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Importance of Sustainability on Agriculture in Southern Africa

By

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Importance of Sustainability on Agriculture in Southern Africa

Andre Louw & Leah Z.B. Ndanga¹

Abstract

This paper seeks to describe and discuss the impact that climate changes, and other challenges in terms of sustainability, have had on Africa and particularly on South Africa. It seeks to discuss the extent to which these changes directly and indirectly impact agriculture and the measures that are currently underway, with particular reference to South Africa, as well as suggest other strategies that could be implemented to attenuate the effects of climate change, thereby advancing the global shift towards sustainability. The paper discusses environmental and other changes that have taken place in Africa and asserts that the continent is in a particularly difficult situation in light of the debate on sustainability versus productivity. The fact that most of the world's rural poor depend on agriculture and that climatic changes have created new complications makes it more difficult to meet the MDGs and impedes economic development. This is especially relevant in light of the financial crisis and the drop in aid from the developed world. However, although more still needs to be done, it should be noted that significant progress has been made and projects and strategies are currently underway to utilize the region's natural advantages.

Key words: sustainability, agriculture, South Africa, climate change

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Importance of Sustainability on Agriculture in Africa

1. Background

A recent global phenomenon has been the paradigm shift towards sustainability and the green movement. Biodiversity, high energy and emission-reductions and conservation of natural habitats are encouraged and mindsets have changed from where global climate change was seen as something just happening to the environment, to something that will completely change the economic, social and especially the business sectors.

The concept of sustainability in an agricultural context is not new to the world. One of the first definitions of sustainable agriculture was adopted and later published in the US by the American Society of Agronomy (1989:15). It defined sustainable agriculture as a system that, “over the long term, enhances environmental quality and the resource base on which agriculture depends; provides for basic human food and fibre needs; is economically viable; and enhances the quality of life for farmers and society as a whole.” From this statement numerous definitions emerged but the concept surrounding agricultural sustainability remains the same.

Sustainability hinges on a combined focus on environmental changes and their impact on society (people), the environment (planet) and economic value (profit) known as the ‘*Triple Bottom Line (TBL)*’. Increasingly it is being recognised that people, profit and the planet dimensions are interlinked and an important challenge for public and private policy is to take them jointly into account (Kambewa, 2007) as shown in Figure 1.

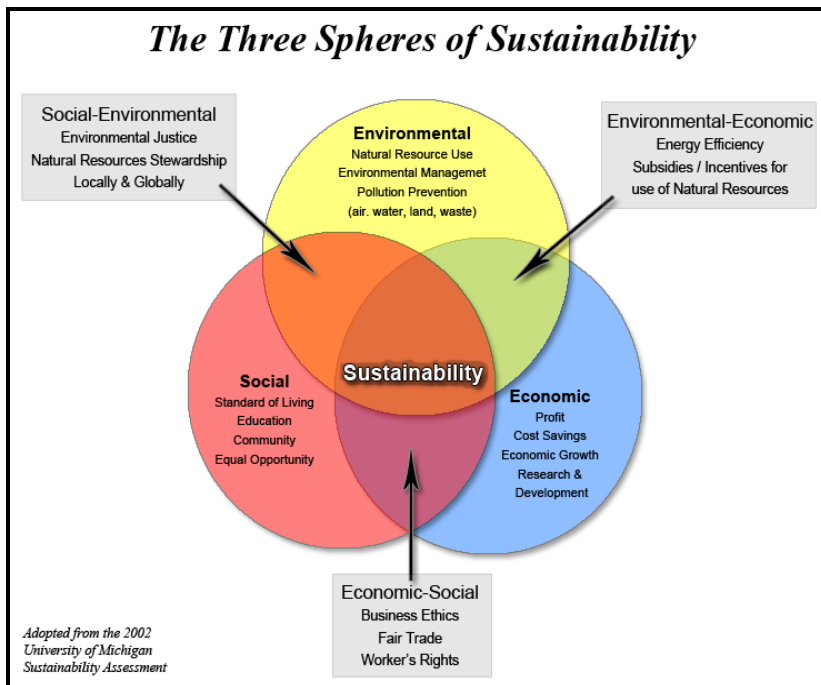


Figure 1: Triangle of sustainability

Source: University of Michigan, 2002

According to Östergren and Ohlsson (2009) the following areas should be highlighted:

- Environmental dimension
 - Environmental management in terms of the atmosphere, oceans, freshwater, land, forests, cultivated land, extinctions, biological invasions
 - Management of human consumption in terms of energy, water, food, materials, toxic substances, waste
- Economic dimension
 - Decoupling environmental degradation and economic growth
 - Nature as an economic externality
 - Economic opportunity
- Social dimension
 - Peace, security, social justice
 - Human settlements
 - Human relationship to nature

Over the years environmental sustainability has become more and more important. Issues relating to climate change, available usable land for agriculture, water availability and waste

management are increasingly in the media. However, it is integral to not forget the other two pillars: social sustainability and economic sustainability, as these factors play just as big a role as environmental sustainability. With the ever increasing world population, especially in developing countries, strategic and economic management is critical in the feed and food markets with food security concerns at heart. South Africa is a developing country and competitive markets in agriculture will ensure that optimal production takes place as well as long term growth. Climate change and productivity are key issues affecting sustainability, especially in Africa, and these are discussed in the next section.

2. Climate change

Climate change is the key issue affecting the global economy and environment. Climate change poses interconnected challenges, including controversial political decisions, daunting technological change, and far-reaching global consequences. This is especially true of Africa, where climate change is threatening to reverse recent gains made in economic growth and poverty reduction, two of Africa's greatest challenges. This makes it even harder to attain the Millennium Development Goals and ensure a safe and sustainable future beyond 2015 (World Bank, 2009; Bradford, 2009).

The African continent has warmed by about half a degree Celsius over the last century, and the average annual temperature is likely to rise an additional 3-4 degrees by 2099. Dry areas will become drier and wet areas wetter, posing an additional challenge to livelihoods and economic activities that depend on natural resources. It is believed that carbon concentrations are changing the global climate. However, even if emissions were to fall to zero now, there would still be significant changes to the global climate. An increase in temperature of about 2°C above the pre-industrial level is anticipated. This 2°C temperature increase could result in a 4 to 5 percent permanent reduction in annual income per capita in Africa as opposed to minimal losses in high-income countries and a global average GDP loss of about 1 percent (DBCCA, 2009a; World Bank, 2009; Bradford, 2009)

These losses would be driven by impacts in agriculture, a sector important to the economy of Africa. African economies are highly dependent on agriculture. Rain fed agriculture contributes about 23 percent of Sub Saharan Africa's GDP (excluding South Africa) and employs about 70 percent of the population. North Africa's vulnerability lies in the scarcity

of water in the region. North Africa is one of the world's driest regions, where per capita water availability is predicted to halve by 2050 even without the effects of climate change. Close to 90 percent of the region's freshwater resources are already stored in reservoirs and therefore the region has few attractive options for increasing water storage. The increased water scarcity combined with greater variability will threaten agriculture, which accounts for some 85 percent of the region's water use (DBCCA, 2009a; World Bank, 2009).

