

EVALUATION OF POLICIES PROMOTING SUSTAINABLE AGRICULTURE IN SOUTH AFRICA

Khwidzhili, R. H.¹⁵ & Worth, S. H.¹⁶

Correspondence Author: R. H. Khwidzhili, Email: humphrey.khwidzhili@ump.ac.za

ABSTRACT

South Africa will require the establishment of a formal inclusive policy on sustainable agricultural practices. This will not only assist the country in avoiding further exploitation of the natural environment, but will also position agricultural extension in promoting the five pillars of sustainable agriculture. A comprehensive review using conceptual reflection presented in this paper confirms that most of the sustainable aspects are covered in both the white paper in sustainable agriculture and policy on agriculture in sustainable development. The existing documents, legislation, and policies available should be integrated into a working document that promotes sustainable agricultural practices. Thus, this paper provides a philosophical comparison between South Africa's policy on agriculture in sustainable development and its white paper on agriculture. The review found that these two key South African agricultural policies are closely related in terms of the five pillars of sustainable agriculture. This paper further argues that the two policies reviewed could be used in the formulation of national policy on sustainable agriculture. In conclusion, this paper also suggests possible legislation addressing sustainable agriculture that should be integrated to develop a national policy on sustainable agriculture.

Keywords: Sustainability, Policy, Agricultural extension, Social acceptance, Economic viability, Environment

1. INTRODUCTION

There is no final or approved policy on sustainable agriculture in South Africa. However, there is a working document on agriculture in sustainable development and several draft policies and guideline documents delineating South Africa's intentions regarding sustainable agriculture. These policies seek to promote sustainable agricultural practices throughout the nine provinces of the country. This paper evaluates these policies in terms of five pillars of sustainable agriculture, namely biological productivity; economic viability; protection of natural resources; reduced levels of risk; and social acceptance (Khwidzhili & Worth, 2016). The policies are evaluated as to the extent to which they address the five pillars. This paper highlights on which of the five pillars are most prominent in the policies, both individually and in terms of their integration. Integration is important since the five-pillar framework, like sustainability, is essentially a function of interdependent processes and is less informative if implemented in isolation of any of the five pillars. This paper draws from other published papers and relevant policy documents to argue for the possible establishment of a policy on

¹⁵ R.H. Khwidzhili. PhD Student at the University of KwaZulu-Natal and Lecturer: Agricultural Extension and Rural Resource Management, University of Mpumalanga, P/Bag x 11283, Nelspruit, 1200. Tel. 013 002 0144; E mail: humphrey.khwidzhili@ump.ac.za. This article is part of the author's PhD Thesis at the University of KwaZulu-Natal, Pietermaritzburg Campus.

¹⁶Prof. S. Worth. Programme coordinator: Agricultural Extension and Rural Resource Management, School of Agriculture, Earth and Environmental Sciences. University of Kwa-Zulu Natal, P/Bag x01, Scottsville, 3209. Tel. 033 260 5811; E mail worth@ukzn.ac.za

sustainable agriculture. The paper emphasises that the philosophy of sustainable agriculture is not a mere organic practice in agriculture, but rather a synergy of practices that are aimed at promoting agricultural production with little or no harm to the environment. The paper concludes with recommendations that could assist policy-makers in establishing a policy promoting sustainable agriculture in South Africa.

2. OBJECTIVES

The main objective of this paper is to examine the current policies promoting sustainable agriculture in South Africa to determine:

- The extent to which policy-makers considered the five pillars of sustainable agriculture when developing the policies,
- The extent to which the policies contribute to the promotion of sustainable agriculture in the country, and
- Whether there is a need for a review of these and related policies in order to promote sustainable agriculture.

The paper also aims to:

- Make agricultural extension officers and their managers aware of the policies and the relevant documents promoting sustainable agriculture in South Africa to aid them in their work, and
- Provide the National Department of Agriculture, Forestry and Fisheries (DAFF) with insight relevant to drafting a national policy promoting sustainable agriculture in the country.

3. RESEARCH METHOD

Using the pillars of sustainable agriculture (Khwidzhili & Worth, 2016), an in-depth comparison between South Africa's policy on agriculture in sustainable development and its white paper on agriculture was conducted to establish the presence of the pillars in both documents (Hart, 1998). This paper is a result of an informative, critical and useful synthesis of already existing literature on sustainable agriculture (Bolderston, 2008). A conceptual reflection in this paper explores a detailed evaluation of existing literature on sustainable agriculture to determine shortfalls in terms of the five pillars of sustainable agriculture. Findings are consolidated in a table followed by a discussion related to each of the two policies.

