The role of local knowledge in agriculture: The case of small-scale farmers in South Africa.

THE ROLE OF LOCAL KNOWLEDGE IN AGRICULTURE: THE CASE OF SMALL-SCALE FARMERS IN SOUTH AFRICA

By

Jonas Magedi

Student number: 206200072

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Supervisor: Professor Mario Scerri

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DECLARATION

I hereby declare that THE ROLE OF LOCAL KNOWLEDGE IN AGRICULTURE: THE CASE OF SMALL-SCALE FARMERS IN SOUTH AFRICA is my work and that all the sources used or cited in the study have been acknowledged by means of references.

Date……

Magedi Jonas (206200072)

ABSTRACT

This study explores the role of local knowledge in agriculture with reference to the case of small-scale farming in South Africa, specifically with regard to its role in enriching agricultural productivity and sustainability in localities. Small-scale farming has enhanced the agricultural value chain in South Africa, particularly in localities which are characterized by food insecurity, job uncertainty and environmental sustainability. Agricultural development and the capacitation of small-scale farmers are not only often overlooked by policy makers at national and local government levels, but also tend to be under-researched. For many years, African farmers have participated in agriculture and protected biodiversity with local knowledge. Local knowledge has been a key instrument of survival for humanity since time immemorial and there is a relationship between local knowledge and sustainable farming. This relationship and its ensuing advantages need to be highlighted for researchers and communities and further explored within the context of Local Systems of Innovation (LSI) in order to have local knowledge utilized fully and effectively.

Keywords: local knowledge, agriculture, South Africa, small-scale farming, Local Systems of Innovation.

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ACRONYMS

ACRONYM	MEANING
ADMP	Agricultural Drought Management Plan
ASGISA	Accelerated Shared Growth Initiative
AMR	Antimicrobial Resistance
BATAT	Broadening of Access to Agriculture Thrust
CAFOs	Concentrated Animal Feeding Operation
CIKARD	Centre for Indigenous Knowledge for Agriculture and Rural Development
CASP	Comprehensive Agricultural Support Programme
DAFF	Department of Agriculture, Forestry and Fisheries
DEIC	Dutch East India Company
FAO	Food and Agriculture Organization
FIVISM	Food Insecurity and Vulnerability Information System Management
GDP	Gross Domestic Product
GMPs	Genetically Modified Products
IKS	Indigenous Knowledge Systems
IMF	International Monetary Fund
ISPAAD	Integrated Support Programme for Arable Agriculture Development
LED	Local Economic Development
LSI	Local Systems of Innovation
MAFISA	Micro Agricultural Financial Institutions of South Africa
NDP	National Development Plan
R&D	Research and Development
RDP	Reconstruction and Development Plan
SMMEs	Small, Micro and Medium Enterprises
SACN	South African Cities Network
SADC	Southern African Development Community
SDGs	Sustainable Development Goals
SADP	Swaziland Agricultural Development Programme
STASSA	Statistics South Africa
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNEP	United Nations Environment Programme

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CHAPTER ONE - INTRODUCTION AND BACKGROUND

1.1 INTRODUCTION

This study seeks to investigate the role of local knowledge in agriculture with reference to the case of small-scale farming in South Africa, specifically with regard to its role in enriching agricultural productivity and sustainability in localities. Small-scale farming has enhanced the agricultural value chain in South Africa, particularly in localities which are characterized by food insecurity, job uncertainty and environmental sustainability. Agricultural development and the capacitation of small-scale farmers are often overlooked by policy makers at national and local government levels, and also tend to be under-researched. This study will investigate the role that is played by local knowledge within the Local Systems of Innovation (LSI) theoretical framework, with a particular focus on agricultural development in South Africa. This is significant for South Africa, which has a notable number of small-scale farmers who mostly farm for subsistence.

1.2 BACKGROUND AND MOTIVATION OF STUDY

Researchers, scientists, agriculturalists and economists are of the view that agriculture plays an important role in sustainable local development. One of the arguments of Lewis (1954) cited in Anrique and Stamoulis (2007:7) is that agriculture contributes immensely to overall economic development where labour productivity is poor and severely constrained.

Local knowledge continues to face multiple obstacles. One of these has to do with the patenting of indigenous knowledge, as it is inevitably a community intellectual property and no single individual can lay claim to ownership. There is also the overarching common practice of multinational corporations that tend to privatize local knowledge without the consent of local communities, which in turn deprives local communities of the opportunity to utilize and commercialize local knowledge. One of the factors that continues to be a major obstacle and serious setback for the preservation and development of local knowledge is the rural-urban migration. South African youth migrate from rural communities to cities to look for better social and economic opportunities. This results in a breakdown of knowledge transfer from the elderly to the young and places severe restraints on its evolutionary potential: local knowledge is usually transferred through orally conducted interactive processes. Migration

patterns impede and derail Local Economic Development (LED) programmes in local communities, given that people with skills consistently migrate to cities in search of better working and living conditions (Shezi, 2013:94).

Small-scale farmers in local communities normally have limited or no access to financial assistance, unlike large-scale farmers who are also referred to as commercial farmers. Small-scale farmers seldom use modern machinery and technology to enhance their agricultural productivity. Farmers in local communities tend to rely on the indigenous knowledge systems (localized knowledge), passed down over generations, to sustain their productivity and efficiency.

The most potent resource used by local communities to develop and grow their agricultural practices has usually been the utilization of local knowledge which is regarded as an integral part of the community and thus shared freely amongst individuals for subsistence farming and possibly commercial purposes. Over the years, local knowledge has contributed to the survival of livestock and agricultural productivity in rural localities without the use of conventional scientific methods or modern methods of agriculture. At the heart of this argument lies the element of “necessity” and how it continues to guide innovative activities. This type of local knowledge usually takes the form of tacit knowledge and resides amongst the bearers of this particular knowledge form. Indigenous forms of communication are pivotal with regard to local level decision making processes and for the preservation and spread of indigenous knowledge (Grenier, 1998:7).

Local knowledge has contributed to the thriving of livestock through methods of treatment of persistent diseases and ailments, which are not necessarily formally studied but passed on through an interactive process of knowledge sharing in local communities. Through this interactive process of learning, local people become the key role players and actors in agricultural research, monitoring and awareness-raising with regard to enhancing small-scale farming.

According to Kirsten and Van Zyl (1998:564), there is international evidence to the effect that small-scale agriculture has the potential to generate employment and income opportunities in localities, especially rural areas. Small-scale farmers continue to play a key role in reducing staple food prices and making a substantive contribution to job creation by increasing the need for labour in rural communities where most of

these small hold farms are located. According to the Food and Agriculture Organization of the United Nations[1], during 2015 small-scale farming in China accounted for almost 50% of the world's small-scale farms while 80% of the farms in India were engaged in small-scale farming. China's position within the global system of innovation is particularly instructive when it comes to understanding the role played by small-scale farming in tackling some of the profound socio-economic challenges of our time and how small-scale farming can contribute to enriching the livelihoods of localities within the developing world.

South African local communities that are engaged in small-scale farming have been sustaining themselves through agricultural practices that are generally beneficial for local ecosystems and environmental sustainability. The non-conventional agricultural practices that are found in localities had been in existence for years before the introduction of conventional agricultural practices. The indigenous people of Africa domesticated cattle, sheep and goats long before colonization and employed traditional practices in livestock management, disease management and treatment in the absence of veterinary scientists and scientific conventional practices (Swanepoel & Snijders, 2006:82).

Indigenous knowledge underpins local systems of innovation which are guided by localized knowledge systems. The sustainability and development of agriculture in local communities cannot be successful without consideration of local circumstances and local systems of knowledge. Local knowledge has been tried and tested through trial and error experiences and local practices have proven to be sustainable and cost effective in countries such as China and India where small-scale farming predominates. Farmers in local communities may even prefer to use traditional methods to produce and sustain their agricultural outputs rather than chemicals or pesticides that may come at a cost which is unaffordable, both financially and environmentally.

The role of local knowledge in enhancing small-scale farming has not been sufficiently investigated and documented, which in turn threatens the preservation of such local knowledge. This offers an opportunity for public and private institutions, knowledge

[1] FAO (2015), the economic lives of smallholder farmers. An analysis based on household data from nine countries.

intermediaries and traditional authorities to play a key role in developing, preserving, codifying and documenting local knowledge and the experiences of localities. South Africa is a diverse country with various ethnic groups that have for centuries relied on local knowledge for hunting and farming and have developed means of transferring such knowledge to others, thus building structures for the preservation of local knowledge systems. Within the variety of natural resources, diversified cultures and different climate conditions in regions, the South African people have historically relied on nature for survival and subsistence.

It is increasingly recognized that local knowledge is critical to human survival, particularly in rural areas where development is lagging behind; Agrawal (1995:6) asserts that “indigenous knowledge is of crucial significance if one wishes to introduce cost-effective, participatory and sustainable developmental processes”. For development to be possible and sustainable, the key contributing elements to the survival of society should be engaged in the developmental processes and in the context of South Africa such processes should involve the indigenous practices of different ethnic groups and how this diversity can be utilized towards the developmental objectives of the country.

Agriculture plays a critical role in livelihoods, employment opportunities, income growth, food security, poverty alleviation and socio-economic development. Rural areas are dependent on agriculture as a means of survival, meaning that it uplifts the lives of the poor and marginalized (Upton, 2004:1). The agricultural sector, like any other sector, is vulnerable to exogenous factors that may hinder growth, such as the natural and political environments, government policies and - most importantly - the economic conditions/structure. Small-scale farmers continue to face multiple developmental impediments, most notably the lack of resilient state subsidies and support programmes which may positively affect the development and sustainability of small-scale farming. Investing in the generation, utilization and dissemination of local knowledge can contribute to poverty reduction and foster local economic development.

Resolving the problems of food security and the high levels of unemployment in South Africa requires a multifaceted approach. The exploration of local knowledge to identify

historic and traditional agricultural practices that can be integrated into the mainstream agricultural production and development serves as the basis for this study.

1.3 THE SCOPE AND LIMITATION OF THE STUDY

This study is set to assess the use of local knowledge in agricultural development in South African communities. The study seeks to investigate the role of local knowledge in enhancing small-scale farming while also trying to understand agricultural practices through the knowledge and experience of local farmers from South Africa.

The key limitation within the study is the lack of substantial literature on, or analysis of, local agricultural knowledge in South Africa. In a nutshell: local knowledge in the particular field of agriculture presents a scientific lacuna. Research on agriculture often focuses on conventional commercial farming and the use of scientific knowledge, rather than on systems of local knowledge in agriculture. This research project seeks to narrow the research gap that currently exists.

1.4 OBJECTIVES OF THE STUDY

The aim of the study is to explore the main characteristics of local knowledge systems and establish the role played by local knowledge in enhancing agricultural productivity in the South African local communities. To achieve this, the research will be guided by the following research objectives:

- to understand local knowledge in the context of small-scale farming;
- to identify the role of small-scale farming within the Local Systems of Innovation (LSI);
- to analyze the socio-economic challenges of small-scale famers in the South African local communities;
- to compare the growth opportunities, successes and problems of South African small-scale farmers to those in other countries (SADC and international);
- to establish the role played by government in sustainable rural farming through policy interventions; and
- to discuss current systems for managing local agricultural knowledge.

1.5 REVIEW OF RELATED LITERATURE

The agricultural sector in South Africa is dualistic and can be categorised into (i) capital intensive commercial agriculture, and (ii) small-scale subsistence farming which is less resourced and relies on local knowledge for sustainability. Thamaga-Chitja and Morojele in their seminal work describe the South African agricultural sector as dualistic and divided between "a well-financed and resourced category which is commercial and the marginalized and less-resourced smallholder farming" (Thamaga-Chitja & Morojele, 2014:147).

According to Statistics South Africa (2012:25), "over six million households are engaged in smallholder agricultural activities in South Africa". Small-scale farming in the local communities is characterized by low productivity and lack of investment as opposed to commercial farming that is highly technologically intensive and financially viable. The sector of small-scale farming is characterized by a number of interrelated problems including soil erosion, lack of water, poor infrastructure and minimal state support, and it therefore finds itself limited to household subsistence rather than developing into a profitable and job creating sector. However, the importance and role of small-scale farming in ensuring food security and alleviating poverty in rural communities cannot be ignored.

The South African agricultural sector cannot be studied without a grasp of the history of land ownership in the country. The existing literature (Aliber & Hart, 2009:435) suggests that commercial farming occupies 87% of the total productive agricultural land and produces or accounts for about 95% of the agricultural output, while local farmers and smallholder producers operate on the remaining 13% of the productive agricultural land. The reality is that small-scale farmers are left on the periphery when considering the level and extent of state intervention in this regard. Hence, the exploitation of local knowledge has fallen far short of its potential, with the consequence that local systems of innovation are functioning deficiently.

Land dispossession in South Africa was unique and exclusive compared to other African countries given the scale, magnitude and penetration at which it was inflicted by the minority white people on the indigenous peoples[2] of South Africa. The socio-

[2] In this particular case the term indigenous people refers to the Bantu and the Khoi-San people and not the white minority settlers who have come to South Africa since the 1650s.

economic injustices and landlessness experienced by black people were by-products of colonialism and apartheid land dispossessions and exploitation of African people - laws were passed that had an atrocious effect on the original inhabitants of the land. The African indigenous people were restricted to only 13% of land in their home country. This devastated the functioning of the local communities and led to the rapid deterioration of indigenous systems of innovation.

Bundy (1979:183) explains that prior to 1853 black Africans were self-reliant, economically independent and prospering to the extent that very few of them experienced poverty. Bundy further states that black Africans used to trade maize at Cape Town in large quantities and also traded wool on various markets, including the Natal market. All this was prior to the Natives Land Act, 27 of 1913, and the mass scale dispossession of land from indigenous African people (Bundy, 1979).

The Natives Land Act, 27 of 1913, formalized and cemented the limitations on black land ownership and laid a foundation for territorial segregation which thoroughly dispossessed local small-scale farmers. Productive land was expropriated with utter disregard for the welfare of local communities at the dawn of the 20th century. The impact of the Natives Land Act will be investigated during the analysis since it constitutes the histories that continue to shape current realities. The Natives Trust and Land Act, 18 of 1936, also played a particular role in the egregious segregationist policies. These Acts abolished any form of individual land ownership by black people, limiting land access to small isolated communal reserves for indigenous African occupation.

In 1950, hardly two years after the National Party had come into power, the government introduced another law that perpetuated dispossession and further undermined land ownership by black people. This was the Group Areas Act, 41 of 1950, which introduced and legitimized another wave of evictions targeted at indigenous African people. It disqualified indigenous African people from occupying any land or owning immoveable property in an area from which they were disqualified.

As a result, millions of indigenous African people - including farmers, most of whom lost their livestock - were removed and relocated to unproductive areas where grazing was poor and the land could not be utilized productively for agricultural activities. Before the introduction of the Natives Land Act, black South Africans could rent or own

land and were able to generate surpluses that made it possible for them to even buy land from white farmers. The establishment of the first Native Affairs Commission (1903 – 1905), introduction of the Native Labour Regulation Act of 1911 and the adoption of the Natives Land Act of 1913 are an indication that the self-sufficiency and economic development among African peasantry didn't go unnoticed by white farmers in South Africa (Scerri, 2016:161).

The massive loss of productive agricultural land and displacement of indigenous African people resulted in the concentration of poverty in the peripheral South African rural areas, in the so-called "Bantustans". The majority of the population was vulnerable due to the persistence of poverty, the lack of formal education and unemployment. The marginalization and continued dislocation of black people, as well as the introduction of non-indigenous institutional structures (such as "Bantu Education"), weakened the traditional social structures that preserved and spread local knowledge. Local communities who were disrupted culturally and suffered the loss of land, natural resources and local knowledge, were further undermined by non-indigenous institutions that imposed their own knowledge on local communities. The disruption of traditional social structures, however, provided communities with the opportunity to exchange survival strategies and come up with indigenous systems of innovation for both survival and the preservation of natural resources.

Maskell and Malmberg (1995:169) argue that the creation of new knowledge is an interactive process done intentionally and requiring resource-consuming effort. Knowledge is often created through experiential learning, through trial-and-error, ultimately resulting in new and better ways of doing things. According to Cheng (2003:6), local knowledge is the knowledge that has been generated by the local people or community, validated in a local context. Kumar (2010:7) asserts that just like any other learning process, local knowledge is also not static and is not confined to the specific environment it originated from. Local knowledge produced in a particular area can be transmitted to other communities.

Lundvall (2003:2) relates knowledge to innovation by asserting that knowledge production is a process of joint production, in which innovation is one output and the learning and skills enhancement that takes place in the process is another. The relationship between innovation and knowledge will provide some clarity and insight

with regard to the role of local knowledge. According to Adrian (2008:639), there has been an evolution in technology and institutional solutions throughout history and local communities and individuals have always been innovative to protect their socio-economic needs and conditions of production. To maintain and sustain their survival local communities have, from time to time, been innovative in order to respond to socio-economic conditions that are constantly evolving.

For local knowledge to be preserved and spread across the community, the modern state institutions should help protect the intellectual property of the communities and support the initiatives and economic activities of such communities. To develop the local economy and alleviate poverty, government intervention is critical and includes the introduction of subsidies and skills development programmes to support local agriculture as the catalyst for sustainable local development.

According to the South African Cities Network (SACN) (2004), municipalities in South Africa do not have adequate economic strategies in place to address the issues of poverty, unemployment and inequality. Local Economic Development (LED) strategies in some peripheral and rural municipalities appear to be too abstract and were developed by consultants who may have assumed that the challenges of one municipality were identical to those of another municipality and that the proposed solutions could be applied indiscriminately across municipalities. The relationship between Local Economic Development and Local Innovation must be investigated and defined.

The definition of local tends to vary. For instance, Gustavsen et al. (2007:23), define the concept of localities as follows: (a) people have shared common interests and history; (b) small geographical size leading to proximity of actors to one another; (c) infrastructure for co-operation and a context for learning from one another. This means that the definition of the word “local” in terms of systems of innovation has to encompass the geographical environment and the actors who have a common interest.

Prolinnova (2009:2) asserts that local innovation is the process by which people develop new and better ways of doing things using their own resources and their own initiative. In so doing, they may be exploring new possibilities simply out of curiosity or may be responding and adapting to changes regarding natural resources, availability

of assets, markets and other socio-economic and institutional contexts brought about by higher-level government policies, disasters, climate change and other external influences. Local innovation often occurs in the face of new challenges or opportunities.

1.6 RESEARCH QUESTIONS

The study seeks to investigate the role played by local knowledge in enhancing agricultural productivity in South African local communities, with a particular focus on small-scale farming. Hence the key research question is: what is the role of Local Knowledge in enhancing small-scale farming? To address the research objective of the study, the research will attempt to answer the following sub-questions:

- How has local knowledge contributed to small-scale farming?
- What is the role of small-scale farming within the Local Systems of Innovation (LSI)?
- What is the level of state intervention regarding the development and sustainability of small-scale farming and local knowledge?
- What are the advantages and disadvantages of local knowledge with regard to enhancing small-scale farming in localities?
- What are the socio-economic obstacles to the development of small-scale farming in South African communities?
- What is the contribution of small-scale farming to food availability and security?
- What systems are in use for managing local agricultural knowledge?

