

RESEARCH ARTICLE:

## Contribution of Indigenous Knowledge to Agricultural Growth in South Africa: A Case of Disaneng Community in the Ratlou Local Municipality

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### Abstract

*Indigenous knowledge is the cornerstone of the society's agricultural growth; however, its documentation and dissemination remain big challenges. This paper explores the contribution of indigenous knowledge to agricultural growth in the Disaneng community. A qualitative research approach was employed in the study. Twenty participants took part in the study and semi-structured and unstructured interview guides were utilized to collect data from participants. The thematic approach was used to analyze results and five themes emerged during the study. Key themes that emerged include weather patterns, land preparation, seed selection, soil fertility, and stockpiling. The findings revealed that locals are endowed with indigenous knowledge (IK) on land preparation, seed selection, stockpiling, and soil fertility, and this promotes agricultural growth. The study concludes that IK acts as a vehicle for enhancing agricultural growth. However, challenges such as disregard of IK by some religious beliefs continue to hinder the application of IK for the growth of agriculture. Hence, for IK to continue influencing agricultural growth positively, effective measures should be introduced to mitigate the hindrances.*

**Keywords:** agricultural growth; farming; food security; indigenous knowledge; indigenous knowledge systems

### Introduction

Agriculture plays a critical role in the entire life of any given community world-wide, and, most importantly, in developing countries. Agricultural growth entails the process of creating the circumstances for agricultural potential to be realized. It is the accumulation of knowledge and the availability of technology, as well as the allocation of inputs and outputs (Food and Agricultural Organization, 2019). For the purpose of this paper, agricultural growth includes the techniques used by indigenous communities to improve agriculture productivity (food production). Agriculture is the backbone of the economic system of any country since it helps promote economic growth (Cook *et al.*, 2011; Hart and Mouton, 2005; Wegren, 2018; FAO, 2019). Nonetheless, while there is universal agreement that global demand for food is anticipated to rise in the coming years, there is no certainty on worldwide agriculture's capability to service this demand (Smutka *et al.*, 2009; Cook *et al.*, 2011; Wegren, 2018; Pawlak and Kołodziejczak, 2020). In South Africa, decades of attempting to advance agricultural development, most particularly in rural small-scale farming, have produced hardly any results, albeit at a considerable cost (FAO, 2020). In many cases, the transfer of information and technology to farmers has contributed to the degradation of agricultural resources and often a decline in the social and economic welfare of the intended rural small-scale farmers (Grain South Africa, 2019; FAO, 2020). Most parts of the country including Ratlou Local Municipality have faced severe drought conditions for more than five years (Grain SA, 2019; Bureau for Food and Agricultural Policy, 2020). In more than 100 years, some parts of the country recorded the worst drought situations, that caused great financial strain to food producers. Besides, agricultural growth in recent years has

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become more intense with water shortage, climate change, financial crisis, and the COVID-19 pandemic hitting hard on communities that are poor. In addition, the Ukraine-Russian war has also caused a rise in food prices (FAO, 2022). It has resulted in a massive increase of the food insecurity challenge, hence disrupting the growth of agriculture. This necessitates tapping from IK for agricultural development (Chigeza, 2008; United Nations Sustainable Development Goals, 2015; Prosekov and Ivanova, 2018; Ahmed *et al.*, 2017; FAO, 2022).

