listed in the Action Plan. Two specific interventions in this area form part of the plan, viz.:

i. “Adoption of integrated water and land resources management as a model framework for the sound and equitable allocation of water as a public good among users, and its implementation in a sustainable way at all levels, including catchments”; and

ii. “Supporting programmes to ensure the protection of agricultural land, sustained food security and local economic development.”
2.2.2 The new Growth Path Framework and Accord 4: Green Economy (2011) (Department of Economic Development)

The New Growth Path Framework, and in particular the Green Economy Accord (Accord 4), focuses on addressing unemployment, poverty and inequality. One of the main targets of the Framework is ‘the creation of 300 000 additional jobs in the green economy. A significant portion of these jobs is expected to be created in the operation and maintenance of environmentally friendly infrastructure, in employment schemes for environmental protection, and in the development of the biofuels industry’. The Framework calls for the following agriculture related goals:

- Support for small-scale agriculture, including food and community gardens in urban contexts;
- Marketing and service cooperatives to support initiatives in the agricultural sector; and
- Investment in and development of integrated agro-processing supply chains and the expansion of trade.

In the Green Economy Accord, one of the focus areas of relevance to agriculture is the sixth commitment dealing with the development and production of Biofuels. This includes the production of feedstock for fuel production for mandatory blending with petrol and diesel. The Accord expressly precludes the development of biofuels in conflict or competition with food production, and there is also a

**DID YOU KNOW?**

Government intends to create 300 000 jobs in the Green Economy through the New Growth Path Framework. Many of these jobs will be in the operation and maintenance of environmentally friendly infrastructure, environmental protection and in developing a biofuels industry.
cautionary statement regarding water use for biofuel crops. In the Green Economy Accord the other focus areas of relevance to agriculture include: renewable energy, energy efficiency, waste re-use and electrification of poor communities and promotion of localisation, youth employment cooperatives and skills development.

2.2.3 National Development Plan – Vision for 2030 (2012) (National Planning Commission)

Chapter 6 of the National Development Plan (NDP) of the National Planning Commission (NPC) entitled; ‘An Integrated and Inclusive Rural Economy’, focuses on agriculture, with substantive reference to the Land Reform Programme. The primary goal set out in the NDP is to “reverse the decline in the agriculture sector, promote food production and raise rural income and employment” (NPC, 2011:198). Much attention is given to uplifting poor rural inhabitants and emerging farmers, and to creating jobs in the agriculture sector; while “white” commercial farmers, agribusinesses and organised agricultural industry bodies” (NPC, 2011:198) are called upon to provide the necessary support for the achievement of these goals. The NDP also motivates for an expansion of commercial agriculture due to the potential for job creation, suggesting that “winning agricultural sub-sectors” should be selected and focused on for expansion, because of their higher productivity and established markets. Some sub-sectors are suggested in the following categories: large labour intensive industries, smaller labour intensive industries, and large existing industries with significant value chain links.

Amongst others, the following pertinent issues of relevance to a green economy are raised in the NDP:

- Land reform and security of land tenure in communal areas; based on the argument that people will not invest in and expand agriculture on land which does not belong to them;
Government needs to spend money on infrastructure and farmer support (especially for small farmers) to enable job creation;

Irrigation can only be expanded within the realities of the water crisis in South Africa – existing irrigation efficiency must be improved, and water reallocated where necessary; and

Expansion of agricultural production must occur not only in the large scale commercial sector where job creation potential is limited, but more importantly also in small scale farming.

Box 2.2:
Issues of relevance to agriculture in the Green Economy in the NDP

- Land reform and security of land tenure
- The need for investment in farming infrastructure and farmer support
- The need for increased water efficiency in agriculture within the limits of the resource
- The need for growth and expansion of small scale farming
2.2.4 Medium Term Strategic Framework (MTSF) 2014-2019 (the presidency, department of planning, monitoring and evaluation)

The MTSF highlights Government’s support for a competitive economy, creation of decent work opportunities and encouragement of investment. All these factors are relevant to agriculture and the green economy. The aim of the MTSF is to ensure policy coherence, alignment and coordination across government plans as well as alignment with budgeting processes. The framework makes particular reference to the agriculture sector as it is meant to ensure growth in the core productive sectors of manufacturing, mining, and agriculture and open new areas of economic growth such as the oceans economy, the green economy and shale gas (Republic of South Africa, 2014).

2.2.5 National Skills Development Strategy III (Department of Higher Education and Training)

The National Skills Development Strategy aims to ‘increase access to high quality and relevant education and training and skills development opportunities, including workplace learning and experience, to enable effective participation in the economy and society by all South Africans and reduce inequalities’ (Department of Higher Education and Training, 2010). The strategy is particularly relevant to agriculture and the green economy as it places emphasis on training to enable trainees to enter the formal workforce or create a livelihood for themselves. Furthermore, the strategy particularly targets those who do not have relevant technical skills or adequate reading, writing and numeracy skills to enable them to access employment. This potentially affords opportunities to people with low skills levels to access skills development and ultimately employment through agricultural green economy initiatives.
2.2.6 National Climate Change Response White Paper (Republic of South Africa, 2011) (Department of Environmental Affairs)

This White Paper presents the South African Government’s vision for an effective climate change response and the long-term, just transition to a climate-resilient and low-carbon economy and society. The paper (section 5.3) analyses agriculture in the context of climate change, and highlights that:

- Climate change significantly impacts agriculture, however, agriculture has significant potential for adaptation;
- Agriculture is particularly vulnerable to climate change as it is the largest consumer of water (through irrigation) and is vulnerable to changes in water availability, increased water pollution (particularly from toxic algal or bacterial blooms) and soil erosion from more intense rainfall;
- A climate-resilient agricultural response depends on the recognition that agriculture should provide not only food, but also a range of other environmental and socio-economic benefits.
- Effectively manage inevitable climate change impacts through interventions that build and sustain South Africa’s social, economic and environmental resilience and emergency response capacity;
- Make a fair contribution to the global effort to stabilise greenhouse gas (GHG) concentrations in the atmosphere at a level that avoids dangerous anthropogenic interference with the climate system within a timeframe that enables economic, social and environmental development to proceed in a sustainable manner.

This vision and objectives are aligned with the principles of a green economy and are relevant in the context of agriculture supporting and/or contributing to the green economy.
2.3 Sector strategies, plans and programmes

2.3.1 Strategic Plan for the Department of Agriculture, Forestry and Fisheries for 2012/13 – 2016/17 (DAFF)

The Department of Agriculture, Forestry and Fisheries (DAFF) has been working according to its Integrated Growth and Development Plan (IGDP) since 2009/10 (DAFF, 2012a). The Plan incorporates the intentions of the New Growth Path (NGP) of the Economic Development Department (EDD), and the Industrial Policy Action Plan (IPAP2) of the Department of Trade and Industry (DTI). In particular, the DAFF is currently focusing on initiatives that promote job creation, rural development and food security.

A number of key policy mandates and planned policy initiatives are outlined in the 2012/13 – 2016/17 DAFF Strategic Plan (DAFF, 2012b). The policy mandates and initiatives of relevance to the green economy are highlighted in Figure 2.

The DAFF strategic plan for 2012/13 – 2016/17 is structured around the achievement of six strategic goals. Two of these are particularly relevant to the green economy (Figure 3).
Policy mandates and planned initiatives relevant to the Green Economy

**Zero Hunger Programme**, which links subsistence farmers and smallholder producers with government institutions such as schools (e.g. the School Nutrition Programme), hospitals and prisons.

**Strategic Plan for Smallholder Producers**, which provides smallholder farmers with improved support including making access to land easier for these farmers, as well as high quality extension services and assistance with setting up cooperatives.

**Agro-processing Strategic Framework**, which responds to the identification of this sector in the IPAP and NGP as holding the potential for creating large numbers of jobs.

**Spatial Analysis of Agriculture, Forestry and Fisheries** (in partnership with the Department of Rural Development and Land Reform and the CSIR), to be used as a planning tool to identify interventions for amongst others, the Zero Hunger Programme and Strategic Plan for Smallholder Producers.

**Collaboration with the Food and Agriculture Organisation (FAO)** to develop a comprehensive approach to agro-ecological agriculture.

**Support for labour intensive commercial agriculture**, to prevent loss of wage jobs and targeted support to smaller scale commercial farmers who are more vulnerable to going out of business.

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Figure 2: DAFF policy, mandates & planned Initiatives relevant to the Green Economy
The strategic goals are addressed through six implementation programmes, the relevant ones being:

- Agricultural production, health and food safety (e.g. ensuring protection of indigenous genetic resources);
- Food security and agrarian reform (improve profitable food production by all producers);
- Economic development, trade and marketing (e.g. improved integration of the second economy into the mainstream economy); and
• Forestry and natural resources management (e.g. LandCare Programme).

2.3.2 Other DAFF programmes and strategic initiatives

There are a number of other DAFF initiatives which are potentially relevant to the green economy, specifically with regards to the potential for livelihoods development, resource efficiency and sustainable resource management. These include:

• Integrated Sustainable Rural Development Strategy (2000) – providing targeted support for the rural poor and emerging farmers, and also focusing on gender, poverty alleviation and health more generally;

• Integrated Food Security Strategy (2002) – the goal of this strategy is to eradicate hunger, malnutrition and food insecurity by 2015, by increasing inter alia household food production and trading, provision of income generating opportunities and job creation, and improving nutrition and food safety;

• Land Redistribution for Agricultural Development Programme (LRAD) – providing grants to black citizens to access land for farming purposes, to provide opportunities for people to develop sustainable livelihoods through agriculture, and also to stimulate agricultural production for the country;

• Comprehensive Agricultural Support Programme (CASP) – providing post settlement grant funding support to the beneficiaries of land reform and to others who have acquired their own land and who are operating value adding enterprises, which could include subsistence and household food producers as well as farmers;

• National LandCare Framework Programme – a community based approach to integrated land management, particularly natural resources, with the goal of ecologically
sustainable development, brought about through partnerships between communities, government and the private sector, and encouraging skills development and enterprise development with a focus on sustainable resource management.

2.4 Provisions for agriculture in strategic plans of other departments and sectors

Beyond DAFF’s comprehensive strategic planning for the agriculture sector, there are also provisions relating to agriculture in the strategic plans of other sectors and departments, which are supportive of the plans of the DAFF, and could also potentially be relevant to the green economy. These links are outlined in Table 1:
<table>
<thead>
<tr>
<th>Departmental or Sector Strategy</th>
<th>Links or provisions for Agriculture</th>
</tr>
</thead>
</table>
| Department of Rural Development and Land Reform Strategic Plan 2011-2014 | *Includes a focus on:*  
  - Achieving spatial equity, environmental sustainability and sustainable livelihoods;  
  - Improved skills, employment and participation of rural people in the mainstream economy; and  
  - Sustainable land reform that ensures food security – including improved systems of land rehabilitation. |
  - Agro-processing (e.g. food processing, development of the organic sector, water efficiency programme for cane growing, small scale milling); and  
  - Biofuels development – accelerated development of feedstock production and fuel manufacturing. |
| Economic Development Department (EDD) Strategic Plan 2012-2017 |  
  - Mandate of EDD includes developing programmes to promote the role of agriculture (amongst others) in employment; to invest in creating large numbers of green jobs; and to step up expanded public works programmes (e.g. community gardens and removal of alien vegetation).  
  - Strategic Objective 5: Grow the Green Economy. This includes developing and supporting projects that create jobs and have lower carbon emissions in *inter alia* agriculture.  
  - Guided by the four Accords – including the Green Economy Accord |
  - Focuses on enabling the development of the biofuels industry towards a 2% penetration of biofuels in the national liquid fuel supply in the short term.  
  - Purposes include to support renewable energy development, uplift the agricultural sector, promote sustainable development, and attract investment into rural areas. |
2.5 Provisions for agriculture in provincial and local green economy policies and strategies

In South Africa to date, the only strategies and plans which have been developed specifically for implementation of the green economy have been at the level of provincial and local government. Four provinces and one metro authority have developed green economy strategies. These strategies differ in terms of both the extent and the manner in which they refer to agriculture. The following sections outline these strategies.