4. CONCEPTUAL REFLECTIONS

The premise of this discussion is that the five pillars of sustainable agriculture, while being distinct as they are, should be viewed in their totality in order to be effective. Attempts to analyse them individually will distract from the value of the holistic approach. These conceptual reflections give perspectives of already available literature and provide a direction when developing a policy on sustainable agriculture. Some limitations emanating from the findings of this study indicate clearly that there is still a vacuum in South Africa to develop an integrated policy on sustainable agriculture.

The philosophical argument by OECD (2006) reflects that policies which intend to promote agricultural development (policies in agriculture) might not be effective unless accompanied

by policies for agriculture, which include education, transport, communication infrastructure, as well as private sector development. Approximately three decades ago, Yudelman (1987) had already observed sustainable agricultural production systems as a major concern for research and policy-makers in both developed and developing countries. Medugu & Jahor (2006) similarly concluded that several human activities such as inappropriate technology, overpopulation, pollution, overgrazing, deforestation, and mining are a result of poor policy regulation. Further, Phrek, Songsak, Aree & Bubsara (1999) suggested that the most important element of success in policy formulation should involve intergraded marketing arrangements initiated by the private or government sector.

Policies should not be formulated for farmers; this should rather be a collaborative process which includes many stakeholders including farmers. Implementation of sustainable agricultural practices remain of paramount importance (Mazumadar, 2006), and it requires reduced use of chemicals and increasing internal farm skills and sound management to reduce the use of chemicals in farms. Further emphasis was given by the World Bank (2006), supported by Ahmadvand & Karami (2007), who concluded that agricultural extension should be used to champion sustainable agriculture. Similar notions were also confirmed by Allahyari (2009), who proposed that agricultural extension should take a leading role in promoting sustainable agriculture. However, this responsibility should be carried out with the understanding that the role of agricultural extension agents is also changing from transferring knowledge and technology to consultants, advisors and facilitators of the farmer learning processes (Karbasioun, 2007). Historically, as cited by Dart (2000), agricultural extension worldwide has shifted from an emphasis on production at the beginning of the 21st century, to productivity (or efficiency) based agriculture and to the more recent philosophy of sustainability.

An ecological report by Lundberg & Albaeco (2008) puts forward that agriculture should be based more on ecosystem services than on fossil fuels. This will assist in access to healthy food and clean water, climate change will be limited and, ultimately, biological diversity will be protected. A major obstacle facing agricultural extension systems in sub-Saharan Africa is how to contribute to the process of transforming rural and agricultural systems in sustainable ways (Korma, 2003). Extension scholar, Röling (1999), reminds us that a knowledge-driven extension system constitutes the most effective means to strengthen and creatively reconstruct the entrepreneurial, social, and ecological capacities of people to successfully engage in production and livelihood activities that demand on the one hand, a strong competitive orientation, and on the other hand, heightened sensitivity to environmental issues. Conway & Pretty (1991) documented several environmental and human effects caused by modern agriculture. These, amongst others, include the use of pesticides, the inclusion of nitrate and phosphate on fertilizers, soil erosion, destruction of micro-organisms, and air pollution. Studies by Bollman & Bryden (1997), as supported by Eutrostat (1997), established that modern agriculture impacts on social aspects. For example, through the introduction of mechanisation, more than 1.93 million jobs were lost across the European Union in the 1980s. Similarly, in the United Kingdom, the shift to fewer farms using capital-intensive technologies contributed to job losses resulting in rural poverty and economic disadvantage (Pretty, 1998; Ministry of Agriculture Fisheries and Food (MAFF), 1997).

The world's biological diversity is reported to be decreasing rapidly. This decrease is observed in natural ecosystems, agriculture, forestry, and aquaculture. For example, today just four species of rice, maize, wheat and potato make up about half the energy intake of humans from the plant kingdom. In a similar way, almost half of the global meat production

comes from only a few breeds of pigs, chickens and cattle. Furthermore, the richness of variation within the different species used in agriculture is declining. One example of loss of diversity is the loss of rice varieties. Only a few decades ago, farmers in India grew almost 30 000 different varieties of rice, which were adapted to local conditions. Since the inception of green revolution, these have been replaced by a few high-yielding rice varieties that are often grown in monoculture (Lundberg & Albaeco, 2008). Drawing from the above argument, it is evident that farmers prefer to resort to farming practices that are aimed at increasing production, and do so without necessarily considering the natural environment and human health. A report by the World Conservation Monitoring Centre (1992) indicated that South Africa ranks third in the world with regards to biodiversity distribution. The country has almost one million species that need to be conserved for future generations. This is confirmed by Wynberg (2002) who emphasised that many species that exist in South Africa do not exist anywhere else in the world. This diversity of species in South Africa contributes to soil fertility, aquaculture, atmosphere, food, ecosystem, and many more (Shackleton, 2009). In contrast, South Africa also contributes enormously to threatening biodiversity through unsustainable agricultural practices, mining, and industrialisation (Twine, Moshe, Netshiluvhi & Siphugu, 2003).