Studies have shown that since time immemorial, South Africa has depended on indigenous knowledge (IK) to augment agricultural growth. Indigenous Knowledge is very important and suitable during different periods and farming seasons. It provides problem-solving strategies for local communities, especially for the small-scale farmers (Ashraf *et al.*, 2018; Department of Science and Technology, 2020). Indigenous Knowledge methods are very important in the control and deterrence of pests, aphids, and weeds, and they have been confirmed as an instrument for improving crop health and yield. Indigenous Knowledge of farming such as minimum soil manipulation and growing of different crops in sequence on a piece of land helps maintain soil quality, hence improving agricultural growth (Berkes, 2008; Sithole, 2014; Sithole, 2020). Indigenous Knowledge refers to local communities' beliefs, rituals, practices, and how they relate with their surroundings. It further relates to stories developed by their knowledge, which have all created bonds over time with that environment (Du Toit, 2005; UNESCO, 2018). To facilitate IK and agricultural growth in the country, the South African government ratified a few legal and policy frameworks. One was the Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983). The Act promotes soil conservation, vegetation, water sources and combating weeds that affect food production (South Africa Yearbook, 2014). The second was the Comprehensive Agricultural Support Programme (CASP) of 2005, which concentrated on sharing of knowledge, marketing, skills, and financial advice aimed at creating wealth through IK, which would improve agriculture and food security both locally and nationally (Department of Agriculture, 2021). The other was the Indigenous Knowledge Systems (IKS) Policy of 2004. The South African government adopted this policy to provide a platform to understand, integrate and recognize IK (agricultural) resources to create wealth (Department of Science and Technology, 2022).

Despite the significant contribution of IK in agricultural growth, studies on IK have focused mostly on rural development, climate change, environment, and social protection. Very little is known about the contribution of IK to facilitating agricultural growth in South Africa and in the Disaneng community in particular. A study on IK and agricultural growth might assist the government and other stakeholders involved in implementing policies and assist document IK's contribution to food security and agricultural growth. The purpose of this paper was to explore the contribution that indigenous knowledge has made to agricultural growth in the Disaneng community. The Disaneng village, with approximately 7, 229 people, is located in the Ratlou Local Municipality, in the Ngaka Modiri Molema District Municipality of the North West Province. It is located within the semi-arid Savanna, classified as Thornveld, and it lies between latitude of 25:46 South and a longitude of 25:15 East. Most residents are farm tenants, farm labourers or peasant farmers. They earn meager incomes from farming activities, which are mainly of traditional subsistence nature. In the community, IK is regarded as the best method to promote the growth of agriculture (Statistics South Africa Community Survey, 2016; Mahikeng Local Municipality, 2019).

Despite the introduction of legislative and policy frameworks to promote IK and agricultural development, challenges such as pest infection of plants, lack of farming equipment, absence of proper farmer training, and drought continue to affect agricultural growth. Besides, the role of IK in agricultural South Africa in South Africa, particularly in Disaneng community, remain marginalised even with the high rate of food inflation (Magocha, 2019). Indigenous Knowledge is often viewed as backward, inferior, and conservative by scientists and social scientists and is based on total lack of knowledge (Department of Arts and Culture, 2021; Department of Science and Technology, 2022). Furthermore, documentation and dissemination of IK and agricultural South Africa remain a big challenge (Department of Arts and Culture, 2021). The Department of Agriculture (2021) states that approximately 23,6 per cent of the population in 2020 were affected by moderate to severe food insecurity, while almost 14,9% experienced severe food insecurity due to low food production. This has resulted in hunger and malnutrition, most particularly the children. Therefore, there was need for a study to validate the contribution of IK in promoting the growth of agriculture, hence the current study.

## **Theoretical Framework**

The Sustainable Livelihoods Approach (SLA) guided the study. The SLA was employed to understand the way the poor and vulnerable live their lives and the importance of policies and institutions. The SLA is a technique for examining and transforming the lives of disadvantaged people experiencing poverty. The framework is centred on people, and it provides the podium for all involved to participate based on the recognition that all people have assets and capabilities. These assets and capabilities can be developed to improve lives through the application of IK in agriculture (Kiragu, 2016; Rarmaloko and Asha, 2019). Indigenous knowledge has presented itself as a feasible option for cost-effective and sustainable growth of agriculture, specifically in African countries, including South Africa, where there is need to enhance food security (Senanayake, 2006; Zhang and Nakagawa, 2018; Department of Arts and Culture, 2019). Studies have shown that for many decades most rural communities, especially in developing countries, rely on traditional knowledge to ensure agricultural development (Enete and Amusa, 2010; Bvenura and Sivakumar, 2017). IK is a vital resource for dealing with daily problems such as droughts. Droughts have extensive outcomes for humankind, as they cause crop failure, reduce natural plant life, and diminish water supply. Furthermore, when faced with drought conditions, many people die, and shelter, livestock, and properties get destroyed. Victims of drought tend to borrow money and food, or sell their land and other basic items, thus worsening their situation (Senanayake, 2006; Zhang and Nakagawa, 2018; Department of Arts and Culture, 2019). IK plays a key role in fostering agricultural development for small holder farmers in rural areas, equipping them with expertise and understanding of ecological systems and local biodiversity. The safeguarding and continued growing and use of this knowledge are rooted in recognizing indigenous peoples' fundamental right to follow their own traditional ways of advancing agricultural growth generally, and in South Africa in particular (Heywood, 2011; Ponge, 2011; Kamwendo and Kamwendo, 2014).

