



Access and benefit sharing arrangements on African ginger with local and indigenous communities in Mpumalanga province

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Dissertation submitted in fulfilment of the requirements for the degree *Master of Indigenous Knowledge Systems* at the Northwest University

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ABSTRACT

Access and benefit sharing (ABS) is the sharing of benefits arising from the utilization of natural resources. In this study, the concept was used to include indigenous local communities and their indigenous knowledge associated with African ginger. The access and benefit sharing term emerged as a solution to fight un-equal sharing of benefits which occurred between researchers, government, bio-prospectors, and indigenous knowledge holders. African ginger has gained much interest and is already in the market. Hence, there is a need for access and benefit sharing arrangement.

Based on the above, this study focused on the access and benefit sharing arrangements on African ginger with local and indigenous communities in Mpumalanga Province of South Africa. This study was composed of three objectives. The first objective was to profile and document the characteristics of African ginger stakeholders in Mpumalanga. The second objective was to investigate the traditional uses and benefits associated with African ginger. The third objective was on the views and perspective of indigenous local communities based on ABS . To achieve the mentioned objectives, the policies and regulations implemented nationally and internationally were used as a reference. Using the labour theory and personhood theory in clearly proved that indigenous local communities have power over their knowledge and resources and once lost it is like they lost themselves in the process.

The findings on the identification of stakeholders revealed that majority of African ginger stakeholders are involved with the research and commercialization of African ginger, this raised concern with regard to the conservation of African ginger. There were many uses of African ginger although some of the participants did not want to reveal their knowledge on the use of African ginger, this too had an impact in the study. The participants were questioning on how the university ensures that the knowledge does not go to the outside world. The study discovered that the traditional health practitioners and knowledge holders knew nothing about the existence of the benefit sharing arrangements on African ginger which was uploaded on the government gazette notice number 37582 dated 23 April 2014 (DEA, 2014). From this issue it can be concluded that the government must come with an approach of notifying indigenous local communities about existing access and benefit sharing

arrangements or allowing them to be part of benefit sharing agreement negotiations so that their voices can be heard.

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DEDICATION

This study is dedicated to my parents Simone Cossa and Lucia Langa, Thank you for all your support throughout. It is also dedicated to my elder sister Joanah Cossa, My younger sister Rebecca Cossa and to my two brother Alex Cossa and Abednego Cossa. Most Importantly it is dedicated to My son Amogelang Lungelo Cossa. It is also dedicated to my nephews Tshepo Cossa, Surprise Segage and Phetile Cossa.

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LIST OF ABBREVIATIONS

ABS- Access and Benefit sharing

IK- Indigenous knowledge

TK-Traditional Knowledge

IPR-Intellectual Property Rights

NP-Nagoya Protocol

CBD-Convention on Biological Diversity

GTRs-Genetic Resources

PIC-Prior Informed Consent

MAT-Mutually Agreed Terms

BABS- Bio-prospecting, Access and benefit sharing arrangements

DEA-Department of Environmental Affairs

DST-Department of Science and technology

CSIR-Central Scientific Industrial Research

BCP-Bio-cultural community Protocol

INTRODUCTION TO THE STUDY

1.1. Background

Before the introduction of the Convention on Biological Diversity (CBD) in 1993 natural resources were accessed freely and considered as common heritage and seen as free for everyone to use for various purposes, such as scientific research or research project to develop new products for market access or establishment of new business based on biological resource (Srinivas, 2008; Brush, 2005: 19; Brink, 2013). The implication was that was that biological resources were being used in unsustainable ways in their natural ecosystems, and that the benefits derived from their usage were not being shared equitably among the countries that contributed these resources and accompanying traditional knowledge. The CBD made stakeholders to be aware of access and benefit sharing and to equally share benefits made from commercial utilization of knowledge/resources with the knowledge holders. It does not imply that it stopped exploitation of knowledge.

According to Brush (2005); Schroeder and Pogge (2009:268), common heritage can be defined as biological resources that are not privately owned by individuals or businesses but rather belong to the general public domain, thus readily accessible to anyone interested/curious about exploiting them for general or cultural use. During the access of the common heritage with regards to biological resources and associated indigenous knowledge, there was no prior consent from the owners of the resources and holders or custodians of indigenous knowledge, whom they have been relying on these resources for centuries to survive. This resulted in these resources being used in an unsustainable manner and the indigenous knowledge misappropriated by scientifically and technologically rich developed countries without the sharing of benefits generated from commercial use with the national governments or local communities (Chinsebu & Chinsebu, 2020:83). The organisations or institutions within the food, pharmaceutical and other industries that depended on biological resources to grow and develop their businesses got the

greatest share of benefits from the resource utilization (Dauda & Dierickx, 2013:2; Zerbe, 2005:494).

The inequity in sharing benefits especially with the indigenous knowledge holders led to the development of regulatory frameworks on access and benefit sharing by rich resourced countries in biological diversity and indigenous knowledge to manage access to the resources, ensuring that there are sustainable use of the resources and fair and equitable sharing of benefits. The concept of access and benefit sharing emerged as an answer to the resulting sustainable use of the resources and a fair and equitable sharing with the indigenous and local communities based on their knowledge and biological resources (Morgera & Tsioumani, 2010).

Access and benefit sharing can thus be defined as fair and equitable sharing of the benefits arising from the use of genetic resources (Natural Justice, 2009). Consequently, the international framework referred to as the Nagoya protocol (NP) on access to genetic resources and fair and equitable sharing of benefits arising from their utilization were developed, to operationalise the third objective of the convention on biological diversity which focuses on fair and equitable share of benefits (Buck & Hamilton, 2011). The Nagoya protocol on access and benefit sharing emphasizes that the states or national governments as well as the holders of indigenous knowledge must provide access to their biological resources and associated and thus, traditional knowledge has the authority to share the benefits arising from their utilisation equally (Secretariat of the Convention on Biological Diversity, 2011). Within the Nagoya protocol on ABS, ethical access to biological resources and indigenous knowledge coupled to a fair and equitable sharing of benefits which are known as ABS compensation promoting social justice (Dauda & Dierickx, 2013:2; De Jonge & Korthals, 2006:145).

In the past South Africa lacked legislative or regulatory frameworks on access to indigenous knowledge and this has allowed unrestricted access to South African biological resources, with materials being harvested, sometimes in destructively excessive quantities, and exported to foreign countries for innovative value addition and offshore financial benefit (Crouch et al., 2008; Andrzejewski, 2010). The appropriation of South Africa's biological resources and indigenous knowledge has resulted in the extinction of biological resources, leading to non-benefit sharing agreements, particularly for the conservation of biological resources (Crouch et al., 2008).

An example is *Hoodia gordini*, a South African indigenous plant species used by San people to combat hunger and thirst (Stonewall & Sweeteners, 2007:218). The South African Research Council for Scientific and Industrial Research (CSIR) developed an anti-obesity product based on indigenous knowledge of the San community, patented the hoodia molecule, and later licensed it to international companies without going through the ABS process of obtaining prior informed consent from San communities and concluding benefit-sharing agreements. The CSIR failed to get Prior Informed Consent (PIC) from the San, which drew national and international attention to the issue. As a result of the CSIR's experience, led to one of the primary benefits sharing agreements to offer a share of royalties from product sales (Wynberg & Chennels, 2009; Wynberg et al., 2009; Chennels et al., 2009)

With the given challenges faced, South Africa has been at the forefront of creating ABS regulation on the African continent and is one of the few African countries with well-established ABS legal and policy frameworks (Crouch et al., 2008:355; Lowman, 2012; Taylor & Wynberg, 2008). This is due to South Africa's abundance of plant genetic resources, as well as its many cultural manifestations, which include indigenous knowledge systems, and the undeniable truth that the country has suffered from biopiracy and misuse of indigenous knowledge (Amechi, 2015).

The CSIR in South Africa announced a bioprospecting collaboration with ten traditional healers as part of the African ginger bioprospecting agenda (DEA, 2014). The extent to which these traditional health practitioners involve their particular communities was raised by this news. While keeping in mind Dutfield's warning not to make any fixed assumptions about ownership or authorship of TK in traditional

societies (Dutfield, 2004: 141), one might assume that traditional healers have no right to seek to patent such communal knowledge or enter into an ABS with any corporate body for bio-prospecting purposes without their indigenous communities' permission. This highlights the legitimacy or otherwise of ABS entered by traditional healers or organizations representing their interests in South Africa with the CSIR and other bio-prospectors (Ostrom, 2006). In the Biodiversity act of 2004 (DEA, 2004) it is clearly stated that indigenous local communities are entitled to benefit from their knowledge because they hold communal knowledge, hence this study is focused on access and benefit sharing with local and indigenous communities.

The South African government implemented the Biodiversity Act in 2004, IKS Policy in 2004, Bioprospecting, Accessing and Benefit Sharing (BABS) regulations in 2008 and the Promotion, Development, Management and Protection of Indigenous knowledge in 2019 (DEA, 2004; DEA, 2015; DEA, 2012; DSI, 2019). All of the policies were implemented to put emphasis on the third objective of the CBD which is access and benefit sharing.

After 20 years of implementation of the CBD and the NP, the majority of countries, particularly African countries, as well as local populations, still do not understand the implementation of access and benefit sharing policies (Masango, 2010; Hansen and VanFleet, 2003; Okediji, 2003; Kamau et al, 2010). Local and indigenous communities are used in the study in accordance to the IKS Act of 2019 and biodiversity Act of 2004. Communities that have historically occurred naturally in their geographical area are referred to as local and indigenous communities. Under Article 82(1) (b) of the Biodiversity Act of 2004, only local and indigenous communities are regarded as major stakeholders, and they are thus qualified to enter into ABS with prospective bio-prospectors in respect of communal medicinal knowledge (DEA, 2004; DSI, 2019). As a result, the study's focus is on local and indigenous communities' access and benefit-sharing arrangements.

1.2. Rationale for the study

According to Cunningham (1993), African ginger has been identified as one of the most widely traded species in South Africa, as well as one of the species with the greatest commercial potential. There are several advertisements on African ginger, this lead to more people becoming interested on it and consequently leads to its exploitation. According to the South African Biodiversity Act of 2004, when products reach commercial stage it worthy for benefit sharing agreements (DEA, 2004). African ginger is currently being sold in limited quantities (Street et al., 2013; Van Wyk, 2011). According to the South African Biodiversity Act of 2004, benefit sharing applies to indigenous biological resources that are commercially used (DEA, 2004). There is a substantial correlation which exists between bio prospecting and African ginger, as described by the NEMBA. There are several companies which are involved with developing products such African ginger capsules, polish and powders, these companies are Phytonova and Mountain Herb nursery just to mention a few (van Wyk, 2011). This knowledge of commercializing African ginger has been acquired through indigenous research which was done with indigenous local communities; hence the Nagoya protocol states that benefits derived from indigenous knowledge should be equally shared with these communities (Secretariat of the convention and biological diversity, 2011). The fact that indigenous knowledge holders and traditional health practitioners contribute in the development of new drugs through research made with them led to the need of this research. Another reason is that in most cases indigenous local communities do not benefit from sharing their knowledge. Equitable sharing of benefits will create a mutualistic relationship between the stakeholders involved.

1.3. Problem statement and central research question of the study

Research has been conducted by many scholars on Indigenous knowledge of African ginger, some of the topics which were researched includes Hydroponics propagation of African ginger and the other one was on the role of African ginger in agronomic practices (Manzini, 2007; Xego et al., 2016; Hartzell, 2011; Gabatadzi, 2019). There is limited research on access and benefit sharing and African ginger. Also, most of the products within the pharmaceutical industry that were developed from the indigenous medicinal plants used by indigenous and local communities do not benefit the owners of these resources and indigenous knowledge in terms

economic benefit, and they are not even recognised or compensated as the knowledge holders of such medicinal plants (Farnsworth, 1993; Mugabe, 1998; Masango, 2010).

In addition, the methods of knowledge protection introduced which are known as intellectual property rights were not sufficient to protect indigenous knowledge (Mukuka, 2010). The fact that intellectual property rights are western in nature is witnessed by an increase in the number of cases of misappropriation of indigenous knowledge without payment of compensation to the provider countries and their indigenous people (Roht-Arriaza, 1996; Blankeny, 2000; Shiva, 2000; Chander & Saunder, 2004). Furthermore, the ownership of indigenous knowledge among indigenous local communities is communal in nature whereas the introduced methods of knowledge ownership are western in nature and this lead to the misappropriation (Oguamanam, 2008; Moore, 2012; Helfer, 2004).

There are other challenges associated with using the South African access and benefit sharing legislation. This is because when there is a new benefit sharing agreement is implemented for future use it is placed before the Minister for approval, this information may be published in the Government Gazette in order to invite comments from interested and potentially opposing parties (BABS, 2015). The fact that information about benefit sharing agreement is published on the government gazette does not favour indigenous local communities and is not exactly helpful. The government gazette is inaccessible to communities for this reason it favours certain African ginger stakeholders which are researcher only, which means that this method of commenting via the government gazette is bias as it favours the user over the provider. Hence, the central research question for the study was: “How do African ginger stakeholders prefer benefit-sharing arrangements with them based on their indigenous knowledge”?

1.4. Aim and objectives of the study

The aim of the study was to explore how benefit-sharing arrangements based on indigenous knowledge and associated indigenous biological resource can be undertaken from the views and perspectives of the local and indigenous communities of Mpumalanga. The objectives of the study were to:

1. Identify, document and profile the characteristics of stakeholders involved in African ginger in Mpumalanga Province.
2. Investigate traditional uses and benefits of African Ginger by African ginger stakeholders in Mpumalanga Province.
3. Establish the views and perspectives of identified African ginger stakeholders regarding access and benefit sharing.

The study was guided by the following questions:

1. What is the nature and roles of African ginger stakeholders in Mpumalanga?
2. How do stakeholders utilise and benefit from African ginger in Mpumalanga Province?
3. How do the African ginger stakeholders in Mpumalanga province understand and view the concept of access and benefit sharing on African ginger?

1.5. Significance of the study

The importance of this study stems from growing global concerns about inadequate protection for indigenous communities and their knowledge (Burrows, 2005). Many of Africa's biodiverse countries still have poor legislation governing access to genetic resources (GRs), benefit sharing, and the protection of traditional knowledge linked with genetic resources (Moody, 2011). As a result, putting in place an effective joint process may not be enough to ensure indigenous local communities (ILCs) the developmental advantages of sharing agreements (Moody, 2011). Governments in biodiverse countries have a great responsibility to guarantee that restrictive legislation is formed based on local populations' knowledge of access and benefit sharing. The outcomes of this study are significant since they will add to the existing theoretical and scientific data. It is also believed that the study's findings will help policymakers understand what indigenous local populations genuinely desire in terms of ABS. This is demonstrated by the identification of African ginger in communities, as well as research into how communities use African ginger and how they perceive access and benefit sharing arrangements. The research is also significant since it will serve as a roadmap for the creation of future ABS models.

1.6. The researchers' positionality in the study

The research was influenced by previous findings of the researcher which proves that traditional healers of Mpumalanga suffer exploitation of their knowledge even after the implementation of the bio-cultural community protocol (Cossa, 2018). The research on the access and benefit sharing was chosen because the researcher is from Mpumalanga Province and as an indigenous scholar the researcher will not allow her people to suffer exploitation of knowledge while knowing exactly that the concept of access and benefit sharing exists.

1.7. Organisation of the dissertation

The dissertation is divided into seven chapters which are as follows: Chapter one (1) provides the Introduction of the study, the aim, and objectives of the study, questions formulated for the study and the motivation for conducting the study. In this chapter problem statement is introduced. Chapter two (2) is the literature review which presents key themes from academic and practitioners in line with this research it also establishes the existing reality and state of knowledge around the concepts of access and benefit sharing. Chapter three (3) provides the indigenous philosophical underpinnings of the study in order to set and clear the bases in which the study was designed and implemented. Conceptual framework is presented which followed by the theoretical framework and the introduction to the study area. Chapter four (4) presents the profile of the stakeholders in terms of their names, contacts, and nature of involvement with African ginger. Chapter five (5) provides the traditional uses and benefits on African ginger. Chapter (6) presents understanding access and benefit sharing arrangements on African ginger from local community perspective and finally, a discussion of the results and implications of the findings are presented in chapter 7. The following chapter is based on the literature review which is the existing literature about the research phenomenon in this case it refers to access and benefit sharing and African ginger.

LITERATURE REVIEW

2.1. Introduction

The previous chapter introduced the study and stated the motivation for undertaking the study. The purpose of this chapter is to present key themes from academic and practitioner literature in line with this research such as access and benefit sharing and properties of African ginger. The chapter provides definition of concepts identified for the study and discuss the existing international and national frameworks on access and benefit sharing. The chapter also discusses bio-cultural community protocol in access and benefit sharing. Finally, the chapter discussing the issues mentioned above it gives examples of those i.e., access and benefit sharing exploitations, Bio-cultural community protocols which were implemented by communities, cases of exploitation etc.

2.2. Definition of key concepts and terms used in the study

Access and benefit sharing- Access and benefit sharing links access with the sharing of benefits (both monetary and non-monetary) arising from the commercial use of indigenous knowledge or indigenous biological resources with indigenous knowledge communities holding such knowledge or resources (Laird et al., 2020)

Policy- A course or action adopted by a government, ruler or a party (Collins English Dictionary, 1994)

Indigenous knowledge- Indigenous knowledge (IK), is knowledge that local people in a certain area or community have accumulated over time and which they continue to accumulate (Warren, 1991; Scoones & Thompson, 1994; Ngozwana, 2015).

Traditional knowledge - refers to a body of knowledge accumulated over centuries by a group of people who lived in close proximity to nature (Berkes, 2009).

Indigenous community-means any acknowledged group of people who arose from, or were historically settled in a geographic location or areas located within the borders of the Republic (DST, 2019).

Local community means any community of people living or having rights or interests in a distinct geographical area (DEA, 2004)

Stakeholders- People or groups with interests or concerns about land or resources are referred to as stakeholders (Franks et al., 2018).

Indigenous biological resources - Indigenous biological resources include any animals or plants that are indigenous to the area (DEA, 2004).

Bio prospecting –Bio prospecting is the quest for biological resources that have real or potential commercial value for development (DST, 2019).

Commercialization- The practice of profiting from indigenous knowledge (DST, 2019)

Prior and Informed Consent (PIC)– Is the consent with respect to indigenous knowledge (DST, 2019).

Mutually agreed terms (MAT)- MAT Terms of an agreement that have been understood and agreed upon by all parties in the negotiations (Swideska, 2009).

Intellectual property- refers to all mental creations including work of art, inventions, computer programs to trademarks and other commercial indicators (WIPO, 2020).

Ethics- The branch of philosophy concerned with how one should act in certain situations (Allhoff et al., 2011).

Biological diversity- Biological diversity means the variations among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic habitants, as well as ecological complexes to which they belong; this encompasses diversity within species, between species and of ecosystems (UNEP,1993).

Environment - refers to physical surroundings that all living things share, such as air water, land, plants and wildlife (Kumar, 2018).

Conservation- conservation is described as an action aimed at establishing, improving, or maintaining positive relationships with nature (Sandbrook, 2015).

Bio-cultural community protocol- a bio-cultural community protocol is generally a community-led instrument that promotes participatory advocacy for the recognition of and support for ways of life that are based on the customary sustainable use of

biodiversity, based on the customary, national, and international laws and policies. In this sense, bio-cultural community protocols are community-specific declarations of the right to diversity (Jonas et al., 2010).

2.3. International, African, national and regional frameworks implemented on ABS

The issue of unequal distribution of profits has become a problem, which led to the development of frameworks at both national and international level and regional resource initiatives. Below are international, national and regional initiatives, rules and policies to implemented to address the inequality that arises during the time of sharing benefits arising from commercial use of indigenous knowledge. These policies are explained below.

2.3.1. International frameworks

2.3.1.1. Convention on biological diversity (CBD)

CBD is the world's first worldwide tool for dealing with equal sharing of benefits. It changes the concept of common heritage by giving the government power to genetic resources (UNEP, 1992). The CBD was signed in June 1992 at the Earth Summit in Rio de Janeiro, Brazil, and came into effect in 29 December 1993 (UNEP, 1993). The CBD's main aim is to promote biodiversity conservation, sustainable use of its components, and a fair and equitable distribution of the benefits of genetic resource usage. The CBD stresses the significance of sharing the benefits arising from the utilization of indigenous resources (Mshana, 2002).

This research focuses on the CBD's third objective, which is a fair and equal distribution of benefits. The CBD states that the criteria for sharing benefits among nations that offer genetic resources and indigenous knowledge associated with their use must be determined on a case-by-case basis through bilateral communication. It stipulates that, in accordance with CBD Article 15 (4), access must be allowed on mutually agreed terms (MAT) and with the resource provider's prior informed consent (PIC) (CBD Article 15 (5) (UNEP, 1992). Furthermore, the benefits derived from the use of resources or knowledge must be distributed fairly and equitable (CBD Article 15). (7). Each ABS must be discussed with a country of origin as well as a community with traditional knowledge and benefits (1992, UN).

2.3.1.2. United Nations declaration on the rights of indigenous people (UNDRIPS, 2007)

According to Article 32(3) of the UNDRIPS, Indigenous peoples have the right to be consulted in good faith with the State, through their own representatives, to obtain their free, prior, and informed consent before any project affecting their lands, territories, or natural resources is approved, especially when it involves the development, utilization, or exploitation of mineral, water, or other resources, according to Article 31 (1) of the Declaration (UN, 2008). Furthermore, indigenous peoples have a right to effective mechanisms for just and fair redress (including compensation) for activities affecting their lands, territories, or natural resources, particularly where such activities involve the development, utilization, or exploitation of mineral, water, or other resources, as well as appropriate measures to mitigate or lessen the severity of any adverse environmental, economic, social, cultural, or spiritual impact (UNDRIPS, 2008).

2.3.1.3. Nagoya protocol on access and benefit sharing

The 'Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable sharing of Benefits Arising from their Utilisation' was adopted by the Conference of the Parties to the Convention on Biological Diversity at its tenth meeting on 29 October 2010 in Nagoya, and it came into effect in 2014 (UNEP, 2011).

According to Brink (2013) and UNEP (2011), the Nagoya protocol was established to further advance the implementation of the third objective of the CBD: fair and equitable sharing of benefits arising from the utilisation of genetic resources. It provides an international regime, within the framework of the CBD, to promote and safeguard the fair and equitable sharing of benefits arising from the utilisation of genetic resources. Important elements of the protocol are obligations to comply with domestic legislation of the country providing access and contractual obligations reflected in mutually agreed terms (MAT) (Nagoya protocol Article 5 (2) and 5), and provisions aiming at more predictable conditions for access to genetic resources. It also states that communities have the right to PIC in article 6 (2) It also contains provisions on access to traditional knowledge (UNEP, 2011).

2.3.1.4. Bonn guidelines on access to genetic resources and fair and equitable sharing of the benefits arising out of their utilization

The sixth Conference of the Parties to the CBD adopted the Bonn Guidelines in April 2002. The Bonn guidelines were created to assist countries in developing ABS law. They define the duties and responsibilities of users and providers of genetic resources, and they encourage stakeholders to work together to achieve ABS objectives (Secretariat of the Convention on Biological Diversity, 2002).

According to Carrizoza et al., (2004) the point at issue included the involvement of applicable stakeholders and capacity building, the components in ABS procedures, elements of informed consent, possible monetary and nonmonetary, incentive and countrywide tracking and reporting, and accountability. When access to genetic sources and traditional know-how is sought, the Bonn guidelines state expressly that prior informed agreement of indigenous and adjacent groups must be obtained. This means that there is a need to inform indigenous local communities before using their knowledge/ indigenous biological resources.

2.3.2. African union guidelines on the coordinated implementation of the Nagoya protocol

Article 5 of the Nagoya protocol states that African Union member states must ensure that benefits derived from the use of biological resources and traditional knowledge are shared in a fair and equitable way with indigenous peoples and local communities, as well as all relevant stakeholders who have indigenous knowledge and indigenous biological resources, to coordinate their views on creating transparent, fair and equal, and consistent standards (African Union Commission, 2015). Following the establishment of access and benefit-sharing requirements, they must implement those standards into their legislative, regulatory, and administrative policies in accordance with Articles 12, 19, and 20 of the Nagoya protocol, as well as mutually agreed-upon terms and norms of conduct (African Union Commission,

2015). This strategy would be the best because it would be indigenous people creating their own ways on dealing with access and benefit sharing.

In addition, African Union Commission (2015), states that African member states should pass national legislation ensure the direct benefits from the use of indigenous biological resources for the promotion of the protection and sustainable use of indigenous knowledge. Such legislations have been implemented in South Africa and they include the Indigenous Knowledge Systems Act of 2019 (DST, 2019) which shall be discussed in the next section. In accordance with Articles 9 and 12 of the Nagoya Protocol, African Union Member States shall direct benefits arising from the use of genetic resources and associated traditional knowledge toward promotion of conservation and sustainable use of biological diversity, as well as improvement of the livelihoods of indigenous and local communities, through domestic legislation. This means the benefits should not be only monetary but rather improve the life of communities also.

Further, in accordance with Article 12 of the Nagoya protocol, African countries have a role to play in supporting indigenous people and local communities with the implementation with cultural laws, community protocol and procedures for accessing sharing of benefits. National intellectual property offices, as well as continental and regional intellectual property organizations, are also encouraged to take a more active role in ABS by building capacity, assisting in the negotiation of Mutually agreed terms (MAT), and adhering to ABS requirements to monitor and track genetic resources and related traditional knowledge (African Union Commission, 2015).

All in all, the role of African union guidelines on the Coordinated Implementation of the Nagoya Protocol, is to encourage African communities to implement policies and laws which needs to be followed for access and benefit sharing purposes. Also, by giving indigenous local communities the authority to implement these policies as they are the who are directly affected the benefit sharing issue.

2.3.3. Regional Initiatives

Since the early 2000s in Southern Africa, Transfrontier Conservation Areas (TFCAs) have been created to promote biodiversity conservation and local development (Thomson et al., 2013). The concept of transboundary conservation areas has gained international praise and is now widely used around the world (Busher, 2013; Neuman, 2014; Saarinen, 2016). The IUCN defines TFCAs or “parks for peace” as transboundary protected areas with “a specific objective of the promotion of peace and cooperation, as well as the protection and maintenance of natural and cultural values” (Sandwith, et al., 2001:3; Wild, McLeod, & Valentine, 2008:42). According to Mugandza (2019), Transfrontier conservation areas (TFCAS) originated from the concept of establishing conservation areas across international borders for biodiversity conservation, economic development and poverty alleviation. They date as far back as 1925 when Czechoslovakia and Poland signed the Krakow Protocol to set the framework for establishing international co-operation for the management of border parks (Griffen et al., 1999: 5). Transfrontier conservation areas (TFCAs) have been established not just for the expansion of conservation areas, but also for the promotion of economic integration, cultural reconnection, peace and cooperation through collaborative management of natural resources across national borders, operationalized in terms of a regional cooperative framework (Schoon, 2013; Singh, 1998).

Transfrontier conservation areas (TFCAS) were born out of the idea of constructing conservation zones across international boundaries for biodiversity conservation, economic development, and poverty alleviation, according to Mugandza (2019). Despite its flaws and paradoxes, transfrontier conservation has been praised internationally and is preferred as a holistic strategy to conservation with numerous successes (Busher, 2013; Newman 2014; Saarinen, 2016). A transfrontier conservationist promotes ecologically responsible stewardship and sustainable development as a means of advancing a country's development goals (Mugandza,

2019). TFCAS are huge ecological zones that span the borders of two or more countries, encompassing one or more countries.

The Ais/ Richtersveld, Kgalagadi Transfrontier Park, Maloti - Drakensberg, Limpopo I Shashe, Lubombo, and Great Limpopo Transfrontier Park are just a few of the TFCA projects in Southern Africa that are growing year after year (Myburgh, 2003).

The Kgalagadi Transfrontier Park was the first "Peace Park" to be established in Africa. In July 1931 the area between the Auob and the Nossob rivers in South Africa was proclaimed a national park and named the Kalahari Gemsbok National Park. Seven years after the proclamation, a 40-km strip of land in the adjacent Botswana, east of the Nossob River, was declared a game reserve. Co-operation between the two countries' conservation agencies in managing this area started already in September 1967 (Myburgh, 2003). The Park was formally declared on 7 April 1999. (Modise & Broekhuis, 2003)

The Great Limpopo Transfrontier Park was the other benchmark in the history of TFCAs. In 1938 a Portuguese ecologist, Games de Sousa, proposed to the Portuguese colonial government of Mozambique that negotiations with South Africa over connecting the area currently known as Coutada with the Kruger National Park, be undertaken. Only after Mozambique's independence was the idea discussed again, but was abandoned due to the civil war. After the signing of Mozambique's Peace Accord in 1992 and South Africa's commitment to bring to an end to apartheid, the Council of Ministers of Mozambique recommended that the possibility of establishing pilot Transfrontier Conservation Areas be explored.

In 1991, the GEF provided funds for feasibility studies, which examined the ecological, socio-economic, and political viability of the initiative. These suggested that three pilot TFCAs of Chimanimani, Lubombo and Gaza have been established. In 1997 the GEF, through The World Bank, provided US\$5 million to the government of Mozambique to implement a five year TFCA Project. This was being promoted as a shift from a state-controlled activity to being more community based, to encourage local people to play a more positive part in natural resource management (Munthali & Soto, 2003: 7)

Nature-based conservation development, according to Ramutsindela (2007) and Saarinen (2016), is neoliberal conservation, which ignores local communities. According to Mugandza, (2019), TFCA has the potential to improve cooperation between local communities and governmental organizations, as well as to alleviate socioeconomic marginalization associated with rural remoteness. However, critical study shows that TFCAS can ignore local populations (Ramutsindela, 2007;2009; Saarinen 2016). The Great Limpopo TFCA, for example, was created in 2002. Its primary goal was to provide sustainable tourism job possibilities for impoverished people (Dutton & Archer, 2004; Dhliwayo et al., 2009). However, since its introduction it has been reported that people living on the boundary of the TFCA are often forgotten and potentially marginalized (Chiuts i& Saarinen, 2017)-thus threatening the sustainability and the GTLFCA itself.

2.4. Legislations and policies implemented by selected African countries on access and benefit sharing

2.4.1. Namibia

Namibia is also one of the African countries which implemented policies to ensure that the indigenous people do not suffer of Knowledge exploitation (Shikongo, 2017). In 1992 Namibia became a signatory to the CBD. The CBD was ratified in Namibia during the year in 1997 (Brink, 2013). In fulfilling requirements of African union guidelines Namibia announced its desire to sign and ratify the NP in a letter to the CBD Secretariat in 2011 (Shikongo, 2017). Namibia joined the NP on ABS in May 2014 and consequently joined the Swakopmund protocol for the preservation of traditional knowledge and folklore expressions within the African Regional Intellectual Property Organization (ARIPO) on February 11, 2015. (Chinsemu and Chinsemu, 2020).

Given that the African guidelines states that African countries must implement policies which enable indigenous local communities to protect their own knowledge. Namibia also adopted the Environmental Management Act of 2007 in 2007, which allows indigenous peoples' custodians to regulate their environment and protect their traditional knowledge of indigenous biological resources from harm, theft and appropriation (Government Gazzete of Namibia, 2007). The Namibian government

fulfilled their requirements of implementing a policy which speaks about equal sharing of benefits it implemented the Access to Biological and Genetic Resources and Associated Traditional Knowledge Act 2 of 2017 in order to regulate access to biological resources and associated indigenous knowledge and consequently monitors the access and benefits sharing arrangements (Namibia government Gazzete, 2017). This act also enables indigenous communities to benefit from sharing their knowledge. exploitation (EIAR, 2011).

2.4.2. South Africa

International agreements

South African as one of the countries which became victims of knowledge exploitation signed the CBD in 1993 and ratified in 1995. In line with the African union guidelines discussed above on May 11, 2011, South Africa signed the Nagoya Protocol, which was ratified on January 10, 2013 (DEA, 2011).

Current legislation, regulations and practices

South Africa as a country which once suffered knowledge exploitation, saw a need of implementing national protocol/ policies which will assist in ensuring that indigenous local communities benefit from sharing their knowledge. Policies like the Indigenous Knowledge Systems policy (IKS policy) of 2004 was implemented, it was followed by the biodiversity Act of 2004 then Bioprospecting, access and benefit sharing (BABS) in 2008 and in 2019 the Indigenous knowledge systems act of 2019 was implemented (DEA 2004; DEA 2008; DST, 2019). These legislations were developed in order to protect indigenous knowledge and to promote sharing of benefit from using indigenous knowledge/ resources for commercial purposes. Most importantly these policies were implemented to prevent history of exploitation to strike south Africa once more. developed guidelines are discussed below.

a) Indigenous knowledge systems policy of 2004

The Indigenous Knowledge Systems policy was developed and adopted by the Department of Science and Technology (DST) in 2004. The aim of this policy was to recognize indigenous knowledge and the contribution it can make through innovation skills especially in medicine, it recognises the role of traditional health practitioners

which was not considered during the apartheid era (DST, 2004). This policy is thus complementary to Chapter 6 of NEMBA and provides a road map to safeguard IKS within South Africa (Lowman, 2012).

b) The national environmental management: biodiversity Act, 10 of 2004

The biodiversity Act of 2004 was implemented to clearly address the issue of unequal sharing of benefits, it became effective on 1st of January 2006 (DEA, 2004). Its objective are similar to those of the CBD as stated by Wynberg (2017). Its aim are rooted in the protection of indigenous knowledge and to ensure that indigenous communities benefits from knowledge or indigenous biological resources (DEA, 2004). Chapter 6 of the South African Biodiversity Act is mainly focused on the ABS (Crouch et al., 2008). This is seen by the implementation of access to natural resources / or knowledge protocols which requires one to obtain permit to the minister of environmental affairs. It also requires that communities have the right to PIC prior access to knowledge or resource (Article 82 (2) and Article 82 (3) (DEA, 2004).

The biodiversity Act of 2004 was also implemented to act as a permitting system for those who want to access in indigenous biological resources and indigenous knowledge associated with those resources (Jacobs, 2017; Wynberg et al., 2008).

The MAT aims to regulate the exchange and the manner in which Indigenous Biological Resources are to be used by the relevant parties. The MTA is to be completed with the benefit-sharing agreement at the commencement of the commercialization phase as presented within NEMBA.