Antonaci, Demeke & Vezzani (2014) indicate that agricultural production is highly susceptible to risks which affect farmers and consumers of agricultural products. They argue that coherent and integrated long-term strategies and policies are required to lower production risks with the aim of promoting sustainable agricultural production. They further argue that the government should ensure the protection of farmers against production risks and price shocks through incentives, development of agricultural markets, and easy access to financial institutions. Siegal & Alwang (1999) had earlier indicated that production risk triggered by extreme occurrences would require high insurance premiums by farmers which they are unlikely to be able to afford. This could result in farmers defaulting on bank loans (Anderson, 2002). As a partial means to address this susceptibility, risk management and price stabilisation policies should focus on long-term investments to increase the role of the private sector and build confidence in a market-based approach (World Bank, 2005; Byerlee, Jayne & Myers, 2006). Government intervention is needed since a lack of access to credit and saving facilities in rural areas are the major constraints in all African countries (Allen, Otchere & Senbet, 2011).

Although technology brought enormous changes in the agricultural sector, especially on resource rich farmers, Altier (2002) supported by Ray, Ugarte & Tiller (2003) argue that poor farmers, due to social constraints and insufficient training, remain laggards in adoption. Still, the adoption of technology to the extent that it has been adopted has created uncertainty in the labour force (e.g. leading to unemployment). Intensive irrigation, modern machinery, and hybrid varieties have been major sources of job losses (Todaro, 1996). Considering another aspect of this discussion, the transfer of technology model that is used in extension, which promotes a top-down transmission of agricultural knowledge from extension officers to farmers, strengthened the adoption conventional (mechanised) agriculture by converting research results into easily transmittable production recommendations (Chambers, 1989), while bypassing small-scale farmers' own needs and insights and ignoring holistic ecological approaches. This raises the question as to the legitimacy of imposing any technology innovation on (poor) farmers, and suggests that they are involved in all processes that involve developing and testing technologies before implementation. An ineffective regulation on pesticides is a major challenge in developing countries (Murray, 1994).

Agriculture is a major user of natural resources, albeit in different ways and to different extents depending on the farming system. According to Kabat (2013), globally, agriculture uses almost 80% of all agricultural land (suggesting there is little room to expand), and about 70% of the world's fresh water resource used is consumed by the agricultural sector. Within this high resource use, some agricultural systems are the drivers of environmental degradation and loss of biodiversity (e.g. the practice of monoculture and high use of pesticides) (FAO, 2009; IAASTD, 2009, UNEP, 2010) to the extent that over 60% of the world's goods and services are being degraded or used unsustainably (MEA, 2005). This is taking place while the genetic diversity of crops, breeds, trees and aquatic resources on which agriculture depends is at severe risk. Global environmental changes as well as the loss of knowledge associated with agricultural practices based on local varieties remains a major challenge. Today, four crops only – potato, wheat, maize and rice – supply more than half of humanity's calories.

5. FINDINGS

Table 1: A comparison of the policies reviewed in this study against the framework of the five pillars of sustainable agriculture.

	Policy on agriculture in sustainable development	White paper on agriculture
Pillar 1 Maintaining and increasing biological productivity	<ul style="list-style-type: none"> • Agricultural chemicals • Limited crop rotation • Monoculture • Industrial developments • Integrated production • Integrated pest management • Organic fertilisers • Minimum tillage • Intercropping • In-cropping • Biodiversity conservation 	<ul style="list-style-type: none"> • Ecosystem • Inorganic fertilisers • Pesticides • Rural biodiversity • Indigenous fauna and flora
Pillar 2 Decreasing the level of risk to ensure larger security	<ul style="list-style-type: none"> • Farm inputs • Poor subsidy • Re-train extension officers • Effective risk management strategies • Farmer training 	<ul style="list-style-type: none"> • Research • Poor risk management • Legal instruments • Water catchment management • Risk reducing mechanisms • Farmer training on finance • Training extension officers
Pillar 3 Protecting the quality of natural resources	<ul style="list-style-type: none"> • Protection of natural resources • Preventing soil erosion • Contamination of ground water • Land degradation • Intensive tillage • Pollutants • Collection of firewood • Overgrazing • Deforestation • Industrial developments 	<ul style="list-style-type: none"> • Limited arable land • Lack of water supply • Sustainable utilisation of natural resources • Resource conservation • Incorrect irrigation methods • Pollution of ground water • Destructions of natural forest