The KwaZulu-Natal Green Economy Strategy has as its vision that the Province will have “an economy which provides opportunities for all its residents to prosper, and where natural resources are enhanced and used sustainably in supporting basic needs as well as ‘green’ economic growth” (p.28). The aim of the strategy is that the existing economy must be entirely replaced by a green economy, rather than seeing a green economy as simply an add-on to the existing economy. Although general reference is made to rural development projects, no specific mention is made of agriculture in the strategy. General objectives include the creation of green jobs, and self-sufficiency of the province (producing its own food, water and energy).

2.5.2 Green Strategic Programme for Gauteng (2011) (Department of Economic Development, Gauteng Provincial Government)

The Gauteng Green Strategic Programme was drafted as a specific response to the MTSF of the EDD, and to the Gauteng Employment Growth and Development Strategy. In this regard, the links to green growth and job creation are particularly relevant. Agriculture is
addressed via one of nine programme statements in the strategy, namely the programme relating to food security. The following are key focus areas in the programme:

- food security;
- local organic production and small scale urban agriculture; and
- spatial planning and land use to protect and manage biodiversity and ecosystem services.

2.5.3 **Green is Smart: Western Cape Green Economy Strategy Framework (2013) (Western Cape Provincial Government)**

The core ambition of the Western Cape Green Economy Strategy Framework is “to position the Western Cape as the lowest carbon province in South Africa and the leading green economic hub of the African continent” (p.8). The framework lists three high level priorities encompassing renewable energy, financial provision for green growth and green jobs. There is a specific focus on agri-production as one of the drivers of a low carbon economy in the framework. Emphasis is placed on sustainable farming practices, energy and water efficiency, waste beneficiation (for example biodiesel production from waste cooking oil), food security, and support for expanding value chains and markets.

2.5.4 **Limpopo Green Economy Plan (2013) (Department of Economic Development, Environment and Tourism)**

The goals of the Limpopo Green Economy Plan are outlined for the short, medium and long term. The immediate goals are to create jobs and improve on environmental quality, in the medium term to create enabling conditions for green growth and to change behavioural and production patterns, and ultimately in the long term to build a new economic and environmental paradigm for the Province.
Agriculture, food production and forestry is one of 10 focus areas in the plan. Several priorities are identified in relation to this focus area (but are not elaborated upon):

- Methods of production / farming: organic and local production, companion agriculture, permaculture and urban agriculture;
- Water efficiency, appropriate crops;
- Regulation of feedlots;
- Production of biofuel resources;
- Seed banks;
- Food labelling; and
- Food banks.

2.5.5 Green Economy Strategic Framework for the City of Tshwane (2012)

The City of Tshwane is the first local authority in South Africa to have developed a green economy strategy. The City of Tshwane Green Economic Strategic Framework has as its vision that “by 2055, growth and development in Tshwane is driven by an economy that supports a sustainable, vibrant, liveable and prosperous city, through integrated ecological, social, economic and spatial agendas that promote human and environmental well-being” (City of Tshwane, 2013). The framework comprises several themes, one of which is sustainable agriculture and food security, with the following strategic objectives:

- Develop incentives to actively promote sustainable agriculture and agro-ecology;
- Rehabilitate currently degraded common-lands and promote their sustainable use by communities and small-scale farmers;
• Promote small-scale organic farming and farm-produce, the establishment of community co-operatives and local food markets, as well as green packing houses and processing facilities that add value to local produce;

• Expand existing feeding schemes and establish community nutrition centres or restaurants that serve as educational platforms for good nutrition;

• Promote urban agriculture and establish food gardens at public institutions such as clinics, hospitals, schools and state correctional facilities; and

• Support programmes to ensure protection of agricultural land, sustained food security and local economic development.

**Note:**
Although there are some commonalities across the various strategies, plans and programmes which could support or provide for agricultural initiatives in a green economy, it is pertinent to note that no clear and common green economy focus for agriculture is evident.
2.6 A bird’s-eye view of the various strategies, plans and programmes

Table 2 provides a synopsis of the agricultural and green economy issues which are highlighted in each of the strategies, plans and programmes discussed in this chapter. Although there are some commonalities, it is pertinent to note that there is very little common ground between these documents in terms of the way in which agriculture is referred to in the context of a green economy.

Table 2: Primary issues for agriculture and the Green Economy in various Strategies, Plans and Programmes

<table>
<thead>
<tr>
<th>Strategy / plan / programme (Department)</th>
<th>Issues</th>
</tr>
</thead>
</table>
| NSSD (DEA)                             | – Sustainable Water and Land Resources Management  
– Protection of agricultural land  
– Sustained food security  
– Local economic development |
| New Growth Path & Green Economy Accord (EDD) | – Addressing unemployment, poverty and inequality  
– Support for small scale agriculture  
– Investment in agro-processing chains and expanding trade  
– Biofuel production |
| National Development Plan (NPC)        | – Land reform and security of tenure  
– Expansion of agriculture: Promotion of food production and increasing rural income and employment in the large scale and small scale sectors  
– Development of poor rural inhabitants and emerging farmers  
– Infrastructure for agriculture and farmer support  
– Improving efficiency of irrigation |
| Medium Term Strategic Framework (MTSF) (The Presidency) | – A competitive economy  
– Decent work opportunities  
– Growth in core productive sectors including agriculture |
<table>
<thead>
<tr>
<th>Strategy / plan / programme (Department)</th>
<th>Issues</th>
</tr>
</thead>
</table>
| National Skills Development Strategy III (DHET) | – Training to enable effective participation in the economy  
– Training to enable entrance into formal workforce or self-employment and livelihood creation |
| National Climate Change Response White Paper (DEA) | – The significant impacts of climate change on agriculture  
– Agriculture has significant potential for adaptation to climate change  
– The vulnerability of the agricultural sector due to climate change impacts on resources such as water (changes in availability) and soil (increased erosion from more intense rainfall)  
– Dependence of a climate-resilient agricultural response on recognition that agriculture should provide commodities and a range of other environmental and socio-economic benefits |
| Strategic Plan for the Department of Agriculture, Forestry and Fisheries | – Subsistence farmers and smallholder producers  
– Agro-ecological agriculture  
– Efficient use of natural resources  
– Protection of indigenous genetic resources  
– Green jobs to improve livelihoods  
– Increase investment in agriculture  
– Increase market access for South African products  
– Increase production of feedstock for manufacturing  
– Food security and agrarian reform: improve profitable food production  
– Integration of the second economy into the mainstream |
<table>
<thead>
<tr>
<th>Strategy / plan / programme (Department)</th>
<th>Issues</th>
</tr>
</thead>
</table>
| National sectoral strategy with provisions for agriculture (DRD&LR, DTI, EDD, DOE) | **Department of Rural Development and Land Reform**  
– Sustainable livelihoods  
– Skills, employment and participation of rural people in the mainstream economy  
– Land reform that ensures food security  
– Land rehabilitation  
**Department of Trade and Industry**  
– Support for agro-processing industries  
– Development of biofuels  
**Economic Development Department**  
– Employment / green jobs  
– Lower carbon emissions  
**Department of Energy (Biofuel Strategy)**  
– Renewable energy development  
– Uplift agricultural sector  
– Attract investment to rural areas |
| Provincial & Local Strategies | **KwaZulu-Natal**  
– Green jobs  
– Self-sufficiency (produce own food, water and energy)  
– Comprehensive overhaul of the whole economy  
**Gauteng**  
– Food security  
– Local organic production  
– Small scale urban agriculture  
– Spatial planning and land use – biodiversity and ecosystem services  
**Limpopo**  
– Methods of production / farming: Organic and local production, companion agriculture, permaculture and urban agriculture  
– Water efficiency, appropriate crops  
– Regulation of feedlots  
– Production of biofuel resources  
– Seed bank  
– Food labelling  
– Food banks |
<table>
<thead>
<tr>
<th>Strategy / plan / programme (Department)</th>
<th>Issues</th>
</tr>
</thead>
</table>
| **Western Cape**                       | – Support for agri-production and expanding value chains and markets  
                                          – Sustainable farming practices  
                                          – Energy and water efficiency  
                                          – Waste beneficiation  
                                          – Food security |
| **City of Tshwane**                    | – Promote sustainable agriculture and agro-ecology  
                                          – Rehabilitate degraded common-lands and promote their sustainable use  
                                          – Promote small-scale organic farming and farm-produce, community co-operatives and local food markets, green packing houses and processing facilities  
                                          – Expand existing feeding schemes and establish community nutrition centres  
                                          – Promote urban agriculture and establish food gardens at public institutions  
                                          – Support programmes to ensure protection of agricultural land, sustained food security and local economic development |
3. THE SETTING FOR AN AGRICULTURAL GREEN ECONOMY

The green economy has its basis in humans interacting with the biophysical environment making the green economy a social ecological system. The green economy cannot, therefore, be isolated from the biophysical or socioeconomic realm. If the agriculture sector is to support a green economy, the sector has to be in tune with social, economic and environmental conditions in order to be sustainable and deliver planned benefits in the face of changes in these variables. The Global Environment Outlook (GEO-5) report (UNEP, 2012b) highlights that in terms of the current state and trends of the global environment; population growth, economic development, urbanisation, and globalisation are driving environmental degradation. According to UNEP (2013a:3); ‘environmental pressures will increase throughout the foreseeable future, causing major changes not only in physical landscapes, but in social, political, and business landscapes as well’. These changes have to be understood and planned for in the context of a green economy.

3.1 The general context

There is international acknowledgement that meeting the food needs of an expanding population while addressing climate change and other environmental problems and supporting economic growth requires a change in the way agriculture is practised (IAASTD, 2009; UNEP, 2011b; FAO, 2012b). The required changes entail making the practice of agriculture greener, and greener agriculture is better aligned with green economy principles. Linked to the concept of a green economy, UNEP (2011b) highlights that agricultural practices that simultaneously maintain and increase farm productivity and profitability while maintaining and building ecological resources such as soil and water are crucial for greening agriculture. A key element of greening agriculture is reducing waste and inefficiency in the whole agriculture production and consumption chain, from crop
losses due to pests and hazards, food waste in storage, distribution, marketing and at household level (UNEP, 2011b).

In a similar vein, the World Farmers Organisation has put forth four primary goals for agriculture in the context of the green economy: produce more with less; use a knowledge-based approach of best practices; reward farmers for adopting sustainable practices; and break the poverty cycle (World Farmers' Organisation, 2012). These goals relate to the fact that for agriculture to provide a basis for the green economy, it has to be able to meet demands for food, social equity, economic growth and environmental protection. This means that agriculture has to be multifunctional, so that, in addition to meeting current and

**Box 3.1:**
Requirements for making agriculture a dynamic sector which can underpin green economy initiatives:

- Adoption of supportive frameworks and investment in infrastructure and markets;
- Access to markets at the local, regional and global levels in order for farmers to sustain a livelihood from their activities— in some areas, this means improving access to transport, storage, and market facilities;
- Maintaining and increasing farm productivity and profitability;
- Producing food and agricultural goods and services on a sustainable basis;
- Reducing negative externalities and gradually leading to positive ones;
- Rebuilding ecological resources (i.e. soil, water, air and biodiversity “natural capital” assets);
- Reducing pollution and using resources more efficiently; and
- Maintaining ecosystem services on a sustained basis.

Source: The Farming First coalition (http://www.farmingfirst.org/)
future needs for food and fibre (and other biomass based materials), it also needs to provide non-commodity goods and services (such as carbon sequestration), reduce poverty and enable inclusive economic growth and not disrupt social and cultural systems.

With the state of many developing countries where there is food insecurity and large poor rural populations, green economic initiatives in the agriculture sector are critical for achieving the triple goals of a secure food supply, poverty reduction through improved rural livelihoods, and environmental sustainability through a reduced footprint and climate change adaptation (Farming First, 2013). Green economy initiatives in the agriculture sector have the potential to transform the lives of large numbers of people. Currently 65% of people in developing countries are involved in agriculture with 1.3 billion of them being small farmers; and these could be affected positively if agriculture and the associated economy it supports are improved (Farming First, 2013). A green economy which is linked to and supported by agriculture has the potential to impact on a significant proportion of South Africa’s population. South Africa’s 2011 census results show that 2.9 million households in the country (20%) were involved in agriculture, mainly subsistence and smallholder farming, with the largest percentage of agricultural households being located in KwaZulu-Natal (25%), Eastern Cape (21%) and Limpopo (16%) (Statistics South Africa, 2011). These households could potentially participate in the green economy through agricultural activities. Since agriculture is a vital component of South Africa’s economy, improving sustainability and inclusivity in the sector could make a significant contribution to steering the country towards a green economy.