Permits for bioprospecting and research are to be applied by bio-prospectors at the Department of Environmental Affairs. Where a permit has been granted by the DEA for a bioprospecting activity, the applicant must then approach the provincial department and apply for a collecting permit (DEA, 2004).

c) The Bioprospecting, access, and benefit sharing (BABS) regulations

The Bio prospecting, access, and benefit sharing (BABS) regulations , 2008 entered into force on 1 April 2008. It was made under the National Environmental Management Biodiversity Act (NEMBA); Act 10 of 2004 it has been since amended.

It was implemented to implement the process. The BABS Amendment Regulations 2015 came into force on 19 May 2015 and prescribe the notification process for the discovery phase of bio prospecting involving any indigenous genetic and biological resources contemplated in section 81A (2) of the Act. It further prescribes the permit system be set out in Chapter 7 of the Act insofar as that system applies to bio prospecting involving any indigenous genetic and biological resources or export from the Republic of any indigenous genetic and biological resources for the purpose of bio prospecting or any other kind of research. The BABS Amendment Regulations set out the form and content of, and requirements and criteria for benefit-sharing and material transfer agreements and the administration process of the Bio prospecting Trust Fund (DEA, 2015).

d) Indigenous Knowledge Systems Act of 2019

The Act was mainly focused on addressing the following (IKS Act, 2019): (1) Bio piracy Misappropriation Promotion and registration of Indigenous Knowledge, (2) Recognises prior learning of practitioners, (3) Ensuring benefit sharing for communities, (4) Facilitates research and development, and (5) Creates mechanisms for dispute resolution for the communities (DST, 2019).

2.5. Bio-cultural community protocols

Community protocols were championed by the natural justice. Bio-cultural community protocols (BCPs) record the role of a community and its traditional knowledge with regard to indigenous biological resources (KohlerRollefson, 2010). Bio-cultural community protocols were implemented as one of the requirement of the Nagoya protocol which stated that customary laws must be taken into consideration, they developed as an answer to the inequity which occurs during sharing of benefits (UNEP and Natural Justice, 2009). The following are some community protocols developed in South Africa and India.

2.5.1. The Raika protocol

The Raika herders implemented a bio-cultural community protocol because they were not allowed to enter certain places (Raika Protocol, 2009). The bio-cultural community protocol implemented explain in detail about who they are and what their land (forest) means to them (KohlerRollefson et al., 2010). In the protocol they also

explain the importance of prior informed consent when one wants to access their knowledge (Raika Bio-cultural community protocol, 2009). The protocol enabled the Raika pastoralist to be able to communicate with other organization regarding the issue of the contribution of their indigenous knowledge and traditional methods of maintaining indigenous biological resources(KohlerRollefson, 2010).

2.5.2. Bushbuckridge healers' bio-cultural community protocol

The traditional health practitioners of Bushbuckridge were denied to enter in some of the environments/ areas, their knowledge was stolen from the by researchers without sharing with them the benefits the get after using their knowledge and also they were hated by other community members due to the nature of their practice (Sibuyi et al., 2012). They had meeting a after meetings and they ended up developing a Kukula traditional health practitioners bio-cultural community protocol. In this protocol they explained about who they are and what they want, they also explained the processes which one can follow to do research with them (Sibuyi, 2012).

2.5.3. Bio-cultural community protocol of the Baigas, Traditional Healers Community

The Baigas are indigenous tribes belonging to Chhattisgarh, India. They are known for their knowledge of medicinal plants and treatment methods. They worry that their knowledge and resources will be extremely threatened for various reasons. They are aware of the need to protect this knowledge and related resources, and there are national and international laws to protect it (Baigas bio-cultural community protocol, 2012).

The Baigas Community decided to develop a bio-cultural community protocol because of the following reason: Access to the forest is restricted, which affects their livelihood and survival needs. This also affects the traditional knowledge associated with these resources, because the younger generation who are less involved in the forest gradually lose this knowledge and its use in life. Your restricted access to these resources can also pose a threat to outsiders mining in unregulated and unsustainable ways. The younger generation in their community generally tends to show less interest in their knowledge and are especially unwilling to learn from them about the healthcare system. However, there is some hope, because some young people, including women, become interested and do innovative things. Their

knowledge and continued use of this knowledge help maintain an ecological balance and are the key to future research and development solutions in the health, nutraceutical, and pharmaceutical industries (Baigas bio-cultural community protocol, 2012).

The Care for the Earth Society (CES), local experts, the Chhattisgarh Traditional Healer Association, local foresters, and other community members living in remote areas of the Bilaspur region of the state, assisted the Baigas community they developed a bio-cultural community protocol. The Bio-cultural Community Agreement implemented to solve the problems they encounter. The Bio-cultural community protocol allows them to obtain prior informed consent and benefit sharing. The bio-cultural community protocol can also be used as an internal governance tool to regulate the fair sharing of benefits among traditional healers and help reduce conflict agreements related to access and benefit sharing (Bio-cultural Community Agreement of Baigas, 2012).

Table 2.1. Summary of the bio-cultural community protocols in South Africa and India

Community	Location	Year	Reasons	References
Raika pastoralists	Rajaschan, India	2009	Access, PIC	(Kohler Rollefson, 2010)
Bushbuckridge healers	Bushbuckridge, South Africa	2009	ABS, TK, GRs, and sustainable use of biodiversity	Sibuye et al., 2012;2010; African bio-cultural community protocol initiative (2011)
Baigas healers	Chhattisgarh, India	2009	ABS, PIC	(Baigas, 2012)

2.6. The national recordal system initiative (NRS)

The national recordal system was implemented to prevent misappropriation of indigenous knowledge, the aim of this recordal system is to record indigenous knowledge which in turn will assist in the protection of knowledge from being stolen (Amechi, 2015). The Department of science and technology came up with this strategy on 24 March 2015, it was also raised by the same department in the Indigenous knowledge systems Act of 2019 (DST, 2019). In the Act it is stated that National indigenous Offices (NIKSO) will be launched in order to record and preserve indigenous knowledge. The methods of indigenous knowledge sharing which is mainly verbally through word of mouth contribute to the increase in stealing of indigenous knowledge by third parties, hence the need for Recordal system (Dountio, 2011; Andrzejewski, 2010).

DST believes that the records can enable relevant Indigenous knowledge holders to be identified. Also, the records can avoid granting patents to the incorrect person, because the database will be able to show existing indigenous knowledge information. At an international level, databases are being recognized as a way to protect indigenous knowledge systems through preventive measures like registration and archiving (Sonhai, 2016). Examples of such international initiatives embrace the normal Chinese traditional medicine data base, the Traditional Knowledge Digital Library (TKDL), and the Biozulua information of Venezuela (Alexander, 2004). The Recordal System is discussed in this study because the main issue is based on access and benefit sharing arrangements. Through the use of Recordal system cases of stealing indigenous knowledge and labelling it as belonging to you can be minimized and reduced, this is because the recording can act as evidence as to who owns the knowledge.

2.7. The Impact of mining in Biodiversity

Sonter et al., (2018) states that mining has a direct (i.e. mineral extraction) and indirect (i.e. industries supporting mining operations, and external stakeholders who gain access to biodiversity-rich places as a result of mining) affect biodiversity at several spatial scales (site, landscape, regional, and global). Mining-related infrastructure development, for example, can draw people populations, posing new dangers (Sonter et al., 2017). Over-exploitation (e.g., hunting, fishing), invasive species, and habitat degradation for other land uses are all examples of pre-existing concerns. When several mines cause more biodiversity loss than the sum of the individual mines, cumulative consequences arise (Almgir et al., 2017). Mining and associated mineral processing activities emit carbon directly, which has a negative impact on biodiversity due to anthropogenic climate change. Mineral supply chains can have a wide range of biodiversity-related effects, which are frequently overlooked (Northey et al., 2017). Although mining provides jobs for people, it is important to note that it also has negative consequences, as described above. To mitigate the effects of mining on biodiversity, effective conservation methods must be developed, which necessitates an awareness of the distribution of risks (Sonter, 2018).

2.8. The Impact of Agriculture on natural biodiversity

Agriculture is the leading cause of biodiversity loss, with escalating consequences due to shifting consumption patterns and population growth. Agriculture depletes biodiversity by turning natural environments into intensively managed systems and by emitting pollutants such as greenhouse gases (Dudley & Alexander, 2017). In the 1980s and 1990s, forests were the dominant source of additional agricultural land (Gibbs et al. 2010), and this trend continues today (Wassenaar et al., 2006). Tropical forest area decreased by 5.5 million hectares each year from 2010 to 2015. (Keenan et al., 2015). Agriculture was revealed to be a substantial, and often the main, cause of change in a review of 11 deforestation fronts (Taylor et al., 2015). Agricultural growth also has an influence on remaining natural grasslands, such as the Paraguayan Chaco (Dal Pont & Longo 2007). Agriculture leads to total removal of natural resources in their environment and this lead to extinction of plants.

2.9. Selected cases of countries which experienced unsustainable exploitation of indigenous knowledge and biological resources due to lack of access and benefit sharing arrangements

2.9.1. Libya - A treatment for diabetes

According to McGown (2006), *Artemisia judaica* L is an aromatic medicinal plant is used in Libyan traditional medicine as an infusion for the treatment of "debilitating diseases". Used in traditional medicine as a herbal remedy for antibacterial, anthelmintic, antidiabetic, analgesic and anti-inflammatory activities. The last sentence clearly shows that it means diabetes. Scientific literature shows that Egypt and other North African countries also use this plant. Although the plant is used for traditional purposes in Libya, the patent has been granted by the U.S. patent office. A British company discovered a traditional Libyan diabetes treatment method, and then successfully claimed in the United States that the treatment method was its own invention. According to McGown (2006). The US patent office apparently did not realize (or did not care) that the "invention" was-recognized by the company itself- Not a novel. McGown did not find any evidence of the company's intellectual property policy regarding the traditional knowledge of its patent, or the benefit-sharing agreement related to the patent (McGown, 2006)

2.9.2. Namibia, Botswana, and South Africa

According to Kathe et al., (2003), the African Devil's Claw is a traditional medicinal plant from Southern Africa. It has been used for traditional purposes in Botswana, Namibia, and South Africa. Devil's Claw is known by different names in its place of origin as follows; Namibians as *Makakata*, *sengaparile* (Tswana), *Gamagu* (Nama), (Brendler, 2021).

Devil's claw contains the harpagoside used to treat rheumatoid arthritis, joint cartilage, rheumatic diseases, kidney inflammation, and heart disease (Stewart & Cole, 2005). Devil's claw was traditionally used to reduce pain and inflammation and lower gout uric acid levels (Chinsemu, 2020). Indigenous peoples of Namibia use plant tubers primarily as a remedy for painkillers, health tonics, dyspepsia, fever, wounds, ulcers, and boil (NBRI, 2017). It was discovered by Kim and Park (2015)

that the devil's claw can work for someone who want to lose weight and weight maintenance benefits via loss of appetite (Toress-Futes et al., 2014).

In 1962 the Namibian company known as Harpago began by exporting a large number of devil's claw tubers to the German company (NBRI, 2017). In Germany, dried devil's nail tubers were used as a common blood cleaner in the 1960s, including as a bitter tea to treat indigestion (Cole & Du Plessis, 2001). The medical use of devil's claw is used by multinational pharmaceutical companies without sharing its benefits to the country where devil's claw originates (Chinsebu, 2020). This implies that if the issue of the Devils claw happened during the Convention on Biological Diversity era the communities would have been benefitted from sharing their knowledge, and their natural resource being exploited for commercial purposes. The case of Devil's claw shows how a lack in policy implementation affected African countries back then. Even today commercial companies benefit from selling herbal drugs derived from the Devil's claw, it is believed that since well the ABS law which was implemented in Namibia to address issues like bio piracy, unequal sharing of benefits can address this issue.

2.9.3. *Pelargonium sidoides* (South Africa)

Pelargonium species is a medicinal plant which is indigenous to South Africa and Lesotho. The *Pelargonium* plant is used by Zulu, Xhosa, Khoi, and Sotho indigenous communities for various ailments including stomach aches, flu, and coughs (Brendler and van Wyk, 2008:421). It is not clear to as which community held the knowledge first (Brendler and van Wyk, 2008:421). In 1970s it was proved that *Pelargonium* was effective in healing respiratory diseases, this is because an Englishman known by the name Charles Henry Stevens took the plant and its knowledge to England where it was be tested into a remedy. It was marketed as a natural remedy for bronchitis (Msomi, 2015). The patents for *Umckaloabo* were held by German pharmaceuticals. It is produced and collected in various places in South Africa and Lesotho, including land belonging to the *Imingcangathelo* Xhosa community near Alice in the Eastern Cape by Schwabe Pharmaceuticals (Msomi, 2015).

The international company Schwabe pharmaceuticals negotiated a benefit sharing agreement with a Xhosa grouping in the Eastern Cape who claimed TK rights and who also provided access to the resource, which grew wild on their tribal land (van

Niekerk & Wynberg, 2012). The local community was paid harvesting fees for the product. The same company applied for a range of patents in Europe relating to the *Pelargonium*, which were successfully challenged by a group of opponents including a different Xhosa community (Chennels, 2013). The question of who 'owns' the TK related to the *Pelargonium* is unresolved and is being addressed by the Department of Environmental Affairs (Chennels, 2013).

2.9.4. South Africa: Hoodia

Hoodia gordonii is a species which was used by the San to stave off hunger and thirst by the indigenous San, the San People are indigenous to South Africa (Deacon & Deacon, 1999; Lee et al., 2002; Wynberg & Chennells, 2009). Without proper communication and informing the San people the CSIR patented the active ingredient. Due to the fact that it made media attention the CSIR was forced to negotiate a benefit sharing agreement. The CSIR was subsequently forced to negotiate with the South African San Council (hereafter referred to as the San Council), which represents the three indigenous San communities of South Africa: Khomani, Xun and Khwe. This in turn led to a benefit-sharing agreement in 2003 (CSIR and South African San Council, 2003).

2.9.5. Zimbabwe

According to Mutsiwa (2015), University institutions in Zimbabwe misappropriated the Snake-Bean plant (*Mutukutu*), a plant used by local tribes to treat fungus. The University of Zimbabwe and the University of Lausanne in Switzerland signed an arrangement in which the University of Zimbabwe's Department of Pharmacy would extrapolate the plant's chemical components while the University of Lausanne would provide financial and material support to the former (Magaisa, 2007). The University of Lausanne would have access to around 5000-plant species used by traditional Zimbabwean communities as part of the deal (Magaisa, 2007). The University of Zimbabwe and the University of Lausanne were the benefactors of this arrangement, and the research findings were shared between them.

The partnership was jeopardized; however, the University of Lausanne applied for a patent for the plant and discussed licensing agreements with Phytera, a US pharmaceutical company, without the University of Zimbabwe's authorization. When

this development was uncovered, there were disputes not only between the two contracting parties, but also between traditional communities whose knowledge had been misappropriated by the University of Zimbabwe, who claimed that they had been disenfranchised (Magaisa, 2007). The University of Lausanne defended itself, claiming that there was no documented evidence of such a plant being used to cure fungal diseases. The underlying reverberation from the preceding is emblematic of the theft of traditional knowledge without acknowledging or giving proper credit to those who created it in the first place. This clearly shows that universities have the authority to exploit indigenous knowledge through research conducted with local indigenous communities. In this case, unfortunately, things did not go as planned and the community had to know. If it was not that the University of Lausanne wanted sole benefit, the communities were to be left there without any form of benefit (Mutsiwa, 2015).

2.8. Intellectual property rights

Intellectual property rights (IPR) laws are utilized in the North to grant legal monopoly protection to those that produce knowledge or ideas. These laws do not seem to be helpful for protecting indigenous knowledge (Grenier, 1998). The rationale for intellectual property for being unable to protect indigenous that is that they are in private or separately control and non-competitive in characteristic (Wynberg, 2004) IPR laws “have comparatively rigid criteria for protection and tend to favour advanced innovations that need high-priced, long term institutional investment in analysis and development”. Indigenous knowledge on the opposite hand is communal, inter-generational and developed step by step over time, and since it blends spirituality, cultural beliefs, and technical experience, it's thought of to be too unstructured to qualify for protection under existing intellectual property laws (Posey & Duffield, 1996).

Traditional innovative ideas are developed communally over a generation which means that each and every one contributed to development of new ideas, as for intellectual rights the patent protection protects knowledge which was created at a specific time (Barber et al., 2002). The communal nature of knowledge makes it difficult to choose and individual to own a patent. Patent rules view this knowledge as being in a public domain/knowledge by everyone and regard it as un-patentable (Barber, 2002)

A lot of knowledge surrounding medicinal plants and food crops arise from this collective innovation, and patent laws view this knowledge as in the public domain and therefore incapable of being protected by patents (Barber, et al., 2002). But Biotechnology and pharmaceutical companies who develop new products based on genetic resources and TK obtained from indigenous communities receive protection in the form of a patent. However, the knowledge, innovations and rituals that allowed for the discovery to occur are not patentable (Barber et al., 2002).

Biotechnology and pharmaceuticals develop new products from indigenous biological resources and TK obtained from indigenous communities receive protection within the variety of a patent, but the knowledge, innovations and rituals that are allowed for the invention to occur do not seem to be patentable (Barber et al., 2002). There has been some effort by governments and organizations to develop separate or 'sui generis' belongings laws for protecting indigenous knowledge, however such efforts have nonetheless reached the purpose of use. A problem complicating the creation of such laws is that a lot of indigenous people reject the IPR approach outright, supported beliefs that indigenous knowledge and resources are common property shared by all community members, and not commodities to be closely held or sold by an individual (Grenier, 1998).

2.9. The case of African ginger (*Siphonochilus aethiopicus*)

Siphonochilus aethiopicus is the scientific name for African ginger, which is also commonly known as wild ginger or Natal ginger. It is known by indigenous local names in the respective communities where it is located, *Serokolo* in Sepedi, *Xirungulo* in Xitsonga, *Indungulo* in Zulu, and *Isidungulo* in Siswati are the local names for African ginger in South Africa. It falls under the monocotyledonous *Zingiberaceae* family includes African ginger (Adebayo, 2020). The common name *Siphonochilus* was derived from the Greek words *siphono*, which means tube, and *chilus*, which refers to the flower's shape, and *aethiopicus*, which means from Southern Africa (Hankey & Reynolds, 2002).

2.9.1. Geographical distribution of African ginger

According to Hartzell (2011) and Street & Prinsloo (2013), African ginger is extensively dispersed throughout tropical and subtropical Africa's seasonal dry woodlands (Hartzel, 2011; Street & Prinsloo, 2013). The western part range

stretches from Senegal to Ethiopia, then south through the miombo woods of eastern and south-central Africa to the forests of South Africa's Mpumalanga province. The species appears irregularly in South Africa, ranging from the Letaba watershed in the Limpopo lowlands to Swaziland as it became extinct in KwaZulu Natal (Lotter et al., 2006, Department of Agriculture, 2009). The plant is native to South Africa, where it is well-known for its medicinal benefits (Igoli & Igoli, 2017).

2.9.2. Morphological characteristics of African ginger

According to Manzini (2005), African ginger leaves exhibit grass characteristics and emerge from the ground in spring. The leaves fall every year; they can reach a height of up to 400 mm. The leaves are light green, spear-shaped, and grow at the end of the stem as a leaf base (Hankey & Reynolds, 2002). The stem grows to a maximum height of 2 m (Department of Agriculture, 2014).

The description of African ginger was made by Manzini (2005) and described as having charming flowers that grow on the ground level and have a short lifespan. The African ginger flower blossoms from October to February. The flowers of African ginger can vary in colour, from bright pink to white with a yellow centre, and have a pleasant odour (Hankey & Reynolds, 2002). In spring, the flowers usually appear before the leaves, perhaps to make them easier for pollinators to see. During the flowering season, each plant will produce approximately 15 flowers and each flower lasts for one day (Nichols, 1989). Small berry-like fruits ripen underground or above ground. African ginger is characterized by small cone-shaped rhizomes with a strong odour (Viljoen et al., 2002). Up to 20 swollen tubers can be attached to the rhizomes, each tuber connected by succulent roots (van Wyk & Gericke, 2000). It is a forest plant with aromatic rhizomes (Hankey & Reynolds, 2002). Figure 2.1 shows how the African ginger looks like, it only shows the leaves and flowers of African ginger. Figure 2.2 shows the roots and rhizomes of African ginger



Figure 2.1: Leaves and flowers of African ginger (Courtesy: Department of Agriculture Forestry and Fisheries)



Figure 2.2: Rhizomes and roots of African ginger (Photo taken by the researcher during data collection)

2.9.3. Habitat

African ginger is found in the Miombo forest in Tanzania and Mozambique, and in the northern provinces of South Africa, it is mostly found in Lowveld sour bushveld,

tall open or closed Woodland, and some populations in the transition zone between Acocks' Sour Lowveld, Bushveld, and Bushveld and Lowveld type of veld (Crouch et al., 2000). The plant is indigenous to South Africa and is well-known for its therapeutic benefits (Igoli and Igoli, 2017). African ginger is found in Sudan-Saharan woods in West Africa, where it grows in clusters under tall deciduous trees that are seasonally damp. This species likes deciduous forests, wooded grasslands, and shrubs in Ethiopia and Kenya.

2.9.4. Uses of African ginger

Wild ginger's rhizome and root are widely used in traditional medicine in Southern Africa (Van Wyk et al., 1997). The root has a variety of medical and traditional purposes, and the indigenous peoples of South Africa have been cultivating it for a long time. The cone-shaped rhizome of African ginger is used in conjunction with the root to cure colds, coughs, flu, hysteria, and pain. Wild ginger plant rhizomes are normally chewed fresh (Van Wyk and Gericke, 2000).

According to Hankey and Reynolds (2002), the Zulus use African ginger to prevent disease in horses such as tickbone, ringworm and athrax to name a few. . In addition, African ginger can be used as a mosquito repellent resistant to mosquitoes and can be used as a wound dressing (Lategan et al., 2008). The Xhosa people of Idutywa (Eastern Cape) use the powdered roots of *S. aethiopicus* to prevent evil spirits from attacking them. Furthermore, African ginger can be used for human food consumption and can be planted for decoration (Department of Agriculture, 2009). Smith (1998) and Van Wyk et al. (1998) reported that the Zulu people used African ginger root to prevent lightning strikes and snakes, and to treat hysteria. There are more reports of unspecified groups using rhizome infusion to treat epilepsy (Smith, 1998; Stafford et al., 2008; Street et al., 2013).

The root is used to cure diarrhoea, stomach illnesses, and internal parasites, such as schistosomiasis, in Senegal (Burkill, 2000). Aside from that, African ginger is used to treat asthma, headaches, and dysmenorrhea in women (usually including abdominal cramps, menstrual abnormalities, and yeast-like fungal parasites that sometimes cause thrush). It was recently discovered to be useful in treating sleeping sickness (Hutchings et al., 1996; and Crouch et al., 2000).

The African ginger rhizome offers a lot of potential for novel functional foods development (van Wyk, 2011). Roots and rhizomes were also utilized as spices by the Igede people of Nigeria to flavor their cuisine and cooked yams, according to studies (Noudogbessi et al., 2013; Igoli and Obanu, 2011; Igoli et al., 2012). Tubers of *S. aethiopicus* are utilized as a spice in East Africa as well.

2.9.5. Commercialisation of African ginger and ABS

In traditional markets in South Africa, the majority of medicinal plants are sold as unprocessed raw pharmaceuticals (Cunningham, 1988; Williams et al., 1997; Mander, 1998; Von Ahlefeldt et al., 2003; Street et al. 2008). According to a 2011 study by Moeng and Potgieter, *S. aethiopicus* is the second most commercialized medicinal plant in Limpopo province, with prices as high as South African rand 800.00/kg ZAR (Moeng and Potgieter, 2011).

These products have a significant quantity and market value. According to Mander (1998), the entire volume of pharmaceutical transactions in South Africa might surpass 20,000 tonnes per year, with an annual revenue of around US \$ 60 million. In 2015, the South African National Institute of Biodiversity (SANBI) undertook a survey on the urban muthi market on behalf of the South African CITES Science Management Agency on the urban muthi market showed that the species is sold in Gauteng, KwaZulu-Natal, Free State and Limpopo. The commercialization of African ginger should lead to benefit sharing negotiations. In line with the IKS Act of 2019 and the Nagoya protocol (DST, 2019)

Figure 2.3. shows a medicinal product which has been developed from African ginger.



Figure 2. 3 African ginger tablets (Source: African Botanicals on the internet).

2.10. Status of African ginger

Serokolo is known for its popularity in traditional medicine, and there are increasing concerns about its conservation status. Due to overexploitation, it was called locally extinct in parts of South Africa (van Wyk, 2008). The plant is currently listed as a critically endangered plant in the South African Red Data Plant List (Hankey & Reynolds, 2002; Raimondo, 2011). Hartzell (2011) stated that according to the Swaziland flora database, the red book status of *S. aethiopicus* is EN A1d, which was previously listed as rare. Wild ginger is listed as an endangered species in the national environmental management according to The Biodiversity Act of 2004 (Act No. 10 of 2004), a category lower than that of critical danger, faces a high risk of extinction in the wild in the near future not "extremely high risk" (Hartzell, 2011). Although the plant is now very scarce, demand continues unabated and plant prices continue to rise (Diederichs, 2002); Even though, it is one of the five most used, most valuable, and most important medicinal plants in Africa. The information on African ginger mentioned above clearly shows some of the reasons for the strong demand for African ginger. This gives reasons to work with the community to develop benefit sharing agreements. This is because if it is packaged in-house, it will be difficult for them to claim ownership. The Council for Scientific and Industrial Research (CSIR) Biosciences bioprospecting team focuses on the development of prescription drugs and herbs based on traditional South African medicinal plants

(including *S. aethiopicus*). One of the clues being developed is a new herbal extract from *S. aethiopicus* for the treatment of asthma and allergies (Fouche et al., 2008).

The bioprospecting group of the Council for Scientific and Industrial Research (CSIR) Biosciences has focused on the development of prescription drugs and herbal remedies based on South African traditional medicinal plants including *S. aethiopicus*. One of the leads being developed is novel herbal extract from *S. aethiopicus* for the treatment of asthma and allergies (Fouche, et al., 2008). There are also patent applications on African ginger. Patenting of indigenous medicinal plants must also lead to benefit sharing agreements. Table 2.1. shows the patents applications done on African ginger. This information was derived from the World Intellectual Property Organization (WIPO).

Table 2. 2 Patents made on African ginger

Publication date	Applicant	Inventors	
10 Oct 2013	Integral Bioceuticals (PTY) LTD	Nigel Gericke and Olga Gericke	Siphonochilone and related chemicals, as well as their applications
19 April 2011	CSIR	Ebrahim Wadiwala, Gerda Fouche et al.	Composition and application of a chemical made from an extract of the plant <i>Siphonochilus aethiopicus</i> (for allergies and atopic syndrome)
1 July 2010	CSIR	Roelof Marthinus Horak	Treatment and remission of allergic disorders

			as a preventative measure
13 May 2009	CSIR	Roelof Marthinus Horak	Preventative treatment and remission of allergic diseases
26 March 2009	CSIR	Roelof Marthinus Horak	Preventative treatment and remission of allergic diseases
31 December 2008	CSIR	Roelof Marthinus Horak	Preventative treatment and remission of allergic diseases
11 October 2007	CSIR	Roelof Marthinus Horak	Preventative treatment and remission of allergic diseases

The above statements make it clear that African ginger is in demand and highly commercialised. If there are no benefit sharing arrangements made it will be difficult for local and indigenous people to claim that the knowledge belonged to them.

2.11. Concluding remarks

This chapter was about the various literatures on the study. It has shown how people experienced exploitation of knowledge and their response in addressing the issue. It gave examples of international frameworks which were put in place to fight the issue of access and benefit sharing and how its implementation consequently led to development of policies in countries. This chapter has proved that there is a need to discuss benefit sharing with local and indigenous communities first. The issue of *Hoodia* which was briefly discussed in the introduction and also in the part of this chapter, proved that indigenous local communities need to be consulted before exploitation of their knowledge. it involves the CSIR which patented the hoodia without evening consulting the indigenous knowledge holders, when the knowledge

holders became aware the issue became public. It led to an access and benefit sharing arrangement between CSIR and the San. The following chapter is on the philosophical underpinnings of the study, there is a need to underpin the study to understand on the type of philosophies which guide communities.

INDIGENOUS RESEARCH PHILOSOPHIES UNDERPINNING THE STUDY

3.1. Introduction

The above chapter was about existing literature about the study. This chapter is about the philosophical underpinnings of the study. The reason for underpinning the study is to find out the philosophies of the Vatsonga and Bapedi in epistemology (ways of knowing), Ontology (Reality) and Axiology (values). Indigenous research philosophies are important as they show the philosophies of the research participants. This chapter shows the link between research participants and their ways of interpreting their natural environment.

3.2. African indigenous worldview and paradigms

An indigenous research paradigm which was put forward by Hart (2010) guided the study throughout the research. This indigenous research paradigm is underpinned by indigenous epistemology, ontology, axiology, and methodology as stated by (Chilisa, 2012; Guba and Lincoln, 2005; Mertens, 2015; Wilson 2008). The researcher is coming from the indigenous local community where the research took place which means that she is familiar to the cultural beliefs and language spoken which shows her reality (ontology) in the study. The researcher also know how knowledge is transmitted from one person to another (epistemology). The indigenous research paradigm was chosen because the researcher is doing indigenous research which requires her to understand all the cultural protocols. Therefore, the, the methods chosen in this study enabled the researcher to be who she is and allowed the research participants to freely express themselves as the language used was understood by both the researcher and the participants. Below are the indigenous philosophies which underpinned the study.

3.1.1. African indigenous epistemology

The goal of this study was to articulate African indigenous types of knowledge that encompassed the types and practices of action and networks, relationships, connections, and Include systems that make up and inform the reality that can be

seen and how it can be viewed, as stated by Chilisa (2017). Epistemology is concerned with the type and form of knowledge related with African ginger in this study (Cohen et al., 2007). In African epistemology, acquiring knowledge on one's own is insufficient without doing it in a social context (Ajei, 2007: 191). According to Ruch (1984: 47), an African scholar thinks in, for, and through his community. You are well aware of your own social activity. Tradition, ancestry, and heritage are all known in this regard. As a we-company, we must now acquire knowledge (Hamminga 2005: 58).

Epistemology, according to Guba and Lincoln (1994:108), asks, "What is the nature of the link between the possible knower and the thing that can be known?" African ginger knowledge is passed down from generation to generation, therefore elder people teach or educate young people on how to use it. Some people can also learn about the use of African ginger through having dreams about it (narrated by their ancestors). African indigenous epistemology, according to Martin (2008), consists of four basic types of knowledge: divination, revelation, intuition, and reasoning. Indigenous knowledge of African ginger can be a direct revelation from the ancestors or an indirect one passed down through the generations; consequently, God is its origin. It clearly demonstrates that one can learn how to use African ginger by having one's ancestors analyse one's dreams. It begins with God and ends with His creation, and it can be demonstrated via deductive apologetics.

According to Ani, 2013; Owusu-Ansah and Mji, 2013, the knowledge of the use of African ginger can come from God. Its mode of acquisition is collective, based on the relation with the higher humanities, and is community oriented . Mabika (2002) puts it in his own way: "The formal holistic object is fundamentally relational. It does not separate a thing from its principle of intelligibility". The knowledge of African ginger is communal i.e., elders educate youth on how to use African ginger. Other people may observe how it is used and learn from there. This type of knowledge through observation is empirical knowledge (Mawere and Mubaya 2016). The separation of humans with other parts of the universe, which leads to their feeling of superiority and to abuse of nature is absent in the holistic and mutually enforcing ontological approach of the solar science (Ani, 2013).

In this study, epistemology is very crucial as the researcher works with knowledge holders who acquired their knowledge mostly on observation and imitation and through word of mouth. Traditional health practitioners also form part of this study, and they acquired their knowledge on the use of medicinal plants through the assistance of their ancestors.

3.1.2. African indigenous ontology

African indigenous ontology, according to Chilisa (2012), is a knowledge system that deals with the fundamental features of the meaning of existence. The link between human beings and living and non-living beings can be understood in relational ontology to understand social reality. Indigenous peoples have a strong bond with both living and non-living creatures, as well as the land, animals, and other living things. Their friendship is built on the Ubuntu idea of *motho ke motho ka Batho* (*motho ke motho ka Batho = motho ke motho ka Batho = motho ke motho*). It means that a person owes himself to others in English (Goduka, 2000). This value includes community, collectively, social justice, human solidarity, and pluralism.

Furthermore, ontology is concerned with what can be known as well as what it means "to be" and "to be." Reality is a way of comprehending the nature of existence, as well as the various interconnections that make up the network connections that sum up existence. In Southern Africa, interpersonal interactions are portrayed in the notion of *botho* or Ubuntu (human nature). All living and non-living objects must be respected and recognized in Ubuntu. All of our connections, as well as our marginalized efforts to safeguard and sustain those that are essential to the continuation of all relationships, are the truth. This connection is crucial and pervades all aspects of study. "Joining with all knowledge systems and all living and non-living things and producing harmony and balance," says the relationship, which is neither adversarial nor binary (Goduka, 2000). Ubuntu is based on the principles of community, collective, social justice, and humanity. Community, collective, social justice, and humanity are implicit in Ubuntu in principle. The Ubuntu philosophy supports this research because the researcher aims to treat the research participants as part of the research, not as an object. The Ubuntu philosophy will be used throughout the learning process

In addition, ontology deals with questions about what can be known and what is "to be" and to be. Reality refers to the way of understanding the nature of existence, and the multiple relationships that make up the network connections that summarize existence. Interpersonal relationships in Southern Africa are reflected in the concept of *botho* or *Ubuntu* (human nature). Ubuntu needs to respect and recognize all living and non-living things. The reality is all our connections and all our marginalized efforts to protect and maintain those that are vital to the continued existence of all relationships. This relationship is fundamental and runs through all research activities. The relationship is neither antagonistic nor binary, but inclusive, "joining with all knowledge systems and all living and non-living things and creating harmony and balance (Goduka, 2000).