	Policy on agriculture in sustainable development	White paper on agriculture
Pillar 4 Ensuring agricultural production is economically viable	<ul style="list-style-type: none"> • Contribution to the economy • Poor financial market • Farmer support • Research funding • Infrastructural support 	<ul style="list-style-type: none"> • Successful agriculture • Economic growth • Market • Financing for farmers • Reduce financial regulations • Subsidise repayment of loans • Marketing information • Increase production
Pillar 5 Ensuring agricultural production is socially acceptable	<ul style="list-style-type: none"> • Social well-being • Human health • Safeguard livelihood • Poverty alleviation • Food insecurity • Crime • Education • Microbial contaminations • Equity • Unemployment • Trade opportunities • Biotechnology • Indigenous pest control 	<ul style="list-style-type: none"> • Food safety standards • Consumer satisfaction • Quality products • Food security • Hybrid plants • Biotechnology • Technology

5.1. Policy on agriculture in sustainable development

Sustainable agriculture and sustainable development are two different concepts; however, there is a direct link between the two. The policy identifies strategies, guidelines, and practices that constitute the South African concept of sustainable agriculture. It emphasises that farming plays a crucial role in the growth of South Africa's economy. The policy reviewed used the traditional pillars of sustainability (environmental, economic and social aspects of development) and does not explicitly use the five pillars of sustainable agriculture. Within the traditional three pillars, the policy argues that the following should be at the centre of sustainable agriculture:

- *Environmental*: protection of the natural resources; prevention of water and soil erosion and biodiversity conservation.
- *Economic*: assurance of a safe and high-quality supply of agricultural products.
- *Social*: contribution to social well-being.

This policy submits that some agricultural practices impact negatively on human health. Chemicals such as pesticides and fertilisers used in agriculture can contaminate groundwater. The policy declares that land degradation is the primary environmental issue affecting sustainability. This policy also argues that soil degradation, resulting from soil impoverishment, leads to greater susceptibility of vegetation to drought. The main contributors to soil impoverishment, particularly in the commercial sector, are monoculture in cereal production, intensive tillage, and limited crop rotation. Soil degradation in communal land is caused by excessive collection of firewood, inappropriate land use, population density, and overgrazing. The policy acknowledges that South Africa is ranked third in the world for biodiversity distribution (National Department of Agriculture, Unspecified.). However, it also notes that species extinction rates in the country are high due to unsustainable farming practices, deforestation, and industrial developments. In addition, the policy cautions that the quality and quantity of water in South Africa is unlikely to be

sustainable for future generations, primarily due to the projected growth in population and industrialisation.

Economic sustainability is hampered by poor financial markets, especially in rural areas, that make it difficult for farmers in these areas to cope with various risks. They cannot afford to purchase risk ameliorating farm inputs even if it would be profitable to do so. The draft policy suggests that constraints such as inadequate physical infrastructure, unstable market opportunities, lack of market information, poor subsidies, and unfair market competition all contribute to hindering farmers in accessing markets. The policy also argues that research that can provide sustainable increases in agricultural production and improve management of natural resources amongst poor populations is grossly underfunded.

With regards to the first of the five pillars (biological productivity), the policy warns of negative effects of pesticides, industrial development, and the advantages of organic production, minimum tillage, and inter-cropping. The second pillar (decreasing the level of risk) is also covered in this policy with the intension of providing examples of farm inputs, subsidies to poor farmers, re-training of extension officers, effective risk management strategies, and farmer training. The third sustainable agriculture pillar (protecting the quality of natural resources) is covered by the policy through calling for protection of natural resources, stemming or minimising soil erosion, contamination of ground water, land degradation, intensive tillage, the use of pollutants, collection of firewood, overgrazing, deforestation, and limiting industrial developments. The fourth pillar of sustainability ensures that agricultural production is economically viable. Some elements of the fourth pillar are also addressed by this policy, for example, the policy speaks to economic factors such as agriculture's contribution to the economy, the poor financial market, farmer support, research funding, and poor farmers' infrastructural support. Finally, some elements of the fifth pillar (socially acceptable agricultural production) are also covered in this policy with reference to social well-being of farmers, human health, safeguarding sustainable livelihood, poverty alleviation, food insecurity, crime, education, microbial contaminations, equity, unemployment, poor trade opportunities, the usage of biotechnology, and the use of indigenous pest control. In conclusion, as shown in Table 1, although the policies reviewed do not explicitly address all the elements of the five pillars of sustainable agriculture, the language used, and the issues addressed in the policy can be related to each of the pillars.

