Harnessing Zimbabwe's indigenous knowledge

for a changing climate

KONRAD ADENAUER STIFTUNG

Cover photographs: Grandfather Shoko, Luwisa Mutandi, Nesta Muzondo and Sekuru Mhene

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We hope that this knowledge will continue to be shared with pride by Zimbabweans young and old, and that it will not be forgotten.

Foreword

Important research has been done on indigenous knowledge in Zimbabwe over the years. The has focussed on people's experiences and practices in diverse spheres of life. The majority of research has been done by academics, both local and foreign. Since the knowledge is collected for academic interrogation, most published works are arguments for and/or against acceptance or dismissal of indigenous knowledge as an important component of modern life and innovation. For that reason, the analyses of data tend to have very little in terms of knowledge documentation and sharing.

This book is about knowledge gathering and sharing by all and has taken a different approach in terms of data collection and presentation. First, people in communities across the country were involved as both the sources and collectors of information. 'Ordinary' members of respective communities gathered data from people in their localities who were considered knowledgeable about different kinds of topics. Second, the collected information was shared on public media, which makes it available to more people, specialists and non-specialists. Third, data presentation is documentary in the sense that the book has huge chunks dedicated to interview responses where people are explaining different kinds of phenomena as well as tables providing names and descriptions of different kinds of traditional food, wildlife and processes.

Besides making the information easily shareable, this presentation makes it easy for people to relate to their current or once-lived experiences. The book invigorates indigenous Zimbabwean knowledge in a way that keeps it alive and easy to preserve.

The book shows that people in different communities still remember information about traditional dishes and their processing, methods of preserving food, wild fruits, farming practices, weather forecasting methods, herbal medicines, environmental management, governance, community living, etc. Responses from knowledge custodians show that communities were self-sustained, innovative and responsive to change. They also lived as responsible citizens of their communities as is seen in the way they developed a balanced relationship between themselves and their local environment. However, very little of these have been kept alive as they are no longer widely practised except in a few rural areas.

A closer look at the content shows that in the past Zimbabweans lived in close connection with their environment and understood signs of drought and other variations. They developed ways of living in difficult conditions. To adapt to current climate change we do not have to reinvent the wheel. We can look at what people used to do and combine this with modern approaches to come up with effective practices.

Reading this book reminded me of what I had forgotten from my childhood. It felt like a regeneration of my youthful life; the way I and those of my age grew up in our communities, the kinds of crops we used to take care of and the kinds of food we ate, how we behaved, the symbiotic relationship that obtained between us and our immediate environment and the way we relied on our forests, rivers, wetlands and the general environment for food, water, medicines, etc. – in summary, the sources of our happy and guaranteed livelihood.

Professor Emmanuel Chabata
Acting Director of the African Languages Research Institute
University of Zimbabwe
December 2020

Preface

This book must begin with a short description of my role. Throughout my life I have been amazed at how most white Zimbabweans (including myself) know so little about the history, culture, languages and people who they share this country with. Through my work over the years I have met farmers, teachers, extension officers and field workers and others who have been generous enough to share their knowledge with me. I have also met many indigenous Zimbabweans who consider the knowledge of their parents and grandparents to be worthless. This can be blamed on colonial attitudes, but also on the education system and worldview that has been promoted since independence.

I do not believe that we should return to a pre-industrial lifestyle; some indigenous knowledge, attitudes and practices are inappropriate in the 21st century. But the short-sighted dismissal of indigenous culture has meant that vital knowledge that could improve agriculture, health and natural resource management and build resilience to climate change, has undoubtedly already been lost.

My role in this project was to mobilise, guide and encourage the Community Knowledge Gatherers (CKGs), but I did not really have to do this: everyone was extremely enthusiastic, motivated and competent. I was also responsible for sharing the information on social media, and finally, gathering and summarising the information into the form of you have in front of you.

People have heard me say that this was the most exciting project I have ever been involved with: it is true. Not only have I learnt a huge amount but I have met a range of interesting and inspiring people, reading their interviews

and watching their videos. I feel as though I have travelled to their communities and have a clearer picture of rural life in Zimbabwe today and in the past.

Because I cannot claim to be part of any of Zimbabwe's indigenous cultures, it is inevitable that there will be mistakes in interpretation, and I apologise for this. I hope the reviewers will correct any major mistakes before going to print.

In closing, my thanks to all who took part in this process, especially in the face of Covid-19. Overall, this process has made me optimistic that Zimbabweans will find ways to survive the uncertain future that we all face.

Knowledge gathering was a sterling experience. Even the CKCs were excited by the research. A lot of the elders are eager to leave their wealth of knowledge only didn't have platforms or inspiration to share it. I hope and believe this is the starting point. (CKG, Kaunda Ncube Chenzou Primary School, Hwange)

1. Introduction

Climate change, caused by human activities, is a major threat to humanity and is already having impacts on Zimbabwe's temperature and rainfall patterns. These impacts have been made worse by environmental destruction and a growing population. Because most Zimbabweans live in rural areas and get most of their food and income from agriculture, it is crucial that we develop ways to adapt to the new unpredictable conditions: hotter temperatures, less water, reduced soil fertility, increased pest and disease threats and increased droughts, floods and storms. Governments and non-governmental organisations (NGOs) have promoted several approaches to adapt, such as conservation farming and climate-smart agriculture, but we can also look at the indigenous solutions that were developed over time to deal with Zimbabwe's naturally variable climate. Although not all indigenous knowledge is relevant or appropriate today, taking stock of what is still remembered can help us to decide which methods should be promoted by communities and others to help people adapt to climate change.

Defining indigenous knowledge

In this book, indigenous knowledge is defined as the wisdom, experience and practices that developed in a particular place and have been passed down through time to help people adapt to their environment. Most of the information given by the CKCs is knowledge from past generations but some examples in this book combine old knowledge with new innovations (such as the indigenous poultry project and the seed archive described in chapter 4 and other innovations coming from Shashe Agroecology School). Local innovators include the late Zephaniah Phiri[1] from Zvishavane, who became famous for developing local water-harvesting systems.

Resilient new livestock breeds have been developed by crossing indigenous cattle, goats and poultry with improved breeds (such as Boschveld chicken). Numerous effective traditional ways of food preservation are being improved through the promotion of solar food driers and processed products for marketing. Modern 'conservation agriculture' being promoted by government and NGOs is based on a traditional method of making planting basins using a hoe.

Some of the responses shared by the CKCs included a combination of a) knowledge developed before the arrival of white settlers, b) knowledge that was introduced by whites, government extension officers NGOs and others but has since become common practice and so it is now considered indigenous and c) local innovations.

It is not my place to state what is 'authentically' indigenous knowledge (and what is not) and it is not really useful to get bogged down by this issue so I will not discuss it here.

Historical background

In 1890, when the white settlers arrived in the land now called Zimbabwe, they saw that local communities had developed complex ways of living with a variable climate and environment. Farmers were using shifting cultivation. A diverse mixture of drought-resistant crops (including millet, sorghum, cowpeas and roundnuts) were planted in fields cultivated with hoes. Land-use was governed by traditional leaders. Over 200 indigenous plant, mushroom, insect and animal species were sustainably harvested from forests, wetlands and grasslands for food and medicine. Religious and cultural systems evolved to conserve the natural resources.

During colonial times, from around 1927[2] until independence European farming techniques[3] were introduced, including clearing trees from fields, mechanical ploughing and the planting of single crops (monocultures). Resilient, indigenous crops were thought to be inferior and discouraged, while maize (originally from Central America) was promoted. As time went by, farmers were encouraged to buy expensive inputs, including hybrid seed and livestock breeds, fertilisers, herbicides and pesticides. Wetland agriculture was banned, even though it had been practiced sustainably for thousands of years.

In the last twenty years scientists across the world have realised that most of the practices that were introduced cause serious environmental damage and have contributed significantly to the release of greenhouse gases that cause climate change. Tree-felling and ploughing are particularly harmful, as they reduce soil nutrient and water-holding capacity while releasing carbon dioxide and increasing local air and soil temperatures. Farmers are now advised to avoid ploughing and cutting down trees. Traditional crops are encouraged once more, they are more nutritious and drought tolerant than maize and do not require expensive inputs (fertiliser, pesticides and herbicides) to produce high yields. Dependence on these inputs makes farmers poorer and causes environment and health problems.

In most rural communities there are still systems to protect the natural resources on which farming, water supply and community health depend. Traditional leaders, who are responsible for environmental protection, often prohibit the felling of certain tree species and designate some forests, hillsides and water sources as sacred. These places can be used only after performing special rituals. In some areas, traditional

systems such as z*unde ramambo/isiphala seNkosi* are still practiced. The traditional leader organises extra grain to be produced and stored for distribution to the needy.

There are also systems to encourage collective community work such as *nhimbe* (Shona) and *amalima* (Ndebele). During dry times of the year or before the harvest, people often collect wild fruit, vegetables, mushrooms and insects, which provide nutritious food. These are not only a source of food but have become a source of income.

The Indigenous Knowledge for Climate Adaptation initiative

In July 2020, with funding from Konrad Adenauer Foundation, the Indigenous Knowledge for Climate Adaptation initiative (IKA) was launched. The aim was to gather, share and celebrate indigenous knowledge from across Zimbabwe to help communities adapt to climate change. People throughout Zimbabwe were invited to become Community Knowledge Gatherers (CKGs). A simple interview was developed with questions about traditional agriculture, (agriculture practiced before the influence of colonialism) food and environmental management, community co-operation and traditional weather forecasting methods. Information was documented in write ups, photos, voice recordings and videos. The information was sent back by WhatsApp. This method was chosen due to the Covid-19 pandemic as people were under lockdown in their communities.

The CKGs were mainly schoolteachers, field officers and others living in rural communities. Some urban CKGs also collected information by phone from rural friends and relatives and a Facebook page was set up to share what had been collected. The CKGs were paid for their airtime, stationery and travel. By the end of September there were about 46 CKGs who

had interviewed over 200 people in 49 districts covering all the provinces. The people who were interviewed were called Community Knowledge Custodians (CKCs). The youngest was 23 and the oldest, 99. The balance between men and women was almost equal; 95 CKCs were women. Most of those interviewed were farmers. Some were traditional leaders, traditional healers and traditional midwives. There were also potters, carpenters, leather-workers, teachers and university students.

The enthusiasm of the CKGs and CKCs was inspiring. The initiative made it clear that Zimbabweans have been desperate to share their knowledge and have been waiting for someone to facilitate the process. The process of gathering and sharing encouraged people to be proud of their knowledge and to value it. The enormous volume of knowledge collected meant that there was not enough time to include everything in this version of the book, particularly the many different crop varieties, edible wild plants and insects and livestock medicine methods described. However, this information will not be lost and we will find ways to use them in future.

A new research approach

Research[4] has been done on indigenous knowledge in Zimbabwe over the years but most has been conducted by outsiders who were not part of the communities studied. Most of the output of this research has stayed in academic papers and has not been shared with the communities that gave their knowledge or with Zimbabweans at large. The IKA initiative is about gathering and sharing knowledge. Most of the CKGs were themselves part of the communities where the knowledge was gathered. The use of WhatsApp and social media showed that research can be done in new ways and does not need to be done by academics. The initiative provided an opportunity to make the research interactive so that it became a conversation

between me and the CKGs. Having the videos, photographs and other information on Facebook meant that a wide range of other people not directly involved in the project could participate in the discussion.

This book is one product of the knowledge-gathering exercise. Its aim is to summarise the information that was collected and make it freely available to all those who were involved in the project as well as anyone else who is interested.

About this book

The book is divided into sections on indigenous knowledge related to weather and climate, traditional community management, traditional agriculture and traditional diet. There is also a section looking at how indigenous knowledge can be used to help Zimbabweans adapt to climate change in the future. Appendix 1 gives information about the CKGs and CKCs.

It is very hard to find a common language that all readers will understand. Zimbabwe has sixteen officially recognised languages, including Chewa, Chibarwe, English, Kalanga, Koisan (Tjwa), Nambya, Ndau, Ndebele, Shangani (Tsonga), Shona, Sotho, Tonga, Tswana, Venda and Xhosa. This book will be translated into Shona and Ndebele in the hope that its use will be widespread. The names of crops, wild plants and animals are mostly given in English with the Shona and Ndebele in brackets. Where the text describes information given by a CKC, I have given the local name used with the English name in brackets if I was able to find it. Sometimes this name could be given in a local language (such as Nambya of Tsvonga) that I was not able to translate. To find out the English, botanical and local names (Shona and Ndebele) for the plants, use Appendix 2.

Endnotes

1 You can read more about Mr Phiri's work online at: https://sustainableagriculturezimbabwe.wordpress.com/2013/08/29/zephaniah-phiri-the-water-harvester-zvishavane/ or watch the film https://www.youtube.com/watch?v=ieqYZaT0JwA

2 Alvord, 1930.

3 Page and Page, 1991; and Whitlow, 1988.

4 Such as Chanza and Mafongoya, 2017;, Mapara, 2009; Risoro *et al.*, 2013.

We used to harvest adequate food and wild fruits but toward the ’90s we started noticing a change in the climate: high temperatures, uneven rainfall pattern, droughts and death of livestock. Pests and diseases increased on both crops and livestock. Farmers who were growing maize suffered from hunger but despite the lowering yields, our family was able to sustain itself … because we were planting drought-tolerant small grains. In times of drought, the elders would request for food from their ancestors (*madzime*) and floods were rare. (Mwadaro Chieza, Chitimbi Village, Mhandarume, Chimanimani)

2. Weather and climate

In this chapter we look at indigenous ways of monitoring the weather and climate. It begins by documenting signs of climate change mentioned by CKCs and goes on to present indigenous weather forecasting methods. It concludes with the ways suggested for addressing climate change. Some of the methods described here may be help farmers make decisions about how to prepare for the agricultural season. Signs that indicate a drought could help families to save surplus grain to tide them over the drought period. Farmers could choose to plant drought-resistant crops and be vigilant to pest and disease attack. They can also collect vegetation for supplementary livestock feed. If there are signs of a flood, farmers can plant their crops far away from wetlands, stream banks and low-lying areas. They can also plant water-loving crops such as rice and yams in flood-prone areas.

Zimbabwe naturally has a very variable climate, with cycles of droughts and floods and a wide range in rainfall and temperatures. Climate change is gradual and happens over a long period of time, so without scientific instruments it is hard to measure. Scientists[1] have found that the average temperature across Zimbabwe has increased by about 0.9°C since 1900, with greatest warming occurring since the 1980s. Average annual rainfall has declined by about 5% across the country since 1901 and there are more dry spells and changes in the length, start and end of the rainfall season.
Many of the CKCs said that they noticed that the climate in their area had changed. Several described traditional weather forecasting systems which are still used today.
A few participants also talked about ways in which their communities are trying to address climate change:

We had rivers which never dried out. We would rely on rainfall and once it fell our rivers would overflow with water which was always enough for our consumption and our livestock. There was no pollution … and we would drink water straight from the river. Later in the year we would dig into the sand in these rivers to open a *kamufuku* and without going far we had water coming out through the sand. It was clean and safe for drinking. (Panyika Dovi, Mashava)

Signs of a changing climate

Many CKCs believe that the climate in their area is changing. They said that the rainfall has decreased and water sources have dried up. Some noted that rainfall patterns have changed, with the rainy season starting later, so that planting times for field crops had to change. In addition, although there used to be bad droughts in the past they were less frequent in those days. The worst drought mentioned by several CKCs was in 1947 and this led to famine and locust outbreaks.