In general, climate change affects the poor in Africa in two main ways. First, agriculture productivity is very sensitive to changes in rainfall and the length of seasons, and poor people are heavily dependent on agriculture as a source of income and sustenance. Many poor people also live in areas that are acutely vulnerable to severe weather, and greater extremes will continue to make their lives more fragile. Climate change is a key development issue for Sub-Saharan Africa given the region's widespread poverty and unique geography. The World Bank's (2009) climate simulations for Africa indicate that the continent will experience:

- Stress on agricultural and natural ecosystems as temperatures rise
- Less rainfall in some regions, resulting in shorter growing seasons
- Higher rainfall in other regions, with more frequent and severe flooding
- A sea level rise in coastal and delta areas
- More severe and frequent hydrological disasters such as cyclones

Although prior development efforts had been focused primarily on the production of material goods and secondarily on the production of marketable services, with emphasis more on the financial bottom line, it is now essential to integrate all three aspects into one: a kind of common approach that includes all resources, goods, services, and assets that must be produced and/or consumed (used), at least in part, collectively. Sustainable agriculture forms the core of this approach as sustainable agriculture yields healthy investment returns while providing broader economic, social and environmental benefits (World Bank, 2009; Bradford, 2009). To fully comprehend the necessary amendments to development and the urgent need for a shift towards sustainable agriculture, it is essential to note the impacts that climate change has had on Africa and the steps needed to try rectify these changes and still ensure sustainable economic growth.

Impacts of climate change on Africa

Although Africa had made drastic progress in terms of economic growth over the past 20 years, climatic variability and climate change now pose a daunting risk to growth, development, and poverty reduction. Climate is hardly a new factor in the region's history, but with global warming, Africa's vulnerability is deepening, making it the most exposed region in the world to the impacts of climate change. As the planet's temperatures get warmer, rainfall patterns shift and extreme events such as droughts, floods, and forest fires become more frequent. Millions in densely populated coastal areas and in island nations will lose their homes as the sea level rises. Poor people in Africa face prospects of tragic crop failures; reduced agricultural productivity; and increased hunger, malnutrition, and disease. Figure 2 shows the incidence of extreme weather phenomena in recent years.

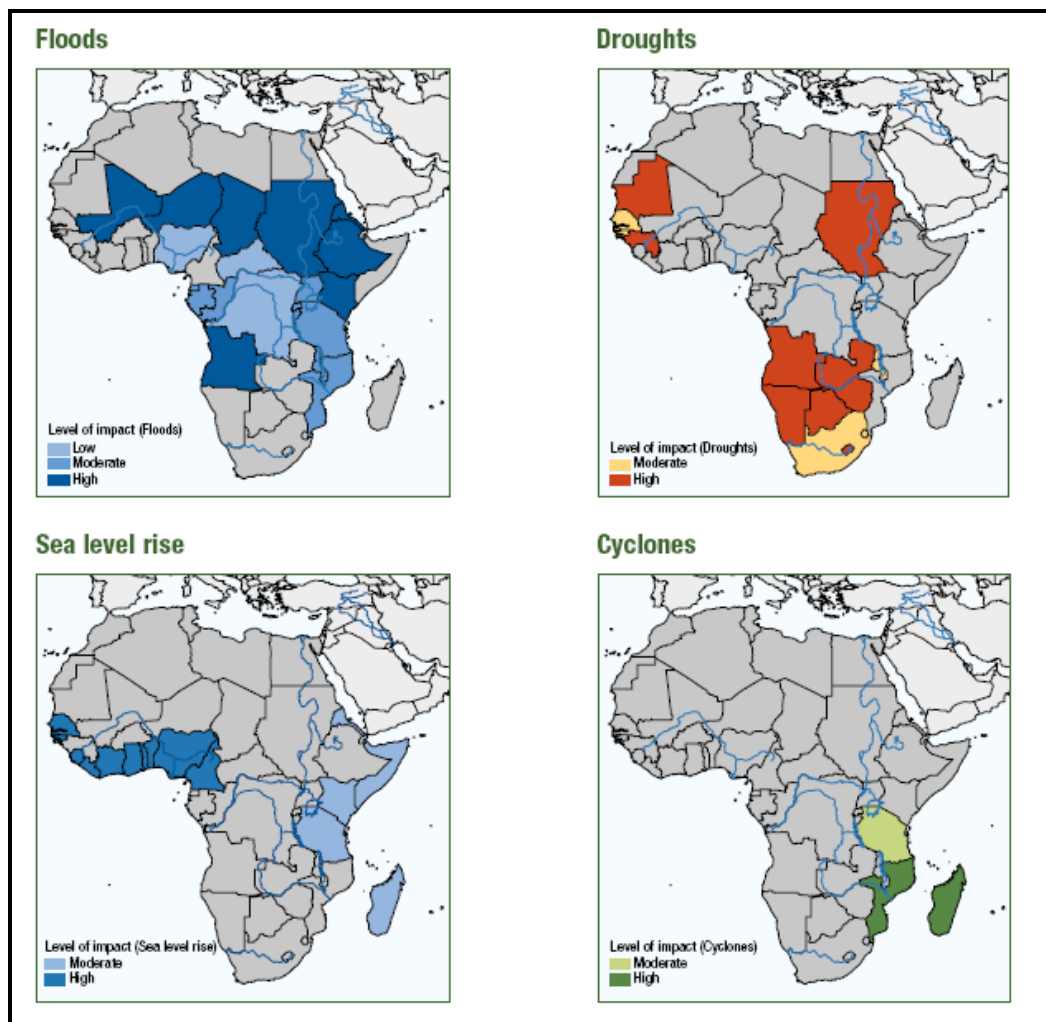


Figure 2: Exposure to Climate Change Risk

Source: World Bank (2009)

As has already been alluded to, Africa has a natural fragility. Two-thirds of Sub-Saharan Africa's surface area is desert or dry land, and the region is also home to many fragile terrestrial and coastal ecosystems. Climate projections for Africa (IPCC, 2007) include a likely average temperature increase of 1.5 to 4° C in this century, which is higher than the global average. Anticipated changes in rainfall patterns will be accompanied by an increase in droughts and floods, and sea level rise. Devastating floods have been reported across Sub-Saharan Africa. North Africa is one of the driest regions in the world and faces particular vulnerability to water scarcity. This vulnerability is compounded by a heavy concentration of population and economic activity in flood-prone coastal zones and by social and political tensions that resource scarcity could heighten.