5.2. White paper on agriculture

One of the two objectives of the white paper on agriculture was to reflect on principles of successful agriculture. 'Successful' and 'sustainable' can sometimes be confused. In the context of agriculture, successful is not always sustainable in the long-term. Agriculture can be successful in the short-term, but at a cost compromising the natural environment to attain that success. While the South African constitution states that the governance of agriculture functions falls within the competence of provinces, that governance needs to be guided by policy on a national level in which the distinction between the role of provincial and national agricultural administration and governance are clear (National Department of Agriculture, 1995). Through its nine provincial Departments of Agriculture, the South African government has the mandate to implement agricultural policies using agricultural extension services. The objective of the white paper suggests that the National Department of Agriculture, Fisheries and Forestry (DAFF) has the obligation to establish a policy that promotes sustainable agriculture through inclusive consultation with the relevant stakeholders. Such a policy should integrate the five pillars of sustainable agriculture.

Poor risk management causes farmers to use high risk farming methods that could endanger resource conservation. The white paper notes that unsustainable farming practices are common in South Africa, although specific practices are not identified. There is provision of mechanisms for relief for natural disasters. However, some events that occur on a regular basis are not covered in the relief programme. These, amongst others, include areas that are prone to particular disasters like hailstorms. The relief programme could include financial assistance and provision of government relief resources. The white paper links agricultural marketing to the right to freedom of association entrenched in the South African constitution and considers this right as a cornerstone of agricultural marketing policy, but limited by the requirements for maintaining order. Whatever marketing arrangements and regulations are put in place should emanate from thorough consultation with farmers. The white paper acknowledges that marketing of agricultural products plays an important role in the production cycle of any category of farmers. Thus, farmers require knowledge about marketing their produce. They should also be assisted by the National Agricultural Marketing Council. The composition of the council should have commercial agricultural producers, small-scale farmers, agriculture-related commerce and industry, as well as consumers. Specifically, the white paper cautions on the over regulation of the market, but that the government does need to step in to correct market imperfections and social unacceptable effects resulting from marketing. The paper contextualises agricultural marketing in a wider commitment of the state to social justice and welfare. Thus, the state should assist in marketing arrangements which will enhance the welfare of the nation (National Department of Agriculture, 1995).

The white paper emphasises that natural resources are national assets. It also confirms the definition of sustainability by stressing that natural resources are essential for the economic welfare to present and future generations. The country is partially endowed in both the land and water resources. Agriculture depends on how these two assets are conserved. In this context, the white paper also emphasises that South Africa's soil is fragile and prone to erosion, especially if farmers use incorrect or improper irrigation and other farming techniques. Excessive use of pesticides and chemical fertilisers in their farms by farmers leads to the pollution of ground water as well as rivers and dams. The paper further highlights that new cultivars that are produced by hybrid plant breeding and biotechnology may threaten indigenous species that are cultivated over generations by traditional farmers. The government should play a leading role in the legislation to prevent further harm of the natural environment. As part of this, the government will ensure that there is collaboration amongst the extension officers, research institutes and farmers. The main goal for the collaboration is to ensure that the latest knowledge and technology should be affordable to farmers and not in the expense of the natural environment (National Department of Agriculture, 1995).

At the time of writing the white paper, financial institutions, both government and private, generally served commercial agriculture only. The paper registers the need to regulate financial assistance to beginner (small-scale) farmers and those who lacked sufficient power. The white paper suggests that the beginner farmers should be assisted with government-linked agricultural loans subjected to performance auditing and review on a regular basis. Financial institutions need to show greater flexibility in rescheduling loans or adjusting repayments to suit the cash flow of individual farmers (National Department of Agriculture, 1995). Financial assistance is not only restricted to monetary value; farmers can also be assisted with resources or even encouraged to share resources in the form of cooperatives. Forming cooperatives is encouraged as an effective tool for networking amongst farmers. Finally, the

white paper promotes that agricultural research should always be in consultation with the farmers. This means that researchers should begin their programme planning by gaining an understanding of the wider context of farming by consulting farmers, extension officers and other stakeholders.

6. LEGISLATION IMPACTING ON SUSTAINABLE AGRICULTURE

The following are fundamental South African legislations impacting on sustainable agriculture and which could be integrated to develop a national policy on sustainable agriculture in the country:

- Fertilisers, Farms Feeds, Agricultural Remedies and Stock Remedies Act of 1947 (Act No. 36 of 1947). The Act provides for the registration of fertilisers, farm feeds, agricultural remedies, stock remedies, sterilising plants, and pest control operators. The Act further regulates the importation, sale, acquisition, disposal or use of fertilisers, farm feeds, agricultural remedies, and stock remedies. This legislation has both environmental and social impacts through pollution and negative impact on human health if used injudiciously.
- Livestock Brands Act, 1962 (Act No. 87 of 1962). The Act provides for an identification system for stock owners. This is important for traceability, minimising stock theft and the monitoring of animal diseases. This legislation has economic impact through minimising risk of theft and disease surveillance.
- Fencing Act, 1963 (Act No. 31 of 1963). This Act specifies fencing standards and regulates the relationship between neighbours regarding construction and maintenance of fencing. This legislation has economic impact through minimising risk posed by the spread of diseases from one area to another.
- Plant Breeders' Rights Act of 1976 (Act No. 15 of 1976). Any variety for which a Plant Breeders' Right is sought must comply with the provisions of this Act. The variety must also be "new", in other words newly developed or bred. This legislation has economic impact through protection of intellectual property rights of breeders.
- Plant Improvement Act, 1976 (Act No. 53 of 1976). The aim of this Act is to ensure the availability of high quality propagating material to all users. This legislation has economic impact by contributing to high productivity through ensuring the availability of propagation materials of high quality.
- Livestock Improvement Act, 1977 (Act No. 25 of 1977). This Act is aimed at development and importation of animal breeds of high quality. This legislation has economic impact by contributing to high productivity through ensuring the availability of animal breeds of high quality.
- Agricultural Pests Act of 1983 (Act No. 36 of 1983). This Act provides for measures to prevent the introduction and establishment of pests. The Act ensures that import of controlled goods is done in such a way that exotic pests and diseases are not imported and allowed to be established in South Africa, as well as preventing their spread to other countries. This legislation has both environmental and economic impacts by minimising risks posed by possible spread of pests and diseases, and thus protection of the agricultural production from adverse effects of these pests and diseases.
- Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983). The Act provides for the control over the utilisation of the natural agricultural resources of South Africa in order to promote the conservation of the soil, the water sources and vegetation, and the combating of weeds and invader plants. This legislation has environmental impact by promoting sustainable use of natural resources in order to ensure long-term productivity of the plant production sector.

- Animal Diseases Act of 1984 (Act No. 35 of 1984). This Act provides for development and enforcement of measures for the prevention and control of diseases and parasites to promote animal health. This legislation has economic impact by minimising risks posed by the possible spread of diseases and parasites, and thus protection of the agricultural production from adverse effects of these diseases and parasites.
- Liquor Products Act, 1989 (Act No. 60 of 1989). This Act provides for the control on the sale, as well as import and export of liquor products. This legislation has both economic and social impacts by ensuring the quality and safety of liquor products.
- Agricultural Product Standards Act of 1990 (Act No. 119 of 1990). The Act, among other things, provides for control on the sale of agricultural products by ensuring that they comply with certain minimum quality standards. This legislation has both economic and social impacts by ensuring the quality and safety of agricultural products.
- Genetically Modified Organisms Act, 1997 (Act No. 15 of 1997). The act provides measures to promote the responsible development, production, use and application of genetically modified organisms (GMOs). This legislation has environmental, economic and social impacts by ensuring the safety of GMO products, changing the nature and cost of production requisites (in particular seed), as well as minimising possible negative impacts of these products on the environment.
- Meat Safety Act, 2000 (Act No 40 of 2000). This Act is aimed at promoting meat safety, establishing and maintaining national standards in respect of abattoirs and export control. This legislation has both economic and social impacts by ensuring the quality and safety of meat and regulating export market of meat.

7. CONCLUSION AND RECOMMENDATIONS

This paper has reviewed two anchor policies against the framework of the five pillars of sustainable agriculture (Khwidzhili & Worth, 2016). The review highlights the fundamental need for the South African government to develop a policy for sustainable agriculture to harmonise its plan for agriculture as reflected in the white paper with the objectives of its policy on sustainable development. Since there are some essential differences between the more generic concepts of sustainable development and sustainable agriculture, the paper suggests that the proposed policy should be based on the five pillars of sustainable agriculture. Further, to insure integration, the proposed policy on sustainable agriculture should take into account the existing agriculturally related policies. With such a comprehensive and integrated policy, the government through the DAFF, could create an enabling environment for investors, farmers, producers, processors, financial institutions, traders, and other sector stakeholders to carry out activities that are consistent with sustainable agricultural practices. By extension, (e.g. through the increased investment in the agricultural value chain) this should contribute to create more sustainable employment.

Sustainable agricultural policies should take a holistic approach of the five pillars of sustainable agriculture. Furthermore, sustainable agricultural policies should focus on catastrophic risks that are rare but cause significant damage to many farmers at the same time. Contingency plans should define in advance the procedures, responsibilities and limits of the policy response. Subsidised insurance is one way of providing disaster assistance, but it tends to crowd out the development of private insurance markets and has not been successful in preventing additional ad hoc assistance being granted after the event. Agricultural extension should play a pivotal role in assisting farmers to avoid further exploitation of the

natural environment; hence this could be a futile exercise without a formal policy on sustainable agriculture. Policies should be formulated to include all relevant stakeholders in the agricultural sector as the current situation makes it difficult for extension officers to promote sustainable agriculture. It becomes difficult for officers to source all relevant policies, documents, legislation and guidelines that are widely scattered in order to promote sustainable agriculture. If all relevant information is arranged in a single document, labelled a national policy on sustainable agriculture, it would make it easier for extension officers to promote sustainable agriculture throughout all provinces of South Africa.