The World Bank (2019) underscores that in agricultural growth IK allows diversity of plants and animals in the land. Sustainable land management also improves biodiversity development. As a knowledge-based procedure, land management helps manage soil and the environment to meet the growing food demand whilst sustaining livelihoods. The sustainable running of land and its properties is indispensable to ensuring agricultural growth, which enables communities to meet food sustenance for the growing population. Rankoana (2018) argues that the use of IK in agriculture ensured a wide range of foods are produced using mixed crop farming techniques, even before the use of conventional agricultural techniques was introduced. Earlier studies on the food habits of the BaPedi residing in Sekhukhune District in Limpopo, South Africa revealed that IK is used in agricultural growth to contribute to food and nutrition security. To identify edible wild fruits and vegetables, they require indigenous knowledge that is mainly possessed by adult members of the community and is transferred orally from generation to generation (Masekoameng, 2015). Masekoameng and Molotja (2019) found that in rural communities IK continues to act as a vehicle to promote agricultural growth. They further state that in Limpopo Province, traditional farming practices and IK are used by the people in the villages to cultivate indigenous foods in their fields and backyard gardens. Their study also found that although indigenous methods (animal traction) to prepare the land for cultivation were used, some households had shifted to using modern methods, such as fertilizer, while some combined the traditional knowledge and contemporary methods. Despite the significant contribution of indigenous knowledge to agricultural growth highlighted by extant literature, studies on IK have focused mostly on rural development, environment, climate change, and social protection. Very little is known about the contribution of IK to facilitation of agricultural growth in South Africa.

## **Methodology**

This study adopted a qualitative approach because this approach is used to understand people's beliefs, experiences, attitudes, behavior, and interactions. A qualitative approach helps explore and elaborate 'why' and 'how' a specific behaviour or phenomenon operates the way it does in a particular context (Creswell, 2014). In addition, it provides the platform to comprehend the attitudes, opinions, and beliefs of groups and people as nearly as possible as its partakers live it or feel it. The qualitative approach allows groups and individuals to be studied as they are. In relation to research design, this study used an exploratory research design owing to the fact there was little or no past information concerning indigenous knowledge and agricultural growth in the Ratlou Local Municipality. Adopting the exploratory research design in this study provided the opportunity for more precise investigation of the research problem (Creswell, 2013). Purposive sampling was employed to recruit the participants and key informants. The rationale for adopting

purposive sampling was that it provided the opportunity to identify and select information-rich cases related to the growth of agriculture and IK (Creswell, 2014). The key informants were recruited because they worked closely with the members (small scale farmers) of the Disaneng community, and they had knowledge about indigenous knowledge and agricultural growth. Moreover, they were knowledgeable about the information required to achieve the objectives of the paper. A sample of twenty (20) participants were selected for the study and they were drawn from the Disaneng community. The sample included both males and females, and participants of different education levels. The sample also included officials of the Department of Agriculture. One traditional leader also participated in the study. Therefore, 17 small-scale farmers from the Disaneng community, two (2) key informants (extension workers) from the Department of Agriculture, and one (1) traditional leader participated in the study.