3.2 South Africa’s unique social circumstances

An underlying principle of virtually all government policy in South Africa is to address the injustices of past discriminatory policies and practices. This is underpinned by bringing the previously excluded black community into the mainstream economy through job creation and entrepreneurship. This has also been the case in the agricultural
sector, where policy reforms include land reform, a minimum wage for farm workers, agricultural support for disadvantaged farming communities, and a broad based programme of economic empowerment for the black population (De Villiers et al., 2009).

South Africa has a legacy of inequalities relating to land tenure and access to various resources, and the role of agriculture in supporting a green economy is likely to be affected by these inequalities. However, other issues such as widespread unemployment and poverty, a large unskilled work force excluded from the formal economy, weak social and education systems, a significant level of crime and a high prevalence of HIV/AIDS (Scotcher, 2009) would also have a bearing on the ability of agriculture to contribute to a green economy. Agricultural green economy initiatives would need to contribute to addressing key socio-economic issues such as poverty and limited economic opportunities for the majority while safeguarding existing desirable livelihoods and social systems.
3.2.1 Poverty

Poverty can be defined as the inability to achieve a minimal standard of living, which is often measured in terms of basic consumption needs or the income required to satisfy these needs. However, poverty is in fact more than income and consumption needs and should be viewed as nuanced and multi-layered. For example, poverty includes continuous ill health, hard and hazardous work that is poorly remunerated, no power to bring about change, and high levels of anxiety and stress. Poverty is also not a static condition. People can easily fall into poverty as a result of shocks and crises that may harm their livelihoods or food security, and as a result of long-term trends (such as racial and gender discrimination, environmental degradation and macro-economic trends) (Government of South Africa, undated).

Globally, of the 1.4 billion people living in extreme poverty (defined as those living on less than USD 1.25/day) in 2005, approximately one billion or around 70% lived in rural areas (IFAD, 2011). Further, it is estimated that globally, 2.6 billion people depend directly on agriculture for their livelihoods, the majority of them on small farms and in rural areas. Many of these people live on less than one US$ per day (UNEP, 2011b). UNEP (2014) further highlights rural poverty, stressing that 75% of the world’s poor live in rural areas, where “agricultural workers suffer the highest incidence of poverty, caught in a cauldron of low productivity, seasonal unemployment and low wages”. In South Africa, poverty rates (based on the food poverty line5) are higher in rural (30.7%) than in urban areas (11.9%) (Statistics South Africa, 2012b). The number of people living below the food poverty line in 2011 was estimated at 10.2 million people (20.2% of the population of South Africa) (Statistics South Africa, 2014). The

5 The food poverty line is the level of consumption below which individuals are unable to purchase sufficient food to provide them with an adequate diet. Those below this line are either consuming insufficient calories for their nourishment, or must change their consumption patterns from those preferred by low income households’ (Statistics South Africa, 2012b).
severity of poverty\(^6\) is also higher in rural (18.1\%) than urban areas (6.2\%) (Statistics South Africa, 2014).

In addition to the issue of rural poverty, rapid urbanisation and increasing urban poverty are pressing issues for developing countries, including South Africa. In 2001, 56.2\% of the population of South Africa lived in cities, increasing to 60\% in 2009, with an expected urban population of approximately 70\% by 2024 (Frayne et al., 2009). This rapid urbanisation poses challenges in the form of urban sprawl, which destroys agricultural land and increases the demands for energy, water and food. Rapid urbanisation has meant the transfer of rural poverty problems into urban areas; a phenomenon which is on the rise globally. Ravallion (2007) reports that “among those living on no more than $1 a day, the proportion found in urban areas rose from 19\% to 24\% between 1993 and 2002”. One of the manifestations of urban poverty is food insecurity. Food insecurity is high in the urban areas of South Africa and Southern Africa (Frayne et al., 2009).

3.2.2 Inequality

In addition to the common understanding of inequality as referring to an unequal distribution of income and/or wealth, inequality can include anything from gendered division of labour, valuation of knowledge between young and old, class divisions between poor and rich, to overt policies of exclusion, e.g. along racial lines. Box 3.3 provides some examples of issues relating to inequality in South Africa.

\(^6\) Poverty severity: this takes into account the distance separating the population from the poverty line (the poverty gap) and the inequality among the poor (Statistics South Africa, 2014).
Box 3.3: Apartheid policies of exclusion

- Apartheid’s policies of exclusion and inequality still have an impact today:

- Wide disparities of income between rich and poor; with one of the highest Gini coefficients (a measure of income inequality) in the world;

- In 2011, South Africa’s Gini coefficient was 0.69, (Statistics South Africa, 2013a); in comparison with coefficients of 0.33 and 0.32 for Ethiopia and the UK respectively (CIA, 2014);

- Low social capital still a debilitating issue for black South Africans (PCAS, 2004);

- Existence of the so-called “two-economies” which intensifies the inequality between groups (Gelb, 2003; New Growth Path, 2010; Faccer et al., 2012); and

- Necessity of land redistribution programs in South Africa for emerging farmers. UNEP (2011b) for example argues for national policies to be implemented that support improved land tenure rights of smallholder farmers. They assert that more secure tenure is needed for farmers if they are to take on more risks associated with embarking on new green agricultural initiatives (UNEP, 2011b).
In addition, inequality between the sexes is also an issue that can be of importance in the context of agriculture supporting a green economy. For example, the unequal division of labour in more traditional societies can impact negatively on the ability of women to participate in, and benefit fully from agricultural green economy initiatives. UNEP (2011b) highlights that what may be required are targeted programmes for women smallholder farmers. They argue that securing collective and individual legal rights to land and productive resources (e.g. water, capital), especially for women, is essential for the effective participation of women in agriculture linked to the green economy. For example, access to working capital for women could be improved through microfinance, which would allow for much greater numbers of small-scale producers to procure green inputs and technologies (World Bank, 2009).

3.2.3 Unemployment, livelihoods, and the informal economy

Many developing countries, including South Africa, have high unemployment rates. In June 2012 the unemployment rate in South Africa stood at 24.9%, while in the same year unemployment rates in some of the agricultural provinces were higher than the national average (32.9% in the Free State, 29.9% in the Northern Cape and 28.9% in Mpumalanga) (Statistics South Africa, 2012a). Given the high unemployment rates, particularly in provinces dominated by agriculture in South Africa, it is imperative to create employment opportunities through green economy initiatives in the agriculture sector. In addition, employment in the agriculture sector has been on the decline in the last decade (DAFF, 2010).
High unemployment rates often mean increased dependence on natural capital for livelihoods by poor communities, especially those living in rural areas (UNEP, 2011b). This, in conjunction with high poverty rates, can impact negatively on the environment through a lack of pro-environmental behaviour. However, the availability of labour could be an incentive for the establishment of labour intensive agricultural green economy initiatives. Linkages to secure niche markets for green produce could secure higher returns for such jobs. UNEP (2011b) states that green agriculture has the potential to create more jobs and provide higher returns on labour inputs compared to conventional agriculture.

Furthermore, in countries where poverty and unemployment rates are high, there is also a strong informal economy such as the case in

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**Box 3.4:**
**The green economy, agriculture and inequality**

“The transition to a green economy in agriculture requires supportive enabling environments that promote investments, entrepreneurship and innovation. It also requires a keen focus on inclusivity, ensuring that smallholder farmers and particularly women and youth are able to engage. Global trade rules need to be sensitive to these challenges and the World Trade Organization addresses this issue by supporting developing countries to invest public funds into agricultural crops important for food security and inclusive economic growth.”


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*Natural Capital* is the stock of natural assets which include geology, soil, air, water and all living things. It is from this Natural Capital that humans derive a wide range of services, often called ecosystem services, which make human life possible (World Forum on Natural Capital, 2014).

*Informal economy:* “The informal economy is comprised of all forms of ‘informal employment’—that is, employment without labour or social protection—both inside and outside informal enterprises, including both self-employment in small unregistered enterprises and wage employment in unprotected jobs” (Chen, 2007).
South Africa. The informal economy in South Africa has grown significantly, more than doubling during the period 1997 to 2009 (Wills, 2009; Adcorp Employment Index, 2011). However, the informal economy can be seen as a ‘short term’ solution to poverty, with the emphasis being on ‘survival strategies for the poor’ (Nabudare, 2006), and these strategies help satisfy basic human needs while generally neglecting environmental issues.

Nevertheless, for many people the informal economy provides an alternative means of earning a livelihood. These alternative forms of livelihood provision do not necessarily feature in policy or formal planning initiatives, and may be overlooked when planning for initiatives such as agricultural green economy projects. In establishing agricultural green economy initiatives, a qualitative context analysis is needed. This kind of analysis can feed into planning based on international and national policies which have been developed or recommended.

3.2.4 **Balancing different knowledge types and practices**

Agricultural green economy initiatives have to be tailored for specific contexts and apply different types of knowledge and practices appropriately if they are to be sustainable. UNEP (2011b) notes that traditional/indigenous farming practices, or farming practices that have been carried over from generation to generation, might not always be completely suitable for the way in which green agriculture is envisaged (depending on the circumstances). UNEP (2011b) further asserts that traditional or subsistence agriculture has, for example, no or limited use of off-farm inputs, which can result in low productivity, low value-add per worker, and extraction of soil nutrients without sufficient replenishment by organic or inorganic fertilisers. In addition, they contend that because traditional or indigenous agriculture has limited scope for capital intensive farm mechanisation and intensive use of external agrochemical inputs, it can trap already poor farmers in a downward spiral of growing poverty.
While in some cases it may be necessary for new practices to be implemented, in other cases, traditional practices, particularly those that make use of local knowledge, and that are labour intensive, may be more appropriate, both in terms of being sustainable and in terms of providing livelihood opportunities. Nevertheless, even in cases where new practices need to be implemented, this needs to be done very carefully and with cultural sensitivity. Communities who still use traditional practices are likely to place a great value on cultural practices and the knowledge that has been carried over from generation to generation. One also has to be aware that this knowledge, apart from having practical applicability, may also be intricately woven into the social fabric and labour practices of a community. Certain practices may not contribute to furthering agricultural practices which are compatible with a green economy; however, they may have extensive cultural and spiritual meaning. Similarly, some practices might also be integral to specific modes of social networking and support, especially for women in patriarchal communities. A balance would thus need to be sought between traditional and green agricultural practices which come with green economy initiatives. Failing this, there could be a rejection of agricultural green economy initiatives by communities who are meant to benefit from them.
4. OPPORTUNITIES AND CHALLENGES FOR CROP-BASED AGRICULTURAL GREEN ECONOMY INITIATIVES IN SOUTH AFRICA

In dealing with agriculture in a green economy context, it is important to ensure that risks and opportunities associated with changing climatic and other conditions such as trade terms (at both the local and global scales) are understood and addressed. Although agriculture has been identified as one of the sectors that should support green economic growth in South Africa, there are diverse factors that could affect the effective contribution of agriculture to a green economy. These range from changeable aspects such as social conditions to non-changeable circumstances such as climate. There are also features of agriculture that make it uniquely suited to contribute to a green economy and others that present specific challenges for the contribution of the sector to a green economy. For effective planning, it is important to be cognisant of the potential opportunities and challenges presented by agriculture in the context of a green economy. This chapter highlights South Africa’s unique conditions that are likely to present both challenges and opportunities for crop-based agricultural green economy initiatives.

4.1 Resource scarcity and degradation

A major challenge impeding the ability of the agricultural sector to meet the food security needs of a growing population is the rising scarcity and degradation of land, soil and water resources. Although South Africa has a relatively large total land surface area (122 million hectares), only about 14 million hectares, or around 11% of the total, is arable (i.e. suitable for crop production); excluding the area under commercial forestry. Furthermore, “soil erosion and degradation of agricultural land through overexploitation and inappropriate and unsustainable farming methods pose a threat to the country’s food security” (UNEP, 2013a: 8). The rate of land degradation is high, with 70% of South Africa’s agricultural land currently classified as
degraded, with potential negative implications for food production (DEA et al., 2010).