REFERENCES

- AHMADVAND, M. & KARAMI, E. 2007. *Sustainable agric. toward a conflict, management based agricultural extension. J. Appl. Sci.*, 7: 3880-3890.
- ALLAHYARI, M. S. 2009. *Agricultural Sustainability: Implications for extension Systems. African Journal of Agricultural Research*, 4: 6.
- ALLEN, F. OTCHERE, I. SENBET, L. W. 2011. "African financial systems: A review". Review of Development Finance: Science Direct. Africa Growth Institute.
- ALTIERI, M. A. 2002. *Agro-ecology: The science of natural resource management for poor farmers in marginal environments. Agric Ecosystems and Environment* 93(1-3):124.
- ANDERSON, J. R. 2002. "Risk Management in Rural Development". Rural Development Strategy Background Paper No: 7. World Bank: Washington DC.
- ANTONACI, L. DEMEKE, M. & VEZZANI, A. 2014. *The challenges of managing agricultural price and production risks in sub-Saharan Africa. ESA Working Paper No. 14-09. Rome, FAO.*
- BOLDERSTON, A. 2008. *Writing an effective review. Journal of medical imaging and radiation Science*, Vol 39: 86-92.
- BOLLMAN, R. A. & BRYDEN, J. M. 1997. *Rural Employment: An International Perspective. CAB International: Wallingford.*
- BYERLEE, D., JAYNE, T. S. & MYERS, R. 2006. "Managing food DRAFT price risks and instability in a liberalizing market environment: Overview and policy options", *Food Policy*, Vol. 31, Issue 4, 275-287.
- CHAMBERS, R. 1989. "Farmer-first: a practical paradigm for the third world agriculture." In *Agro ecology and small farm development*, eds. Altieri M. A. & Hecht, S. B. 233-244. Boca Raton, Ann Arbor, Boston: CRC Press.
- Crabtree, J. 2002. The impact of neo-liberal economis.
- CONWAY, G. R. & PRETTY, J. N. 1991. *Unwelcome Harvest: Agriculture and Pollution. Earthscan, London.*
- DART, J. J. 2000. *Stories for change: A new model of evaluation for Agric. Extension project in Australia.* Unpublished doctoral dissertation, Institute of Land and Food Resources, University of Melbourne.
- EUROSTAT. 1997. *Agricultural Statistical Yearbook. Brussels, European Commission.*
- FAO- FOOD AND AGRICULTURAL ORGANIZATION. 2009. *The State of Food and Agriculture. Livestock in the balance. Rome.*
- HART, C. 1998. *Doing a literature review: Releasing the Social Science Research Imagination. London-SAGE*
- IAASTD- INTERNATIONAL ASSESSMENT OF AGRICULTURAL KNOWLEDGE & TECHNOLOGY FOR DEVELOPMENT. 2009. *International assessment of agricultural knowledge, science and technology for development (IAASTD). Global report. Washington, DC.*
- KABAT, P. 2013. *Water at a crossroads. Nature Climate Change*, 3: 11–12