Rain fed agriculture is the main safety net of poor people in rural areas and employs about 70 percent of the population of Southern Africa. This region will suffer particularly severe drops in yields by 2030 without adaptation measures. One study projects the almost total disappearance of land in Africa suitable for growing wheat by 2080 (Fischer *et al.*, 2005). In fact, by then, as much as 9 to 20 percent of Sub-Saharan Africa's arable land will become much less suitable for agriculture. Already, crop failure and livestock death are imposing significant losses.

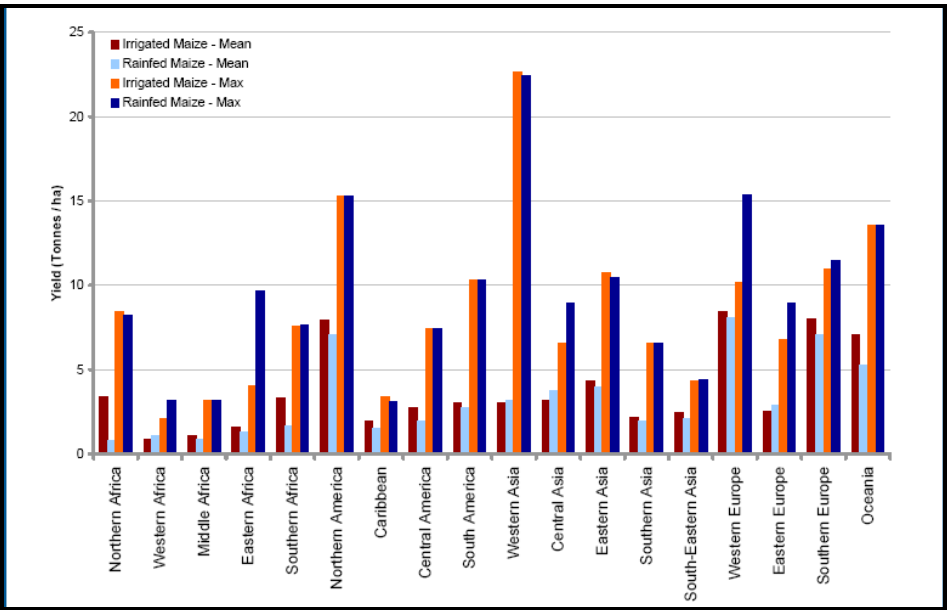


Figure 32: Irrigated versus Rain fed Maize

Source: DBCCA, 2009

While a large segment of North American and European agricultural production is devoted to feed crops, the majority of areas in sub-Saharan Africa are used to produce food directly consumed by people. Figure 323 illustrates that there is ample opportunity to increase productivity by closing production gaps in regions in Africa by raising productivity for soy, sugar cane and rice which further will lower the risk of food security. Switching land use and expanding land supply are going to be important elements of the solution (DBCCA, 2009).

In terms of water and infrastructure, even without climate change, Africa faces water challenges. Africa's trans-boundary river basins together account for 90 percent of its surface water resources. This is compounded by the insufficient infrastructure, even relative to existing needs. There are few water control systems and not much water storage capacity, despite relatively abundant resources. Most rivers cross more than one country, necessitating effective cooperation across borders. Poorly developed transport, energy, information and communication systems may also hinder adaptation. Also, the region's rapidly urbanizing population is vulnerable because of ill-defined property rights, weak land use planning, and informal settlements often on land subject to erosion or flooding. Nearly three-quarters of the region's urban population live in slums, and the vast majority of the 300 million additional urban residents expected in Africa over the next 25 years may also be faced with similar living conditions (World Bank, 2009).

However, despite these postulations, a large share of unexploited hydropower potential lies in developing countries, particularly in Sub-Saharan Africa. North Africa and the Middle East, with year-round exposure to sunlight, could benefit from increased European demand for solar energy. Figure 4 clearly illustrates that Africa has enormous untapped hydropower potential, compared to lower potential but more exploitation of hydro resources in the United States. The United States has exploited over 50 percent of its hydropower potential, compared to only 7–8 percent in the countries of Sub-Saharan Africa. Total electricity production in the United States is shown for scale. It should be noted that developing countries, with less existing infrastructure than developed countries, have a flexibility advantage and could potentially leapfrog to cleaner technologies (DBCCA, 2009; World Bank, 2009).