1.7 METHOD OF INVESTIGATION

The study will be conducted through a qualitative approach of desktop research, mainly involving the collecting of secondary data through analyzing existing academic research, reports commissioned by international and local government agencies and published data, in order to understand how communities use localized learning and respond to local risks.

1.8 LAYOUT OF CHAPTERS FOR THE STUDY

Chapter 1: Introduction and background

This chapter introduces the research topic and provides a background to the research problem. The key research questions and objectives and the methodology to be applied in the study are expounded.

Chapter 2: Literature review

This chapter will review the body of relevant theory underpinning local knowledge and its role in agricultural development. It will provide the definition of interrelated concepts that will be used to direct the study. The literature to be presented by the study will be on the following themes: Local Innovation, Local Knowledge, Agriculture, Local Economic Development and Systems of Innovation.

Chapter 3: Global perspective on local knowledge and its contribution to the development of small-scale farming

The role of local knowledge in small-scale farming development and sustainability has to be analyzed globally, particularly in developing countries. This chapter assesses the key local knowledge practices in agriculture and also looks at the successes and challenges of agricultural development in Africa. The countries that the study will use for a comparative analysis are Namibia and Zimbabwe, which are both in the Southern African Development Community (SADC) region, as well as China and India.

Chapter 4: Small-scale farming in South Africa

This chapter will provide in-depth analysis of the small-scale farming industry, with a focus on South Africa. The chapter will also identify the current systems in use for managing local agricultural knowledge and how local knowledge has contributed to small-scale farming.

The chapter will discuss the current government policies supporting small-scale farming through local knowledge and also limitations to, and critics of, local knowledge in small-scale farming in South Africa. Finally, the role of small markets in promoting LED and in LSI will be explored.

Chapter 5: Findings and analysis

This chapter will analyze findings from the literature study to address the research sub-questions.

Chapter 6: Recommendations and conclusion

This chapter gives a summary of the findings of the research, specifically on the question of the relationship between local knowledge and sustainable small-scale farming in South Africa. Recommendations for improving bottom-up innovation and development initiatives that are driven by farmers are detailed.

1.9 CONCLUSION

This research will form part of the academic work that forms the basis for understanding the critical role of local knowledge in local development. The study is premised on the recognition that local knowledge is critical to the survival and development of rural communities that rely on agriculture for subsistence and the fact that local knowledge continues to play a key role in social, environmental and economic conditions.

The study will investigate the many benefits of using local knowledge in development projects that may include the empowerment of local agricultural cooperatives or even individuals involved in agricultural development programmes. Local knowledge can be found to be beneficial to local farmers in offering a viable alternative to the global agricultural corporations, which use advanced technology and have the benefit of massive resources, in terms of cost implications and environmental considerations. There is, therefore, a need for the development of theory in the space of local knowledge and for researchers to highlight the significant role of local learning if there is to be any meaningful integration of local knowledge into local economic development and practice.

The high number of local communities involved in small-scale farming practices necessitates further investigation of the local contexts; this will assist in identifying the actors within specific systems of innovation that can provide sufficient support for local farmers. Municipalities also need this particular research in order to develop appropriate strategies that are contextually embedded to ensure adequate, effective and sustainable support for local farmers. The study calls for empirical research

documenting the role of farmer-led innovation as the driver of local and global food security, job creation and ethno-veterinary practices which refer to a specific approach in animal health care through basic skills and techniques.

CHAPTER TWO - LITERATURE REVIEW

2.1 INTRODUCTION

This chapter provides an in-depth literature review of local knowledge in small-scale farming. The chapter starts by defining concepts that are utilized throughout the analysis of the role of local knowledge in small-scale farming. It also explores an epistemological background of local knowledge and what actually constitutes local knowledge. The study then explores local knowledge in small-scale farming and identifies the different types of small-scale farmers. Finally, the advantages and disadvantages of local knowledge in small-scale farming are addressed.

2.2 DEFINITION OF TERMS

The following terms will be frequently used throughout the study.

Local knowledge

According to Beckford and Barker (2006:1), local knowledge can be defined as "dynamic and complex bodies of know-how, practices and skills that are developed and sustained by peoples/communities with shared histories and experiences." Local knowledge embodies information systems which are influenced by reality and in some cases underpinned by traditional cultural beliefs, as is the case with the use of some medicinal plants believed to be curing spiritual origins of diseases. Local knowledge is a continuous process which is adaptive and reliant on mankind for perpetual updating. Local knowledge is the knowledge that local people in a given area or community have developed over time and such knowledge is neither static nor confined to the original inhabitants of that area (Hart & Vorster, 2006:9). This description of local knowledge is applicable to larger, continental and/or global communities but is nonetheless historically contingent on the level of interactive capacity of the locality in question.

In addition, local knowledge can be perceived as "a cumulative body of knowledge, know-how, know-who practices and representations maintained and developed by peoples with extended histories of interaction with the natural environment. These sophisticated sets of understandings, interpretations and meanings are part and parcel of a cultural complex that encompasses language, naming and classification systems,

resource use practices, ritual, spirituality and worldview" (Science and Traditional Knowledge, 2002:3).

Small-scale farming

In this study, the term "small-scale" is used to refer to "farmers who typically cultivate areas of up to 5 hectares. These farms are labour intensive and are characterized by a high degree of fragmentation and a low resource base and mixed cropping" (Beckford, 2002).

Small-scale farming can be further defined as the production of agricultural goods on small pieces of land and for immediate consumption (Kirsten & Van Zyl, 1998). The support of small-scale farming is one of the vital measures for poverty alleviation, wealth acquisition, improvement of standard of living and self-sustaining outcomes for black people living in rural areas. Hence Van Schalkwyk, Fraser, Obi and Van Tilburg (2012) argue that small-scale farming can significantly improve the lives of rural farmers.

A common misconception amongst policy makers and in academia, government and even business circles, equates "small-scale farming" with a backward, non-productive, non-commercial, subsistence agriculture that is found in parts of the former homeland areas in South Africa (Kirsten & Van Zyl, 1998). This negative perception often misleads scholars, policy makers and researchers alike to underestimate the essence and value of local knowledge in small-scale farming.

Local Systems of Innovation (LSI)

According to Crooke et al. (1998), LSI can be defined as the systematic interactions between firms, organizations, universities and research institutes for the development of a particular region that is embedded in a locality.

Manzini (2012:4) further defines LSI as the contribution of innovation which is based on the advancing of new ideas to be commercially viable in a locality and may even contribute to the development of the local economy. LSI involves meaningful interactions between various stakeholders who drive innovation.

The theoretical perspective of LSI is based on the meso-economic approach that contributes to economic change. Stakeholders from districts and regions contribute to

the meso perspective which is shaped by the development and circulation of local knowledge (Dopfer, Foster & Potts, 2004:263).

For LSI to be effective, the capacity of the locality is important. This can be in the form of human capabilities, infrastructure and financial investment as they play a role in the innovation process (Ferretti & Parmetoia, 2015:11).

According to Martin and Simmie (2008:183), LSI has various characteristics which may be applied according to the uniqueness of the locality. The characteristics are: knowledge which is tacit circulates freely in the locality; firms have the capability to supply high technology specialities from the local knowledge generated (tacit or codified); and knowledge spill overs can take place locally, regionally or even nationally.

Agricultural systems of innovation

Agricultural Systems of Innovation can be defined as various interactions amongst key role players involved in agricultural activities; these activities comprise the growing, processing, packaging, distribution and consumption of various agriculturally produced products. Interactions between role players need to be diverse for the advancement of skills, for development and for enabling conditions for actors to continuously innovate (The International Bank for Reconstruction and Development, 2011:5).

Agricultural systems of innovation exist as webs of relationships between farmers; natural systems involving climate, geology, soil, air, pests and water; and human systems involving politics, land-use planning and infrastructure, law, finances and marketing. These innovation systems and the relationships within and between the systems inform the production of food, agricultural goods and other commodities. This web of intricate relationships is sometimes referred to as the “agricultural systems of innovation”. The viability and sustainability of an agricultural system depends on the ability of farmers to be profitable (Caldwell, 2015).

Indigenous people

Indigenous peoples, also known as the first peoples, aboriginal peoples or native peoples, are the original inhabitants of a given region, as opposed to groups that have settled, occupied or colonized the area more recently (Sanders, 1999). Groups are usually described as indigenous when they maintain traditions or other aspects of an early culture that is associated with a given region. However, not all indigenous groups share this characteristic or quality. With the imposition of Western governance models in South Africa, the Bantu and Khoi-San - as well as other population groups later on during the colonial, segregation and apartheid eras - were classified as “black people” and consequently segregated from the white community; that led to two communities existing under one government, but one elevated to be superior and the other regarded as inferior. The term “black people” refers to “those who are by law or tradition politically, economically and socially discriminated against as a group in the South African society and identifying themselves as a unit in the struggle towards the realization of their aspirations” (SAHO, 2018).

2.3 CONCEPTUAL FRAMEWORK

2.3.1 Epistemological background of local knowledge

Local knowledge in small-scale farming is an overlooked phenomenon in economic policy and it is often a neglected factor. The propensity for, and contributions of, local knowledge are vested in small-scale farmers through generations of using, generating and disseminating knowledge.

Nonetheless, researchers, policy-makers, economists and users of local knowledge ought to ask what is local knowledge; how does local knowledge come into existence; what are the defining features of local knowledge; what are the constraints of local knowledge; how does local knowledge relate with the systems of innovation approach; how can local knowledge be utilized in order to effect economic development; and more significantly, who are the bearers of local knowledge? These questions need to be addressed in order to develop an epistemological background of local knowledge.

Two terms exist within this epistemology, namely “local” and “knowledge”. Both these terms have distinctive defining features that need to be unpacked separately before analyzing the concept “local knowledge”. When something or somewhere is described

as being “local”, it actually refers to a position in space, a particular place or particular places and/or a local custom. While this could allude to a city, town, small district, country and/or regional block, diaspora communities constitute a part of local communities as the local knowledge practices have been advanced and transmitted to destination countries for the benefit of those in the diaspora. Local people possessing local knowledge are often found in rural communities, but there are those in urban and international contexts who are able to recognize and promote the use of local knowledge.

Knowledge, on the other hand, refers to a body of truths or facts accumulated over time through learning and interacting with the bearers of these truths and facts. Knowledge also refers to the element or condition of knowing, the reading of actuality and/or the mental apprehension of authenticity. Knowledge can further be broken down into various taxonomies. In the literature reviewed concerning the role of knowledge and learning within the economy, four categories of knowledge were recognized, namely “know-how”, “know-who”, “know-where” and “know-what” (Lundvall, 1996).

According to Lundvall (1996), “know-how” refers to skills one possesses and the capability to do something. This particular taxonomy of knowledge refers to personal knowledge and this personal knowledge can be both scientific and practical in nature. “Know-how” is typically knowledge developed and kept within the borders of an individual firm, research team, individual community and/or individual person. “Know-how” is typically tacit knowledge and is very hard to transmit - the reason why this particular form of knowledge depends on experience for transmission.

Lundvall (1996) further states that “know-who involves information about who knows what and who knows what to do”. It revolves around the creation of networks and relationships between groups and firms with the particular objective of drawing upon expert specialization. “Know-who” is learnt in social interactions and practices that can be both in an informal learning environment, as in small-scale farming, or in a specialized environment as in agro-processing plants.

Lundvall and Johnson (1994) cited in Lundvall (1996) view “know-why” as knowledge about “principles and laws of motion in nature, in the human mind and in society”. This particular type of knowledge is mainly suited to scientific research in relation to nature

and society. The “know-why” knowledge entails identifying and scrutinizing specific challenges faced by the community. On the other hand, “know-what” refers to the knowledge about facts and truths (Lundvall, 1996). In this case knowledge is often linked with what we actually call information. We link this particular knowledge with information because the data probably has not yet been applied in the field it was initially intended to be applied in. “Know-what” can be obtained through books or research that has been conducted in a particular learning area. This type of knowledge is easily transferrable but requires some effort to articulate.

Before dwelling on local knowledge, it is important to further distinguish between “tacit” and “codified” knowledge. Codified knowledge involves the process of transforming knowledge into a format that makes it possible for knowledge to be stored and transferred as information (Johnson & Lundvall, 2001). According to the authors (Johnson & Lundvall, 2001), it is assumed that codification involves a process aimed at making knowledge accessible to a collective of agents (groups). Nonetheless, codified knowledge is also specific in nature and can be directed to individuals such as researchers, academics and experts specializing in a particular field; even what is called codified knowledge is still the product of tacit knowledge that has evolved through various generations and innovation processes. With regard to the process of codification, deployment of this kind of knowledge comes first and then is followed by the codification process.

Tacit knowledge, on the other hand, refers to knowledge embedded in individuals, communities, firms and/or nations. Usually it is referred to as that sticky element of knowledge known as the “know-who” and “know-how” type of knowledge. It is subjugated to experience and an intense process of learning within the knowledge economy. When it comes to the creation and utilization of knowledge, tacit and codified are complementary and do not necessarily substitute each other (Johnson & Lundvall, 2001). Knowledge and the taxonomies of knowledge are relevant to this study because they address the essence of local knowledge and how it can contribute to local economies in general and to local systems of innovation in particular.

2.3.2 What is local knowledge?

Local knowledge is knowledge that people from a given community developed and continue to develop based on experience and that is often tested over a particular time span. Importantly, local knowledge is adapted to the current realities confronting a specific segment of society and it also complements the local culture of doing things which simultaneously protect the environment. In a nutshell, local knowledge is knowledge that is embedded in community practices, relationships, routines and institutions. According to Scoones and Thompson (1994), local knowledge can be defined as information, knowledge, practices and skills that are known, developed and preserved by people from the same locality who share histories and experiences.

Local knowledge embodies information systems which are influenced by reality and authenticity. Of particular interest is that local knowledge is dynamic and ever evolving in relation to the current circumstances or opportunities; however, in some cases it is perceived as static and unable to adapt to the changing world, appearing to have lost its “original” meaning. Yet not all communities are resistant to new methods and technology, and so we cannot simply dismiss local knowledge as primitive and static. In a world that is rapidly globalizing and where the term “local” is slowly disappearing, confining local knowledge to indigenous groups or original inhabitants is a grave error because local knowledge exists across all strata of society, ranging from rural communities to urban communities, migrant communities and indigenous communities. Traditional and indigenous knowledge systems are synonymous with local knowledge to a certain degree, but do not necessarily mean the same thing. We can postulate that local knowledge is founded on indigenous knowledge systems. In a sense local knowledge involves the innovation of indigenous knowledge systems.

Local knowledge involves processes where knowledge is generated, stored, applied and transmitted to others on a local level (FAO, 2018). Local knowledge is specific to every culture or society - young and old, farmers, educated people, non-educated people, children, men and women all possess local knowledge in relation to specific local context. A common implicit understanding of indigenous knowledge assumes people living in rural and poverty-stricken areas who are isolated from the rest of the world and whose knowledge systems are static and isolated from other knowledge systems (FAO, 2018). Notably, anything referred to as indigenous has a relationship

with the past and in the context of the people it has ancestral linkages, making it somewhat static and unchanging over time as it continues to identify with the historical identity. This may not be the case with all practices, but rain making and certain indigenous medicinal practices may serve as an example; these have remained unchanging over the years, anchored as they are in the cultural and traditional practices of specific communities. For communities to survive and even protect their biodiversity they have to consistently be innovative and that appears to be a divergence from the preservation of the old lessons and practices constituting “indigenous knowledge”.

Counter to common perceptions, interactions with the outside world do exist and rural-urban linkages are inevitable due to the interactive nature of knowledge. At the heart of this quandary is how to integrate current scientific knowledge with traditional knowledge systems. Local contexts are slowly dissolving in the global community and losing territory. What is viewed as localized knowledge today is gradually being utilized in different contexts and innovation continues to guide the implementation of local knowledge in different localities.

We can further distinguish between three types of local knowledge, namely specialized knowledge, common knowledge and shared knowledge. Common knowledge is deemed to be held by most people within a community or locality - for instance, the knowledge of cooking “pap” in South African communities or the knowledge of preparing local staple food. Shared knowledge is held by many individuals within a community but not necessarily all people. For instance, small-scale farmers who raise livestock will know more about basic animal husbandry than community inhabitants without livestock (FAO, 2018). Specialized knowledge is held by a selected few individuals within a community and these selected few individuals might have gone through the process of specialized training and/or education. Thus only a few local inhabitants will become healers, midwives or blacksmiths (FAO, 2018).

Knowledge systems are dynamic and adapt as the environment evolves. The generation, utilization and dissemination of knowledge create a platform for expanding the already articulated local knowledge. As access to local knowledge increases, the exponents of this knowledge innovate and constantly enhance this particular knowledge to meet the day-to-day needs and wants. One pivotal aspect of local

knowledge is that jurisdictionally speaking, local knowledge is boundless and contributes to the overall national knowledge economy and the global knowledge economy. The semantics must not be allowed to imply that local knowledge does not overlap into other localities nationally and/or internationally.

Due to the boundless nature of local knowledge and the changes that occur over time, it is sometimes difficult to decide whether an innovation or practice is localized, adopted from outside, or a blend of localized and externalized knowledge. In most cases it is a blend of the two - for instance, external knowledge fine-tuned to meet local demands and specifics.

Sustainable development is reliant on human capital and in the context of rural communities, local knowledge is the key asset for survival. Local knowledge is not the only driver of sustainable rural development but remains part of the people's daily lives and has enabled communities to develop mechanisms to survive based on local resources.

Nonetheless, what matters is whether a custom is really localized knowledge or includes externalized knowledge. The most important element regarding the use of knowledge is to first search within the local context for solutions to problems before attempting to incorporate the external element of knowledge.

2.4 LOCAL KNOWLEDGE IN SMALL-SCALE FARMING

Small-scale farming has evolved over centuries through the accumulated experiences of indigenous farmers. The knowledge of how to farm, harvest, preserve and sustain has been acquired through continuous lived experiences and understanding of the environment, for example through climate understanding (Tella, 2007:185).

Maroyi (2012:5412) asserts that indigenous small-scale farming continues to take place without the use of scientific or codified knowledge, as the famers utilize the in-depth knowledge and expertise that have been passed down for generations and are embedded in the community's cosmology. This is because communities have built a network of farming systems that are unique to the particular locality and environmental conditions. The level of indigenous knowledge varies greatly as it is dependent on human factors such as age, experience or even gender.

According to Agrawal (1995), Carswell and Jones (2004) and Pretty et al. (1999), local knowledge in small-scale farming is of great value and importance as it means that traditional skills and agricultural systems are recognized as pivotal to the community's survival. This knowledge allows for farmers to adapt to different circumstances (environmental or economic). The use of local knowledge through skills and practices for small-scale farming has proven to be related to sustainable agricultural production (Food and Agricultural Organization, 2009).

Beckford and Barker (2006:118) explain that local knowledge in small-scale farming is largely embedded in culture and has some distinct characteristics. In the first place, farming practices are localized. Secondly, the practices are unique to a specific context or environment. Thirdly, knowledge is constructed and developed informally and is rarely documented. The fourth characteristic is that local knowledge plays a significant role as the way of life in those communities. It is important to note that the term "local" does not refer to the confines of a rural setting. Locality can mean various spatial scales, including villages, communities, regions and nations.