Furthermore, South Africa has a relatively low annual rainfall, and “water is extracted from most of the country’s 22 major rivers to supply the growing number of domestic, agricultural and industrial users. It is estimated that national water requirements will exceed availability by 2025. This is exacerbated by the fact that water quality has been seriously compromised in many areas” (UNEP, 2013a: 8). The scarcity and/or degradation of land, soil and water resources have an impact on the ability of agriculture to sustain green economy initiatives.

4.2 Changing climatic conditions

Although agriculture in general, and crop production in particular could potentially contribute towards a green economy for South Africa, changing climatic conditions present challenges for South Africa’s agriculture sector, and these challenges would in turn impact negatively on green economy initiatives premised on agriculture. Climate change projections for South Africa indicate increased temperatures across the country, an increase in precipitation in some parts of the country and a decline in precipitation in other parts; as well as increases in the magnitude and frequency of extreme events such as floods and droughts (Lumsden et al., 2009). These changes have implications for ecosystems and their capacity to provide services such as water; as well as for crop production and yields (Du Toit et al., 2002; Midgley et al., 2007; Walker and Schulze, 2008); which will in turn affect the country’s food security. Climate change is already threatening the ability of some rain-fed agriculture-dependent regions to maintain levels of agricultural production and food security; and is destabilising markets (UN, 2010). Climate change poses a real threat to agriculture-based green economy initiatives, especially in southern Africa, where it is estimated that yields from rain-fed agriculture could be reduced by up to 50% between 2000 and 2020 (IPCC, 2007).
Due to the variation in the magnitude of changes in climate across South Africa, Gbetibouo et al. (2010) show that there is spatial differentiation in the vulnerability of South Africa’s farming sector to climate change, with vulnerability being intrinsically linked to the level of socio-economic development. The most vulnerable provinces were found to be areas of low socio-economic development, i.e. largely rural, with a high share of small scale farmers, relying on rain fed agriculture, a high level of soil degradation, and low employment, among other factors. Poverty rates in South Africa’s rural areas are higher than in its urban areas (Statistics South Africa, 2012b) and the poor are especially vulnerable to climate change (IPCC, 2014). While agriculture-based green economy initiatives present opportunities for poor rural areas, the high vulnerability of these areas to climate change should be considered and planned for accordingly. Changing global and climatic conditions will result in unpredictable availability (due to wide variation in growing conditions and extreme weather events), quality, and price of agricultural products; affecting profitability and thus sustainability of agriculture-based green economy initiatives.

### 4.3 Environmental impacts of agriculture

The New Partnership for Africa’s Development (NEPAD) noted with concern, that in many parts of Africa, environmental degradation and unsustainable exploitation of natural resources threaten to reduce the future productivity of agriculture and natural resources, (NEPAD, 2002). Similar concerns have been expressed by the Millennium Ecosystem Assessment (MA). According to the MA (Millennium Ecosystem Assessment, 2006), two-thirds of the earth’s ecosystem services\(^9\) are in decline, while the resources which underpin the world’s food production are finite, declining, and in some cases disappearing. Farming practices need to focus on managing natural resources wisely and conserving biodiversity and ecosystem services if agricultural production is to increase in the face

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\(^9\) Ecosystem services are benefits people derive from ecosystems (Millennium Ecosystem Assessment, 2005) or from nature.
of increasing demands for food and other agricultural commodities, climate change, and limited resources (Scotcher, 2009).

Worldwide, land transformation is the major driver of ecosystem and biodiversity loss. Almost 30% of the Earth’s terrestrial area has been converted to urban areas or cropland, leading to habitat loss and fragmentation, with resulting species extinctions. Land transformation has left 34% of South Africa’s terrestrial ecosystems (and their associated ecosystem processes and services) threatened, and of these, 21 ecosystems (5%) are critically endangered (Scotcher, 2009). According to Scotcher (2009), a business-as-usual approach would lead to serious consequences by 2050, by which time 11% of the natural areas that existed in 2000 could have been lost, predominantly as a result of conversion for agriculture, a switch from low-impact farming to intensive farming, urbanisation, and uncontrolled alien plant infestations. The associated loss of species and ecosystems would not only affect agricultural productivity, but also local, regional, and global productivity through the loss of services such as climate regulation, air quality and water availability (Scotcher, 2009). The loss of agricultural productivity would negatively impact on the backward and forward linkages of agriculture with other sectors of the economy, for example, it would result in the shortage of raw material inputs for the manufacturing sector.

The environmental impacts of agriculture are not limited to large-scale commercial agriculture. Small-scale farming, although utilising low levels of inputs and little machinery, also has adverse effects on the environment. In South Africa, soil degradation has been reported to be most severe in many communal croplands and grazing lands (Meadows and Hoffmann, 2002) where small-scale agriculture is practised. South Africa has grappled with land degradation caused by agriculture for many decades, and the negative environmental consequences of agriculture have been widely documented (e.g., Giliomee 1992; Yeld 1993; Scotney 1995; Mather 1996).
Agriculture is one of the human activities which contribute to climate change through greenhouse gas emissions. The sector (excluding land use change) is estimated to directly contribute 10 to 12% of global anthropogenic greenhouse gas emissions (Smith et al., 2008). Emissions from agriculture are varied, and include carbon dioxide emissions from soils, particularly from tillage and fertiliser and manure application; conversion of natural or semi-natural ecosystems, e.g. woodlands to agriculture; methane emissions from ruminant livestock and manure; and burning of fossil fuels in agricultural machinery.

4.4 Post-harvest food losses and food waste

Recent studies suggest that, globally, between one third and half of all food produced for human consumption is lost or wasted (Lundqvist et al., 2008; Gustavsson et al., 2011). As such, it could be argued that the issue of food security is not necessarily (or not only) one of food production, but rather one of distribution. Indeed, it has been argued (e.g. by the FAO) that there is enough food produced in the world to feed the entire global population, but that this food is not always available in the right places and accessible to the people who need it; while a significant proportion of this food ends up going to waste. As such, it could be argued that much of this lost and wasted food could have been used to feed the hungry, had it been better managed and distributed. In terms of the green economy, this suggests that there are significant opportunities for improving food security through reducing losses and waste, without necessarily increasing agricultural production (and the associated environmental impacts).

Food losses and waste arise throughout the supply chain, from agricultural production, storage, transportation, processing, distribution, at retailers, and in the kitchens of restaurants and households. As such, not only do food losses imply wastage in the form of reduced availability of food; they also imply a waste of resources (e.g. water and energy) used (and emissions generated) along the supply chain. Again, this is significant from a green
economy perspective, as it suggests that much of the ‘greening’ of agricultural value chains can be achieved through the reduction of losses and waste, at little cost in terms of food security.

A recent Council for Scientific and Industrial Research (CSIR) study (Nahman and de Lange, 2013) has estimated that the total quantity of food waste across the value chain in South Africa (including agricultural production, post-harvest handling and storage, processing and packaging, distribution, and consumption) amounts to 10.2 million tonnes per annum. On the other hand; in terms of food waste at different stages of the value chain, there is a more or less even spread among the four pre-consumer stages (agricultural production, post-harvest handling and storage, processing and packaging, and distribution), with each of these stages contributing between 20 and 26% of the overall mass of food waste; while post-consumer food waste only contributes 5% to the total.

These patterns can largely be explained by financial, managerial and technical limitations in harvesting techniques, storage and cooling facilities (exacerbated by difficult climatic conditions), infrastructure, packaging and marketing systems in developing countries (Parfitt et al., 2010). This suggests that investment in overcoming these limitations is an important requirement for reducing food losses and waste, and therefore for greening the agricultural value chain in developing countries, while contributing towards food security.
4.5 Opportunities linked to agricultural practices

Despite the limitations of agriculture in terms of its negative environmental impacts and the threats posed by resource scarcity and degradation and changing global conditions, South Africa’s agricultural sector could contribute towards a green economy if it adopts green practices and addresses environmental problems. While the contribution of the sector to a green economy requires more than simply ‘green agriculture’, (because, for example there are key social aspects that also need to be considered), agriculture has to be ‘green’, as one necessary (but not sufficient) condition for it to contribute to a green economy.

The greening of agriculture can be achieved through the application of a variety of agricultural production techniques and practices. Some of the practices which can contribute to the greening of agriculture, and thereby to aligning the sector with the requirements of a green economy include conservation agriculture, which aims to sustain production through enhancing the resource base and environment;

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**Box 4.1: The greening of agriculture**

According to UNEP (2011b:42), “the greening of agriculture refers to the increasing use of farming practices and technologies that simultaneously:

- Maintain and increase farm productivity and profitability while ensuring the provision of food and ecosystem services on a sustainable basis;
- Reduce negative externalities and gradually lead to positive ones; and
- Rebuild ecological resources (i.e. soil, water, air and biodiversity natural capital assets) by reducing pollution and using resources more efficiently.
organic farming, a production management system that aims to promote and enhance ecosystem health; and the bio-economy, which encompasses the production of renewable biological resources and their conversion into food, feed, bio-based products and bioenergy. Market branding certifications such as Good Agricultural Practices (GAP) and others and the use of biochar for carbon dioxide emission reduction can also contribute to the greening of agriculture. Furthermore, agricultural practices can be applied to mitigate greenhouse gas emissions. Several farming practices and technologies can mitigate climate change by reducing greenhouse gas (carbon dioxide, methane and nitrous oxide) emissions, enhancing carbon storage in soils and plants, and preserving existing soil carbon.

Farming practices and technologies which restore and enhance soil fertility through the increased use of naturally and sustainably produced nutrient inputs, use of diversified crop rotations, integration of crop and livestock production and reduction of chemical pesticide use and food waste can all contribute to the greening of agriculture (UNEP, 2011b: 42). Some of these strategies have also been highlighted by the South Africa Green Economy Summit discussion document (DEA et al., 2010) as practices that could provide opportunities for green economic activities supported by agriculture in South Africa. The Green Economy summit identified additional strategies in the specific context of South Africa, and these include improving water and energy use efficiency and others (Figure 4).
Figure 4: Strategies to enable South Africa's agriculture sector to support a Green Economy Adapted from SA Green Economy Summit discussion document (Source: DEA et al., 2010)
4.6 Potential contribution of agriculture to poverty reduction and economic growth in the context of a green economy

Agriculture-based green economy initiatives present real opportunities for addressing rural poverty in a sustainable manner. This is particularly important given the fact that poverty disproportionately affects rural areas. Green agricultural initiatives can potentially contribute towards reducing poverty (UNEP, 2011b). This reduction of poverty could be achieved through policy reforms and investments, which should be aimed at greening agriculture and offering opportunities to diversify economies; as well as providing livelihood opportunities and access to resources for smallholder farmers. Such reforms and investments can provide an enabling environment for the sector to “reduce poverty through increased yields and creation of new and more productive green jobs – especially in rural areas, ensure food security on a sustainable basis, and significantly reduce the environmental and economic costs associated with today’s industrial farming practices” (UNEP, 2011b).

Box 4.2: Agricultural growth and poverty

Agricultural growth has a powerful impact on reducing poverty across all types of countries. Estimates show that GDP growth originating in agriculture is at least twice as effective in reducing poverty as GDP growth originating outside agriculture. For China, aggregate growth originating in agriculture is estimated to have been 3.5 times more effective in reducing poverty than growth outside agriculture – and for Latin America 2.7 times more.

The potential role of a green economy premised on agriculture in reducing poverty should be assessed in the context of the linkages of agriculture to poverty reduction. There is evidence that economic growth in the agriculture sector is a crucial factor in poverty reduction (World Bank, 2007). For example, there is evidence from China, India and other developing countries that there are strong linkages between agricultural growth in general and poverty reduction among smallholder farmers (Djurfeldt, 2013). The African Development Bank (2010) notes that agricultural growth is a proven driver of poverty reduction, and that when agriculture stimulates growth in Africa, the growth is twice as effective in reducing poverty as growth based in other sectors.