People should start living as they did in the past protect forests, wetlands, water bodies, use traditional farming methods. (Mike Chadamoyo, Rushinga)

Because there is less rain and the wetlands are drying up, some indigenous fruit trees that had been common in the past are no longer found in some communities. A CKC in Hwange noted that human–wildlife conflicts have increased over food and water in that area. Some of these problems are blamed on climate change but some CKCs also said that environmental

destruction was to blame, including deforestation, stream bank and wetland cultivation, uncontrolled mining and veld fires. Many also blamed these changes on the failure to respect the ancestors and traditional customs.

Traditional weather forecasting methods

Studies of traditional Zimbabwean weather forecasting methods have been recorded in academic publications. Chanza and Mafongoya[2] recorded weather forecasting using the observed changes in plants and animals, weather phenomena and the movement of the stars, the sun and the moon. A study in Domboshava found that farmers use observations of temperature, rainfall, wind, storms and the sun to prepare for the agricultural season. They also use the appearance of certain birds, the mating patterns of certain animals and the flowering of certain plants to forecast the weather[3]. In another study, communities in Lupane and Lower Gweru used traditional environmental indicators to predict rainfall and there was surprising consistency between their predictions and the actual rainfall recorded[4]

Many CKCs talked about traditional methods of weather forecasting used in their communities. These included the fruit and flower production of certain trees, the appearance or sounds made by certain birds and insects, types of weather and the position, shape and cycle of the moon. These are summarised in Table 1.

The most common method stated was the production of fruit on indigenous trees. Abundant fruit on certain species seems to be a reliable indicator of drought for many communities.

Table 1: Traditional weather forecasting methods

Drought indicators

- Abundant fruit or flowers on *muhacha/umkhuna*
- Abundant fruit on the *umgwadi/mudo* or *isigangatsha/mugan'acha* and also on *mutsambatsi, mutohwe* and *mumbumbu*
- Abundant birds such as doves and ground hornbills (*dendera/insingizi*)
- Abundant edible caterpillars or crickets
- Cool temperatures close to the rainy season
- Few butterflies at the onset of the rainy season

Good rainy season indicators

- Abundant flowers on *umdlandlovu/mumhungu* and *umsehla/mugarahanga*
- Abundant fruit on *muzhanje/umhobohobo*
- Large numbers of *shuramurove* (rain storks), hornbills or butterflies
- The sound of hoto bird or flight pattern of *pfukepfuke* bird.
- Frost in winter followed by very hot temperatures
- More water/louder sounds/vibrations coming from natural springs and waterfalls
- Halo around the moon

Signs that the rainy season will start soon

- *Pfumvudza* – colourful new leaves appearing on trees especially *musasa/igonde, muunze/umbuze* and *mupfuti/itshabela*
- Presence of *shuramurove* (rain storks), *mashavishavi* (male silkworm moths), *dzvatsvatsva* spiders in the home, m*azongororo/itshongololo* (millipedes) and *hozhwa/iminenke* (snails)

- The sound of frogs, toads, crickets, *haya* or *inkanku* (Jackobin cuckoo) or *dendera/insingizi* (ground hornbill)
- *Mugan'acha, muuyu/umkhomo* and *muonde/umkhiwa* trees start to shoot
- Wind blowing from the north west (*nhurura)* or west or winds blowing from several different directions (*kupesana pesana kwemhepo*) (in Midlands, Matabeleland north area) or wind blowing from west then changing to north (Gokwe) or winds from north east
- Occurrence of mist (*mhute/inkungu*)

Rain about to start

- Very hot conditions with calm wind (*uma*)
- The sound of cicadas (*nyenze)*
- More rain was likely when there is no moon and when the moon is in the last part of its cycle
- Occurrence of mist (*mhute/inkungu*) or haze
- Abundant mirages during a hot day
- Red clouds in the morning or clouds called shongwe dzemvura in sky

Rain the next day

- The call of *dendera/insingizi* heard at dawn indicate that the following day will be cloudy and rainy

No rain

- When dew appears on plants in the morning
- Wind blowing from several different directions

Abundant rain/floods

- A large halo around the sun or moon signals abundant rain while a small halo means less rain
- Lots of hot, humid wind

Several CKCs said that farmers would also use the signs of certain trees shooting to help them know when to begin preparing their fields.

There are two specific stars in the sky, one called *Mazhara* (drought) and the other *Maguta* (bumper harvest). *Maguta* is the bigger star while *Mazhara* is the smaller one. When *Mazhara* is ahead of *Maguta* then we know it's a season with plenty of rains and the opposite is true for a drought year. (Ketina Chikwari, Gokwe South)

A CKC from Mutoko said that the elders would tie knots in cloth or string to indicate the passing of time and to mark when events took place. The beginning of the rainy season was marked this way and people would use the string or cloth from previous years to predict when the rains were likely to come:

Some explained that spirit mediums (*masvikiro/mhondoro/amahosana*) can foretell the amount of rainfall, the presence or absence of storms and thunder and lightning. Spirit mediums can intercede on behalf of the community to prevent violent storms, lightning, hail or drought. Traditional rain-making ceremonies were important in the past and the failure to observe traditional practices could lead to drought and other disasters. These include not working on sacred days (the first three days of the new moon) and not killing pythons and other sacred animals. Spirit mediums were also consulted on what to plant and likely crop and livestock diseases.

The wide range of different indicators presented in Table 1 shows that Zimbabweans have developed a broad and deep understanding of their environment, helping them to manage their natural resources effectively and become expert farmers. The fact that these methods can still be described presumably means that this relationship with the environment has not been lost despite the influences of colonialism and a western-style education system that dismisses the value of indigenous knowledge.

Addressing climate change

Academic studies have documented methods used by communities in Zimbabwe to cope with climate change. In Muzarabani[5] farmers say that the climate is becoming drier, with shorter growing seasons punctuated by mid-season dry spells. Rivers, streams, ponds and wetlands are drying up and pest populations are increasing. Locals note changes by studying migratory birds (*mashuramurove*) and the flowering pattern of certain trees that they use to predict droughts and floods. To cope, they harvest wild fruit and practice dry planting of drought-resistant crops, stream bank cultivation and traditional food storage and preservation techniques. In flood years they practice two-season cropping.

CKCs noted that preventing people from cutting down trees and recycling waste is essential to address climate change. A CKC in Chivi blamed traditional farming methods (slash and burn and pastoralism) for climate change. Other CKCs mentioned that dry planting and planting small grains are traditional methods that are now used to fight climate change.

One CKC said that in the past disaster mitigation methods were not events but a lifestyle. The maintenance of sacred sites, trees and sacred rituals ensured the survival of forests and diversity that resulted in predictable weather patterns. Because they have lived in a variable climate for thousands of years, Zimbabweans have developed a wide range of ways to cope with climate variability. Many of these methods are described in the following chapters relating to community management, traditional agriculture and diet.

Endnotes

1 Unganai *et al*. 2020.
2 Chanza and Mafongoya, 2017
3 Zvigadza *et al*., 2010
4 Chagonda *et al*., 2014
5 Chanza and Mafongoya, 2017

3. Traditional community management

This chapter looks at the traditional mechanisms governing natural resource management, particularly water, trees and forests. It discusses mechanisms developed for community co-operation particularly with respect to care for the most vulnerable in the community. Such mechanisms could be revived or adapted to help communities protect vulnerable resources and people in the face of climate change hazards.

Before the arrival of whites, the land, resources and people were governed by traditional leaders (chiefs, kraal heads and headmen). Traditional leaders were in charge of protecting forests, water sources and other resources, organising cultural rituals and ceremonies, allocating land and settling disputes. The whites incorporated traditional governance into a western-style administration and divided the country into provinces, districts, wards and villages. Each district and province was run by a white administrator with traditional leaders as subordinates. After independence, traditional leaders were given both a legal and a customary role. Their role as environmental stewards is meant to complement that of the Environment Management Agency (EMA) but EMA is under-resourced and understaffed and does not reach beyond district level. The power of traditional leaders has weakened but in many communities they are still widely respected by older people, although less so by the youth:

Failure to respect traditional environmental laws in the past would attract a huge fine and the spirits of the land would shun such people. (Cephas Sawadye, farmer and village head Chaitezvi Village, Goromonzi)

Water conservation laws

Although Zimbabwe has rain for only a few months a year, the country has a large network of wetlands, rivers and streams and underground water. In the past fifty years these resources have declined substantially with rivers, wells, boreholes and wetlands drying up due to over-exploitation, siltation and declining rainfall.[1] Wetlands help rainwater to be absorbed into the soil and slowly delivered to streams, rivers and the underground water system. They also clean water by removing excess nutrients and some toxins.

Wetlands can easily be damaged by burning vegetation, contamination from waste, ploughing, building and compaction from vehicles, machinery and livestock. In the past wetlands were cultivated using traditional methods with specific crops such as rice and yams.

Mharapara and Mugabe[2] maintain that during the early 1800s African rice was the staple food of the Shona and was grown in wetlands from the north east to the south east of the country. Meanwhile, in the eastern parts of the country, wetlands were used for cultivating yams (*madhumbe/umjumbula)* and the African potato (*tsenza/umbondiwe*).

Researchers found that in the past wetlands in Matobo district were used for livestock grazing in the dry season.[3] The livestock were moved to dry areas during the rainy season and the wetlands were planted with maize, pumpkins, vegetables and rice, giving communities two harvests per year. During the colonial era commercial farmers began ploughing and cultivating wetlands for wheat, maize and tobacco. After observing the severe soil erosion and drying-out that resulted, the government passed the Water Act and the Natural Resources Act.

Under these laws, which are still in force today, wetlands can be cultivated only with special consent and cultivation within 30m of stream banks is forbidden.

The CKGs told us that in the past, certain ponds, springs (*zvisipiti/ /imithombo*) and wetlands (*zviputu/amaxhaphozi*) were protected with laws prohibiting people from bathing, washing their clothes or using potentially contaminating containers for fetching water (such as those covered with soot). Spirit beings such as mermaids (*njuzu/injuzi*) would guard sacred water sources and would punish those who abused them. People were also forbidden from using sledges in these areas. A CKC in Mutoko noted that some ponds were regarded as sacred places where only elderly women were allowed to fetch water. Ploughing or grazing cattle during the rainy season and building on wetlands was prohibited under traditional law in order to protect these fragile areas:

Cultivation of fragile areas near water sources (*chindanga*) was not allowed. In these areas mysterious things used to happen if you just visited the places without proper protocols; one could see a beautiful woman sitting on top of the water or a huge black snake. (Mbuya Pelina Mhondera, Gutu)

Cultivating river and stream banks was regarded as an offence [under customary law] as these places were reserved as burial places for infants. (Agnes Mukumbo, Chiendambuya, Makoni)

This spring was discovered in 1963 by Master Munyoro. It is called Master's well and has never run dry. It services three villages in Guruve. (CKG Jefred Madzvanya)

Forging the friendship between soil and water

Elizabeth Mpofu was born in 1959 in South Africa. She is a smallholder farmer and the founder of the Zimbabwe Smallholder Organic Farmers Forum, current La Via Campesina General Coordinator and founder of the African Women's Collaborative on Health Food Systems. She is also a core founder of the Shashe Agroecology School where she lives and works. She explains:

[S]oil and water are not enemies like what we are seeing today where all the soil is being washed away by running water … What we are witnessing today is not global warming but God's warning. I believe the relationship of the soil and water ought to be respected, preserved and always protected for the human life to succeed … The soil is very important, because every living organism is dependent on it … We were made of soil, live in the soil, and when we die, shall be returned to the soil. We walk on the soil. We build on the soil and we farm in the soil, we are one thing. We are the soil.

Water is the blood of the soil that must flow within it, not above it. A living soil should be moist with life in it, allowing germination of plants and their growth. Water is what life is all about because where it is, all living things multiply, thereby balancing ecosystems and enhancing stability. For the past two decades we have had more droughts than good seasons in my area but the relationship that I have created with soil and water has made me harvest enough food until the next season.

It has become my hobby to harvest every single drop … It is by engaging in this way of life, and sharing knowledge and experience with other peasant farmers, that new knowledge for growing food in a changing climate should be created.

(Adapted from the original interview by Nelson Mudzingwa)

Water management methods

Apart from the traditional laws and taboos mentioned above, CKCs explained that springs were protected from livestock by being fenced off and wells were covered. In some areas rice was planted around the edges of wetlands to make use of excess water. Stream banks could also be cultivated but there were strict rules governing the practice.

Ponds and water-holes were dug in dry rivers to access water during the dry season. Sometimes water was channelled into these with trenches. People would also take advantage of holes made by animals. In Chipinge south the Tsonga would use holes dug by aardvarks to access water. People in that area also dug holes in certain trees, including baobab, mopane, nyala berry, common star chestnut and marula, and allowed these holes to fill with rainwater. These trees would then be used as living water tanks supplying water throughout the year:

Long back there was plenty of water. It used to be humid and the veld was ever green. People were observant and would not grow crops along the slope but would grow across the slope. (Edward Ncube, Ward 5, Tsholotsho)

Various water-harvesting methods were mentioned. Ridges (*makandiwa/ amagandiwa*) were constructed in some areas to allow water to sink into the soil or to divert water into fields. In Hwange, CKCs described the practice of making *mipitu* (ridges) to control waterlogging on field crops while retaining water around the field. These ridges were rotated by shifting the crest and contour of the ridge between one planting seasons and the next. This practice reduces weeding labour while providing and spreading soil fertility.

A sand dam in Chenzou, Hwange

Sometimes pits were dug in the furrow (*makandiwa ane zvikodobo*) to let water sink into the soil. A CKC from Zvishavane described traditional silt traps (*majengetavhu*).

Another from Mutoko said she had learnt a method from people in Masvingo of placing pits strategically in fields to harvest rainwater. These wells would fill up and could be used to water crops after the rain was over. A CKC from Gokwe described a water-harvesting technique whereby a 2m-strip (called *marerambeva*) was left fallow across the whole field to catch and sink the water as it flowed down the field. In Rushinga stone bunds were built in fields to reduce run-off. In Nyanga CKCs noted that in the past people built stone terraces in sloping areas to sink water into the soil and reduce soil erosion.

As Sabhuku of Chiyangwa I am fighting what appears to be a losing battle with the established mine in my area … and a host of informal miners, 'makorokoza', the Chinese who also have a gold mill in my area and the tobacco farmers. These people and companies have wrought tremendous damage to our environment, indiscriminately digging tunnels everywhere, polluting our rivers and water sources with deadly chemicals such as cyanide and mercury. The tobacco farmers are notorious for cutting down forests of indigenous trees for curing their tobacco.

I am trying in a small way to raise awareness of the dangers posed by these activities to our land, environment and livelihoods, however the desperately poor socioeconomic situation and the corruption in environmental watchdogs like EMA doesn't help. (Sabhuku Joseph Chiyangwa, aged eighty years. Headman of Chiyangwa Village under Chief Bushu, Shamva. Interview by George Mangava)

A CKC from Lupane mentioned that people used to grow a special grass called *umnyankomo* around ponds to reduce evaporation. In Hwange people used to plant reeds (*matete*) to conserve moisture in wetlands. People also build sand dams in rivers where rainwater would be stored in the sand and was accessible to the community. The methods is still practiced.

In fields, rather than ploughing, farmers would dig planting holes so that water would collect around the plant instead of running off the field. Some planted crops on mounds

(*matutu*) to retain moisture. Several CKCs mentioned catching rainwater from roofs in large clay pots (*mhirimo/udiwo*) and others mentioned recharging wells with rainwater channelled from roofs or upslope areas using trenches.