3.1.3. Indigenous research methodologies

In the past the research which was done with indigenous local communities was mainly based on the benefits of the researcher and their cultural methods were not followed (Martin, 2003; Wilson, 2008). Those kinds of studies were done by non-indigenous researchers who employed a colonial worldview as a point of departure (Wilson, 2008: 50; Smith, 2005). These types of research were not made to empower indigenous local communities.

Indigenous communities and scholar began to openly question the continuous colonization approaches, practices, and role of Western research as the human rights movement grew in prominence in the 1970s (Denzin and Lincoln, 2008; Smith, 2005; Wilson, 2008). They defied conventional research paradigms by articulating their own views on indigenous research, including study guidelines and methods. The goal was to create research paradigms that were culturally secure and respectful (Martin, 2003; Rigney, 1999), emphasized indigenous knowledge, experiences, and voices, and so took an emancipatory and liberating perspective (Rigney, 1999).

Indigenous researchers from respective regions of the world are demanding that their peoples be given access to research and, as a result, to knowledge, language, and culture. Taking back control of research by incorporating it into their worldview is a kind of racial and colonial oppression resistance (Martin, 2003, cited in Rigney, 1999; Steinhauer, 2002). This decolonization of research is part of a liberation

struggle that seeks recognition, self-determination, and power and supports places of rehabilitation, healing, and development (Zavala, 2013). (Rigney, 1999; Smith, 2012). It was decided to use a relational indigenous technique. When scholars like Chilisa (2012), Kovach (2009), and Smith questioned Eurocentric approaches and presented indigenous research methods in 1992, it was indigenous. Indigenous methods are those that enable indigenous researchers to be who they are while actively participating as participants in the research processes (Weber-Pillwax, 2001). This way of being not only creates new knowledge, but also changes who researchers are and where they are (Weber-Pillwax, 2001: 174). Wilson (2001) suggested that an indigenous methodology implies talking about relational accountability, which means that the researcher fills out his or her relationship with the world around him. It requires that researchers be accountable to all my relationships (Wilson 2001: 177). Indigenous research is defined as research by indigenous scholars on, for, and with indigenous communities (Bishop, 2005; Wilson, 2008).

To be in line with the indigenous research methodologies this research was done by an indigenous scholar with indigenous local communities. As a result, it is rooted in the respective Indigenous worldview and promotes self-determination of the community (Chilisa, 2017). The aim of the research was to promote indigenous people by giving them voices and to be the one who brings solutions to their problems. Relational indigenous methodologies advance collaborative research that is inclusive of communities' voices. It revitalises and restores lost identities and value systems and legitimises indigenous knowledge as content and as a body of thinking (Chilisa, 2013).

This research used decolonized research methodologies. A transformative research paradigm was used as the research aim of this research is to engage with indigenous local communities and understand access and benefit sharing from their perspective. It brings voice of the participants because it gives them the authority to talk about what they want and what they do not want. Chilisa (2012), Hart, (2010), and Kovach (2010) stated that an indigenous knowledge research is guided by the four Rs (responsibility, respect, reciprocity, and rights).

The research was done by a postcolonial researcher and it was guided by the four Rs as composed by Ellis and Earley (2006), Louis (2007), Weber- Piiwax (2001) and Wilson (2008) below:

- **Relational accountable responsibility**, which implies that all parts of the research process are indeed related, and that the researcher is accountable to all. The researcher recognized indigenous values and practices.
- **Respectful representation**-the research was not biased and attention was paid to the research participants, they were listened with more than ears and was never biased. The knowledge holders who agreed to be part of the study were acknowledged The views, practices, and worldviews of the participants were respected.
- **Reciprocal appropriation** Participants were promised that they will be acknowledged in the study and also the copy of the dissertation will be given to them after completion. As a form of token of appreciation meals were bought for the participants.
- **Rights and regulations**- Ethical protocols as stated by (Chilisa, 2011: 22) were followed, all the community protocols which include asking approval from a traditional leader and also introducing the study to the research participants so as to ensure that they have knowledge on what is expected from them during the research were taken into consideration.

3.1.4. African indigenous axiology

The relational axiology was followed as described by Chilisa (2012), the participants were respected so that they can have a sense of belonging. It was ensured that the participants are respected by being representable during data collection. In some cases, some of the participants asked the researcher to put on their ancestral cloth, she never refused to do that as a sign of showing respect. The participants felt a sense of belonging because the researcher spoke the language which they understand, and they felt free when speaking, they saw that she is one of them.

In addition, the four Rs which were put forward by Chilisa (2012) which are relational accountability, respectful representation, reciprocal appropriation and rights and regulations, those four Rs were taken into consideration when conducting the research (Chilisa, 2012).

For axiology, the researcher followed Wilson's (2003) Atkinson's identification of certain principles for Indigenous research:

- The participants were enabled to have indigenous control over research, which can be demonstrated by having. Indigenous people developing, approving, and implementing the research. In addition, the researcher will ensure that the research participants become masters of their knowledge.
- The participants were respected and their culture, norms and values and it was ensured that the dress code is representable and is accepted by the research participants and the entire community. In addition, the language used during the research process/interviews will be the language that is understood by the research participant this is because people easily understand their mother tongue and they freely express themselves.
- The participants were assured to feel safe; this was done by addressing the issue of confidentiality before the commencement of the research.
- The participants were deeply listened with more than the ears. In addition, the research was not judgemental towards the research participants they were listened carefully before immediately placing a sense of right or wrong on what is shared and where one would consider what is said within the context presented by the speaker.
- The rules and regulations of the research community and all their cultural protocols.

3.3. The use of indigenous languages in indigenous local communities

Previously, study in indigenous communities was undertaken in the framework of colonialism, with university researchers assuming supremacy over communities (Khupe, 2020). Researchers only cared about research goals because they saw participant communities as lacking in resources and expertise, and hence paid little attention to their realities and potential life priorities. The research studies' processes and outcomes projected the researchers' worldview at the expense of the communities who hosted them (Chilisa, 2012). Indigenous peoples' cultural protocols, languages, and intellectual property rights were frequently ignored by researchers (Odora-Hoppers, 2002). As a result, the academics would propose remedies to problems that, in many cases, turned out to be insufficient and devalued, because, rather than strengthening communities, the solutions generated reliance at best and skepticism and even resentment among indigenous peoples at worst (Odora-Hoppers, 2002; Smith, 1999).

In this study the researcher used languages which were understood by the indigenous local communities. Sepedi and Xitsonga were mainly used when conducting the research. The reason behind the use of the language understood by the research participants is because they feel free and open when speaking in their own language. The cultural protocols were followed as the researcher asked permission from the traditional leader to do research and also informing participants before conducting the research about the nature of the research. Unlike the colonial researcher, this study aims at uplifting the communities by addressing the issues of access and benefit sharing and understanding their views on this perspective. Access and benefit sharing is also connected to knowledge protection because lack of indigenous knowledge protection led to exploitation of knowledge and consequently to no benefits arising to such cases. This research was done to give indigenous local communities unlike in the past where their voices did not matter.

3.4. Policy frameworks which guided the study

3.4.1. IKS Policy

The policy's goal is to conserve traditional knowledge and to identify traditional knowledge holders in benefit sharing agreements and other knowledge production outputs like publications (DST, 2004). Protection of TK, according to the Policy, entails ensuring that TK holders get fair and consistent acknowledgment, as well as, where appropriate, financial payment, for the use of their expertise (Sechaba, 2019). The research is guided by the IKS policy since the goal of the study is to support indigenous people by giving them a voice and allowing them to be recognized.

3.4.2. Indigenous Knowledge Systems Act of 2019

The act was used because it also speaks about the protection of indigenous knowledge. It does not end there it also states that the utilization of indigenous knowledge for commercial purposes must lead to the benefit sharing arrangements with the communities whom the resources were derived from. It also supports the implementation of national indigenous knowledge system offices to enable indigenous knowledge holders to record their indigenous knowledge for them to prevent misappropriation of knowledge. This policy is in line with the aim of the study as it advocates for providing for access and conditions of access to knowledge of indigenous communities (DST, 2019)

3.5. Conceptual framework of the study

A conceptual framework is a structure that researchers believe can better explain the natural process of the phenomenon to be studied (Camp, 2001). It is related to concepts, empirical research and important theories used in knowledge promotion and systemization advocated by researchers (Peshkin, 1993). In this section conceptual framework is included to better understand how concepts in “access and benefit sharing arrangement on African ginger with local and indigenous communities” are linked with each other. Equal sharing of benefits is central to the conceptual framework; this is because the aim of this study is to achieve this perspective. The knowledge on the use of biodiversity which includes African ginger is held by indigenous local communities. The indigenous communities are visited by bio prospectors who in most cases access the knowledge of indigenous communities without following proper ethics implemented by bio-cultural protocols, and in most

cases the bio prospectors are the once who benefit, they do not follow the policies implemented by the Nagoya protocol which states that communities should be informed about the nature of involvements and if their knowledge is commercialized they are entitled to fair and equal benefit sharing. There are many stakeholders involved in African ginger such as the marketers, bio prospectors, researchers, harvesters, traditional health practitioners' etcetera, but their activities are not well documented. The reason that this research is collected in Mpumalanga is that African ginger is natural in Mpumalanga, the communities in Mpumalanga rely on it for sustaining their primary health care system. The CSIR has claimed to have developed a benefit sharing but its effectiveness is not known. The conservation of Africa is very important because African ginger has been reported to be extinct in some parts of the country. Figure 3.1. captures the conceptual framework of the study.

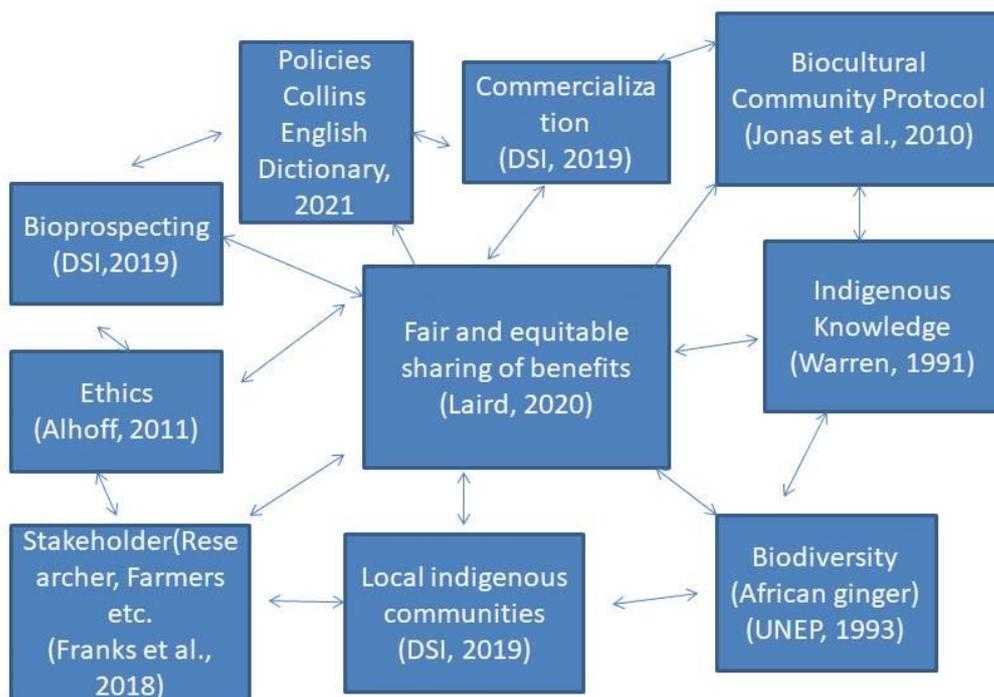


Figure 3. 1 Conceptual framework of the study

3.6. Theoretical framework of the study

The study was guided by three theories these are: the natural rights theory, self-determination theory and the personhood theory. These theories have been fully discussed below.

3.6.1. Natural rights theory

The natural rights theory of work was put forward by John Locke, who made a major claim that people own themselves (Morrisey, 2012). John Locke states that a person possesses what they have transformed from a natural state to a personal state. Therefore, only he has the right to exclude the results or products of others. God created things in nature for human use, no one has basic or natural rights over them and makes them useful (Locke, 2005).

Locke believes that every person in a natural state has the right to punish any violator, not just those who violated their own rights. Any transgression that is a transgression against the whole species, and its peace and security provided by natural law, can be withheld by every human being in this regard by the right he has to preserve humanity in general, or where it is necessary to destroy things that are harmful to them. However, this right to the preservation of mankind generally only allows violators of the law, i.e., those who unprovoked take away or impair the freedom of life or property of others, to withhold or, if necessary, to destroy (Locke, 1980). In this context, the biopiracy of indigenous biological resources and knowledge endangers the intellectual property of indigenous communities and contradicts natural law theory (Nyamongo, 2017). The natural rights theory is used in this study to emphasize the fact that indigenous local communities have the authority to own what belongs to them and to know that they have a right to punish whoever steals that from them. As Locke states that communities have the right to punish someone who violate their resources.

3.6.2. Self-determination theory

Deci and Ryan created self-determination theory in the 1970s and 1980s (Deci & Ryan, 1985). Self-determination theory (SDT) is a motivation theory that looks into a variety of topics such as gender, culture, age, and socioeconomic status. It examines what motivates people to behave and what motivates them to act, as well as how

their behavior is governed in various aspects of their lives. The explanations of SDT are based on human perceptions, cognitions, emotions, and needs as predictors of regulatory, behavioural, developmental, and experiential results (rather than sociological or physiological consequences) (Ryan & Deci, 2000). Feelings of natural fulfilment are heightened when an individual is offered a sense of choice, an affirmation of emotions, or an open door to self-study (Rigby et al., 1992; Ryan & Deci, 2000). The aspect on the feelings of fulfilment whereby individuals are given the opportunity to say what they want and have a choice in taking decisions on what affects the theory is suitable for this study because its aim is to give voices to the indigenous local communities and consequently making the masters of their knowledge.

3.6.3. Personhood theory

The theory of personality was suggested by Hegel and Margaret Latin. A person must exercise some control over things in the environment in order to achieve self-actualization as an individual, and property rights secure their control (Radin, 1982). Radin's view of this theory supports the view that people have items that are closely related to them, and their separation or loss will cause great pain to the owner, making it impossible to relieve that pain by replacing items. One of the main goals of protecting intellectual property rights, especially traditional medicine, is not necessarily to prevent their sharing, but to allow their subjects to be shared and indigenous local communities to receive adequate compensation for the use of their knowledge or their indigenous ones to conserve biological resources (Nyamongo, 2017).

Hegel's theory is since creators have the right to protect the integrity of their creation, just as they have the right to protect their own personalities. Private property rights play a role in securing personal performance (Fisher, 2001). Compared to the fruit itself, the dignity of the creator is emphasized more, because intellectual property should prevent misuse and change the expression of will of the creator (Article 32 of copyrights). This means that intellectual property is interspersed with the personality of the creator and the creator has at least given it moral rights. This is especially true in the case of copyright law, even after the owner has transferred or licensed the economic rights to others, the owner's personal rights continue to exist (Article 32 of

the Copyright Act, 2001). If someone's work is used in a way that violates their moral rights, the law gives them the right to remedy, as such behaviours harms them and, in addition to their rights, can distort their reputation. Traditional medicine is a symbol of the community that symbolise them because they are the source of their identity and are often inseparable from the communities that depend on them (Nyamongo, 2017). Traditional medicine is symbolic of the communities that own it, as they are the source of their identity and are often inseparable from the communities that depend on them (Nyamongo, 2017).

The above theories are relevant in this study because the knowledge of African ginger is held by indigenous local communities. Researcher must share with them the outcomes of the knowledge derived from the (relational contract). If they do not share the benefits with them the participant will fear to share their knowledge with other people as they do not want to lose what they survived with from time immemorial.

3.7. Description of the study area

3.7.1. Location of the study

The research was carried out in two villages, Hluvukani and Acornoek Plaza representing one Municipality of Mpumalanga province-the Bushbuckridge local municipality (BLM). Mpumalanga is divided into three districts, with Bushbuckridge falling under one of them, the Ehlanzeni district. Gert Sibande and Nkangala are the other two districts. Bushbuckridge local municipality (where the study was based), Thaba Chweu local municipality, Mbombela municipality, Nkomazi municipality, and Umjidi local municipality are the five municipalities that make up the Ehlanzeni district. Bushbuckridge is part of the Mpumalanga Province's Ehlanzeni District. Bushbuckridge is bordered to the north by Limpopo Province's Mopani District Municipality, to the east by Mozambique, to the south by Mbombela and Nkomazi Local Municipality, and to the west by Thaba Chweu and Maruleng local Municipality (Integrated Development Plan, 2015; Statistics South Africa, 2015). Figure 3.1 (A) shows the provinces of South Africa and (B) shows the district where the research took place and lastly (C) shows the villages where the research took place.

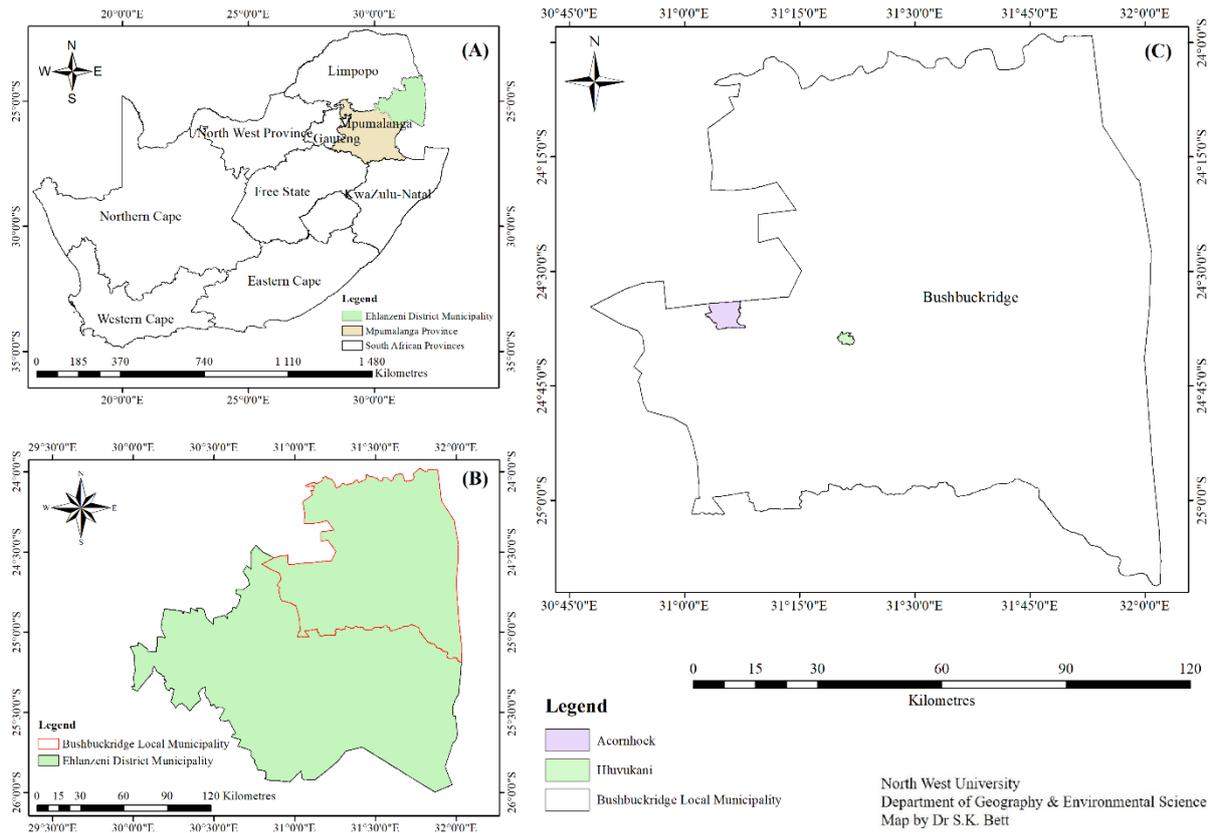


Figure 3.2 (A) South African map, (B) Number of district Municipalities found in Mpumalanga and (C) Bushbuckridge where the study was collected.

3.7.2. Population of the study area

Bushbuckridge has a population of 546 216 people (STATS SA CS, 2016). Children aged 0 to 14 and below have the highest population in the Bushbuckridge Local Municipality, with 218 954 individuals, followed by youth aged 15 to 34 with 188 500, adults aged 35 to 65 with 102 465, and the elderly aged 66 to 120 with 38 841. (CS, 2016). Females account for 295 855 of the totals, or 52.1 percent, while males account for 252 905 of the totals, or 47.9%. (Stats SA, 2011). Black Africans account for 99.55% of the population of the Bushbuckridge municipality, with whites accounting for 0.19 percent and coloured and Indian tribes representing for 0.10 percent (STATS SA CS, 2016). After Nkomazi Municipality, Bushbuckridge Local Municipality is the municipality with the highest unemployment rate. The unemployment rate is exceptionally high (46%), and many families rely on government assistance, especially child support and welfare.

3.7.3. Physiography of the study area

The municipality is located in Southern Africa's largest biome, the Savanna Biome (Spatial Development Framework, 2017). The biome is extensively developed in South Africa's lowveld and Kalahari regions, as well as Botswana, Namibia, and Zimbabwe, where it is the dominant vegetation. The Shrub-veld, Woodland, or Bushveld biome of the Savanna biome has a grassy base layer and a distinct upper layer of woody vegetation (Spatial Development Framework, 2017).

Extreme temperatures are common in the municipal area, with most summer days hovering around 35-40°C. The area's yearly summer rainfall ranges from 450 to 600 mm. Temperatures range from -4 to 45 degrees Celsius, with an average of 22 degrees Celsius (Mathebula, 2017). In some of the higher altitudes, when snowfall is possible, temperatures can be harsh. Rainfall is seasonal, with the most of it falling between November and April, while the winters are mild and dry. The elevation in these places varies from sea level to 2 000 m, with annual rainfall ranging from 235 to 1 000 mm (Bushbuckridge SDF document, 2010). In the uplands, sandy soils predominate, whereas in the bottomlands, clayey soils with high sodium content predominate. In the uplands, the bushveld is located on deep, mostly sandy to sandy loam soils, whereas in the bottomlands, it is found on clay soils with a strong structure (Spatial Development Framework, 2017).

In terms of climate, biodiversity, and the number of dams, agriculture in the municipal area possesses a distinct competitive edge (Integrated Development Plan, 2015). Despite the fact that commercial agriculture employs the majority of the population, over half of the population, especially the youth, is unemployed (Spatial Development Framework, 2017).

3.8. Cultural background of Vatsonga and Pedi tribes of Bushbuckridge local municipality, Mpumalanga province

3.8.1. Vatsonga

Xitsonga is the language of the Vatsonga tribe. Xitsonga is connected to the xironga, Xitswa, and Xichangana dialects or languages spoken in Mozambique. The Xiluleke, Xin'walungu, xidzonga, xihlave, xinkuna, and xihlangano dialects are the most common (Junod, 1927). Xitsonga is an official national language of the Republic of South Africa. It is spoken in the former Gazankulu homeland (Hlanganani, Malamulele, Giyani, Ritavi, and Mhala), Mpumalanga province, and much of Gauteng province (Manganye, 2019) Xitsonga is a South African language spoken by about 2 million people (Census, 2021). According to Mathumba (1993:63-64), the Tsonga people migrated from Zimbabwe and Zululand to Mozambique, where they occupied the area 16 from St Lucia in the south to the Save (Sabie) River in the north, and from the east coast to the west of the Lebombo Mountains in the west. Warfare and battles with the Portuguese and Ngunis, on the other hand, drove many Tsonga to flee. Many Tsongas were compelled to evacuate to the Lebombo Mountains in the west of the Transvaal due to ongoing violence and clashes with the Portuguese and Ngunis. Some went to Bushbuckridge and Lydenburg in the south, while others went to Bushbuckridge and Lydenburg in the north (Maluleka, 2007).

Nessa (2007) stated that traditional healers are known among the Tsongas as *n'anga*. The Tsonga tribe have a deep respect for their ancestors, who are seen to have a significant impact on their descendants' life. Consistent aches, infertility, and periods of hostility can all be evidence that an extra-terrestrial spirit has taken up residence in a person's body. When this happens, the person will consult a *n'anga* to determine the reason of their disease. The Indigenous Tsongas, according to Manganye (2011), believed in a *sangoma* or *nanga* (spiritual/traditional healer) as part of their traditional culture. Ancestral worship (*ku gandzela swikwembu/va le hans*) was very important to them. Each homestead used to have a tree or just a space for sacrificial purposes. Occasionally, an individual or a family would make an offering at certain locations. Snuff, traditional beer, and an animal were among the offerings (Manganye, 2011).

3.8.2. Pedi/Mapulana tribe

The Bapedi tribe of the Pedi ethnic group speak Northern Sotho, which is sometimes known as Sepedi, and they are Bantu speakers (Lebaka 2018 and Mokwana 2009). Northern Sotho, also known as Sesotho sa Leboa, is one of South Africa's 11 official languages. It has up to 30 varieties, one of which is Pedi (South African History Online, 2021; Allen and Linn, 1986). Historians believe that Pedi civilisation originated in the northern Transvaal (currently called Limpopo province). Strong Pedi chiefs claimed land from smaller chiefdoms and dominated trade routes from the interior to the coast. The Pedi began as a confederation of petty chiefdoms sometime before the 17th century. Historians also credit the Pedi for establishing the region's first monarchy, but their reign was marred by military defeats and population instability (South African History online, 2021).

Bapedi tribe seek traditional healers to defend themselves against evil spirits and witchcraft (Lebaka,2019). To impart their people's philosophy and values, as well as to maintain their cultural legacy, Bapedi tribe adhere to their ancestral beliefs (Lebaka (2019)).

3.9. Concluding remarks

This chapter was based on the philosophical underpinnings of the study. It established that the method of having knowledge is mostly based on observation, imitation and a gift from God and ancestors. It is clear from the above that knowledge is not only acquired through education but rather the indigenous methods. The next chapter is about the identification of African ginger stakeholders so as to discover the most affected stakeholders.

PROFILE OF THE CHARACTERISTICS OF STAKEHOLDERS INVOLVED IN AFRICAN GINGER SUPPLY CHAIN IN MPUMALANGA PROVINCE

4.1. Introduction

The goal of this chapter is to identify, document and profile the characteristics of African ginger stakeholders. The reason for identifying stakeholders is to find out about people's involvement with African ginger. Stakeholders are defined as "individuals or groups with legitimate interests in procedural and/or substantive aspects of corporate activity and are identified by their interests in the organization, whether the organization has any interest in them" Eskerod and Huemann (2013:40), Donaldson and Preston (1995). The characteristic in the study means the nature of involvement. The stakeholders of African ginger range from those who sell African ginger, harvest African ginger, utilize African ginger, researching on African ginger just to name few. Those stakeholders are important because when access and benefit sharing arrangement is concerned, they must also be involved.

4.2. Methodology

4.2.1. Research paradigm, design, and approach

A mixed method research approach as defined by Burke Jonson et.al. 2007 was used in the study. Unlike when a single strategy is used to a certain research, this approach leads to a greater degree of understanding being formed (Creswell & Plano-Clark, 2011). In a supporting secondary role, an embedded mixed method design was employed to help researchers and readers make sense of the overall study. It aims to elucidate, support, enhance, illustrate, and clarify the results of one approach by utilising the results of another method (Creswell & Plano-Clark, 2011).

This study used in-depth interviews to gather information from the identified African ginger stakeholders. The study also relied on secondary data from literature, Facebook, and other sources to get information about African ginger stakeholders.

Document analysis was used in this chapter to summarise the information gathered from both secondary data and primary data.

4.2.2. Unit of analysis and target population

The unit of analysis was any stakeholder who was identified to be involved with African ginger. The population ranged from researchers, marketers, and policy makers to name a few. The target population was identified through snowballing technique. A key informant in this study was Dr Bareetseng Sechaba who is also an African ginger stakeholder at the CSIR in Pretoria. The key informant was regarded as a key informant because of the direct involvement with African ginger through research and development and access and benefit sharing arrangements, hence the knowledge provided by the informant was regarded useful. The key informant directed the researcher to known African ginger stakeholders who also identified other stakeholders. This process was repeated until the names of the stakeholders were repeating (saturation). Each stakeholder was profiled by providing the names and surnames, address, and nature of involvement in African ginger. A total number (48) of stakeholders was identified. Both secondary and primary data played a role in this study. Google search engines, research publications, literature, and Facebook were also used in the study.

4.2.3. Sample size and sampling procedure

The sample consisted of 48 stakeholders which was also the population. These included: 16 academic researchers who were involved with African ginger mainly for academic reasons in order for them to obtain their degrees and graduate, 17 stakeholders were researchers who collected and published scientific papers on African ginger. Other stakeholders were involved with the commercialization of African ginger, these include the companies which develop drugs, marketers, research and development for commercial reasons etc. the commercializes of African ginger was 22 in total and finally there were those stakeholders involved with making policies on African ginger this include the CSIR, DST, DEA, and Natural justice there were 4 in total. Other stakeholder was involved with the conservation of African ginger (5).

4.2.4. Data collection tools

To collect data, an in-depth interview guide was used. (Appendix 5a). The interview guide was used for interviewing the African ginger stakeholders while the in-depth interview guide was used when searching for information using google search engines and the internet (Appendix 5b). The questionnaire was emailed to research stakeholders and data collection took place using zoom and telephonic interviews.

4.2.5. Data collection strategies

An in-depth interview guide was used to collect data from the key informant and the African ginger stakeholders who were identified by the key informant as attached in Appendix 5b. The second tool which was used it is the one which the researcher was using to acquire information on the internet and google search engines.

An email was sent to the key informant and the key informant was interviewed following the in-depth interview guide. After the interview with the key informant, stakeholders were identified and emails were also sent to them with the information about the study. The attachments which were attached in the email are the ethics approval letter, consent form and the in-depth interview guide. As for some of the stakeholders the information was acquired through research publications, literature, dissertation, and thesis.

4.2.6. Data analysis

The data of this study was analysed using document analyses, where information was summarized so that it can be understood. In addition, the knowledge gathered was separated by name, surname, in case of academic and publications the titles were also included, the addresses and contact details. In the case of policies developed, the names of the policy, year of implementation and reasons for implementing were also discussed. The information was gathered through the use of literature and reading journal also the key informant the key informant assisted in the collection of information. The information was manually written.

4.2.7. Ethical considerations

The Faculty of Natural and Agricultural Sciences (Appendix 1) ethically approved the research proposal. A letter from the university which had details on the aim of the study was used and attached to the emails sent to the research participants (Appendix 2). This letter was accompanied with the consent form (Appendix 3).

4.2.8. Risk and risk management

Few of the African ginger stakeholders responded to be part of the interview and this made the researcher rely more on secondary data. The unavailability of some of the participants was not a problem as they were only needed to confirm on whether the knowledge gathered in literature were true or not, it was used to validate the existing information collected.

4.3. Results

4.3.1. Demographic characteristics of the participants

Out of the 48 African ginger stakeholders, 22 of these stakeholders were involved in research. The type of research differs one was based mainly for academic reasons mainly for the academic researchers to submit and obtain their degrees. The academic research done was classified in the following manner: the name and surname of the stakeholders, their title of research, the names or level of the degrees obtained and their addresses. The addresses in this case were university/institutions where the stakeholders were studying when completing their degrees. There was also a section in contact details but very few information was collected especially for those who published their studies. The second method of research was focused on publications, some of the publications was to enable the researchers mentioned in the academic research to pass, while others were publishing these articles for advancing the indigenous knowledge associated with African ginger and purely for research purposes. Some were publishing to get titles and promotions in their respective institutions. The order of the stakeholders involved with publishing was as follows; the names and surnames of the stakeholder, the title of the article published, the nature of involvement, the address of the institution

where they publish their articles based and their contact details. Table 4.1a and 4.1b gives a summary and shows the order of classification.

Other stakeholders were involved with the commercialization of African ginger; these stakeholders were 17 in total. Those stakeholders were organised in the following manner: the name of the company, nature of involvement, and their address. Table 4.2. shows the summary of the stakeholders involved with the commercialization of African ginger. Four (04) of the stakeholders were involved in developing policies on African ginger. The order of the stakeholders was as follows; the name of the stakeholder, policy developed, reason for policy development and the people involved. The last stakeholders are those who deals with the conservation of African ginger, these stakeholders were put in the following manner: name of the stakeholder, nature of involvement, location, and address.

4.3.2. The types of stakeholders involved with African ginger supply chain in Mpumalanga and the nature of their involvement

There are four categories of stakeholders involved with African ginger. They are the following: the researchers who are involved with African ginger, the stakeholders involved with the commercialization of African ginger, stakeholders involved with the policy development on African ginger and the stakeholders involved with the conservation of African ginger. These stakeholders have been discussed below with the tabulated summary of their nature of involvement.

4.3.3. Researchers involved with African ginger and their activities

Some of the stakeholders of African ginger are academics who did their research on African ginger for them to obtain their degrees. The universities include the University of KwaZulu-Natal, North-West University, Cape Peninsula university, and University of Pretoria. The most researched information/knowledge about African ginger was about the medicinal properties of African ginger, research on African ginger have been done by various institutions such as universities as seen in a research on the indigenous knowledge of African ginger in Mpumalanga (Manzini, 2005). Another study was conducted investigating the medicinal properties of *Siphonochilus aethiopicus* by Light in 2002 from KwaZulu Natal University-(Light, 2002). The research on mulching, plant population and density and indigenous

knowledge on African ginger was done by Masevhe (2007). In addition, Hartzel (2011) conducted a study on the responses of African ginger on agronomic practices. Furthermore, the chemical characterization of invitro was done by Berg (2016). All the research which was done for academic reasons is summarised in table 4.1. Table 4.1 summarises the information of academic researchers identified in the study.