Due to their vulnerability, smallholder farmers should particularly be targeted through agricultural growth. The UN (2010) supports the targeting of smallholder farmers and notes that; “only by supporting small producers can we help break the vicious cycle that leads from rural poverty to the expansion of urban slums, in which poverty breeds more poverty” (UN, 2010: 5). The International Fund for Agricultural Development (IFAD, 2013) further notes that supporting smallholder farmers to play a greater role in food production and natural resource stewardship is one of the quickest ways to lift over one billion people out of poverty and sustainably nourish a growing world population.

Currently there are opportunities for poor households in South Africa to engage in agricultural green economy initiatives. For example, 13.9% of poor households in South Africa own or have access to land that could be used for crop production or raising livestock (Statistics South Africa, 2012b). This access to land presents an opportunity for poor households to participate in the green economy through agricultural initiatives. However, up to 20% of the households which have access to land do not utilise the land for agricultural production. An investigation of the reasons why poor households who own or have access to agricultural land do not utilise it; found that 70.7% of households cited lack of funds, 49.0% lack of equipment, and 28.9% lack of skills as the main reasons for not utilising this land (Statistics
South Africa, 2012b). In addition, there have been challenges in land reform in South Africa, and in providing support to emerging farmers. Addressing the factors that hinder poor households from utilising the land that they have access to, and providing them with the support required to establish and run agricultural green economy projects, could contribute towards reducing poverty.

For agriculture to be a driver of poverty reduction; there must be strategies in place for pro-poor agricultural growth. However, there are no universally applicable strategies, as these have tended to vary among countries (Djurfeldt, 2013). One of the important criteria for agricultural growth to be pro-poor is inclusivity, in the sense of involving the majority of smallholders in improvement initiatives, and their gradual integration into commercial production and into national, and possibly global, value and market chains (Djurfeldt, 2013). The policies for ensuring inclusivity in situations of scarce public resources have also varied, with governments targeting regions or smallholder segments to fulfil criteria which favour the poor (Birner and Resnick, 2010; Smale and Jayne, 2010).

It should be borne in mind that agriculture alone is not capable of addressing poverty. An agricultural-led path out of poverty does not occur through the growth of the agricultural sector alone, but requires other factors to be in place. For example, the choice of agricultural enterprises (growing staples versus non staple crops), the role of the state, and issues of market integration all have a bearing on the effectiveness of agriculture in addressing poverty. In addition, there is a need for a diversified economy which is not reliant solely on primary sectors (such as agriculture) and on exports of low value commodities; but which also conducts processing and beneficiation throughout the value chain, comprising of secondary industry and tertiary sectors. Developing the agriculture sector in the context of a green economy therefore requires a holistic approach which addresses these different factors.

It has been shown that some types of investments are more effective than others in achieving agricultural growth, with the
multiplier effects being significantly higher when growth is triggered by higher incomes for smallholders, stimulating demand for goods and services from local sellers and service providers (UN, 2010). In addition to addressing rural poverty, agriculture-based green economy initiatives could also help to alleviate urban poverty, by offering an alternative to migration to urban slums, through providing opportunities for sustainable livelihoods and increased food security in rural areas. Although agricultural green economy initiatives could potentially reduce rural poverty, in many situations, a number of factors, including low agricultural production and limited market access hinder the capacity of the sector to drive poverty reduction. The UN (2010) notes that raising agricultural production (particularly in food deficit countries), while at the same time improving the livelihoods of smallholder farmers and preserving ecosystems, would contribute to rural development; and thereby slow the trend towards urbanisation, and the attendant stress it places on public services in urban areas (UN, 2010).

Agriculture is, however, not always an effective driver of poverty reduction. In most African countries, poverty levels are high among farmers, particularly smallholder farmers. Proponents of agriculture as a driver of rural development and economic growth note that the poor performance of the sector to date reflects inadequate investment, as well as policies that are historically biased against the agricultural sector (Fan et al., 2004). It is also argued that potentially there are large gains from investing in rural infrastructure and agricultural technology (Diao et al., 2010); and for agriculture to contribute to green economic growth, conducive conditions have to be created.

It is important to note that agriculture is not expected to, and is not going to be, a universal driver of green economic growth and poverty reduction at all levels. Nevertheless, while the contribution of agriculture to the economy may seem small at a national level; at a local level, the contribution could be significant in certain areas. In South Africa, for example, nationally, agriculture contributed only 2.4% to GDP in 2011 (DAFF, 2012c); while its contribution to local
economies in some areas was much higher. For example, agriculture contributed 25% to the economy of the Greater Sekhukhune district in Limpopo Province in 2012 (Limpopo Business, 2012). Experiences from other African countries also highlight the importance of agriculture to local economies. An example from Rwanda (Diao et al., 2010) highlights that agriculture was found to account for half of the average household income at the national level, but three-quarters of income for the average poor household. The importance of agricultural incomes was found to be even greater in poorer regions of the country.

In the SAGEM Report (UNEP, 2013b), agriculture is identified as one of the four sectors assessed in terms of the potential impacts of green investment on economic growth. Specifically, the agriculture case study focuses on the adoption of sustainable agricultural practices, in particular the use of organic as opposed to chemical fertilisers; and the resulting effects on yields, land requirements, and avoided CO₂ emissions. Targets were based on the National Development Plan (NDP) targets for increasing yield and land under agricultural production, although in this case it was assumed that this land would be under organic rather than chemical fertiliser. The assessment was done using a systems dynamic model, based on relationships between variables as illustrated in the causal loop diagram presented in Figure 5.
Box 4.3:
Determinants of the effectiveness of agriculture as a contributor to economic growth

- Linkages between agriculture and other sectors of the economy – in many countries agriculture has strong growth linkages with other sectors;

- Ability to transform individual success stories into broader agricultural development;

- Availability of appropriate innovations in science and technology - these are both a precondition for and a part of agricultural transformation. African farmers need technologies applicable to their diversified agro-ecological conditions in order to deal with different challenges e.g. erratic rainfall;

- Availability of appropriate technologies to support agricultural intensification – to achieve a shift from expansion of land for agriculture;

- Development of supply chains around small-scale farmers to increase farm production and deliver goods to consumers at competitive prices e.g. presence of input markets, seasonal finance, and marketing systems;

- Investments in agricultural research and in market and institutional development in order to reduce costs and mitigate risks; and

- Rural infrastructure - to stimulate the rural non-farm economy and rural towns, and improve integration of these areas into national economies.

(Source: Diao et al., 2010)
Figure 5: Causal loop diagram: Effects of green economy investment on agricultural production (Source: UNEP, 2013b)
Figure 5 shows that, “being a production sector, agriculture has an influence on macroeconomic indicators related to a green economy. An investment in ‘resource conservation’ and ‘agriculture capital’, will lead to an increase in ‘agricultural production’ with a consequent increase in GDP with opportunities for further investments” (UNEP, 2013b: 25). Agriculture thus has the potential to contribute to green economic growth which could translate to poverty reduction if poor people have the opportunity to participate in agricultural activities linked to a green economy. This study revealed that green economy investments can contribute to 46% more restored land by 2030, and greater water availability, without reducing the amount of land for agriculture. It also found that in the agriculture sector, investment in ecological practices could increase crop yields by as much as 23.9% by 2030, while avoiding further greenhouse gas emissions.

5. LESSONS FROM EXISTING INITIATIVES

Although the concept of a green economy is relatively new, both in South Africa and globally, agricultural green economy initiatives in South Africa need not start from scratch. There are existing agricultural plans, programmes and projects which, while not explicitly branded as “green economy” initiatives, nevertheless apply some of the principles of a green economy. As such, these existing initiatives provide pertinent examples which new green economy initiatives could learn from and build upon. Many ongoing plans, programmes and initiatives are aligned with some of the principles of a green economy, and could, with relatively minor adjustments, become fully aligned with green economy imperatives. Such adjustments are likely to cost less in terms of resource and time investments than starting brand new initiatives. This section presents examples of plans, programmes and initiatives which are aligned to some of the principles of a green economy, and could therefore provide a foundation for agricultural green economy initiatives.
5.1 South African national government plans and programmes

Although agriculture has been identified as one of the sectors that could contribute towards a green economy in South Africa, currently (at the time of compiling this document [August 2014]) there is no publicly available information from the DAFF (e.g. on the department’s website) on any aspect of agriculture in the context of a green economy, nor is there a vision on how agriculture would support a green economy. Furthermore, no explicit ‘green economy’ initiatives linked to agriculture have been publicised by DAFF. Nevertheless, certain DAFF objectives, as elucidated through the mandates and functions of its different directorates, are aligned with the concept of agriculture contributing towards a green economy in the broad sense, as explained by South Africa’s Green Economy Summit discussion document (DEA et al., 2010). The document defined greening the economy as ‘the process of reconfiguring businesses and infrastructure to deliver better returns on natural, human and economic capital investments, while at the same time reducing greenhouse gas emissions, extracting and using less natural resources, creating less waste and reducing social disparities’.

Specifically, DAFF’s strategic priorities (as indicated in the Department’s Strategic Plan for 2012/13 to 2016/17)\(^{10}\) include employment creation; improving agricultural output; food security and incomes; enhancing exports and markets for agricultural commodities; and sustainable utilisation of natural resources through environmentally sustainable production systems. These priorities are aligned with the requirements for South Africa’s agriculture sector to contribute to a green economy.

Furthermore, several DAFF functions and programmes such as the LandCare Programme\(^ {11}\) and the natural resources management


\(^{11}\) [http://www.nda.agric.za/docs/landcare/landcare.htm](http://www.nda.agric.za/docs/landcare/landcare.htm)
programme\textsuperscript{12} are compatible with the notion of a green economy. The functions of the DAFF directorates of plant production, subsistence farming, agro-processing, and cooperatives and enterprise development include: supporting the crop production sector in South Africa to ensure food security, economic development, development of subsistence producers and sustainable food production\textsuperscript{13}. These functions are aligned with the principles of a green economy, in particular those which allude to sustainable development, resource and energy efficiency and delivery of poverty reduction, well-being and livelihoods, and access to essential services. In addition, the functions of some other government departments and programmes are aligned with and could support or provide opportunities for the establishment and running of green economy initiatives based on agriculture. The DTI’s strategic plan (2012/13-2016/17\textsuperscript{14}) makes explicit reference to the green economy, specifically highlighting the green industries sector. The DTI Industrial Policy Action Plan (IPAP2) 2012/13-2014/15 (2010)\textsuperscript{15} identifies strategies and action plans focussed on the agriculture sector, amongst others. These strategies could provide a basis for some agricultural green economy activities. One such strategy is the ‘Soybean Strategy and Action Plan’, the focus of which is the acceleration of the development of the soybean value-chain at both the upstream agricultural level and the downstream processors level. Significant potential to increase local soybean production by both commercial and smallholder farmers has been identified, with the need for processing the increased soybean output creating opportunities for new investment and job creation. The DTI action plan also focuses on development of the organic food sector. The envisaged outcome of this strategy is a competitive organic sector producing high-quality food products for both the local and export markets.

\textsuperscript{12} http://www.daff.gov.za/daffweb3/Programmes/Natural-Resources-Management
\textsuperscript{13} http://www.daff.gov.za/
\textsuperscript{14} http://www.thedti.gov.za/DownloadFileAction?id=694
\textsuperscript{15}http://www.thedti.gov.za/DownloadFileAction?id=656
5.2 South African local government, civil society and private sector initiatives

In addition to national level government strategies, there are organisations in South Africa which are running and/or supporting agricultural initiatives with some alignment to green economy principles. These initiatives are located in different parts of the country and are run by the private sector, NGOs, local government and/or farmers’ organisations (Table 3). Such initiatives, while not established as “green economy” projects, nevertheless provide lessons for, and a possible template for, agricultural green economy initiatives. Examples of such initiatives are provided in Table 3.

The listed initiatives show the involvement and collaboration of a diversity of organisations (e.g. local government, NGOs, farmers’ organisations and private sector). This is an indication that different types of organisations would have a role to play in the transition to and full implementation of an agriculture supported green economy in South Africa.