CKCs from Nkayi noted that ditches were sometimes dug from fenced-off wetlands to provide water for livestock. Water was also sometimes diverted from streams to store in hollow logs (*imbele*) which were reserved for drought years:

Laws protecting trees and forests

In the past, food harvested from the wild (such as fruits, mushrooms and insects) could be gathered only once special rituals had been carried out. In many areas felling certain trees is still forbidden, particularly the mobola plum (*muhacha/umkhuna*), mahobohobo *(muzhanje/umhobohobo*), snot apple (*mutohwe/uxakuxaku*) and marula (*mupfura/umganu*). These practices preserve natural resources and encourage people to value them while having basic, practical functions. For example, wild-harvested foods provide nutritious sustenance during dry times of year and wild fruit trees distract birds, baboons and elephants away from field crops and gardens. A CKC from Zvishavane mentioned that thick forests (*madhireni*) were often left to demarcate the area between one clan's fields and another's:

> When gathering vegetables, fruits, and even while fetching firewood or when fishing we would only take enough for our needs and were careful not to destroy nature. We never gathered for profit or in the case of firewood, cut down trees but we would only pick dead or dry branches. And we would only fish for that day's meal! We respected nature so the spirits, *vadzimu* or *mhondoro* would ensure we had adequate rain. (Sophia Chichera (Mhene Village, Bushu, Shamva)

Several CKCs noted that certain indigenous trees, particularly *muzhanje/umhobohobo, muhacha/umkhuna* and *mukute/umdoni* are used for cultural celebrations and celebrations:

The muhacha tree (mobola plum) was regarded as an ancestral tree where people will gather and interact with the ancestors in gatherings such as rain making ceremonies while *muhute* was believed to hold water, thereby making rivers and streams continue to flow. (Agnes Mukumbo, Makoni)

In our area people are highly spiritual and they would gather around the *mutoro* tree (mobola plum) where they would request for rains from the ancestors and God, as well as offering the first fruits to the place as a way of thanksgiving. This was done also to guard the fields from attacks from wild animals such as baboons. (Andsen Manenji, Gutu)

The *mushamba* tree was popular not only for its fruits but for its healing traditional qualities. As was common for medicinal trees, it was a taboo to cut the tree for firewood. This was a clever way of preserving trees. Another way was to say only take the bit of bark facing eastwards so that the bark of the tree is taken from one side and not right

round such that the tree would survive. Also, people were encouraged to use cow dung as fuel for cooking to preserve trees. Cutting down fruit trees was absolutely forbidden even if the fruit tree was in your yard. (Wonder Rusike Sabhuku, headman Dadiya Village, Ward 12, Bushu Communal lands, Shamva).

Community co-operation and care

Rural life is hard work and Zimbabwean communities developed systems to help each other with large tasks such as cultivating, planting, weeding, harvesting and threshing. Work parties (called *nhimbe, humwe*, *mushandirapamwe, jakwara* and *hoka* in Shona and amalima or umngeno in Ndebele) were the most common way for people to co-operate. A household that needed work done would brew beer and prepare food and the whole village (or sometimes people from neighbouring villages) would be invited to come and share the workload.

People would always attend because one day it would be their turn to need help. These work parties often included song and dance as way of motivating people to finish the task. Some typical work songs from Lupane are given in table 2:

Another system mentioned by CKCs was *majangano*, a rotation system in which villagers would take turns to work in each other's fields. In some communities children in the village were asked to help the elderly. This was called *kwasekuru* or *kwambuya*:

Table 2: Songs sung in Lupane to encourage community work parties (gathered by Personal Ncube)

Name of song	**Lyrics**
Sibhula amabele (Threshing song)	Women: Sibhula mabele Men: Mabele Women: Sibhula mabele Men: Mabele All: Sibhula mabele. Sibhula mabele Sibhula mabele
Sisika utshani (Cutting grass)	Sisika utshani. Sisika utshani. Sisika utshani ngelanga lobusika. Sisika utshani. Sisika utshani. Sisika utshani ngelanga lobusika. Sibuthi hemu hemu hemu Sibuthi hemu hemu hemu Sibuthi hemu hemu hemu Mami qolo mami qolo

The production of crops and grains was centred on social cohesion and communalism captured in the proverbs used by our ancestors such as '*chara chimwe hachitsvanyi inda'* (one finger cannot squash a louse) or *'kuita mushandirapamwe samajuru*' (to work together like ants). This was done through reciprocal work activities in the sense that if I attend your work party, you should attend mine as well. Beer work parties were known as '*humwe*'. An individual seeking to get work done by others brewed beer and prepared food for the workers. *'Humwe*' was a social event in which the workers would rejoice

but at the same time they undertook some serious work such as tilling the land, weeding or harvesting, threshing and winnowing. Another collective work process was *majangano* or *majanha*. These were non-beer work parties and operated as a form of labour exchange in which members of a particular village took turns to work for each other. Thirdly, the village head conducted targeted labour events where the whole village gathered at the homestead of an elderly person or widow. They would perform duties such as tilling the land, planting, weeding or harvesting. (Tamuka Matambo, Mvuma, retired headmaster and consultant to Forestry Department)

Another common traditional practice was *zunde ramambo* (Shona) or *isiphala senkosi* (Ndebele) which means the king's field. In this system the whole community would work in a field provided by the chief, from planting to harvesting. The harvest would be distributed to the vulnerable in the community including the sick and the elderly. Other practices that were mentioned were *madzoro* (taking turns to herd each other's cattle and goats) and *maricho*, where the poor in the community were given part-time jobs such as weeding for other people in exchange for money, food or other items:

Neighbours were called to assist a certain household. Work was done and food prepared. Food was in the form of *sadza, amahewu* and beer. This function on its own was also unifying. No one was left unassisted; it was a common norm for people to assist each other. By so doing people would always share together during bad and good times. The ones in need of food were also assisted. Those without draught power were assisted too. They will also be given animal manure to fertilise the fields. (Edward Ncube, Tsholotsho)

A couple of CKGs mentioned that in the past roles in each community were clearly and strictly defined according to ones age and gender. Some noted that these roles prevented men from assisting women even if they wanted to:

> Gender roles were taken seriously. It was a taboo for a man to do work that is supposed to be done by women. For example, no man was allowed to carry anything on his head, especially water. Some worked together as families and communities in times of need. (Elizabeth Mugwira, Charumbira, Masvingo)

Protecting forests with indigenous medicine

My name is Leticia Chisveto. Born 1951. I am the first wife of the late traditional healer Jerimani Nago Chikwarakwara. My husband passed on about four years ago but I am proud because he left me the everlasting gift of healing the people in my community and beyond. I gained this first-hand knowledge of traditional medicine through an intense mentorship with him. I used to do much of the collection and administering of processed parts

of plant roots, leaves, bark, stems, fruits, grasses, aloes, seeds, thorns, climbers, as well as symbiotic insect–plant growths, parts of animals and excretion. When in the forest collecting medicine, my husband used to explain how to collect medicines without destroying the parent plant. With all this knowledge I developed a small traditional medicine pharmacy at our home. When my dear husband passed on, I continued to help the local community and some of his patients whom I know.

The local people have a long history of traditional plant usage for medicinal purposes that has a great impact on modern Zimbabwe. This is primarily because medicine is used to not only cure physical disorders but to achieve control over forces which would otherwise be uncontrollable on body of a person.

The most popular preventive medicine I am currently using for spiritually influenced chronic illnesses and diseases is a type of plant known as *chifumuro* (exposer). In my language, the verb from which it is derived has the connotation of exposing shame *(kufumura*). The use of this plant will expose the nature of the illness and neutralise its effects. The *chifumuro* root is tied onto a fibre or string prepared from the bark of a tree that I usually recommend after diagnosing the illness. This is then tied around the neck or waist thus for both curative and preventive. Although *chifumuro* is limited to a specific disease, it acts as a safeguard against illness in children.

Another serious disease to which the local children are prone is *ndongorongo* (inflammation of the navel). This disease is believed to be caused by evil forces and is lethal if it is not given proper attention. The manifestation of this

disease is the convergence of blackish blood vessels at the navel of the child.

Precautions needed for successful treatment include non-exposure of the patient's clothes to other people or the environment. Carried within the wind are some malicious spirits that may cause further harm if they come across the clothes. Protection against the disease lies in tying *chifumuro* to the waist or neck.

The benefits that I am getting from the traditional medicine has made me guard these forests jealously. My task is making sure that I raise awareness of these values to the local community. Sustainable utilisation will be guaranteed if we begin to nurture resources. (Recorded by CKG Nelson Mudzingwa)

Endnotes

1 FAO, 2016.
2 Mharapara and Mugabe, 1984.
3 Ranger, 1999.

4. Traditional agricultural methods

This chapter looks at traditional agricultural methods that were described by the CKCs. Some seem to include methods promoted during and since the colonial era while others specifically identified methods practiced before colonial influences. The chapter begins with an analysis of the influence of colonialism on traditional agriculture. The information is then presented in terms of crop choice, land preparation, soil fertility management, crop pest and disease control, livestock pest and disease control, harvesting and storage of produce and seed preservation.

According to research and the responses of the CKCs, traditional agriculture (understood as meaning agriculture practiced before the influence of colonialism) was based on shifting cultivation. Land was cleared of shrubs and low-lying tree branches. Small fields were prepared.

Milton Makoni of Shamva in his field

Fruit trees, such as mobola plums *(muhacha/umkhuna)* were left in fields, as they were believed to trap moisture and provide fertiliser for the soil through their falling leaves as well as having religious significance. The cut vegetation was left on the fields and burnt so that the ash would fertilise the soil. This practice also got rid of weeds, pests and diseases. Planting holes were made using hoes and seeds of a mixture of crops were planted or broadcast. After two to five years the land was left to rest and a new piece of land was opened up for farming.

From the 1920s the Rhodesian government began a nation-wide effort to eradicate traditional agricultural systems in order to push farmers into the workforce and clear the most productive land for commercial cash cropping and cattle ranching.[1] Using the Land Apportionment Act and the Land Tenure Act they relocated people to 'tribal trust lands' in the country's low-lying periphery, where the soils and climate are not conducive to farming.

The Rhodesian government was concerned by the population increase and land degradation in the Tribal Trust Lands. Emory Alvord, a former American missionary, was employed to modernise agriculture. Alvord imposed many unpopular changes, including forcing people to use centralised grazing and crop fields, together with the compulsory destocking of cattle and the construction of contour ridges. Alvord and his extension team encouraged people to use the plough instead of the hoe, ordered all trees to be cleared from fields and promoted monoculture of maize over intercropping. In his study of land degradation in Zimbabwe, Richard Whitlow[2] explains how the colonial farming practices contributed to land degradation. This is how one retired headmaster describes it:

Our ancestors would clear only the shrubs and branches of trees and plant their crops. Alternatively, they would just plant their crops in the bush without clearance of vegetation. Such methods were condemned as primitive and unproductive [by colonials]. These methods naturally restored the soil organic matter from the leaves, nutrients were recycled by deep-rooted trees and shrubs. The system also naturally controlled pests, diseases and noxious weeds. It also binds soils by plant cover and increases water infiltration as well as assisting in controlling soil erosion from the impacts of raindrops. The soil temperatures were also modified by mulching and shading.

Because our ancestors practiced chitememe (bush fallow) there was lots of mulch keeping the soil moist. Only small areas were cleared of trees and minimum tillage meant increased infiltration. Because of less disturbance on vegetation, wetlands and *matoro/mapani* (wetlands) and *zvitubu/zvisipiti* (springs) were kept in the natural state. These kept the rivers flowing throughout the year. Plants such as cassava were planted in mulched basins for moisture retention. The clearance of land for agriculture and the use of manure only came in as a colonial education popularly known as the master farmer certificate. (Tamuka Matambo, Retired headmaster and advisor to Forestry Department, Mvuma – Interview by Achieford Mhondera)

Indigenous poultry

Crop and livestock choice

In terms of livestock, CKCs said that people selected the strongest and most productive animals by castrating those that were weak and unproductive. Strong indigenous cattle, goat, pig and sheep and poultry breeds have resulted. people grew a wide range of crops in wetlands and fields in the past. These crops included indigenous plants and as time went by, plants introduced by foreigners including sweet potatoes, blackjack, cassava, groundnuts, pumpkins and maize. Some of this produce was for home consumption and the surplus was for trade in local markets and later for sale to whites.[3]

In hotter, drier areas, pearl millet (*rukweza/mhunga/inyawuthi*) and sorghum (*mapfunde/amabele*) were staple crops. In higher rainfall areas, finger millet *(zviyo/uphoko*) was widely grown as a staple. The

Maize varieties

CKCs noted that the advantage of these crops is that they are drought, flood and pest resistant and do not need fertilisers. Millet can be stored in granaries for a long time without the need for insecticides. White and yellow maize was also given out as drought relief by the colonial administration. As maize became a commercial commodity, indigenous staples lost their appeal and the people, drawn into a market-based economy, needed cash to pay their land tax and later, for clothes, groceries, education and healthcare:

> When I was nine or ten we experienced drought and we received white maize from the colonial government we refer to that year as '*gore rechiwaya*' meaning the maize was thrown in the air and everyone start to pick each seed on the ground. They did that because they didn't have enough maize for the community. (Edward Musweweshiri, Musweweshiri Village, Chimanimani)

African rice *mupunga/ingqoloyi* grown in wetlands and irrigated plots. In wetlands yams and sweet potatoes were planted on ridges while rice was usually grown in the furrows. A CKC from Mazungunye said that in her community, people used to grow rice on circular raised beds (*mateka*) surrounding a pool of water:

Millet, sorghum and sweet reeds

Gutu does not receive high rainfall but luckily in our area there are some wetlands in which we used to grow rice and maize planted in September and harvested in December. Sometimes we would receive excessive rain and the maize crop would be affected so people in our area planted rice, red sweet potatoes and *madhumbe*. Where rice was grown the crop residues were left to decompose thereby improving soil fertility. Also, people put tree leaves and crop residues in the rice fields to dry up the ground. These residues decompose in the fields improving soil fertility. (Andsen Manenji, Gutu)

Legumes included cowpeas (*nyemba/indumba*) and roundnuts (*nyimo/indlubu*). Groundnuts were introduced and became very popular as a replacement for traditional nuts and seeds that had been used to make cooking oil and butter. In some places sesame (*runinga*) was and still is grown.

The African potato (*tsenza/umbondiwe*) and yams (*madhumbe/umjumbula*) were grown on ridges in wetlands, especially in the eastern part of the country. Cassava (*mufarinya//mujumbuya*) is grown in certain places – not countrywide and is said to have been introduced from Malawi. Most Zimbabweans did not have gardens in the same sense as today.

Leaf vegetables, such as pigweed (*mowa, bonongwe, imbuya*), blackjack (*tsine, mhuuyu, ucucuza*) and spider flower (*nyevhe, ulude*), wild okra (*derere, idelele)* and spiny cucumber (*mugaka, ihalabujana)* were harvested as weeds from fields. Pumpkins (*manhanga, ijodo*), squash (*mapudzi/ikhomane*) and melons *(mafere, manyani, ijodo, ibotola)* were planted in fields.

Some crop varieties described by the CKCs

Chibukwa sorghum

Inzembwe pearl millet

Okoshana sorghum

Halare pearl millet

Nyiminya rapoko

Bunyunya sesame

Chigwa cowpeas

Runinga sesame

Indlubu roundnuts

Beating climate change with indigenous chickens

My name is Aron Mugarisi, I was born in 1956 in Chirumanzu in Midlands. I am married to Maida Wandai and we have two children, Panashe and Atida. I went into indigenous chicken production about ten years ago and throughout the years suffered losses that have forced me to think outside the box. Through experience I have learnt that the success of an indigenous chicken project lies in the ability to raise day-old chicks to on- month old.