There are also some stakeholders who are involved with researching and publishing of information on African ginger. Some of the publications were done as requirement before submitting their degrees. Those are the people who wrote their dissertation/mini dissertation and thesis on African ginger and proceeded on publishing. They include Light (2002) who first wrote a dissertation on African ginger and published an article titled "Investigation of the biological activities of *Siphonochilus aethiopicus* and the seasonal senescence" (Light et al., 2002). And proceeded to publish on African ginger. Another stakeholder who wrote about *Siphonochilus aethiopicus* is Mokgehle 2019, she first wrote a thesis on African ginger and published an article on African ginger (Mokgehle et al., 2019). Xego and Fouche are also stakeholders who wrote their dissertations and published on African ginger (Fouche et al., 2011; Xego et al., 2017)

There are some who wrote about African ginger purely for research purposes, and a most recent published article was written by Dadaya et. al., (2021) which is focused on aromatic African ginger's volatile profile and its response to biological activities. Another recent study was by Adebayo et al., (2021) which is focused on Ethno medicinal use, biological activities and the conservation of African ginger. The Department of Agriculture also provided the guideless on African ginger (DAFF, 2014). The ARC is involved in the cultivation of African ginger research purposes (Sechaba, 2021). The invitro and in vivo anti-asthmatic properties was published by Fouche (Fouche et al., 2011). SANBI is involved with the taxonomy of African ginger and in the management and conservation of African ginger, other researches were done to advance the knowledge of African ginger and its application. These publications show that there was knowledge lacking in the uses of African ginger and some of the knowledge gathered had to be scientifically tested in the labs to find out whether the African ginger is working or appropriate in the contemporary health care

system. Table 4.1b is about the stakeholders who are involved with African, purely for research purposes and who manage to publish their studies.

Table 4. 1(a) Academic researcher's stakeholders involved in research on African ginger

Name and surname	Institution	Title of Research	Type of Degree	Nature of Involvement	Address	Contact Details	References
Tryphine Zodwa Manzini	University of Pretoria	Production of wild ginger (<i>siphonochilus aethiopicus</i>) under protection and indigenous knowledge of the plant from traditional healers	Master of Plant Production	Academic Research	Lynnwood Rd, Hatfield, Pretoria, 0002		Manzini,2005
Mashudu Ronnie Masevhe	University of Pretoria	Mulching, plant population density and indigenous knowledge of wild ginger	Master of Plant Production	Academic Research	Lynnwood Rd, Hatfield, Pretoria, 0002		Masevhe, 2007
James Francis Hartzell	University of Kwazulu-Natal	Response of the endangered medicinal plant <i>Siphonochilus aethiopicus</i> (Schweif.) B.L Burt to agronomic practices	Master of science in plant pathology	Academic research	238 Mazisi Kunene Rd, Glenwood, Durban, 4041		Hartzell, 2011

Sibusiso Xego	Cape Peninsula University of Technology	Hydroponic propagation of <i>Siphonochilus aethiopicus</i>	Master of Technology: Horticultural Sciences	Academic Research	CPUT Bellville Campus Technology way Food Science & Technology Building, Bellville South Industrial, Cape Town, 7530		Xego, 2017
Z. Berg	North West University	Chemical characterization and Invitro permeation of <i>Siphonochilus aethiopicus</i> extrac.t	Honours in Biochemistry	Academic Research	North-West University Potchefstroom Campus Private Bag X6001 Potchefstroom 2520		Berg, 2016
Salmina Ngoakona Mokgehele	University of Kwazulu-Natal	Variations in growth, yield and metabolities of African ginger (<i>Siphonochilus aethiopicus</i>) in response to irrigation regimes and nitrogen levels	Doctor of Philosophy in Agriculture	Academic re search	Agricultural Research Council, Vegetable and Ornamental Plant (VOP), Private Bag X293, Pretoria 0001, South Africa;	Mokgehele NS1@arc.agric.za	Mokgehele, 2017
Auges Gabatazi	University of Pretoria	Irrigation and nitrogen management of African (<i>Siphonochilus Aethiopicus</i>)	Doctor of Philosophy in Agronomy	Academic Research	Department of Plant and Soil Sciences, University of Pretoria, Pretoria 0002, South	auges2012@gmail.com	Gabatazi, 2019

		(Schwenf.) B.L. Burt) and Commercial ginger (<i>Zingiber officinale Roscoe</i>)			Africa		
Timothy Ivan Jasson	Cape Peninsula University	Effects of compost tea extract on growth, nutritional value, soil quality of <i>hypoxis hemerocallidea</i> and <i>siphonochilus aethiopicus</i> .	Master of Technology: Horticulture	Academic Research	Faculty of Applied Sciences, Department of Horticultural Sciences, Cape Peninsula University of Technology, PO Box 1906, Bellville, 7535, South Africa.	jassont@cup.ac.za. Tel: +2721-9596005	Jasson, 2017
Marnie Elizabeth Light	University of Kwazulu-Natal	An investigation of the medicinal properties of <i>Siphonochilus aethiopicus</i>	Master of Science	Academic research	238 Mazisi Kunene Rd, Glenwood, Durban, 4041		Light, 2002
Leylene Kruger	University of Pretoria	Development of <i>Siphonochilus aethiopicus</i> as a treatment for colds and influenza and gas chromatographic analysis of volatiles of	Master of Science	Academic research	Faculty of Natural & Agricultural Sciences, University of Pretoria, Pretoria 0002, South Africa	N/A	Kruger, 2020

		an insect repellent					
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Table 4. 1 (b) Stakeholders involved with pure research and publishing articles based on African ginger

Name and Surname	Article title	Nature of involvement	Year of publication	Address	Contact Details	References
SN Mokgehle ZS Tesfay JM Makgato	Phytochemical profiling and soluble sugars of African ginger (<i>Siphonochilus aethiopicus</i>) from different growing regions in South Africa	Research paper (publication)	2019	University of KwaZulu-Natal, Pietermaritzburg, South Africa; Agricultural Research Council–Vegetable and Ornamental Plants, Pretoria, South Africa	arayah@arc.agric.za	Mokgehle et al, 2019
S Adebayo S Mokgehle A Aremu S Amoo	Ethnomedicinal uses, biological activities, phytochemistry and conservation of African	Research	2021	1. Agricultural Research Council, Vegetables and	Amoos@arc.agric.za	Adebayo et al., 2021

	<p>ginger (<i>Siphonochilus aethiopicus</i>): A commercially important and endangered medicinal plant</p>			<p>Ornamental Plants, Private Bag X293, Pretoria, 0001, South Africa</p> <p>2. Indigenous Knowledge Systems Centre, Faculty of Natural and Agricultural Sciences</p> <p>3. North-West University, Private Bag X2046, Mmabatho, 2790, North West Province, South Africa</p> <p>4. Department of Botany and Plant Biotechnology,</p>		
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				<p>Faculty of Science, University of Johannesburg, P.O. Box 524, Auckland Park 2006, South Africa</p> <p>5. School of Life Sciences, University of KwaZulu-Natal, Private Bag X01, Scottsville 3209, Pietermaritzburg, South Africa</p>		
G Fouche S van Rooyen MT Faleschini	Siphonochilus aethiopicus, a traditional remedy for allergic asthma.	Research paper	2013	Council for Scientific and Industrial Research (CSIR) South Africa	gfouche@csir.co.za	Fouche et al., 2013
Y Naude	Investigating volatile compounds in the	Research paper	2016	University of Pretoria	Tel: +27 12 420 2517	Naude et al., 2016

R Makua V Maharaj	vapour phase of (1) a hot water infusion of rhizomes, and of (2) rhizomes of <i>Siphonochilus aethiopicus</i> using head space solid phase microextraction and gas chromatography with time of flight mass spectrometry					
NP Igoli ZA Obanu AI Gray C Clements	Bioactive Diterpenes and Sesquiterpenes from the Rhizomes of Wild Ginger (<i>Siphonochilus aethiopicus</i> (Schweinf) B.L Burt)	Research paper	2012	University of Nigeria	ngozi_igoli@yahoo.com	Igoli et al., 2012
ME Light	Investigation of the	Research	2002	University of	vanstadenj@nu.ac.za	Light et al.,

LG McGaw T Rabe CG Sparg MB Taylor DG Erasmus AK Jager J van Staden	biological activities of <i>Siphonochilus aethiopicus</i> and the effect of seasonal senescence	paper		Kwazulu-Natal University of Pretoria		2002
Department of Agriculture Forestry and Fisheries (DAFF)	Provided guidelines on wild ginger production	Research paper	2014	Pretoria, South Africa. Directorate Plant Production Private Bag X250 PRETORIA 0001	Tel. 012 319 6072/ E-mail DPP@daff.gov.za	DAFF, 2014
ARC Pretoria	Cultivation of African ginger for research purposes			Pretoria		Dr Sechaba
MS Malaka	Extraction of	Research	2017	Department of	malaka.msc@gmail.com	Malaka et al.,

<p>K Naidoo J Kabuba</p>	<p>siphonochilus aethiopicus essential oil by steam distillation</p>	<p>paper</p>		<p>Chemical, Metallurgical and Materials Engineering, Tshwane University of Technology, Pretoria, South Africa.</p> <p>Biosciences, Council for Scientific and Industrial Research, Pretoria, South Africa</p> <p>Department of Chemical Engineering, Vaal University of Technology, Vanderbijlpark, South Africa</p>		<p>2017</p>
<p>G Fouche</p>	<p>Investigation of in vitro and in vivo anti-</p>	<p>Research</p>	<p>2011</p>	<p>Bioscience Council For Scientific and</p>	<p>Tel: +27 012 841 2664.</p>	<p>Fouche et al.,</p>

N.Nieuwenhuizen V Maharaj N Harding R Nthabeleng J Jayakumar F Kirstein B Emedi P Meloni	asthmatic properties of <i>Siphonochilus</i> <i>aethiopicus</i>	paper		Industrial Research PO BOX 395 Pretoria 0001	Fax: +27 012 841 4790 E-mail address: gfouche@csir.co.za	2011
M Erasmus L du Plessis J Viljoen	<i>In-vitro</i> cytotoxicity of various <i>Siphonochilus</i> <i>aethiopicus</i> (Schweinf.) B.L. Burt extracts in combination with selected tableting excipients	Research paper (Publication)	2019	North West University, Potchefstroom, Department of health centre	Joe.Viljoen@nwu.az.za	Erasmus,2019
S Xego L Kambizi F Nchu	Effects of different hydroponic substrate combinations and watering regimes on	Publication	2017	CPUT Bellville Campus Technology way Food Science & Technology	felixnchu@gmail.com	Xego et al., 2017

	physiological and anti-fungal properties of <i>Siphonochilus aethiopicus</i>			Building, Bellville South Industrial, Cape Town, 7530		
S.N. Mokgehle, S.Z. Tesfay, H.T. Araya, C.P. du Plooy, T.N. Suinyuy	Volatile profiling of aromatic African ginger (<i>Siphonochilus aethiopicus</i>) in response to irrigation regimes and nitrogen levels	Research paper (Publication)	2019			
E Dadaya BB Koubala HN Abaissou S Zingues D Ndjonka	Antioxidant and anti-inflammatory properties of the methanolic extract of <i>Siphonochilus aethiopicus</i> rhizomes	Research paper (publication)	2021	University of Maroua Cameroon	bkoubala@yahoo.fr	Dadaya et al., 2021
NP Igoli NF Tannak IC Ezenyi AI Gray	Antiplasmodial activity of a novel diarylheptanoid from <i>Siphonochilus</i>	Publication	2020	University of Kuwait Benue State University University of	Igolij@gmail.com j.o.igoli@uam.edu.ng	Igoli et al., 2020

JO Igoli	aethiopicus			Strathclyde GlassGow		
NF Altannak JV Anyam NP Igoli AI Gray Alzharani MA	A new sesquiterpene from South African wild ginger (<i>Siphonochilus aethiopicus</i> (Schweinf) B.L. Burtt)	Publication	2021	University of Kuwait Benue State University University of Strathclyde GlassGow	dr.altannak@ku.edu.kw	Altannak, 2021
P Maphothoma R Kleynhans G Prinsloo SN Mokgehle I du Plooy HT Araya	Growth and yield of African ginger in response to application of organic fertiliser	Publication	2021	Agricultural Research Council– Roodeplaat: Vegetables, Industrial and Medicinal Plants, Pretoria 2 Department of Agriculture and Animal Health, University of South Africa (UNISA), Florida 3 Department of Horticulture,	arayah@arc.agric.za	Maphothoma et al., 2021

				Tshwane University of Technology, Pretoria		
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4.3.4. Stakeholders involved in Commercialization of African ginger

There are stakeholders who are involved in the commercialization of African ginger. These stakeholders range from marketers, Muthi markets, manufacturers of African ginger tablets. The CSIR is one of those stakeholders involved with the commercialization of African ginger, they do research and development, development of products based on African ginger, and they are also responsible for patenting African ginger. Companies such as the Phyto Nova and the Source of Health develops drugs from African ginger extracts (Van Wyk, 2011; Hartzell, 2011) Gauteng markets, Bushbuckridge Street vendors, Faraday markets, Wits traditional markets and Muthi shops are involved in selling raw products of African ginger in markets (Williams et al., 2001; Cites, 2016; Williams, 2016). There are two nurseries identified one specialize in the selling of African ginger seedlings and educating people about indigenous trees, the name of the nursery is Bvundza Mutupa Nursery. The other nursery is mountain herb nursery which sells African ginger seedlings. Table 4.2 shows the stakeholders involved with African ginger

Table 4. 2 African ginger stakeholders involved with the commercialization of African ginger

Name of the Company	Nature of involvement	Address	Contact Details	Reference
Phyto Nova (PTY) LTD	Drug Development	P S X5038, 7599, Stellenbosch, South Africa		Van Wyk, 2011
Source of Health	Drug Development	31 Lennox Rd, Greyville, South Africa	(031)309-4949	Hartzell, 2011
Gauteng Markets	Selling raw <i>siphonochilus aethiopicus</i>	Gauteng	N/A	Williams et al., 2001
Muthi Markets	Selling African ginger	Bushbuckridge	N/A	CITES,2016
Afrinatural Holdings	Suppliers of African ginger			Google search engines
Wits traditional medicine shops	Selling traditional medicines	Gauteng		Williams et al., 2001

Faraday Markets	Selling raw African ginger			
Street Vendors	Selling raw roots of African ginger and powdered African ginger	Mpumalanga Province Bushbuckridge, Arconoeck		Williams,2015 Researcher (Own experience)
Global Fusion Trading	Supplying African ginger	Cape town, South Africa	+27 84 6658096	CITES, 2016
International Cosmetic care	offers extracts of South African origin <i>S. aethiopicus</i> .	Sydney, Australia Level 2 Piccadilly Court, 222 Pitt Street	+1 604 277-2284	CITES, 2016
Cape Town medicinal plants	Supply medicinal plants	Cape town, South Africa	002723232050	Suppliers.com website
Afrigetix	Sourcing new medicinal plants in Africa and manufacturing botanical extracts made from African herbs.	381 Waterside Rd	27448771645	Afrigetix, 2021
Afriplex	Manufacture African ginger and sell its extract	Western cape		Dr Sechaba

Mountain Herb Estate Nursery	Selling plants, seeds and herbal products	Kameeldrift-West, Pretoria	082 924 3076	Mountain Herb Estate, 2021
Bvundza Mutupa Nursery	Selling seedlings of <i>Siphonochilus aethiopicus</i>	Bushbuckridge Violet Bank	072 055 8705	Key informant
CSIR	Research and Licensing agreement bioprospecting permit Benefit sharing with Development Traditional healers council	Pretoria	012 841 2911	Creamer media's engineering news,2021 and Sowetan Live Dr Sechaba
African Botanicals	Developing products on African ginger	48 Emerald Crescent Fish Hoek Cape Town	Email: info@africanbotanicals.com Phone: +27-21-782 0096	Online

4.3.5. Stakeholders involved with policies on African ginger

There are some stakeholders are involved in policy development. These stakeholders are involved in developing policies, implementing bio-cultural protocols, and by creating access and benefit sharing arrangements. Bio-cultural community protocols were created by Bushbuckridge's traditional health practitioners with the help of natural justice to allow them to benefit from sharing indigenous knowledge with outsiders. According to the key informant, the CSIR has drafted a benefit sharing agreement with the traditional healer's association, which has been published in the government gazette for public comment. The IKS Act of 2019 was created by the Department of Science and Technology to safeguard indigenous knowledge while also allowing indigenous knowledge holders to profit from sharing their indigenous knowledge for commercial uses. This Act was also implemented to guide researchers, business people and governments towards their approach/engagement with indigenous knowledge holders. The role of the research is to evaluate the effectiveness of the Bio-cultural community protocols and the policies to discover whether they are working for indigenous local communities. The IKS policy was developed to protect the indigenous knowledge associated with African ginger including other indigenous resources.

Table 4. 3 Stakeholders involved with policy development

Name of the stakeholder	Policy developed	Reason for policy development	Year of developed	People involved	Reference
CSIR	Access and benefit sharing arrangements on African ginger with traditional health practitioner	To enable the CSIR to commercialize African ginger	2014	Traditional health practitioners	Dr Bareetseng CSIR
DEA	Biodiversity Act of 2004	To enable indigenous local community to benefit from sharing their knowledge	2004	Indigenous local communities	DEA, 2004
DST	IKS Policy of 2004 IKS Act of 2019	Indigenous knowledge protection Access and benefit sharing PIC	2004; 2019	Indigenous local communities, Researchers and Bio prospectors	DST 2004; 2019

Natural Justice	Bio-cultural community protocol of the Kukula traditional healer	PIC Access to natural resources Access and benefit sharing	2009	Traditional health practitioners	Natural justice, 2009
Universities	Community engagement	Creating a relationship between the university and local communities		Researchers Local communities	North West University
Traditional leaders	Monitor access to natural resources	Inform local communities about the nature of research to be conducted		Traditional Leaders Traditional health practitioners & Traditional knowledge holders	Researcher
North West University (IKS) in collaboration with DSI	Make awareness to local communities e.g. presentation of the BCP at Moruleng village in North west	Present to communities		Researchers DSI	Researcher

4.3.4. Stakeholders involved with the conservation of African ginger

There is a time whereby KNP harvest medicinal plants from their nurseries and give them to traditional health practitioners. SANBI are involved in conducting research related to the conservation of African ginger. The traditional knowledge custodians are the holders of the indigenous knowledge of African ginger, they are the ones whom the information regarding the use of the knowledge to develop products is derived from. They have survived through using African ginger from time immemorial. They are directly involved with African ginger. They have their indigenous harvesting methods which lead to the conservation of African ginger. There is a commercial farmer who is in Mpumalanga and is ploughing African ginger. Table 5 shows the stakeholders involved with the conservation of African ginger.

Table 4. 4 African ginger stakeholders dealing with the conservation of African ginger

Name	Nature of involvement	Location	Address	Reference
Traditional health practitioners and indigenous knowledge holders	<ul style="list-style-type: none"> • Indigenous conservation methods • Indigenous harvesting method • Indigenous knowledge holders • Consumers of African ginger 	Mpumalanga	Bushbuckridge Kruger NP PO Box 176 Skukuza 1350	Researcher
Kruger National Park	<ul style="list-style-type: none"> • Have wild populations of African ginger • Conserve wild ginger • Cultivate wild 	Mpumalanga	Kruger National Park PO Box 176 Skhukhuza 1350	Researcher

	ginger and partnership with traditional healers.			
SANBI	<ul style="list-style-type: none"> • Taxonomy on African ginger • Assisting with the management of African Ginger, • Research on conservation and sustainable 	Mpumalanga, Pretoria.	2 Cussonia Ave, Brummeria, Pretoria	Lotter et al., 2006
Commercial farmer	Farming African ginger	Nelspruit, Mpumalanga	N/A	Dr Sechaba CSIR
Mpumalanga Parks and Tourism Agency	Monitoring of African ginger	Nelspruit, Mpumalanga	<u>013 759 5300</u>	Crouch et al., 2000
Harvesters of African ginger	Harvest African ginger	Bushbuckridge	N/A	Researcher
Mpumalanga Department of Agriculture	Research on African ginger	Bushbuckridge	N/A	Researcher

Violet Bank residents and learners	Taught by Brian Gajeno on how to harvest and conserve African ginger and other trees	Bushbuckridge	072 055 8705	Informant
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4.4. Discussion of findings

Stakeholders in African ginger are largely interested in research, utilization and commercialization. Because African ginger is in high demand and short supply, it was classified as one of the South African species with commercial production potential in 1993. Because African ginger has been identified as one of the South African traditional medicines that has been partly or fully developed as commercial products, and is regularly sold as crude, unprocessed drugs on traditional markets in various parts of South Africa, there is a greater focus on profiting from the commercialization (Cunningham, 1988; Williams et al., 1997; Mander, 1998; Von Ahlefeldt et al., 2003; Street et al., 2008) Mander (1998) projected that the entire volume of pharmaceutical items traded in South Africa annually could approach 20000 tonnes, with a revenue of around US\$ 60 million per year. There is a broad trend to produce and brand these as well. The annual trade in medicinal items in South Africa is estimated to be in excess of 20000 tonnes, with a revenue of around US\$ 60 million. Because there is a general trend to develop and brand these traditional items, the research aids in the development of products that resemble consumer products offered as over-the-counter medicines and herbal supplements more closely.

From the findings of the study it is clear that there is more research on African ginger. Is it possible that the study undertaken will aid indigenous knowledge communities? Written materials such as books, journals, newsletters, maps, and charts are used to store research done with indigenous knowledge communities since they are viewed as the easiest way to disseminate indigenous knowledge. In a rural area, the methods used to disseminate the indigenous knowledge are difficult or impossible for locals to access (IIRR, 1996a). To resolve this difficulty, researchers must send the hard copy of the material to the study participants. Indigenous peoples contribute significantly to research by sharing their knowledge, resources, and data. That contribution should be recognized early on by granting access to research results and negotiating research rights. Expectations of the community, anticipated outcomes, and access to study findings should all be documented.

Traditional leaders, traditional health practitioners, and indigenous knowledge custodians were previously entrusted with the responsibility of overseeing medicinal plant collection. Cultural taboos, for example, guarantee that resources are conserved. People who are not necessarily traditional healers are now active in medicinal plant gathering as a result of the rising trade in medicinal plant products (Tshisikhawe 2002, Botha et al. 2004a, 2004b). Most commercial sellers of indigenous medicinal materials are unfamiliar with the rituals associated with gathering such materials. *Siphonochilus aethiopicus* is Critically Endangered in South Africa (Lotter, et al., 2006) and endangered in Swaziland due to overharvesting (Dlamini & Dlamini, 2002). To harvest and conserve African ginger, indigenous harvesting

and conservation practices should be used to ensure that it does not become extinct in the province where it is currently found because if it becomes extinct the research done on African ginger will be useless without the exact ginger.

Despite the efforts of various stakeholders to preserve African ginger, several plant species are being researched for medical and cosmeceutical reasons, as well as commercialization (Van Wyk, 2011). In South Africa, there are an estimated 200 000 indigenous traditional healers, and up to 80% of South Africans consult these healers in addition to using modern biomedical facilities (SANBI, 2006). This explains why the bulk of African ginger stakeholders are heavily invested in its commercialization as well as research and development. According to Bruneton (1995), medicinal plants still provide a portion of daily life in South Africa. People's increasing awareness of the need for natural products to suit their daily needs has created numerous potential for enterprises based on medicinal plants. According to Mander (1997), there is a high demand for medicinal herbs in Bushbuckridge, with roughly 200 to 300 plants available.

The Kruger National Park (KNP) conserves African ginger and other medicinal plants in particular, in their respective nurseries. Findings from the study conducted by Cossa (2018) on the evaluation of the Kukula bio-cultural community protocol discovered that the Kruger National Park also work hand in hand with the traditional health practitioners as they also provide them with certain medicinal plants. The Kruger National Park also run conservation project on pepper bark (*xibaha*) the aim was to mitigate the threats to this endangered, widely used medicinal plant. The project involves building relations with traditional healers providing them with medicinal plants so they can start a community nursery to cultivate the plant (SanParks, 2012). Imbewu (seed) is a three-day visit to a national park in which a group of eight to sixteen young people is exposed to the wilderness experience. The Kruger National Park implements Imbewu. This is a method by which elders (indigenous people) pass on traditional and cultural knowledge to youth in a wilderness setting by telling them stories. The idea is to find and apply ancient ecological knowledge and learning strategies that Africans used to relate to their environment in the past. The students are required to create their own conservation groups, school or community-based environmental projects when they return to their villages and schools (SanParks, 2012). Other parties should be urged to support the interaction between the Kruger National Park and traditional health practitioners. It's a mutualistic relationship, after all.

The Kukula bio-cultural community protocols implemented by the natural justice (2009), assisted the healers in recognition and they also stated they are now able to access lands which they were previously prohibited (Cossa, 2018). The only thing that was left to be achieved by the protocol is access and benefit sharing, as the traditional health practitioners

clearly stated that they have never benefitted from sharing their indigenous knowledge (Cossa, 2018). The CSIR have a benefit sharing arrangement on African ginger, the local indigenous communities know nothing about its existence, this is because they are not made aware of its existence because it is uploaded in the government Gazette for objection. There must be a communication between the bio-prospectors and the indigenous local communities.

4.5. Concluding Remarks

From the above findings it is evident that African ginger has gained interest mostly in the commercialization and research sector. Out of all stakeholders identified There are less stakeholders who conserve African ginger for future use. There is a need for ways on conserving African ginger to be introduced in order for it not to be totally extinct in communities where it is currently found. The information which leads to research on African ginger is gathered from indigenous local communities. As such, the following chapter is focused on the uses and benefits of African ginger.

TRADITIONAL USES AND BENEFITS OF AFRICAN GINGER ACCORDING TO TRADITIONAL HEALTH PRACTITIONERS AND INDIGENOUS KNOWLEDGE HOLDERS FROM BUSHBUCKRIDGE (MPUMALANGA PROVINCE)

5.1. Introduction

The aim of this chapter is to document the knowledge associated with the use of African. Since ancient times, traditional medicine has been used to treat a variety of disorders and has been a part of human society (Watt and Breyer-Brandwijk, 1962; Van der Merwe et al., 2001). Despite the prevalence of western medicines, herbal remedies are still widely used in South Africa, with an estimated 27 million people self-medicating on traditional medicine at some point in their life (in 2002)(Cocks and Moller, 2002). For primary health care, 75 percent to 90 percent of the world's rural inhabitants rely on herbal medicine (Debnath et al., 2006). According to recent World Health Organization (WHO) estimates, more than 3.5 billion people in underdeveloped countries rely on plants as part of their primary treatment (Balick & Cox, 1996; Bodeker et al., 1997).

Traditional healers and plant-based treatments have an essential role in the health of millions of people throughout Africa (Monitor, 2002). Over 30,000 species of higher plants have been discovered to be utilized in traditional medicine in South Africa (Van Wyk et al., 1997), with about 350 species being the most widely used and trafficked medicinal plants (South African National Biodiversity Institute, 2006). There is a large amount of South African literature (Mander, 1998; Makunga et al., 2008; Mongalo, 2013; Leso et al., 2017), which confirms that both traditional health practitioners and lay people choose plants to make medication. Plant-based materials are favored, according to Dold and Cocks (2002) and Lewu et al., (2007), regardless of their conservation status. Traditional medicine is also used in Mpumalanga to keep people healthy.

5.2. Methodology

5.2.1. Research paradigm, approach, and design

Firstly, an indigenous research paradigm was used in the entire study. The researcher followed all the cultural protocols when doing the research. The researcher also ensured that the knowledge collected does not lose meaning. The researcher further ensured that the knowledge collected from the research participants remains as it is. During the data collection period the researcher learnt about the reality of Vatsonga and Pedi people of Bushbuckridge.

Secondly, a mixed method research approach was used in this chapter. The researcher used both closed ended and open-ended questions. A quantitative method was used to analyse the demographic while a qualitative research approach was used to gather deep information regarding the traditional use of African ginger from the research participants.

Finally, an exploratory research design was employed since the research was undertaken to obtain new insights, find new ideas, and increase indigenous knowledge of African ginger, as stated by Burns & Groove (2001:374).

5.2.2. Unit of analysis and target population

Individuals who are knowledge holders and traditional health practitioners in the study area served as the unit of analysis for this chapter. According to Polit and Beck (2017:743), population is the totality of examples in which the researcher is concerned. The study's population was defined as a group of persons who shared certain traits (LoBiondo-Wood and Haber, 2018:213) Traditional knowledge holders and traditional health practitioners were targeted in this study because they have the same trait of possessing indigenous knowledge of African ginger and having access to African ginger. This chapter's target population was 12, with six traditional health practitioners and six traditional knowledge holders among them. Traditional health practitioners and those with a lot of understanding about African ginger. The goal of balancing the research participants was to avoid bias.

5.2.3. Sample size and sampling procedure

A sample refers to the selected participants from the population to be part of the study (Polit and Beck, 2018: 417). A sampling on the other hand refers to the practice of choosing particular constituents from the population of the study. Both purposive and non-probability sampling were used in the study. Easterby-Smith et al. (2002:41) and Greenfield (2002:189) both endorse the use of several sampling methods, arguing that it provides more viewpoints on the problem under investigation. Purposive sampling, according to Greenfield (2002:189), is a technique in which the researcher uses subjective judgments to resolutely pick groups that the researcher believes will represent the population. There are also elements of

accessibility sampling (selecting more easily available groups) and purposive sampling that are often combined in practice. Purposive sampling in this study was used to identify research participants whom the researcher was familiar with, while the probability sampling technique was used to identify other research participants who were unfamiliar to the researcher. In this case the participants were referring the researcher to other people who use African ginger. The reason for using both is to ensure that the data collected is not biased.

5.2.4. Data collection tools

A semi structured interview guide was used in the study (Appendix 6). Interview guide was divided into three sections, section A was based on the demographic of the participants while section B focused on the investigation of the traditional uses and benefits of African ginger, Section C was based on perceptions of African ginger stakeholders on access and benefit sharing (Fully discussed in Chapter 6)

The interview was composed of both open ended and close ended questions. The observation tool was used to obtain unwritten knowledge such as the body language of the participants when answering the questions, the dress code of the research participants and the setting preferred by the research participants during data collection (Appendix 6). Some of the participants preferred the research interview to take place at their ancestral huts and they told the researcher to observe protocols such as the taking off shoes before entering the hut to show respect to the ancestors. A camera was used to take photographs whilst the audio recorder was used to record the interview sessions. Figure 5.1 shows the researcher and the knowledge holder inside a shelter where data collection took place. Figure 5.2 shows the researcher and the traditional healer inside the ancestral hut where data collection took place.



Figure 5. 1 Researcher and the knowledge holder inside a shelter where data collection took place



Figure 5. 2 the researcher and the traditional health practitioner inside the ancestral hut

5.2.5. Data collection methods

The nature of the research was explained to the participants prior to the research interview. The in-depth interview was done face to face, and it allowed probing. During this session the participants were given the opportunity to freely express themselves while listening with more than ears was taken into consideration. The participants were observed on the use body language when expressing what they were talking about. For example the use of hands to explain what they are saying and also their eyes when they are surprised. The dress code of the participants and their facial expressions were also observed.

5.2.6. Data analysis

Data analysis is based on the arrangement of the data into a final account and recognizing common themes emerging from the data (LoBiondo-Wood and Haber 2018: 140). In this chapter, two data analysis methods were used because the researcher used both closed questions and open-ended question. The first method used was the descriptive statistics method which included calculating of data. The data was calculated by dividing the total number of the participants with the frequency to get the percentage (distribution). This method was used in order to summarize the results either in graphs or table format.

The study employed thematic analysis, which is the technique of detecting patterns or themes within qualitative data (Braun and Clarke, 2006). In the thematic analysis approach, themes are defined as the end outcomes of data analysis (Braun and Clarke, 2006). The material acquired through in-depth interviews was analysed using thematic analysis.

The audio recorded data and the data obtained through field notes was transcribed in Xitsonga and Sepedi first. Then the transcribed data was then translated to English. The 6 principles which were put forward by Braun and Clarke (2006) was followed as follows; firstly, familiarising with the data collected by re-reading the transcripts, Secondly, the generation of initial code to make meaning of the data collected. Thirdly, the themes were organised by grouping all similar information of the data collected. Fourthly, themes were reviewed so as to check whether they make sense or not or whether they are in line with research questions and also with the objectives. Fifthly, the themes were defined to check whether the subthemes identified are in line with the main theme. Finally, the writing up.

5.2.7. Ethical considerations

Ethical considerations are very important in a study as they clearly show issues of confidentiality and anonymity, consent forms and non-disclosure agreement. The permission was granted by the North-West University before collecting data. Firstly, the permission letter was obtained from the IKS Centre this is attached in Appendix 3. Then the traditional leader of the research community was visited for permission to do research in their community this is given in Appendix 8. Consent form (Appendix 6) was filled in after the traditional leader was granted permission letter, the letter was attached with the North-West University, Faculty of Natural and Agricultural Sciences ethical form to apply for ethical clearance from the Faculty (Appendix 4). Once the ethical clearance is granted, permission letter from the IKS Centre was requested in order to proceed with data collection.

The participants were informed about the purpose of the study. The word Informed means that the participants were told relevant information concerning the study for them to make their decision. In addition, the information was given to the participants with the language they understand (Sepedi & Xitsonga). They were told in the first place that they have a right to agree or disagree. The consent forms were signed to show that the research participants were not forced to be part of the study. Access to the participants was gained by introduction and explanation of the purpose and objectives of the study by written letter. The participants were requested to ask questions to make sure they have understood the key details of the study. The rights of the research participant were explained to the participants. They were requested to sign an informed consent form to show that they agree to participate in the

study. This was done in accordance with Rubin and Babbie (2001) who states that participation should be voluntary. Also, the participants were assured that the information which they shared will be used only for this study

5.2.8. Principle of trustworthiness in the study

Trustworthiness questions whether the findings of the study can be trusted (Korstjens and Moser, 2018:121).

Credibility- credibility is equivalent to validating of tools a pilot study as defined by Cataldi (2018) was conducted to check whether the language used is understood by the participants or the questions asked are relevant. The pilot study was done with 6 indigenous knowledge holders from two villages which are Zoeknog and Violetbank. The pilot study added value in the research because the number of questions being asked were reduced as there were no taboos associated with African ginger. The comments of the participants were implemented as requested by the participants who were part of the pilot study. The participants who partook the pilot study were not the same as those who took part in the actual research. During the actual data collection there was a prolonged engagement between the researcher and the participants as the interviews lasted approximately for an hour. For triangulation purposes, the research questions were closed and open ended, an observation tool was also used. After transcribing member checking was done.