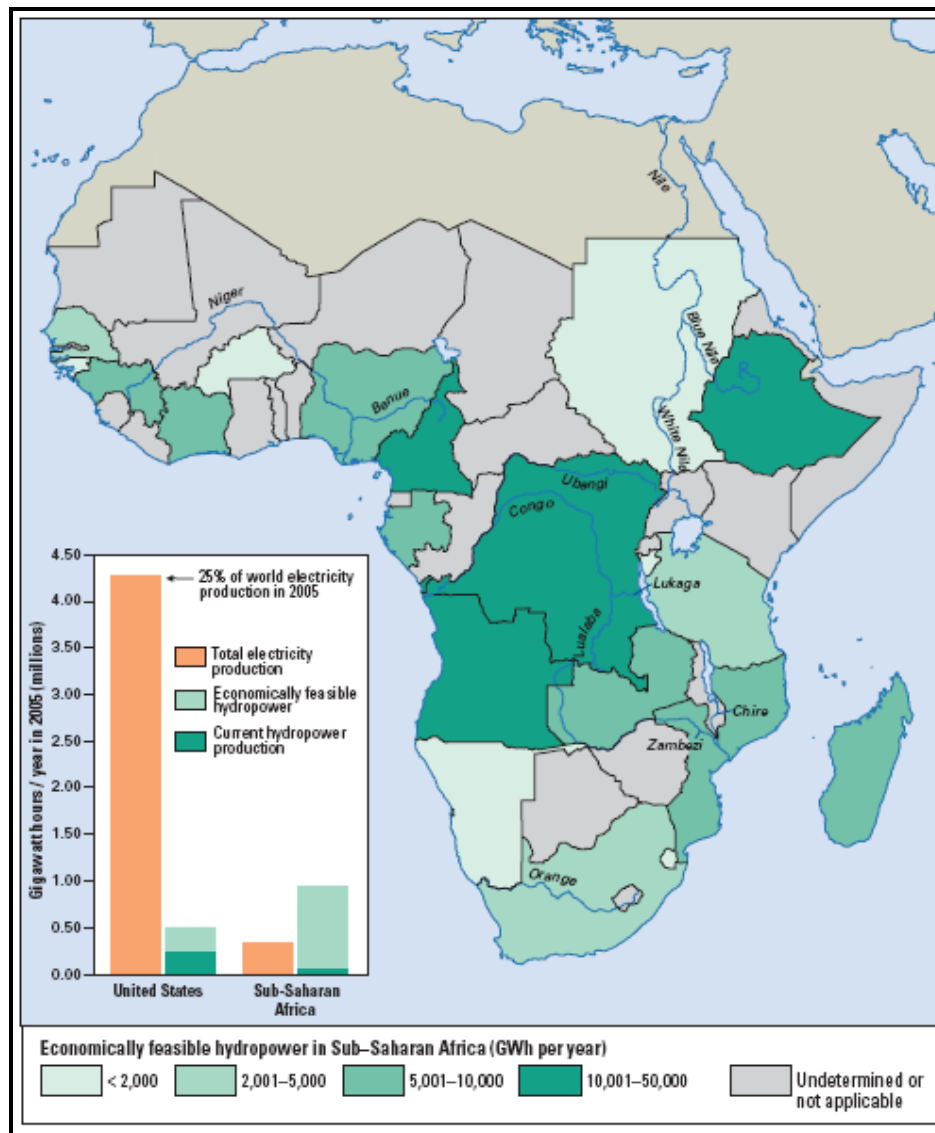


Figure 4: Economically feasible hydropower in Africa

Source: DBCCA, 2009

The impacts of climate change on health add to the human and economic losses, especially in developing countries. The World Health Organization estimates that climate change caused a loss of 5.5 million disability-adjusted life years in 2000—84 percent of them in Sub-Saharan Africa and East and South Asia. It has been asserted that the incidence of drought, projected to increase in the Sahel and elsewhere, is strongly correlated with past meningitis epidemics in Sub-Saharan Africa. The reach of some diseases is changing as temperature increases. Malaria, already the biggest killer in Sub-Saharan Africa, is spreading to higher altitudes. A 14 percent increase in Malaria incidence is expected as climate change is expected to expose

90 million more people in Africa to malaria by 2030 (Hay *et al.*, 2006). It also has indirect effects on health through water and sanitation, ecosystems and human habitation.

Children will be increasingly susceptible to malnutrition and diarrhoeal diseases. One study in Ghana estimates the costs associated with malnutrition and diarrhoeal diseases to be as high as 9 percent of GDP after accounting for long-term productivity losses. Further research in Côte d'Ivoire linking rainfall patterns and children's education shows that in regions with greater-than-usual weather variability, school enrolment rates declined by 20 percent for both boys and girls (Jensen, 2000). Indirectly climate change has intensified conflict as a result of competition for scarce resources. Armed conflict further complicates climate change risk management. For poor people living in weak or unstable states, climate change will deepen suffering, and intensify the risks of mass migration, violent conflict, and further fragility. Young children exposed to drought and civil strife in Zimbabwe suffered from a loss of stature of 3.4 cm, nearly one less grade of schooling, and nearly six months' delay in starting school. The estimated negative effect on lifetime earnings was 14 percent. Zimbabwe also discovered a diamond vein after the southern Africa earthquake in 2008 and this led to further civil strife in already difficult conditions (Alderman, Hoddinott & Kinsey, 2006).

Climate Change and Economic Growth

Climate change has made growth and poverty reduction more complicated and difficult, but it also presents tremendous opportunities. "Climate-smart" policies of the future would, for instance, pay more attention to land and water management and diseases like malaria — steps which would be good for growth and prosperity. There is a growing realization that the cost of building climate resilience into existing development programs is far less than the cost of emergency relief, rehabilitation, and recovery associated with disasters. Most developing countries lack sufficient financial and technical capacities to manage increasing climate risk. They also depend more directly on climate-sensitive natural resources for income and well-being. And most are in tropical and subtropical regions already subject to highly variable climate. The increasingly volatile climate and the rise in related disasters are having a significant impact on development. Droughts and floods have reduced Ethiopia's economic growth by more than a third and Kenya's by 10 to 16 percent of GDP a year over the past several years.

In addition to direct and immediate effects, climate disasters can also have persistent impacts by destroying assets that are critical to economic activity, such as livestock. Development strategies in Africa already include important adaptations to climate risk by the poor, including investments in water storage, flood control, irrigation infrastructure, and diversification of water sources. But climate change introduces a new set of risks and challenges. With undiversified economies and reliance on rain-fed agriculture, Africa sees a close association between rainfall and GDP growth. Long-term projections forecast that agricultural output could fall about 16 percent by 2080—more than in any other world region. This has serious implications for food security.

3. Importance of Sustainability in Agriculture in South Africa

In light of the discussion in the previous section, it is necessary to review the strategies that are currently in place in South Africa. In South Africa, as in the rest of Africa, sustainable development is almost synonymous with the sustainable utilisation and conservation of natural resources. A large portion of South Africa's land is arid and due to the inherent low rainfall and poor soil fertility, these arid regions are particularly susceptible to retrogression and desertification. This is especially true of the areas where agricultural practices or other land use practices continuously degrade the natural resources. This is the case because these land use practices usually concern some form of inefficiency and this results in sub-optimal profits, low yields or, with regard to the physical environment, as degraded resources (soil erosion, overgrazing, depletion of subterranean water, bush encroachment and bush thickening, unproductive wetlands, diminished bio-diversity, etc.). Due to the sensitivity of ecosystems, especially those in arid regions, conservation farming presupposes the adoption of specific farming practices that are compatible with the limitations imposed by unfavourable farming conditions. These practices could prevent degradation whilst the non-adoption, in turn, could lead to man-made desertification (Düvel & Botha, 1999: 47).

Environmental degradation remains a major concern to the world at large and to South Africa in particular. Factors such as climate change, an ever increasing world population, loss of productive land to urbanisation and through soil erosion, various kinds of pollution, and other such issues are limiting the ability of the environment to fully meet the needs of the people (Boyd, 1989 in Düvel & Botha, 1999). Of the total land area of the Republic of South Africa (approximate 123 million hectares) 80 percent is utilised by agriculture and forestry. The

major proportion of this agricultural land can be regarded as low potential land of which 80 percent is still under natural grazing (De Klerk, 1986). More than half of these grazing areas can be regarded as desert, semi-desert or arid with a rainfall ranging from 0 to 500 mm per annum (Düvel & Botha, 1999: 47).

The retrogression has been so serious, that many areas show major and rapid changes in the type of vegetation (Acocks, 1988: 11 in Düvel & Botha, 1999). Examples of these are the desertification of the Karoo, Karoo encroachment into the grassland areas, desertification and bush encroachment of the Northern Cape savannah, and bush encroachment of the Transvaal savannah. The retrogression of vegetation and the degradation of the natural environment can, apart from the role of climatic factors, be directly ascribed to the non-application or adoption of the desired conservation and or production practices. This emphasises the key role of the land user and the necessity of understanding his adoption behaviour (Düvel & Botha, 1999: 47).