- S. Afr. J. Agric. Ext.,
Vol. 45, No. 2, 2017: 73 – 85
DOI: <http://dx.doi.org/10.17159/2413-3221/2017/v45n2a443>
- Khwidzhili
& Worth
(License: CC BY 4.0)
- KHWIDZHILI, R. H. & WORTH, S. H. 2016. *The sustainable agriculture imperative: implications for South African agricultural extension*. S. Afr. J. Agric. Ext. Vol. 44, No. 2, (2016). South African Society of Agricultural Extension: Department of Agricultural Economic, Extension and Rural Development, University of Pretoria, Pretoria.
- KARBASIOUN, M. 2007. *Towards a Competency Profile for the Role of Instruction of Agricultural Extension*. Professionals in Esfahan. PhD thesis- Social Science Group, Chair group of Education and Competence Studies. Wageningen. University and Research Centre: The Netherlands.
- KROMA, M. M. 2003. Re-shaping extension education curricular for 21st century; agricultural development in sub-Saharan Africa. Proceedings of the 19th Annual Conference. Association for International Agriculture and Extension Education. Raleigh; North Carolina, USA.
- LUNDBERG, J. & ALBAECO, F. M. 2008. Farming with nature increase profitability and reduce vulnerability. Ecological report in Ethiopia. Swedish Society of Conservation. Stockholm.
- MAZUMADAR, P. K. 2006. *Information is key to agricultural development In: Participatory Planning and Project Management in Extension Science* (eds) ADHIKARY M.M., SARKAR, A. ACHARYA, S. K., & Basu, D. Geeta Somani- New Delhi, 390- 393.
- MEA- MILLENNIUM ECOSYSTEM ASSESSMENT. 2005. *Ecosystems and human well-being: Synthesis* (<http://www.millenniumassessment.org/documents/document.356.aspx.pdf>).
- MEDUGU, I. N., & Jahor, S. 2006. *Achieving sustainable agriculture in Nigeria*. A land policy perspective. Tokyo Academic: Shibaura Institute of Technology, Japan.
- Ministry of Agriculture, Fisheries and Food. (1997). *Departmental Report: The Government's Expenditure Plans 1997–98 to 1999– 2000*. MAFF. London.
- MURRAY, D.L. 1994. *Cultivating crisis: the human cost of pesticides in Latin America*. Austin, TX: University of Texas Press.
- NATIONAL DEPARTMENT OF AGRICULTURE. Unspecified. Policy on agriculture in sustainable development. A discussion document. 8th draft. Pretoria: RSA.
- NATIONAL DEPARTMENT OF AGRICULTURE. 1995. White paper on agriculture. Printed and published by Department of Agriculture, Pretoria: RSA. ISBN 0-621-16111-
- OECD- ORGANIZATION FOR ECONOMIC COOPERATION AND DEVELOPMENT. 2006. Promoting pro-poor growth. Private sector development
- PHREK, G. SONGSAK, S. AREE. W., & BUBSARA, L. 1999. *Policies that works for sustainable agriculture and regenerated rural economics*. Thailand case study. Multi Cropping Centre: Chiang Mai University'- Thailand.
- PRETTY, J. N. 1998. *The Living Land: Agriculture, Food and Community Regeneration in Rural Europe*. Earthscan: London.
- RAY, D. E. UGARTE, L. T. & TILLER. K. 2003. "US prices matter. Rethinking US agricultural policy: Changing course to secure farmer livelihoods worldwide." The Agricultural Policy Analysis Centre, 24-31
- RÖLING, N.1999. *Sustainability as an outcome of human interaction: implications for curricula in higher agricultural education in industrialized countries*, in: Wout Van de Bor, P. Holen, A. Wals, & W. Leals Filho eds. *Integrating concepts of sustainability into education for agriculture and rural development*. Frankfurt: Peter Lang.
- SHACKLETON, C. M. 2009. *Will the real custodian of natural resource management please stand up?* S. Afri. J. Sci. 105 (3/4): pp. 91-93.

- SIEGEL, P. B. & ALWANG, J. 1999. “*An Asset-Based Approach to Social Risk Management: A Conceptual Framework*”, Social Protection Discussion Paper No. 9926, World Bank: Washington DC.
- TADARO, M. 1996. *Economic Development*. Menlo Park, New York, Don Mills, Harlow, Amsterdam, Bonn, Sydney, Singapore, Tokyo, Madrid, San Juan, Milan, and Paris: Addison-Wesley Publishing Company.
- TWINE, W. MOSHE, D. NETSHILUVHI, T.R. & SIPHUGU, V. 2003. *Consumption and direct-use values of savannah bio-resources used by rural households in Mametja*. A semiarid area of Limpopo province, South Africa. S. Afr. J. Sci., 99: 467-473.
- UNEP. 2010. *Assessing the environmental impacts of consumption and production: priority product and materials*. A Report of the Working Group on the Environmental Impacts of Products and Materials to the International Panel for Sustainable Resource Management. In. HERTWICH, E. VAN DER VOET, S. SUH, A. TUKKER, M. HUIJBREGTS, P. KAZMIERCZYK, M. LENZEN, J. MCNEELY, J. & MORIGUCHI, Y. Nairobi.
- WORLD BANK. 2005. “*Managing Food Price Risks and Instability in an Environment of Market Liberalization*”. Agriculture and Rural Development Department- The World Bank, Washington DC.
- WORLD BANK. 2006. *Agriculture Investment Sourcebook*. Washington, DC, World Bank.
- WORLD CONSERVATION MONITORING CENTRE. 1992. *Global Biodiversity: Status of the Earth’s Living Resources*. Chapman & Hall; London.
- WYNBERG, R. 2002. *A decade of biodiversity conservation and use in South Africa*. Tracking progress from the Rio Earth Summit to the Johannesburg World Summit on Sustainable Development. S. Afr. J. Sci. 98: pp .233-243.
- YUDELMAN, M. 1987. *Prospects for Agricultural Development in Sub-Saharan Africa*. Occasional paper: Winrock International Institute for Agricultural Development. Little Rock, Arkansas.