For the protection of the identity of the participants during the collection of demographics, the participants were given the opportunity to write their actual names or secret names, the secret names in this study are referred to as participants so and so in numbering methods/ the numbering codes was used as method of protecting the identity of the participants. To help protect the participants' confidentiality, the recorded audio files and the electronic transcripts will be stored in password protected computer folders. Printed transcripts will be stored in a locked drawer. If an article is published about the research project, the identity of the participants would be protected to the maximum extent possible. Some of the participants refused to reveal their names, while others refused to be recorded and taken a picture. In these cases, the participants were assured that the secret code format will be used so as to ensure that they are not identified. Member checking was also done to check the correctness of the information gathered.

5.3. Risk management

Some of the participants did not want to answer questions regarding the uses and preparation of African ginger. Even after it was explained that the knowledge will be used for academic reasons and also the consent form was presented. The participants insisted that they do not freely share their knowledge because it is a gift from their ancestors, and also act as their source of income. Participants in the study conducted asked for the knowledge regarding uses and benefits of African ginger which was gathered from other participants not to be documented, as they fear that the knowledge might be stolen or inappropriately used by other stakeholders. Other participants have questioned on how universities ensure that the knowledge which is collected from them is not stolen nor improperly used by others.

5.4. Results

5.4.1. Demographic characteristics of the participants in the study

92% of the research participants were female, while only 8% were male. The reason for the dominance of females in this study is that the dominant gender in Bushbuckridge local municipality is females with 55%, while only 45% are males (Census, 2011). In addition, the reason for dominance of women is that women play a critical role in the survival of their families and communities. Gathering, cultivating, and cooking food for subsistence, giving traditional medicine and therapy, collecting fuel, fodder, and water, and birthing and rearing are all common occupations. This is because they are left alone with the responsibility of taking care of children while men go to work (Lindh,2015). When a child becomes ill, they rely on medicinal plants. The dominant age category of the participants fall under 25-54 age category, followed by the 55-64 age categories. Table 5.1. Shows the age category of the research participants.

The marital status of the participants is stated as follows; 42% of the participants were married while 25% of the participants were separated. 17% of the participants were not comfortable in telling their marital status as they believe that it is their secret. One participant was single while the other participant was cohabiting which made it 8% each. The distribution for marital status is 83%, because 2 participants refused to answer the question as they found it uncomfortable. Figure 5.2 is a pie chart which summarises the marital status of the participants.

58% of the participants attended an informal education through attending initiation schools and undergoing the *Ukuthwasa* process. Other participants manage to go to school and explained their reason for dropping out was because of the calling. One participant even mentioned that she became blind and that forced her to leave school and for training to become a *sangoma*. In addition, a participant added by saying that she had severe headaches which led her to leave school. She explained that when she left and consulted a certain traditional healer, she was told that she must answer her calling by undergoing the *ukhuthwasa* process. In summary, 58 percent of the participants attended an informal schooling, while 17% of the participants attended primary and secondary education, only 8 % of the participant attended up to tertiary education. The education levels of the research participants have been summarised in figure 5.3.50% of the participants were unemployed. Their source of income came from healing and assisting their patients to undergo the *ukuthwasa* process. Two of them who own nurseries relied on the money they get from selling seedlings. Participant 8 said that she was once employed but due to her calling she was forced to leave her job. One participant stated that “*My ancestors provide for me*”.

The dominant household size was 3-4. The participants mentioned that their children got married and left and this explains the household size category. The household size has been tabulated in table 5.4.

Table 5. 1 Age category of the Participants

Age category	Frequency	Distribution
25-54 years	6	50%
55-64 years	2	17%
65 years and over	4	33%

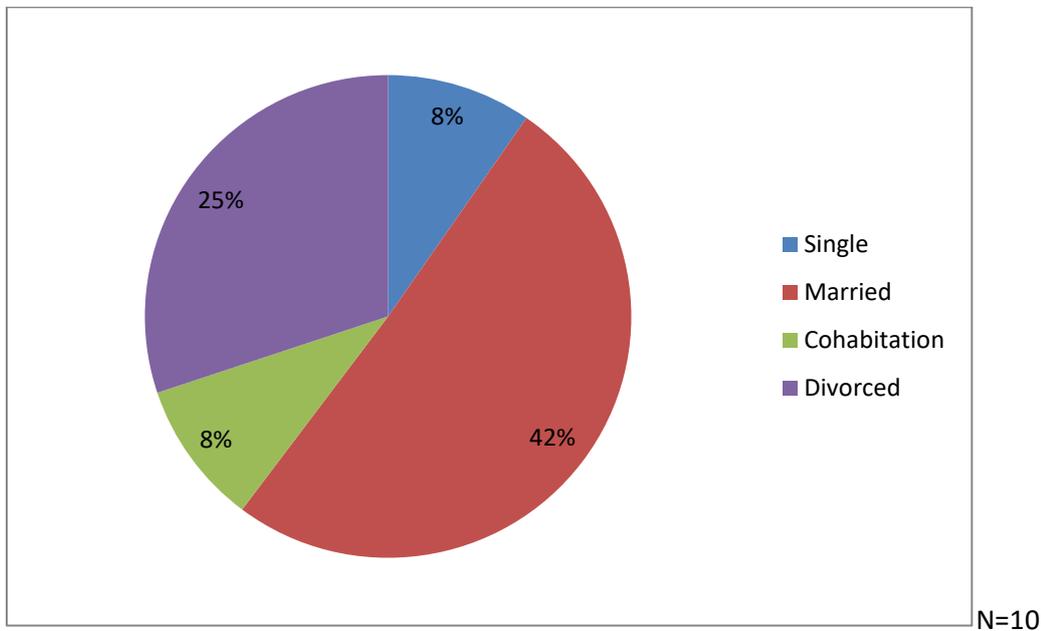


Figure 5. 3 Marital status of the research participants

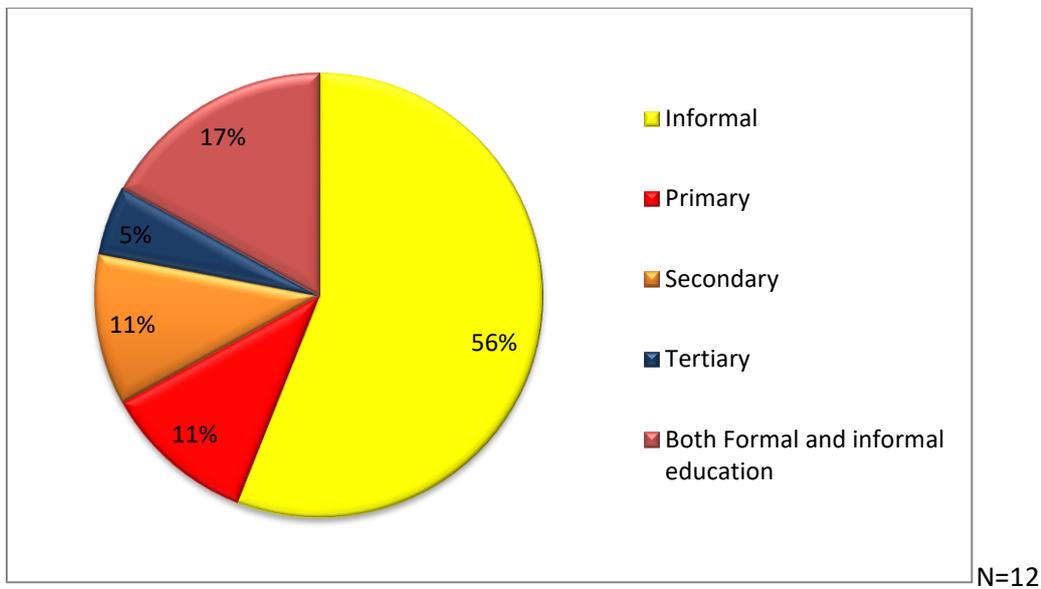


Figure 5. 4 Education levels of the research participants

Table 5.4 Household size of the research participants

Household size	Frequency	Distribution
1-2	2	17%
3-4	5	42%
5-6	2	17%

7 and more	3	25%
Total	12	100%

5.4.2. Themes emerging from the analysis of the data

There were five themes which emerged from the analysis. The first theme was the acquisition of knowledge associated with the use of African ginger and period of involvement. The second theme was the harvesting and collection method of African ginger. The third theme was the traditional uses of African ginger. The fourth theme was the preparation method of African ginger and the part used for healing and finally, the fifth theme was the fear of sharing indigenous knowledge associated with the uses of African ginger. These themes are fully discussed below.

5.4.3. Acquisition of African ginger knowledge by participants and period of involvement

The question which led to this theme was when the participants were asked how they learnt about African ginger. All the participants stated that they know African ginger and have 20 extensive years of being exposed with African ginger.

According to the participants' knowledge on African ginger was acquired from their grandparents, parents and as for the traditional health practitioners they also acquired the knowledge from the person who trained them to be traditional health practitioners (*Gobela*). The participants made it clear that the knowledge of healing using African ginger was acquired informally so without attending any formal schooling. Majority of the research participants stated that they learnt about the use of African ginger through observation, training, and imitation. The participants learnt about African ginger from their grandparents and parents, they stated that their grandparents did not stay with them or teach them, rather they observed their grandparents when using African ginger. Others mentioned that they used to go with them to the mountains and observed the harvesting methods and proceeded at home to observe whilst they made African ginger concoction. Participant 1 said "*As a first-born child I grew up staying with my grandparent when he goes to harvest African ginger, he goes me and in some other days when he is not well, he asks me to go*". The participants stated that in some cases their grandparent

will harvest African ginger in their presence and ask them to do the same, they imitate what their parents were doing.

Those who were traditional health practitioners stated that although they learnt African ginger through observation, they had to undergo the traditional health practitioner's initiation schools known as "*ukuthwasa*" as a method of answering their calling, this is where they got the opportunity to learn about the medicinal plants in details. They mentioned that they were pushed by situations to undergo the initiation. They stated that they had a calling for them to become traditional health practitioners. The participants stated that they experienced severe headaches, others went blind while others experienced frequent dreams which led them to consult, and they discovered that they must respond to their calling. The traditional health practitioner's initiation school is whereby they learn about different types of medicinal plants, their uses, and the preparation for concoction. They further stated that for one to undergo this type of training, it is not free but is rather expensive. Only those who receive a calling can undergo the *ukuthwasa* process.

In addition, the participants mentioned that they just grew up seeing their grandparents using African ginger. As mentioned in the demographics that majority of the research participants did not attend formal education because they had to answer their calling. It is clear that the method of sharing indigenous knowledge from one person to another does require one to go to school but rather anyone can transmit the knowledge. This explains the epistemology of the study as the knowledge on African ginger which is held in people's memories.

5.4.4. Harvesting and collection of African ginger

Majority of the participants stated that they harvested African ginger from the mountains then planted it in their yard. Other participants mentioned that they got African ginger from their friends and neighbours. In addition, participant 3 and 9 stated that they receive African ginger from the Kruger National Park as it sometimes gives some of African ginger to the Kukula traditional health practitioners. The participants stated that the reasons they are recognised and given medicinal plants is because the bio-cultural community protocol which they implemented caused them to be recognised and they can access some places which were previously prohibited to access. Participant one stated that

he got the African ginger seed from the Kruger National Park. Other participants mentioned that they get African ginger from town because they lack water in the communities where they are staying and the fact that the soil does not allow them to plough African ginger.

Some participants mentioned that they grow African ginger in their yard for easy access because they use African ginger frequently. Participant 9 stated that “*serokolo se soma mo dilong tse di ntsi ge e lenna ke re ke makgona tsohle*” which means that African ginger is used for many reasons. Other participants stated that they had to plough African ginger in their yard because the harvesters of African ginger do not practice good methods for harvesting African ginger. Participant 3 stated that her dream is to have her own nursery to access all the medicinal plants needed nearby. The participant stated that African ginger is needed because it can fight against the disobedience of taboos. Few of the participants stated that they are unable to plough African ginger in their yard because their soil does not allow them to plough ginger.

The participants mentioned that African ginger is always available throughout the year. They stated that even though it loses its leaves in winter, the roots are always active. They stated that they do not have to plough African ginger continuously, because it is able to provide seedlings for itself. Participant 7 said “*Serokolo se a hlabelelela se a naba*” which means that African ginger roots stretch from the inside. They stated that when in winter you cannot even recognize that there is African ginger in their yard but as for themselves, they remember because they mark where they planted with sticks or a wire for them not to forget where they harvested. The participants stated that it is not difficult to harvest African ginger and that one can use a hoe (as seen in figure 5.1.), stick or even their bare hands, as long as they know the positions of the roots, they ensure that they don't harm the entire ginger.

The participants stated that when one goes to harvest African ginger in the mountains, they obey certain protocols, this includes abstaining from sexual activities. They stated that if one forces to go without obeying protocols, they lead to the death of those medicinal plants they wither and consequently lose their healing powers. They added by saying that “*ge motho a bona kgwedi*” (menstruation) or *a le mmeleng (pregnant)*, they are not allowed to harvest African ginger. The traditional health practitioners stated that they are taught about harvesting methods which enable other people who want to harvest African ginger to find it. The participants clearly stated that there is no

difference between the African ginger harvested from mountains and the ones they planted in their yards. Participant 7 said “*pele ke ya thabeng go epa serokolo le dihlare tsa setso ka kakaretso ke thoma ke bolela le badimo gore ba ete pele*”. Which means that before harvesting African ginger they call their ancestors for guidance.



Figure 5. 5: The researcher and how they harvest African ginger in her yard

5.4.5. Traditional uses of African ginger

All the participants knew that African ginger is used to heal *mokomane* (flue). They mentioned that mostly people are attacked by flue in winter, hence they use African ginger. Participant 7 said “*Ge ngwana a fiša kemo alafa ka serokolo ka gore ga se tšee nako go šoma se tshwana le panado*”. Participant 4 supported by saying “*serokolo ga se na ngwaga mang le mang a ka kgona go se šomiša*”. Which means that everyone can consume/ heal using african ginger because it doesnt have age strictions. One participant said “*serokolo a sena diila ka gore se a ikilela*”. Participant 6 said “*batho ba bagolo ba se hlagunya gore ba fole mola ba bangwe ba nwa meetse a sona masea wona a tšhelelwa motong*” which means

that elder people chew african ginger whilst other prefer the boiled ginger and others use the powdered ginger to eat soft porridge. Others believe that if a child is having flue or is sick, they can give african ginger to the mother and the child can be healed through breast feeding.

In the *Pedi* and *Tsonga* cultures, when a new-born child's *phogwana* (fontanel) if not treated they may get sick and die. An infant is treated *phogwana* with *dipitsa* for a period of 12 months. It is believed that that a child must drink "*dipitsa*". The participants stated they African ginger is one of the medicinal plants used to heal the fontanel. The healing of the fontanel goes hand in hand with the umbilical cord. The participants believe that the umbilical cord of a child must be treated, if not treated it might lead to death or it will rot. They stated that powdered African ginger is sprinkled in the cord so as to hasten the healing process of the cord. Other participants stated that African ginger is used as a panado. Participant 11 said "*ge ngwana a fiša ke mo nwiša serokolo o fola ka pela*", which means that when a child is in heat, they use african ginger to heal the child.

In *Pedi* and *Tsonga* culture it is believed that when a woman is pregnant (*imile*) she can make her family members ill/sick if she doesn't observe cultural protocols. They can become sick. Participant 10 said "*ge motho a le mmeleng o fiwa Serokolo a se hlagunya a tshwela paketeng ya meetse moo go nwang mang le mang gore ba lapa kamoka a sa ba lwadisi ge a ba apegela goba a ja le bona*". Which means that when a woman is pregnant, she is given African ginger to chew and split the saliva in the bucket of water where everyone drinks to heal them so that they do not get sick.

In the cases of *Makgoma/makhuma* African ginger works as a preventative method. In the *Pedi* and *Tsonga* culture it is believed that when a person attends a funeral, he/she is not allowed to hold an infant to prevent *Makgoma* from occurring they ensure that there is African ginger in the yard so as to ensure that even when a person is not well when they hold the child she does not become infected. In the *Pedi* culture it is also believed that when a woman attends a funeral, she is to stay 7 days without being intimate if she disobeys this she is given *serokolo* to heal her. When a man sleeps with a person who have made an abortion he is healed with African ginger. When a man sleeps with a widow, he might experience *makgoma*.

When a man encounters erection dysfunction he is healed by African ginger. Participant 7 said "*ke sehlare sa banna ge motho a tla a gaka a ga lefele eupša wa tšea a nwa ge a kwa a le gabotse o tla a leboga*". Which means that the medicinal concoctions are for males, and everyone is allowed to drink I do not require them to pay immediately rather they thank me

when they feel fine. In addition, Participant 7 said, “I use African ginger to heal men who had an intercourse with women who have recently made an abortion”.

The research participants believe in witchcraft, they believe that if your house is not protected you can be easily attacked by evil spirits. Participant 3 said “*ndzi byala xirungulu ku sirelela munti wa mhina*”. which means that African ginger is ploughed in the yard to prevent attack by evil spirits/ witchcraft. Participant 6 supported by saying “*Motho wa tliša motse go tshwanetše a be ngaka*”. which means that although African the research participants believe that if your home is not tied witches will play as they please.

The research participants believe that it is possible for one to have bad luck which is known as *senyama*. Participant 6 said “*when someone have bad lucks maybe in getting a job or failing at school, I use African ginger to cleanse that person through bathing and steaming with boiled African ginger*”. Another participant added by saying when someone does not want to be stopped by police when travelling they must ensure that there is African ginger”.

The traditional health practitioners stated that they use powdered African ginger to enable ancestors to speak, to prevent their medicinal concoction and to wash ancestral bones. Participant 7 said “*ge motho a tlile go hlahloba ke šomiša Serokolo sa lerole gore ke kgone go bolela le badimo, se šoma bjalo ka pulamolomo*. Which means that when someone consult, they put powdered African ginger in their mouth to make the ancestors to speak. Participant 7 said “*Ke šomiša Serokolo go hlatswa ditaola*”. Which means that she uses African ginger to wash the ancestral bones. It is believed that when a person is not well e.g., menstruating is not allowed to enter the ancestral hut as they contaminate the medicinal plants concoctions. Participant 7 said “*Serokolo se kgona go ikilela bjalo pitseng enggwe le enngwe ke netefatša gore go nale serokolo gore ge motho a fihla a se gabotse dipitsa tšaka di se amege*”, which means that since African ginger is able to fight taboos, I ensure that in each medicinal concoction I put African ginger so as to ensure that there’s African ginger to protect the medicinal plants concoctions.

Other participants mentioned that powdered African ginger is mixed with marijuana and smoked to prevent lung diseases. There were other uses of African ginger which were mentioned by the research participants which includes the use of African ginger in healing chronic pains, muscle pains, depression, headache, and tonsils.

The participants stated that the healing power of African ginger and other medicinal plants in general is based on the faith or belief of the person. They stated that one can also speak with his/her ancestors or God and ask to be healed using African ginger.

5.4.6. Formulation method and parts used for healing with African ginger

Majority of the participants stated that they are using the roots for healing. When asked why they said that they were told that the power of healing with African ginger is in the roots. The research participants mentioned how they prepare African ginger prior use. Their formulation methods ranged from steaming, grinding until powdered, dry/raw, and boiled. These preparation methods are fully discussed below.

Liquid form/ Steaming: The participants stated that they use African ginger for steaming. This is whereby when a patient is not feeling he/ she is told to boil African ginger then cover himself with a blanket and inhale the steam water. Participant 6 “*Ge ngwana a lwala ke bidiša meetse mme ka tšea serokolo ka si enela mme ka leta metsotswana go re tsenelele ebile meets a gona a šale a le borutho, ka nako tše di ngwe ke kopantšha serokolo le lengana goba matlakala a mangwaba*”, which means that I boil water then after putting African ginger for few minutes and then when the water is lukewarm, I give the child to drink, in some cases I mix African ginger with guava leaves and *Artemisia afra*.

Powdered: the participants stated that African ginger is dried then grinded until it is powdered to sprinkle it in the umbilical cord of an infant to hasten the healing process. In addition, they stated that the powdered African ginger is also mixed with the soft porridge of a child so that they can be healed. The powdered African ginger is also used by traditional healers as they pour it in every medicinal concoction to ensure that they are not affected when a polluted person (menstruating women). Those who are smoking they use they powdered mixed with tobacco to prevent lung diseases.

Raw/Dry African ginger is chewed dry by elderly people to heal flue. The raw African ginger is tied in the cloth of a new-born when they leave the house to protect the child from being affected by evil spirits. Figure 5.4. is the summary of the formulation method of African ginger.

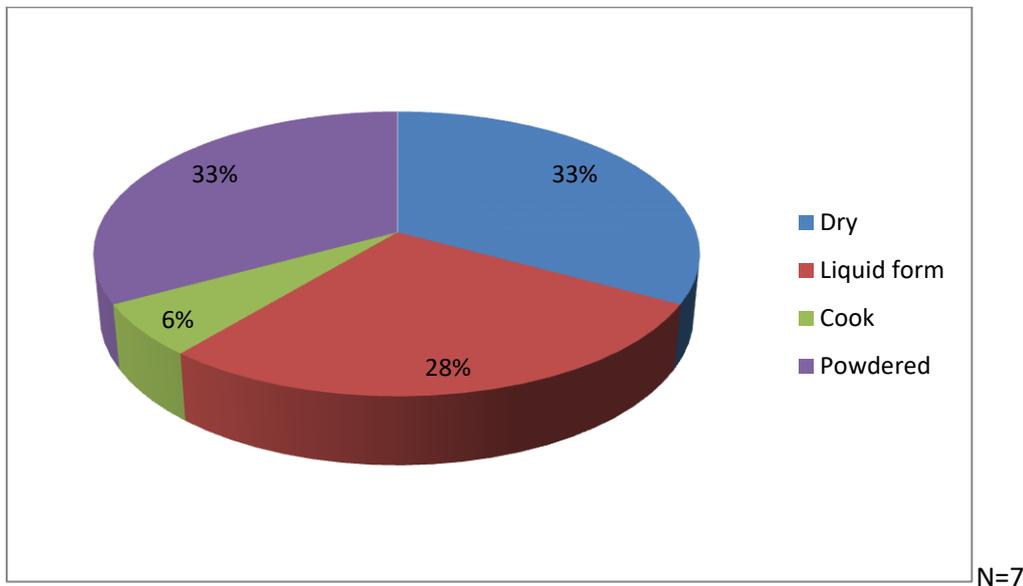


Figure 5. 6.Formulation methods of African ginger

5.4.7. Fear of sharing indigenous knowledge on the use of African ginger

The participants who did not want to share their knowledge associated with African ginger supported their statements as mentioned below.

Other participants were not free when answering the question on the uses of African ginger and they had their reasons. The participants stated that they fear their knowledge of medicinal plants can be stolen from them and people might create products out of them. Participant 2 said *"I won't tell you about the uses of African ginger. This is because I got the gift of healing using medicinal plants from my ancestors, they can be angry if I share it freely. Another thing is that people are stealing our knowledge on medicinal plants and after that we see those medicinal plants at chemist with different names. If I continue to share my knowledge freely, I will gain nothing in future because my customers and patients will prefer buying from chemists other than supporting me"*. Participant 10 said *I once experienced knowledge exploitation before and for that reason they cannot share their knowledge with anyone"*.

One participant likened the knowledge of African ginger with the one acquired from the university, this is what she said ; Participant 3 supported by saying *"It is used for many reasons/ there are many uses of African ginger, but I can't tell you because my ancestors can say that I am undermining them. They gave me this knowledge to survive not to give it away for free"*. She further stated that *"Ndzi fanisa vutivi bya mina na xikolo xa le henhla hikuva munhu a nge dyondzi a nga hakelanga. Na madokodela ma humesa mali ku va dyondza hi yona mirhi leyi. Na mina i nyiko yaku huma eka swikwembu/ Vo kokwana va*

mina swa ku ndzi tiva mirhi yaku hambana hambana ya xintu ndzi hakele govela ra mina. Loko munhu a lava vutivi bya swa mirhi ya xintu a ndzi mu nyiki loko a ngari thwasani. Vutivi bya mina ndzi vu fanisa na ngoma hikuva a wu nge byeli munhu hi timhaka tale ngomeni loko a nga yimbanga/ a nga yangi engomeni. Loko ko fika ku munhu a lava ku thwasa ndza mu nyika vutivi bya mina hikuva u te ku dyondzeni loko a heta u ta ndzi vuyerisa/hakela. Another reason is that I was once a victim of knowledge exploitation (I likened my knowledge to the higher education because they pay and learn, if you do not pay you don't learn. Even doctors pay to learn about medications. I also paid the person who taught me taught me to become a traditional healer. The only person whom I can give the knowledge to is the person whom I am teaching to become a healer as he/she will be paying me. There is a saying which says, "u cannot tell people who have never gone to initiation schools about what happened there". So, it is not easy for me to share my knowledge). Participant 8 stated that *"My ancestors won't allow me to answer such question this is because the knowledge on African ginger is a gift from my ancestors. They gave me such knowledge for me to be able to survive with. If I share it freely with people, they will feel undermined"*.

5.5. Discussion of the findings

The dominant gender for the study were female. The reason is that women are more familiar with both the field of and the medicinal value of local flora than male, (Voeks, 2007). In addition, Coe and Aderson 1996; Voek and Nyawa 2001; Kothari (2003) stated that in Brazil For example, if a person becomes unwell in the community, elder women are contacted as main health care providers for the family and community. Another explanation for the hegemony is because of females in this study is that it is the dominant gender in Bushbuckridge local municipality is female with 55% while only 45% are males (Census, 2011).

This chapter revealed that majority of the research participants used the underground roots of African ginger for medicinal and cultural purposes. The same findings of using underground parts were also discovered by Shale et al., (1999) and Semenya et al. (2013a), traditional medicine's strong use of subsurface parts is based on the belief that they have the most therapeutic qualities of all parts. As a result, it's not surprising to find that the practice of employing plant subterranean components is regularly recorded in many studies (Hutchings, 1996; Shale et al., 1999; Tabuto et al., 2010). According to Gericke, S. *aethiopicus* is recognized as a natural anti-inflammatory and is frequently referred to as "our Panado" by local South African healers (paracetamol).

The study established that African ginger is used to heal flu. In the study done by Hankey & Reynolds, 2002 the rhizomes and roots are chewed fresh to treat asthma, hysteria, colds, coughs, and flu in addition, it was also discovered that people in Limpopo province also use African ginger to heal the cough (Rasethe, 2017)The study revealed the use of African ginger in preventing evil spirits. The Xhosa of Idutywa (Eastern Cape) as they use the roots to ward off bad spirits, use powdered roots of *S. aethiopicus*, also known as isphetho. (Xego et al., 2016). The use of African ginger to protect homestead was also found by Randrianarivony et al., (2016). Further, *siphonochilus aethiopicus* is used to protect homesteads (Masafu et al., 2016). Even in this study the researcher established that African ginger is used to protect the homestead.

In this study it was revealed that the traditional health practitioners used *siphonochilus aethiopicus* to facilitate erections. The same findings were found by Noudogbessi et al., 2013 as they stated that *siphonochilus aethiopicus* facilitates erection. Manzini, (2005) in his research obtained that 75% of the respondents believed there were no taboos associated with the cultivation or harvesting of the plant. While, on the other hand, 16% said there were some restrictions when it comes to handling of medicinal plants, whether in the wild or at home (Manzini, 2005).

The findings of the study established that indigenous knowledge holders are scared to share their knowledge. Manzini (2005) also experienced the same challenge when collecting data, he stated that traditional healers suspect that researchers often gather information for their own benefit, and this forces them to protect their indigenous knowledge from people they do not know. Cossa (2018) when conducting a study doing research on the evaluation of bio-cultural community protocols experienced the same challenge whereby participants requested to be paid upfront in exchange of sharing their knowledge.

5.6. Concluding remarks

This chapter discussed the uses and benefits of *siphonochilus aethiopicus*. It is evident from the above findings that African ginger plays a crucial role in the life of indigenous local communities. Although some participants were not free in sharing their knowledge those who shared they mentioning many uses as they can. From the above findings it is evident that universities must come with a platform to convince indigenous knowledge custodians about the importance of documenting knowledge. The following chapter is based on views of the research participants regarding access and benefit sharing.

VIEWS AND PERSPECTIVES OF AFRICAN GINGER STAKEHOLDERS REGARDING ACCESS AND BENEFIT SHARING IN BUSHBUCKRIDGE (MPUMALANGA PROVINCE)

6.1. Introduction

This chapter focuses on the African ginger stakeholders' opinions and viewpoints on access and benefit sharing. Traditional health practitioners and indigenous knowledge custodians who are directly affected by the problem of benefit sharing are referred to as stakeholders in this chapter. According to the Indigenous Knowledge Systems Act of 2019, benefit sharing refers to the fair and equal distribution of monetary and non-monetary advantages under the conditions of a benefit sharing agreement between the indigenous community trustee and the license holder (DST, 2019). This chapter was written since most communities are unaware of access and benefit sharing agreements, and they do not gain from sharing their expertise. The chapter's goal is to have a better understanding of access and benefit sharing arrangements from the perspective of indigenous local populations.

6.2. Methodology

6.2.1. Approach, design, and paradigm

In this study, an indigenous research paradigm was applied this is because the research was conducted by an indigenous scholar. The participants' thoughts and perspectives on the problem of access and benefit sharing were investigated using an exploratory study approach. Finally, the study employed a mixed method research strategy to investigate the study's goal. Creswell and Plano Clark (2011) defined mixed method research as "research that uses both qualitative and quantitative methods." The qualitative approach was used to investigate the lived experiences of indigenous local communities in relation to access and benefit sharing (Streubert and Carpenter, 1999:18). In this approach, the views and perceptions of the participants were taken into consideration in an unbiased manner. The mixed method approach was used since well both open ended and closed questions were used throughout the investigation. The data was analysed using both statics and descriptive

analysis through graphs and development of themes (thematic analysis)". A recorder was used to record the interviews and a notepad was used to take notes.

6.2.2. Unit of analysis and target population

Traditional health practitioners and knowledge holders were the unit analysis for this chapter. The total number of people who took part in the study was 12. Six traditional health practitioners and six knowledge bearers were present. The purpose of having an equal population in both groups is to determine how the research participants feel about benefit sharing. In addition, the purpose of interviewing both traditional health practitioners and knowledge holders is to align with the IKS Act of 2019, which specifies that indigenous local communities have the right to benefit, not just individuals.

6.2.3. Sample size and sampling procedure

The study included both purposive and non-probability sampling. Both sampling approaches were utilized because they offer diverse views on the problem under investigation. Greenfield et al., (2002:41) and Easterby-Smith et al (2002:189). Purposive sampling, according to Greenfield (2002: 189), is a technique in which the researcher uses subjective judgments to resolutely pick groups that the researcher believes will represent the population. In practice, accessibility sampling (selecting groups that are more easily accessible) and purposive sampling are frequently combined. Purposive sampling was employed in this study to select participants were familiar, whereas probability sampling was utilized to identify other research participants who were unfamiliar. Other participants suggested other stakeholders who could be interested in participating in the access and benefit sharing concerns.

6.2.4. Data collection tools

A semi structured interview guide was used in the study. The interview was composed of both open ended and close ended questions. The observation tool was used to obtain unwritten knowledge such as the body language of the participants when answering the questions, the dress code of the research participants and the setting preferred by the research participants during data collection. Camera was used to take photographs whilst the audio recorder was used to record the interview session.

6.2.5. Data collection method

The nature of the research was explained to the research participants about the nature of the research and what is expected from them. The interviews took place in the yards of the research participants, because in-depth interview guide was used and face to face meetings were needed and enabled probing of questions.

6.2.6. Data analysis

The data was analysed using descriptive statistics and thematic analysis. The descriptive statistics were used to analyse the quantitative data collected which were the closed questions. The thematic analysis was used to analyse qualitative that (the open-ended answers). The research was analysed through thematic analysis, firstly the data collected from knowledge holders and traditional practitioners was transcribed from the indigenous local languages into English. Raw data files for the participants which were created. The data file was read repeatedly to understand what the participants were saying. The themes were derived from the information collected from the research participants.

6.2.7. Ethical considerations

The ethical consideration is the same with the ones given in section 5.2.7.

6.2.8. Risks

The aim of the research was to use three tools for this objective which are the in-depth interview guide, observation tool and focus group tool. The challenge encountered was that the research participants were not participating when they were in groups. This led to the focus of two tools.

6.3. Results

6.3.1. Themes which emerged from the study

There were 6 themes which emerged from the study. The first theme is about the perceptions of participants regarding the protection of indigenous knowledge associated with the uses of African ginger. This theme has two subthemes which are No need for indigenous knowledge protection and protection of indigenous knowledge by revealing this knowledge to certain people. The second objective is about the collaboration with African ginger stakeholders. The third theme is based on the perceptions of the participants regarding benefit sharing. The fourth theme is on the expectations of the participants from sharing their knowledge for commercial purposes. The fifth theme is about the processes involved in benefit sharing negotiations. The theme has three subthemes which are stakeholders that must be involved, skills for entering benefit sharing negotiations, and the signing of benefit sharing agreement. The sixth and last theme is about the fear of sharing indigenous knowledge associated with African ginger. The last theme misappropriation of knowledge. These themes are being discussed below.

6.3.2. Perceptions of the participants regarding the protection of indigenous knowledge associated with African ginger

There were two different views regarding the protection of indigenous knowledge on African ginger. The traditional knowledge holders mostly held the view that there was no need for the protection of indigenous knowledge associated with the use of African ginger. The traditional health practitioners on the other hand, were of the view that there is a need for protecting the indigenous knowledge associated with the use of African ginger.

As stated above, the research was done with both knowledge custodians including traditional health practitioners. All the knowledge holders explained that they do not have a problem with sharing their knowledge with their families or community members stated that they do not believe that knowledge can be stolen but rather believe that if it is shared it remains for generations. Participant 1 said *“I don’t believe that knowledge can be stolen but rather people learn from us what we acquired from our great grandparents so that the knowledge does not die but exist for generations”*. Participant 9 also said *“I don’t believe that knowledge can be stolen for this reason is share it freely with my family and community members”*. Finally, participant 5 said *“I don’t believe that knowledge can be stolen. If it was the case my grandparents wouldn’t have shared the knowledge with me”*. There are different

knowledge systems which the participants are willing to share with the outsiders. Those knowledge systems differ from participant to participant. Participant 1 said *"I am willing to share Indigenous knowledge associated with medicinal plants and also knowledge on indigenous trees as I specialize with them in my nursery, I will be happy if each and every indigenous tree could be documented this includes their uses and the importance of planting them"*.