According to the Limpopo Department of Agriculture (2008), various scientific studies on the African continent found that the majority of people, even those in South Africa, still depend on indigenous knowledge for survival. Hart and Vorster (2006) affirm that most poor people in Africa reside in rural areas, and rely largely on indigenous farming for their livelihood. According to the United Nations Educational, Scientific and Cultural Organization (UNESCO, 2018), "local and indigenous knowledge refers to the understanding, skills and philosophies developed by societies with long histories of interaction with their natural surroundings". Indigenous knowledge encompasses hands-on learning on the land, unlike formal education where generations spend much time learning passively in a classroom setting. In indigenous knowledge transmission, parents and elders occupy the space of teachers who hold knowledge and authority.

Hart and Vorster (2006) are of the view that indigenous knowledge and related social and cultural practices are important but much neglected resources for agricultural development and subsequently economic development in South Africa and the rest of the world. Indigenous knowledge is vital in small-scale farming, especially with regard to sustainable development. The biggest challenge to indigenous knowledge in small-scale farming is its replacement with new scientifically oriented mechanisms of farming

which are profit centred rather than sustainable development centred. Hence Hart and Vorster (2006:2) argue that “rather than replacing what people know with new, often expensive, unfamiliar, culturally and socially inappropriate and consequently locally unsustainable technologies, it makes sense to consider and understand what people know and where appropriate build upon this knowledge”.

2.5 TYPES OF SMALL-SCALE FARMING

In this particular section, the types of small-scale farming will be elaborated on, namely subsistence, commercial and family-based farming.

Heidhues and Brüntrup (2003) assert that small-scale farmers can be defined as farmers who use low-technology intensive and subsistence farming techniques to produce agricultural products for household consumption. Small farms usually comprise personal households which have land smaller than 10 hectares.

According to Miguel and Parviz (2008), the crux of subsistence farming can be linked to the preservation of local practices as well as the level of farming activities of the particular locality.

Pinder and Wood (2003:5) define commercial farming as agricultural production and marketing processes that are profitable and competitive in localities and globally. This involves large-scale agricultural activities such as crop production and livestock grazing, solely for distribution to maximize profits.

According to Delgabo (1996), family farms can be defined as farms where the owner and operators are from one family which carries out all farming activities for the purpose of increasing profits over time. Family farms rely on themselves for labour, making them more efficient; they sometimes make use of part-time capacity.

2.6 ADVANTAGES AND DISADVANTAGES OF LOCAL KNOWLEDGE IN SMALL-SCALE FARMING

This section discusses the advantages and disadvantages of the economic utilization of local knowledge. Theories are subject to scrutiny and in most cases are not as absolute as authors might suggest. Delimitations in many theoretical frameworks affect how knowledge is transferred.

Knowledge within the system of innovation approach is treated as an endogenous factor which is embedded in individuals, firms, localities, regions and/or countries. Local knowledge provides an understanding of local systems of innovation and of the determinants of the productivity and efficiency of local systems. Learning is an interactive process and the transfer of local knowledge requires participation in this interactive process for the generation, dissemination and utilization of local knowledge. Nonetheless, some theoretical notions such as “local knowledge” can offer solutions to social, cultural, economic and environmental challenges confronting localities that are often neglected through policy direction and orientation. The researcher in this case intends to critically examine the successes and failures of local knowledge within small-scale farming.

In essence, this study seeks to paint a picture of the contributions that can be elicited by the utilization of local knowledge in small-scale farming and to present the challenges confronting this ideal of local knowledge in small-scale farming. The advantages of local knowledge in small-scale farming will first be set out, followed by the challenges of the underutilization and/or under-endorsement of local knowledge in small-scale farming.

2.6.1 Advantages

- Improving food quality

According to Inica.org (2018), crops and livestock produced from small-scale farming are sold in local markets; this is projected to significantly support the maintenance of quality food and sustainable livelihoods. In terms of vegetation farming, this kind of farming yields organic products which are free from genetic modification. Livestock is also reared by small-scale farmers without the use of pesticides and genetic organisms.

- Formulation and improvement of practices

Local knowledge provides small-scale farmers with the opportunity and capability to formulate practices and innovations. These innovations have sustained the farmers for centuries through careful observation of agriculture processes and environmental factors. Farming has significantly contributed to sustainability at house and local community level (Eyzaguirre, 2001; Shepherd, 2001).

- Traditional medication

Communities make use of different forms of traditional medications such as herbs for healthcare purposes; this is becoming more prevalent as traditional medications are introduced in pharmacies. In South Africa, specifically, studies have shown traditional medicine to play an important role in the management of certain ailments, while at the same time the sale of traditional and indigenous products through small-scale farming has beneficial effects on poverty reduction and employment creation (Moos & Struwig, 2018).

The healthcare sector within rural and poverty-stricken areas thrives on the use of ethnic medicinal plants to alleviate illnesses and diseases that continue to confront them. The localized knowledge transmitted from generation to generation helps local community members understand the beneficial qualities and attributes that exist within certain crops and plants (Diop,1974). Local knowledge also contributes to the alleviation of poverty by supporting survival strategies like the use of ethnic medicinal plants and crops to treat illnesses and diseases confronting local community members who may not be able to afford private healthcare or travel distances to access public healthcare.

- Competitive advantage

Local knowledge is knowledge that is embedded in community practices, relationships, routines and institutions. The embedded nature of local knowledge creates competitive advantage by making local agents of change experts specializing in a particular set of knowledge. For instance, despite the decline in agricultural activities by most rural people in South Africa, large numbers of rural households are still engaging in agricultural activities for subsistence (Statistics South Africa, 2012, cited in Thamaga-Chitja & Morojele, 2014:147).

This is due to the dynamic nature of local knowledge and its quality of being able to evolve regardless of the imperious issue of urbanization which leads to communities diversifying and knowledge spillage. Through the vehicle of urbanization, local knowledge gets diluted in some quarters but thrives in other contexts. The embeddedness of local knowledge denotes skills and techniques learned over time and able to adapt to current realities through various innovative capabilities.

- Collaboration

Local knowledge is owned by the local community that utilized it in the first place. Usually local knowledge bears collective ownership rather than being the intellectual property of a single individual. This does not necessarily mean that an individual cannot articulate local knowledge; it means that even though a single person might articulate local knowledge, this process of articulation will require some form of interaction because learning is an interactive process and demands the creation of networks for the generation, exploitation and dissemination of knowledge.

This process of learning or interacting can be regarded as the process of collaboration between community members in order to articulate local knowledge. In this collaboration process, members of society can articulate new discoveries that can enrich the intellectual capital of that particular locality. The collaboration process also creates community awareness of the importance of local knowledge, critically providing a basis for disseminating this knowledge in an understandable way that will reach all strata of society.

- Mitigation of social, cultural, environmental and economic challenges

The United Nations Food and Agriculture Organization (FAO, 2018) states that local knowledge is imperative for various economic sectors, namely agriculture, animal husbandry, ethnic veterinary, use and management of natural resources, healthcare, community development and poverty alleviation. In the case of the agricultural sector, local knowledge can be utilized to determine the plants and crops that can be planted in a particular region, as well as determine the optimal season and time to plant the agricultural crops and plants.

The agricultural sector includes the animal husbandry sector and the localized ethnic veterinary practices. These two elements (animal husbandry and ethnic veterinary) depend heavily on localized knowledge due to their prerequisites (i.e. weather, water availability, soil type, etc.) for both surviving and thriving. On the hand, local community members are the ones who are immediately disadvantaged when private corporates and the government exploit natural resources without paying attention to the environmental degradation challenge. Global warming is a borderless phenomenon and continues to be a major impediment in terms of achieving sustainable development goals.

Animal husbandry also requires the use of medicine for the health and well-being of the animals, which can prove to be expensive for local community members and small-hold farmers. The inevitable solution to the challenge of cost is the application of local knowledge in the form of utilizing ethnic medicinal plants like the aloe plant, which has overwhelming benefits for both humans and animals. Exploiting local knowledge creates community development and in particular fosters local economic development. The collaboration processes also help local communities to better understand each other's local customs and traditions. This in turn creates an interactive process based on trust and loyalty.

- Food diversification

According to Notsi (2012), local farming systems have the potential to stabilize food production through diversification and reduced dependency on unstable market prices for certain products. Furthermore, small-scale farming systems give local farmers an opportunity to manage different crops simultaneously, which will increase diversified farming income.

2.6.2 Disadvantages

- Lack of support

One challenge facing small-scale farmers is that they do not enjoy the same support as large-scale farmers, due to their limited economic viability that is a direct result of historical imbalances and marginalization. Government has failed to equip small-scale farmers to protect their knowledge. The lack of support has resulted in big companies with direct access to market taking over indigenous practices and even plants to the exclusion of small farmers and communities from which these practices originate (Kirsten & Van Zyl, 1998:554).

- Inability to ensure food security

Notsi (2012:10) argues that some of the advantages that the small-scale farming systems have in South Africa are clouded with a number of challenges, even though farming is at the heart of the rural areas' livelihood strategies. Food security is a complex term to define as there is no universally agreed definition of this concept.

Du Toit (2011:1) attests that food security is a broad term which is defined in different ways by various organizations and authors across the world. According to the International Food Policy Research Institute (2018), food security is the condition in which all people, at all times, have physical, social and economic access to sufficient and nutritious food.

Du Toit (2011:1) postulates that **"**the issue of food security has been critical in many parts of the world including South Africa. The right to food is enshrined in international and national law. The constitution indicates that every South African citizen has a right to sufficient food and water; and social security". Small-scale farming provides rural farmers with an opportunity to enjoy and exercise their constitutional right as mentioned in the above postulation. Hart (2009) affirms that South Africa is one of the countries largely deemed a food secure nation producing enough staple food and having the capacity to import food. But the same cannot be said about households in rural areas.

The continuous technological enhancements and modernization practices have contributed to how indigenous knowledge in the schooling system and markets is used to benefit communities. Applying traditional practices and methods without complementing them with modern methods will lead to the production of food that is insufficient to meet the high volumes demanded by communities.

Food security may be compromised in small-scale farming due to factors such as small farming plots which have sub-economic output levels, as well as insufficient rainfall. Small-scale farming relies heavily on organic production where neither chemicals nor irrigation methods of plant watering are used. According to the study conducted at Kikuyu, in Kenya, "55.9% of the indigenous farmers who were the respondents, indicated that indigenous farming practices entail farming without chemicals" (Maina, 2015:xiii). Maina (2015) further argues that non-usage of chemicals in small-scale farming leads to food insecurity due to the extended time period before matured organic foods can be harvested. Notsi (2012) advises that in an indigenous farming system with mixed crop production, high plant competition for water and space may cause low yields.

- Globalization

Hart and Vorster (2006) are of the view that generally the discourse that favours modernization has greatly impacted developing economies around the world. In the modernization paradigm, which is output driven, new scientifically researched technologies are always considered to be reliable and productive. Consequently, indigenous knowledge and agriculture related practices are often overlooked, or attempts are made to replace them with more efficient modern methods.

Modernization has brought about limitations and challenges for indigenous farming to adapt to the instant-products dominant agricultural market. Increased inconsistency in rainfall and temperature has propelled small-scale farmers to lose confidence in the indigenous knowledge underlying the small-scale farming system (Ajayi & Mafongoya, 2017).

- Marginalization and exclusion

While there's a growing call internationally for local knowledge to be supported and nurtured for the preservation of biodiversity and sustainable development, it is still often being marginalized and excluded in local economic development policies. The significance and contribution of local knowledge are often under-recognized and under-utilized. Policy makers usually have a narrow outlook when articulating developmental policy; Thamaga-Chitja and Morojele (2014) observe that it is when an understanding of the "way of life" in localities is developed that interventions can be tailor-made to confront policy issues and obstacles.

- Exploitation

Local knowledge is exploited in some quarters under the guise of venture capital and constant market research conducted in localities without acknowledging the bearers and initiators of this knowledge. Globalization and the age of large corporates have contributed to exploiting local knowledge without any regard for its sole owners. Local developers of this knowledge are exploited because in most cases these people do not have formal education and may not understand the patenting standards and rules.

Most importantly, local knowledge in many cases is a collective asset and corporations usually use this train of thought to challenge the issue of exploitation. They claim that ownership is not registered and is open for their incorporation and innovation and it

has consequently often been the case that local communities are neither acknowledged for their contribution nor compensated.

- Lack of research and investigation

The research lacuna that prevails in the local knowledge paradigm also creates an impediment to the fruitful utilization of this knowledge. Local citizens who possess this particular form of knowledge are not the ones conducting research in the field of local knowledge. This research is usually conducted outside the confines of the local context, maintaining the status quo of not formalizing this particular knowledge strand.

Participatory research between the academics and the community is crucial in order to ensure findings are correct and useful for the local communities. Many research studies conducted have only raised expectations for external intervention in the challenges faced by communities, such as health and economic challenges. Participatory research requires that indigenous methods be included within the design and research process; this will help enrich the investigation. Brief encounters with communities can lead to erroneous conclusions by researchers and academics. On the other hand, fostering relationships with indigenous people and involving them in information-seeking activities would rectify this and would also empower local communities to exercise control over the research.

2.7 CONCLUSION

This chapter set out the conceptual framework for the current study, namely “local knowledge”. The focus of the chapter was on defining the features of the term local knowledge. The chapter also presented a brief analysis of the terms that will be utilized throughout the study in order to provide clarity and direction. The types of small-scale farmers and the advantages and disadvantages of utilizing local knowledge in small-scale farming were discussed. Of particular importance within the chapter is the segment that deals with the conceptual framework. This framework will be used as the lens through which the role of local knowledge in small-scale farming can be investigated. The subsequent chapter will explore the international and regional perspective with the aim of providing a comparative analysis before addressing the South African context. Nature does not allow for a vacuum: in the absence of formal education local knowledge thrives and contributes to local systems of innovation in both progressive and regressive ways. The essence of local knowledge and its tacit

nature need to be researched further in order for us to develop a succinct understanding of local systems of innovation, in particular local agricultural systems of innovation.

CHAPTER THREE - GLOBAL PERSPECTIVE ON LOCAL KNOWLEDGE AND ITS CONTRIBUTION TO THE DEVELOPMENT OF SMALL-SCALE FARMING

3.1 GLOBAL AND SADC PERSPECTIVE ON SMALL-SCALE FARMING

According to the United Nations Educational, Scientific and Cultural Organization (UNESCO, 2016:4), local knowledge systems have been developed over time as a response to the local surroundings. Small-scale farming has ensured that indigenous people and communities are able to grow, harvest, process and sustain different types of goods which are intended for subsistence use and survival. UNESCO further notes that by 2016 approximately 70% of the world's population was fed by small-scale farmers. This highlights the significance of small-scale farming in reducing food insecurity.

The Agenda 2030 (2015:1) for Sustainable Development Goals (SDGs) is focused on aligning national strategies which will deal with conservation issues, sustainable development, climate change, marginalization of indigenous people and local communities. This agenda provides a platform for indigenous people to make a valuable contribution to global sustainable development.

One of the overlooked elements in mainstream economic analysis is that micro-level actions taken at grassroots level continuously reconstruct the macro-level environment. Through micro-level actions, the rate, dynamism and direction of innovation are shaped. Small-scale farming is often overlooked due to the level of agricultural outputs it has to offer for the overall economy. Nonetheless, small-scale farming continues to contribute to the livelihoods of local and rural communities who are self-sufficient.

The paradigm of small-scale farming is a contested field both in the developing and developed world. The production of crops and breeding of livestock are limited to a small piece of land without the usage of modern and expensive technologies.

An interesting aspect of small-scale farming is that it is informed by local knowledge and has the potential to flourish only if a deeper analysis of the contributions of small-hold farmers is provided for in academic literature. The critical question here is the difference between scientific knowledge and local knowledge. Scientific knowledge refers to "knowledge about natural, material processes expressed in declarative, transmissible form; its representations generally aspire to be authoritative beyond the

time and place of their production" (Bray, 2008:319-344). Local knowledge, on the other hand, may be defined as "dynamic and complex bodies of know-how, practices and skills that were developed and sustained by people/communities with shared histories and experiences" (Beckford & Barker, 2007:118–128).

In this chapter the first section deals with the international perspective on local knowledge in small-scale farming with particular reference to India and China. The second section deals with the regional perspective, with a focus on SADC countries.

3.2 GLOBAL PERSPECTIVE

This section presents a comparative analysis of local knowledge in small-scale farming, specifically within India and China. The section also seeks to provide lessons from the experience of India and China regarding the role of small-scale farming, the local practices in small-scale farming and the environmental impacts of industrial agriculture.

3.2.1 The Chinese and Indian agricultural experiences

The agricultural development in both China and India has been led by small-scale farmers and therefore their experiences are relevant to the South African context. Both countries have adapted from agricultural productivity for household consumption to agricultural production as a vehicle for economic development. It is these experiences that can be very helpful to policy makers and farmers in South Africa.

With over 600 years under British rule India became independent on August 15, 1947. Throughout the colonial period, and even the post-colonial era, a large section of the Indian community was dependent on the agricultural sector for jobs and food security; other sectors came to rely on agriculture as well. The agricultural sector performed much better during the post-colonial era than during the pre-colonial era (Mahendra, 2012:3). Mahendra asserts that crop production and output recorded 2.57 percent growth yearly between 1949-50 and 2007-8 as opposed to the 0.4 percent witnessed in the first half of the last century. Singh et al. (2002:8) state that small-scale farmers produced more vegetables and fruits, comprising 51 percent of the national production in 1991. Between 1971 and 1991, smaller farms are also reported to have contributed 62 percent of rice production and 48 percent of wheat. The commendable role of small-

scale farmers in India is a lesson to South Africa: it becomes clear that small-scale farming should be strengthened to boost productivity, job creation and food security.

The role played by the state through political and policy interventions to support the small farmers in India is notable. According to Mahendra (2012:3-5), between 1950 and 1965 the government rolled out institutional reforms and public investment programmes that saw the abolishment of Zamindari law (the Zamindari system was introduced in 1793 to collect revenue from peasants and divide it into 11 parts, giving the identified owner 1/11 of the share and the East India Company the remaining 10/11 of the share), and the introduction of incentive policies and constructing of irrigation reservoirs to support farmers.

A study conducted by Kumari (2008:119) found that the majority of the respondents (59.17%) felt that Indigenous technical knowledge is preferred for agricultural practices over conventional methods. Accumulated experience is a common learning experience in rural communities where illiteracy levels are high. This is the reason why most small-scale farmers in the rural communities are more comfortable with their historical practices than modern practices. Kumari also acknowledges that Indian small-scale farmers in the Udaipur and Uttarakashi regions have local practices that have sustained their farming over many years. Amongst other practices are the following:

- Irrigation in wheat crop production is controlled to evade late maturity so that the following paddy crop is not delayed.
- In hilly and mountainous areas, land is ploughed on a slope in parallel lines rather than in a circular fashion to improve balance depth for ploughing.
- Ash is sprinkled on crops such as garlic and onion to improve the nutrient status and eliminate pests and diseases.
- Ash is also used in many other ways to control fungal diseases on vegetables.
- Maize seeds are soaked in cow urine, as seed treatment, for 12 hours before sowing.