In July, 2008, the South African Government outlined its climate change vision. The plan included a substantial, quantified deviation from baseline emissions, enabled by international funding and technology, whereby South Africa's greenhouse gas emissions would peak in around 2000-2025, stabilize for up to 10 years, and then decline in absolute terms. On March 31st, 2009, South Africa announced feed-in tariffs that guarantee a stable rate-of-return for renewable energy projects. Due to its large coal deposits, South Africa has some of the lowest electricity prices in the world. However, in recent years, strong economic growth, rapid industrialization, and a mass electrification program have led to demand for power outstripping supply. The recent power supply crisis has accelerated recognition of the need to diversify the energy mix, including sources such as nuclear power and natural gas, as well as various forms of renewable energy. According to the South Africa House of Representatives Select Committee on Energy Independence and Global Warming, South Africa has been leading the way among developing countries with its proposals for climate change action (DBCCA, 2009a).

From a sustainability point of view, grain and grain stocks are of immense importance as they are crucial in the development of a country's agricultural sector and for purposes of food security. Maize, wheat and soya contribute to a large source of energy and carbon footprint globally. Grains are not only used for human consumption but also in the manufacturing of

biofuels and animal feed. With a growing world population, relying only on agriculture for energy will put a great pressure on the food production system, the environment, distributional effects and will definitely cause re-organisation in agriculture. There are many debates in South Africa and elsewhere, whether there will be enough food produced in spite of the biofuels and ethanol production. Sustainability issues have arisen given that maize as a feedstock product is becoming less profitable because of ethanol and biodiesel production which is also a staple food for most of the poor. For sustainable staple food production as well as energy production, strict incentives and policies must be put in place.

South Africa is facing a severe shortage of energy resources, as noted by the recent Eskom problems. This has caused a shift back to traditional sources, such as wood fuel, which further exacerbates the problem of deforestation. The shortage is largely due to uneven distribution of energy resources that calls for integration of energy development throughout the continent. The South African Government set its renewable electricity target in its 2003 White Paper on Renewable Energy. On March 31st 2009, South Africa announced feed-in tariffs (REFIT) that guarantee a stable rate-of-return for 15 years for renewable energy projects. The feed-in tariffs announced were substantially higher than those in the National Energy Regulator's initial proposal. The tariffs are differentiated by technology and will be paid for a period of 20 years. The Department of Minerals and Energy established the Renewable Energy Finance and Subsidy Office, whose mandate includes the management of renewable energy subsidies. At the 2009 renewable energy summit in March, a recommendation was made that there is a need to strengthen the Renewable Energy Finance and Subsidy Office and other development finance institutions that fund renewable energy projects.

South Africa formed a National Tradable Renewable Energy Certificate Team after a feasibility study on the certificates in 2007. The team aims to establish an Issuing Body responsible for registering, issuing and redeeming certificates in South Africa. The scheme is still in development. There are several international and domestic institutions that offer financial assistance to private sector companies that want to establish renewable energy projects. South Africa has partnered with the Global Environment Facility to provide funding and technical assistance to renewable project developers. Every year the Department of Minerals and Energy collects data on renewable energy to evaluate progress towards the goal.

In August, 2009, the Department of Environmental Affairs found that currently South Africa is producing less than 1% of its electricity from renewables (DBCCA, 2009a).

In terms of alternative energy sources and South Africa's carbon footprints, ESMAP (2009) undertook a low carbon growth study which included the stakeholders and structure illustrated in Figure5.

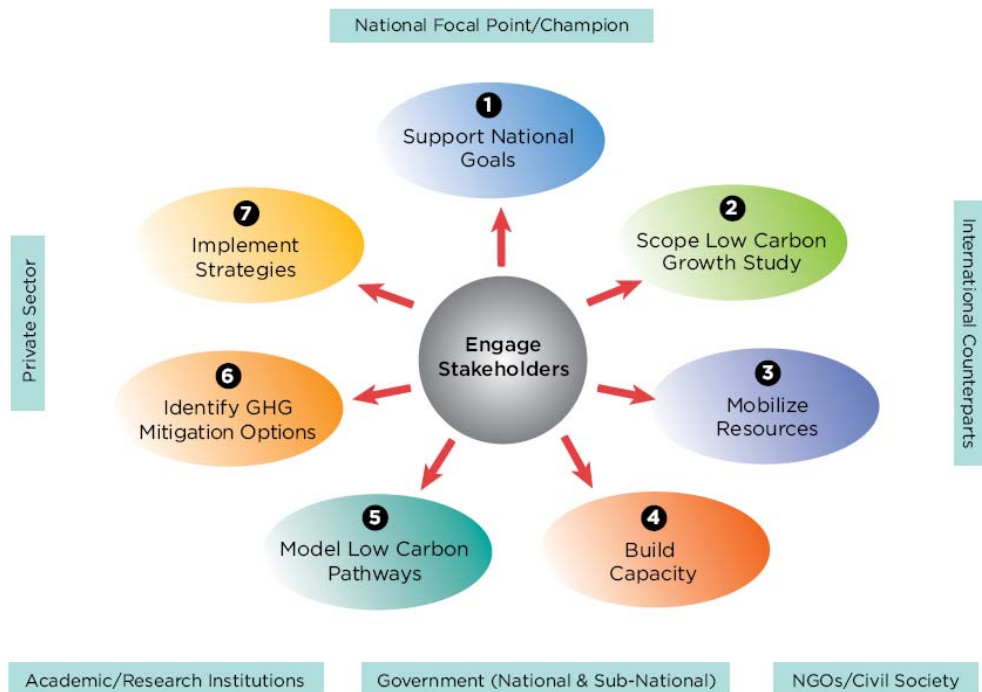


Figure 5: Low Carbon Growth Country Studies Process Framework

Source: ESMAP, 2009:3

Although the project was undertaken in six different countries, the results from the South African component of the study are given in Table 1 below.