I have innovated a pit cage that is 2m long, 1.2m wide and 40cm deep. I dig a pit of that size and every day I put my day-old chicks there with a chick mesh cover when it is warm or a transparent cloth when temperatures are low. The cover is stretched to allow free movement of air and

sun light. My chicks spend most of the day in the pit and are only allowed outside for an hour a day to scavenge. The pit system, makes it easy to manage the chicks, requires a low level of labour, and enables me to control any losses even through pests and diseases.

In the pit, I assign many chicks to a mother with good mothering abilities. Indigenous chickens are known to spend half of their lifetime caring for their chicks. With this system, I can get many hens laying again after weaning them from their chicks.

After one month I transfer the chicks to the main housing which is constructed using locally available materials and considers factors such as ventilation and wind direction. Inside the house, I provide the birds with bedding and perches raised 60cm high and treated with used oil as a repellent against parasites. I clean the floor daily and use the manure collected for my pearl millet and sorghum fields to boost the soil fertility. The extra grain is fed back to the chickens after we have taken what we need as a family.

For optimum production, I feed my chickens with green grass, kitchen waste, sunflower cake, pearl millet and sorghum. While scavenging in the later day, the birds go for insects, wild seeds, and maggots, as well as ticks from around the cow pen, acting as a biological pest control. Water is provided all the times, but I have observed that 100 chickens drink less than 20 litres a day.

I group my chickens into laying hens, brooding hens, chicks, and the rest of the flock. The laying and brooding hens are provided with laying boxes comprised of old

basins, used car rims, and sacks filled with soft materials for increasing comfort. I always monitor each chicken's progress and feeding habits. Most of my hens lay 10–15 eggs, but it depends on the breed. I sort eggs by desired quality and allow hens with good hatchability and mothering skills to sit on them. With my creativity, I can manipulate the chickens' laying habits by placing eggs in advance on their laying nests or in particular spots they like most, encouraging many hens to lay and brood. This is how I get more eggs and increase the flock, therefore making more sales all year round. This proves that the poor performance of indigenous chickens is not due to genetics, but a lack of good management. (Interview by Nelson Mudzingwa)

Appendix 3 lists a selection of the crop varieties that were mentioned by the CKCs.

CKCs from Nkayi said that farmers would select preferred millet and sorghum varieties with large grains or early maturing varieties. They would tie string around these plants to remind themselves to save some of the seed:

[People in the past] also practised seed banking and even today most people in this community prefer using their own seeds more than those distributed by Agritex as they believe they need more rain and are not compatible with our soils and weather patterns. (Dedasai Moyo, Nkayi)

Land preparation

Before the introduction of the plough, hoes were used to make planting basins (makomba/ugatshompo). A CKC from Marondera noted that in the past, people had much smaller fields. A third of a hectare could produce enough food to feed a family of eight:

> I now see some people starting to talk about zero tillage farming as a new thing now but it's not new. We never used to till all the huge pieces of land but we would just scatter the small grains or just dig holes where we wanted to put seed. (Panyika Dovi, Mashava, Masvingo)

Seeds of different crops such as cereals, legumes and pumpkins were mixed together and broadcast. In Lupane several CKCs described dry planting, a method of sowing crops such as millet, sorghum and cowpeas before the start of the rains (dry planting) in October:

> Mixed cropping is one of the traditional farming methods that was used in Zimbabwe before colonisation. It is a better farming method than monoculture, which was brought by the whites. (Tildah Nyakunu Marange)

In Gutu one CKC described a method of planting finger millet. First, cows were walked through the field and then the seeds were broadcast. The cows were then made to trample on the seeds, helping to cover them with soil. This was done to encourage the roots of the millet to form close to the soil surface and utilise the manure in the field efficiently. Later, with the introduction of the plough, people began planting in straight lines using methods such as putting the seeds in a bottle and following the plough, dropping seeds in the furrow.

A CKC from Guruve explained that the advantage of mixed cropping was that the produce would all ripen at different times:

> *Mapudzi* were the first to be eaten, sorghum would follow with the fresh seeds eaten raw, called *musoso*... millet before drying, gave a delicious meal called *muperera* eaten raw, pumpkins would go on until and even beyond harvest. (Tendaupenyu Kudyahakudadirwe, Guruve)

> We did *mbundo* – digging lines in the fields from one end to the other using hoes … planting the seeds in the lines while others followed covering the seeds with heaps of soil (*mihomba yemadima*). We started planting early October (*kukurunhira/ kuparira*) and most harvesting was end of March. We planted groundnuts, roundnuts, cowpeas and watermelons mixed with pearl millet. (Joyce Jesse, Chimanimani)

Several CKCs noted that mixed cropping was common in the past and this helped maintain soil fertility and reduce pest and disease problems. In Lupane CKCs said that common mixtures included sweet reeds, sorghum, pumpkins, melons, watermelons and cowpeas while groundnuts and roundnuts were planted alone. The pumpkins, melons and beans kept the soil cool and moist and also suppressed weeds. Some CKCs noted that legumes added nitrogen to the soil, although this information is likely to have come from agricultural extension officers. Some also mentioned that people planted *tsunga* (mustard leaf) in the fields:

In Chiendambuya pumpkins used to be grown together with every crop. Pumpkin varieties such as *makavhu* were grown with maize crops so that they could climb on the maize crops, which helps in the development of gourds (*mikombe*), allowing the fruit to have enough room and freedom to develop. The pumpkin plant provides ground cover because of the size of its leaves. Also, *nyimo* used to be grown with maize and groundnuts. This helped to protect the roundnuts from destruction by animals such as bushbucks. (Agnes Mukumbo, Chiendambuya, Makoni)

Soil fertility management

Some CKCs said that crop rotation seems to have only involved rotating cereals with groundnuts. To improve the soil people applied ash, leaf mould, livestock manure and anthill soil *(ivhu rechuru*). Often crop residues would be burnt and the ash spread across the field. This would improve soil fertility and kill weeds, pests and diseases. A CKC from Murewa said that tree branches were burnt in one spot to collect the ash. The place where the burning took place was used as a seed bed for planting *zviyo* and *mapfunde*, which could later be transplanted because they were very vigorous. Some CKCs also mentioned mulching with grass and humus (*murakwani/mutsakwani/umquba*). This kept the soil cool and moist and protected plants from termites. One CKC from Mutoko said that soon after harvest the land was tilled to speed up decomposition of the crop residue:

Murakwani was preferred for mulch because it is a good source of nitrogen. It decomposes fast and helps balance fertility when the soil is weak. Mulching also protects plants from termites. Termites will eat the mulch first before going to the plant. (Rebecca Benhura, Rushinga)

Crop pest and disease control

Some CKCs said that in the past pest problems were said to be caused by not observing the traditional day of rest (*chisi/ikhefu*) in their community. This would result in attacks of crops by wild animals, locusts, army worms and diseases. To control pests and diseases one of the most common methods was sprinkling ash on the crops.

Ash is said to be particularly effective against aphids. Ash from burnt maize cobs without their grain (*maguri/isiqu*) or from the *umpandula/mubaramhoto* tree or *inkiza/mubangwa* tree, mixed with water and then sprayed onto plants, was effective, particularly against army worm. It could also be applied with a traditional broom (*mutsvairo/umthanyelo*). Ash made from burnt pests was used against these pests in some areas. Ash was also spread in fields against termites and applied to sorghum against diseases. In Matobo people used smoke from burning the *umpandula* tree logs mixed with *umfumfu* tree leaves and *periperi* against locusts.

A CKC from Shurugwi noted that whey from milk processing was sprayed in groundnut fields to repel pests while another from Nyanga said that sheep fat was burned in fields to repel pests. Larger pests such as locusts, crickets, *isidlonono* and army worm were handpicked off plants. In some areas, if an outbreak was suspected, old women were tasked to pick the pests early in the morning and take them to the chief for rituals to be performed. Sometimes chickens or turkeys were walked through the fields to eat these pests.

Repellent plants could also be used as pest control. Several people mentioned the use of eucalyptus leaves (this tree was introduced by the whites). In Rushinga, fever tea (*zumbane/umsuzwane*) was made into a spray for susceptible crops. Pesticides were made using chili mixed with tobacco.

Some made sprays from blackjack *(tsine, mhuuyu, ucucuza* and chilies, the crushed fruit or runners of the mobola plum tree (*muhacha/muchakata/umkhuna*). Hundi was used to treat maize for stalk borer, also ash from *munhondo/ishungo* tree. Crushed fruit of the apple of Sodom (*nhundurwa/intume*) added to a fever tea solution was used to treat caterpillars on various crops. Other insect and disease control methods included crop rotation and destroying crop residues to prevent sorghum stalk rot. Waiting for the rain to wash aphids off cowpeas was mentioned by several CKCs.

Birds, monkeys, baboons and elephants are all common threats to field crops and gardens at harvest time. To control birds and wild animals, family members would take it in turns to guard the fields. *Jesa* birds would be trapped by making a sticky substance (*urimbo*) from the *mukonde* plant that would be applied to millet stalks. To scare queleas, people would make loud noises or make fires in fields. Other methods include making scarecrows that look like people, flap in the wind or make a noise. The trapped birds would be cooked and eaten as relish. For rodents, people would make traps during harvest time and the rats and mice caught would be dried and kept to flavour relish throughout the year.

Muchacha - fruit is crushed and mixed with water and applied to leaf vegetables as a pesticide

Mutsatsai leaves used as a repellent

Livestock pest and disease control

The CKCs said that livestock pests and diseases were far fewer in the past than they are today. A variety of traditional methods was mentioned for controlling livestock pests and diseases. Appendix 4 shows some remedies that were mentioned by CKCs.

I now rely on traditional medicines to treat a wide spectrum of livestock ailments, and this will benefit my personal and school poultry project. This kind of herbal medicine provides a valuable alternative to and complements the western veterinary drugs which have become very expensive and therefore unaffordable. (CKG Percy Mapudzi of Mpumbu Primary School, Shurugwi)

Some plants used to treat livestock diseases

Top row: *Dzimuramoto, mubook, isihaqa*. Bottom row: *gavakava, mutiti, nhundurwa*

Harvesting and storage

Grain drying structure

Most field crops were harvested after 3–4 months. A portion of some crops, such as cowpeas and maize, would be harvested green to feed the family during the period before the main dry harvest. After harvesting, cereal crops must be dried before processing and storage. Maize was left to dry on a wooden platform (*dara*). Others used a *tsapi/isipahla* – a cone-shaped wooden structure. After drying, the seeds are separated from the husks (*miguri/isiqu*) using sticks for pounding (*kupura*). They are then cleaned *(kuurutswa)* and the grain is stored in a granary (*dura/hozi/isiphala*).

> A real man was he who had a granary and a kraal. Even neighbours would wish their daughters to marry into such a family. (Moffat Moyo, Lupane)

A *dura/hozi/isiphala* is a structure built on top of large stones to allow air circulation and prevent attack by termites. The structure was built from pole and *dagga* (mud) and thatched with grass. The floor was made from poles laid very close together and bound by *dagga* to create a thick layer. The walls were made from poles with a thick layer of *dagga* both inside and outside. The roof trusses were made from poles laid close together and bound by *dagga* inside, then covered on top by grass. The inside of the granary was divided into sections for storing different grains. All the crops harvested, that is maize, sorghum and pearl millet, were kept in the granary. The grain was poured on the ground in each section. Minor

crops were put in bags and placed in the same compartment. Granaries could preserve the grain for several years. Millet and sorghum can be stored for three years without adding any storage chemicals. In Chipinge south, Tsonga CKCs note that granaries were built using ironwood poles because this wood repels pests.

Granary in Tsholotsho

My grandmother used to have a square hut called *hozi* in Shona. It was built suspended on the foundation of four big boulders. The material used to build was thatch grass for the roof, wooden poles for the walls and then it was plastered neatly with mud. I remember she would smear cow dung on the walls. Big smooth pebbles (*nhombo*) from the river would be used to polish this cow dung and the wall would be left almost waterproof and very smooth. I enjoyed watching this process and I was always the little helper. In this *hozi* were three compartments for *chibage, zviyo* and *nzungu*. (Irvive Muzuva, Harare)

In Matobo CKCs reported that grain was kept in granaries made of clay soil. Sometimes people in Matobo would make *izilulu* from grass. These were mobile containers smaller than granaries for storing smaller quantities of food. Products such as *inhogwane*, *isikuba* or *insetshe* could also be stored in

Basket and large pot for storing food

isixaxa, which was also made from grass and fibre from an *indakane/ isikhukhukhu* tree. In some areas, millet and sorghum were stored in a large woven grass basket plastered with cow dung (*nyumbu*). In Gokwe grain was put in a large woven reed basket that was then placed in a pit covered with wooden poles and a layer of cow dung. In Marange the community would build a secret granary near the area where they buried their chiefs to hide it in case of war. They would store finger millet and sorghum there to have back-up grain for the whole community if needed. Sometimes the dry leaves of strong-smelling plants such as *zumbane/ umsuzwane* were put in the granary to repel pests.

A strong-smelling plant (*mbanda/ imbanje*) often used to repel pests in granaries

Pumpkins and watermelons were stored under the granary. Sweet potatoes (*mbambaira/ imbambayila*) were stored in protected pits (*pfimbi).* Selected sweet potatoes that were free from scars were put in this specially dug hole and sprinkled with ash before the hole was closed with a stone or wooden poles.

Sweet potato storage pit

Using smoke to preserve seed

Seed preservation

The most common method of seed preservation for cereals mentioned by the CKCs was smoking. Seed heads were carefully selected from fully mature crops and were hung in the kitchen so that the smoke from the fire would penetrate them, preventing pest and disease attack. Ash was also used in tightly sealed granaries to prevent seed pests. The best type

of ash was said to be from burnt cow dung or burnt maize cobs. Millet chaff (*hundi*) was also mixed with seed in several areas as a preservative because it resists pest and disease attack. In Lupane a CKC said that ash from teak (*mutwiri*) was used for preserving grain:

> The maize was stored in a hut supported by long tree stumps. Under this hut, they used as their kitchen. The smoke then acted as a weevil (*zvipfukuto*) repellent. To preserve it from discolouration, it was stored after partially removing the outer jacket (*chisina kupera kufururwa*). (Shylet Mututwa, Macheke)

Vongai Dube's seed heritage archive

My name is Vongai Dube or Mrs Mudzingwa, although I am most known as Mai Grace. Both my husband and I come from the same village in Chiwundura. We have lived in the Shashe block of farms in Mashava since 2000. We have two children, these are Grace and Peter.

Diverse local seed varieties are the very essence of our life, food, ecologies, cultures, spirituality, knowledge systems and even our economies … I cannot be a farmer without producing crops like rapoko, sorghum and pearl millet, because these are the crops that are true to my people and my history, particularly rapoko, because of its sacred value to my culture … Seed saving has made our family grow different kinds of food crops: maize, sorghum, pearl millet, rapoko, sunflower, groundnuts, roundnuts, pumpkins, cowpeas, watermelons and cucumber, among other integrated projects that we have. We produce food for our own consumption, for seed, and for stock feed. We are very strict not to let any single grain from our plot go to waste

… I get annoyed by the cost of seed. I do not understand why commercial seed costs so much. Why buy seed when I can produce my own? … Seed is part of my culture and is my heritage, allowing me and family to maintain our own ancestral wisdom and defend our identity.