While India became independent in 1947, another country with a rich history in small-scale farming was declared the People's Republic of China in 1949 by Mao Zedong – the leader of the Communist Party of China. China was dominated by small-scale subsistence farming and rural communities were self-sufficient. However, recently

China has witnessed the widespread use of conventional farming which gave rise to negative environmental consequences. Over and above the concerns about sustainable agriculture, the large-scale rural-urban migration has impacted rural development in China; this in turn affects the transfer of traditional knowledge from the elders to the young who see their future in cities rather than in rural areas. Rural depopulation in China is rapidly growing due to the fact that the rural populace is looking for better economic and social opportunities in the cities where the industrialization project is seen to be the driving force of employment. According to Liu et al. (2016:15), “what appears to be an economic decision to leave farming for higher factory wages is in reality a cultural decision meant to forsake the rural peasant life of the old China for the routinized and secure urban waged labour of the new industrialized China”. The routinization of life has led to increased migration and thus impedes the capacity for local communities to innovate their local agricultural systems.

According to King (1911:16), Chinese farmers have been working the land productively for thousands of years leading to a widespread peasant way of life. At the core of this peasant way of life was “an understanding of the soil types, water, environment, and family labour commitment that allowed them to maintain the health of their farm at production level in excess of that common in the Western countries at the time” (Liu et al., 2016:17). Developing areas - and in particular, rural areas - depend on agriculture for their livelihoods and agronomy plays an instrumental role in eradicating poverty, effectively leading to local economic development.

The term “agronomy” denotes the science, technology and innovation in agriculture. Agronomy has come to encompass work in the areas of plant genetics, plant physiology, meteorology and soil science. It is the application of a combination of sciences such as biology, chemistry, economics, ecology, earth science and genetics to the improvement and management of the major food crops of the world. It is precisely a component of agriculture that deals with soil and crop. At the core of agronomy lies the technical and/or technological factor. According to Bray (2008:319), “technology denotes social–material networks or systems, including sets of techniques and equipment, but also trained personnel, raw materials, ideas and institutions”. The technical aspect refers to the techniques that denote skills which go into the articulation of knowledge.

3.2.2 Local practices of small-scale farming

A prerequisite for comprehending the contributions of small-scale farming in sustainable biodiverse systems and local economic development is to understand small-scale farming and the different types of small-scale farming that exist across the globe. Small-scale farming is often perceived as something negative – even regressive - but what many people don't know is that small-scale farming has been in existence since the civilization of mankind. [3]

3.2.2.1 Characteristics and types of small farms

The Food and Agriculture Organization (2018) recognizes the characteristics of small-scale farmers. These are (Davendra, 1993):

- They are essentially poor people who face geographic isolation.
- They continuously experience hunger and rural poverty.
- They have the capacity to adapt and survive hardship.
- They resist changes because of the inability to use new technology.
- Being illiterate, they are not interested in extension materials.

According to the Food and Agriculture Organization (2018), there are three types of small-scale farming in South-East Asia. These *inter alia* include:

- farms in rain-fed agricultural areas;
- farms in irrigated agricultural areas;
- farms in areas of plantation agriculture.

The types of small-scale farming listed above can be integrated in order to enhance agricultural productivity, but most importantly to create room for innovations and competitive advantage. Amongst others these include systems combining crops, ruminants, ponds and fish, as well as systems combining non-ruminants, ponds, fish and crops.

3.2.2.2 Farms in rain-fed agricultural areas

[3] For more information on this see Beckford (2002:248-259); Beckford and Barker (2007:118–128); King (1973); and Liu et al. (2016), who detail the contributions of small-scale farming.

According to the FAO (2018), farms in rain-fed agricultural areas are found in both lowland and highland areas with an estimated rainfall of 1000–1500 mm per year. It is interesting that traditional and/or indigenous farming activities are conducted in these areas. Usually, these types of farming activities are guided by local knowledge systems that are embedded in the localities where small-scale farming exists. The FAO adds that small-scale farming in these areas includes both crops and animals, with animal farming generally concentrated at the top or the highlands. Animal small-scale farming includes swine, goats, sheep, cattle and swamp buffaloes.

Furthermore, the FAO (2018:5) reports that: “In Malaysia, for example, intensive livestock surveys of 5274 farm households in the Muda rice growing area showed that about 87% of all the rural households were engaged in livestock keeping. Of these, 89.4% of all households owned chickens, 47.1% ducks, 26.7% cattle and buffaloes and 7.7% goats. It was also found that individual households owned quite large numbers of poultry and ducks (13–15 birds)” (Davendra, 1993).

3.2.2.3 Farms in irrigated agricultural areas

According to Shubladze (1970-1979), “irrigation consists of a set of technical, scientific-farming, and organizational-management measures that are based on hydraulic-engineering methods for supplying standard quantities of water to the soil. Irrigation water improves water conditions in the soil, increases the water content of plant fibres, improves turgor, and dissolves nutrients and makes them available to plants. Irrigation affects temperature conditions by regulating the temperature of the surface layer of the soil and the ground layer of the air, and also makes possible control of the growth and development of plants, intensification of the growth of particular organs (including generative organs), and improvement of the quality of the harvest”.

In South-East Asia, irrigation areas are usually used for cultivating crops, with rice the dominant crop. Swamp buffaloes and cattle play a vital role in providing ploughing power and assisting local farmers with tedious agricultural labour. Ducks, pigs and poultry are also found in these irrigated areas. It worth noting that, regardless of the positive aspects of “irrigation systems”, the technologies do not hold as an absolute because there are negative elements and shortcomings existing locally and within the global community. These include waterlogging and salinization, water-borne and

water-related diseases, potential environmental impacts of dams and reservoirs and socio-economic impacts of irrigation schemes.

3.2.2.4 Farms in areas of plantation agriculture

Agricultural plantations in South-East Asia are involved in conducting agricultural activities such as tree crops (e.g. coconuts, macadamia nuts, palm oil and rubber) and livestock farming. Usually this type of farming occurs on both large scale and small scale. The animals are generally reared mainly for food and meat production. These include dairy cows for milk; pigs, goats, sheep, poultry and ducks for meat; and poultry and ducks for egg production (FAO, 2018). Plantation agriculture creates job opportunities for local communities; it is a source of income for the local farmer and contributes to the country's economic growth. Waibel et al. (n.d.) note that small-scale rubber farming has taken over the rural economy of Xishunangbanna and other parts of Southern China, with 81% of the cultivated land used for rubber farming. It is further noted that poverty has been reduced in some quarters of the rural communities, with 40% of household income derived from rubber farming.

3.2.3 Environmental impacts of Industrial agriculture

Small-scale farmers face many challenges in both India and China. This section discusses the issue of environmental destruction and impact of industrial agriculture on local communities and the agricultural industry.

One of the responses to the challenges of development has been a call for a sustained and dynamic approach to agricultural development. The demand for food supply across the world presents an opportunity for rural farmers to generate revenue and reduce poverty levels in their communities, but the fundamental challenge confronting India and China - as with many countries across the world - is to both protect small farmers against being replaced by large farms in the modern global agricultural economy and also ensure that smallholder farms benefit from the global agri-food value chain (Reddy, 2007:4; Shi et al., 2011). Animal farming contributes to more than one-third of the global methane emissions, which result primarily from the enteric fermentation in ruminants (dominated by beef and dairy cattle) and the decomposition of animal wastes (Steinfeld et al., 2006).

In this regard the juxtaposition of small and large-scale animal farming practices is irrelevant: global warming affects livestock on both small and large-scale farms and both types of farming contribute to the methane emissions, although the degree may vary. The solution to the above problem might be to look into the rearing of animals utilising the “free range” method, where animals are free to roam around farms and/or villages, limiting the peculiar practice of concentrating livestock in feedlots. This in turn will limit the disease contact points and also provide healthy living conditions for livestock. Yet it can only be achieved by considering the contribution of small-hold organic livestock farmers who are currently marginalized in the agricultural sectors and valuing the contribution of traditional local knowledge systems that have been in existence since the dawn of civilization. Throughout the forty centuries of farming in China, local knowledge was utilized to enhance the agricultural productivity of the peasants of China (Hu et al., 2017; Hu & Cheng, 2016).

The use of antimicrobial resistant drugs further exacerbates the environmental and health challenges faced by local knowledge. In another paper, Hu and Cheng (2016) specifically note that “the overuse and misuse of veterinary drugs, particularly antimicrobials, in food animal production in China cause environmental pollution and wide food safety concerns, and pose public health risk with the selection of Antimicrobial Resistance (AMR) that can spread from animal populations to humans”. One of the most disturbing elements of the administration of AMR drugs and the rapid growth of Concentrated Animal Feeding Operations (CAFOs) is the pollution of local water sources, negatively impacting the national health budget as a result of the excessive consumption of Genetically Modified Products (GMPs). “The quantity of urine and faeces from even the smallest CAFO is equivalent to the urine and faeces produced by 16,000 humans” (Sierra Club).

CAFOs undermine sustainable biological systems and the arguments for them are mostly driven by profit generation rather than social value. Profits place too little value on the future and therefore degrade the ecological integrity of society. Farming shouldn’t prioritise money or profits over ecological and social integrity. Often profits are central to the operations of large-scale farms at the expense of public health, the welfare of animals and climate protection. Hu et al. (2017) note that the airborne pathogens and endotoxins found in CAFOs are known to cause adverse respiratory

conditions in workers in swine and poultry CAFOs, where air emissions are concentrated in the confinement buildings.

Furthermore, elevated occurrences of acute and chronic respiratory health problems, such as sinusitis, bronchitis, mucus membrane inflammation, nose or throat irritation, and decline of pulmonary function, are found as a result of CAFOs. Industrial animal agriculture can also negatively affect the environment as a result of waste management and land rehabilitation challenges. To address these challenges, countries such as India and China should look into acknowledging the role of small-scale farming and its contribution in rectifying our current destructive environmental practices. Furthermore, healthy diets, which are based predominantly on plant source foods, will not only improve public health through lowering the risk of diseases associated with excessive consumption of animal-based foods (Akhtar et al., 2009; Ornish et al., 1998), but also significantly reduce the need for industrial animal farming, and correspondingly, the associated environmental and public health risks (Hu et al., 2017).

A generation ago, chickens in India were mainly produced through household farming and largely reared by women, but today India ranks number five amongst the world's biggest poultry meat producers; this is done through industrial-style facilities. The same is true of China: it has become the world's largest producer and consumer of meat, but the consequences of these environmentally destructive methods are felt even more by the Chinese people who suffer diet-related chronic diseases that are China's most common cause of death (Brighter Green and the Global Forest Coalition, 2013:4).

3.3 SADC PERSPECTIVE

This section provides an in-depth comparative analysis of local knowledge in small-scale farming focusing on African countries, namely Botswana and Swaziland, with a discussion of their history of small-scale farming, the role of small-scale farming, local practices in small-scale farming, challenges and successes and current policy interventions.

3.3.1 Botswana

Botswana has a population of 2 million residents but the contribution of agriculture to the GDP has been declining. By 2011, the GDP for agriculture accounted for 2.4%, compared to the mid-1970s when it was at 25%. The main sources of income for some parts of the country are cattle farming, small-scale retail commerce, tourism and public service activities (Jefferis, Rudloff, Kenewendo, Sigwele, Tlali & Moyo, 2012:2).

Botswana attained independence in 1966; at that time agriculture accounted for 40% of the GDP (FAO, 2015:10). After gaining independence, Botswana's local communities engaged in hunting and livestock as well as crop agriculture, with a focus on maize, millet, sorghum and beans on a small scale. According to the United Nations Environment Programme (UNEP) Policy Brief (2013:1), small-scale farming in Botswana plays a critical role in rural areas because it offers employment opportunities as well as subsistence living.

3.3.1.1 Local practices of small-scale farming

The various small-scale farming practices in Botswana are utilized as a developmental process to come up with solutions to local agricultural complexities (Botswana Agricultural Sector policy brief, 2012:2).

There are different harvesting practices across regions in Botswana which are determined by environmental as well as social conditions. Furthermore, the traditional authority also shapes the agricultural activities in localities. A study conducted across two districts, namely Bobirwa and Kgalagadi, found that these districts were engaged in small-scale farming activities. In Bobirwa district, harvesting activities take place through collection of firewood - but not cutting all trees in winter - and also carving for subsistence purposes. The chiefs of these districts monitor the environment and manage the harvesting of bark and leaves from trees with medicinal properties and also the collection of Mopani worms (Kayombo, Tsheko, Semetsa & Malepa, 2014:6).

In Kgalagadi district, however, common practices include protecting trees and preserving them for shade; the community gathers fruits without cutting trees. The district is focused on conserving water through traditional methods which range from using ostrich eggshells to using special animal skins for collecting and transporting

water. One commonality between these districts is the collection and preservation of certain plants such as Hoodia Gordonii (appetite suppressant), Artemisia afra (anti-malarial and antioxidant) and also Sclerocarya birrea (nutritional) which are used for medicinal purposes (Kayombo, Tsheko, Semetsa & Malepa, 2014:5). Table 1 illustrates the different practices of local knowledge in small-scale farming in Botswana.

Category	Practices	
	Bobirwa Sub-district	**Kgalagadi District**
Harvesting practices	Fruit trees not cut for firewood	Grasses cut by hand/sickle and seeds dusted off
	Cutting dead trees	Temporal relocation to gather fruits
	Neighbourhood monitoring of natural resources	Neighbourhood resource monitoring
	Some trees not cut in rainy season	Gathering fruits without cutting trees
	Carving performed only in winter on male dead trees	In field clearing, trees were spared for shade and those cut used for fencing
	Firewood collected from dead trees and transported manually	Protection of trees within the village space
Traditional laws and taboos	Chiefs protected some animals from being hunted	Chiefs protected Kgori and eland
	Restrictions on movement of widows , miscarriage victims and girls on 1st menstruation into livestock and other environments	Restrictions on movement of widows , miscarriage victims and girls on 1st menstruation into livestock and other environments
	Prohibition of killing water snakes	Prohibition of starting uncontrolled veld fires
	Chiefs announced start of ploughing, hunting, gathering and harvesting seasons	Prohibition of hunting calving animals, and hunting was done in winter
	Totems were respected and not killed by respective tribes	Prohibition of cutting trees in rainy season
	Soil replaced after harvesting some roots/tubers for medicinal purposes	Praying for rain
	Chiefs and advisors monitored surroundings	Chiefs and advisors monitored surroundings
Farming practices	Selection of seeds was based on drought resistant varieties, and if treated with ash	
	Shift cultivation	
Water conservation		Water was manually collected and transported in specially designed animal skins
		Ostrich egg shells were used for storage of water, milk and medicines
		Water was fetched before sunset to limit its misuse
		Rumen liquid was used as drinking water and medicine
Other practices	Encouraged harvesting of fully-grown leaves of Mokolwane(*Hyphaene pertersiana*) and the bark of Monyee (*Berchemia discolor*)	
	Harvesting of fully-grown mopane worms leaving pupae and those in the highest branches of trees for regeneration	
	Colonial prohibition of hunting some animals for aesthetic purposes and protection of endangered species	

(Source: Kayombo et al., 2014:7)

These practices have led to the effective management of natural resources that help meet the needs of households and local communities. Local knowledge is transferred from one generation to another (Mutula, 2002:135). The local chiefs play an important role in preserving and protecting the local knowledge, for collective and coordinated synergy in the community. The chief announces production seasons as an indication

of the commencement of certain farming activities (Kayombo, Tsheko, Semetsa & Malepa, 2014:5).

3.3.1.2 Challenges and successes

According to the United Nations Environment Programme (UNEP) Policy Brief (2013:1), the small-scale farming sector has experienced several challenges, ranging from erratic and unpredictable weather conditions to social conditions and often difficult trading conditions which may impede local sustainable development.

The current local knowledge practices are diminishing because knowledge is predominantly upheld by local authorities and chiefs. This means that knowledge is largely unwritten, making it difficult to centralize and transfer (Cassidy, Wilk, Kgathi, Bendsen, Ngwenya & Mosepele, 2011:87). Due to the lack of understanding of the role technology plays on the part of the traditional leadership, technology is often regarded as a negative influence which will ultimately dilute traditional small-scale practices.

3.3.1.3 Current policy interventions

The Botswana government seeks to support agricultural development through an initiative called the Integrated Support Programme for Arable Agriculture Development (ISPAAD). The programme is aimed at empowering farmers from rural communities to have access to essential inputs for processing purposes. Farmers are provided with free seeds, fertilizers and fertilizer applicators. Beneficiaries of this project have comprised over 60% of women, 28% being the elderly and about 17% having no formal qualifications. The limitation of this programme is that support is focused on subsistence farmers who need to cultivate a maximum of 16 hectares - which is seldom the case for small-scale farmers (UN-UNEP Policy Brief, 2013:2).

3.3.2 Swaziland

3.3.2.1 History of small-scale farming

According to Dlamini (2005:43), the Kingdom of Swaziland is the smallest country in the SADC region, occupying 17,364 square kilometres of which 20% is arable. In

2002, commercial farming contributed more than 81%, while small-scale farming contributed at least 11% of the GDP. Swaziland has a dual agricultural economy like the current one in South Africa. According to the FAO Swaziland Agricultural Development Project (2012:2), small-scale farming is crucial in many communities because of the high poverty rate within predominantly rural communities and also the current challenge of food insecurity.

According to the Ministry of Economic Planning and Development (2012), the accelerating rate of urbanization has led to an increase in the consumption of genetically modified food rather than locally produced foods which are healthier. Furthermore, the Ministry of Economic Planning and Development (2013) notes that 70% of the Swazi population work on land that is in a trust (Ingwenyama) managed by the King of Swaziland. From land owned by Swazi small-scale farmers, 60% of the income is generated from the cultivation of crops and the rearing of livestock.

3.3.2.2 Local practices

Farmers engaged in small-scale farming are mainly heads of homesteads and have little to no education. They rely on farming techniques passed down from their forefathers (Central Bank of Swaziland, 2014; World Fact Book, 2005). The following farming methods are widely informed by indigenous knowledge which maintains food security.

The process of harvesting maize involves planting selected maize seeds in the fields. The crops are then harvested manually and sorted into baskets, stored for drying on a maize crib (umsisi) and exposed to the sun for ventilation. The maize crib is placed in high areas to prevent livestock from eating the crops (Dlamini, 2007:51).

Various animals have been identified as important for subsistence farmers. The first is cattle, which are used for ploughing, producing manure (used for fuel and floor polish), food and traditional attires. Cattle are also used to graze, which is known as *kukhokha tinkhomo impunga.* The second animal is donkeys which are used for transportation as well as draught power. Finally, chickens are used as meat and for their eggs. Chickens were normally prepared for special visitors and the head of the family (Dlamini, 2007:91).

Medicinal treatment for livestock makes use of various remedies. The first is the lubozana tree that is used to treat mouth blisters; the second is oil hippotamus that is used to stimulate breeding; and lastly, applying the ash from snails to cattle eyes to treat infections (Dlamini, 2007:95).

The Marula tree is mostly harvested around February every year when the fruits are picked up from the ground. The collecting of the fruits is done mainly by women in the Lubombo region. The Marula fruit has various uses, from brewing beer (buganu) to applying its oil to minimize stretch marks during pregnancy (United Nations Development Programme, 2013:4).

3.3.2.3 Challenges and successes

Since the 1980s, Swaziland has been experiencing hydrological disasters such as droughts, which have negatively affected production and food security (Mlipha, 2015:24). According to Warren (1991), there has not been adequate research and systematic recording of the local knowledge. This has led to the knowledge becoming extinct.