Table 1: Emerging Results from SA Low Carbon Growth Study

Theme	Emerging Results
Renewable Energy	Across the program, RE resources—small-scale hydropower, wind, solar water heating, solar PV, and ethanol, etc.—are recognized as having untapped potential. South Africa aims to decarbonize the power sector by 2050 and steps are being taken to scale up RE with government targets of 4% of electricity demand

	being met with RE resources by 2013. Eskom, South Africa's public electricity utility, plans to install solar water heating for 1 million households and businesses to reduce peak demand. Also, South Africa is supporting feed-in tariffs for RE.
Policy Implementation	Analysis, identification, and development of policy measures to support implementation of a lower carbon development path are common themes across the study program. Support needs to be tailored to the local context and sector. South Africa needs implementation support to achieve its National Energy Efficiency Strategy.
Financing	All countries face large challenges to finance investments and institute supportive policies and programs. Both public and private investment sources, including households, are important going forward. For example, financing South Africa's program to improve EE by 12% by 2015 is a major challenge and technical assistance was provided through the study to examine financing mechanisms for EE.
Capacity and Knowledge	There has been significant demand for capacity building and knowledge. Knowledge transfer to support technical, cross-sector, and policy analyses, as well as policy implementation. South Africa needs support to strengthen new and existing organizations tasked with implementing EE/DSM programs.

Source: ESMAP, 2009

The South African approach to sustainability is also distinguished by the importance placed on social issues, such as HIV/AIDS, inclusion and empowerment of disadvantaged groups, and protection of local societies. Human and animal rights are important concepts in post-apartheid South Africa as they continue their attempts at correcting the injustices of previous regimes. One such programme is the transformation of the economy through a concept known as Black Economic Empowerment (BEE). BEE is addressed in all sectors of the economy, including the financial sector. The Financial Sector Charter is a unique industry-led framework that establishes the principles upon which BEE will be implemented in the

sector, establishes targets to implement the principles, and outlines mechanisms to monitor and report on progress (DBCCA, 2009b).

Under South Africa's National Environmental Management Act (NEMA), financial institutions can be found liable for environmental pollution and risks of a social nature. Corporate governance standards have also expanded significantly in Sub-Saharan Africa. A good example is the standards developed by the Institute of Directors in Southern Africa and its King Committee on Corporate Governance (IFC, 2007).

Although Nedbank is an international leader in terms of sustainability and transformation, improvements are vital for other South African banks, as they face strong competition for international investments from other emerging markets. International private banks are also active in South Africa and these have been introducing social and environmental standards into the region's lending practices (IFC, 2007).

4. Sustainability focus in South African Agribusiness Firms

This section provides an overview of some of the focus areas of different firms involved in the agricultural sector with respect to sustainability. It is interesting to note that most are common to all firms.

ABSA (2010) assesses its sustainability performance in terms of its transformation, economic, social, environmental and corporate governance objectives with respect to its stakeholders (shareholders, customers, employees, communities, suppliers, government and regulators).

AFGRI (2008) conducts its business in a holistic manner, and both financial and non-financial strategies are implemented to create value for its stakeholders. This report provides information on the following:

- Employment equity
- Black Economic Empowerment
- Health and safety
- HIV/AIDS
- Community involvement

- Training and development (Education)
- Environmental management

BAT's (2010) sustainability agenda is an integral part of delivering their strategy and comprises five goals. These include the following focus areas:

- commercially viable, consumer acceptable reduced-risk products to market;
- high standards of corporate conduct within the marketplace;
- positive social, environmental and economic impacts in the supply chain;
- Address the impacts of our business on the natural environment
- Ensure the right people and culture to meet the goals.

OMNIA (2009) framework for sustainability focuses on the following areas:

- ECONOMIC PERFORMANCE
- SOCIAL PERFORMANCE
- BROAD-BASED BLACK ECONOMIC EMPOWERMENT
- SOCIO-ECONOMIC DEVELOPMENT
- HIV/AIDS

IDC (2009) focuses on five themes which have a direct bearing on the continuing sustainability of both the organisation and the context in which we operate. These are:

1. Broad-based Black Economic Empowerment
2. Enterprise Development
3. People Development: Skills, Talent Management and Employee Well-being
4. Environment
5. Investing in our Communities

Standard Bank (2009) has 4 focus areas in terms of sustainability. These are

- Corporate governance
- Economic performance and contribution
- Social performance
- Environmental performance

Rainbow (2009) has 3 main focus areas in terms of sustainability. These are

- **Economic sustainability practices**
 - Value added
 - Black Economic Empowerment (BEE)
- **Key stakeholder relations**
- **Environmental sustainability practices**
 - Nature conservation
 - Environmental management system
 - Operational and environmental risks
 - Energy usage
 - Water usage
 - Waste and recycled products
 - Emissions to air
 - Environmental Impact Assessment

In SAM & PWC's published sustainability report, companies on the stock market are ranked in terms of their sustainability according to the sectors. The following table lists these criteria and South African firms identified in these rankings as sustainability leaders.

Table 2: Sector Specific Sustainability Criteria

SECTOR	SECTOR SPECIFIC CRITERIA			SUSTAINABILITY LEADERS 2008/2009*
	ECONOMIC DIMENSION	ENVIRONMENTAL DIMENSION	SOCIAL DIMENSION	
Banks	<ul style="list-style-type: none"> – Anti-Crime Policy/Measures – Brand Management – Customer Relationship Management – Stakeholder Engagement 	<ul style="list-style-type: none"> – Business Opportunities Financial Services/Products – Business Risks Infrastructure/ Project Finance – Climate Change Governance – Environmental Policy/ Management System – Operational Environmental Footprint 	<ul style="list-style-type: none"> – Code of Ethics in Investments/Financing – Occupational Health & Safety – Social Value Added: Financial Inclusion/Capacity Building – Standards for Suppliers 	Nedbank Group Ltd South Africa
Diversified Industrials	<ul style="list-style-type: none"> – Customer Relationship Management 	<ul style="list-style-type: none"> – Climate Strategy – Environmental Policy/ Management System – Operational Eco-Efficiency – Product Stewardship 	<ul style="list-style-type: none"> – Occupational Health & Safety – Standards for Suppliers 	Barloworld Ltd South Africa
Mining	<ul style="list-style-type: none"> – Transparency 	<ul style="list-style-type: none"> – Biodiversity – Climate Strategy – Environmental Policy/ Management System – Mineral Waste Management – Operational Eco-Efficiency 	<ul style="list-style-type: none"> – Mine Closure – Occupational Health & Safety – Social Impacts on Communities – Stakeholder Engagement – Standards for Suppliers 	Anglo Platinum Ltd South Africa
Oil & Gas Producers	<ul style="list-style-type: none"> – Brand Management – Customer Relationship Management – Exploration & Production – Gas Portfolio – Transparency 	<ul style="list-style-type: none"> – Biodiversity – Climate Strategy – Environmental Policy/ Management System – Operational Eco-Efficiency – Refining/Cleaner Fuels – Renewable Energy 	<ul style="list-style-type: none"> – Occupational Health & Safety – Social Impacts on Communities – Stakeholder Engagement – Standards for Suppliers 	Sasol South Africa