Semi-structured and unstructured interview guides were used to collect information from the participants. On one hand, semi-structured interviews were informal and relaxed, and were held using a more defined topic guide with a list of questions that allowed probing for more information. With their permission, participants were asked questions about IK, the contribution of IK to agricultural development, and challenges faced by small-scale farmers in relation to IK and agricultural growth. On the other hand, unstructured interviews were used to collect data from the traditional leader and the officials from the Department of Agriculture. Furthermore, direct observations were utilized to obtain data for the study. Direct observations were adopted to capture processes such as land preparation, seed selection, and stockpiling. In addition, secondary data were used to supplement data in this study. Secondary sources such as books, unpublished and published theses and dissertations, and reports on the contribution of IK to agricultural growth provided more insight. The documents on indigenous and agricultural growth were obtained from the Department of Agricultural, the Department of Arts and Culture, the Department of Science and Technology, Statistics South Africa, and Ratlou Local Municipality. The seventeen participants in the interviews were labelled as P1 to P17 and the officials O1 to O3 to maintain the confidentiality and privacy in the study. Data was analyzed using thematic content analysis that involves repeated reading of field notes, listening to, transcribing, and translating recorded data from the participants and key informant interviews. The translated data were typed, organized, sorted, and coded into meaningful units. The study was approved by the research ethics committee of the researcher's university. Anonymity was assured by ensuring that neither the researcher nor the readers of the findings can identify a given response with a given participant. Participants gave their consent to participate in the study. Confidentiality was guaranteed by ensuring that responses from participants would not be revealed in public.

## Findings and Discussion

Below, the findings on the contribution of IK to agricultural growth in the Disaneng village are presented and discussed. Five themes emerged during data analysis. The themes include weather patterns, land preparation, seed selection and food storage, soil fertility, and stockpiling. These themes guide the data presentation and discussion of findings below.

### ***Theme 1: Weather pattern***

Most of the participants, including the key informants (traditional leader and Department of Agriculture), revealed during interviews that they knew how to interpret and read the patterns of weather. One participant noted that:

*"We have knowledge to read and interpret the weather. This is done via observing changing seasons, seasonal patterns, the stars, and the lunar cycle which provides the platform for agricultural growth."* (P1)

Another one said:

*"The color of clouds is employed by us to determine those clouds that may carry hailstones that destroy crops. We used hail nets to protect yields. The position of the moon also determines if it is going to rain or not."* (P3)

One extension worker participant reported:

*"If the moon is upside down, it means that there will be drought that distorts agricultural development. A curved shape signifies rain, while a full moon signifies less or no rain. Storm is followed by lengthy drought, lightning, and thunder during the first rains, enables them to expect or prepare for disaster. In addition to these plant*

*phenomena, the appearance of stars, moon, and the sun is carefully observed at the beginning of September, which marks the beginning of a new season.” (O1)*

According to the data above, farmers have knowledge to read and interpret the weather that creates conducive conditions for the fulfillment of agricultural potential. This is done through observing changing seasons and seasonal patterns. They also explained that the color of clouds could be interpreted to determine if hailstones, which destroy crops, were imminent. To prepare for hailstones and protect crops, they utilized hail nets. According to the participants, protecting crops consisted of the tall post system, which supported overhead wires that held light-weight netting over each row. The participants also indicated that an early warning sign of drought could be determined by observing the position and shape of the moon. This knowledge guided the small-scale farmers to determine if there would be rainfall or not in a particular farming season, helping them prepare for catastrophes, such as drought and food shortages.