Those who explained that they do not have a problem with sharing their knowledge with their families or community members stated that they do not believe that knowledge can be stolen but rather believe that if it is shared and it remains for generations. Participant 1 said, *"I don't believe that knowledge can be stolen but rather people learn from us what we acquired from our great grandparents so that the knowledge does not die but exist for generations"*. Participant 9 also said *"I don't believe that knowledge can be stolen for this reason is share it freely with my family and community members"*. Finally, participant 5 said, *"I don't believe that knowledge can be stolen. If it was the case my grandparents wouldn't have shared the knowledge with me"*. These views clearly show that for one to protect knowledge it is based on their experience.

In addition, the indigenous knowledge holders stated that if the knowledge is not shared it will perish and for the fact that they acquire the knowledge freely, they see a need of sharing the knowledge with others. Participant 1 said, *"As a person who learnt African ginger through my grandfather, I believe that the knowledge on African ginger should be shared. I teach my family members so that they can teach others to ensure that they survive through this knowledge for generation"*. Participant 5 added by saying *"Yes I do share my knowledge on medicinal plants with my family because I was also taught, and I want the knowledge to remain for generations"*. Participant 9 further said *"Yes, I love to share my knowledge on African ginger with youth as I become pleased when they learn about ways, we used to heal using traditional medicinal plants"*.

Participant 10 said, *"I don't see a need of sharing my knowledge with as they see me when prepare medicinal concoctions. Community members alert me when their children are sick this is because even though I am not a traditional healer I am known in my community that I have knowledge of healing using medicinal plants"*.

The traditional health practitioners stated that they prefer sharing their knowledge with only their family members. Participant 3 said *"I ensure that my knowledge is not stolen by not telling anyone and by ensuring that my family members don't share it with anyone too"*.

Participant 4 supported what was said by participant 3 by saying *"I protect my knowledge by not telling anyone about deep methods associated with the use of medicinal plants and educating my family members to also to the same"*. Participant 6 also said *"I protect my knowledge telling my family not to tell anyone because if they do, I will suffer, people will not consult me because they already know the knowledge I have"*. Participant 2 supported the statement she said *"I share the knowledge on medicinal plants with my family members because I don't want them to suffer when I pass on. As for community members I share with them only when they consult me or when one needs to be trained as a traditional healer"*. Participant 4 added by saying *"I do share my knowledge on medicinal plants with my family so that they do not suffer when I am no more. I also tell them not to tell anyone because if they do, I will not have customers or patients coming to me because they will be knowing my source of income. As for my community members the only time I share with them is when they are sick"*. The views of the participants clearly show that some participants fear sharing their knowledge not because they want to but because they fear that if they share it with anyone they will suffer as they depend on their knowledge for survival.

Other participants stated that they are not free when sharing their knowledge. Those who considered their knowledge as sacred based on what they were taught had this to support their views: Participant 2 said *"I was taught not to tell anyone about how I use medicinal plants. I also believe that if there is a need for my family members to know about medicinal plants, they will have a calling and undergo the ukhuthwasa process just like I did. If they don't have a calling, they must consult other people in case they have problems in future. As for community members they consult when they need help, I don't just share with them"*. Participant 8 said *"I don't share my knowledge on medicinal plants because I fear that it may be stolen from me. The only time I share my knowledge with someone is when they are sick, or they want to be trained as traditional healers"*. Participant 2 supported by saying *"u nge khulume swa le ngomeni na mhunu lweyi anga yimbanga"* which means that you cannot share information you learnt in initiation schools with those who have never been there. She liked the *ukuthwasa* process with initiation school.

6.3.3. Collaboration with other African ginger stakeholders

Although the participants were given options to choose for collaboration, they only chose business and government. The participants who wanted to collaborate chose to work with businesspeople and government. Some participants who were not willing to collaborate emphasized the fact that they are used by government. Participant 2 supported her statement by saying *"I do not want to collaborate with anyone because we as traditional*

health practitioners we are not taken seriously. They don't teach us how they develop products from raw materials to products, but they want us to share with them how we use our indigenous medicinal plants. Even in 2019 when Covid19 became an outbreak they knew that we can heal it using medicinal plants, but they never considered us. Municipalities organize parties for us, but we do not benefit from that". Those who wanted to collaborate explained their reasons below.

Government-Participants believe that when collaborating they should also benefit. Participant 4 said "I would like to work with hospitals or those people who are experienced in developing medicinal plants into products so that they can be able to educate me also". Participant 5 is of the view that the Western health system is weak where they are strong and strong where they are poor and vice versa and for that reason there is need to work hand in hand with them to maintain health she said "I would like to work with government especially hospitals so that when they have patients who are suffering from culture specific illness they transfer them to me as I also transfer my patients whom I think they can be healed in hospital".

For businesspeople, the research participants stated that they would like to collaborate with businesspeople so that they can educate them on how to manufacture products from African ginger so that they can be able to produce the products communally so. They stated that the collaboration will assist in fighting poverty and bringing source of income.

6.3.4. Perceptions of participants regarding benefit sharing

Some of the traditional health practitioners stated that they understand the concept of benefit sharing because when they were implementing their bio-cultural community protocols they were also taught about the concept of Access and benefit sharing. On the other hand, the knowledge holders stated that they knew nothing about it and it was their first time hear about it. There were differing views on whether there is a need to benefit or not. Some of the knowledge holders felt that there is no need for them to benefit when sharing their knowledge on medicinal plants because they also acquired it freely. Participant 1 said *"No I don't think that I should benefit because I have learnt the knowledge freely from my grandfather, for this reason I share it freely. In case where people want to reward me, I can accept that"*. Participant 5 added by saying *"I don't see a need for me to benefit because I didn't pay for the knowledge, I have with African ginger but rather I learnt freely from my grandparents"*. All in all, the other 6 participants who were knowledge holders believed that there is no need for one to commercialize indigenous knowledge.

Traditional health practitioners stated their reasons on why they think that they should benefit from sharing their knowledge. Participant 2 said *"Yes I must benefit from sharing my knowledge, because the knowledge of healing using medicinal plants is a gift from our ancestors so that we can be able to survive, another reason is that I paid to become a sangoma so I cannot share my knowledge freely"*. Participant 3 added by saying *"Yes, I think I must benefit because it is our knowledge as traditional healers given by our ancestors as means of our survival"*. Participant 7 further said *"yes I think I should benefit; this is because I use African ginger for ginger for many reasons and If I share this knowledge freely, I stand it will be the end of me"*. Participant 8 *"Yes, this is I suffered for me to get this knowledge, I got sick several times until I realize that I have to answer my calling. I didn't train to be a traditional healer freely so, but I have paid for it"*. Other knowledge holders stated that although the knowledge was acquired freely, sharing of the indigenous knowledge must lead to benefits such as employment.

It is clear that the participants want to benefit from sharing their knowledge based on the nature which they acquired their knowledge. This means that according to the participants those who entitled to benefit are the traditional health practitioners as they paid to have extensive knowledge on the medicinal plants

6.3.5. Expectations of participants from sharing their indigenous knowledge on African ginger with outsiders.

Those who did not have any problem with sharing their knowledge with outsiders had their views regarding what they want to get in exchange of sharing their knowledge. Their expectations ranged from money, consent, knowledge exchange, education and community development and knowledge documentation. Participant 1 said *"Yes the knowledge can be shared with outsiders given that they provide us with the information on how they are going to use the knowledge"*. Participant 3 said *"I can share my knowledge with government and businesspeople if they are willing to give me money, as for herbalists I will share my information with them because I know that there is a lot to learn from them"*. Participant 4 said *"I work with other traditional healers when I know that when I share my knowledge with them, they will also teach me something new. I am also willing to share my knowledge with researchers, government, and business if they can educate me to develop medicinal plants into products"*. Participant 9 said *" Yes, as for researcher they ensure that our knowledge is not forgotten in future by writing it down so that our great grandchildren can be able to read about it in future. As for business companies they can be of need in our community as they are needed to educate us on developing products out of African ginger"*. Below is the

summary of the research participants' expectations when they share their knowledge with outsiders.

Community development - The participants stated that they expect knowledge exchange with the people whom they are sharing their knowledge with. It should be a win-win situation whereby they also benefit as communities which can also be called a mutualistic relationship. Participant 1 said *"I would like to work with businesspeople, I think those companies must visit indigenous local communities and educate them on how they develop products from siphonochilus aethiopicus and also provide those machines so that these products can be locally owned for poverty alleviation and economic empowerment"*. The statement clearly shows that the participant believes that if the products are produced locally it can lead to employment.

Money- Other participants stated that they don't have a problem of sharing their knowledge with outsiders, but they want to be paid first. Participant 3 said *"I can share the knowledge on medicinal plants when they pay me. I also educate community members on signs of a calling and how they can answer their calling"*. Other participants stated that money act as an introduction to the ancestors i.e., they let them know that so they brought money to give us the way to show him/her the medicinal plants or indigenous knowledge on medicinal plants. Participant 8 said *"I want to receive money before sharing my knowledge because I have to first introduce the person who want to the research by consulting the ancestors first and introducing the person using the money so that they can give me a go ahead"*. Participant 3 further said *"I can share my knowledge with government and businesspeople if they are willing to give me money"*.

Education on developing products from raw African ginger plants - Participant 9 also said *"There must be classrooms where the youth of our community are educated about the uses of African ginger and how they can turn them into products"*. The reason for participant 4 and 9 to state that is that they must be taught how to make products because if they are able to develop by themselves, they will also be able to sell and get profit from the products they will not lose patients as they will be developing them by themselves. Participant 4 said *"I want us as traditional healers to be taught about how to develop products so that we can also be able to develop our own. Another thing when a person develops a product from our knowledge it must be known out there that this is our knowledge"*. Participant 4 said *"I am also willing to share my knowledge with researchers, government, and business if they can educate me to develop medicinal plants into products"*.

Informed consent - Those who were willing to share their knowledge on medicinal plants stated that they must be informed first about the nature of the research so that they can prepare their mind and souls. Participant 1 supported the statement by saying “*the knowledge can be shared with outsiders given that they provide us with the information on how they are going to use the knowledge*”. The above statement is supported by participant 5, 9 and 10 who were of the view that if you are informed earlier about research it easier for you to prepare your mind and soul and also reducing workload for that day to ensure that you focus on the research

Knowledge exchange -Participant 3 stated that she can share her knowledge with herbalists because she knows that there is a lot to learn from them. Participant 4 supported the statement said by participant 3 by saying “*I work with other traditional healers when I know that when I share my knowledge with them, they will also teach me something new*”. Participant 2 said “*I only want to share my knowledge with herbalists because I know that I will learn something from them also*”.

Knowledge documentation- Participant 9 is of the view that researchers assist in documenting knowledge for future generations because themselves as knowledge holders can perish but if the knowledge is written down it shall live for generations. She supported her statement by saying “*I prefer to work with researcher because they ensure that our knowledge is not forgotten in future by writing it down so that our great grandchildren can be able to read about it in future. As for business companies they can be of need in our community as they are needed to educate us on developing products out of African ginger*”

Acknowledgement/ self-determination- The issue of acknowledgement was also raised by Participant 8 and participant 11 who are of the view that when one conducts a study with them or develops products from their knowledge, they mentioned that they got the knowledge from them. Participant 8 supported the statement by saying “*I want it to be known that the knowledge on African ginger is ours and even in newspapers it must be written also*”. Participant 11 added by saying “*I want people to know that the knowledge on African ginger and other medicinal plants is ours. When a person writes a book or a newspaper it should be acknowledged that this knowledge come from us. When one develops a product out of African ginger a picture of us as traditional healers should be shown. Even the company that robbed us should have kept its promise so that we trust other people who come and do a research with us*”.

Plastics and fence- Participant 1 said "I want to benefit with plastics and fence for my nursery". He stated that the plastics are need for him to plant more indigenous medicinal plants and trees. Participant by participant 3, 10 and 8 who are of the view that they should provide with a fence as some has already have a land to plough variety of medicinal plants. Participant three also said "*I want a fence for my small nursery at home*".

6.3.6. Issues involved in access and benefit sharing negotiations

6.3.6.1. Choice of the stakeholders to be involved in the negotiations

Majority of the participants stated that a person who should be made aware of benefit sharing agreement negotiations is the counselor of the community or induna. They believe that those who lead their community must be made aware about anything happening within their communities. Participant 2 said, "*I also introduce my patients and mathwasana to induna and our traditional leader so as to ensure that they know if anything goes wrong*". In communities where they are ruled by traditional leaders, they stated that they let the traditional leader know so that they are aware of anything which happens in their territory. The traditional health practitioners who have organizations stated that their chairperson must be made aware of these negotiations.

6.3.6.2. Negotiation skills in access and benefit sharing

Majority of the participants stated that they did not have skills of signing a benefit sharing but they are willing to learn through workshops and training. Those who had experience of knowledge exploitation and medicinal plants said that they are no longer willing to be part of any access and benefit sharing negotiations. They want to benefit on the spot if you want to benefit them with money then you give them, and they show you the indigenous medicinal plants and indigenous knowledge associated with the plants. Those who never entered any benefit sharing agreement said that they are not willing to partake benefit sharing discussions because the money which might be given to them will not be enough compared to the money they are doing daily with consultations and training other traditional health practitioners to be traditional healers. They said that the money can finish but their knowledge will be gone forever.

6.3.6.3. Signing of a benefit sharing agreement

Knowledge holders stated that whoever is situated within their communities are capable of signing benefit sharing agreements as they believe that indigenous knowledge on medicinal plants is communally owned hence no one can claim sole ownership. Indigenous knowledge on medicinal plants. Traditional healers believed that they have entitlements to individually sign access and benefit sharing agreements because they suffered to get this knowledge from calling, leaving their education and employment behind. Those who were not interested in anything to do benefit sharing agreements said Participant 8 said *“My knowledge is sacred, and my ancestors can punish for publicly sharing the knowledge they gave me for survival and helping my people*

6.3.7. Fear of sharing knowledge due to misappropriation of indigenous knowledge

Some of the participants stated that they knew nothing about the existence of benefit sharing arrangements and they have never benefited from sharing their knowledge. Participant 10 said *“I don’t even want to be part of benefit sharing because the money promised can be low as compared to the money, I make daily through healing patients and training people to become traditional healers”*.

Participant 3 said *“No I have never benefitted, the company which came and wanted our knowledge on medicinal plants used as cosmetics. We gave them a medicinal plant known as hlampfura and explained how it is used to make lotion traditionally. They promised that they will come and give us feedback. We waited for them only to come and tell us that the plant is everywhere and also the knowledge, so we are not entitled to the benefits. Since then, I don’t trust anyone when it come to my traditional knowledge on medicinal plants”*. The statement of participant 3 was supported by participant 11 who had the same experience. Participant 2 stated that *“No, I have never benefitted from researchers or businesspeople who seek my knowledge. The only time where I get profit is when patients thank me for healing them and when I train someone to be a sangoma”*. Participant 8 further said *“No, I am not even willing to benefit because we as traditional healers we are undermined, when*

they have a crisis in the country, they forget about us". All in all, majority of the participants stated that they have never benefitted from their knowledge

The participants stated that they are experiencing challenges when they must work with government. Participant 2 said *"Mhina a ni lavi ku vueriwa hi nchumu hi swaku a vutivi bya mhina a ni nyikani. Vhanu va mfumo va tlanga hi hina va lava hi va byela gi ta mi mhiri ya xito vona a va hi byeli hi byeli ku ya von ava I endla njani. Swi nwani na kambe hina a hi tekeriwi a nhlokweni tani hi tinanga loko tiko ri hlaserwe hi mababyi a ku nga nyikani vurongo a va hi tsundzukangi hina*. The participant stated that she does not want to work with anyone as they are being used by the government. This is because they want them to tell them about their traditional medical plants and their uses, but they won't tell them about how they make their Western drugs. She also added by saying that they are not considered as traditional healers because when the country experienced Covid-19 their roles as traditional healers diminished. Participant 8 said *"If I share my knowledge I might lose customers because people will prefer buying the end products rather than consulting me"*.

Participant 8 said *I do not share my knowledge on African ginger Because the knowledge on African ginger is a gift from my ancestors. They gave me such knowledge for me to be able to survive with. If I share it freely with people, they will feel undermined*. She further added by asking "what is it that the university is doing to ensure that the knowledge does not go to the outside world". Other participants stated that benefit sharing arrangements is a long process, hence they prefer to benefit on the spot.

6.4. Discussion of the findings

Some of the participants stated that they want to be paid first before sharing their knowledge. This practice is also done by the Dene, a northern Canadian aboriginal community, have created procedures that outside researchers must follow when studying in their communities (Grenier, 1998). These rules require that local people should be paid an hourly pay for sharing their knowledge, and that an attempt be made to train and hire local people such as researchers, in addition to outlining the minimal circumstances under which Dene knowledge can be accessed, gathered, preserved, and used (Grenier,1998.).

Other participants stated that they prefer to benefit and does not need to sign a benefit sharing agreement. This is because benefit-sharing agreements can take time to develop and negotiate. Because of a lack of understanding of ABS laws and execution within Ethiopia, the cultivation and development of *Eragrostis tef*(tef) in Ethiopia took ten years to

accomplish (Wynberg, 2008). Because commercialization is far from certain, a holistic approach to benefit-sharing is required. Benefit-sharing should not be solely rely on successful development, but should also provide for immediate and tangible benefits to be realized (Wynberg, 2004).

The research participants feared sharing their knowledge because they fear that the information, they give might be taken away from them without their knowledge. A medicinal plant known as Engokirkir (in Maasai language) can be found in Tanzania's semi-arid and desert areas. The Parakuiyo pastoralists have long utilized the Engokirkir plant for medicinal, such as to treat stomachaches, as well as for food and blessing and peace rituals. Pickers are hired by an unnamed company situated in Dar es Salaam City to collect the plant's roots in rural parts of Tanga's Handeni district. The roots are thought to be used to make perfumes and tablets by the corporation. Due to the lack of ABS regulations/agreements, local community members who assist in locating and gathering the plant's roots are rarely considered in the distribution of the subsequent benefits. (McGown, 2006).

The findings of the study shows that some of the traditional knowledge holders did not want to benefit from sharing their knowledge because they acquired it freely. TK rights to traditional medicinal knowledge are generally exchanged freely between cultures and neighbouring groups over decades, according to Dutfield (2004). Maundu (1995) further stated that indigenous knowledge IK may be recorded and conserved for future generations to ensure that it does not perish with the death of elders. Furthermore, IK can be legitimized in the eyes of younger generations by presenting it in a format that places it on an equal footing with the international knowledge system, which they are exposed to in state-run schools and through television and radio; IK can be taught to younger generations as a regular program in schools or other flora; IK can be made available to the community's least knowledgeable members. People can improve their IK by using study or personal experience, which they can then pass on. Through the examination of data, problems and solutions can be recognized.

The participants stated that they fear sharing their knowledge because when they do people will buy from the chemist rather than coming to them hence others suggested that it will be good if the companies provide them with the machines and educate them on how to develop products so that they can be communally owned. The same findings were found by Manzini (2005) as a majority (71%) of her participants said they would buy more if medicine were to be sold in modern packaging.

The findings of the study established that the participants are concerned about knowledge protection. The national Recordal system was implemented by the DST in 2004 (Amechi, 2015), The Department also introduced the National Indigenous Knowledge Systems Offices (NIKSO) as part of its mandate about the indigenous knowledge systems Act. The Recordal systems may play a crucial role in ensuring that indigenous knowledge holders are protected from exploitation through recording and documenting their indigenous knowledge/ biological resource, this will act as evidence/preventative method to bioprospectors, it will also assist in the easy identification of knowledge holders.

The issue of the existence of the benefit sharing arrangement on African ginger is confusing because all the research participants interviewed in the study stated that they knew nothing about its existence. Even in literature Badley (2018) stated that “Although African ginger is already a commercially successful crop in South Africa, it is hoped that if an African ginger product ultimately achieves the necessary regulatory marketing approvals for asthma, it will provide not only an important treatment for a life-threatening condition, but also significant value-added revenues that will be shared with Indigenous knowledge holder communities”. This statement means that there is no benefit sharing agreement, but as soon as African ginger passes its marketing for asthma that is when the communities will benefit.

Sechaba & Mika (2019) in their article stated that there were no monetary (financial) benefits that were paid to the traditional healers’ committee in terms of the benefit sharing agreement, 2003. However, the traditional healers’ committee was trained on agro processing, i.e., extract preparations to making formulations (Capsules, Teabag, and creams). The participants interviewed in the study knew nothing about the training of the healers hence one of the issues raised when it comes to benefit sharing arrangements is that they want to be trained on developing products so that they can benefit.

Through literature readings, a benefit sharing agreement signed between CSIR and traditional health council was discovered (DEA, 2014). The Benefit Sharing Agreement involves the utilisation of the following plant species: *Monsonia anustifolia* (Crane's bill, *malengoana*, *Tee ya thaba*), *Elephatorthiza elephantina* (Dwarf Elephant-root, *Elandsboontjie*, *Intolwane*, *Mositsane*) and *Siphonochilus aethiopicus* (Natal Ginger, *Gemmerhout*, *Indungulu*) to develop potential commercial products DEA (2014). According to BABS there must be a document which needs to be signed by community members’ representative to show that they have knowledge about the existence knowledge, there is no such document in benefit sharing uploaded (BABS, 2015).

The participants knew nothing about the benefit sharing agreement. The department must find a solution of enabling indigenous local communities to know about what is happening especially the issue of benefit sharing which includes the utilization of indigenous medicinal plants.

6.5. Concluding remarks

This chapter was focused on access and benefit sharing arrangements on African ginger. The findings of the above chapter clearly show the difficulties of benefit sharing arrangements as majority of the participants were not in favour. In the above findings it is evident that the neither the traditional health practitioners nor the knowledge holders are aware of any existing of access and benefit sharing arrangements on African ginger. Although a document was published by government gazette that there is a signed document between CSIR and traditional health practitioners. Those who were once exposed to access and benefit sharing arrangements stated that they were robbed of their knowledge and never benefitted anything. The challenge that it is mostly encountered by the traditional health practitioners is the fact that access and benefit sharing arrangements are uploaded online communities are not given the opportunity to object whatever it is said. Even though in the article written by Dr Sechaba it is stated that they are assisting traditional health practitioners but none of the research participants was aware of this action, hence they recommended that the companies should give them the machines and educate them on how to develop raw medicinal plants just like modern medicine.

GENERAL DISCUSSION, CONCLUSION AND RECOMMENDATIONS OF THE STUDY

7.1. General discussion

The findings of the study indicated that indigenous knowledge holders and traditional health practitioners are the custodians of indigenous knowledge of African ginger and have the authority to control how the knowledge is utilized and who access the resource itself. Hence the natural rights theory was used. The first objective of the study was based on the stakeholder's identification; it was evident that majority of the stakeholders were not located in the Mpumalanga province. This calls for a need for an awareness campaign on the African ginger.

The participants were concerned about how their knowledge will be protected by the university after submission. They fear that third parties who read the submitted work may develop products of African ginger without their knowledge. This problem caused them to be hesitant to freely share their information. Posey (1996) & Laird (2002) support the participants' viewpoints, stating that while sustainable development researchers may not be interested in commercially exploiting indigenous knowledge, they must be aware of the possibility that they may unwittingly pass information on to people who are reading those publications (e.g., through publication) (Posey, 1996). The utilization of biodiversity in academic research may lead to bioprospecting, or commercialization, through publications, databases, and other vehicles that make knowledge and study results available to the public (Laird, 2002).

There is a need for universities to come with strategies to protect the documents submitted especially which involves uses and preparation methods of medicinal plants. Most participants are blaming researchers, they said that how can they say they document the knowledge, whilst assisting exploiters to continue exploiting their knowledge through publications and submission of documents to the libraries. The views of the participants were valid because the researcher obtain a degree with their knowledge, other get promotions when they publish their findings. How about them the custodians of this knowledge. An agreement has to be reached between stakeholders involved to compensate the knowledge holders as they contribute much to the research arena which also leads to drug discoveries.

The study expected to discover more traditional uses of African ginger, but the traditional health practitioners stated that they need payment upfront as they use this knowledge for survival. When it comes to benefit sharing arrangements, it is a challenge as it is mostly

uploaded in the government gazette, this method favours certain stakeholders such as the researchers who are literate and have access to internet. As for traditional health practitioners and knowledge holders they know nothing about existence of benefit sharing arrangements. The benefits sharing agreement is put online for 30 days for objection and without any objections it is approved. This shows that the opinions of the indigenous knowledge custodians do not matter. There must be a way that bio prospectors inform traditional healers about access and benefit sharing agreements.

The study only focused in one district of Mpumalanga Province which is Ehlanzeni district. This is a limitation in a sense that the findings of the study cannot be generalised on the representation of access and benefit sharing arrangements on African ginger in the entire province of Mpumalanga. The research participants who agreed to be part of the research study were located in different villages. The study focused mostly in the Bushbuckridge local municipality, Mpumalanga province of South Africa with knowledge holders of African ginger, hence the main aim of the study was to do a research in all the districts found in Mpumalanga province and other district found in the Limpopo province. The Covid-19 pandemic led to the total removal of the Limpopo province and only focused on one province due to the strict protocols which were put in place and consequently led to study to focus mostly in one district of Mpumalanga province due time constraints. Most of the targeted research participants wanted to be paid in turn for sharing their knowledge. Other participants felt uncomfortable with giving answers for objective two which is “uses and benefits of African ginger”. When the key informants refer a researcher to a certain participant that person sometimes refuses and say that they know nothing about the research phenomenon. The time given for the study completion was short, given that there are many African ginger stakeholders.

Some of the participants who were not willing to tell the researcher about the uses of African ginger and concoction preparation asked the researcher not to document the knowledge gathered from other research participants as they are scared that she was going to sell their knowledge. Even after explaining to them that it was for academic reasons, they asked about the issue of leaking of information i.e., how will my supervisor ensure that the knowledge documented will never go to the outside world/will never be known. The researcher showed them the consent form, but they were still in disbelief that was the biggest challenge.

7.2. Conclusion

The research was about the access and benefit sharing of African ginger with indigenous local communities in Mpumalanga. It followed an indigenous research approach to collected data. The identification of African ginger stakeholders proved that stakeholders are not concerned about how their research benefit the community nor the impact associated with the commercialization of African ginger. The study revealed many traditional uses of African of which some were not told to the researcher due to fear of indigenous knowledge. It was also discovered that the researcher who claim to be doing research for academic reasons can also be labelled as bio prospectors, this is because of their inability to control how the knowledge is used, in presentations and by publishing their studies they attract the third parties. On the access and benefit sharing aspect it was discovered that indigenous knowledge has no knowledge regarding benefit sharing agreement on African ginger. With the above given, it can be concluded that South Africa still have a long journey to go, in ensuring that indigenous local communities are informed about any benefit sharing (this is because benefit sharing a concluded by people who are not even indigenous). Compensation of indigenous knowledge in exchange of their knowledge should be made mandatory.

Findings of the study revealed that acknowledgement of research participants either in research, presentation or when products derived from their knowledge are produced it must be clearly state that it was acquired from their knowledge. The method of acknowledging stakeholders can act as a tool to prevent knowledge exploitation; this is because when a document is published bio-prospectors will know relevant stakeholders to approach.

7.3. Future research directions

- Given the fact that the findings of the study showed that many stakeholders of African ginger. There must be research conducted on access and benefit sharing model.
- Awareness campaigns on the existence of access and benefit sharing arrangements should be done.
- The impact of indigenous knowledge exploitation on the livelihood of indigenous local communities.
- The role of National recordal systems in the prevention of knowledge exploitation and misappropriation among the indigenous local communities.
- The evaluation of the effectiveness of the implementation of National Indigenous Offices in South Africa.
- The impact of western intellectual property right on the protection of Indigenous knowledge

7.4. Recommendations

- The government should consider working with traditional health practitioners or involve them in case there are health issues just like the pandemic of Covid-19 and see their roles.
- Policy developers should also involve knowledge holders and traditional health practitioners so that they can be able to develop relevant policies which suites them.
- Intellectual properties should be on the indigenous knowledge systems perspectives.
- Researchers and government should share benefits with knowledge holders If the knowledge is to be used for commercial purposes. They must tell them the truth on how the knowledge is going to be used, to avoid the challenges whereby traditional health practitioners and knowledge holders are scared to share their knowledge due to knowledge exploitation.
- Businesspeople should provide machinery equipment for indigenous local communities and educate them about how they develop products from raw medicinal plants to ensure that these products are locally owned and benefit the community in fighting the high rate of unemployment.
- If a benefit sharing agreement is lodged online, communities should be made aware through advertising in social media platforms and visitation of communities to find their perspective on what transpired.
- The Department of education should educate children about access and benefit sharing arrangements at an early age so that they can educate their grandparents about it so that they do not experience knowledge exploitation.
- Access and benefit sharing should be implemented in the curriculum to educate learners about it so they can also educate their great grandparents.

References

Adebayo, S.A., Amoo, S.O., Mokgehle, S.N., & Aremu, A.O. 2020. Ethnomedicinal uses, biological activities, phytochemistry and conservation of African ginger (*Siphonochilus aethiopicus*): a commercially important and endangered medicinal plant. *Journal of Ethnopharmacology*, 266 (1) Available online at: <https://doi.org/10.1016/j.jep.2020.113459>.

African Botanicals. 2020 Nature's Healing gifts South Africa. Pretoria Accessed at <https://africanbotanicals.com/> on the 9/ 11/ 2021

African Regional Intellectual Property Organization (ARIPO). 2010. *Swakopmund Protocol on the Protection of Traditional Knowledge and Expressions of Folklore*; Diplomatic Conference of ARIPO: Swakopmund, Namibia.

African Union Commission. 2015. The African union guidelines for the coordinated implementation of Nagoya Protocol on ABS. Addis Ababa, Ethiopia.

Ajei, O.M. 2007. *Africa's Development: The Imperatives of Indigenous knowledge and Values*. Pretoria: Unpublished Thesis. University of South Africa.

Alexander, M., Chamundeeswari, K., Kambu, A., Ruiz, M., & Tobin, B. 2004. The role of registers and databases in the protection of traditional knowledge: A 240 comparative analysis.

Allen, H.B.; Linn, M. D. 1986. "Introduction to Dialect Theory", *Dialect and Language Variation*, Boston: Academic Press: 3–4,

Allhoff, F., Patrick L., & Steinberg, J. 2011. Ethics of human enhancement: an executive summary. *Science and Engineering Ethics*, 17(2) :201-212.

Al-Tannak, N.F., Anyam, J.V., Igoli, N.P., Gray, A.I., Alzharani, M.A. & Igoli, J.O., 2021. A new sesquiterpene from South African wild ginger (*Siphonochilus aethiopicus* (Schweinf) BL Burt). *Natural Product Research*, pp.1-6.

Amechi, E.P. 2015. Leveraging traditional knowledge on the medicinal uses of plants within the patent system: the digitisation and disclosure of knowledge in South Africa. *Potchefstroom Electronic Law Journal*, 18(1): 3101-3701.

Andrzejewski, A., (2010). Traditional knowledge and patent protection: conflicting views on international patent standards. *Potchefstroom Electronic Law Journal*, 13(4): 94-125.

Ani, C. K. C. 2013. Redefining the Concept of Women Empowerment: The Vision and Quest for Equality and Partnership in the Post 2015 Development Era. Special Gender and Development Publication, New York: United Women (UNIFEM).

Bacon, B.T., 2003. A pragmatist and feminist relational epistemology. *European Journal of pragmatism and American philosophy*, 2(1): 1-11.

Baigas of Tatidhar Village. 2012. Bio-cultural Community Protocol of the Baigas, Tatidhar Village, Marwahi Forest Division, Chattisgarh. New Delhi: UNDP.

Balick, M.J. & Cock, P.A. 1996. Ethnobotanical Research and Traditional Health Care in Developing Countries. Plants, People and Culture. The Science of Ethnobotany.

Barber, c., Glowka, L., & La Vina, A. (2002). "Developing and Implementing National Measures for Genetic Resources Access Regulation and Benefit-Sharing." In Biodiversity and Traditional Knowledge, edited by Laird, S. Earthscan: London.

Berg, Z. 2016. *Chemical characterization and invitro permeation of Siphonochilus extract*. Unpublished Honours Mini-Dissertation, Potchefstroom: North West University.

Berkes, F., 2009. Indigenous ways of knowing and the study of environmental change. *Journal of the Royal Society of New Zealand*, 39(4):151-156.

Bienabe, E., Bramley, C. and Kirsten, J., 2009. An economic analysis of the evolution in intellectual property strategies in the South African agricultural sector: The rooibos industry. The economics of intellectual property in South Africa, pp.56-83.

Bishop, R. (2005). Freeing ourselves from neo-colonial domination in research: A Kaupapa Maori approach to creating knowledge. In N. K. Denzin & Y. S. Lincoln (Eds.), *The Sage handbook of qualitative research* (3rd ed., pp. 109–138). Thousand Oaks, CA: Sage.

Bodeker, G., Bhat, K.K.S., Burley, J. & Vantomme, P. (1997). Medicinal plants for forest conservation and health care. Food and Agriculture Organization of the United Nations. Oxford, UK.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101. <https://doi.org/10.1191/1478088706qp063oa>

Brendler T. 2021. From Bush Medicine to Modern Phytopharmaceutical: A Bibliographic Review of Devil's Claw (*Harpagophytum* spp.). *Journal of Pharmaceuticals*, 14(8):725-726.

Brendler, T. & van Wyk, B. E. 2008. A historic, scientific and commercial perspective on the medicinal use of *Pelargonium sidoides* (Geraniaceae). *Journal of Ethnopharmacology*, 11(1): 420–33.

Brink, M. 2013. *Implementation of access and benefit sharing policies in Sub-Sahara Africa: inventory, analysis, and proposals*. Centre for Genetic Resources, Netherlands. <https://edepot.wur.nl/280508> Accessed 5 August 2021

Brush, S.B., 2005. Protecting traditional agricultural knowledge. Washington University *Journal of Law & Policy*, 17(1): 59-60.

Buck, M. & Hamilton, C., 2011. The Nagoya Protocol on access to genetic resources and the fair and equitable sharing of benefits arising from their utilization to the Convention on Biological Diversity. *Review of European Community & International Environmental Law*, 20(1): 47-61.