* As of October 31, 2008

Source: PWC/SAM, 2009

Nedbank has been identified globally as a sustainability leader in the banking sector. The Nedbank's Sustainability and Transformation Report (2010) includes the following focus areas:

Enterprise Governance and Compliance

Client service

- **Employee management**
- CSI and staff volunteerism
- **Minimising our impact on the environment: ‘The green bank’** (The environment & Affinities)
- **Transformation** (across all initiatives)

In the oil and gas producers’ sector, Sasol has been identified globally as a sustainability leader. Sasol’s (2009) sustainability strategy encompasses the following:

1. **Energy security and climate change**
2. **Water.**
3. **Safety**
4. **Workforce diversity.**
5. **Ethics**
6. **Skills development**
7. **Black Economic Empowerment**

5. Sustainability strategies to mitigate the effects of climate change

While many strategies entail trade-offs between economic viability and wide-boundary costs by externalizing environmental, social or economic issues, the triple bottom line strategy recognizes that some of the greatest returns are achieved when environmental, social and economic interests are aligned. Sustainable best-practices for managing Africa’s resources also reduce environmental pollution, enhance food quality and safety, and stimulate the economy by creating quality jobs and keeping money spent on food within the regional economy.

Environmental

Agriculture is the main economic activity among the poor in Africa and changes in terms of agricultural practices and land use form the core of any discussion on the environment. In terms of the environment, the important words are adaptation and mitigation. Traditional development activities often enhance adaptive capacity, but some can worsen problems.

Adaptation is thus not a standalone issue, but needs to be integrated throughout national, sectoral, regional, and local planning processes, as well as at the project level.

In terms of adaptation and climate risk management, the focus should include energy; disaster risk reduction; sustainable management of land, water, and forests; coastal and urban development; agricultural productivity; and health and social issues. Developing drought-resistant crops, managing scarce water supplies, protecting forests and coastal ecosystems, and improving access to energy will all help vulnerable groups survive in coming decades, as will the following:

- Improving weather data collection and forecasts (for farmers and insurers)
- Providing technical assistance (such as extension services on new crop varieties, help for health systems addressing new diseases)
- Developing and sharing knowledge on options in land use, forestry, and agriculture
- Assessing risk and vulnerability
- Prioritizing investment through better understanding of options and costs
- Helping develop drought- and saline-resistant crops

With respect to mitigation, the huge energy deficit and heavy reliance on wood for fuel must be taken into consideration. In this way, most mitigation opportunities should be linked to more sustainable land and forest management, energy use and development, and urban transport systems. By taking advantage of opportunities and new technologies in these areas, African countries can further development while providing clean energy access to their people. The following will be necessary (Bradford, 2009; World Bank, 2009):

- ***Climate change:*** Reduce greenhouse gas emissions and sequester carbon dioxide.
- ***Pollution:*** Keep the air, water and soil clean and free of pesticides and fertilizers.
- ***Land and water:*** Develop healthy, rich soils to hold water and reduce the risk of flooding and erosion.
- ***Biodiversity:*** Native habitat restoration, crop rotation and smart landscaping to recover and encourage beneficial plants and wildlife.

While Africa accounts for only 4 percent of global carbon dioxide emissions, more than 60 percent of the region's emissions are due to deforestation and land degradation. Therefore,

with improved land, water and forest management practices, mitigation and adaptation go hand in hand for Africa. Greenhouse gas reductions in farming include energy efficiency, sequestering of carbon in soil, and replacement of fossil fuels with renewable energy. In addition, local distribution channels are more resilient in the context of high transportation costs. Africa could leapfrog past outdated technologies and move forward with untapped hydropower, wind power, solar power, and other renewable sources of energy. The region has only utilized 8 percent of its hydroelectric power potential, compared, for example, to 30 percent in Latin America. There is therefore room for expansion of energy exploitation (World Bank, 2009).

Social

In terms of the social aspects of sustainability, health, justice and education are key areas, especially in Africa. The need for sustainability in terms of the environment and economically, ensure better diets and safety and access to resources, which leads to improved social development. The three concepts are interlinked and interdependent. In terms of health, measures should be put in place to detect and monitor epidemic-prone diseases, national health systems need better surveillance and early warning systems. In many parts of the world, surveillance fails to anticipate new disease pressure, for example, in Africa, where malaria is reaching urban dwellers with the expansion of urban settlements into areas of transmission. With advanced seasonal climate forecast models, predictions on peak times for malaria transmission can be made and given to regional authorities in Africa to provide them with information to operate an early warning system and longer lead-times to respond more effectively.

Justice and the rule of law are especially important in a region such as Africa where conflict is rife. Laws and policies need to be secured to mitigate the effects of climate change in a sustainable manner. The following policies and institutions should be implemented at both national and regional level for sustainability to occur:

Policies:

- Eliminating counterproductive incentives (such as subsidies for water-intensive crops)
- Creating appropriate incentives for private sector action (including private insurance)
- Improving land security and social protection
- Improving integrated river-basin and ecosystems-based planning

Institutions:

- Strengthening institutions in key sectors (including water, agriculture, infrastructure)
- Increasing coordination among sectors for disaster risk management
- Improving participatory processes and community involvement in decisions
- Strengthening disaster preparedness and safety nets for disaster-hit households
- Providing key public services (hydro-meteorological services, early warning systems)

Education, knowledge and capacity development will reduce the uncertainties about the impact of climate change and make policy decisions less complex. To ensure that Africa has the capacity, information, and technologies it needs to prepare for projected changes in climate, the region should invest in education systems, especially higher education in weather forecasting, water resources monitoring, land use information, disaster preparedness, and technology development. It is also essential to build capacity for risk management, planning, and coordination.

Economic

Because climate change is one of the fundamental problems facing poor people, development agency financing will remain the main platform for integrating climate resilience into African countries' development. More support will come from existing sources (such as carbon finance and the Global Environment Facility), as well as from new instruments designed to leverage private sector investment. New instruments include the UNFCCC's Adaptation Fund, the World Bank Group's Climate Investment Funds, the Forest Carbon Partnership Facility, and the Carbon Partnership Facility. Funding from these sources will help to build the knowledge base, strengthen institutions, and support "climate-proof" investments.

Over 60 World Bank projects in Africa have taken into account the critical importance of combating climate change. The Bank's Africa Region is tackling adaptation by beginning to address climate risks within project design. It is also emphasizing access to energy for all, while taking advantage of opportunities for clean energy development and efficiency gains. In fiscal year 2008 alone, the World Bank made \$447 million in renewable energy and energy efficiency commitments for 22 projects in the region. These accounted for 17 percent of all our renewable energy and energy efficiency commitments. Most were for new renewable energy projects, reflecting their potential in off- and mini-grid applications. The Bank has

also undertaken project identification and preparation activities in 16 countries and signed several emission reduction purchase agreements, especially via the Community Development Carbon Fund. A notable project in this area is the 85-megawatt geothermal project in Kenya. Capacity building efforts under the Carbon Finance-Assist program have been launched in nine African countries, with a focus on developing the Clean Development Mechanism project portfolio and strengthening institutions.