In our household seed heritage archive we collect, select, grade and package and store seed after every season for exchange with other farmers. We have more than fifty different varieties of food crops displayed. This is a demonstration at local level of how rich our local community is on food crops diversity that are beyond doubt resilient to climate change. (Adapted from the original interview by Nelson Mudzingwa)

Endnotes

1 Page and Page, 1991.
2 Whitlow, 1988.
3 Alvord, 1929, Duncan, 1933, Gelfand 1971.

5. Traditional diet

This chapter looks that the traditional diet described by the CKCs. The information is presented in the following categories: food from agriculture, wild food, processing and preserving, preparation and cooking methods and a description of some traditional dishes and ends with a look at how the traditional diet has changed. The traditional diet was much more diverse in the past. Families ate from a wide range of agricultural products as well as food gathered from the wild.[1] Because Zimbabwe has a long dry season, people became expert at preserving food to ensure that enough was available throughout the year.

Food from agriculture

Traditional agriculture provided a wide range of cereals, legumes, root and tuber crops and fruit and vegetables as well as animal products. Some agricultural products produce more than one type of food such as cowpeas, pumpkins, cassava, yams and sweet potatoes, which have edible leaves in edible seeds, fruit or tubers.

Finger millet, pearl millet and sorghum are the most commonly consumed traditional cereals, and African rice used to be more widely consumed in the past than it is today. The most widely eaten cereal today is maize, which originated in Mexico and is likely to have been introduced to southern Africa about 150 years ago.[2] Initially maize was eaten green (roasted or boiled) as a snack, and it is still enjoyed in this way today. A wide range of maize dishes has arisen in Zimbabwe since it was introduced, and it would be inaccurate to say it is not a traditional food. Although it is a good source of energy, maize is lower in most other nutrients than the traditional cereals mentioned. Maize, sorghum and millet are usually milled into flour and cooked as *sadza* (stiff porridge) while rice is de-

husked and then often cooked whole or sometimes pounded into flour. Maize, millet and sorghum may also be cooked and eaten as whole grains or popped:

Indigenous people did not entirely depend on farming; they were also very good hunters and fruit gatherers. Wild meat was in abundance in this country. Wild fruit was part of their food … People could also eat insects like *majuru, harurwa, mhashu, tsambarafuta, nhowa*, and many more. We had our own vegetables, some from forests and some were grown during farming season. The types of vegetables were; *mutsine, munyevhe, howa, muboora, munyemba, mowa*, some tree roots were also used as food. (Elizabeth Howahowa, born in Mhondoro district, now lives in Sanyati)

Wild food

This include fruit, vegetables, roots and tubers, climbers, herbs and mushrooms. Harvesting of insects, birds and rodents was an key form of pest control in crop fields. Indigenous fruits were mentioned by almost all CKCs as being an important foodstuff in the past and they still are today. They have many advantages. Many are highly nutritious[3] and ripen at different times of year, making fruit available almost all year round, as shown in Table 3. Most indigenous fruit can also be dried, increasing their availability as a food source and making them useful as portable snacks that can be eaten while

Matohwe fruit

Mazhanje fruit

Checking the fruits of the Mutamba tree

Table 3: Common winter and summer fruits (developed by Godfree Foyo)

Common winter fruit	**Common summer fruit**
Matohwe	Nhunguru
Tsvubvu	Nhengeni/tsvanzva
Chakata	Bhubhunu
Mafamba	Mutakura weshiri
Gan'acha - just before the rains	Tsombori
Shomhwe	

working or travelling. Many indigenous fruit can be processed into sweets, drinks and beer. Some favourite fruit drinks include buffalo thorn (*masawu/umphafa*) juice and baobab (*muuyu/umkhomo*) fruit juice. Mobola plum fruit (*hacha/unkuna*) are made into confectionary in some areas.

Some fruit such as the mobola plum (*hacha/mbola*) and marula (*pfura/umganu*) contain edible nuts that can be eaten raw, roasted or processed into nut butter, or they can be used to make cosmetic oil or cream. Some tree roots are also used, notably from the waterberry (*hute/umswi*), wild custard apple *(maroro/ububese*) and wild grape (*tsambatsi/itakbomvu*). The fleshy trunks of baobab seedlings (called *mudzipuzipu*) are eaten in some communities.

Mahacha fruit

Mauyu fruit

A CKC from Nyanga noted that during times of severe hunger the *munyanya* tree, which is only found in Nyanga, produces tubers (*kuri*) that can be peeled and cooked to make a potato-like paste. In the same area, the *gunzuyu* plant produces seeds in pods that are similar to cowpeas and were cooked and served as a snack. CKCs said that people survived drought seasons due to the abundance of these fruits.

Leaf vegetables included wild plants harvested from fields as well as the leaves of trees in some areas. CKCs from Hwange mentioned enjoying dried *tende* tree leaves while in Chipinge south Tsonga CKCs described eating baobab tree leaves (cooked or raw). People in this community also eat water lilies, tree roots and wild grass grain as well as

Dry *tende* vegetable leaves

the climbing plant, *manyanya*. Apart from fruit, people still gather mushrooms, leaf vegetables, climbers and root and tuber plants. CKCs from Nkayi listed various tuber plants (*izangontsi*) that were found in mountainous areas. One, called *izadenda*, produces tubers similar to potatoes and is eaten raw. Some CKCs noted that certain plants such as wild grape (*intakubomvu/ tsambatsi*) are no longer found due to reduced rainfall. Commonly consumed insects and small animals mentioned by CKCs are given in Appendix 5.

Manyanya

Edible indigenous fruits vegetables and insects are not merely for times of scarcity but reserved as foods for different times when people are too busy to prepare meals while working fields and/or doing chores. Of late such foods have become a source of much needed income. Mr Shoko and his family members gather such fruits as *nyii, makwakwa, insuvu, insuma, nhungulu, insambya, imfura, maphwi* and *mabuyu*. For relish they gather vegetables and roots such as *tende, idilibhande, ishungwa* and *bwili*. Most fruit are soaked in water and separated from their seeds then mixed with millet meal to make *mangende* (home-baked bread). Podded fruits are crushed, ground and used to make *chintele* (*idovi*) butter. The *chintele* is then used to cook vegetables. Fresh fruits are eaten or sucked *(kumoma*) or squeezed to make into soup which people then drink. Some dried fruits are also used for making *ibwa* (porridge). Such fruits give the porridge a sweet, sour taste. Hunting and insect gathering are not popular but occasionally some people catch the *tundonga* (birds) that move in flocks and are a menace to

millet and sorghum crops. Some elders still gather some bulbous roots from the likes of *makile, madami, umviti, zwibuyubuyu* and *nhendele*. (From an interview with Francis Shoko, village head of Chezhou Village and a former teacher at Chezhou Primary School. Interviewed by CKG Kaunda Ncube in the local Nambya language)

Madora/ amaximbi (dried)

Nyenze

Mandere are insects you can still find today … mostly in *musasa* or *muchekecha* trees. When these bugs start flying then you know that the rain season is here. They have a very loud buzzing sound that they make when flying. These were easy to catch though, just one shake to the tree and they all fall on the ground. You need to cook the thoroughly and dry them before eating them. These were easy to prepare, just pluck out the wings and they are ready to be cooked. I heard stories of their blood being used as dye since if it gets on your skin or clothes it is stubborn to remove. *Madora* – We find these caterpillars on trees and the type of caterpillar is determined by the type of tree. You can find *harati* on *mukarati* tree and other types on *muchekecha, mutiti* and *mutsvanzva* trees. Some even come from *musasa* trees and the well-known ones come from the *mopane* tree. Mostly they are found during the rainy season but some are found in winter. (Rosemary Devera, Zvimba)

Traditional diet of the San/Tshwao community in Mitshina Village, Tsholotsho

There are about 2000 people in Zimbabwe who belong to the San group speaking the Tshwao/Tjwa language. Their ancestors are thought to have inhabited Zimbabwe about 20 000 years ago, and subsisting by hunter-gathering. They interacted with the Bantu farmer groups (from which the Shona and Ndebele and others in Zimbabwe are descended) who are thought to have arrived in the area around 2 000 years ago. In 1928 the Tjwa were moved by the government from their home area to make way for Hwange National Park. They now live in villages in Tsholotsho and Bulilima, where they are banned from hunting but have not adapted fully to a sedentary agricultural lifestyle:

Madlela Nyoni and Mpemba Sibanda elders of the San/ Tshwao Community, Mitshina Village, Tsholotsho

We were forced to settle in designated areas where we are today, we are/were forced to have fields like … the Kalanga and the Ndebele. We were not used to farming but today we are. We are not used to eating greens from gardens and the fields but today we are. Our staple food was meat. We have even changed how we look due to the lack of the type of food we used to have. Our environment has totally

changed. We no longer have enough rain. Vegetation is dry. No permanent water sources where we could get some of our foods. (Madlela Nyoni one of the surviving elders of the San people in Mtshina Village of Tsholotsho District. Information collected by CKG Liseli Mathe)

Edible wild plants. *Igoba* is a water plant that grows in permanent water sources and *dansina* is a plant found under the water that has a bulb. The bulbs were collected, dried and pounded, then cooked with meat and served to the family as a delicacy. *Cwatshe* is another water plant that has a bulb. It is dried and boiled with meat:

All these water plants were abundant because water was abundant in the past. Wetlands were perennial but today, because of climate change, they have dried up. Rain no longer comes and even when it does it is not enough. Today we have years of total dryness and we don't even have enough water to drink. The borehole close by is always down as a result of excess demand. (Madlela Nyoni)

Favourite wild fruits included *ubhunzu, umpumpulwane* and *umviyo*. These were eaten fresh or dry. *Ubhunzu* and *umviyo* was pounded and dried to form bread. Sometimes it was cooked and water added to make a drink. Another alternative was to use it for porridge for the family meal. Meat. This came from different wild animals, including impala, kudu, eland, giraffe and buffalo. The fat from these animals was cooked and oil extracted and kept in the animal's large intestine which was tied at both ends. It was used in cooking and as a body lotion for children:
We never ate elephants. When hunting, elder men had a sophisticated traditional way of catching animals. The animal was lured using a secret method and then you could

catch it without too much effort. (Madlela Nyoni)

Insects and small animals. *Magogoro* (mopane caterpillars). These are black and white spotted caterpillars that grow, live and forage on mopane tree (*mupane/iphane*) leaves. They are found twice a year in April and December when there has been a lot of rain and temperatures are hot. The San eat both the caterpillar and pupa stages but say that the pupae are more nutritious than the caterpillar. The pupae burrow under the mopane tree and bury themselves in small heaps of soil from which they are harvested and cooked. The caterpillars are collected as they come down the tree to complete their life cycle under the soil. In the past these caterpillars were abundant:

We did not harvest to finish everything. We allowed them to grow and harvesting was only done as needed, unlike today, when people harvest to eradicate everything and leave nothing for the future … These worms were cooked and broth was extracted from them for children to drink. We were very healthy and were never sick. (Madlela Nyoni)

Tsamwa (frogs). These are big frogs that usually seen in the rainy season or in areas that are permanently wet. They are commonly identified with their size and their deep croak. These are a special delicacy and have very soft meat. They are boiled in an open pot. Due to changes in the climate, they are found less frequently than they used to be.

Uxamu (water lizard). They were usually found in rivers. After they were caught, the skin of the lizard was removed

and it was boiled. The fat surrounding the kidneys was dried and added and the bone marrow was also added to make a good meal. Salt made from dried animal bile was added. This was said to protect people from different diseases.

Gaviri (tortoise). Water and land tortoises were easy to catch because they hibernate in specific shrubs and grasses (called *xobanahu* and *silalamba*) and could easily be dug out. Their shells were removed before cooking and were used as plates:

Thanks to colonialism and climate change we are no longer able to live the way we used to. Our community has been assimilated into the Ndebele and the Kalanga cultures – ours is slowly coming to an end. (Madlela Nyoni)

Processing and preserving

Because of our long dry season and hot climate, food preservation is crucial. The most common method of preservation is drying. Grain is dried and stored whole in the granary. Sometimes maize cobs can be boiled and salted before drying. Maize could also be smoked in its leaves and later shelled when needed to make maize meal or mutakura (a traditional dish made by boiling whole maize grain and whole pulses). A CKC from Nyanga noted that during the processing of rice (*kushokor*a) the grain was broken into small pieces, which led people to prefer cooking rice mashed with peanut butter or milk. Groundnuts could be cooked in their shells and dried in the sun to extend their shelf-life.

Most leaf vegetables are sun-dried (to produce *mufushwa*). They are usually boiled, as in the case of pigweed (*mowa, bononguwe, imbuya*), blackjack (*tsine, mhuuyu, ucucuza*) spider

Dried leaves of: cowpea, wild okra, okra powder and black jack

flower (nyeve, ulude) and wild okra (*derere, idelele*). Pumpkin leaves (*muboora/ijodo*) and okra (*derere, idelele*) are either dried raw or partially boiled, then dried in the sun. In some areas the whole okra plant is dried by being suspended in a tree. It is then crushed into a powder that is added to soups and stews to thicken them.

In some places, pumpkins (*manhanga, ithanga*), squash (*mapudzi/ikhomane*) and melons (*mufere/mashamba/manyani/ijodo/ibotola*) are skinned, sliced and sun-dried. In Hwange, turning the melons and pumpkins while drying (called *unkankalu*) is said to give them a sweeter taste. In Lupane, sometimes these melons were pounded into powder and then stored in a calabash. Sweet potatoes (*mbambaira/imbambayila*) were cut into slices and dried and stored for later use.

Mushrooms are usually boiled fully or partially and then sun-dried, sometimes after being salted. Some wild fruit such as the mobola plum (*hacha/chakata/umbola*), bird plum (*nyii/umnyii*) and African ebony (*shuma/umdlawuzo*) are sun-dried. In Rusape, snot apple (*matohwe, uxakuxaku*) was cooked before drying, while sweet reeds (*ipwa/imfe*) are peeled and then sun-dried.

Fish, game (rabbit, rock rabbit, porcupine and spring hare) and livestock meat were mostly smoked. Some insects such

as chafer beetles (*mandere*), and termites (*majuru*) are boiled and salted, then dried by being roasted in a pan on the fire or in the sun. Birds and rodents were usually dried on a fire or smoked:

Chimukuyu was made by cutting meat into small strips sprinkled with salt, or the ash of a certain plant used as a salt substitute. The meat was then hung to dry without being boiled. This method was usually used when people were out hunting in a *chiradza* (a hunting expedition away from home for a number of days). If it was meat from a domestic beast, the meat would be boiled first. (Tildah Nyakunu, Marange)

Drying meat

The Vashangwe people put a freshly slaughtered goat or any piece of meat in an airtight plastic bag. They then place the bag on the roof of their huts and the meat is heated and cooked to some extent. The meat is left for about a week and then the pack is opened and the meat is ready for cooking. The meat is said to be tender and tasty and they call it *mvumvira* due to its partial decomposition. (Andison Dali Siziba and Consi Consiliah Siziba, who are originally from Lupane but now live in Gokwe)

Milk was stored in a clay pot. The next day, after thickening, the cream (*ruraza* or *ruomba*) was skimmed off. Fresh milk was then added and the whey (*mutuvi*) was drained off, leaving the curds (*mage*) which would be eaten with sadza. Other food was usually stored in the house in pots, baskets, gourds or large bags placed on stones with leaves put between the stones to keep the bags dry.

Food preparation and cooking methods

Before maize became the staple food, most Zimbabwean main meals consisted of millet and sorghum made into stiff porridge (sadza) served with a stew, soup or gravy or a relish of meat, beans or vegetables. Sometimes dried mushrooms, insects, birds or small animals were added as flavouring. Often peanut butter or sometimes pounded groundnuts were added to flavour the food.