Indigenous Knowledge of reading and interpreting the weather patterns helps small-scale farmers determine the crops to be sowed, for example whether to plant crops that need plenty of rainfall only, or drought resistant plants. Weather controls the distribution of rainwater on earth. Agricultural growth requires liquid water to survive. In other words, using the IK to interpret the weather enables small-scale farmers to accurately plan farm operations, such as planting, weeding, and harvesting, because farming and agriculture chiefly depend on weather and seasons. The above findings are consistent with Behera and Nath's (2005) study, which found that IK is the entirety of the abilities and knowledge such as weather patterns, that community members in a specific physical region possess and use to get the maximum benefit from their environment, as learned from the experience of community members over time. The success of agricultural quests is influenced by weather patterns, which act as a vehicle of agricultural productivity. Weather was the main factor on which most field crops depended for life sustaining water and vigor. In some cases, unpleasant weather conditions, especially if experienced during significant stages of plant growth, can cause losses in final output (Lwoga *et al.*, 2010; Magocha, 2019). The findings also align with the SLA used in the study which demonstrates that small-scale farmers have knowledge to read and interpret weather. If IK were to be encouraged by the government, the abilities and assets could be developed which will improve IK and agriculture (Rarmaloko and Asha, 2019).

### **Theme 2: Land preparation**

The interviews indicated that small-scale farmers used IK techniques such as farrowing, digging basins, spreading of ashes and the slash and burn system to prepare land for agricultural activities. Small-scale farmers shared their experiences, and some of these are excerpted below:

*“To prepare the land we use tools such as spade, shovel, trowel, fork, and rake. Draft animals such as donkeys and camels are also used for land preparation”. (P2)*

*“We also dig basins which keep moisture for longer periods while spreading of ashes and manure adds nutrients and quality to the soil for farming.” (P4)*

*“We are not using contemporary farming techniques such as synthetic fertilizers; however, our crops are growing healthy and improving food security greatly.” (P6)*

An extension worker participant added:

*“Community members also spread ashes which decrease the use of artificial fertilizers and pesticides, which in turn keep food prices down because it leads to higher crop productivity.” (O2)*

According to the participants, land was prepared using tools such as spades, shovels, trowels, forks, and rakes. Draft animals such as donkeys and camels are also used for land preparation. These indigenous procedures, such as digging basins and spreading of ashes, contribute to agricultural progress, which is essential for providing food not only for them but also the growing non-agricultural labour. The participants also revealed that they burnt fields as a technique for fighting insects that could destroy crops. Burning also helps remove weeds, prevent disease, and control pests. Burning their fields to remove plants that are already growing and to help the plants that are about to come up.

It was also observed during the field study that ashes are pesticides and spreading them destroys pests that invade crops. Furthermore, the ashes have some chemical substance that overpowers weeds, which enables crops to be healthy, hence increasing food production. Indigenous Knowledge helps sustain agricultural growth, preventing plant genetic erosion and environmental deterioration through land preparation and thus contributing to food security and socio-economic development in the Disaneng specifically, and in South Africa in general. Land preparation comprises farrowing, harrowing, digging of basins and slashing and blazing of trees to make the land suitable for planting. This process releases nutrients to the soil, reduces weeds, and destroys ant nesting. Moreover, land preparation provides the necessary soil conditions which enhance the successful establishment of food production. These findings are in line with the views held by Klein *et al.* (2007) and the World Bank (2019) that proper land preparation, through appropriate spreading of ashes, soil conservation, and farrowing enhancement practices, ensures high crop productivity. The finding was also in line with the SLA used in the in study. Small-scale farmers of the community have knowledge on land preparation that improves food security. The support and encouragement by the government and other stakeholders involved will enhance their capabilities and improve IK and agriculture (Kiragu, 2016).

### **Theme 3: Seed selection and food storage**

All the participants indicated that they used IK to select seeds and store food. The knowledge of seed selection and food storage helps in producing healthy crops and safeguarding food for the future. Participants indicated the following:

*“When selecting seeds, the following are taken into consideration, resistance to disease, yield capacity, nutritional value, and drought tolerance. In addition, the selection of seeds depends upon the following factors: broken or crushed seeds should be avoided; the sowing quality of seeds should be high; the seeds should have high germinating capacity and the seeds should be free from infection.”* (P5)