With five years to meet the Millennium Development Goals (MDGs), policymakers are keenly aware that few countries can hope to achieve their development goals without the scientific, engineering, and technical/vocational capacity to handle pressing development issues such as food security, cleaner energy, adaptation to climate change, improving health systems, providing water and sanitation services, generating wealth and jobs, and reducing absolute poverty. Many developing countries are bypassing official development agencies and boosting their STI research capacity by partnering directly with universities, private enterprises, think tanks, and research institutes. Development agencies may play a supporting role in facilitating and financing some of these partnerships but, to date, they have not been direct participants in many of them.

6. The effect and opportunities of climate change on non-agricultural industries

Global climate change influences all other industries because of the ripple effect that fundamentally stems from agriculture. Essentially if the agricultural market collapses or decreases, so will all other industries. Globally industries face risks, uncertainty, possible instability and changing markets. The consumer also plays a big role in the demand side, with higher awareness for 'going green' and carbon neutrality. Investors are also not only looking at the financial statements, but increasingly to company's carbon performance. Major uncertainty is caused by the global energy price increases and scarcity. Government policy has increased the demand for renewable energy for security of supply and environment purposes. Major investment would have to go into renewable energy projects and sustainable energy usages. All industries will have to deal with increased energy prices or new incentives, especially the mining and manufacturing industries face big uncertainty and risk. To secure world trade, access to energy is an important factor in any country. If it is

financially feasible, the hope to increase electricity generation without increasing GHG emissions is to upgrade to progressively clean power-plant technologies.

Investment opportunities are growing in the global market change into carbon emission transparencies. The Global CDP (Carbon Disclosure Project) is promoting higher levels of disclosure and transparencies with regard to carbon performance and to strengthen the case for emissions control as a strategic imperative for all organizations. According to the Deutsche Bank Group (2009) investing in climate change produces out-performances. They also voiced that before the private investor will commit large amounts of capital in the sector, they must first be transparent in regulations governing carbon emissions, renewable and energy efficiency.

Probably without taking a company's own sustainability into consideration, the consumer plays a big role in how an industry or company operates. The concept the consumer is king, never dies and at the back of their minds are global sustainability and climate change. Consumers also want to take action and be responsible for the earth they are living in and some are even willing to pay more to play a role in reducing global climate change.

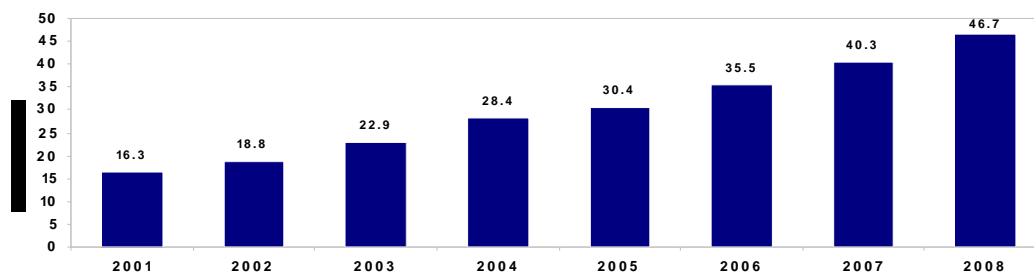


Figure 6: Global organic food and drink consumption in 2001 to 2008

Source: Planet retail, 2008

Figure6 it can be seen that consumer's organic consumption went up from 16.3 to 46.7 percent. Thus in ten years have grown with 30.4 percent. But consumers are not only going organic or green in the food and beverage sector, they are also increasingly aware of all businesses effects on the environment and other non-agricultural businesses need to take note of this and adapt appropriately.

The following are reasons for financial incentives to go green according to Planet Retail (2008):

- Changes in technology
- Bags are reusable, recyclable and employees can be trained to add more items per bag
- Reduction in packaging
- General utility costs in lighting and electricity are reduced
- Cheaper distribution methods available per rail or ship
- Retailers are starting to go green to stay out of the red.

Conclusions

A paradigm shift is beginning to take place where agriculture is increasingly important in the modern society. According to the World Bank Group, for the poorest people, GDP growth originating from agriculture is about four (4) times more effective in reducing poverty than GDP growth originating in any other sector. Most of the 900 million rural people, who live of less than \$1 a day are involved in agriculture, and can be reached through sustainable agricultural development. This is further compounded by the fact that Africa is the most exposed region to climatic vulnerability and most countries have agricultural based economies, where agriculture is a major source of growth and contributes on average 32 percent of GDP growth (World Bank, 2010). The further dilemma is that most poor and developing countries are resistant to change, and the global economy can only hope that they will realize the risks they are facing before it is too late.

The current issues with regard to the global and Africa creates sustainability challenge. The question is how these challenges affect agriculture including environmental issues such as global warming, carbon footprints, sustainable food, energy and water usage. Another major issue is the debate whether sustainability and productivity are compatible and how to balance the two. All businesses need to realise the importance of sustainability and its impact on their business models of the future. This requires immediate and aggressive action.

Although industries and financial institutions will also be affected by climate change, it is a common misconception that only the agricultural sector will be affected. This is because the most direct effects will be felt in the food industry. The agricultural industry plays a fundamental role in development as it causes a multiplier effect that can lead to sustainable

development in all sectors. As soon as agriculture starts to grow the rest of the industries and financial sectors follow as the multiplier effect comes into play.

Global climate change influences all other industries because of the ripple effect that fundamentally stems from agriculture. Essentially if the agricultural market collapses or decreases, it will impact on many other industries. Globally industries face risks, uncertainty, possible instability and changing markets. The consumer also plays a significant role in the demand side, with higher awareness for 'going green' and carbon neutrality. Investors are also not only looking at the financial statements, but increasingly to company's carbon performance. Major uncertainty is caused by the global energy price increases and scarcity. All industries will have to deal with increased energy prices or new incentives, and risk. Investment opportunities are growing in the global market and only firms that manage these changes and adapt to sustainably will thrive. This is particularly important in Africa as the continent relies heavily on food and financial aid from the developed world. In light of the recent financial crisis, the situation has become particularly bad for the developing countries as there is less money for aid. This makes it integral for Africa to develop economically sustainable methods of development and in particular, economically sustainable agriculture, if the region is to survive and meet the MDGs.

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