Figure 6: Functional sphere of Municipal Integrated Development Plans (IDPs)
Participation in agricultural green economy initiatives requires access to land. As such, it is clear that South Africa’s land reform programme is an important aspect for the agriculture sector in the transition to a green economy. The land reform programme has the objective of ‘promoting equitable land redistribution and ensuring that land allocated for agricultural purposes is used productively and contributes towards economic development and food security’ (DRDL, 2014: 43). Furthermore, agricultural green economy initiatives have to be compatible with and be integrated within national and local development plans (Figure 6).

**Box 5.1:**
**Agricultural Green Economy Initiatives have to be integrated with other development strategies**

An integrated and inclusive rural economy is a necessary precondition for a Green Economy (National Planning Commission, 2011). Local government development strategies and land reform (a crucial aspect of development and transformation) need to be more synergistic in a green economy. In order to make an impact, land reform projects and programmes need to be rolled out in tandem with Provincial Growth and Development Strategies (e.g. Integrated Development Plans [IDPs]), Spatial Development Frameworks [SDFs], and Land Use Management Strategies [LUMs]) and Integrated Sustainable Rural Development Strategies [ISRDs]).
Table 3: Sample of current South African agricultural initiatives aligned to some of the principles of a green economy

<table>
<thead>
<tr>
<th>Name of Organisation</th>
<th>Type of organisation</th>
<th>Focus and activities</th>
<th>Relevance to agricultural Green Economy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lima Rural Development Foundation</td>
<td>Non profit</td>
<td>Skills development and access for poor rural communities to funding for agricultural, food security, land reform and social development initiatives. The foundation runs a farmer support programme which provide small scale / emerging farmers with essential linkages to input suppliers, credit, mechanisation, technical information and produce markets so that they can be integrated into the mainstream agricultural value chain. The foundation also provides direct agricultural extension support to small scale farmers, and operates in 15 districts spanning four provinces. Source: Lima Rural Development Foundation, work programme: Abalimi phambili [online]. <a href="http://www.lima.org.za/index.php/menu-examples/lima-agriculture-programme">http://www.lima.org.za/index.php/menu-examples/lima-agriculture-programme</a> [accessed 15 July 2013]</td>
<td>Aligned with green economy principles related to poverty reduction, well-being, livelihoods, access to essential services, and employment.</td>
</tr>
<tr>
<td>Name of Organisation</td>
<td>Type of organisation</td>
<td>Focus and activities</td>
<td>Relevance to agricultural Green Economy</td>
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<tr>
<td>WWF – South Africa</td>
<td>Conservation Non-Governmental Organisation (NGO)</td>
<td>WWF-SA’s Sustainable Agriculture Programme works in collaboration with the agricultural and retail sector, and other key stakeholders in government, civil society and the corporate sectors to promote and implement sustainable production practices, whilst reducing the sector’s environmental impact. The programme promotes the prevention of degradation of the South African natural environment, conservation of biodiversity &amp; sustainable use of natural resources. The programme also works with a mix of farmers, both small scale and large scale commercial farmers. Source: WWF SOUTH AFRICA. 2013. Sustainable agriculture [Online]. World Wildlife Fund South Africa. [Accessed 12 July 2013].</td>
<td>Closely aligned to green economy principles relating to protection of biodiversity and ecosystems, sustainable development, resource efficiency, poverty reduction, livelihoods and well-being, inclusivity and being participatory.</td>
</tr>
<tr>
<td>Name of Organisation</td>
<td>Type of organisation</td>
<td>Focus and activities</td>
<td>Relevance to agricultural Green Economy</td>
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<tr>
<td>Woolworths Holdings</td>
<td>Retailer</td>
<td>Farmers supply the retailer with produce on the ‘Farming for the future’ initiative- an approach to growing food sustainably and in harmony with nature. This is done to enable South Africa’s farms to provide enough food for future generations, without compromising quality or adding to the cost. Farming for the Future is a holistic approach that manages the entire farming process systematically to support the growing of quality food while preserving natural resources and reducing dependence on chemical fertilisers, herbicides and pesticides. This initiative is supported by WWF South Africa. Source: <a href="http://www.woolworthsholdings.co.za/investor/gbj/2010/environment/f.asp">http://www.woolworthsholdings.co.za/investor/gbj/2010/environment/f.asp</a> [Accessed 16 July 2013]</td>
<td>Aligned with green economy principles relating to protecting biodiversity and ecosystem services, poverty reduction, well-being, livelihoods, respect of planetary boundaries and ecological limits, resource and energy efficiency, and sustainable development.</td>
</tr>
<tr>
<td>Cacadu District Municipality</td>
<td>Local government (municipality)</td>
<td>The Cacadu District Agricultural Mentorship Programme is a mentorship programme in which successful commercial farmers as mentors are paired up in a contractual agreement with emerging farmers. Commercial farmers transfer skills in farm and business management, including marketing. The programme covers five local municipalities in the Cacadu District and is supported by the Department of Rural Development and Land Reform and an international development agency.</td>
<td>Aligned with green economy principles relating to poverty reduction, well-being, livelihoods, access to essential services, and employment</td>
</tr>
<tr>
<td>Name of Organisation</td>
<td>Type of organisation</td>
<td>Focus and activities</td>
<td>Relevance to agricultural Green Economy</td>
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<tr>
<td>Sedikong Organic Farmers’ Cooperative</td>
<td>Farmers’ cooperative</td>
<td>An organic farming cooperative located in Dendron, Limpopo focuses on community wellness and food security. The primary crop grown is Moringa tree (<em>Moringa oleifera</em>). The cooperative produces and distributes tree seedlings to poor rural communities to enable people to grow their own trees, the cooperative also processes moringa and sells it in capsule and powdered forms, as a tea, as whole leaves and as crushed.</td>
<td>Aligned with green economy principles relating to poverty reduction, well-being, livelihoods, access to essential services, employment, and protecting biodiversity and ecosystem</td>
</tr>
<tr>
<td>Name of Organisation</td>
<td>Type of organisation</td>
<td>Focus and activities</td>
<td>Relevance to agricultural Green Economy</td>
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<tr>
<td></td>
<td>moringa. The cooperative is supported by several research institutions, including the CSIR and the Agricultural Research Council, universities, government departments, and the private sector. Source: <a href="http://www.sedikongorganicfarming.co.za/index.html">http://www.sedikongorganicfarming.co.za/index.html</a></td>
<td></td>
<td>services.</td>
</tr>
<tr>
<td>Ezemvelo Farming Initiative (linked to a retailer - Massmart)</td>
<td>Farmers’ Groups located in Limpopo, Gauteng, Mpumalanga and KwaZulu-Natal. The initiative is supported financially and technically by a retailer – Massmart. Capacity building is provided for in the technical and managerial aspects of farming, facilitated access to inputs, and markets. The initiative also provides training in sustainable farming practices. Source: <a href="http://www.bizcommunity.com/Article/196/183/99575.html">http://www.bizcommunity.com/Article/196/183/99575.html</a></td>
<td></td>
<td>Aligned with green economy principles relating to poverty reduction, well-being, livelihoods, access to essential services, employment, and protecting biodiversity and ecosystem services.</td>
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</tbody>
</table>
5.3 Lessons from other developing countries

It is worthwhile examining potential lessons that can be learned from the experiences of other countries for agricultural green economy initiatives in South Africa. The general concept of the green economy is still evolving, and there is a paucity of examples of what could be considered as fully fledged agricultural green economy initiatives. Nevertheless, green agriculture initiatives are the closest available examples of agricultural activities aligned with green economy principles. Table 4 provides a summary of some green agriculture initiatives that are cited as success stories by organisations such as UNEP which are operating in the green economy and/or green agriculture field. In addition, the table identifies key learning points from these initiatives which could potentially inform the development of agriculture-based green economy initiatives in South Africa.

Table 4: Green agriculture initiatives in other countries with potential lessons for South Africa

<table>
<thead>
<tr>
<th>Country &amp; Initiative</th>
<th>Driver of initiative</th>
<th>Benefits</th>
<th>Lessons</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>IFOAM (Global market for organic foods and drinks)</td>
<td>Climate change mitigation - GHG emissions per ha from organic</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Country &amp; Initiative</th>
<th>Driver of initiative</th>
<th>Benefits</th>
<th>Lessons</th>
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<tr>
<td></td>
<td>UNEP, UNCTAD</td>
<td>agriculture are estimated to be on average 64% lower than emissions from conventional farms.</td>
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<td></td>
<td></td>
<td>Carbon sequestration – evidence that organic fields sequester 3–8 tonnes more carbon per ha than conventional agriculture.</td>
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<td></td>
<td>Increase in area under organic agriculture &amp; participating farmers: 2004 - around 185,000 ha of land under organic farming with 45,000 certified farmers. By 2007: 296,203 hectares of land under organic agricultural production with 206,803 certified farmers.</td>
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</table>

- Links green initiatives with policy, livelihoods and eradicating poverty.
- Making sure that green initiatives are not stand-alone but linked to the generation of information, further research, and development of different markets and the participation of special interest groups.
- Use of partnerships between government, private sector and development agencies.
<table>
<thead>
<tr>
<th>Country &amp; Initiative</th>
<th>Driver of initiative</th>
<th>Benefits</th>
<th>Lessons</th>
</tr>
</thead>
<tbody>
<tr>
<td>India: maintaining ecological infrastructure through labour intensive wage employment (National Rural Employment Guarantee Act)</td>
<td>Government of India</td>
<td>Increase in the average wage for agricultural labourers.</td>
<td>Focus on livelihood security specifically for marginalised rural households.</td>
</tr>
<tr>
<td></td>
<td>Local governance structures</td>
<td>Enhanced livelihood security of marginalised households in rural areas.</td>
<td>Focus on rural natural resource management for restoration of natural capital on which rural livelihoods depend.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Promotion of inclusive growth.</td>
<td>Making sure that infrastructure supports agricultural activities optimally.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Contribution to the restoration and maintenance of ecological infrastructure.</td>
<td>Endeavours targeting the increase of average wage for agricultural labourers.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Training and jobs for villagers to develop solutions to their heavily silted water harvesting infrastructure.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Alleviating water shortages.</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Increasing agricultural output through increased availability of water.</td>
<td></td>
</tr>
<tr>
<td>Barbados: National strategic Framework (6 goals) Including building a green</td>
<td>Government of Barbados</td>
<td>Plan not yet implemented but potential range of benefits including social, economic and environmental as the</td>
<td>Green Plan is all encompassing from cultural revitalisation, poverty eradication to environmental protection and a</td>
</tr>
</tbody>
</table>

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Barbados National Strategic Plan 2006-2025

<table>
<thead>
<tr>
<th>Country &amp; Initiative</th>
<th>Driver of initiative</th>
<th>Benefits</th>
<th>Lessons</th>
</tr>
</thead>
<tbody>
<tr>
<td>economy</td>
<td></td>
<td>plan touches on all aspects of society.</td>
<td>green economic path.</td>
</tr>
</tbody>
</table>
| Indonesia: Strategic long term development plan – aims to achieve: a “green and everlasting Indonesia”. | Government of Indonesia | • Specific policies and goals on mainstreaming sustainable development and natural resource and environmental management.  
• Benefits not yet accrued as this is still a plan. | • Plan links pro-growth, pro-job and pro-poor initiatives.  
• Plan is integrative of a number of issues that support food resilience.  
• Agrees with and adheres to international treaties. |

http://www.unep.org/greeneconomy/AdvisoryServices/Indonesia/tabid/56278/Default.aspx)
<table>
<thead>
<tr>
<th>Country &amp; Initiative</th>
<th>Driver of initiative</th>
<th>Benefits</th>
<th>Lessons</th>
</tr>
</thead>
</table>
| Cuba\(^{20}\): transition to organic agriculture | Government of Cuba | • Positive impact on livelihoods;  
  • Steady income for a significant proportion of the population; and  
  • Lack of pesticides for agricultural production – which is likely to have a positive long-term impact on Cubans’ wellbeing since such chemicals are often associated with various negative health implications such as certain forms of cancer | • Ensures security of tenure.  
  • Incentives created for farmers in terms of local markets, using organic technologies as well as reviving traditional ‘green’ techniques.  
  • Policy targeting urban farmers. |
| Tanzania\(^{21}\): smallholder woodlots as a strategy for climate change adaptation | Tanzania government (International donors) | • Building capacity of communities and disadvantaged groups in improved woodlot management;  
  • Improved smallholder livelihoods;  
  • Increased incomes and council revenues from royalties on timber sales  
  • Promoted inclusive growth; and  
  • Promoted savings and credit operations among members and loans to finance | • Focus on conserving the environment for agriculture and livestock production – recognises the link and develops plans around it.  
  • Inclusive and beneficial to vulnerable groups such as rural women.  
  • Innovative lending to benefit the poor – use of local |