Burkill, H.M. 2000. *Useful Plants of West Tropical Africa*. (2nd ed). vol. 5. Families S –Z. Crown Agents for Overseas Governments, London, pp 320-321.

Buscher, B. 2013. *Transforming the frontier*. 1st Ed. Duke University Press.

Bushbuckridge local municipality final integrated development planning 2020/21 https://www.cogta.gov.za/cgta_2016/wp-content/uploads/2021/02/Bushbuckridge-Municipality.pdf Accessed on 20 October 2021

Bushbuckridge Local Municipality. 2018. Integrated Development Plan (IDP) 2017/22. <https://bushbuckridge.gov.za/wp-content/uploads/2017/10/FINAL-IDP-BLM-2017-22.pdf>
Date of access: 20 October 2020

Bushbuckridge local municipality: spatial development framework 2017.
<http://bushbuckridge.gov.za/wp-content/uploads/2017/10/Spatial-Development-Framework.pdf> Accessed 04 January 2021

Bushbuckridge SDF document. (2010) *Spatial Development Framework 2010-2011*

Camp, W., 2001. Formulating and evaluating theoretical frameworks for career and technical education research. *Journal of Vocational Education Research*, 26(1): 4-25.

Caroll, K.K. 2008. Africana studies and research methodology: Revisiting the centrality of Afrikan worldview. *The journal of Pan African Studies*, 2(2):5-27.

Caron, A., Cornelis, D., Foggin, C., Hofmeyr, M., & de Garine-Wichatitsky, M. (2016). African Buffalo Movement and Zoonotic Disease Risk across Transfrontier Conservation Areas, Southern Africa. *Emerging infectious diseases*, 22 (2): 277-280

Carrizosa, S., McGuire, P.E. & Brush, S. eds., 2004. *Accessing biodiversity and sharing the benefits: Lessons from implementing the Convention on Biological Diversity* (No. 54). IUCN, Gland, Switzerland.

Cataldi, S. A proposal for the analysis of the relational dimension in the interview techniques: a pilot study on in-depth interviews and focus groups. *Qual Quant* 52, 295–312
<https://doi.org/10.1007/s11135-017-0468-9>.

Census. 2011 South African Population Census 2011. Indicators derived from the full population. Available online at: Census <<https://wazimap.co.za/profiles/municipality-MP325-bushbuckridge/>>.

Chennells, R. 2013. 'Traditional Knowledge and Benefit Sharing After the Nagoya Protocol: Three Cases from South Africa', 9/2 *Law, Environment and Development Journal* 9 (2): 163. Available online at <http://www.lead-journal.org/content/13163.pdf>. Accessed on 20 January 2021

Chennells, R., Haraseb, V. & Ngakaeaja, M. 2009. "Speaking for the San: Challenges for representative institutions", In Wynberg, R., Schroeder, D. and Chennells, R. (eds), *Indigenous Peoples, Consent and Benefit Sharing. Learning from the San-Hoodia Case*, Springer-Verlag, Berlin. pp. 165-192.

- Chilisa, B. 2011. *Indigenous Research Methodologies*. Los Angeles, CA: Sage
- Chilisa, B., 2012. Postcolonial indigenous research paradigms. *Indigenous research methodologies*. Thousand Oaks, CA: Sage, pp.98-127.
- Chilisa, B., 2013. Review of Indigenous Research Methodologies by Bagele Chilisa.
- Chilisa, B., Major, T.E. and Khudu-Petersen, K., 2017. Community engagement with a postcolonial, African-based relational paradigm. *Qualitative Research*, 17(3) :326-339.
- Chinsembu, W.W. & Chinsembu, K.C., 2020. 'Poisoned Chalice': Law on Access to Biological and Genetic Resources and Associated Traditional Knowledge in Namibia. *Resources*, 9(7):83.
- Chinsembu, W.W., & Chinsembu, K.C. 2020. Poisoned Chalice Law on Access to Biological and Genetic Resources and Associated Traditional Knowledge in Namibia, *Resources* 9(7): 80-83.
- Cocks, M.L. & Møller, V. 2002. Use of indigenous and indigenised medicines to enhance personal well-being: A South African case study. *Social Science and Medicine* 54:387–397.
- Coe FG, & Anderson GJ (1996) Ethnobotany of the Garifuna of Eastern Nicaragua. *Economic Botany* 50, 71–107
- Cohen, L., Manion L., & Morrison, K. 2007. *Research methods in education*. 6th ed. London: Routledge.
- Cole, D. & du Plessis, P. 2001. Namibian Devil's claw. In *A Case Study on Benefit-Sharing Arrangements*; Ministry of Environment and Tourism: Windhoek, Namibia.
- Collins english dictionary*. 3Rd ed. updated edn. (1994) edn. Glasgow: HarperCollins.
- Coopoosamy, R.M., Naidoo, K.K., Buwa, L. & Mayekiso, B., 2010. Screening of *Siphonochilus aetiopicus* (Schweinf.) BL Burt for antibacterial and antifungal properties. *Journal of Medicinal Plants Research*, 4(12) :1228-1231.
- Creswell, J. W., & Plano Clark, V. L. 2011. *Designing and conducting mixed methods Research*. Thousand Oaks, CA: Sage.

Crouch, N.R., Douwes, E., Wolfson, M.M., Smith, G.F. & Edwards, T.J. 2008. South Africa's bioprospecting, access and benefit-sharing legislation: current realities, future complications, and a proposed alternative. *South African Journal of Science*, 104(9-10): 355-366.

Crouch, N.R., Lotter, M.C., Krynauw, S. & Pottas-Bircher, C., 2000. *Siphonochilus aethiopicus* (Zingiberaceae), the prized Indungulu of the Zulu-an overview. *Herbertia: Journal of the International Bulb Society*, 55(89):115-129.

CSIR and South African San Council, 2003. Benefit-Sharing Agreement (March).

Cunningham, A.B., 1988. An Investigation of the Herbal Medicine Trade in KwaZulu Natal. Investigational Report No. 29, Institute of Natural Resources, University of Natal.

Cunningham, A.B., 1993. *African medicinal plants*. 1st ed. United Nations Educational, Scientific and Cultural Organization: Paris, France.

Cunningham, A.B., 1993. Setting priorities at the interface between conservation and primary healthcare. In: African Medicinal Plants. People and Plants Working Paper to United Nations Educational, Scientific and Cultural Organization (UNESCO) 53 pp. Available online at: citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.294.2667&rep&type=pdf. Accessed date: 25 November, 2021.

Dadaya, E., Koubala, B.B., Abaïssou, H.N., Zingue, S. & Ndjonka, D., 2021. Antioxidant and anti-inflammatory properties of the methanolic extract of *Siphonochilus aethiopicus* rhizomes. *Journal of Herbmed Pharmacology*, 10(4)

Dal Pont, S., and L. Longo. 2007. "Transformaciones productivas en la Provincia de Chaco: avance de la frontera agrícola e implicancias sobre la estructura agraria local." *IADE Revista Realidad Económica*, 228 (1): 113–133.

Dauda, B. & Dierickx, K. 2013. Benefit sharing: an exploration on the contextual discourse of a changing concept. *BMC Medical Ethics*, 14(1):1-8.

De Jonge, B. & Korthals, M., 2006. Vicissitudes of benefit sharing of crop genetic resources: downstream and upstream. *Developing world bioethics*, 6(3) :144-157.

De Jonge, B. 2009. *Plants, Genes and Justice. An inquiry into fair and Equitable benefit sharing*. Netherlands: Wageningen University. (Thesis-PhD).

DEA 2012. South Africa's Bioprospecting, Access and Benefit-Sharing Regulatory Framework. Guidelines for Providers, Users and Regulators. DEA, Pretoria.

Deacon, H.J., & Deacon, J., 1999. Human Beginnings in South Africa: Uncovering the Secrets of the Stone Age. David Phillip Publishers, Cape Town.

Debnath, M., Malik, C.P. & Bisen, P.S. (2006). Micropropagation: A Tool for the Production of High Quality Plant-based Medicines. *Curr. Pharm. Biotechnol.*, 7: 33–49.

Deci, E. L., & Ryan, R. M. 2000. The “what” and “why” of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, 11(1): 227-268.

Denzin, N. K., & Lincoln, Y. S. (2008a). Introduction: Critical methodologies and Indigenous inquiry. In N. K. Denzin, Y. S. Lincoln & L. T. Smith (Eds.), *Handbook of critical and Indigenous methodologies* (pp. 1–20). Los Angeles, CA: Sage.

Department of Agriculture Forestry and Fisheries (DAFF). 2014. Production Guidelines of Wild Ginger (*Siphonochilus aethiopicus*). South Africa. Accessed at <https://www.dalrrd.gov.za/Portals/0/Brochures%20and%20Production%20guidelines/wild%20ginger%20production%20guideline.pdf> on the 07/11/2021

Department of Agriculture. 2009. Wild ginger. Available online at: <http://www.nda.agric.za/docs/brochures/wildginger.pdf>. Date accessed: 07/10/2021.

Department of Environmental Affairs (South Africa). 2004. National Environmental Management: Biodiversity Act 10 of 2004. (26436). *Government Gazette*, 700:27 June 2004.

https://www.dffe.gov.za/sites/default/files/gazetted_notices/nemba10of2004_gg37582_0.pdf
Accessed 5 July 2019

Department of Environmental Affairs (South Africa). National Environmental Management: Biodiversity Act 10 of 2004. (3752). *Government Gazzete*, 330: 23 April 2014. https://www.dffe.gov.za/sites/default/files/gazetted_notices/nemba10of2004_gg37582_0.pdf
Accessed on 12 June 2020

Department of Environmental Affairs. (South Africa) 2015. National Environmental Management: 2004 (Act No.10 of 2004) (38809) Amendments to the regulations on Bio-prospecting, Access and benefit sharing *Government Gazzete*, 447: 19 May 2015

<https://cer.org.za/wp-content/uploads/2010/05/Amendments-to-Regulations-on-Bioprospecting-access-and-benefit-sharing.pdf> Accessed 15 November 2021

Department of Environmental Affairs.(South Africa) 2015. National Environmental Management: 2004 (Act No.10 of 2004): Biodiversity Economy Strategy. South Africa.

Department of Science and Innovation (South Africa). 2019. Protection, Promotion, Development and Management of Indigenous Knowledge Act, 2019 (IKS Act 6 of 2019). *South African Government Gazette*.

Dhliwayo, M, Breen, C & Nyambe, N, 2009. Legal policy and institutional provisions for community participation and empowerment in transfrontier conservation in Southern Africa, *Journal of International Wildlife Law and Policy* 12, 60–107. doi: 10.1080/13880290902938153

Diederichs, N., Geldenhuys, C., & Mitchelle, D., 2002. The first harvesters of protected medicinal plants in South Africa. Available online at: <http://www.scienceinafrica.co.za/2002/november/bark.htm>. Accessed 20 October 2021

Dold, A.P. & Cocks, M.L., 2002. The trade in medicinal plants in the Eastern Cape Province, South Africa. *South African Journal of Science*, 98(11):589-597.

Donaldson, T. and Preston, L.E., 1995. The stakeholder theory of the corporation: Concepts, evidence, and implications. *Academy of management Review*, 20(1) :65-91.

Dossetor, J. B. 2005. *Beyond the Hippocratic oath: A memoir on the rise of modern medical ethics*. Edmonton, Canada: University of Alberta Press.

Dountio, J. 2011. The protection of traditional knowledge: challenges and possibilities arising from the protection of biodiversity in South Africa. *South African Journal of Art History*, 26 (1): 10-22.

Dutfield, G., 2004. Developing and implementing national systems for protecting traditional knowledge: experiences in selected developing countries. *Protecting and Promoting Traditional Knowledge: Systems, National Experiences and International Dimensions*, p.141.

Dutton, S & Archer, F, 2004. Transfrontier parks in South Africa. *Cultural Survival Quarterly* 28(1).

Easterby-Smith, M., Thorpe, R., & Jackson, P.R. 2012. Management research: Sage.

Ellis, J.B. & Earley, M.A., 2006. Reciprocity and constructions of informed consent: Researching with indigenous populations. *International Journal of Qualitative Methods*, 5(4):1-13.

Erasmus, M., Du Plessis, L.H. & Viljoen, J.M., 2019a. In-vitro cytotoxicity of various *Siphonochilus aethiopicus* (Schweinf.) BL Burtt extracts in combination with selected tableting excipients. *Journal of Pharmacy and Pharmacology*, 71(11) :1714-1724.

Eskerod, P. & Huemann, M., 2013. Sustainable development and project stakeholder management: What standards say. *International Journal of Managing Projects in Business*.

Farnsworth, E. J., & Rosovsky, J. (1993). The Ethics of Ecological Field Experimentation. *Conservation Biology*, 7(3), 463–472. <http://www.jstor.org/stable/2386674> Accessed 5 April 2019.

Fennell CW, Lindsey KL, McGaw LJ, Sparg SG, Stafford GI, Elgorashi EE, Grace OM, & van Staden J. 2004. Assessing African medicinal plants for efficacy and safety: pharmacological screening and toxicology. *J Ethnopharmacol.*, 94(2-3):205-17. doi: 10.1016/j.jep.2004.05.012. PMID: 15325724.

Fisher, W., 2001. Theories of intellectual property. *Cambridge: Cambridge*.

Fouche, G., Moodley, N. & Maharaj, V., 2008. Ten years of bioprospecting activities at the CSIR: BP4 as a model. In *Paper Presented at Science Real and Relevant: 2nd CSIR Biennial Conference, CSIR International Convention Centre, Pretoria*. 17 (1): 1-6.

Fouche, G., Nieuwenhuizen, N., Maharaj, V., van Rooyen, S., Harding, N., Nthambeleni, R., Jayakumar, J., Kirstein, F., Emedi, B. & Meoni, P., 2011a. Investigation of in vitro and in vivo anti-asthmatic properties of *Siphonochilus aethiopicus*. *Journal of ethnopharmacology*, 133(2): 843-849.

Fouche, G., Van Rooyen, S. & Faleschini, T., 2013. *Siphonochilus aethiopicus*, a traditional remedy for the treatment of allergic asthma. *CELLMED*, 3(1) :6-1.

Franks, P., Booker, F., & Roe, D. (2018). *Understanding and assessing equity in protected area conservation* (p. 40). London, UK: IIED.

Gabatazi, A., 2019. *Irrigation and Nitrogen management of African (Siphonochilus Aethiopicus) B.L. Burt and Commercial ginger (Zingiber officinale Roscoe)*. Unpublished Doctoral Thesis, Tshwane: University of Pretoria.

Gandiwa E, Kativu S (2009) Influence of frequency on colophospermum mopane and combretum apiculatum woodland structure and composition in northern Gonarezhou National Park, Zimbabwe. *Koedoe* 51(1):685. <https://doi.org/10.4102/koedoe.v51i1.685>

Gibbs, H. K., A. S. Ruesch, F. Achard, M. K. Clayton, P. Holmgren, N. Ramankutty, & J. A. Foley. 2010. "Tropical Forests Were the Primary Sources of New Agricultural Land in the 1980s and 1990s." *Proceedings of the National Academy of Sciences*, 107 (38): 16732–16737.

Goduka I.N. 2000. African/Indigenous philosophies: Legitimising spiritually centred wisdoms within the academy. In: Higgs P, Vakalisa NCG, Mda TV and Assie NT (eds) *African Voices in Education*. Lasdowne, South Africa: Juta, 63–83.

Greenfield, T. 2002. *Research Methods Guidance for Postgraduates*. Michigan: Hodder Education. Pp 189

Grenier, L. 1998. *Working with Indigenous Knowledge: A Guide for Researchers*. Ottawa, Canada: IDRC.

Guba, E. G., & Lincoln, Y. S. 1994. Competing paradigms in qualitative research. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (pp. 105–117). Thousand Oaks, CA: Sage.

Guba, E. G., & Lincoln, Y. S. 2005. Paradigmatic controversies, contradictions, and emerging confluences. In N. K. Denzin and Y. S. Lincoln (Eds.), *The Sage handbook of qualitative research* (3rd ed., pp. 191–215). Thousand Oaks, CA: Sage.

Hamminga, Bert (ed) 2005. *Knowledge Cultures: Comparative Western and African Epistemology*. Amsterdam.

Hankey, A. & Reynolds, Y. (2002). *Siphonochilus aethiopicus (Schweif.) B.L. Burt*. Witwatersrand National Botanical Garden.

Hansen, S.A. & Van Fleet, J.W., 2003. *Traditional Knowledge and Intellectual Property: A handbook on issues and options for traditional knowledge holders in protecting their intellectual property and maintaining biological diversity*. American Association for the Advancement Science (AAAS). Washington, DC.

Hart, M. A. 2010. Indigenous worldviews, knowledge, and research: The development of an Indigenous research paradigm. *Journal of Indigenous voices in social work*, 1(1) :1–16

Hartzell, J.F., 2011. *Response of the endangered medicinal plant Siphonochilus aethiopicus (Shweif) B.L. Burt to agronomic Practices*. Unpublished Master Dissertation, Durban: University of Kwazulu-Natal.

Helfer, L. H. 2004. Regime shifting: The TRIPS Agreement and new dynamics of international intellectual property lawmaking. *Yale Journal of International Law*, 29(1) :1–83.

Holzappel, C.W., Marais, W., Wessels, P.L. & Van Wyk, B.E., 2002. Furanoterpenoids from *Siphonochilus aethiopicus*. *Phytochemistry*, 59(4):405-407. Available online at: <https://doi.org/10.1111/j.1747-7093.2009.00217x>

Hutchings, A., Scott, G. & Cunningham, A., 1996. Zulu medicinal plants: an inventory. Pietermaritzburg: University of Natal Press.

Igoli, N.P., Al-Tannak, N.F., Ezenyi, C.I., Gray, A.I., & Igoli, J.O. 2021. Antiplasmodial activity of a novel diarylheptanoid from *Siphonochilus aethiopicus*, *Natural Product Research*, 35:24, 5588-5595, DOI: [10.1080/14786419.2020.1799358](https://doi.org/10.1080/14786419.2020.1799358). 5 August 2021

Igoli, N.P. & Igoli, J.O., 2017. Lesser Known Aromatic Plants in Nigeria. In *Aromatic and Medicinal Plants-Back to Nature*. IntechOpen.

Igoli, N.P. & Obanu, Z., 2011. The volatile components of wild ginger (*Siphonochilus aethiopicus* (Schweinf) Bl Burt). *African Journal of Food Science*, 5(9): 541-549.

Igoli, N.P., Al-Tannak, N.F., Ezenyi, I.C., Gray, A.I. & Igoli, J.O., 2020. Antiplasmodial activity of a novel diarylheptanoid from *Siphonochilus aethiopicus*. *Natural Product Research*, pp.1-8.

- Igoli, N.P., Obanu, Z.A., Gray, A.I. & Clements, C., 2012. Bioactive diterpenes and sesquiterpenes from the rhizomes of wild ginger (*Siphonochilus aethiopicus* (Schweinf) BL Burt). *African Journal of Traditional, Complementary and Alternative Medicines*, 9(1):88-93.
- Jacobs, C.S. 2017. *Patents of Traditional Medicine Inventions and Their Relationship with Traditional Knowledge Associated with Genetic Resources in Namibia, Proposals for Legal Reform*. Unpublished Master Dissertation, Cape Town: University of Cape Town.
- Jasson, T.I. 2017. *Effects of compost tea extract on growth, nutritional value, soil quality of hypoxis hemerocallidea and siphonochilus aethiopicus*. Unpublished Masters Dissertation, Cape Town: Cape Peninsula University of Technology.
- Johnson, R.B., Onwuegbuzie, A.J. Turner, L.A., 2007. Toward a definition of mixed methods research. *Journal of mixed methods research*, 1(2) :112-133.
- Jonas, H., Shrumm, H. & Bavikatte, K., 2010. Biocultural community protocols and conservation pluralism. *Policy Matters*, 1n7, pp.102-112.
- Junod, Henri Alexandre (1927). *The Life of a South African Tribe*. London (second edition).
- Kamatenesi-Mugisha M, & Oryem-Origa H. 2007 Medicinal plants used in some gynaecological morbidity ailments in western Uganda. *Afr J Ecol*, 2007; 45:34–40.
- Kathe, W., Barsch, F. & Honnef, S., 2003. Trade in Devil's Claw (*Harpagophytum procumbens*) in Germany - Status, Trends and Certification. Final Draft, prepared for the Food and Agriculture Organization of the United Nations, Non-wood Forest Products Program.
- Khupe C. 2020. Indigenous Knowledge Systems. In: Akpan B., Kennedy T.J. (eds) *Science Education in Theory and Practice*. Springer Texts in Education. Springer Switzerland.
- Kim, T.K. & Park, K.S., 2015. Inhibitory effects of harpagoside on TNF- α -induced pro-inflammatory adipokine expression through PPAR- γ activation in 3T3-L1 adipocytes. *Cytokine*, 76(2) :368-374.
- Kohler-Rollefson, I.U., Mathias, E., Singh, H., Vivekanandan, P. & Wanyama, J., 2010. Livestock keepers' rights: the state of discussion. *Animal Genetic Resources* 47 (1):119-123.

Korthals, M. & De Jonge, B., 2009. Two different ethical notions of benefit sharing of genetic resources and their implications for global development. *New Genetics and Society*, 28(1): 87-95.

Kothari B .2003. The invisible queen in the plant kingdom: Gender perspectives in medical ethnobotany. In Howard PL (ed) *Women and Plants: Gender Relations in Biodiversity Management & Conservation*, 150–64. Zed, London.

Kovach, M. 2009. *Indigenous methodologies: Characteristics, conversations, and contexts*. Toronto, Canada: University of Toronto Press

Kruger, L., 2020. *Development of Siphonochilus aethiopicus as a treatment for colds and influenza and gas chromatographic analysis of volatiles of an insect repellent*. Unpublished Dissertation. Tshwane: University of Pretoria

Kumar, A. 2018. Brief introduction of environment, ecology and environmental pollution. *Journal of Modern Management & Entrepreneurship (JMME)*. 8(1): 314-315

Laird, S., Wynberg, R., Rourke, M., Humphries, F., Muller, M.R. & Lawson, C., 2020. Rethink the expansion of access and benefit sharing. *Science*, 367(6483): 1200-1202. Available online at: <http://www.sciencemag.org/about/science-licenses-journal-article-reuse>.

Lategan, C., Smith, P. & Campbell, B.W., 2008. Isolation and characterization of novel antiplasmodial compounds from *Siphonochilus aethiopicus*. *Planta Medica*, 74(09):149-159.

Lebaka, M.E.K. 2019. Resistance to Lutheran missionary activities through antagonism, traditional beliefs, customs and practices: The case of the Bapedi tribe in Limpopo province, South Africa. *Theological Studies*. 76 (1)

Lebaka, M.E.K., 2019. The Societal Value of Art and Music in the Bapedi Culture and the Implications for Music in Healing as a Cultural Phenomenon. *European Journal of Multidisciplinary Studies*, 4(3) :64-76.

Lee, R.B., Hitchcock, R., & Biesele, M., 2002. Foragers to first peoples. *Cultural Survival Quarterly* 26 (1): 18–20

Leso, L.K., Elansary, H.O., Mearns, K. & Yessoufou, K., 2017. Ethnobotany at a local scale: diversity of knowledge of medicinal plants and assessment of plant cultural importance in the Polokwane local municipality, South Africa. *Botany Letters*, 164(1): 93-102.

Light, M.E., 2002. *An investigation of the medicinal properties of siphonochilus aethiopicus*. Durban: University of Kwazulu-Natal. (Dissertation-Masters).

Light, M.E., McGaw, L.J., Rabe, T., Sparg, S.G., Taylor, M.B., Erasmus, D.G., Jager, A.K., Van Staden, J. & Eloff, J.N., 2002. Investigation of the biological activities of *Siphonochilus aethiopicus* and the effect of seasonal senescence. *South African Journal of Botany*, 68(1) :55-61.

Lindh, H., 2015. Mothers, Markets and Medicine: The role of traditional herbal medicine in primary women and child health care in the Dar es Salaam region, Tanzania

LoBiondo-Wood, G & Haber J. 2018. *Nursing research : Methods and Critical appraisal for Evidence based practice*. (9th ed.). St. Louis, Missouri: Elsevier.

Locke, J. 1980 [1690]. *Second Treatise of Government* (C. B. Macpherson, Ed.). Indianapolis, IN: Hackett Publishing Co., Inc.

Locke, J. 2005. Property is Second Treaties of Government.

Lotter, M., Burrows, J.E. & von Staden, L. 2006. *Siphonochilus aethiopicus* (Schweinf.) B.L. Burtt. National Assessment: Red List of South African Plants version 20.

Louis, R.P., 2007. Can you hear us now? Voices from the margin: Using indigenous methodologies in geographic research. *Geographical research*, 45(2) :130-139.

Lowman, M., 2012. *The effectiveness of access and benefit-sharing legislation in South Africa: practical considerations for national regimes*. Unpublished Masters Dissertation, Cape Town: University of Cape Town.

Mabika, N. J. 2002. *La Mystification fondamentale* (The fundamental mystification). Lubumbashi, Democratic Republic of the Congo: Presse Universitaire (University Press).

Magaisa, A., 2007. Knowledge and Power: Law, Politics and Socio-cultural Perspectives on the Protection of Traditional Medical Knowledge Systems in Zimbabwe.

- Makunga, N.P., Philander, L.E., & Smith, M. 2008. Current perspectives on an emerging formal natural products sector in South Africa. *Journal of Ethnopharmacology*, 118 (1): 365-375.
- Malaka, M.S., Naidoo, K. & Kabuba, J., 2017. Extraction of *Siphonochilus aethiopicus* essential oil by steam distillation. *Chemical Engineering Communications*, 204(7) :813-819.
- Mander, M., 1998. *Marketing of indigenous medicinal plants in South Africa: a case study in KwaZulu-Natal*. Kwazulu Natal South Africa.
- Manzini, T.Z., 2005. *Production of wild ginger (Siphonochilus aethiopicus) under protection and indigenous knowledge of the plant from traditional healers*. Unpublished Masters Dissertation, Tshwane: University of Pretoria.
- Maphothoma, P., Kleynhans, R., Prinsloo, G., Mokgehle, N.S., du Plooy, I., & Araya, H.T. 2021. Growth and yield of African ginger in response to application of organic fertiliser. *African Journal of Plant and Soil*, 38 (4) 338-342
- Martin, K. 2008. *Please knock before you enter: Aboriginal regulations of outsiders and the implications for researchers*. Teneriffe, QLD: Post Pressed.
- Masango, C.A., 2010. Indigenous traditional knowledge protection: prospects in South Africa's intellectual property framework? *South African Journal of Libraries and Information Science*, 76(1): 74-80.
- Masevhe, M.R. 2007. *Mulching, plant population density and indigenous knowledge of wild ginger*. Unpublished Masters Dissertation, Tshwane: University of Pretoria.
- Mathebula, J.H. 2017. *Determinants of household participation in agricultural production in Shatale region of the Bushbuckridge local municipality, Mpumalanga Province*. Unpublished mini dissertation, University of Limpopo.
- Mawere, M. & Mubaya, T.R., 2016. *African philosophy and thought systems: A search for a culture and philosophy of belonging*. Langaa Research & Publishing CIG. Mankon Bamenda (Cameroon).
- McGown, J., 2006. *Out of Africa: mysteries of access and benefit sharing*. Washington DC: Edmonds Institute.

Mertens, D. M. 2015. *Research and evaluation in education and psychology: Integrating diversity with quantitative, qualitative, and mixed methods* (4th ed.). Thousand Oaks, CA: Sage.

Moeng, E. & Potgieter, M., 2011. The trade of medicinal plants by muthi shops and street vendors in the Limpopo Province, South Africa. *Journal of Medicinal Plants Research*, 5(4): 558-564

Mokgehle, S.N. 2017. *Variations in growth, yield and metabolites of African ginger (Siphonochilus aethiopicus) in response to irrigation regimes and nitrogen levels*. Unpublished Doctoral Thesis, Tshwane: University of Pretoria.

Mokgehle, S.N., Tesfay, S.Z., Araya, H.T. & du Plooy, C.P., 2017. Antioxidant activity and soluble sugars of African ginger (*Siphonochilus aethiopicus*) in response to irrigation regimen and nitrogen levels. *Acta Agriculturae Scandinavica, Section B—Soil & Plant Science*, 67(5):425-434.

Mokgehle, S.N., Tesfay, S.Z., Araya, H.T., du Plooy, C.P. & Suinyuy, T.N., 2018, August. Volatile profiling of aromatic African ginger (*Siphonochilus aethiopicus*) in response to irrigation regimes and nitrogen levels. In *International Horticultural Congress IHC2018: II International Symposium on Root and Tuber Crops: Value Added Crops for the 1251* (pp. 37-48).

Mokgehle, S.N., Tesfay, S.Z., Makgato, M.J. & Araya, H.T., 2019. Phytochemical profiling and soluble sugars of African ginger (*Siphonochilus aethiopicus*) from different growing regions in South Africa. *South African Journal of Plant and Soil*, 36(3) :157-163.

Mongalo, N.I., 2013. *Antibacterial activities of selected medicinal plants used to treat sexually transmitted infections in Blouberg area, Limpopo Province*. Unpublished dissertation, University of Zululand.

Monitor, A.U. 2002. Africa: Overview on Medicinal Plants and Traditional Medicine, Issue 58 <http://pambazuka.org/en/category/hivaid/6560>. Accessed: 11/11/2021

Moody, O.O. 2011. *The Nagoya Protocol: a possible solution to the protection of traditional knowledge in biodiverse societies of Africa*. Unpublished Masters Dissertation. University of the Western Cape.

Moore, A.D. 2012. Intellectual Property and Copyright Available at SSRN: <https://ssrn.com/abstract=2194729> or <http://dx.doi.org/10.2139/ssrn.2194729>
Accessed 12 June 2021

Morgera, E and Tsioumani, E. 2010. The Evolution of Benefit Sharing: Linking Biodiversity and Community Livelihoods. *Review of European Community & International Environmental Law*, 19 (2): 150-173

Morrissey, M. 2012. *An alternative to intellectual property theories of Locke and utilitarian economics*. Unpublished Masters Dissertation, Baton Rouge: Louisiana State University and Mechanical College.

Motsei, M.L., Lindsey, K.V., Van Staden, J. & Jager, A.K., 2003. Screening of traditionally used South African plants for antifungal activity against *Candida albicans*. *Journal of ethnopharmacology*, 86(2-3):235-241.

Mshana, R. 2002. 'Globalization and Intellectual Property Rights: *The case for Africa*'. In: Odora Hoppers, C. A. (ed.) *Indigenous Knowledge and the Integration of Knowledge Systems: Towards a Philosophy of Articulation*, Claremont: New Africa Book.

Msomi, Z.N., 2013. *The Protection of Indigenous Knowledge Within the Current Intellectual Property Rights Regime: A Critical Assessment Focusing Upon the Masakhane Pelargonium Case*. Unpublished Thesis ,Rhodes University.

Mukuka, G. F. 2010. *Indigenous Knowledge Systems and Intellectual Property Law in South Africa*. Unpublished PhD Thesis, University of the Witwatersrand.

Mutsiwa, A. 2015. *Precedent, policy and possibility: A victimological orientation towards the protection of traditional knowledge in Africa*. Unpublished thesis. University of KwaZulu-Natal, Durban

Namibian Government Gazette. 2007. Environmental Management Act of 2007. Republic of Namibia.

Namibian Government Gazette. 2017. Access to biological and genetic resources and associated traditional knowledge Act 2 of 2017. Republic of Namibia.

National Botanical Research Institute (NBRI). 2017. Indigenous natural Products: Devil's Claw. Available online at: <http://www.nbri.org.na/sections/economic-botany/INP/sectors/Devils-claw>. Date of access: 16 November 2021.

Natural Justice, 2009. Access and benefit sharing: E-Learning Series on International Frameworks that Support Indigenous Peoples, Local Communities, and Their Territories and Areas. <https://naturaljustice.org/wp-content/uploads/2015/09/Access-and-Benefit-Sharing.pdf>
Accessed on 25 September 2021

Naude Y., Makuwa, R. & Maharaj, V., 2016. Investigating volatile compounds in the vapour phase of (1) a hot water infusion of rhizomes, and of (2) rhizomes of *Siphonochilus aethiopicus* using head space solid phase microextraction and gas chromatography with time-of-flight mass spectrometry. *South African Journal of Botany*, 106 (1):144-148.

Ngozwana, N. 2015. *Understandings of democracy and citizenship in Lesotho: Implications for civic education*. Unpublished Thesis. Durban: University of KwaZulu-Natal.

Nichols, G., 1989. Some notes on the cultivation of Natal ginger (*Siphonochilus aethiopicus*). *Veld and Flora*, 75(3): 92-93.

Northey SA, Mudd GM, Werner TT, Jowitt SM, Haque N, Yellishetty M, Weng ZH. 2017. The exposure of global base metal resources to water criticality, scarcity and climate change. *Glob. Environ. Change-Human Policy Dimens.* 44 (3): 109-124.

Noudogbessi, J.P.A., Tchobo, P.F., Alitonou, G.A., Avlessi, F., Soumanou, M., Chalard, P., Figueredo, G., Chalchat, J.C. & Sohounhloue, D.C.K. 2013. Chemical study of extracts of *Siphonochilus aethiopicus* (Schweinf.) B.L. Burt (Zingiberaceae) from Benin. *Asian Journal of Chemistry*, 25(15): 8489–8492.

Ntuli H, Muchapondwa E (2017) Effects of wildlife resources on community welfare in Southern Africa. *Ecol Econ* 131:572–583

Nyamongo, R.N.K., 2017. *Bio-piracy and the case for traditional medicine in Kenya*. Unpublished dissertation, Strathmore University (Kenya)

Odora-Hoppers, C. A. 2002. Indigenous knowledge and the integration of knowledge systems: Towards a conceptual and methodological framework. In C. A. Odora Hoppers

(Ed.), *Indigenous knowledge and the integration of knowledge systems: Towards a philosophy of articulation* (pp. 2-22). Cape Town, South Africa: New Africa Books.

Oguamanam, C. 2008. Local knowledge as trapped knowledge: Intellectual property, culture, power and politics. *Journal of World Intellectual Property*, 11(1):29–57.

Okediji, R.L., 2003. The international relations of intellectual property: Narratives of developing country participation in the global intellectual property system. *Singapore Journal of International & Comparative Law*, 7 (1): 315–385.