*“Some of us have better knowledge of disease and drought resistant seeds and therefore we have a drought-coping mechanism that uplifts agricultural growth. We understand which seeds do well in certain types of soil and those that do not in certain conditions based on their experiences. We also have knowledge about seeds that develop fast and those that are good at responding to famine after long dry spells or other natural disasters.”* (P10)

*“I see people getting bothered about money for buying plant seeds during planting season. Planting seeds cannot be my problem because I keep my own seeds which are well selected from my own harvests. I know how to do it to get better results.”* (P12)

*“In terms of food crops such as cabbage, tomatoes, Irish potatoes, pumpkin, watermelon, and maize, which are sometimes produced on a large scale, we have adopted new types of stores which are constructed like houses using local materials. We have ample ventilators, and a rack is erected in such a way that foodstuffs stored do not get into contact with the floor to avoid getting damaged by mold, termites, and red ants.”* (P14)

As explained by the participants they possess good knowledge of the selection of seeds and food storage. They indicated that when selecting seeds, good taste, resistance to disease, yield capacity, nutritional value, and drought tolerance are considered. They also expressed knowledge of seeds that grow fast and those that survive drought conditions. Good quality seeds are very important to achieve a strong and healthy crop that promotes agricultural growth. While seed selection is mainly aimed at obtaining healthier seeds, it can also be used to maintain and improve the quality of the crop variety. According to the participants, local materials were used to construct granaries which serve as a new kind of stores for seedlings and food. These granaries have openings that are wide and a bar erected to prevent stored foodstuff. from getting in contact with the floor, this prevents damage from mold, termites, and red ants. In addition, proper food storage helps avoid foodborne illnesses brought about by hurtful bacteria. These findings corroborate those by Gueye *et al.* (2013), which revealed that before agriculturalists buy seeds, they should ensure it is of better quality than the local seeds they have saved from previous harvest. Furthermore, Rankoana (2018) acknowledges that indigenous methods of food storage help reduce the inconsistency of the food supply in the face of natural, inevitable variability. They allow foods to be eaten for longer time after harvest rather than just immediately.

An official from the Department of Agriculture (extension worker) revealed that some small-scale farmers refused to embrace modern farming technology in selecting seeds and storing food. According to the official, IK is lucrative, which is the reason small-scale farmers were still employing their local knowledge to attain food security. Furthermore, the quality of seeds distributed by the Department of Agriculture was often suspected to be low because, most often, the seeds failed to germinate compared to local ones. The use of IK in preserving food output enables farmers to make better seed choices, even when buying from stores; this implies less use of chemicals and fertilizers.

In the field during the study, we observed that IK techniques and practices were employed largely by elderly men and women because they upheld the IK better than the youth. Consequently, their role was very crucial in promoting agricultural expansion in the area. Participants used more traditional methods than modern farming technologies. However, some participants preferred combining both traditional methods and modern knowledge, allowing them to produce more food.

#### **Theme 4: Soil fertility**

Most of the participants expressed better knowledge of soil fertility, which increases agricultural growth. Participants shared their experiences thus:

*“Soil characteristics are very crucial for agricultural expansion and the types of crops grown, regulating the movement of air and water, influencing root development, and affecting nutrient availability. Good quality soils are friable (crumbly) and have fine aggregates, so the soil breaks up easily if you squeeze. The balanced contributions of these components allow for water retention and drainage, oxygen in the root zone, nutrients to facilitate crop growth; and they provide physical support for plants. This allows them to produce healthy food with all the necessary nutrients needed for human health.” (P7)*

*“We have reasonable indigenous knowledge of the soil color and texture. According to one participant, soil color allows them to know some of its most important characteristics, such as mineral composition, age, and soil processes. That is chemical modification, carbonate accumulation, the presence of humified organic matter that promotes agricultural development.” (P8)*

*“Dark brown suggests that the soil has a good percentage of organic matter. Red reflects the oxidized iron content of the soil, while tan indicates a combination of organic matter and iron. We can also determine when the soil is exhausted.” (P9)*