There was no modern cooking oil, so people used animal fat or butter (milk cream) or oil made from groundnuts (*nzungu/amazambane*), sesame (*runinga/utwiro*) or *shomwhe, hacha/chakata/umbola* and marula nuts and *mapudzi/ikhomane*. Before the introduction of metal pots and pans, cooking was done in earthenware pots and some Zimbabweans say that traditional food tastes better when cooked this way:

> To extract oil from *mapudzi* seeds you pound the seed and sieve it, separating the fine nut powder from the hard kernel. Then soak the powder in water overnight. The oil will be found floating at the top. Then the oil is separated from the water. (Esnath Chari, Macheke)

The seeds or nuts are cleaned of flesh and then sun-dried or roasted in a fire. They are then pounded in a mortar and ground to produce a fine powder. The fine powder is added to boiling water in a clay pot and stirred using a *musika* to get the desired result. The nut butter can be cooked with dried meat or vegetables.

Before grinding mills became commonplace, maize had to be soaked in cold water for 2–3 days before being pounded, then ground with grinding stones. Once it is dry finger millet is

Mr Zwakaya of Shurugwi demonstrating how to make dovi, dakataka or *gwatakwwata* (nut butter) from seeds of *mapudzi, chakata*, or *shomhwe*.

pounded slowly, then roasted slowly, then ground using a stone (*gwiyo ne hwiyo/guyo nehuyo*). The flour is used for sadza and porridge. Pearl millet is processed in the same way, but after pounding it can be made into samp (*muchakachaka/umngqutsh*u), which can be eaten with soup or mixed with peanut butter.

Gogo Chinyama demonstrating pounding (*kutswa)* using a mortar *duri*

Millet can also be roasted and ground into powder to make *mbwirembwire* by adding a pinch of salt. Rice was cooked with or without peanut butter. It was sometimes soaked and then ground into meal to make a type of *sadza*. Fine rice powder was made into porridge for infants.


Gogo Chinyama demonstrating winnowing of millet and grinding with a stone

Groundnuts and roundnuts are eaten fresh boiled in their shells or dried. Cowpeas can be picked green and boiled. Pulses were also dried for storage and then boiled as needed. Several wild tubers were collected and eaten. Many were peeled and eaten raw (such as *dzungwa, masorodza, tsenza* and *pfipfi*) but some, such as *manyanya*, require careful preparation. first, the tuber is peeled and then boiled. Then a liquid made from the ash of burnt maize cobs (*hundi)* is added to reduce the slimy texture. They are then roasted and can be eaten as a relish or taken with tea.

Yams (*madhumbe, magogoya)* and sweet potato are usually eaten boiled. The cassava tubers are boiled after removing the outer skin and then eaten like sweet potato. The tubers can also be skinned, sun-dried and pounded to make cassava meal to prepare sadza. The tender leaves are eaten as relish in some areas such as Chipinge.

Not many flavourings apart from peanut butter were mentioned, but a CKC from Chimanimani noted that a plant called *mungurahwe* was added to flavour porridge and also for its health benefits. Today sugar is added instead. In Mutoko and Mudzi, baobab fruit powder was added as a flavouring to baby porridge. Other condiments added to relish included *upfumbu* made from roasted, ground cucumber seed to produce

a powder that was seasoned with salt then added to relish. Similarly, cowpeas were roasted pounded and sieved and salt added as an addition to relish.

Beer brewing was important for celebration and community bonding but also had a key function in traditional rituals for appeasing the ancestors such as in rain-making ceremonies. In Shona communities, millet beer is made by first sprouting the grain then grinding it into a powder. Water is added and it is boiled until it turns reddish. It is then decanted into smaller pots and left to ferment for three days. It is then boiled again and left to ferment for another day before it is ready to be consumed.

In Matabeleland, the process seems to be slightly different, as a mixture is made of sorghum or maize meal and sprouted grain, which are mixed with a little water and then left to ferment for a few days. Water is then added to the mixture and it is boiled while stirring. It is left to ferment and then sieved through a fine grass sieve before being drunk.

For those who prefer non-alcoholic drinks, a favourite is *mahewu*, a semi-fermented maize meal drink. *Mahewu* also used to be made from a tuber known as *mukoyo*:

Traditional pot-making and uses

Gogo Ngazimbi is a traditional potter from Shurugwi. In the past pots were designed and mostly made by women while men were involved in duties like iron manufacture in clay furnaces. The type of soil for making the pots is called *rondo* and *chinamwe*. She uses a smooth stone called *hurungudo* to smooth the pots and a *bvupa* (an animal's bone rib) to shape and curve the pots. Gogo said that before she starts her work she take a small sample of the soil to church to pray (*kuyeriswa*).

Shambakodzi is a big pot for cooking sadza. This was averagely bellied so that it could hold a considerable volume of sadza. The average Shona adult likes a large quantity of sadza with choice relish. The mouth of the pot was made wide to allow the stirring of water and mealie-meal using a stick known as *mugoti* during preparation of sadza. This pot was normally not painted because the soot would obliterate its colourfulness.

Relish was prepared in a pot called *hadyana*. This pot was small in all dimensions and was also not painted …. *Mbiya* was a small pot that was often decorated with coloured earth and used for serving food (*kupakurira*). It is used as a side plate or dish. *Gate* is a big-bellied pot with a wide neck and mouth used to brew beer and cook maize cobs, *nyimo, nzungu* and *mutakura* (a mixture of dried legumes and maize). *Pfuko* was used for storage of *mahewu* and beer. Its neck is narrow and long. It is usually painted and patterns are drawn on it. A side handle is attached to it.

Milk was kept in a pot known as *hwedza*, which has a wide mouth so as to receive milk well. It was decorated with patterns. From the *hwedza* milk was poured into *hodzeko* where it is kept until it becomes sour. Milk can act as a relish going well with sadza. *Chirongo* was a light-weight pot used to fetch water. It was a taboo for people to use cooking pots to fetch water as it was believed the *juzu* (mermaid spirits) that ensured continuous flow of water would be upset and the wells would dry up. Clay pots were also used as beehives. The pots were put on trees to entice the bees to move into them. (CKG Percy Mapudzi, Shurugwi)

Traditional dishes

In the past it was usual for people to eat only two main meals a day, one around mid-morning and one in the early evening.[4] Snacks were thus vital food items and could include wild fruit, boiled or roasted maize, roasted or boiled squash or sweet potato, sweet reeds (*ipwa)*, roasted peanuts, a type of popcorn *(maputi*), dried roasted pumpkin seeds, dried caterpillars, flying ants or *mutakura*. Popular confections included *mabumbe* – a snack made from dried, roasted, pounded

pumpkin or melon seeds and a type of cake *(zvambwa*) made from mobola plum fruit syrup mixed with cooked millet and rolled into a ball. In the Chenzou area of Hwange people make bread using crushed fried wild fruit including *nyii* and *kwakwa*.

The CKCs mentioned a number of favourite traditional dishes that are not as commonly eaten these days as they were in the past. CKCs in Lupane described a maize dish called *umphokoqo*. This was a kind of very dry sadza cooked using maize-meal. When water boiled, the meal was added and boiled until it filled the pot. It was not stirred but some salt would be added and the pot was then closed for about ten minutes. Then it was stirred and the pot was closed again for about five minutes. The dish was served when hot. It was delicious when eaten with *amasi* (sour milk) or biltong boiled in *idobi* (peanut butter).

Umxhanxa is a dish made by boiling melon and maize then the two were mixed and sugar was added.

Ibhizha was a special dish which involved roasting and then grinding beans which were then mixed with roasted and crushed melon seeds. The mixture was then boiled, after which *idobi* and salt were added.

Isiswayi is made by roasting a whole, skinned, gutted rabbit until it turns golden brown. The meat is then minced and salt added before serving.

Idelele is made by adding a little ash to a cup of water, allowing it to settle, then sieving the water into a pot until it is clear. This water is boiled and then okra is added and stirred until the okra is thick and tender. Salt is added and the dish is served with sadza.

A traditional dish from CKCs in Tsholotsho and Lupane was *umcaba*. Sorghum grains were boiled and mashed and sour milk added. This was a special delicacy loved by all in the household. A similar dish called *umfahla* was described by CKCs in Matobo and Lupane. Gently pounded or ground shelled green maize was mixed into a smooth dough. The dough was made into biscuit-like flakes and boiled till ready. The flakes were cooled then broken down and mixed with the *amasi*.

Samp (*manhuchu/umngqutshu)* is a simple dish made from whole grain sorghum or maize and pounded in a mortar with a pestle. It is cleaned and soaked overnight, then boiled the following morning, with a little salt added.

Chimbamba was made from boiled roundnuts which are mashed, with a cooking stick, during cooking so that it becomes one stiff ball.

Mutakura/inkobe is a popular traditional dish mentioned by many CKCs from across Zimbabwe. There are variations but often it consists of whole dried maize grain boiled with whole cowpeas, roundnuts and groundnuts. An interesting dish mentioned in Mutoko is *mapundu*, a kind of sherbet made from crushed baobab seeds boiled in a pot of water and *mhunga* (pearl millet) powder added.

A favourite legume dish mentioned by CKCs is *rupiza* made with crushed, roasted cowpeas with peanut butter. A very popular dish across Zimbabwe is *nhopi/inopi*. This is wild melon porridge traditionally cooked using clay pots with the melon's peel used as spoons. The melon is boiled, sometimes with the addition of maize meal to thicken it. Often peanut butter is added as flavouring.

A CKC in Chibi noted that *nhopi* helps families save on maize meal and sugar in drought years as it is nutritious and fills the belly for the whole day.

Gogo Chinyama's daughter in law preparing *nhopi*

Changes in the traditional diet

When visitors ask Zimbabweans to describe their traditional diet, most will reply *sadza ne nyama ne muriwo* meaning maize sadza with meat stew and leaf vegetables. Although many remember the old traditional dishes, they are not widely eaten today except in remote rural areas by elderly people. Nutritionists are deeply concerned by the decline in dietary diversity, which is leading to various types of malnutrition, especially among women and children. One reason for this decline is likely to be the perception that traditional food is inferior and associated with ignorance and poverty. In addition, modern agricultural methods and policies, which encourage monoculture and cash cropping, mean that less food is available in communities. The degradation of natural resources has also contributed to the loss of many nutritious wild foods.

It is a tragedy that many people no longer enjoy a traditional diet and favour western foods, which are less nutritious and harder to grow in Zimbabwe's hot, dry climate than traditional ones. Thankfully, a revival is happening, and many indigenous foods are available in supermarkets and restaurants. Some products such as baobab fruit powder and marula nuts have become luxury items and are sold to export markets in the USA and Europe. Meanwhile the popular snack – dried caterpillar (madora/amacimbi) can be bought in most local supermarkets and food shops alongside a range of dried traditional vegetables (mufushwa/umfushwa). This is a welcome, trend and a sign that Zimbabweans are regaining pride in an important part of their culture.

Endnotes

1 The change in diet can be seen by looking at past records of what was eaten in comparison to today. See Alvord, 1929, Duncan, 1933, Gelfand, 1971, Gomez, 1988. Tredgold, 1986 recorded over 180 different food plants that Zimbabweans used to use but national nutrition surveys conducted since 2008 have shown that dietary diversity is declining.
2 McCann, 2005.
3 Muchuweti, n.d.; Chitsiku, 1989.
4 Duncan 1933

6. Combining old and new for adaptation

The first part of the IKA initiative involved gathering as much indigenous knowledge as possible without judging what could be useful in the modern context. The greater part of this book summarises information that was gathered. In this final chapter we discuss some ways to help communities to build resilience in a changing climate.

The IKA initiative has shown that in most communities across Zimbabwe there are people who can still recount indigenous knowledge related to weather and climate, natural resource management, community co-operation, agriculture and diet. The information we have been given suggests that many practices are the same across the nation. It is clear that the CKCs and CKGs cherish this knowledge and see its value, particularly in the face of a changing climate. This offers hope that the knowledge can be used to benefit Zimbabweans in future.

Weather and climate

Because they lived in a variable climate for thousands of years, Zimbabweans developed a wide range of ways to cope with climate variability. The numerous weather and climate indicators described in chapter 2 shows that Zimbabweans had a broad and deep understanding of their environment, helping them to manage their natural resources effectively and to become expert farmers. These methods allowed farmers to plan how to prepare for the forthcoming agricultural season and enabled families to access nutritious food from many sources. The fact that these methods can still be described means that this relationship to the environment has not been lost and can be built upon.

Community management

The numerous systems presented in chapter 3 show that Zimbabweans developed effective ways to protect and manage natural resources in the past. Undermining traditional leaders and the failure to review outdated colonial policies have contributed to the degradation of these systems, which provided a crucial fall-back during times of hardship. Community co-operation and social safety nets such as *zunde ramambo/isiphala senkosi, nhimbe* and *amalima* were widespread.

Community governance needs an overhaul, with an integration of old and modern systems that include traditional leaders and representation from vulnerable groups, local authorities and government departments. This is key for transparency and accountability. Wetland and stream bank cultivation laws need a rethink as this kind of cultivation can be done sustainably and bans rarely work. Forest management needs an innovating approach that includes finding alternative fuel (for cooking and tobacco curing) and building material sources while enabling communities to realise monetary benefits from protecting trees.

Traditional agriculture

Few would argue that shifting cultivation is an appropriate method in the 21st century although some would say that the system that replaced it probably caused more widespread harm in terms of soil degradation, pollution, depletion of water resources, food insecurity and undernutrition. While shifting cultivation worked when populations were small and land was abundant, because people are now tied to specific pieces of land a new system must be promoted. This can incorporate some beneficial indigenous techniques that include minimum tillage, integrating trees, seed-saving and planting of a wide

range of indigenous crop varieties using mixed cropping methods and crossing indigenous with modern breeds. The challenges related to growing and using indigenous crops, such as the lack of markets and labour-intensive production and processing methods (relating to bird attacks, threshing and grinding) must be addressed with community-appropriate modern technologies.

A lot more needs to be done to help farmers develop community-wide soil protection and water harvesting methods that can be based on those tried and tested by Mr Phiri. African soils are notoriously fragile and have a highly erodible structure and low fertility. Great effort needs to be put into organic methods that improve the long-term nutrient and water-holding capacity of the soil, rather than promoting and distributing fertiliser, which has numerous social and environmental problems. Other beneficial methods are the promotion of labour-saving methods for growing small grain varieties, improved seed preservation and better grain storage.

Traditional diet

The IKA initiative has shown that the traditional diet includes diverse and varied ingredients. The national Healthy Harvest training approach provides a useful tool for extension workers to promote traditional food while encouraging healthy methods of preparing and preserving food (such as not overcooking vegetables and drying produce in the shade to avoid damaging their nutrients). Organisations such as the Traditional and Organic Food Forum are making great strides in working with consumers and producers to promote nutritious indigenous foods. Attendees to the annual national food festival can buy indigenous seeds and small livestock, sample indigenous ingredients prepared in traditional or modern ways and meet farmers and processors. Such festivals must be replicated in each district.

The way forward

Adaptation to climate change is based on assessing the vulnerability and capacity of communities and the environment to withstand the potential hazards, shocks and stresses. Adaptation plans can help build the resilience of communities, environment, businesses and infrastructure. If a climate change shock (or other problem) arises, the community will be prepared so it can survive and recover.

The erosion of indigenous knowledge is a key factor in vulnerability. While they produce important benefits, the Zimbabwean education system and the nation-wide intervention of extension agents and has eroded the confidence of rural people in their ability to manage their environment and feed themselves. The centralised system of government inherited from colonial times, has disempowered communities and created dependency. The economic and political struggles of the past two decades means that the government is unable to implement policies effectively, protect natural resources and deliver crucial services. Decades of NGO aid has reinforced community dependence on outsiders to solve their problems. All this has deepened vulnerability, which is particularly worrying in the face of climate change.