UNEP/UNDP initiative Climate Change, Development and Adaptation Programme (CC DARE) [http://ccdare.org](http://ccdare.org)
<table>
<thead>
<tr>
<th>Country &amp; Initiative</th>
<th>Driver of initiative</th>
<th>Benefits</th>
<th>Lessons</th>
</tr>
</thead>
</table>
| Rwanda²²: rebuilding natural capital through protection and management of the environment including preserving mountain gorilla | Government of Rwanda Rwanda national parks | • Environmental, economic, and employment benefits.  
• Restoration of the population of the critically endangered mountain gorilla - slight increase in the Virungas National Park.  
• Ecological benefits of preserving a threatened species.  
• Scheme to protect the Rwandan mountain gorilla is also generating substantial revenues from tourism - booming tourism industry, which now accounts for the biggest share of national GDP. | Focus on link between nature conservation and farming. |

In addition to lessons which specifically relate to green agriculture projects, as highlighted in Table 4, the development of an agricultural green economy has to be cognisant of global dynamics in the production and marketing of agricultural commodities. Particularly pertinent is the rapidly changing and globalising political economy of agriculture due to factors such as the increasing role of trade in agriculture, population growth, high unemployment rates, expansion of biofuel production, market speculation, changing nutrition in emerging markets, food insecurity, land-grabbing, and climate change (Karapinar, 2010). The trade distortions in agriculture are also a factor. The ILO and UNCTAD (2013) warn that agriculture is among the most distorted sectors in international trade with relatively high tariffs and subsidies that are not allowed in other sectors. Tariffs tend to be higher for processed products than for unprocessed products, and this tariff escalation is one of the obstacles that keep developing countries from adding more value to their agricultural exports and establishing processing industries for exports (ILO and UNCTAD, 2013).

The experiences of South Africa’s own agricultural sector and those of other developing countries should inform the planning and implementation of agricultural green economy initiatives. A green economy supporting agriculture in South Africa would not operate in a vacuum, but would be affected by global trade and market factors. Failure to proactively deal with the consequences of changing dynamics in the market would have devastating effects on the well-being of those involved in agricultural green economy initiatives. The following examples illustrate this:

- **Ghana:** Between 1996 and 2002, European Union frozen chicken exports to West Africa rose eight-fold, due mainly to import liberalisation. In Ghana, half a million chicken farmers have been affected negatively. In 1992, domestic farmers supplied 95% of Ghana’s market, but this share fell to 11% in 2001, as imported poultry sells at a lower price. (Khor, 2006).
• **Philippines**: The liberalisation of the import regime in the Philippines has led to increased imports of agricultural products into the country. Part of the consequence of this situation has been the concentration of the poultry industry – there has been increased domination by large integrated industries, which increasingly control not only the production of poultry, but also the supply of poultry feed, which constitutes the main cost of production. As a result, the contract growers and small backyard producers are increasingly marginalised. (Tauli-Corpuz et al., 2006).

• **South Africa**: Market reforms implemented in 1996, notably the repeal of the Marketing of Agricultural Products Act of 1937 liberalised prices and trade in large parts of the agro-food sector, including foreign trade. Marketing reform has resulted in significant private sector response across the agro-food chain. The deregulation of markets opened opportunities for entrepreneurial farmers and resulted in a more efficient allocation of resources in agriculture. The net effect of these changes is that the South African agricultural industry has become less dependent on state support and internationally more competitive. The opening of the agricultural sector placed South Africa among the world’s leading exporters of such agro-food products as wine, fresh fruits and sugar. (Source: OECD, 2006: 11-13). These market reforms have largely impacted on large scale commercial agriculture, and have hardly touched the small scale sector.
6. SYNTHESIS AND WAY FORWARD

This chapter amalgamates and analyses information from different sources to highlight key issues for agriculture to contribute to and drive a green economy in South Africa.

6.1 Key issues for agriculture to contribute to a green economy

For agriculture to support a green economy there has to be alignment between the objectives and practices of agriculture and green economy principles. Bodies such as UNEP, the World Farmers’ Organisation and the Farming First Coalition have provided guidelines for aligning agriculture with green economy imperatives. The key aspects highlighted in the guidelines include: efficient use of resources; application of knowledge-based best practices; use of appropriate incentives to encourage sustainable practice; addressing poverty, inclusivity; and being low carbon. Furthermore, agriculture would have to continue to meet local production and other objectives. An analysis of information documented in various reports reviewed in compiling this report highlighted a number of factors that are critical for agriculture to contribute to a green economy:

A. APPROPRIATE ENABLING ENVIRONMENT

In order to achieve the ideals of a green economy (as espoused in green economy principles) and meet social, economic and environmental objectives on a sustained basis, flexible and responsive legislation and policies which consider the all-encompassing nature of a green economy and linkages to different sectors, are required. All of the linkages and inter-relationships need to be actively considered and accounted for in legislation, policies, plans and programmes for agricultural green economy initiatives.

Furthermore, experience from other developing countries, such as Uganda, Cuba and Barbados, has shown that policy needs to be directly supportive of green economy initiatives. In addition, suitable
institutions (e.g. farmers’ organisations, financial institutions, marketing boards, etc.) need to be in place to provide support in various forms (e.g. information, credit). There is therefore a need for government to establish frameworks of regulation, incentives and disincentives, to ensure that practices across-the-board are aligned to the goals of a green economy (environmental, social and developmental objectives). In addition, practical instruments for actualising a green economy backed by agriculture are required. These would take the form of guiding frameworks for designing, implementing, monitoring and evaluating agricultural green economy initiatives. Currently there is no overarching green economy guiding framework at a national level in South Africa. Such a framework would provide guidelines for structuring initiatives in the country.

B. PARTNERSHIPS FOR FACILITATING COORDINATED AND INTEGRATED APPROACHES TOWARDS A GREEN ECONOMY

Government has a central and important role in re-orienting the economy as a whole (and specific sectors in particular) towards a sustainable development pathway. In South Africa, as highlighted in sections 2 and 4 of this document, there are a number of existing strategies and programmes which could provide foundations for the development of agricultural initiatives in a green economy. Although there are national government and sector strategies with some specific provisions for agriculture, and even some specific green economy provisions in this regard, such as in the Green Economy Accord (EDD, 2011), a cohesive framework for agriculture in the green economy does not exist. The provisions that do exist are diffuse, and there is no one department leading the initiatives. The agriculture sector in particular has not responded explicitly to the need for, or opportunities presented by the green economy in its policies and strategies. Given the important planned role of agriculture in South Africa’s green economy, there is a clear need for DAFF to take the lead in developing a strategy or plan for the agriculture sector.
There is a clear need for a coordinated approach, suggesting the need for an integrated national green economy policy, strategy or framework to provide the necessary strategic guidance, and for supportive legislation to provide the enabling environment to activate an agricultural green economy. A successful agricultural green economy requires that all stakeholders (e.g. government, the private sector and civil society) work in partnership in an integrated and coordinated manner to provide the backing required for the different aspects of an agricultural green economy.

C. ADEQUATE FINANCIAL RESOURCES, INFRASTRUCTURE, SKILLS, AND INFORMATION

In addition to the creation of a supportive and enabling legislative environment, and a guiding policy framework, resources, infrastructure, training and information are also required for a successful and sustainable green economy. These are particularly critical for enabling rural communities or smallholder farmers to participate in green economy initiatives. Government has a key role to play in ensuring availability and access to these resources and ensuring that green economy initiatives are supported through appropriate public spending, as the Indonesia experience cited in this document illustrates. Experience from India, for example, highlights that green economy initiatives need to be supported by investment in infrastructure such as roads and other communication networks, particularly where such initiatives are planned for rural areas.

If agricultural green economy initiatives are to impact positively on South Africa’s rural people, there will be a need to invest in human capital, through the provision of information, education, and skills development at all levels. In particular, education needs to be an integral part of the planning and implementation of green economy initiatives. The United Nations Environment Programme (UNEP, 2011b) notes that there will be a certain amount of training needed, especially for smallholder farmers, in green agricultural practices. This is because green agricultural practices focus on approaches which are likely to be novel to smallholder farmers such as crop and
livestock diversification, local production of organic fertiliser, labour intensive farm operations, etc. As many of these practices are variable according to season, area context and literacy, training and awareness would also have to be context specific.

As part of skills development and provision of information in support of an agricultural green economy, it will be necessary to invest in the improvement of agricultural extension services. An efficient extension system can reach smallholders with targeted, adapted advice that takes into account important factors such as local environmental conditions, production practices and market access to help in decision-making and risk reduction.

In addition, the social and human capital development has to extend across the whole agriculture value chain as the whole value chain has to be part of a green economy.

D. NEED FOR APPROPRIATE INCENTIVES

Undertaking new agricultural activities to support a green economy requires considerable long term investment. Such investments can be risky, particularly for smallholder farmers, who can often only afford to adopt short term survival strategies, rather than the relative ‘luxury’ of long term planning. Evidence from around the
world suggests that long term security of tenure (e.g. through the assignment of property rights) must be in place in order for farmers to have an incentive to undertake such investments. For a sustainable agricultural green economy, it is necessary to provide incentives for farmers to go beyond short term survival strategies. The assignment of land tenure is thus necessary for agricultural green economy initiatives.

In addition to the assignment of land tenure, a number of other market and non-market based mechanisms can be used to provide farmers with incentives to invest in sustainable practices. Sustainable practices are a prerequisite for a green economy. For example, removing subsidies on unsustainable inputs and practices (e.g. chemical fertilisers), and instead subsidising inputs and practices that encourage soil and water conservation (such as organic fertilisers, drip irrigation systems, etc.), can help small producers green their own supply chains. Similarly, developing and/or expanding fair or green certification schemes would allow products originating from small scale producers to compete in new niche markets locally and internationally. For example, in Cuba, providing farmers with incentives to use organic technologies facilitated a transition to organic agriculture. However, in providing incentives, care should be taken to guard against perverse incentives\textsuperscript{23}.

E. ADDRESS THE NEGATIVE ENVIRONMENTAL IMPACTS OF AGRICULTURE

In addition to the various socio-economic challenges facing developing countries, there are challenges related to the rising scarcity and degradation of land, soil and water resources and changing climatic conditions. These challenges are exacerbated by growing demands on the resource base to provide food, water and energy security for a rapidly growing population. If agriculture is to contribute towards a green economy, agriculture will have to be practised in a way that does not undermine the integrity of the

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\textsuperscript{23} A perverse incentive is an incentive that has an unintended and undesirable result which is contrary to the objective of the incentive.
social, economic and environmental systems on which it depends. As such, there is a crucial need to address the negative environmental impacts associated with agricultural practices.

There are opportunities for agriculture to support green economic growth through production techniques and practices which sustain production while enhancing (or at least reducing negative impacts on) the resource base and environment. For example, while many current agricultural practices contribute to global greenhouse gas emissions, good management practices can result in an almost carbon-neutral sector, as well as the creation of environmental services and the generation of renewable energy, while also achieving food security. Many of the techniques and practices that could be applied to address the negative impacts of agriculture on the environment are widely available. The experience of Uganda shows that green economy initiatives can be built on existing initiatives and practices such as organic agriculture.

F. BALANCE DIFFERENT TYPES OF KNOWLEDGE AND PRACTICE

As examples from other developing countries cited in section 4 of this document illustrate, new green economy initiatives could learn from existing initiatives and practices and develop a more inclusive approach. Both traditional and research-generated scientific techniques would have a role to play in a green economy premised on agriculture. A balance has to be sought when considering the implementation of new green practices in place of (or to complement) existing traditional practices. This needs to be done on a case-by-case basis, and with the requisite cultural sensitivity. It should be recognised that in many cases, traditional practices making use of local knowledge may be more appropriate than practices that are prescribed from the outside with little regard for the local context.
G. NEED FOR A HOLISTIC APPROACH

Khor (2012) has cautioned against defining or operationalising a green economy in a one (or two) dimensional manner, that is, in such a way that the concept is not seen as embedded in the sustainable development framework. Promoting the green economy in a purely ‘environmental’ (and/or economic) manner, without considering fully the development and equity dimensions, as well as the international dimension (e.g. potential negative effects on developing countries), is irresponsible. Doing so would have the effect of undermining the holistic nature of the sustainable development approach, and result in an imbalance amongst the three pillars (Khor, 2012). A fragmented approach would also go against the principles of a green economy.