Owusu-Ansah, F. E., & G. Mji, G. 2013. African Indigenous Knowledge and Research. *African Journal of Disability* 2(1): 30-39.

Peshkin, A. 1993. The Goodness of Qualitative Research. *Educational Researcher*, 22(2):23-29

Polit, D. F., & Beck, C. T. 2018. *Essentials of nursing research: Appraising evidence for nursing practice* (9th ed.). Wolters Kluwer Health.

Polit, D.F & Beck, C.T. 2017. *Nursing Research. Generating and Assessing evidence for nursing practice.* (10th ed.) Philadelphia.

Posey, D.A & Dutfield, G. 1996. *Beyond intellectual property : toward traditional resources rights for indigenous people and local communities.* IDRC. Ottawa, Canada.

Raika, S.P. 2009. Raika Biocultural Protocol. Available online at: www.pastoralpeoples.org/docs/Raika_Biocultural_Protocol.pdf. 5 May 2021

Raimondo, D., 2011. The Red List of South African plants-a global first. *South African Journal of Science*, 107(3):1-2.

Ramutsindela, M., 2007. *Transfrontier conservation in Africa: At the confluence of capital, politics and nature.* Cabi.

Rasethe MT. 2017. The utilization and management of selected listed threatened or protected species in the Limpopo Province, South Africa. Unpublished MSc thesis, University of Limpopo.

- Rhode, K. 2001. "South Africa Phrased" (A Quick Reference Guide to South Africa's Eleven Languages). Stellenbosch, S.A.: MBV Consulting Group.
- Rigby, C. S., Deci, E. L., Patrick, B. C., Ryan, R. M. 1992. Beyond the intrinsic-extrinsic dichotomy: Self-determination in motivation and learning. *Motivation and Emotion*, Vol. 16, No. 3.
- Rigney, L. I. 1999. Internationalisation of an Indigenous anticolonial cultural critique of research methodologies: A guide to Indigenist research methodology and its principles. *Wicazo Sa Review*, 14, 109–121. Available online at: doi:10.2307/1409555. 05 May 2021
- Roderick P. Neumann (2014) Transforming the Frontier: Peace Parks and the Politics of Neoliberal Conservation in Southern Africa, *The AAG Review of Books*, 2:2, 51-53, DOI: [10.1080/2325548X.2014.901858](https://doi.org/10.1080/2325548X.2014.901858)
- Roht-Arriaza, N., 1996. Of seeds and shamans: The appropriation of the scientific and technical knowledge of indigenous and local communities. *Michigan Journal of International Law*, 17 (1): 917-919.
- Rubin, A. & Babbie, E. 2001. *Research Methods for Social Workers (4th Edition)*. Belmont, CA: Wadsworth Thomson Learning.
- Ruch, E.A, & Anyanwu, K.C 1984. *African Philosophy: An Introduction to the Main Philosophical Trends in Contemporary Africa*. Rome: Catholic Book Agency.
- Ryan, R. M., & Deci, E. L. 2000. Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55, 68-78.
- Saarinen J. 2016. Political ecologies and economies of tourism development in Kaokoland, North-West Namibia. In: Mostafanezhad M, Carr A, Norum R, editors. *Political ecology of tourism: Communities, power and the environment*. London: Routledge. pp. 213–230.
- SANBI. 2006. A South African response to the Global Strategy for Plant Conservation. SANBI Biodiversity Series 1. South African National Biodiversity Institute, Pretoria.
- Sandbrook, C. 2015. What is conservation? *Oryx Journal*, 49 (4): 565-566.

- Sandlos, J. (2011). *Hunters at the margin: Native people and wildlife conservation in the Northwest territories*. Vancouver, Toronto, Canada: UBC Press.
- Sandwith, T., Shine, C., Hamilton, L. and Sheppard, D., 2001. Protected areas for peace and co-operation. *Best practice protected area guidelines series*, (7).
- Schoon, M. L. (2013). Governance structures in transboundary conservation: How institutional evolution influences cross-border cooperation. *Conservation & Society*, 11, 4. doi:10.4103/0972-4923.125758
- Schroeder D., & Pisupati B. 2010. Ethics, justice and the convention on biological diversity. *UNEP*. Available at: <https://www.unenvironment.org/resources/report/ethics-justice-and-convention-biological-diversity>. Date of access: 24 May 2021.
- Schroeder, D. & Pogge, T., 2009. Justice and the convention on biological diversity. *Ethics and International Affairs*, 23(3): 267-280.
- Schroeder, D. 2007. Benefit Sharing: It's time for a definition. *Journal of medical ethics*, 33 (4): 205-209. Available online at: <http://dx.doi.org/10.1136/jme.2006.016790>. Accessed 16 July 2021
- Scoones, I., & Thompson, J. 1994 (eds) *Beyond Farmer First: rural people's knowledge, agricultural research and extension practice*, London: Intermediate Technology Publications
- Secretariat of the Convention on Biodiversity (2011) Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the Convention on Biological Diversity: text and annex. Montreal, Canada, Secretariat of the Convention on Biodiversity, 15pp. DOI:
- Secretariat of the Convention on Biological Diversity (2002). Bonn Guidelines on Access to Genetic Resources and Fair and Equitable Sharing of the Benefits Arising out of their Utilization. Montreal: Secretariat of the Convention on Biological Diversity.
- Semenya, S.S., Potgieter, M.J., & Erasmus, L.J.C. 2013. Ethnobotanical survey of medicinal plants used by Bapedi traditional healers to manage HIV/AIDS in the Limpopo Province, South Africa. *Journal of medicinal plants research*, 7 (8): 434-441

Shale, T.L., Stirk, W.A., & Van Staden, J. 1999. Screening of plants used by southern African traditional healers in the treatment of dysmenorrhea for prostaglandin-synthesis inhibitors and uterine relaxing activity. *Journal of Ethnopharmacology*, 64 (1):9-14

Shikongo, S.T. 2017. The issue of bio-trade and bio-prospecting in Namibia: An analytical Overview. In Proceedings of the Marrakech ABS Workshop, Marrakech, Morocco.

Shiva, V., 2000. North-South Conflicts in Intellectual Property Rights. *Peace Review*, 12(4): 501-508.

Shonhai, V.F. 2016. *Analysing South African Indigenous Knowledge Policy and its alignment to government attempts to promote indigenous vegetables*. Unpublished Doctoral Thesis, Durban: University of Kwazulu-Natal.

Sibuye, R., Uys, M.-T., Cocchiaro, G., & Lorenzen, J. 2012. The Bushbuckridge BCP: Traditional healers organise for ABS in South Africa. Retrieved from International Institute for Environment and Development website. Available online at: <http://pubs.iied.org/pdfs/G03403.pdf>. Accessed on 5 May 2019

Singh, J. (1998). *The lessons learnt: The development and management of transboundary parks world-wide. Contribution to the USAID study on the development and management of transboundary conservation areas in southern Africa*. Gaborone, Botswana: RCSA.

Smith, L. T. 2005. On tricky ground: Researching the native in the age of uncertainty. In N. K. Denzin & Y. S. Lincoln (Eds.), *The Sage handbook of qualitative research* (3rd ed., pp. 85–107). Thousand Oaks, CA: Sage.

Smith, L. T. 2012. *Decolonizing methodologies: Research and indigenous peoples* (2nd ed.). London, England: Zed Books.

Smith, L.T. 1999. *Decolonizing Methodologies: Research and Indigenous Peoples*. London: Zed Books.

Smith, R.M., 1998. FSA contributions. *Bothalia*, 28(1) :35-39.

Sonter, L.J., Herrera, D., Barrett, D.J., Galford, G.L., Moran, C.J. & Soares-Filho, B.S. 2017. Mining drives extensive deforestation in the Brazilian Amazon. *Nat. Commun.* 8, 1013.

Sonter,L..2018 Biodiversity offsets may miss opportunities to mitigate impacts on ecosystem services. *Front. Ecol. Environ*, 16 (1):143-148.

South African History Online. 2021. <https://southafrica.co.za/history-of-the-pedi.html>
Accessed 20 September 2020

South African National Parks (SANParks) (2018) Great Limpopo Transfrontier Park. Available from: [https:// www.sanparks.org/conservation/transfrontier/great_limpopo/](https://www.sanparks.org/conservation/transfrontier/great_limpopo/). Accessed 31 March 2022,

Spenceley A (2006) Tourism in the Great Limpopo Transfrontier Park. *Dev South Afr* 23(5):649–667

Srinivas, K.R. 2008. Traditional Knowledge and Intellectual Property Rights: A note on some issues and some suggestions. *Asian Journal WTO & Int'l Health L & Pol'y*, 81(1):85-81.

Stafford, G.I., Jager, A.K. & Van Staden, J., 2005. Effect of storage on the chemical composition and biological activity of several popular South African medicinal plants. *Journal of Ethnopharmacology*, 97(1):107-115.

Statistics South Africa. 2016. South African Community Survey 2. Indicators derived from the full population Community Survey. Available online at: <https://wazimap.co.za/profiles/municipality-MP325-bushbuckridge/>. Date of access- 15 November 2021

Steinhauer, E. 2002. Thoughts on an Indigenous research methodology. *Canadian Journal of Native Education*, 26 (1) 69–81.

Stewart, K.M.; Cole, D. 2005. The commercial harvest of Devil's claw (*Harpagophytum* spp.) in Southern Africa: The devil's in the details. *Journal of Ethnopharmacology.*, 100 (1) :225–236.

Stowell, J.D. and Sweeteners, D. 2007. *Novel ingredients for weight loss: new developments. Novel food ingredients for weight control*. U.K. p.218.

Street, R.A. & Prinsloo, G., 2013. Commercially important medicinal plants of South Africa: a review. *Journal of chemistry*, 5 (1):9-17.

Street, R.A., Stirk, W.A. & Van Staden., J. 2008. South African traditional medicinal plant trade challenges in regulating quality, safety, and efficacy. *Journal of Ethnopharmacology*, 119(3):705-710

Stumpf, K.H., 2014. Reconstructing the 'biopiracy' debate from a justice perspective. In *Concepts and values in biodiversity*. 1st ed. Routledge. (pp. 241-258).

Swiderska, K., 2006. *Protecting traditional knowledge: a framework based on customary laws and bio-cultural heritage*. IIED: London, UK.

Tabuto, J.R.S., Kukunda, C.B., & Waako, P.J. 2010. Medicinal plants used by traditional medicine practitioners in the treatment of tuberculosis and related ailments in Uganda. *Journal of Ethnopharmacology*, 127 (1): 130-136.

Taylor, M. & Wynberg, R., 2008. Regulating access to South Africa's biodiversity and ensuring the fair sharing of benefits from its use. *Benefits*, 218 (10):15.

Thomson, G.R., Penrith, M.L., Atkinson, M.W., Atkinson, S.J., Cassidy, D. and Osofsky, S.A., 2013. Balancing livestock production and wildlife conservation in and around southern Africa's transfrontier conservation areas. *Transboundary and emerging diseases*, 60(6), pp.492-506.

Torres-Fuentes, C., Theeuwes, W.F., McMullen, M.K., McMullen, A.K., Dinan., T.G.; Cryan, J.F., & Schellekens, H. 2014. Devil's claw to suppress appetite Ghrelin receptor modulation potential of a *Harpagophytum procumbens* root extract. *Public Library of Science (PLOS) Journal*, 1(9): 7- 9.

Troskie, D. & Bienabe, E., 2013. Institution building and local industry dynamics: lessons from the rooibos GI initiative. Springer, Dordrecht, pp. 95-121.

Udefi, A., 2014. The rationale for an African epistemology: A critical examination of the Igbo views on knowledge, belief, and justification. *Canadian Social Science*, 10(3):108-117.

UNEP & Natural Justice. 2009. Bio-cultural community protocols. A community approach to ensuring the integrity of environmental law and policy, UNEP, Montreal.

United Nations (UN). 2008. United Nations Declaration on the Rights of Indigenous People (UNDRPS). United Nations

United Nations Environment Programme. 2011. *Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the Convention of Biological Diversity*. Montreal, QC, Canada.

United Nations Environmental Programme (UNEP). 1993. *Convention on Biological Diversity*. Rio de Janeiro, Brazil

Van Niekerk, J. & R. Wynberg. 2012. The trade in *Pelargonium sidiodes*: Rural Livelihood or relief or bounty for the bio-buccaneers? *Development Southern Africa* 29(4): 530–547.

Van Wyk BE. 2008. A broad review of commercially important southern African medicinal plants. *Journal of Ethno-pharmacology*, 119(3):342-55.

Van Wyk, B.E. & Gericke, N., 2000. *People's plants: A guide to useful plants of Southern Africa*. Briza publications.

Van Wyk, B.E., 2011. The potential of South African plants in the development of new medicinal products. *South African Journal of Botany*, 77(4): 812-829.

Van Wyk, B.-E., Van Oudtshoorn, B., & Gericke, N., 1997. *Medicinal Plants of South Africa*. Briza Publications, Pretoria

Viljoen, A., Demirci, B., Van Wyk, B.E and Baser, K.H. 2002. The essential oil composition of the roots and rhizomes of *siphonochilus aethiopicus*. *South African Journal of Botany*, 68 (1) 115-116

Voeks, R.A., & Nyawa S (2001) Healing flora of the Brunei Dusun. *Borneo Research Bulletin* 32, 178–95.

Von Ahlefeldt, D., Crouch, N.R., Nichols, G., Symonds, R., McKean, S., Sibiya, H. & Cele, M.P. 2003. *Medicinal Plants Traded on South Africa's Eastern Seaboard*. Porcupine Press, Durban.

Wachowich, N., Awa, A. A., Katsak, R. K., & Katsak, S. P. 1999. *Saqiyuq: Stories from the lives of three Inuit women*. Montreal, Canada & Kingston, Canada: McGill-Queen's University Press.

- Warren, D. 1991. Using Indigenous Knowledge for Agricultural Development. World Bank Discussion Paper 127. Washington, D.C.
- Wassenaar, T., P. Gerber, P. H. Verburg, M. Rosales, M. Ibrahim, and H. Steinfeld. 2006. "Projecting Land Use Changes in the Neotropics: The Geography of Pasture Expansion into Forest." *Global Environmental Change*, 17: 86 (1)–104.
- Watt JM, & Breyer-Brandwijk MG,. 1962. The Medicinal and Poisonous Plants of Southern and Eastern Africa, 2nd ed. Livingstone, London.
- Weber-Pillwax, C. 2001. Orality in Northern Cree Indigenous worlds. *Canadian Journal of Native Education*, 25(2):149-165.
- Wild, R., McLeod, C., & Valentine, P. (2008). *Sacred natural sites: Guidelines for protected area managers (No. 16)*. Gland, Switzerland: IUCN.
- Wilson, S. (2008). *Research is ceremony: Indigenous research methods*. Black Point, Nova Scotia, Canada: Fernwood Publishing
- Wilson, S. 2001. What is Indigenous research methodology? *Canadian Journal of Native Education*, 25(1):175-179.
- Wilson, S. 2008. *Research is ceremony: Indigenous research methods*. Halifax, Canada: Fernwood.
- World Intellectual Property Organization (WIPO). 2020. What is intellectual Property? Geneva, Switzerland
- World Intellectual Property. 2020. *What is intellectual property?* Geneva
- Wynberg, R. 2005. Rhetoric, realism and benefit sharing. *The Journal of World Intellectual Property (WIPO)*, 7 (6): 851-876
- Wynberg, R. 2017. Making sense of access and benefit sharing in the rooibos industry: Towards a holistic, just and sustainable framing. *South African Journal of Botany*. 110 (1) :39–51

Wynberg, R., & Chennells, R., 2009. Chapter 6: Green Diamonds of the South. A Review of the San–Hoodia Case. In: Wynberg, R., Chennells, R., Schroeder, D. (Eds.), *Indigenous Peoples, Consent and Benefit-Sharing: Learning from the San–Hoodia Case*. Springer, Berlin, pp. 89–126.

Wynberg, R., 2004. Rhetoric, realism and benefit-sharing: Use of traditional knowledge of Hoodia species in the development of an appetite suppressant. *The Journal of World Intellectual Property*, 7(6):851-876.

Wynberg, R., Schroeder, D. & Chennells, R. 2009. *Indigenous peoples, consent and benefit sharing: lessons from the San-Hoodia case*. Berlin: Springer. (pp. 69-86).

Xego, S. 2017. *Hydroponic propagation of Siphonochilis aethiopicus*. Unpublished Masters Dissertation, Cape Town: Cape Peninsula University of Technology.

Xego, S., Kambizi, L. & Nchu, F. 2016. Threatened medicinal plants of South Africa: case of the family Hyacinthaceae. *African Journal of traditional, complementary and alternative medicines*, 13(3): 169-180.

Xego, S., Kambizi, L., & Nchu, F., 2017. Effects of different hydroponic substrate combinations and watering regimes on physiological and anti-fungal properties of *Siphonochilus aethiopicus*. *African Journal of Traditional, Complementary and Alternative Medicines*, 14(3): 89-104.

Zavala, M. 2013. What do we mean by decolonizing research strategies? Lessons from decolonizing, Indigenous research projects in New Zealand and Latin America. *Decolonization: Indigeneity, Education and Society*, 2, 55–71.

Zedan, H., 2005. Presentation about Convention on biological diversity to the WIPO seminar on intellectual property and development. Geneva, Switzerland.

Zerbe, N., 2005. Biodiversity, ownership, and indigenous knowledge: exploring legal frameworks for community, farmers, and intellectual property rights in Africa. *Ecological Economics*, 53(4), pp.493-506

Appendix 1: Ethical approval letter to conduct the study



Private Bag X1290, Potchefstroom
South Africa 2520

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Fax: 018 299-4910

Web: <http://www.nwu.ac.za>

Senate Committee for Research Ethics

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ETHICS APPROVAL LETTER OF STUDY

Based on approval by the **Faculty of Natural and Agricultural Sciences Ethics Committee (FNAS-REC)**, the Faculty of Natural and Agricultural Sciences Ethics Committee hereby **approves** your study as indicated below. This implies that the North-West University Senate Committee for Research Ethics (NWU-SCRE) grants its permission that, provided the special conditions specified below are met and pending any other authorization that may be necessary, the study may be initiated, using the ethics number below.

Study title: Access and Benefit Sharing Arrangements on African ginger with Local and Indigenous Communities of Limpopo and Mpumalanga provinces of South Africa

Study Leader/Supervisor: Prof SA Materechera

Student: S Cossa

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Ethics number:

Institution

Study Number

Minimal

Year

Status

Status: S = Submission; R = Re-Submission; P = Provisional Authorisation; A = Authorisation

Application type: Single

Risk Category:

Commencement date: 01/02/2019 Expiry

Special in process conditions of the research for approval (if applicable):

. The following documentation are archived by FNASREC and should be complete and kept up to date:

- Research proposal
- Signed approval from the scientific committee indicating the proposed risk category

. All researchers involved in the study should submit signed NWU code of conduct statements annually.

. All researchers of low risk studies should submit proof of relevant ethics training every two years.

. All researchers that take part in activities that pose a safety and security threat to the researchers or the environment should submit a risk assessment form annually.

All research involving human interaction should follow best ethical practise and keep documents as proof. This includes informed consent, questionnaires, incorporation of risk-benefit, and responsible data management.

.Any research at governmental or private institutions, permission must still be obtained from relevant authorities and provided to the FNASREC. Ethics approval is required BEFORE approval can be obtained from these authorities.

General conditions:

While this ethics approval is subject to all declarations, undertakings and agreements incorporated and signed in the application form, the following general terms and conditions will apply:

- *The study leader/supervisor (principle investigator)/researcher must report in the prescribed format to the FNASREC:*
 - *annually (or as otherwise requested) on the monitoring of the study, whereby a letter of continuation will be provided, and upon completion of the study; and*
 - *without any delay in case of any adverse event or incident (or any matter that interrupts sound ethical principles) during the course of the study.*
 - *The approval applies strictly to the proposal as stipulated in the application form. Should any amendments to the proposal be deemed necessary during the course of the study, the study leader/researcher must apply for approval of these amendments at the FNASREC, prior to implementation. Should there be any deviations from the study proposal without the necessary approval of such amendments, the ethics approval is immediately and automatically forfeited.*
 - *Annually a number of studies may be randomly selected for an external audit.*
 - *The date of approval indicates the first date that the study may be started.*
 - *In the interest of ethical responsibility, the NWU-SCRE and FNASREC reserves the right to:*
 - *request access to any information or data at any time during the course or after completion of the study;*
 - *to ask further questions, seek additional information, require further modification or monitor the conduct of your research or the informed consent process;*
 - *withdraw or postpone approval if:*
 - * *any unethical principles or practices of the study are revealed or suspected;*
 - * *it becomes apparent that any relevant information was withheld from the FNASREC or that information has been false or misrepresented;*
 - * *submission of the annual (or otherwise stipulated) monitoring report, the required amendments, or reporting of adverse events or incidents was not done in a timely manner and accurately; and / or*
- *FNAS-REC can be contacted for further information or any report templates via Roelof.Burger@nwu.ac.za 018 299 4269*

The FNASREC would like to remain at your service as scientist and researcher, and wishes you well with your study. Please do not hesitate to contact the FNASREC or the NWU-SCRE for any further enquiries or requests for assistance.

Yours sincerely,



Prof Roelof Burger
Chairperson Faculty of Natural and Agricultural Sciences Ethics Commi

APPENDIX 2: Letter from the university to enable the researcher to gather information



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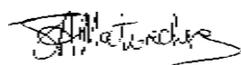
Email: albert.materechera@nwu.ac.za 14 July 2021

To whom it may concern

I Simeon Materechera, the supervisor of Sarah Cossa, hereby state that the research titled "Access and benefit sharing arrangement on African ginger with local and indigenous communities in Mpumalanga Province of South Africa" conducted by Sarah Cossa (26852020) is purely for academic reasons and to enable her to obtain her Master's degree. I kindly request that you assist her with any help she needs.

If you have any enquiries about the above information you are free to contact her supervisors at 018 389 2453/ 073 717 2911 Email: Albert.materechera@nwu.ac.za or Sechaba Bareetseng 082 332 8367 Email: SBareetseng@csir.co.za.

Sincerely yours,



Professor Simeon A. Materechera

Appendix 3: Consent form for the participants



Consent form to the Traditional Health Practitioners and Knowledge holders to participate in the study

My name is Sarah Cossa. I am a Master of student in Indigenous Knowledge Systems at North West University. I am conducting a research project “Access and Benefit Sharing Arrangements on African ginger with Local and Indigenous Communities of Mpumalanga Province of South Africa”.

The aim of the research project is to get an understanding of access to traditional knowledge and benefit sharing arrangements from the perspectives of the Traditional Health Practitioners and knowledge holders of Mpumalanga Province based on African ginger. I am requesting your participation in the study by answering the Research Tool to be used by myself as a guide during the interview. The interview will take up to one hour of your time. Your participation in the study is voluntary. You are free to withdraw at any time in case you do not feel comfortable.

Your name and surname will not be mentioned in the final dissertation from this study and academic writings. The information that you will provide will not be for commercial purposes; rather I will use it to write my masters dissertation in order to graduate from the university. After graduating, I will give you back the final copy of the dissertation produced from the study. If you have any concerns about the use of your information, please contact my supervisors; Prof Simeon Materechera at his cell phone number 073 717 2911 and Dr Sechaba Bareetseng at 082 332 8367

Consent

I..... **agree to participate in the research project:** “Access and Benefit Sharing Arrangements on African ginger with Local and Indigenous Communities of Mpumalanga Province of South Africa”.

Signature:

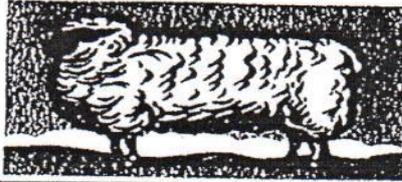
Date:

Place:

Contact Details



MNISI TRADITIONAL COUNCIL



Mnisi Traditional Authority
Private Bag x1403
Hluvukani
1363

ENQ: CHIEF T.M MNISI

DATE : 29/ 07/ 2019

CONTACT NO. **082 617 1198**

TO WHOM IT MAY CONCERN

SUBJECT: PERMISSION TO CONDUCT RESEARCH

APPENDIX 4: PERMISSION LETTER FROM MNISI TRADITIONAL COUNCIL
This serves to confirm that HOSI T.M MNISI and the Mnisi Traditional Council in Islington village (Mpumalanga) has given permission to Ms Sarah Cossa to conduct research on african Ginger.

The Traditional Authority and community members will provide all necessary support.

Signed by

HOSI T.M MNISI

MNISI TRADITIONAL COUNCIL
PRIVATE BAG X1403
HLUVUKANI 1363

2019 -07- 29

TEL: 013 735 5400
MNISI TRADITIONAL COUNCIL
BUSHBUCKRIDGE REGION

APPENDIX 5 (A): SEMI STRUCTURED INTERVIEW GUIDE FOR IDENTIFYING STAKEHOLDERS

Identification, documentation and profiling the characteristics of the stakeholders involved in the African Ginger supply chain

Section A:

Demographics Characteristics of the research participants

1. Name or code of the participant:
2. In which gender category do you fall to?

Female	Male
--------	------

3. In which age category do you fall to?

15-24	25-54	55-64	65 and over
-------	-------	-------	-------------

4. In which category will your marital status fall to?

Single	Cohabitation	Divorced	Married
--------	--------------	----------	---------

5. In which category of education do you fall to?

Formal education	Informal	Both	Level of formal education
------------------	----------	------	---------------------------

6. In which employment category do you fall to?

Employed	Self employed	Unemployed
----------	---------------	------------

7. In which religious category do you fall to?

Christian	Judaism	Islam	African	Other
-----------	---------	-------	---------	-------

1. What is the size of your household?

1-2	3-4	5-6	7 and more
-----	-----	-----	------------

Section B:

Profile the characteristics of the stakeholders

Section 2	Identify, document and profiling of the characteristics of African ginger stakeholders				
	Identify the stakeholders				
1	Do you know anyone who works with African Ginger?				
2.	How many African ginger stakeholders do you know?				
3.	Where are they situated?				
4.	What are their contacts				
	Document and profile the characteristics of the stakeholders involved in the African Ginger supply chain				
1.	What type of African ginger stakeholder are you?				
	Traditional health practitioner	Farmer	Marketer	Harvester	Other (specify)
3.	How long have you been working with AG?				
4.	Where do you access AG?				
5.	Are you formally registered with any entity?				
6	Have you collaborated with stakeholders of African ginger before?				
	Yes		No		
	If yes what was the collaboration about?				

		Sharing of knowledge	Supply of African ginger	Research	Business	Farming African ginger	of
6.	What are the challenges and prospects of working with African ginger?						
7.	What motivates you to be an African ginger stakeholder/ Why are specifically involved with African ginger?						

Appendix 5 (b): Questions used for Key informants and searching using google



Objective 1: Identify, document and profile the characteristics of stakeholders involved in the African Ginger supply chain in Mpumalanga Province.

1. Who are African ginger stakeholders?
2. What is the nature of their involvement with African ginger?
3. How long are they involved with African ginger?
4. What do they benefit from working with African ginger?
5. Where are they located?

APPENDIX 6: SEMI-STRUCTURED INTERVIEW GUIDE FOR INVESTIGATING THE TRADITIONAL USES AND BENEFITS OF AFRICAN GINGER

Section A: Demographics of the research participants and generation of information about access and benefit sharing

1. Name or code of the participant:

2. Date of the interview:

3. Name of the location and GPS coordinates:

4. In which gender category do you fall to?

Female	Male
--------	------

5. In which age category do you fall to?

15-24	25-54	55-64	65 and over
-------	-------	-------	-------------

6. In which category will your marital status fall to?

Single	Cohabitation	Divorced	Married
--------	--------------	----------	---------

7. In which category of education do you fall to?

Formal education	Informal	Both	Level of formal education
------------------	----------	------	---------------------------

8. In which employment category do you fall to?

Employed	Self employed	Unemployed
----------	---------------	------------

9. In which religious category do you fall to?

Christian	Judaism	Islam	African	Other
-----------	---------	-------	---------	-------

1. What is the size of your household?

1-2	3-4	5-6	7 and more
-----	-----	-----	------------

2. What is your role in African ginger?

3. Have you ever been approached with respect to your traditional knowledge and African ginger?

Yes	No
-----	----

If yes, by who?

Government	Researchers	Business people	Herbalist	Farmers	Traditional health practitioners
------------	-------------	-----------------	-----------	---------	----------------------------------

4. Are you aware that you have to benefit from the use of your traditional knowledge from research and commercialisation purposes?

Yes	No
-----	----

5. Have you benefitted from the use of your traditional knowledge?

Yes	No
-----	----

If yes what was the nature of the benefit?

Research results	Transfer of African ginger	Training and education	Money
------------------	----------------------------	------------------------	-------

	technology (e.g. cultivation methods)		
--	---------------------------------------	--	--

6. Were you satisfied with the benefits? If yes why? If no, what should have been done for the benefits to satisfy you?

7. Have you been involved in discussions on benefit sharing?

Yes	No
-----	----

8. Have you collaborated with stakeholders of African ginger before?

Yes	No
-----	----

If yes what was the collaboration about?

Sharing of knowledge	Supply of African ginger	Research	Business	Farming of African ginger
----------------------	--------------------------	----------	----------	---------------------------

9. Did you sign any drafted legal agreement?

Yes	No
-----	----

If you signed a legal agreement what kind of agreement was it?

10. If you have not collaborated before, are you willing to collaborate?

Yes	No
-----	----

11. Who are you willing to collaborate with?

Government	Researchers	Business people	Herbalists	Farmers	Traditional health practitioners
------------	-------------	--------------------	------------	---------	--

Section B: Investigate traditional uses and benefits of African Ginger by African Ginger stakeholders in Mpumalanga Province.

General questions on African ginger and medicinal properties

1. Are you familiar with African ginger?
2. How did you acquire the traditional knowledge on African ginger?
3. How long have you been involved in African ginger and what is the nature of your involvement?
4. Where do you access African ginger?

Mountain/wild Cultivated land Open market

Yard Others:

5. Do you grow the plant? If yes: where and if no: why?
6. What do you use African ginger for?
8. How do you treat the diseases using the plant?

Dry Liquid form Cook Other

9. Which part of the plant is more effective in treating the disease and why?

Leaves Bark Roots Whole plant
other

Section C & D- Objective 3: Establish the views and perspectives of identified African ginger stakeholders regarding access and benefit sharing.

Access to traditional knowledge and protecting traditional knowledge, cultural expressions and commercialising traditional knowledge of African ginger.

1. What traditional knowledge of the African ginger plant do you hold and what do you use it for?
2. Are you the main custodian of the knowledge?
3. What does traditional knowledge of African ginger mean to you?
4. How do you ensure that the knowledge is not stolen?
5. Have you shared this knowledge with your family? If yes, how is the knowledge shared and protected within your family?
6. Would you commercialise your traditional knowledge? If yes, what approach would it be to commercialising the knowledge?
7. Have you shared this knowledge with the members of your community? If yes, what types of knowledge systems did you share with the community and how is the knowledge shared and protected within the community?
8. Who is the main decision making authority to provide consent to access traditional knowledge of African ginger?
9. Do you think the community would commercialise the knowledge? If yes what approaches do you think the community would use to commercialise the knowledge?
10. What community rights are over the traditional knowledge of African ginger and how these rights should be protected?
11. Do you think the knowledge should be shared with outsiders of the community such as, researchers, government, and business people including herbalists? If yes how would the knowledge be shared and accessed?

12. Which knowledge systems would you be willing to share with the outsiders of the community?

13. Under which distances would you and the community share the knowledge with the outsiders?

Section D

Benefit sharing with Traditional Health Practitioners and communities based on the traditional knowledge of African ginger.

1. What does recognition mean to you as by the outsiders and community as the custodian of traditional knowledge of African ginger?
2. How arrangements should be followed by the outsiders such as national government departments, researchers and business people to ensure a fair legal agreement is negotiated and entered into? What does fairness in benefit sharing mean to you?
3. How would you like a benefit sharing agreement to take place?
4. Do you have the relevant skills and knowledge on how to negotiate a benefit sharing agreement?
5. What kind of benefits would you desire and why?
6. Would you share the benefits with your community? If no why? If yes, how would the benefits be shared?
7. Who is the main decision making authority within your family to sign the benefit sharing agreement?
8. For the knowledge you have shared in your community, how do you think the community should benefit?
9. What kinds of benefits should the community receive?
10. What are the motivating factors to receiving the benefits by the community and why?

11. What community authority would be involved in the negotiating a benefit sharing agreement?
12. Who is the main decision making authority within your community to sign the benefit sharing agreement?
13. How would the community prevent fraud and corruption from utilisation of benefits?
14. What do you think the community rights are with respect to knowledge of African ginger to ensure transparency and fairness in negotiating a benefit sharing agreement?
15. List the type of projects you would like to implement and what kind of collaboration should be developed with business, research institutions or government?

APPENDIX 6 (B) PARTICIPANT OBSERVATION SCHEDULE

Appendix 8: Participant observation guide	
Section 1	Field walks
	<ul style="list-style-type: none"> • Observe the places where AG is harvested (how they are planted and harvested) • Observe where participants sell where AG is prepared • Observe the technologies used for processing AG
Section 2	Body language and tone of voice
	<ul style="list-style-type: none"> • Observe the use of eyes when engaging with the participants, the researcher will pay attention on how the participants use eye contact. / Observe the participants' faces, whether there are smiling or sad when the interview is in progress • Observe the head and body language when expressing agreements and disagreements • Observe hand signals • Observe the tones of voice when emphasizing ideas or when in disagreement.
Section 3	Setting
	<ul style="list-style-type: none"> • The preference setting during interviews

Language editor's certificate



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Dear Sir/Madam,

RE: LANGUAGE EDITING CERTIFICATE: MS S COSSA (26852020)

This is to certify that the following Masters dissertation entitled **Access and benefit sharing arrangements on African ginger with local and indigenous communities in Mpumalanga province**, commissioned to me (Dr Chilombo Banda), by Ms S Cossa has been edited for English language, grammar, punctuation and spelling on December 8, 2021.

Disclaimer: the author is free to accept or reject changes made in the document after editing. However, I do not bear responsibility to revisions made to the document after editing is done.

Yours Sincerely,

Dr Chilombo Banda

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Programma Leader/Subject Chair

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