The new era of devolution could increase communities' technical and financial capacity to take charge of their resources and put in place climate change adaptation plans. But this does not mean that government should devolve its responsibility to monitor and protect communities and national resources. NGOs and civil society have recently instituted an ethos of development that strengthens existing community systems, as opposed to handing out aid. More could be done to build community's esteem and their capacities and resources rather than always focusing on what they lack. Communities themselves must understand that they cannot

depend on outsiders. They must not be crippled by the idea that financial resources are required before anything can change.

Organisations around the country, such as those involved in this project (including Muonde Trust, Participatory Organic Research Extension and Training [PORET] and Shashe Agroecology School) have shown that communities can start powerful, far-reaching, transformative movements. Those that have participated in this project should see it as a first step in starting to develop their own adaptation projects. These can include some of the examples described in this book, such as forest protection initiatives, agroforestry (integrating useful trees with field crops), water-harvesting systems, indigenous livestock projects, seed banks and food festivals.

With a bit of encouragement, and building on what is already known, communities can increase their resilience to climate change. When introducing new approaches for climate change adaptation, development partners must not to undermine local knowledge that has been developed over thousands of years. By incorporating indigenous knowledge systems and adaptation science we will be able to build a climate-resilient Zimbabwe.

Appendix 1: knowledge gatherers and custodians

This initiative would not exist without the enthusiasm and hard work of the people who gathered the knowledge as well as those who kindly gave their time to pass on their wealth of information.

Community Knowledge Gatherers

Aaron Muchatuta teaches History and Heritage Studies at Arcturus High School in Goromonzi District. He has a BA Honours and an MA in Cultural Heritage Studies as well as a Postgraduate Diploma in Tertiary Education. Aaron has written and edited a number of textbooks and is Chairperson of the Burning Libraries Foundation Trust, an oral research archive. He is passionate about transerring knowledge from the past to the next generation.

Abigail Mupinga is the head teacher of Mlonyeni Primary School in Lupane District and as a result she is very well-known in her community. Abigail majored in Environmental Science at university and has learnt a lot about crops and agriculture through her connection with the SCOPE programme.

Achieford Mhondera is a PhD student in the Department of Languages, Literature and Culture at the University of Zimbabwe. He holds a BA Honours in Linguistics, an MA in Applied Linguistics and an Executive Certificate in Humanitarian Assistance and

Programme Management. Archieford is doing research on on climate change governance and became a CKG to understand the methods that people are using to adapt to climate change.

Admire Gwatidzo grew up in Mhondoro but is originally from Murewa Soko Mukanya Wafawanaka. Admire is a permaculturist and has been working at Kufunda Learning Village for fifteen years. He uses the Art of Hosting method with communities in Zimbabwe and abroad and is dedicated to working with people, animals and the environment. He became a CKG to learn more about and appreciate Zimbabwean indigenous knowledge and to share it with the next generation.

Adnomore Chirindira in from Mazvihwa in Zvishavane. He works at Muonde Trust as an Agroecological officer and researcher. He is also a farmer. Adnomore wants to help his generation and the coming generations to use indigenous knowledge to fight hunger, climate change and other hazards.

Brenda Ncube is from Mberengwa in Midlands and is working as a field officer for CTDO in Mudzi and Mutoko. She holds an MA in Development Studies and a BCom in Economics. She became a CKG because she wanted to explore rural community systems, survival and adaption in more depth. Instead of just gathering data she ended up learning new things such as traditional weather forecasting and the names of the fruit and vegetables that are eaten in Mudzi and Mutoko.

Charlot Chimhowa is originally from Rusape but is currently based in Rushinga, where she is the district co-ordinator for a CTDO programme promoting conservation farming and small grains in order to improve the communities' food security, nutrition and livelihoods. Charlot wants to expand her knowledge on how communities are adapting to climate change.

Cosmas Sunguro is from Chiadzwa Village in Mutare. He is an electrician and salesman by profession and works in a diamond mine in Chiadzwa. Cosmas is a trade unionist helping mine workers and surrounding communities and has a deep commitment to the environment, indigenous food and natural medicines. Cosmas is a Gateway Fellow as a result of his work with Kufunda Learning Village.

Daiton Swafi is a community development worker, agricultural trainer, social entrepreneur and a Gateway Fellow. He lives in Ruwa where he practices permaculture and herbalism. Daiton sees the elderly as living libraries that we need to treasure to pass on their knowledge and wisdom to future generations. He sees being an indigenous knowledge custodian as a priesthood.

Desmond Vukike Matanga is from Sanyati, Kadoma and is based in Gokwe South District, where he words with CTDO. Desmond is an avid researcher and is particularly interested in indigenous knowledge.

Edith January is based in Victoria Falls, where she is programme co-ordinator for Greenline Africa. Edith is deeply concerned about climate change issues and has a special interest in indigenous knowledge, which she believes can help people to survive the impacts of climate change.

Emmanuel Hove Mhike is the son of Chief Mazvihwa, Zvishavane. He works at Muonde Trust as an arts education and culture officer, helping to revitalise culture. Emmanuel is committed to restoring the spiritual institutions, ceremonies and sacred sites in his community and has made it his mission to document indigenous knowledge through creative writing, videos and cultural performances, including traditional songs and dances.

George Mangava spends a lot of time in Shamva, where his wife is a teacher. George founded the Chiedza organisation that facilitates individual and community healing and empowerment. He is also a founder of Tree Knowers and Growers, which encourages individuals and communities to plant and tend trees and protect the environment. George believes that indigenous knowledge and wisdom makes one grounded and balanced.

Godfree Foyo teaches mathematics at Sanyati Government High School. He has a BTech in Educational Management and a Certificate in Education. Godfree became a CKG to learn about elderly people's perspective on drought and how it was managed before the coming of

whites. He wants to find ways that drought can be overcome and learn about how communities live and deal with social challenges.

Godfrey Marume is a teacher at Hozheri Primary School in Gweru District. He is also a SCOPE facilitator. He loves agriculture and became a CKG because he wanted to learn from the elderly people in his community about how they lived long ago.

Grace Gumba is originally from Mashava in Masvingo district and now lives in Chimanimani, where she is Learning Secretary for PORET Trust. She became a CKG because she wants to motivate elders in the community to share their stories and to use the IKA platform to spread information quickly while documenting it for the future.

Hubert Sibanda teaches at Maphisa Primary School, Mzilikazi District, Bulawayo, and is originally from Nkayi District. He is a SCOPE facilitator and is active in permaculture promotion, herbal medicine and small livestock production. Hubert became a CKG to investigate why some wetlands in his area were fast disappearing and hearing about traditional beliefs helped him identify causes that he had not thought of before.

Jefred Madzvanya lives in Gururve as the deputy head at Nyandoro Primary School and is SCOPE facilitator. He became a CKG in order to meet more people in his community. He thoroughly enjoyed the experience, which

broadened his understanding of indigenous knowledge.

Joseph Mhizah lives in Mandaza North Village in Mhondoro. He is a 'health freak' and co-ordinates programmes for the Lay Institute For Global Health Training. He says the experience of knowledge gathering was awesome and it opened his eyes to new truths. Joseph feels that we should explore indigenous knowledge of trees, herbs and vegetables to identify and use them correctly.

Joyce Siziba is an examination administrator, retired secondary teacher and founder and former head of Mavela Secondary School in Tsholotsho. Joyce is a SCOPE facilitator and is part of an organisation that makes and promotes drinks from indigenous fruit.

June Mpofu is a counsellor from Lupane, originally from the remote area of Jotsholo. He is also a self-employed builder and a farmer. He agreed to be a knowledge gatherer to be part of a team from different committees to broaden his knowledge and help address global challenges.

Kaunda Ncube teaches at Chenzou Primary School and enjoys learning, studying and sharing information. The knowledge-gathering activity gave him the opportunity to visit people in his community. He found that the CKCs were excited to leave knowledge as a heritage for the next generation and he notes that there is still much to learn from them.

Kudakwashe Charles Gijima is originally from Masvingo but now works as a schoolteacher in Gokwe South. He always wanted to know more about his culture and heritage and becoming a CKG has helped. He learnt a lot of new things from the interviews and enjoyed the fact that people are still proud of their culture.

Liberty Chauke was born in the Vahlengwe Mahenye royal house of the Hlengwe tribe of the Tsonga ethnic group. He lives in Uketi Village in Chipinge South. He is a professional writer and is interested in community conservation issues, indigenous knowledge and the history of the Vatsonga (Shangaan) people. As a CKG he learnt things that he had not known about before.

Liseli Mathe is a CTDO field officer based in Tsholotsho. She is originally from Gwanda. She holds an MSc in Development Studies, a BSc in Geography and Environment and a Diploma in Agriculture. Liseli says that community development is her passion. The knowledge-gathering experience made her realise that climate change is real. She also learnt to sympathise with the San community in Tsholotsho and hopes to help them regain their identity and rediscover their culture that is in danger of becoming extinct.

Loice Maposa grew up in Mhondoro and now lives in Harare and works for Africaid. Loice says she loved the whole experience of being a CKG. Agriculture is her passion and she wanted to find out what has been done

traditionally as well as modern approaches that can be used to adapt to climate change. She previously thought she knew all about traditional ways of living and traditional food but has realised there was more to it. She is looking forward to experimenting with growing some of the new crop varieties that she learnt about.

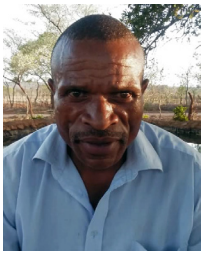
Lovemore Manyati was born in Chibi and teaches at St Magret's Primary School Hwedza. Lovemore is a permaculture leader and a SCOPE facilitator. He became a CKG to find out more about indigenous knowledge and meet more people in his community. He found knowledge gathering exciting and particularly enjoyed learning how to identify different fruit and vegetable varieties and about edible fruits and insects.

Margaret Kudzange grew up in Mutasa District. She holds a BA of Education, teaches at St Vincent Secondary School in Goromonzi and is a SCOPE facilitator. She became a CKG to find out what life was like before climate change and gain information to share with learners as well as to influence her practices at home. She found the experience exciting and will continue to gather information on her own with people she meets from different regions.

Mary Chigiya lives in Nyanga but grew up in Mutoko Resettlement Area. She teaches agriculture and geography at Theydon Secondary School in Marondera. She has been a SCOPE facilitator for over eighteen years. She wanted to become a CKG because she sees the increasing danger from

global warming and the shift from traditional ways of doing things. She enjoys working with the community, who are knowledgeable about traditional ways of producing food and food technologies. She felt that working with the elderly was enriching because of their great wisdom and knowledge. She found the experience very exciting because the CKCs were so eager to share their knowledge.

Mike Zeddy is from a community-based organisation in Chikukwa communal land, Chimanimani. He is an activist for the revival of traditional beliefs, practices and rituals and indigenous knowledge systems and agreed to become a CKG to expand this interest.



Nelson Mudzingwa was born in Chiwundura in Midlands. A graduate from Mlezu Agricultural College, he worked for the Natural Farming Network then joined the Association of Zimbabwe Traditional Environmental Conservationists. He is National Coordinator for the Zimbabwe Smallholder Organic Farmers Forum, a member La Via Campesina and one of the founders of the Shashe Agroecology School. Nelson is dedicated to reviving and supporting the documentation of indigenous knowledge, and talking to elders to gather and share diverse examples.

Nelson Mutasa was born in Gutu District. He has a BA in Education and has taught at various schools across Zimbabwe. He is currently acting headmaster at Lochview Primary School in Gweru. He has been involved in permaculture for several years and has been a district co-ordinator for the Better

Environmental Science Teaching Programme for two terms. He found knowledge gathering very enjoyable and noted that the CKCs wanted to know why it had taken so long for such an activity to take place, as environmental damage could have been reduced if it had been done sooner.

Paul Salimo is the head teacher and SCOPE facilitator at Mupumbu Primary in Zvimba. The school has won several awards in Permaculture at national, district, provincial and cluster levels. Paul says he found knowledge gathering very interesting and learnt a lot as a result. He wants the knowledge to spread like a veld fire.

Percy Mapudzi was born in Gweru and his rural home area is Mutare. He holds a BA in Educational Management. He is a permaculture focal teacher at at St Mary's Poshayi Primary School in Shurugwi and is a SCOPE facilitator. He He also holds a certificate in Practical Permaculture Design for Champions. Percy felt becoming a CKG was a chance to use indigenous knowledge to help expand permaculture to mitigate climate change. He wants to work with outstanding CKCs in his community. Through this project he learned out a range of exciting things, including indigenous livestock treatment methods and weather forecasting methods and the central role of wild fruit trees, insects and wild vegetables as a food resource. He gained skills in preparing, cooking and storing indigenous crops.

Personal Ncube comes from Matobo district. He is a school teacher and is currently research and training officer for Matabeleland North province. He is an environmentalist and coordinates the Better Environmental Science Teaching programme. Personal loves researching and working with communities. His job takes him all over Matabeleland North and he speaks Ndebele, Nambya, Dombe, Shona and Tonga and basic Kalanga. He found being a CKG extremely exciting, as each interview was a new experience and he wishes he could go on and on.

Sheron Kubela was born in Bulawayo. She is a public health nutritionist with experience in project management, public speaking, health promotion and research. She is a district coordinator for the CTDO MANA project in Nyanga. She is passionate about working with people from different backgrounds and wanted to know the survival tactics and climate change adaptation practices from different areas. She says she enjoyed interacting with CKCs to appreciate their history and ways of livelihood.

Sibanga Ncube is from Umzingwane. He is currently a head at Sihlengeni Primary School. Mr Ncube is dedicated to teaching and has received the Secretary's Bell Merit Award of 1999 and 2017, and on behalf of his school, the Unesco–Japan Award on Education for Sustainable Development in 2016. As a farmer Sibanga thought participation in knowledge gathering was a great opportunity to help widen his scope of knowledge.

Tichaenzana Koke is from Tachi Village in Gokwe south. He is farm manager at Kufunda Village and has thirteen years of experience looking after horses. He also practices permaculture and biodynamic farming. He wanted to be a CKG to meet new people and learn different ideas. The activity gave him a chance to find out new information and remind people of the ways of the past.

Trymore Samkange comes from Zvimba and works at Kufunda Learning Centre as a biodynamic farmer and is studying biodynamics at diploma level. He likes working with nature and was very happy to participate in collecting knowledge to help understand past ways of farming and environmental protection. He has found one of the pesticide sprays recommended by a CKC to be very effective against aphids. He has also cooked porridge from hacha fruit and found it to have a lovely sour taste.

Yvonne Shumbanhete is a seedlings farmer from Masvingo. Her work enables her to meet many farmers and people who love nature and this made her interested in becoming a CKG.

Other CKGs who participated were Irvine Muzuva, Winston Jekwa and Tafadzwa Miranda.

Community Knowledge Custodians

The following is a list of the people who generously shared their knowledge.