*“We also have knowledge about soil water retention. When water retention level reduces in soil substantially it becomes too porous, light, and dusty. The porous soil leads to stunted and yellowish crops. Consequently, the crop yields decline at an increasing rate.” (P15)*

The views of the participants above revealed that they possessed good IK of soil fertility. Soil fertility is hugely influenced by soil characteristics such as texture and color. They also state that the nature and quality of the soil was a great determinant to the type of crop that was produced. They had gained knowledge which helped them detect good soil for crop cultivation. The participants also said that brown soil suggested a good percentage of organic matter while crumbly and sandy textured soil meant lack or reduced soil fertility. This knowledge assisted community members to increase overall food production, which increases not only food security but also income and employment. Soil fertility is the capability of soil to withstand the growth of plants and enhance the yield of a crop, which improves agricultural growth. This can be improved by adding organic and inorganic fertilizers to the soil.

Improving food production in agricultural growth systems needs an integrated method of administration of soil fertility that achieves the most in crop production while lessening the deterioration of soil nutrients reserves that prevent soil erosion and decline of soil quality. These findings are in consonance with the International Atomic Energy Agency (2020) research, which acknowledges that good management of soil fertility embraces the use of organic inputs, manure, rotation of crops with legumes, and the use of improved seeds combined with the knowledge on how to adapt these practices to local conditions. In addition, Sithole (2020) submits that soil fertility is the basic support, and it provides

nearly all the needed nutrients for plant growth, including nitrogen, phosphorus, and potassium, calcium, magnesium, sulfur, iron, zinc, copper, boron, molybdenum, and nickel.

Most of the participants indicated that the small-scale farmers employed the stockpiling technique to curtail the spread of diseases to animals like goats, pigs, and cattle by killing the affected animals. The following excerpts explain this:

*“As the community continued to lose animals every year due to diseases caused by drought, stockpiling and food preservation were introduced. In addition, the older people utilized the traditional pesticides, as they could not afford to buy modern pesticides so they burnt fields to kill earth worms and larvae that could infect livestock. Goats, cattle, and traditional chickens are the main forms of livestock found in almost every household in the community. Other types of less common livestock in the area include sheep, pigs, and donkeys.”* (O3)

*“They also use a variety of methods to preserve food. They used drying as a method of food preservation; they dried vegetables, fruits, and meat and thus stockpiled them for future consumption.”* (P14)

According to the participants, the small-scale farmers, especially the elderly people, introduced stockpiling and different methods of food preservation during drought seasons. They also dried most of the fresh produce such as fruits and vegetables and they had them stockpiled for when these produces would be out of season. In drying and stockpiling their harvest, small-scale farmers and community members could have foods that were out of season or during drought periods. This helps them have balanced diets and some could be sold to raise income for other needs. Some of the crops like tomatoes, pumpkin, Irish potatoes, and livestock such as cattle, goats, and traditional chickens are for household consumption. Some are sold to local and national markets to generate income for buying farming inputs and implements.

Stockpiling is the technique in which certain meadows are carefully chosen in the late summer where fodders are kept or stored for eating later. These meadows are then managed with the intent of using them later in the season for winter grazing. Effective stockpiling practices ensure availability, accessibility, stability, and affordability of food, hence boosting domestic food production and agricultural growth. IK is the insight held and shared by people in their community and is spread from generation to generation (Magoro and Masoga, 2005; Pawlak and Kołodziejczak, 2020). It is evident in the accumulation of large stocks of foods (stockpiling), which, as indicated by one official from the Department of Agriculture they learnt from their fathers and mothers that they need to store food for unforeseen happenings like floods. These findings also support the SLA used in this study. If community members are encouraged and supported by the government, this will improve their skills on stockpiling.

Similarly, it was observed during data collection that the exchange of foodstuffs for livestock is common. If for instance drought conditions were intolerable, the size of their herds would be cut down by getting rid of the older and sick animals first, in exchange for foodstuffs. Where drought conditions persisted, the community practiced the rotational grazing strategy, which reduced the effect of drought on animals. The traditional leaders of the community affected by drought would go and request permission from neighboring tribes that had not been hard hit by drought for their livestock to graze on those pastures. This knowledge and skills in turn assisted them in reducing food poverty, hence agricultural growth.