Furthermore, the Agricultural Production Report 2004-2006 by the Ministry of Agriculture and Cooperatives found that modern farming practices are more supported than indigenous practices which are undermined as they do not offer the same economies of scale. Traditional farming practices are viewed as outdated and unproductive (Goering, 2004:2; Yonge Nawe Environmental Action Group, 2005:1).

According to Dube and Musi (2002:10), the lack of small-scale farming can be attributed to the shortage of farming land due to the vast spaces used for commercial farming. This has led to very small land spaces being used to harvest, which impacts the farmers negatively as they are not able to harvest more than one crop.

On the positive side, according to the United Nations Development Programme (2013:4), most household practices are conducted by women and this has empowered them to manage resources and provided them with opportunities to be local producers for commercial purposes. Small-scale farmers have the advantage of selling fresh produce at a cheaper rate than commercial farmers. They also avoid having to sell through a middleman, like supermarkets. This fosters an element of local economic

development amongst the community (Goering, 2004:2; Yonge Nawe Environmental Action Group, 2005:7).

3.3.2.4 Current policy interventions

- Agricultural policy of 1968

According to Mlipha (2015:20), the Agricultural Policy of 1968 was developed to provide a framework for small-scale farmers to achieve food self-sufficiency so that they could be empowered to become semi-commercial farmers. This policy encouraged diversification of practices, even though it could not guarantee a commitment to addressing hunger.

- Swaziland Agricultural Development Programme (SADP)

The Swaziland Agricultural Development Programme was established in 2007/2008, in response to small-scale farmer challenges. The programme provides funding opportunities to small-scale farmers, to ensure that special farming practices and techniques which may sometimes be based on local knowledge are identified, tested and documented in response to agricultural challenges (FAO SADP Mid-Term Evaluation Report, 2011:17).

- Centre for Indigenous knowledge for Agriculture and Rural Development (CIKARD)

The CIKARD is focused on ensuring that local knowledge of small-scale farmers is collected and preserved. This is an international organization which collects documents and disseminates local knowledge pertaining to agriculture and rural development (Dlamini, 2005:36).

Furthermore, the Malkerns Research Centre was established in 1959 and the Agricultural Research Division in 1982 to focus on providing extensive support to small-scale farmers. The Centre is supported by the national government of Swaziland and has a specific focus on wheat, tobacco, cowpea, entomology and cotton production (Dlamini, 2005:56).

- FAO's Awareness Creation of Conservation Agriculture Project

The Swaziland government has engaged with several international agencies - including FAO - to support agricultural conservation for small-scale farmers. This is to

ensure that traditional crops are cultivated to achieve food security. The programme ran for 20 months from 2003 to 2005 to provide resources to small-scale farmers (FAO, 2000).

3.4 CONCLUSION

This chapter analyzed the international perspective of local knowledge in small-scale farming. The chapter discussed the history of small-scale farming. Local practices in medicine, agriculture and livestock were investigated on an international and regional scale, with a focus on South-East Asia and SADC countries. Policy interventions, as well as the successes and challenges of local practices, were explored. The subsequent chapter will provide a South African perspective on small-scale farming.

CHAPTER FOUR - SMALL-SCALE FARMING IN SOUTH AFRICA

4.1 INTRODUCTION

The following section will provide an in-depth analysis of small-scale farming in South Africa. The chapter firstly focuses on the historical and the current context of local knowledge in small-scale farming. Secondly, it presents a discussion on the current systems involved in the management of agricultural knowledge, as well as the role of local knowledge in small-scale farming. Thirdly, it provides examples of small-scale farming practices in South African local communities. Finally, it discusses limitations of local knowledge in small-scale farming.

4.2 SOUTH AFRICAN CONTEXT OF LOCAL KNOWLEDGE IN SMALL-SCALE FARMING

4.2.1 History

This section explains how indigenous knowledge was central to small-scale farming in South Africa during both the pre- and post-apartheid eras and explores the state of small-scale farming in the current democratic dispensation. A substantial amount of research has been conducted by academics and historians in identifying the role of agriculture in the development of the South African economy. Remarkable contributions include those of Chirikure et al. (2016:103) and Randall (1972:47).

The African farmers who first settled in the southernmost part of Africa were Bantu-speakers. These people relied heavily on hunting, crop cultivation and livestock farming for survival. According to South African History Online (2012), human ancestors stopped relying on hunting and resorted to farming and the gathering of food about 10 000 years ago. Farming has always been central to the African economy, even during the Iron Age, as the stable provision of food (vegetation, meat and milk) and clothes from the animal's skins. According to Chirikure et al. (2016: 103), crop production and animal husbandry were introduced to southern Africa by the Bantu people during the migration process in the first millennium AD.

Ancestral Bantu farmers relied on indigenous knowledge to enhance the output capacity of their crop production. With no exposure to modern technology and chemicals, they could protect their crops and safeguard the health of their livestock for many years. They chopped down trees and tall grasses and burnt them to use as

fertilizers for their crops, a technology known as “slash and burn”. According to South African History Online (2018), the early African farmers used iron to make spear tips - for hunting, hammers, hoes and axes. They also made ornaments and jewellery from iron and copper. They searched for iron ore in rocks found in many parts of Africa. The first farmers mined the iron ore and figured out how to turn the ore into liquid metal through a process called smelting. The farmers made smelting furnaces - a closed structure to heat the rocks to a high temperature to turn them into a liquid. Skilled men would take the liquid iron and shape it into tools and weapons. The indigenous black farmers made clay vases to store water for watering their crops and feeding their animals. They also made plates out of clay and clothes and shoes out of animal’s skin and relied on livestock (cattle) for wealth status and the paying of dowries, also known as lobola (South African History Online).

The process of land dispossession started with the arrival of the Dutch East India Company (DEIC) at the Cape in 1652 and continued for years after. The Dutch first came into contact with the Khoisan when they arrived in the Cape (Oliver et al., 2017:2). The intention of the DEIC was to set up a halfway post to supply meat, fruits and vegetables to ships travelling from Holland to Java and the Indies. The DEIC recognized the Khoisan as sovereign groups with whom there was a need to create peace and friendship, as most of the meat supplies to the ships came from the Khoisan population. The Company was opposed to interference with local communities and against colonial occupation because it was a private corporation rather than a colonizing state (Chirikure et al., 2016:129). The DEIC developed its commercial agriculture in the Cape by producing oranges and lemons which were necessary for the prevention of scurvy on long sea voyages.

The company allowed some of its workers to do farming solely for supplying the ships traveling to Batavia and India. This development over time led to the encroaching on land used by the Khoikhoi and marked the beginning of conflict between the Khoikhoi and the Company. The Khoikhoi perceived land to be a public commodity and not a private entity that could be owned, but when the marking of certain territories for the company workers limited the movement or even access of the Khoikhoi to the land the conflict between the Khoikhoi and the settlers became inevitable (Bester, 2011:13).

The development of commercial farming in South Africa can thus be traced as far back as the 1650s when the settlers developed a thirst for more land and livestock in order to feed their growing demand for food. The repression, dispossession and exploitation happened in various stages; through which wars between the Dutch and the British led to the Cape Colony being seized from the control of the Dutch in 1795 by the British and formally incorporated into the British Empire in 1814. Pogue and Scerri (2016) argue that the period during which colonisation was driven by private companies was now replaced with a broader colonialization which included colonial administrators, settlers and missionaries. This entire process undermined the potential growth of small-scale farming by Africans as arable land was targeted by whites for commercial farming (Ntsebeza, 2007).

One of the most significant pieces of the legislation in the history of land dispossession is the Natives Land Act, No. 27 of 1913. The 1913 Land Act came into effect three years after the declaration of the Union of South Africa and was a response to the pressure from rural supporters of Louis Botha's administration (Thompson, 2001:163). The white farmers were struggling to compete with black farmers due to labour shortages and ended up convincing the government to intervene on their behalf. The African farmers were significantly more productive, and this was perceived as a threat to the Afrikaner farmers as it could result in white-owned farms being bought by black people. The Native Affairs Commission Report of 1903-1905 recognized the success of African farmers as they produced surpluses and were able to buy white-owned farms (Scerri, 2016:161). Many black people were doing so well in agriculture that they didn't find it necessary to work in the mines or for white farmers. Scerri further asserts that the insufficient supply compelled the government to opt for different methods, including passing the Native Labour Regulation Act of 1911, in order to keep black workers in the mines they were working in without terminating contracts or alternative employers from offering them higher wages than those received in their immediate occupations. The Land Act came as a direct response to the concern that white farms were being bought up by African farmers who were generating surpluses. The intention was to abolish the cash tenants' system (also called squatter locations) which was regarded as one of the reasons for the shortage of labour in the mines. The best way to force African peasants to work in the mines was by depriving them of the right to own or rent land.

The Act served as the initial law to cement the territorial segregation and differentiation of rights between blacks and whites. Black people were subjected to occupying only the tribal land and such land could only amount to 7% of all land in South Africa. The main objective of the Act was to legalise land dispossession and declare whites the legitimate owners of the land and this could only be achieved through a law that declared African people landless. The Act prohibited the sharing of crops which was a practice before the Act came into effect: African farmers could sow on the basis of sharing the proceeds of the production. The Act enabled white land owners to terminate contracts with African farmers who could then only work for white farmers in order to sustain their families as the Act had a serious impact on the socio-economic conditions of many African communities (Modise & Mtshiselwa, 2013:6).

According to Thompson (2001:164), the consequences of the introduction of the 1913 Land Act were enormous and unbearable to African small-scale farmers, as their livelihood was virtually lost overnight; before 1913 they used to produce "substantial surplus for the market". Thompson points out that the quality of living declined sharply, such that many children died in the first few months after birth and malnutrition was common amongst the African people. The entire systematic attack on African farmers led to the reservoir of exploitable African labour which could work for white commercial farmers and in the mines. The African small-scale farmers who used to produce enough to feed their families and supply markets became dependent on white farmers or on mining companies, thus losing their economic independence. This Act proved to be one of the critical cornerstones for the rise of white farmers and the collapse of black farmers. The Act led to a large number of African farmers and their families becoming dwellers on the white-owned farms; this reality has endured even in the democratic era.

The Act had long-term effects of poverty and inequality in the country: black South Africans were left poor and dispossessed as a result of the loss of land which was their main productive asset. According to Moeti (2007:28-29), the inequality was perpetuated through the forceful removal of blacks from their land into overcrowded and marginal areas which later under apartheid came to be classified as "Bantustans",[4] while white-owned farms were subsidised by government and

[4] Bantustans: major administrative device for the exclusion of blacks from the South African political system under the policy of apartheid. Also called "homelands".

continued to enjoy other intervention programmes such as research and development. The country today faces “two agricultures” which is characterized by the separation of agricultural sectors, one being white-owned agriculture and the other being black-owned. The former grew into a large-scale capital intensive industry and the latter, which enjoyed no support from government, remained marginalized, informal, small and limited to household consumption rather than markets.

One of the effects of land dispossession is the low engagement of small-scale activities in households. The lack of access to arable land and the absence of government support compelled potential black farmers to accept employment on large commercial farms, thereby diverting knowledge and skills to farms that could pay better wages.

Attempts to address the legacy of the 1913 Land in the new dispensation have cost the government billions of rands. Dodson (2013) states that by 31 December 1998, the cut-off date for land claims, the government had received 79 696 claims; of the total number of claims, 71 000 were settled through financial compensation totalling R6.5 billion and over 2.87 million hectares were claimed at a cost of R13.9 billion.

4.2.2 Current context of South Africa’s agricultural conditions

According to Jacobs (2012:3), household food insecurity is a challenge in South Africa and mostly affects ordinary citizens, irrespective of their locality. These conditions are a result of unemployment and increasing inflation in food, as well as fuel, prices. There are thousands of small-scale farmers in South Africa, with a significant number of females involved in these agricultural activities. Many small-scale farmers in South Africa are poor and food insecure and still struggle to penetrate the markets or have access to government services.

Hence Mabaya et al. (2011:IV) attest that, “indeed much has been said through the media, political, academia and development forums about the plight and prospects of South Africa’s emerging farmers”. South Africa is characterized by variations induced by factors such as the subtropical climate found in KwaZulu-Natal and some parts of Mpumalanga, the Mediterranean climate of the Western Cape, the summer rain falls and dry cold winters of the central parts found in the Free State and Gauteng, and the double harvesting seasonal friendly landscape found in Limpopo which is

affectionately known as the national food basket (Department of Agriculture, Forestry and Fisheries, 2013:5).

4.3 THE ROLE OF LOCAL KNOWLEDGE IN SMALL-SCALE FARMING

Small-scale farming is one of the vital measures for poverty alleviation, wealth acquisition, improvement of standard of living and self-sustaining resource for black people living in rural areas. Hence Van Schalkwyk, Fraser, Obi and Van Tilburg (2012) argue that small-scale farming can significantly improve the lives of rural farmers. Local knowledge is created by the local people to meet their socio-economic needs such as food and health. Although local knowledge has been perceived as backward and unnecessary in modern society, it has proven to be cumulative knowledge that has been transferred from one generation to another. Small-scale farmers in the rural areas have mostly not been to school and the methods applied in the agricultural activities are not conventional but traditional practices that have progressed and developed over time (Abdullah & Hassan, 2015).

Over and above the fact that local knowledge is locally based and experimental in nature, there are other recognized features of it that have made it the common practice in rural communities. Local knowledge has been recognized as one of the contributing factors to sustainable development. The environmental destruction that is posing a serious threat to human lives emerged mainly from commercial farming, within the context of agriculture, rather than from small-scale farming. Local knowledge has become a reliable tool to advance the process of sustainable farming (Abdullah & Hassan, 2015).

Local knowledge has encountered multiple challenges, like that of being regarded as a culture-centred knowledge rather than scientific in nature and therefore incapable of providing a meaningful solution to the local problems. This misconception about local knowledge can only be expressed by those who have not been exposed to the contribution of local knowledge to the protection of biodiversity - especially given the increasing loss of biodiversity globally - and generation of revenue for local farmers as production meets the local needs. Local knowledge has been applied in the fields of animal and crop production, protection of biodiversity, medicine and human health. According to Hart (2005), local knowledge can be used by small-scale farmers to inform practices that will improve agricultural production and human lives.

A prevailing misconception in academia equates “small-scale farming” with a backward, non-productive, non-commercial, subsistence agriculture that is found in parts of the former homeland areas in South Africa (Kirsten & Van Zyl, 1998). This negative perception often misleads scholars and policy makers alike. The essence and appraisal of local knowledge in small-scale farming cannot be underestimated in this regard.

Local knowledge practices provide a mechanism to understand the different weather conditions of diverse localities. South Africa is an arid land with limited rainfall and some medicinal plants and herbs demand distinctive weather patterns for cultivation.

4.4 TYPES OF LOCAL KNOWLEDGE PRACTICES IN SOUTH AFRICA

Various agricultural practices are informed by local/traditional knowledge which is unique to the locality. Hart and Voster (2006:17) assert that local knowledge is dynamic in nature and has a positive impact on the conditions of small-scale farmers. This section will provide case studies of local knowledge practices on small-scale farms throughout South Africa. These showcase how local knowledge contributes to small-scale farming and varies in terms of farming, harvesting, preserving and sustaining practices. The case studies are not presented in any order of priority.

- Protecting Sorghum (amabhele) seed heads – Msinga, KZN

Sorghum is believed to have originated in Ethiopia and spread over the world. Sorghum is widely used for making traditional beer. The sorghum seed, however, is vulnerable to damage from birds and this led to local households developing a protection mechanism: wrapping the seed heads with grass and at times even cloth to ensure that birds do not disturb crop production and productivity. Bird pest control measures such as covering seed heads have helped to maintain crop production and yields (Alcock & Letty, 2005:4).

- Pruning of pumpkin plants to maximize yield – Nkwalini, KZN

According to Mthethwa (2005:5), in the Nkwalini local community the pruning of pumpkin plants is important to stimulate growth and ensure a high yield. The community encourages that this be done by persons with physical deformities (e.g. extra fingers or toes) as they will also be making a meaningful contribution.

- African vegetables in several sites in South Africa

The harvesting of vegetables can occur in household gardens or fields by planting or even using left-over crops which were not removed. Different parts of plants can be used for foods; these may include roots, leaves, stems and legumes. Even though South African communities consume meat and milk, many rural communities still believe that traditional leafy vegetables such as morogo are a way of life. The knowledge of plants has proven to be gender-based. For example, women may have a superior knowledge of herbs and domesticated crops because they normally take care of activities related to the household or close vicinity of the house, unlike men who engage in hunting and livestock herding and are likely to have more knowledge of trees and medicinal plants. Owing to the distance from rural areas to towns, community members are only able to go to town once a month. This means that they rely on drying leafy vegetables so that the leaves can last to feed the entire family (Vorster, Van Rensburg, Mashele & Ndlela, 2003).

- Local community grazing – Bergville, KZN

The Okhombe community was experiencing grazing challenges due to stock theft and cattle from various households wandering everywhere and causing crop damage. This led to the community deciding to develop a stock management system. The community established a livestock committee in partnership with the traditional authority, contributing R5 per household for the community herders. Cattle posts were built using local materials and the cattle were separated based on the household they belonged too. Based on this developed practice, cattle have been managed and crop yields have improved (Tau, 2005:9).

- Seed selection and storage –Okhahlamba Local Municipality, KZN

A variety of seeds are selected and stored differently in order to ensure that they are protected from pests as well as unconducive weather conditions. The seeds are selected based on their consumption benefits or medicinal benefits and are stored to ensure that they sustain their life cycle. A number of seeds are stored in Okhahlamba Local Municipality to ensure that their crops are viable. The first crop is maize where the corns are de-coned and dried in a sealed container. An effective pest repellent can be paraffin or smoke. The second practice is that of pumpkin seeds being sun dried and stored in a glass bottle to control pests. The final seed is from potatoes where the seeds are either dried outside or ventilated in plastic bags to initiate the germination process (Ndwandwe, 2013:55).

- African ginger

According to the Department of Agriculture, Forestry and Fisheries (2013:2), African ginger is also known as *Isiphephetho* in isiZulu and is mostly found in the Mpumalanga and Limpopo provinces. The process of harvesting African ginger is through the seed being spread on the ground. The plant is used in households for medicinal purposes such as for sedating, for colds and for treating malaria.

- Cancer bush plant

The cancer bush plant is also known as *Lerumo-Lamadi* in Sepedi and *Mokakana* in Setswana. This plant is mostly found in KZN, Mpumalanga, Western Cape and Northern Cape. The plant is usually harvested in spring and the leaves and stem are used to treat cancer and diabetes and relieve stress (Department of Agriculture, Forestry and Fisheries, 2013:4).

- Lemon grass

Lemon grass is grown in the lowveld areas of Mpumalanga, KZN and Limpopo province; it requires a tropical climate with access to high levels of water. There are different household uses for lemon grass. It can be used as a fragrance for making soaps, as a tissue toner, for relieving menstrual troubles (taken with warm water), for nausea and even for cooking (Department of Agriculture, Forestry and Fisheries, 2009:18).