As such, green economy initiatives need to be all encompassing, focussing not only on economic and/or environmental issues, but also other important social imperatives, such as culture. Examples from Barbados and Indonesia illustrate that cultural revitalisation was a key factor in the success of green economy initiatives in these countries. Furthermore, examples from countries, such as Tanzania and Rwanda, show that green economy initiatives focused on agriculture and conserving the environment can work together, provided that this link is actively fostered and the environmental, economic and social benefits (such as employment) are evident.

6.2 Research required to support South Africa’s transition to an agricultural green economy

The green economy is an evolving concept in South Africa and globally, and there are a number of key unanswered questions such as how to develop and sustain a green economy in general and an agricultural green economy in particular. Addressing rural poverty and food insecurity through agricultural green economy initiatives are especially pertinent for South Africa. Although various documents highlight universal conditions and principles required for a successful green economy, it is necessary to address issues that are specific to South Africa and to build information tailored for South Africa’s peculiar social, economic and environmental conditions.
Research will have to address these questions and generate salient information in a cost effective manner. Furthermore, the information generated has to be generic enough to be applicable to different contexts in South Africa.

Some of the key issues that research needs to address include:

- **Conditions required for agriculture in general and crop-based agriculture in particular to contribute towards a green economy:** While general conditions required for agriculture to support a green economy have been highlighted in a number of documents, the specific conditions (social, economic, environmental) for South Africa have not been elucidated. It is important to describe the specific conditions for South Africa as the green economy is context specific;

- **Interventions required ensuring a successful and sustainable agricultural green economy:** A successful transition to a green economy supported by crop-based agriculture in South Africa will require concrete actions. These actions have to be based on sound scientific information;

- **Support required for rural communities to adopt and sustain agricultural green economy initiatives:** For rural communities to participate in a green economy in a way that results in improvements in their well-being, it is crucial to provide them with the requisite support. It is necessary for research to identify and describe the types of support (technological, institutional, economic, etc.) required in rural areas and by poor communities to enable them to embark on and sustain agricultural green economy initiatives. Research has to develop generic frameworks that can be used to identify and characterise the support required in different contexts;

- **Improving decision making and accountability:** Research needs to be directed at improving decision making to ensure different role players are able to integrate the diversity of factors characteristic of an agricultural green economy in their decision making. Research would also
need to address improving accountability for decisions and outcomes in the context of an agricultural green economy;

- Incentives and disincentives for a multifunctional agricultural sector which generates environmental services and is economically viable: Research needs to generate an understanding of how incentives and disincentives could be effectively used to encourage and sustain adoption of practices which support the generation of multiple benefits from agriculture;

- **Sustaining an agricultural green economy under changing climatic and other global conditions:** Given the uncertainties and potential threats from changing conditions, it is necessary to build information on expected impacts of these changes on a green economy supported by agriculture, and options for maintaining a green economy in the face of these changes;

- Understanding the specific context of smallholder farmers: Agricultural green economy initiatives focused on addressing rural poverty have to focus on rural communities. A significant proportion of these communities are involved in smallholder or small scale farming. Research is required on the factors that drive smallholder farmer practices. Understanding these factors is important for the design of appropriate interventions to support rural communities to engage in agriculture-based green economy initiatives;

- **Increasing understanding of the dynamics of multifunctional agriculture:** Agricultural activities supporting a green economy are expected to deliver other services or benefits in addition to agricultural production. Such services include climate and water provision and regulation, and biodiversity conservation. The benefits of such services extend beyond the local scale and also accrue at regional or global scales. Research should be directed towards quantifying (in spatial and temporal terms) and valuing (in different ways) the benefits of multifunctional agriculture; and
Investments needed for the transition to an agricultural green economy: The investments needed to support the transition to and maintenance of various agricultural green economy initiatives (enterprise type, scale, target beneficiaries etc.) need to be quantified. This information is critical for adequate and realistic planning for an agricultural green economy so that investments leverage maximal benefits in terms of the green economy principles and local needs.

All of the listed issues and others will need to be addressed in order for the agriculture sector to contribute effectively towards a green economy. There is therefore significant scope for research on the role of the agricultural sector in South Africa’s green economy.
6.3 CSIR’s research in support of South Africa’s transition to a green economy

The CSIR is a scientific and technology research, development and implementation organisation. It undertakes directed and multidisciplinary research, technological innovation as well as industrial and scientific development to improve the quality of life of the people of South Africa and, increasingly the African continent. The Natural Resources and the Environment (NRE) unit of CSIR leads a green economy research and development (R&D) focus area, which aligns with the CSIR mandate and focuses on building related national capability and industrial development opportunities. The green economy is a relatively new research area for the CSIR, informed by the nascent green economy thinking. The R&D focus area is guided by the understanding that the green economy is not an add-on or an emerging sector, but is an imperative and framework for all economic activity. It brings effect to the concept of sustainable development, and requires reflection and reform of policy, legislation and incentives within the public and private sector.

The NRE Unit’s green economy R&D focus area responds directly to the national priority for a green economy development trajectory as explicitly embodied in key national development policies and strategies24. Although the scope of R&D required to support the transition to a green economy in South Africa is wide, NRE’s current focus is on the renewable resource sectors of agricultural and biomass processing, and unlocking the development opportunities of the waste sector. In addition, NRE also focuses on an overarching R&D role which works to build capacity, the information base, and a common understanding of the means to implement a green economy transition and establish frameworks for planning, measuring and monitoring in support of all levels of government and the private sector.

24 National Development Plan (NPC, 2011); National Strategy for Sustainable Development (DEA, 2011b); New Growth Path (RSA, 2010); Industrial Policy Action Plan (DTI, 2010); the Green Economy Accord (EDD, 2011); and the National Climate Change Response Strategy white paper (RSA, 2011a).
Some highlights of the green economy work that NRE has been involved in, include:

- Partnering with Rio Tinto’s Richards Bay Minerals company on the Alternative Land Use Programme through which the CSIR leads an experimental pilot farm evaluating feasible species for economic development through forestry and agriculture on previously mined land;

- First phases of the Department of Science and Technology / South African Environmental Observation Network (DST/SAEON) National Bioenergy Atlas- CSIR provided key data layers and input. The Atlas aims to provide strategic insight into the biomass resources and bioenergy opportunities for South Africa;

- Initiation of a biorefinery research and development technology platform to support the forest products sector to meet green economic imperatives and diversify products from biomass, and facilitate regrowth of this biomass sector;

- Partnering with the Department of Science and Technology (DST) in the development of the 10 year National Waste Innovation Roadmap which aims to address the key innovation and capacity requirements to realise the full potential of the waste sector. Coupled with this, the NRE team has partnered with the European Commission and key African countries in “building a joint European and African research and innovation agenda on waste management: waste as a resource: recycling and recovery of raw materials” which was endorsed by South Africa’s Minister of Science and Technology and European parliament representatives; and

- Development of a Pocket Guide to the Green Economy to assist with a common understanding of the concept and means of implementation.
The CSIR has also been working with stakeholders to develop green economy strategies. One such initiative was the development of a Framework for Green Economy Transition for the City of Tshwane, which was developed in partnership with the city and UNEP. This project developed a strategic guide for low-carbon, equitable economic developments that can enhance the transition of City of Tshwane to a green economy and facilitate a sustainable development path. The status quo, policy environment and challenges were explored and used to formulate the Aspirations, Strategic Objectives and Appropriate Actions that can guide Tshwane’s transition to a Green Economy. The project also identified the means of implementation, response options, targets, and aspirations in terms of the appropriate Green Economy projects and programmes in various thematic areas (sustainable agriculture and food security, maintenance and provision of ecosystem goods and services, waste management, sustainable local economic development, sustainable transport and improving mobility, sustainable energy, integrated water resources management, green buildings and the built environment, and sustainable communities). CSIR has also provided input into the green economy plan of Limpopo Province.

In addition to the specific initiatives highlighted above, the NRE unit is also directly engaged in research and development to understand and enhance the value of ecosystem services, adaptation and mitigation of global and climate change, and addressing national water quality and quantity issues. These additional and significant research and development focus areas are closely inter-linked with green economy research and development. Moreover, other units within the CSIR are also involved in work which supports a green economy. These units include, but are not limited to the Enterprise Creation for Development Unit, the Built Environment Unit, Meraka Institute, and the Materials Science and Manufacturing Unit. Research and development outputs from the work of these units include: supporting new green business development, new green energy and materials technologies, SMART network technologies, and green construction materials and design.
This document emanates from one of the CSIR’s green economy research projects: “Prospects for crop-based agriculture to contribute to a green economy in South Africa”. This project aims to develop part of the knowledge and information base required to adequately equip and support rural communities in South Africa to use crop based agriculture to improve their livelihood and economic opportunities through green economic activities.

7. CONCLUSION

Many developing countries, particularly in Africa are facing challenges related to poverty, unemployment, and degradation of the natural resource base which underpins livelihoods and economic activity. In such a context, the concept of a green economy, with its long term focus on improving human well-being, reducing social inequity, safeguarding natural resources and creating long term economic opportunities; appears to be a particularly relevant response. Agriculture-based green economy initiatives present real chances for addressing many of the social, economic and environmental challenges currently facing mankind. Specifically, there are opportunities for increasing crop yields, minimising waste, improving food security for a rapidly expanding population, providing livelihood opportunities, and addressing rural poverty on a sustained basis; while mitigating climate change and addressing environmental degradation. The predominantly rural nature of agriculture is particularly pertinent, given that poverty disproportionately affects rural areas in South Africa and other developing countries.

In South Africa’s circumstances, where addressing rural poverty and food insecurity should be central to a green economy, green economy strategies have to prioritise initiatives that address issues that are relevant and beneficial to the rural poor. Green economy strategies and initiatives need to emphasise the link between livelihoods, the living conditions of rural communities, and the environment. There is a particularly strong link between the rural
poor and the environment. Poor rural communities live close to the natural environment and depend on natural resources for their livelihoods. Green economy initiatives premised on agriculture are thus particularly relevant as they can address social, economic and environmental issues.

Although South Africa has adopted the principle of green economic growth, and has identified agriculture as one of the key sectors that will contribute towards the green economy, certain conditions have to be in place for opportunities in agriculture and the green economy to be realised. In the first place, for agriculture to be one of the drivers of the green economy, it has to be able to meet demands for food, social equity, economic growth and environmental protection. The concept of a green economy premised on agriculture is all encompassing as it is about how humans interact with the biophysical environment, food security, livelihoods and other aspects of well-being. The green economy cannot, therefore, be isolated from the biophysical or socio-economic realm and should be approached holistically. This also means that such an economy has linkages to diverse sectors. A green economy therefore has to be appropriately situated and be in tune with social, economic and environmental conditions in order to deliver planned benefits and be sustainable.

Furthermore, a green economy has to be flexible and be able to adapt to changing conditions. For example, in the context of agriculture supporting a green economy, it is important to ensure that risks and opportunities associated with changing climatic and other global conditions, such as trade arrangements, consumer tastes and preference patterns are understood and appropriately responded to. In addition, there is a need for a diversified economy which is not reliant solely on primary agricultural production and on exports of low value commodities, but which also conducts processing and value addition throughout the value chain, comprising of secondary industry and tertiary sectors. Developing a green economy supported by agriculture therefore requires an integrated approach which addresses these different factors. An
agricultural green economy has to be developed and sustained on the basis of sound and relevant information. Therefore, research has to continuously provide this information. Research will need to identify gaps in information and knowledge, and develop specific interventions in the social, economic and environmental domains required for establishing and sustaining an agricultural green economy in South Africa.
8. REFERENCES


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