However, a small percentage of participants expressed disappointment over some challenges they faced whilst applying IK to agricultural development. Below are some excerpts expressing this:

*“Participants revealed that undocumented indigenous knowledge was a challenge affecting community members in the area. They explained that very little emphasis is put on documenting indigenous knowledge systems and practices concerning agricultural development because it is considered primitive by scientists. This knowledge could fade away and not reach future generations.”* (P2)

*“Many people (educators and learners) look down upon their own traditional knowledge systems and practices which hinder the growth of agriculture in the area. Education and exposure especially of the young generation to modern training have biased people’s attitudes towards using IK.”* (P13)



*“Some religious beliefs do not encourage traditional values and technologies regarding them as demonic and superstitious. Theft was also reported as another challenge. One of the participants revealed that people no longer keep goats, sheep, pigs, and traditional chicken because of thieves.” (P17)*

*“Another vital challenge reported by participants was the absence of extension workers to provide services to people and guidance. Also, some extension workers were not trustworthy for political reasons; hence, they were not trusted by the people.” (P16)*

Participants were of the view that some challenges still plagued IK in agricultural growth. These include IK being undocumented, bias against the use of IK as it is seen as old knowledge, disregard of IK by some religious beliefs, and the absence of extension workers to provide guidance and services to members of the community. In addition, some people do not pass on IK to others because of selfishness. Indigenous Knowledge is at risk of fading not only because of the influence of speedy global change, but also because of the aptitude needed to appraise, document, authenticate, and distribute this knowledge globally, most importantly in developing countries. Owing to the challenges raised, speedy and successful growth of agriculture is impeded. This leads to increase in poverty and unemployment amongst small-scale farmers and members of the community who are dependent on agriculture for a livelihood as supported by Sithole (2014) and the Department of Agriculture (2021). It is therefore crucial to collect IK and document it in a logical and orderly fashion and archive it in the form of a database.

## Conclusion

Indigenous knowledge remains vital in enhancing agricultural growth, thus contributing to food security and economic development in the country as a whole and Disaneng in particular. Five traditional techniques, namely spreading of manure, farrowing, digging of basins, spreading of ashes, and slashing and burning are utilized for land preparation, which facilitates the growth of agriculture. These traditional procedures contribute to agricultural progress, which is essential for provision of food not only for them but also for the growing of non-agricultural labour force. They also indicated that their knowledge regarding seed selection and food storage helped in producing healthy crops and safeguarding food for the future. The stockpiling technique was employed especially by the older people to help preserve the quality and nutritional value of the foods. It also ensures that food remain available and stable hence, food security.

However, many people look down on their own traditional knowledge systems and practices which hinder the growth of agriculture in the area. The government and other stakeholders should introduce awareness programmes on IK and agricultural growth, and on the worth of IK to encourage the community to preserve their knowledge and share it with others. Both modern and indigenous knowledge on agriculture could be encouraged to co-exist, a mixed system which could lessen the burden of food shortages not only in Disaneng but in other communities in South Africa as a whole. The Government and other stakeholders such as Community-Based Organizations and Faith-Based Organizations should continue researching and documenting the IK practices in South Africa at large and Disaneng community. This knowledge should be made available and easily accessible to small-scale farmers and community members. Community leaders and other stakeholders should organize agricultural shows along the lines of IK policies. The display of farm produce would enable comparisons to be drawn between IK informed practices and others, creating the opportunity to learn of the strengths and weaknesses of IK and fine-tune it in view of the outcomes. Farmers should be given prizes and certificates as incentives to encourage others to work even harder. The Corona Virus pandemic and the Russian-Ukraine war have led to food price hikes; therefore, the use of IK as an alternative in improving agricultural output could lessen the burden of small-scale farmers in Disaneng and South Africa in general.

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