- Treatment of Nguni cattle in Amatola Basin and in the Eastern Cape

Nguni cattle are one of the most common breeds in South Africa; they are able to maintain nutrition through grazing and are well known to adapt to harsh weather conditions as well as diseases. There are a number of plants that are used, especially in Eastern Cape, to treat cattle wounds. The first is aloe which is locally known as Ikhala; the leaves are used to wash and dress wounds. The second is Calpurnia aurea (Aiton) Benth which is locally known as Umbethu Umhlahlampethu; it is used as a lotion dressing for maggot infested wounds (Soyelu & Masika, 2009:395).

- Medicinal herb cultivation

According to the World Health Organisation, “a large majority of the African population makes use of traditional medicines for health, social-cultural and economic reasons. In Africa, up to 80% of the population uses traditional medicine for primary healthcare”

(Human Scientific Research Council, 2018). Traditional medicine is usually cultivated by small-scale farmers and traditional healers (“sangomas”). The herbs and medicinal crops cultivated by small-scale farmers find their way into the economy through the informal sector.

Traditional localized knowledge is often at the core of these small medium enterprises existing in the informal economy. The customers who utilize the traditional herbs and medicinal plants usually reside in urban areas, where land is often scarce and the cultivating of such plants and herbs a major challenge. The rural people also utilize these plants and herbs and usually transmit their experiences orally to the urban population regarding the use and contribution to health and wellbeing of the medicinal plants and herbs.

4.5 CURRENT SYSTEMATIC INTERVENTIONS AND/OR POLICIES IN THE AGRICULTURAL SECTOR: SOUTH AFRICA

This section provides an analysis of the evolution of agricultural legislative frameworks from the 1913 Land Act through segregation and apartheid to the democratic dispensation in South Africa. Then the funding programmes during the apartheid era and since the advent of democracy are explored.

4.5.1 Pre-apartheid legislative frameworks

- Land Act of 1913

The 1913 Land Act marked the period of wide-scale land expropriation and the beginning of separate development in South Africa. The Union of South Africa was established during the year 1910. Prior to this, the Cape and Natal were under the administration of British colonial powers while the Transvaal and the Free State were Boer Republics. The promulgation of the Land Act of 1913 marked the era of wholesale and grand-scale land dispossession which also signified a rupture in agricultural land ownership and the total eradication of African farming.

In terms of the Land Act of 1913, 7.5% of land was reserved for the majority of the population (i.e. black people) and black people were not allowed to get more land outside the tribal areas. Through the separate development policy, the migrant labour system came about; this also negatively contributed to the regressive separate development. The impacts of the migrant labour system were colossal: tribal and

traditional societies were broken up with farms left in the hands of women and children. The role of women and children in farming was influenced by men working in mines because farming was no longer sustainable.

- Native Trust and Land Act of 1936

During the year 1936, provisions were made for the allocation of extra land to black people who were designated to tribal areas. The Native Trust and Land Act of 1936 allocated an extra 5.5% of land to black people through the South African Native Trust. Black tribal communities and individual black Africans were allowed to purchase land released through the Native Trust and Land Act of 1936. This particular policy shift did not have any progressive implications because the land that was allocated to these tribal areas was generally not conducive to agricultural activities, as fertile land was already in the hands of white farmers. The South African Native Trust Act of 1936 imposed systems of control over livestock and also introduced the division of arable and grazing land, and enforced residential planning and soil conservation measures. Nonetheless, the commercial white farmers received the majority of support while the black farmers were left to fend for themselves.

- Agricultural Marketing Act of 1937

Prior to 1998, the marketing of agricultural products in South Africa was extensively regulated by both the colonial and apartheid administrations. Vink et al. (2002:3) point out that one of the main characteristics of the Marketing Act was the establishment of institutions such as control boards, grain trading firms and brokerage firms that maximized the participation of farmers in the market with high certainty minimal costs. Most products were regulated under the 22 marketing schemes introduced from 1931 and especially from the time of the 1937 Marketing Act. In addition, commercial farmers benefited from a wide range of support services from the State (research, extension), as well as direct and indirect subsidies.

4.5.2 Apartheid laws and the continued subjugation of African farmers

- Subdivision of Agricultural Land Act of 1970

The Subdivision of Agricultural Land Act, 70 of 1970 (hereafter “the Act”), was enacted on the 2nd of January 1971. Although the Act was repealed by the Subdivision of Agricultural Land Act Repeal Act, 64 of 1998, the former Act was never implemented

by the apartheid administration. The Act sought to regulate actions on agricultural land through preventing the dividing of portions of farming land, as well as prohibiting the sale or transfer of land without approval from the Deeds Office (Subdivision of Agricultural Land Act, 1970).

The inhumane apartheid policies were subject to global pressure, with South Africa being sanctioned in order to mitigate the egregious realities faced by the majority population. In the process of its implementation, the Subdivision of Agricultural Land Act of 1970 gave rise to a plethora of litigation and its provisions and the court decisions given in terms of it have been cited, noted, referred to, applied and distinguished in more than 40 reported cases of the High Courts.

- White Paper on Agricultural Policy tabled in 1984

According to Vink et al. (2000:4), the policy was formulated after the agricultural sector in South Africa experienced serious decline and financial losses between 1970 and 1985; its objective was to support “white” commercial farmers by ensuring that socio-economic and political conditions favoured the farmers in the country. To maintain the hegemony of white commercial farmers in the sectors, wheat, maize and dairy farmers enjoyed protection from foreign competition and received direct state subsidies.

At the height of international sanctions against South Africa in the 1980s, the country wanted to develop a self-sufficiency model for sustainable farming and food security. Hendriks (2013:2) writes that “The 1984 White Paper on Agricultural Policy (RSA, 1984:8–9) motivated this as follows: ‘For any country, the provision of sufficient food for its people is a vital priority and for this reason it is regarded as one of the primary objectives of agricultural policy. Adequate provision in this basic need of man not only promotes, but is also an essential prerequisite for an acceptable economic, political and social order and for stability.’”

- Agricultural Resources Act, 43 of 1983

The Agricultural Resources Act, 43 of 1983, provides control over how natural agricultural resources are used, in order to promote the sustainability and conservation of water, the soil and vegetation which directly affect agricultural productivity (Agricultural Resources Act 1983:1).

Due to the sanctions and lack of global support for the apartheid government, South Africa was forced to develop contingency mechanisms which were meant to protect and preserve the agricultural sector. These, however, did not include the black farmers in the homelands. Schemes and grants were in place to assist large-scale farmers to construct conservation works, reduce animals in the event of droughts, plant crops or even receive weed killers to control invader plants. Hall (2010:103) asserts that the Act not only became a catalyst in supporting and growing large-scale farming but also shaped the articulation of modes of production by advancing a pro-capitalist mode of production which strengthened the rights of landowners to the detriment of labourers and tenants.

4.5.3 Post-apartheid policy developments in the agricultural sector

Beginning two decades ago, the industry faced increasing pressures for land reform as a result of the apartheid policies which were in place to benefit a minority at the expense of landless people. In an attempt to redress the historical problem of landlessness, the new government rolled out a series of land reform and restitution programmes from 1994, aiming at distributing 30% of overall agricultural land to the black people. Another major development from 1994 was the extensive deregulation of state agricultural marketing schemes within the framework of the marketing act of 1968. In 1993, the transitional government borrowed $850 million from the International Monetary Fund (IMF) and as such the government had to accept a particular set of economic and fiscal reforms (Terreblanche, 2002). According to Terreblanche, the pressure for economic and fiscal reforms also came from the World Bank, Western governments and global corporations.

- Constitution of the Republic of South Africa 1996

The constitution of the Republic of South Africa (1996:11), provides for food security and guarantees its citizens the right to have access to sufficient food and water, and that “the state must take reasonable legislative and other measures, within its available resources, to achieve the progressive realisation of the right to sufficient food”. The right to sufficient food complements the right to healthcare, water and social security. According to a Statistics South Africa (STASSA) report, 30.5 million South Africans are living in poverty and are susceptible to food insecurity; 1 760 946 households had

gone hungry in 2016. Expanding small-scale farming for subsistence to more urban areas can help alleviate the threat of food insecurity (Oxford, 2018).

- Genetically Modified Organisms Act (No 15 of 1997)

The act aims to provide for measures that:

- ✓ promote the responsible development, production, use and application of genetically modified organisms;
- ✓ ensure that all activities involving the use of genetically modified organisms (including importation, production, release and distribution) shall be carried out in such a way as to limit possible harmful consequences to the environment;
- ✓ give attention to the prevention of accidents and the effective management of waste;
- ✓ establish common measures for the evaluation and reduction of the potential risks arising out of activities involving the use of genetically modified organisms;
- ✓ lay down the necessary requirements and criteria for risk assessments;
- ✓ establish a council for genetically modified organisms;
- ✓ ensure that genetically modified organisms are appropriate and do not present a hazard to the environment; and to establish appropriate procedures for the notification of specific activities involving the use of genetically modified organisms; and
- ✓ provide for matters connected therewith (DAF, 2018:22).

There is no agreement on GMO practices in South Africa, particularly with regard to biosafety issues. The problem is exacerbated in that there are limited levels of research and scientific capacity in the country to assess impacts and/or track progress. The significant growth in organic agriculture globally is evidence of the global commitment to environmentally sustainable food production. Small-scale farming is increasingly gaining proponents due to its organic nature. Creating sustainable value chains within the small-scale farming sector can help reduce the use of GMOs.

- Integrated Food Security Strategy of 2002

The Integrated Food Security Strategy aims to ensure that food insecure groups in South Africa:

- ✓ gain access to agricultural productive resources;
- ✓ this can be achieved once the government of the day puts emphasis on the role of local knowledge in enriching small-scale farming;
- ✓ gain access to income and job opportunities to enhance their power to purchase food
- ✓ this can be achieved by creating a sustainable value chain in agricultural production to create job opportunities for small-scale subsistence farmers and the local communities where farmers reside;
- ✓ are empowered to eat nutritious and safe food.

With the rise of genetically modified agricultural practices that are a risk to human health due to poor nutrition, organic farming is the route to good nutrition and safe food. Genetically modified agricultural practices are led mainly by multinational corporations seeking to make agriculture more lucrative for themselves. The dominance of multinational corporations in agriculture has pushed small farmers out of the industry on account of large food imports that are cheap and impossible to compete with. With South Africa having 30.5 million people living in poverty, the population is susceptible to the consumption of a cheap and unhealthy diet due to the perceived high cost of organic food, mostly produced by local farmers. South Africa needs locally based organic agricultural models in order to meet the objectives of the Integrated Food Strategy. To curtail rural poverty and hunger, South Africa needs to shift from importing cheap food and expensive fertilisers and pesticides, instead empowering small-scale farmers by ensuring that they have access to state provided relief measures - short to medium-term - on a sustained basis. Depending on the nature of the interventions, these state-led measures to alleviate food insecurity can help destitute, disabled and marginalized groups receive the attention that is needed to develop their localities and, more importantly, provide an environment that will be conducive to social cohesion.

- Food Insecurity and Vulnerability Information System Management (FIVISM)

Through the FIVISM, the agricultural sector in South Africa will be able to provide continuous monitoring and evaluation of food security and nutrition status in the country. This will also broaden the work done by Statistics South Africa (STATSSA).

- Disaster Management Act, 57 of 2002

The Disaster Management Act, 57 of 2002, defines the roles of local authorities and provincial and national government in disaster management. The Disaster Management Act focuses on fast-tracking the response times to natural disasters and ensures that natural disasters are dealt with efficiently and effectively by providing clear guidelines for the classification of disasters and the declaration of a state of disaster. In simple terms, the Disaster Management Act is about all spheres of government, all sectors within government, communities and businesses working together to reduce the risk of disasters and to ensure that arrangements are in place to minimize the impact of disasters on communities.

The aim of the disaster management act is to

- prevent or reduce the risk of disasters;
- take measures to reduce the impact or consequences of a disaster;
- promote emergency preparedness;
- provide for rapid and effective responses to disasters; and
- ensure post-disaster recovery and rehabilitation.

With regard to small-scale farming, environmental challenges like drought and poor rainfall can be addressed through programmes such as rain harvesting, utilising the disaster management act as a guide and standard to follow. The act can be used to also address the challenge of food insecurity because the current situation, with almost 2/3 of the population living in poverty, proves to be a disaster with malnutrition on the radar of many poor communities in the country.

The Agricultural Drought Management Plan (ADMP) can also be used with the Disaster Management Plan. The ADMP of the Northern Cape, for example, aims at an “effective and integrated drought management system for the plant, animal husbandry

income system where the negative impact of drought has been minimized through sustainable use of natural resources" and outlines the vision and strategic objectives pertaining to drought risk management, the implementation guidelines of the plan and the challenges faced within the new dispensation and a new approach to drought risk management (ADMP, 2007:6). In addition, drought management will be enhanced through the implementation of water storage initiatives, water transfer and hydropower infrastructure, agro-processing, tourism and forestry projects (Baloyi, 2007).

- Indigenous Knowledge Systems Policy in 2004

During the year 2004, the South African cabinet adopted the Indigenous Knowledge Systems (IKS) Policy. The National Research Foundation of South Africa notes that the intention behind the adoption of the IKS policy of 2004 is to promote and support research of indigenous knowledge systems and their role in the development of local communities. The ultimate objective of the policy is to contribute to the sustainable economic development of the African continent in general, with a particular focus on South African indigenous knowledge systems.

It is worth noting that the exploration of indigenous knowledge systems within the field of agriculture is necessary for sustainable farming, food security and the reduction of unemployment in rural communities, given that indigenous practices are common in rural communities and can serve as alternative sources of income. These systems of knowledge have been utilized since time immemorial, although evolving and adapting to new environmental and economic conditions, and have been able to sustain crop production and livestock rearing for years without conventional farming practices. The South African cabinet through parliament adopted the IKS policy of 2004 with the aim of recognising, affirming, promoting and protecting the development of indigenous knowledge in South Africa.

4.5.4 Pre- and post-apartheid funding models and subsidies

A number of schemes were established in the 1970s to ensure that resources were at the disposal of farmers to increase production. Resources were in the form of land, credit with low interest rates through the mediation of parastatals, subsidies and access to the market.

The apartheid government provided extended support to white farmers in South Africa. Between the period of 1981 to 1984, the agricultural sector largely benefited from the income tax concessions that assisted them in purchasing assets. This led to a growth of investment in the sector (Kirsten, Van Zyl & Van Rooyen, 1994:31).

The dawn of democracy was characterized by the new government seeking to restructure the agricultural sector within the neoliberal framework which informed broad macroeconomic planning. South African agricultural policy was out of sync with that of other countries, even within the context of a largely neoliberal global economy. International competition led to the South African government reducing import tariffs. The neo-liberal approach of government and free trade in most agricultural products caused a shutdown of small-scale farmers who are primary manufacturers (Helliker, 2013:6).

The late 1990s were challenging to the agricultural sector due to the significant reduction of major state support such as interest rate subsidies in 1997 and export subsidies in 1998. However, an effort was made to control prices through the South African Futures Exchange by managing risk for farmers to stabilize prices (Helliker, 2013:7).

The Department of Agriculture, Forestry and Fisheries (DAFF) established a Subsistence Farming Directorate which is focused on promoting household food production in order to achieve sustainability as well as food security. By the 2017/2018 financial year, more than 94 438 households had been receiving household support (DAFF 2017/18 Annual report, 2018:53).

4.5.5 Government Interventions and programmes: post-1994

- Agricultural Economic Research and Analysis Programme

Research is a tool used for two main purposes: first, to gather information and learn something; and second, to draw conclusions and provide evidence regarding the particular aspect investigated. The Agricultural Economic Research and Analysis Programme provides timely, accurate and relevant agricultural economic and statistical information on a quarterly basis to inform decision making on production by all participants in the agricultural sector. Information provided includes monthly crop forecasts and the quarterly livestock estimates; the quarterly monitoring report on the economic performance of the agricultural sector; the quarterly agricultural economic

review and forecast report; the monthly food security bulletin; the quarterly crops and markets report; the weekly price watch; the annual Africa Economic Review and Outlook; and the economic review of South African agriculture (DAF, 2008:73).

Sender (2014:12) argues that the South African government has not provided adequate research and development support that could help the agricultural sector increase its output. According to Sender there has been a decline in the number of agricultural scientists employed in South African institutions over time and the total research and development (R&D) expenditure declined between 2007 and 2010.

- Farmer Support Programmes

The Farmer Support Programmes provide support for sustainable economic development in order to sustain adequate on-farm incomes which promote stability, competitiveness, growth and transformation of the agricultural sector. These programmes include, amongst others, the Broadening of Access to Agriculture Thrust (BATAT) and Comprehensive Agricultural Support Programme (CASP). BATAT was initiated by the National Department of Agriculture and focused on agricultural development in line with the Reconstruction and Development Plan (RDP) and was supposed to create support for black farmers and improve the access of the historically excluded farmers to agriculture (Vink et al., 2012). When BATAT could not succeed in what was the primary objective of the programme, CASP was created in 2004 to target the beneficiaries of land reform.

The Comprehensive Agricultural Support Programme is a conditional grant raised by national government in order to supplement provincial funding. The programme aims to ensure accelerated delivery of support services to farming communities. CASP focuses on six key pillars. These are:

- ✓ on and off farm infrastructure;
- ✓ training and capacity building;
- ✓ technical advisory and assistance;
- ✓ marketing and business development;
- ✓ information and knowledge management; and
- ✓ financing mechanisms.

- Micro Agricultural Financial Institutions of South Africa (MAFISA)

In July 2013, the Department of Planning, Monitoring and Evaluation, in collaboration with the Department of Agriculture, Forestry and Fisheries, commissioned Business Enterprises at University of Pretoria (Pty) Ltd in collaboration with the Centre for Inclusive Banking in Africa and Infusion Knowledge Hub (Pty) Ltd to conduct an impact study of MAFISA. This took place between July 2013 and October 2014 (Department of Planning, Monitoring and Evaluation, 2016).

The agricultural sector in South Africa went through a major transition during its liberalisation phase which began in 1992. This resulted in reduced state support to the agricultural sector. By 2003, the state found that financial services to smallholder farmers were inadequate, that farmer support was neglected in the budgetary process, and that there was a need to re-establish an agricultural credit scheme in the Department (Department of Planning, Monitoring and Evaluation, 2016).

In 2004 the Comprehensive Agricultural Support Programme (CASP) and MAFISA were implemented in order to meet government's overall commitments towards social uplifting of the people in their local communities. These agricultural support programmes aim to benefit both farm and non-farm beneficiaries such as farm workers, household producers, small-scale land owners, food garden producers and rural and micro-entrepreneurs.

- Accelerated Shared Growth Initiative (ASGISA)

In line with the micro-economic reform strategy and the interrelatedness of national government departments in South Africa, the Accelerated Shared Growth Initiative (ASGISA) was developed in order to "promote opportunities for participation of marginalized communities in the economic activities of the country, and improve the quality of livelihoods of the poor" (ASGISA, 2007:2). Agro-processing is one of the key sectors identified by government as having serious potential for growth, employment creation and value addition. With this initiative the government of South Africa aims to focus on the production of finished value-added products and to establish sustainable (post-funding) Small, Micro and Medium Enterprises (SMMEs). The products tend to be high-value goods and create an opportunity to grow the competitive advantage of local communities (ASGISA, 2007:2).

- National Infrastructure Plan

The South African government adopted a National Infrastructure Plan in the year 2012. The plan intends to transform the economic landscape while simultaneously creating significant numbers of new jobs, and to strengthen the delivery of basic services (South African News Agency, 2018). This is done through national investments that aim to improve access to basic services such as healthcare facilities, schools, water, sanitation, housing and electrification. Simultaneously, investments in the construction of ports, roads, railway systems, electricity plants, hospitals, schools and dams will contribute to faster economic growth (South African News Agency, 2018).

The state investment in the creation or rehabilitation of irrigation infrastructure and provision of water, roads, health care institutions and land will contribute to job creation and meeting output and export targets. The National Infrastructure Plan has 18 Strategic Integrated Projects (SIPs) which focus on fast-tracking development. In terms of support to the agricultural sector, the SIP on Agri-logistics and rural infrastructure seeks to improve and expand small-scale farming and rural development through developing processing facilities, building transportation links which connect to various networks and funding adequate research and development of rural issues (Presidential Infrastructure Coordinating Commission Report, 2012:21).

- National Development Plan

Chapter 6 of the National Development Plan (NDP) addresses what is termed “inclusive rural development”. The NDP regards agricultural development as an important driver of rural economic development. The Plan envisages the creation of 1 million jobs in this sector by improving the historically neglected areas such as financial support for land reform beneficiaries.

Sender (2012:102) sharply critiques chapter 6 of the NDP which focuses on integrated and inclusive rural economy, arguing that it is a poorly designed plan that doesn’t give a clear response to how the integrated and inclusive rural economy will deal with the structural problems of lack of agricultural subsidies for small farms and demotivation of small-scale farmers. Sender further argues that generating 40 000 jobs from the envisaged 25 000 small-scale farmers is wishful thinking. He calls these statements “rural populist rhetoric”. Unfortunately, the government hasn’t been able to provide a concrete plan or strategy to have even 25 000 small-scale farmers supported to create

jobs under the kind of conditions that currently seem to be demoralizing small-scale farmers.

Agricultural development and the capacitation of small-scale farmers are often overlooked by policy makers and under-researched and under-investigated. Various challenges, such as the lack of direction in agricultural research and the mere fact that small-scale farming remains a low-tech industry, give the impression that the sector does not have much to contribute to the agricultural sector as a whole. This has led to the formulation of policies which do not support or protect small-scale farmers. Community members and rural farmers must be the drivers of research and development needs to ensure that the outcomes of the research process provide concrete answers to the needs of small-scale farmers.

4.6 THE LIMITATIONS OF LOCAL KNOWLEDGE IN SMALL-SCALE FARMING IN SOUTH AFRICA

Various limitations have emerged in South Africa which affect local knowledge in small-scale farming. Some limitations may be due to specific internal and external factors. They are:

- Limited land

The inequalities in access and rights to land in South Africa yielded socio-economic challenges amongst the black communities. Lee (2013:3) asserts that “since 1913, the inequalities and discrimination on access to land as well as the prohibition of black people from owning the land have contributed significantly to the socio-economic challenges faced by blacks. The land question in South Africa has revolved around the major inequalities in access to and rights over land between the black majority and the white minority of the population”. Dispossession of land farmed for survival by black people by white settlers led to black people constantly fertilizing farming grounds for the whites to plunder. South African History Online (2011) affirms that most black tribes were forced off their land over the years and had to continually resettle.

This constant relocation diminished the appetite for small-scale farming amongst black people and propelled them to offer cheap labour on whites’ farms as a survival mechanism. The education of Africans was generally poorly structured, underfunded and left to the mission institutions; later - in 1953 - the central government under Verwoerd sought to devalue the education of a black person through the Bantu

Education Act (Act No. 47 of 1953). These actions, in addition to the dispossession of land from African farmers, deepened the socio-political crisis the black communities were already facing. Modise and Mtshiselwa (2013) assert that the exclusion of black people from all possible drivers of development was done deliberately to position a black person as inferior to any white person. The impact of these iniquities on the African communities was exactly what small-scale farmers were faced with.

The characteristics and challenges of small-scale farming are uniform across the African continent. This is mainly due to the small pieces of land owned by peasant farmers. According to Ali (2005), limited land area is the primary disadvantage in small-scale farming, because the majority of farmers have limited land size. Jayne, Mather and Mghenyi (2010) as cited by Ali (2005:11) argue that "limited landholding is evident in Southern African countries such as Malawi where 70 percent of smallholders possess less than one hectare of land. The situation is almost the same in South Africa, where average landholdings for smallholder farmers range from 0.5 to 1.5 hectares per household".

The land owned by black farmers mostly ranges from a quarter hectare to 5 hectares. This is a result of colonial laws and apartheid legislation that left African farmers landless. These small pieces of land have been farmed for centuries and decades and by now they are barren, infertile and bare. Ballabh (2007) posits that small-scale farmers enter a vicious cycle when they farm on the same small piece of land which has been farmed for decades before them, and yet expect the same crop outcomes. This engenders an unfounded lack of confidence in the worth of indigenous knowledge farming. There is hardly crop rotation in small-scale farming, as farmers practise monoculture - producing the same crops over the years.

Access to land is also limited where land is under the control of chiefs. There are processes to be followed before one can be given a piece of land for either farming or settlement. Not everybody in the rural communities finds these processes fair, transparent and legitimate. Maponya and Mpandeli (2014:7) posit that small-scale farmers in rural areas acquire land through the local chiefs and that "local chiefs are responsible for land allocation and this has caused some discomfort amongst some farmers due to nepotism and favouritism". This procedure serves as a barrier against

small-scale farming at local communities and consequently discourages agricultural entrepreneurs to continue farming.

- Poverty

Poverty is one of the forces intensifying underdevelopment in as far as small-scale farming is concerned. Attesting to the latter view, Modise and Mtshiselwa (2013:6) argue that an inquiry into the impact of land dispossession of black South Africans on their poverty is pertinent. Black South Africans depended on the land for farming, which yielded the daily bread for their families. Dispossession of their lands resulted in their losing their primary source of survival.

Ntsebeza and Hall (2007:3) assert that the loss of land amongst black South Africans became a huge contributing factor to poverty in South Africa and that this was due to the 1913 Land Act. Up until 1913, African farmers were self-reliant through engaging in small-scale farming for sustainability and also developed trading systems such as bartering whatever surplus they had. The capitalist colonizing powers brought in a monetary economy which killed bartering - the trade mode mostly understood by black people (Modise & Mtshiselwa, 2013:6-7). This prevented black farmers from continuing to engage in small-scale farming and forced them to look for jobs on the white farms in exchange for wages.

The relationship between poverty and agricultural production can also be considered in the context of the lack of support for small farms that used to provide sufficient food for households. The role of local knowledge in food security has to be recognized in terms of its contribution to small-scale farming and food security.

4.7 CONCLUSION

This chapter provided a contextualization of South African small-scale farming. Agricultural conditions have changed over time, due to the history of South Africa. Various policies were established during apartheid which were replaced with certain reforms under the democratic government with systematic interventions. A number of South African small-scale farming practices are peculiar to certain localities.

Support for small-scale farmers has mainly been articulated on paper and announced in public gatherings, but concrete measures to support and improve the conditions of

farmers - particularly in rural communities - have not materialized. Small-scale farmers need support to protect their knowledge and distribute their produce.

CHAPTER FIVE- FINDINGS AND ANALYSIS

5.1 INTRODUCTION

The following section provides an in-depth analysis of the findings that emerge from the literature reviewed and from contact with ordinary small-scale farmers. The crux of the analysis is the research question that inspired the investigation. The aim was to develop a detailed understanding of local knowledge in small-scale farming and what this entails for the local system of innovation.

5.2 THEMES: LOCAL KNOWLEDGE IN SMALL-SCALE FARMING

Through the literature reviewed it transpired that the contribution of local knowledge to small-scale farming is colossal. Small-scale farming depends and thrives on the generation, utilization and dissemination of local knowledge, which in many instances is embedded in local communities. At this point the overall findings of this research project will be presented based on the following structure: firstly, understanding local knowledge utilization within small-scale farming; secondly, the role of local knowledge within small-scale farming; thirdly, a review of the role played by government with regard to sustaining small-scale farming with a specific focus on sustainable agricultural practices generally and sustainable development in particular; lastly, an analysis of the socio-economic challenges confronting small-scale farmers followed by the success stories in the small-scale farming economic cluster.

5.2.1 Understanding local knowledge in the context of small-scale farming

The system of small-scale farming incorporates complex applications of local knowledge. Seldom does government policy acknowledge the role played by small-scale farmers in relation to food security and local economic development. Small-scale farming innovation systems involve applying local knowledge, integrating scientific knowledge and creating alternative means of managing resources and overcoming local challenges. Farmers have the capacity to innovate and not merely implement others' innovations or be receivers of external concepts as though they are incapable of developing their own solutions. The systems of innovation incorporated by small-scale farmers encompass the deployment of valuable local knowledge in the raising of livestock and the cultivation of a variety of crops, plants and herbs.

The systemic nature of the agricultural sector calls for a deeper analysis of the contributions of local knowledge to small-scale farming and the reasons behind the thriving nature of small-scale farmers from generation to generation. Hart and Vorster (2006:17) assert that local knowledge is dynamic in nature and has a positive impact on the conditions of small-scale farmers. The contribution of small-scale farming to local economic development is often overlooked and negatively associated with poverty.

In many instances the term “small-scale farmer” is associated with poor resource endowment and peasant farming for subsistence living. One of the main attributes of small-scale farmers is that they rely on technologies which appear outdated. Women and children, for instance, play a vital role in this sector and continue to be the bearers of local knowledge. The human capabilities embedded in this stratum of society cannot be underestimated because local knowledge thrives on oral transfer and through interacting with women and children engaged in small-scale farming. These factors continue to shape the evolutionary paths of local systems of innovation in response to a changing eco-system (environmental, economic and political). The development of local knowledge in agriculture has suffered considerably from the disruptions of South African history, especially the great dispossession of 1913, and this loss still has to be addressed comprehensively through policy design and implementation.

5.2.2 The role of local knowledge in small-scale farming

The literature indicates that the role played by local knowledge in small-scale farming is to provide communities with the ability to develop special techniques and strategies in response to their local conditions and more particularly food security. Local knowledge ensures that households are able to survive and lead healthy lives. These means of survival through the incorporation of local knowledge in small-scale farming have the potential to ensure that households are able to continuously improve their lives and contribute to the overall human capabilities formation.

Local knowledge and practices are predominantly tacit and undocumented, relying on oral transmission which can be at risk of getting lost. It is imperative for local knowledge to be codified, so that it can be protected, studied and communicated to

emerging farmers who may need the knowledge. Some of these small-scale farming practices include protecting sorghum seeds, pruning pumpkin plants to maximize yield, cultivating vegetable crops in several localities simultaneously, grazing local community livestock (free range livestock), selecting and storing seed, and cultivating medicinal herbs and plants for both animals and humans, e.g. lemon grass, African ginger and cancer bush.

5.2.3 The level of state intervention regarding the development and sustainability of small-scale farming

During the 1970s and 1980s, the apartheid government provided support to white farmers through subsidies, preferential financing, price setting and tariff protection to boost agricultural outputs. The apartheid government ensured that markets were protected so that small-scale farmers were able to be contributors to the economy.

Promoting small-scale farming within various localities - both urban and rural - can initiate the implementation of an intermixed farming system. Sustainable development requires a healthy, flourishing human capabilities formation. Small-scale farmers have a critical role to play in advancing food security, protecting the bio-system, promoting economic development and developing sustainable food systems. The role played by local knowledge in eradicating some overarching sustainable development challenges needs to be understood. Local knowledge is what small-scale farmers and food insecure locals possess and it can be enhanced and utilized as a tool for poverty eradication and increased agricultural production. Small-scale farmers also add value to the green economy by applying local knowledge in their agricultural practices.

Policy interventions by the government in South Africa, for instance, aims at guaranteeing food security for its population. Nonetheless, the majority of the population continues to live in abject poverty and the unemployment rate is steadily rising, reflecting an insecure population. According to the South African Cities Network (SACN) (2016:64), competing land interests cannot be left unaddressed for long and should receive immediate attention given that land is a necessary asset for various uses such as economic, justice, environmental and residential.

There are agriculture-related policies and programmes in South Africa, but there seems to be a singular focus on commercial farming while the role that is played by small-scale farmers within industrial agriculture is ignored. Furthermore, municipal agricultural strategies are generic and not responsive to the needs of the community. Small-scale farmers are not adequately supported by government with scientific and technological resources and training. Funding of small-scale farmers continues to be a major impediment in realising the contributions of this particular sector in the agricultural cluster.

5.2.4 The socio-economic challenges facing small-scale farmers in South African communities

Small-scale farmers have a hard time engaging in the economy due to a range of constraints which include: (i) poor infrastructural support; (ii) lack of credit access; (iii) low research and development support; and (iv) the ripple effects of the structural adjustment programmes entrenched in many developing countries. This leads to small-scale farmers not having direct access to markets while being considered the potential driver of rural development and food security. Furthermore, South African communities do not have adequate land to engage in farming activities due to the land dispossession that occurred during the years of colonisation and apartheid. This has had a negative impact on the current spatial orientation of many African communities.

The South African agricultural sector cannot be studied without a grasp of the history of land ownership in the country. The existing literature (Aliber & Hart, 2009:435), suggests that by 2007 commercial farming was situated on 87% of the total productive agricultural land and produced or accounted for about 95% of the agricultural output, while the remaining local farmers and smallholder producers operated on 13% of the productive agricultural land. The reality is that small-scale farmers are left on the periphery when considering the level and propensity of state intervention in this regard. Hence, the exploitation of local knowledge has fallen far short of its potential, with the consequence that local systems of innovation are functioning deficiently.

Land dispossession by whites in South Africa was unique and exclusive compared to other African countries in terms of its scale, magnitude and penetration. The unique

post-colonial era of South Africa, during the years 1913 to 1994, marked a period of land dispossession and expropriation: laws were passed to inflict this particularly egregious act on the original inhabitants on the land. During this period the African indigenous people were restricted to only 13% of land in their home country. This devastated the functioning of the local communities and led to dismal systems of innovation. Progress was a far-fetched ideal for the South African peasantry during this particular period in history.

Bundy (1979:183) explains that prior to 1853 black Africans were self-reliant, economically independent and prospering to the extent that very few black Africans experienced poverty. Bundy further states that black Africans used to trade maize at Cape Town in large quantities and also traded wool on various markets, including the Natal market. All this was prior to the Land Act, 27 of 1913, and the mass-scale dispossession of land from indigenous African people (Bundy, 1979).

5.2.5 Successes of small-scale farming and its potential for development

Small-scale farming has had a number of success stories in South Africa. Firstly, small-scale farming has contributed to environmental sustainability through its organic farming orientation and the lower use of chemicals and genetically modified organisms. Small-scale farming creates a sustainable ecology and contributes to the overall environmental sustainability ideals. Secondly, small-scale farming has promoted healthy and sustainable livelihood strategies that aim to promote healthy consumption of natural resources which is guided by organic food production and reduced use of chemicals in farming processes. Thirdly, small-scale farming has contributed to the development and growth of local markets, as the farmers sell directly back to the community members (Kutya, 2012). Nonetheless, small-scale farmers also play a critical role in the agricultural value chain as sector or cluster by providing inputs for the effective functioning of industrial farmers. Local knowledge has been at the centre of small-scale farming activities.

5.3 CONCLUSION

Based on the literature study, it is evident that local knowledge plays an important role in sustaining small-scale farming activities. Global and regional practices have been explored and the literature displays evidence of innovation by small-scale farmers to ensure the survival of livestock, animals and people. The apartheid government

focused its resources on supporting specific communities and segregating others. This has changed in the democratic dispensation through dedicating policies and allocating resources to small-scale farmers; however, a number of challenges have hampered government support. The scope of the knowledge shared in local communities needs to be better documented and the true extent of how knowledge has evolved is subject to further research.

REFERENCES

Abdullah, H.J. & Hassan, T.K. 2015. The use of indigenous knowledge in agriculture and its role in sustainable development. *International Journal of Science and Research (IJSR).*

Accelerated and Shared Growth Initiative - South Africa. 2007. Available from: https://www.daff.gov.za/docs/GenPub/asgisa.pdf [Accessed: 22 March 2019].

ACTS see SOUTH AFRICA.

Adrian, G.M. 2008. Integrated local knowledge and local innovation with development policies for a sustainable agriculture. *Journal of Central European Agriculture,* 9(4):635-640.

Aliber, M. & Hart, T.G.B. 2009. Should subsistence agriculture be supported as a strategy to address rural food insecurity? *Agrekon*, 48(4):435.

Agrawal A. 1995. *Dismantling the divide between indigenous and scientific knowledge*. University of Colorado.

Alcock, R. & Letty, B. 2005. Protection of sorghum seed heads. In: De Villiers, J., Oettle, L. & Salomon, M. (eds.). *Catalogue of farmer innovation: inception phase, 2004.* Durban: WHAM Communications.

Ajayi, O.C. & Mafongoya, P.L. 2017. *Indigenous knowledge systems and climate change management in Africa.* Netherlands: CTA.

Anrique, G. & Stamoulis, K. 2007. *Rural development and poverty reduction: is agriculture still the key?* ESA Working paper No 07-02. Food and Agriculture Organization of the United Nations: Rome, Italy:7.

Baloyi, T. 2007. *Drought management plan for the agricultural sector.* Available from: https://www.nda.agric.za/docs/agrinews/agrinewsnov07.pdf
[Accessed: 31 October 2018].

Ballabh, V. 2007. *Institutional alternatives and governance of agriculture*. New Delhi: Academic Foundation.

Beckford, C. 2002. Decision-making and innovation among small-scale yam farmers in central Jamaica: a dynamic, pragmatic and adaptive process. *The Geographical Journal*, 168(3):248-259.

Beckford, C. & Barker, D. 2006. The role and value of local knowledge in Jamaican agriculture: adaptation and change in small-scale farming. *The Geographical Journal*, 173(2):118–128.

Bester, J.C. 2011. *Land reform in South Africa: a contemporary analysis.* Dissertation, North West University.

Biko, S.B. 1971. *The definition of black consciousness*. Available from: *www.sahistory.org.za*

Binswanger-Mkhize, H.P., Byerlee, D., McCalla, A., Morris, M. & Staatz, J. 2001. The growing opportunities for African agriculture and development. *Conference Working Paper 16*. Accra, Ghana.

Bray, F. 2008. Science, technique, technology: passages between matter and knowledge in Imperial Chinese agriculture. *British Journal of the History of Sciences*, 41(3):319-344.

Brighter Green and the Global Forest Coalition. 2013. Industrial agriculture, livestock farming and climate change: global social, cultural, ecological, and ethical impacts of an unsustainable industry.

Bundy, C. 1979. *Rise and fall of the South African peasantry*. Cape Town.

Caldwell W. 2015. *The agricultural system: components, linkages, and rationale.*

Carswell, G. & Jones, S. 2004. Introduction: environmental problems in the tropics: challenging the orthodoxies. In: Jones S. & Carswell, G. (eds.). *Environment, development and rural livelihoods Earthscan*. London:3–11.

Chand, R., Prasanna, P.A.L. & Singh, A. 2011. Farm size and productivity: understanding the strengths of smallholders and improving their livelihoods. *Economic and Political Weekly Supplement*, XLVI:26 & 27.

Cheng, Y.C. 2003. Local knowledge and human development in globalization of education. (Paper read at the International Conference on Globalisation and Challenges for Education, New Delhi, India, 19-21 February).

Chirikure, S., Mabeza, C., Segobye, A. & Murimbika, M. 2016. Agriculture and rainmaking. In: Scerri, M. (ed.). *The emergence of systems of innovation in South(ern) Africa: long histories and contemporary debates*. Mapungubwe Institute for Strategic Reflection and Real African Publishers: Johannesburg:103.

CONSTITUTION see SOUTH AFRICA.

South Africa. 1996. *The Constitution of the Republic of South Africa.*

Davendra, C., 1993. Sustainable animal production from small farm systems in South-East Asia. Rome: s.n.

Delgabo, C. 1996. *Bringing previously disadvantaged rural people into the economic mainstream: the role of smallholder agricultural production in Sub-Saharan Africa*. (Paper read at the IFPRI Symposium on meeting the challenge of overcoming food insecurity in Southern Africa, Sandton, South Africa, 24-25 June.)

Department of Agriculture, Forestry and Fisheries. See SOUTH AFRICA.

Department of Planning, Monitoring and Evaluation. See SOUTH AFRICA.

Diop, C.A. 1974. *Africa the origin of civilization: myth or reality.* Chicago: Lawrence Books.

Dlamini, R.M. 2007. Investigation of sustainable indigenous agricultural practices: a systems approach. University of Stellenbosch.

Dodson, A. 2013. The Natives Land Act of 1913 and its legacy. Available from: https://sabar.co.za/lawjournals/2013 [Accessed: 11 March 2019].

Dopfer, K., Foster, J. & Potts, J. 2004. Micro–meso–macro. *Evolution Economics,* 14:263–279.

Dube, M.A. & Musi, P.J. 2002. Analysis of indigenous knowledge in Swaziland: implications for sustainable agricultural development. ATPS Working Paper Series: Nairobi: No. 34.

Eyzaguirre P.B. 2001. Global recognition of indigenous knowledge: is this the latest phase in globalization? *Indigenous Knowledge and Development Monitor 9.* Available from: http://www.nuffic.nl/ciran/ikdm/9-2/column.html [Accessed: 12 September 2018].

Ferretti, M. & Parmentoia, A. 2015. The creation of local innovation systems in emerging countries. Springer Briefs in Regional Science.

Food and Agriculture Organization (FAO). 2018. *Gender, agrobiodiversity and local knowledge*. Retrieved from: www.fao.org/sd/links

Food and Agriculture Organization (FAO). 2009. *Adaptation to climate change in agriculture, forestry and fisheries: perspective, framework and priorities*. Rome, Italy.

Food and Agriculture Organization (FAO). 2015. *The economic lives of smallholder farmers: an analysis based on household data from nine countries*.

Goering, L. 2004. In Swaziland, a lasting farming crisis looms: in this rural country in Southern Africa, the age-old tradition of agriculture is rapidly being destroyed by drought, AIDS and growing joblessness. Chicago Tribune.

Grenier, L. 1998. *Working with indigenous knowledge: a guide for researchers*. Cultural Institute, International Development Research Centre, Ottawa, Canada.

Gustavsen, B., Nyhan, B. & Annals, R. 2007. *Learning together for local innovation: promoting learning regions.* Cedefop: Luxembourg.

Hart, T. 2009. Local innovations using traditional vegetables to improve soil quality. *IK Notes* No.79. Washington: World Bank:9.

Hart, T.G.B. & Vorster, H.J. 2006. The importance of indigenous knowledge in reducing poverty of rural agrarian households. Final Report, Department of Science and Technology, South Africa, May 2006:17.

Hart, T. & Vorster, I. 2006. *Indigenous knowledge on the South African landscape: potentials for agricultural development.* Cape Town: Human Sciences Research Council.

Heidhues, F. & Brüntrup, M. 2003. Subsistence agriculture and development: its role in processes of structural change. In: Abele, S. & Frohberg, K. (eds.). Subsistence

agriculture in Central and Eastern Europe: how to break the vicious circle? Studies on the agricultural and food sector in Central and Eastern Europe, 22:1-27.

Halle, D. Institute of Agricultural Development in Central and Eastern Europe (IAMO).

Helliker, K. 2013. *Reproducing white commercial agriculture in South Africa*. (Rhodes University seminar paper read at Critical Studies Seminar Series, Rhodes University, Grahamstown, South Africa, 22 February).

Hendriks, S. 2013. *Food security in South Africa: status quo and policy imperatives*. AEASA Presidential Address, Bela Bela.

Hornby, A.S. 1974. *Oxford Advanced Learner's Dictionary of Current English.* 3rd ed. Oxford university press.

Hu, Y. & Cheng, H. 2016. Health risk from veterinary antimicrobial use in China's food animal production and its reduction. *Environmental Pollution*:993-997. Available from: http://www.aegis.com/news/ct/2004/ct/2004/CT040903.htm [Accessed: 20 November 2018].

Hu, Y., Cheng, H. & Tao, S. 2017. Environmental and human health challenges of industrial livestock and poultry farming in China. Available from: https://www.sierraclub.org/michigan/why-are-cafos-bad [Accessed: 18 January 2019].

Human Sciences Research Council. 2018. *Local is lekker: indigenous knowledge should be encouraged*. Available from: http://www.hsrc.ac.za/en/review/november-/local-is-lekker [Accessed: 3 November 2018].

Inica.org.2018. Available from: http://www.inica.org/Fish-Farming-Process-in-South-Africa.htm [Accessed: 19 October 2018].

International Council for Science, 2002. Science and traditional knowledge. *Report from the International Council for Science*, 3.

Jacobs, P. 2012. *Household food access in rural South Africa: lessons for emerging food security policy*. Human Sciences Research Council. Pretoria, South Africa.

Jayne, T.S., Mather, D. & Mghenyi, E. 2010. Principal challenges confronting smallholder agriculture in Sub-Saharan Africa. *World development*, 38:1384-1398.

Johnson, B. & Lundvall, B.A. 2001. Why all the fuss about codified and tacit knowledge.

Kirsten, J.F. & Van Zyl, J. 1998. Defining small-scale farmers in the South African context. *Agrekon*, 37(4):564.

King, F.H. 1911. *Farmers of forty centuries or permanent agriculture in China, Korea and Japan*. Pennsylvania: Organic Gardening Press.

Kumari, S. 2008. A study on indigenous technical knowledge of tribal farmers in agriculture of Jharkhand State. Ranga Agricultural University.

Kumar, K.A. 2010. Local knowledge and agricultural sustainability: a case study of Pradhan Tribe in Adilabad District. *Centre for Economic and Social Studies*, Begumpet, 7.

Kutya, L. 2012. Small scale agriculture. Available from: http://www.ngopulse.org/article/small-scale-agriculture [Accessed: 13 March 2019].

Lahiff, E. 2007. Redistributive land reform and poverty reduction in South Africa. *Working Paper for the Research Project on "Livelihoods after Land Reform".* Programme for Land and Agrarian Studies, University of the Western Cape.

Links, A., Hart, T. & Jacobs, P. 2014. *Local is lekker: the relevance of local agricultural innovations in rural South Africa: Briefing note.* Economic Performance Management: Human Sciences Research Council.

Liu, P., Ravenscroft, N., Harder, M.K. & Dai, X. 2016. The knowledge cultures of changing farming practices in a watertown of the Southern Yangtze Valley, China. *Agricultural Human Values*:291-304.

Lundvall, B.-A. 1996. *The social dimension of the learning economy.*

Ludvall, B. 2003. *The economics of knowledge and learning*. Department of Business Studies, Aalborg University:2.

Mabaya. E., Tihanyi, K. & Karaan, M. 2011. *Case studies of emerging farmers and agribusinesses in South Africa.* Stellenbosch: Sun Press.

Mahendra Dev, S. 2012. Small farmers in India: challenges and opportunities. Indira Gandhi Institute of Development Research, Mumbai.

Maskell, P. & Malmberg, A. 1995. *Local learning and industrial competition*. The Regional Studies Association European Conference on Regional Futures, Gothenburg, 6 - 9 May:169.

Martin, R. & Simmie, J. 2008. Path dependence and local innovation systems in city-regions. *Innovation: Manage Policy Practice*, 10:183–196.

Maroyi, A. 2012. Enhancing food security through cultivation of traditional food crops in Nhema communal area, Midlands Province, Zimbabwe. *Afr. J. Agric. Res*, 7: 5412–5420.

Manzini, S.T. 2012. The national system of innovation concept: an ontological review and critique. Pretoria: Council for Scientific and Industrial Research.

Maponya, P. & Mpandeli, S. 2014. *Constraints and challenges facing the small scale farmers in Limpopo Province, South Africa.*

Miguel, A. & Parviz, K. 2008. Enduring farms: climate change, smallholders and traditional farming communities. *Third World Network*. Penang, Malaysia.

Moeti, K.B. 2007. Agriculture, land reform and development in South Africa: public policy for social upliftment. *African Journal of Public Affairs*, 1(1):28 & 29.

Modise, L. & Mtshiselwa, N. 2013. The Natives Land Act of 1913 engineered the poverty of black South Africans: a historico-ecclesiastical perspective. *Studia Hist. Ecc.,* 39(2). Pretoria.

Moos, A. & Struwig, J. 2018. Local is lekker: indigenous knowledge should be encouraged. *South African Social Attitudes Survey*. Pretoria: Human Sciences Research Council.

Mthethwa, S. 2005. Pruning the tip of the creeping plant. In: De Villiers, J., Oettle, L. & Salomon, M. (eds.). *Catalogue of farmer innovation: inception phase*. 2004. Durban.

Ndwandwe, S. 2013. *The contribution of indigenous knowledge practices to household food production and food security: a case of Okhahlamba local municipality, South Africa.* College of Agriculture, Engineering and Science, University of KZN. Pietermaritzburg.

Ntsebeza. L. 2007. Land reform politics in South Africa's countryside. *Peace Review: A Journal of Social Justice*, 19(1):33-41.

Ntsebeza, L. & Hall, R. 2007. *The land question in South Africa: the challenge of transformation and redistribution.* Human Sciences Research Council Press:3.

Notsi, L. 2012. *African indigenous farming methods used in the cultivation of African indigenous vegetables: a comparative study of Tsitas Nek (Lesotho) and Mabeskraal Village (South Africa).* Walter.

Oliver, E. & Oliver, W.H. 2017. The colonisation of South Africa: a unique case. *Theological Studies,* 73(3):2-5.

Orton. L. 2003. GM crops – going against the grain. London: ActionAid.

Van Schalkwyk, H.D., Fraser, C.G., Obi, A. & Van Tilburg, A. 2012. *Unlocking markets to smallholders: lessons from South Africa.* Netherlands: Wageningen Academic Publishers.

Oxford, T. 2018. The complex insecurities of hunger in South Africa*. Mail & Guardian newspaper*. Available from: https://mg.co.za/article/2018-10-26-00-the-complex-insecurity-of-hunger-in-south-africa [Accessed: 10 February 2019].

Pinder, C. & Wood, D. 2003. *The socio-economic impact of commercial agriculture on rural poor and other vulnerable groups.* Department for International Development – Zambia.

Pretty, J., Guijt, L., Scoones, L. & Thompson, J. 1999. Regenerating agriculture: the agroecology of low-internal input and community-based development. In: Kirkby, J., O'Keefe, P. & Timberlake, L. (eds.). *Sustainable development Earthscan.* London: 125–145.

Prolinnova Working Paper 30. 2009. *Local innovation and participatory innovation development: some frequently asked questions*. Prolinnova International Support Team:2.

Pogue, T. & Scerri, M. 2016. *The colonial system of innovation*. In: Scerri (ed.), op. cit. Presidential Infrastructure Coordinating Commission Report. 2012. *A summary of the South African National Infrastructure Plan.* Available from: https://www.gov.za/sites/default/files/PICC_Final.pdf [Accessed: 25 March 2019].

Randall, P. 1972. Power, privilege and poverty: report of the economics commission of the study project on Christianity in apartheid society. Johannesburg: 47.

Reddy, D.E. 2007. Impact of globalization on small farmers worldwide: implications on information transfer. World Library and Information Congress: 73rd IFLA General Conference and Council, Durban, South Africa, 19-23 August.

South African Cities Network (SACN). 2016. *State of South African Cities Report 2016*. Johannesburg: SACN.

Sanders, D. 1999. Indigenous peoples: issues of definition. *International Journal of Cultural Property.*

Scerri, M. 2016. From Union to Apartheid. In: Mario Scerri [ed.]. *The emergence of systems of innovation in South(ern) Africa: long histories and contemporary debates*. Johannesburg: Mapungubwe Institute for Strategic Reflection and Real African Publishers:161.

Sender, J. 2012. Fictions and elephants in the rondawel: a response to a brief chapter in South Africa's National Development Plan.

Sender, J. 2014. Backward capitalism in rural South Africa: prospects for accelerating accumulation in the Eastern Cape. ECSECC Working Paper Series 17.

Shezi, X. 2013. *The impact of migration on rural development: a case study of EMabhuqwuni in Nkandla*. Masters Dissertation, University of KwaZulu-Natal.

Shi, Y. et al. 2011. Safe food, green food, good food: Chinese community supported agriculture and the rising middle class. *International Journal of Agricultural Sustainability*, 9(4):551-559.

Shubladze, K.K. 1970-1979. *The Great Soviet Encyclopedia*. 3rd ed. Moscow: The Gale Group.

Singh, R.B. et al. 2002. Smallholder farmers in India: food security and agricultural policy. Food and Agriculture Organization, United Nations.

South Africa. 1983. Agricultural Resources Act, No. 43 of 1983**.** Available from: https://cer.org.za/wp-content/uploads/2014/02/CARA-43-of-1983.pdf [Accessed: 16 March 2019].

South Africa. 1970. Subdivision of Agricultural Land Act, No. 70 of 1970*.* Available from: https://www.sagi.co.za/documents/Subdivision_of_Agricultural_LandAct_70_of_1970.pdf [Accessed: 15 March 2019].

South Africa. Department of Agriculture, Forestry and Fisheries. 2013. Medicinal plants of South Africa.

South Africa. Department of Agriculture, Forestry & Fisheries. 2018. *2017/18 Annual Report*.

South Africa. Department of Agriculture, Land Reform and Rural Development: Northern Cape Province. 2007. Drought Management Plan.

South Africa. Department of Planning, Monitoring and Evaluation. 2016. *Micro Agricultural Financial Institutions of South Africa (MAFISA*).

Available from: https://evaluations.dpme.gov.za/evaluations/518

[Accessed: 31 October 2018].

South Africa. Limpopo Department of Agriculture. 2008. *Indigenous knowledge systems research and innovation strategy*.

South African Cities Network (SACN). 2004. *State of the Cities Report 2004*. Johannesburg: SACN.

South African History Online (SAHO). *The Definition of Black Consciousness by Bantu Stephen Biko, December 1971, South Africa*. Retrieved from: https://sahistory.org.za/archive/definition-black-consciousness-bantu-stephen-biko-december-1971-south-africa [Accessed: 21 October 2018].

South African History Online. 2012. *When, why and where first African farmers settled in Southern Africa.* Available from: https://www.sahistory.org.za/article/when-why-and-where-first-african-farmers-settled-southern-africa [Accessed: 21 October 2018].

South African History Online. 2018. *First farmers in Southern Africa*. Available from: https://www.sahistory.org.za/article/grade-5-term-2-first-farmers-southern-africa [Accessed: 21 October 2018].

South African News Agency. 2018. *National Infrastructure Plan.* Available from: https://www.sanews.gov.za/special-features-archive/national-infrastructure-plan [Accessed: 31 October 2018].

South African History Online. 2018. *Land: dispossession, resistance and restitution*. Available from: https://www.sahistory.org.za/topic/land-act-dispossession-segregation-and-restitution [Accessed: 21 October 2018].

Soyelu, O.T. & Masika, P.J. 2009. Traditional remedies used for the treatment of cattle wounds and myiasis in Amatola Basin, Eastern Cape Province, South Africa. *Onderstepoort Journal of Veterinary Research*, 76:393–397.

Statistics South Africa. 2012. *Food security and agriculture (2002-2011): in depth analysis of general household survey.* Statistics South Africa: Pretoria. (General household survey series Volume IV).

Steinfeld, H. et al., 2006. Environmental issues and options. Food and Agriculture Organization, Rome, Italy.

Swanepoel, D. & Snijders, A. 2006. Reconstructing knowledge about livestock management in Southern Africa before colonization. In: *Running wild, running free: capturing, harnessing and disseminating knowledge flows in support of animal health*:82-89. (Proceedings of the 5th International Conference of Animal Health Information Specialists, 4-7 July 2005.) Pretoria: University of Pretoria.

Tau, M. 2005. Community innovations in grazing management. In: De Villiers, J., Oettle, L. & Salomon, M. (eds.). *Catalogue of farmer innovation: inception phase 2004.* Durban: WHAM Communications.

Terreblanche, S. 2002. *A history of inequality in South Africa, 1652 – 2002*. South Africa: UKZN Press.

Tella, R.D. 2007. Towards promotion and dissemination of indigenous knowledge: a case of NIRD. *Int. Inf. Libr. Rev.,* (39):185–193.

International Bank for Reconstruction and Development. 2011. Agricultural innovation systems: an investment sourcebook. Washington DC.

Thamaga-Chitja, J. & Morojele, P. 2014. The context of smallholder farming in South Africa: towards a livelihood asset building framework. School of Science and Agriculture, University of KwaZulu-Natal, South Africa.

Thompson, L. 2001. *A history of South Africa.* 3rd ed. New Haven: Yale University Press:163.

UNESCO. 2017. *Local knowledge, global goals*. UNESCO: Paris:48.

UNESCO. 2018. *Indigenous and local knowledge(s) and science(s) for sustainable development*. Policy Brief by Scientific Advisory Board of the UN Secretary-General.

United Nations Development Programme. 2013. Swazi Indigenous Products, Swaziland. Equator Initiative Case Study Series. New York, NY.

University of Maryland. Agricultural terms and definitions. Available from:

http://extension.umd.edu/sites/extension.umd.edu/files/_docs/Agriculture%20Terms2.pdf [Accessed: 5 March 2019].

Upton, M. 2004. The role of livestock in economic development and poverty reduction. PPLPI Working paper:1.

Warren, D.M. 1991. *Indigenous knowledge systems for sustainable agriculture. A paper presented at the international conference on sustainable agriculture in Africa*. Columbus. Ohio: The State University.

Yonge Nawe Environmental Action Group. 2005. *Traditional vs. genetic engineering*. Available from: http://www.yongenawe.com/04pressinformation/column/47gmostraditionalagric1605 [Accessed: 20 November 2018].

Vink, N., Kirsten, J. & Van Zyl, J. 2000. *Agricultural policy: undoing the legacy of the past.*

Vink, N., Van Rooyen, J. & Karaan, M. 2012. *Farmer support programmes: lessons from implementation.*

Vorster, H.L., Van Rensburg, W.S., Mashele, X.B. & Ndlela, E. 2003. The effects of (re)creating awareness of traditional leafy vegetables on communities. (Proceedings of the indigenous plant use forum conference, Clanwilliam, South Africa, 5-8 July.)