Agnes Mukumbo, Chiendambuya, Makoni
Alice Moyo, Cowdray Park Bulawayo
Alpha Mukandawire, Gokwe
Andison Dali Siziba, Consiliah Siziba Bovha, Gokwe South
Andsen Manenji, Gutu
Angeline Machakanja, Hwedza
Anna Gambiza Chiwundura, Midlands
Annah Ncube, Mthanyelwane, Tsholotsho
Annah Zenda,Chimonyo Village Nyanga
Annastancia Chiminya, Masvingo
Annie Sibanda, Hwange
Aron Mugarisi, Chirumanzu, Midlands
Benson Mapfumo, Mudzimuri, Gokwe
Bhuqa M Ndlovu, Lupane
Billian Matambo, Marange
Blessing Ndlovu, St Mary's, Hwange
Canisius Feremba, Goromonzi
Cecilia Madida and Sabbinah Chinyanganya, Ward 23, Bikita
Cecilia Mandaza and Martha Mandaza, Guruve
Cephas Machakanja, Hwedza
Cephas Sawadye, Chaitezvi village Gorominzi
Chief Mvuthu, Chidobe ward, Hwange
Chinengundu Mutandwa, Hwedza
Chiwera Tanyarara, Chivhu
Conium Nyathi, Mambala Village, Mangwe
Cosmus Gwama, Hwedza
Cuthbert Gatsi, Chikwaka
David Mukwananzi, Cowdray Park Bulawayo
David Tsikisai, Hwedza
Dedasi Moyo, 4 Jajela Mahlangu, Nkayi
Dominic Gumbo, Lupane
Dorica Gondora, Gokwe, originally from Buhera

Douglas Bvenuru, Gokwe
Easther Mahleka, originally from Chipinge
Edison Jonasi, Chipinge
Edward Musweweshiri, Musweweshiri village, Chimanimani
Edward Ncube, Luwilili Tsholotsho
Egness Machona, Chigumira village ward 8 Mutoko
Elisha Zenda, Hwedza
Elizabeth Gumbo, Bubude Central
Elizabeth Howahilowa born in Mhondoro, grew up in Zvimba
Elizabeth Mpofu, Shashe, Masvingo
Elizabeth Mugwira, Charumbira Masvingo
Ellen Ndlovu, Worringham, Umzingwane
Ellisi Sibanda, 3 Fanisoni, Nkayi
Ennie Musinezano, Mazvihwa Zvishavane
Ephraim Marasirwana (Jockie), Hwedza
Epimore Matsveru, from Gokwe, lives in Marondera
Esnath Chari, originally Mozambique Macheke, Murewa
Ethel Nyoni, insiza, Cowdray Park Bulawayo
Fabby Rafunya, Nhema, Shurugwi
Fatinos Zwakaya, Nhema, Shurugwi
Febby Chiudzu, originally Hwedza, Macheke, Murewa
Felix Chimombe, Guruve
Fizwani Jane Ncube, Chezhou village, Hwange
Florence Shumbanhete, from Bikita
Francis Shoko, Chezhou village, Hwange
Francisca Kanonogora, Frank village ward 8 Mutoko
Fungai Vurayayi, Bhebhura Village, Chibi
George Chari, Ward 8, Rushinga
Georgina Mutedza, Kamusangaza village ward 12 Mutoko
Gideon Nhira, originally Chendambuya
Gogo Chinyama, Nhema, Shurugwi
Gogo MaNcube, Cowdrey Park, Bulawayo
Gogo Matildah Jembwe village, Kachechete ward, Hwange
Gogo Ngazimbi From Morgenster, Shurugwi
Gogo Zhorani, originally Mozambique, Mutoko since 1984

Greatman Muzungu, Hwedza
Hlabekile Moyo, Ekukhanyeni
Innocent Madzivire, Gutu
Irene Rutsito, Mangwende village ward 12 Mutoko
Irvine Muzuva,Mhondoro
Issac Choga, Chezhou Hwange
Issac Mhene, Nhema, Shurugwi
J.J. Bhobho, Mandinyanya, Hwedza
Janet Ndlovu, 3 Fanisoni, Nkayi
Janeth Zambezi, Masvingo
Japhet Moyo, Worringham, Umzingwane
Javet Mutale, Sikalenge Village, Binga
Jim Upenyu, Masvingo
Johanes Mhlanga, Hwange
John Zirugo, Njani village ward 8 Mutoko
Joseph Chiyangwa, Chiyangwa village Shamva
Joseph Mandizha, Marondera
Josephine Chitabura, Bushu, Shamva
Josephine Museva, Nyamuka, Nyanga
Joyce Jese, Mhandarume, Chimanimani
Julia Maposa, Mhondoro
Juliet Bvunde, Masvingo
Juliet Foyo,Chitungwiza
Katikiti Ndonidzashe, Masvingo
Katty Moyo, Village 7 Tsholotsho
Kesiwe Ndlhovu, 3 Fanisoni, Nkayi
Ketina Chikwari, originally Zvishavane now Gokwe South
Khumalo Mandlenkosi, Lupane
Killer Makwenje, Mudzi
Lampson Muleya, Binga Sikalenge Village
Langton Shapure, Nyanga
Last Kupara, Ward 3 Zvimba
Lazarus Magwaza, born in Kwekwe district
Leonard Samuel Magiya, Charumbira Masvingo
Leticia Chisveto, Shashe, Masvingo

Lilian Magaramombe, Ward 3 Zvimba
Lloyd Madziwa, originally Rusape,
Lutha Mlotshwa, Lupane
Luwisa Mutandi, Ward 18, Nyanga
Machakanja Arthurnascious, Hwedza
Macline Dahwu, Masvingo
Madlela Nyoni, Mtshina Tsholotsho
Magreth Michael, Zimuto, Masvingo
Magubeya Andreya Chauke, Uketi village, Chipinge
Mandinyanya Gororo, Hwedza
MaNdlela, Daluka Village Lupane
MaNdlovu Gamba, Nelukoba Village, Lupane
Margaret Musekiwa, Murehwa
Margaret Sangarwe, Macheke, Murewa
Maroya Ncube, Makukubele Village, Matobo
Martha Chikurira, Originally Makoni
Mary Joyce Chavarika, born Murehwa now Harare
Matambo Mvuma, Mvuma, Chirumanzu
Mbuya Pelina, Mhondera Serima, Gutu
Merina Ndemera, Chiwaka village ward 8 Mutoko
Meton Ncube, Cowdray Park Bulawayo
Mhlatshwa Moyo, Filabusi, Matabeleland South
Mike Chadamoyo, Rushinga
Milton Makoni Chakonda, Shamva
Moffat Moyo, Lupane
Molton Mbaira Kachuta, Guruve
Monica Chigowe, Vungu, Midlands
Moses Nyazema, Bindura
Mqhatshwa Moses Sibanda, Lupane
Mr and Mrs Tapfumonei, Hwedza
Mr Pindayi, Chivhu
Mrs Dhimbwi (Julia Tsiga), Hwedza
Mrs Dube and her son, Worringham, Umzingwane
Mrs Jena (Loice Magnuda), Hwedza
Mrs Landulani, Magoli village Chezhou, Hwange

Mrs Media Chineke, Hwedza
Murashewenyu Muzvidzo, Chimanimani
Musafare Sherekete, Hwedza
Mutandwa Chinengundu, St Magrets PS Hwedza
Mwadaro Chiedza, Mhandarume, Chimanimani
Nangisai Murehwa, Mukomeka village, ward 7 Mutoko
Nesta Muzondo, Nyamweda Mhondoro
Ngoni Gumbu, Veronica Madzivadondo, Chivhu/ Chikomba
Nyaradzo Murenje, Marange
Nyengetera Kapita, Mazvihwa Zvishavane
Obert Mapfuka, Nyamuzizi, Mutoko
Onifa Chingwapara, Hwedza
P. Gwatidzo, Hwedza
Panyika Dovi, Mashava, Masvingo
Pascal Matereke, Hwedza
Patricia Mutsvandiyani, Zvimba
Paul Kazembe, Epworth
Pauline Gwaka, Mutiwokuziva Village, Rushinga
Pedzisai Zakeyo, Tapfuma village ward 8 Mudzi
Peter Bhobho, Hwedza
Peter Sango, Ward 8, Rushinga
Philip Chisvino, originally Hwedza,
Philip Mberengwa, Zvimba
Phineas Chauke, Uketi village, Chief Mahenye Chipinge
Pikai S. Tavengwa, Ward 3 Zvimba
Pinela Buhali, Willbiz, Esigodini
Pride Ncube, Chisuma village, Chidobe ward, Hwange
Prince Mashu, Machingambi school, Gutu
Proud Nyakuni, Marange
Rebecca Benhura, Mutiwokuziva Village, Rushinga
Regis Nhika, Hwedza
Ringson Chigero, Munaka and Kubatana village Chimanimani
Robert Akumidzongwe, Rusape Mhandambiri
Robert Masiye, Bocha, Marange
Robson Gijima, Masvingo

Rosemary Devera, Zvimba
Ruramai Abigail Zunza, Ward 3 Zvimba
Rutere Zimuto, from Masvingo
Samson Majoni, Buhera
Sarah Phande, Masvingo
Savania Munetsi, Domboshava
Sebastien Gavhera, Chirumhanzi
Shakespeare Murasiranwa, Hwedza
Shorai Mukarakati, grew up in Gutu
Shylet Mutetwa, originally Chipinge
Sikah Sibanda, Msongelwa, Nkayi
Simeliwe Nkomazana, Lupane
Siphiwe Khumalo, Worringham, Umzingwane
Sophia Chichera, Bushu, Shamva
Standish Nkomo, 3 Fanisoni, Nkayi
Stella Chauke, Palamuke village, Chief Mahenye , Chipinge
Stephen Diti, Nyamweda, Mhondoro
Susan and Everless Murasiranwav, Hwedza
Svinurai Paradzai, Hwedza
Tambudzai Manjengwa, Bushu, Shamva
Tapfidza Mataka, Chitimbe village, Rushinga District
Tembamari Tokanika, Nyadundu Rusora
Tendai Hadzizi, Masvingo
Tendaupenyu Kudyahakudadirwe, Chomgwada, Guruve
Tildah Nyakunu, Marange
Torongo Garwe, Hwedza
Tryphine Tshuma, Mlonyeni village, Lupane
Violet Ntumba, Chezhou Hwange
Vongai Dube, Kwekwe
Voti Nelson Maxen Sibanda, Nesikwe, Nkayi
Webster Gunja,Guruve
William Afiki, Goromonzi
William Kakono, Vungu, Lower Gewru
Wonder Rusike, Bushu, Shamva
Zondai Katerere, Chiwara village, Rushinga
Zvanyadza Chindenga, Chingamuka village ward 2 Mutoko

Appendix 2: Some of the wild plants mentioned by CKCs

English	Shona	Ndebele	Latin
Africa teak	*Mutondo*	*Umkusu*	*Baikia plurijuga*
Baobab	*Muwuyu, muuyu*	*Umkhomo*	*Adansonia digitata*
Batoka plum	*Munhunguru*	*Umqokolo*	*Flacourtia indica*
Bird plum	*Munyii*	*Umnyi*	*Berchemia discolor*
Bitter albizia	*Mugarahanga*	*Umsehla*	*Albizia amara*
Burkea	*Mugaranyenze, mukarati*	*Chababonda, ikenge, umkondo*	*Burkea africana*
Catch thorn	*Musau, musawu*	*Umphafa*	*Zizyphus mauritiana*
Chocolate berry	*Mutsubvu*	*Umtshwankela*	*Vitex payos*
Corky monkey orange	*Mutamba muzinyu*	*Umkhemeswane*	*Strychnos cocculoides*
Cross berry	*Mumaka/musosobiana*	*Umsosobiyane*	*Grewia occidentalis*
Custard apple	*Muroro*	*Ububese*	*Annona senegalensis*
Donkey berry	*Mubhubhunu, mumhudzungwa*	*Ubhunzu*	*Grewia flavescens*
Duiker berry	*Mudyamhembwe*	*Umqhobampunzi*	*Pseudolachnostylis maprouneifolia*
False medlar	*Munzvirumombe*	*Umviyo/umthofu*	*Vanguaria infausta*
False mopani	*Mungenge, mutsotso*	*Umtshibi? Umtshini*	*Guibourtia coleosperma*

English	Shona	Ndebele	Latin
Figtree	*Muonde*	*Umkhiwa*	*Ficus sycamorus*
Granite garcinia	*Mutunduru, munywanywa*	-	*Garcinia huillensis*
Jackalberry	*Mushuma*	*Umdlawuzo*	*Diospyros mespiliformis*
Kei apple	*Mutsvoritsvoto, musvisvirondo*	*Umqokolo*	*Dovyalis caffra*
Kudu berry	*Mumhungu*	*Umdlandlovu*	*Pterocarpus rotundifolius*
Live-long/tree grape	*Mugan'acha, mubvumbu, mumbumbu, mushamba*	*Isigangatsha*	*Lannea discolor*
Marula	*Mupfura*	*Umganu*	*Sclerocarya birrea*
Mobola plum	*Muhacha, muchakata, muchache*	*Umkhuna*	*Parinari curatellifolia*
Monkey bread	*Mubaba, mutukutu, musekesa*	*Ihabahaba*	*Pilostigma thonningii*
Monkey orange	*Mutamba, mun'ono*	*Umkhemeswane, umkibatshame, umngono, umhlali*	*Strychnos spinosa*
Mountain acacia	*Muunze, muuzhe*	*Umbuze*	*Brachystegia glaucescens*
Msasa	*Musasa*	*Igonde*	*Brachystegia spiciformis*
Prickly pear	*Mudhorofiya*	*Idolofiya*	*Opuntia basilaris*
Prince of Wales feathers	*Mupfuti*	*Itshabela*	*Brachystegia boehmii*
Purple hookberry	*Mukosvo/mudavashoko*	*Umdzidzi*	*Artabotrys brachpetalus*

English	Shona	Ndebele	Latin
Raisin bush	*Munjiri, mutewa, mupimbiri, mutongoro*	*Umpumpulwane, umklampunzi, umtewa,*	*Grewia monticolor*
Red milkwood	*Muchecheche, mutunzi*	*Umbumbulu*	*Mimusops zeyheri*
Red wild grape	*Mutsambatsi/musambasi, mutsombori, mumbumbu*	*Intakubomvu*	*Lannea edulis*
Sausage tree	*Mubvee/mumvee*	*Umvebe*	*Kigela africana*
Snot apple	*Mutohwe, mugururа, mutobwe, mhanzu*	*Uxakuxaku*	*Azanza garckeana*
Snow berry	*Muchagawuwe, musososti*	*Umhlagawuwe*	*Flueggea virosa*
Sour plum	*Munhengeni/mutsvanza*	*Umthunduluka /ikhabe*	*Ximenia caffra*
Spined num-num	*Munzambara, mudyabveni, mutsamviringa*	*Umlugulu*	*Carrisa edulus*
Spiny monkey orange	*Muhwaka, mudo*	*Umgwadi*	*Strychnos pungens*
Water berry	*Mukute, muhute, muisu*	*Umdoni, imiswi, umswi*	*Syzigium cordatum*
Wild custard apple	*Muroro*	*Ububese*	*Annona senegalensis*
Wild fig	*Mutsamvi*	*Inkiwane*	*Ficus burkei*
Wild loquat	*Muzhanje, mushuku, mutongoro*	*Umhobohobo*	*Uapaka kirkiana*
Wild medlar	*Mutupfu*	*Umviyo*	*Vangueriopsis lanciflora*

Climbing plants

English	Shona	Ndebele	Latin
Black wild grape	*Makosvo, mudzimbiringa*	*Amajambe*	*Cissus cornifolia*
Potato yam	*Manyanya/madhumbe*	*Umjumbula*	*Dioscorea bulbifera*
Spiny cucumber	*Mushonga, mugaka*	*Ihalabujana*	*Cucumis metuliferus*

Root and tuber plants

English	Shona	Ndebele	Latin
Babiana	*Hwena/hwenya*	-	*Babinia hypogaea*
Morning glory	*Chadhende*	*Igonsi, idididi*	*Ipomoea welwitchii*
Tiger nut/yellow nut	*Pfende*	-	*Cyperus esculentus*
grass	*Tsenza*	*Umbondiwe*	*Coleus esculentus*
Vlei tuber			

Vegetables and herbs

English	Shona	Ndebele	Latin
Black nightshade	*Mushungu-shungu, musungusungu, musaka, mukundanyama*	*Ixabaxaba*	*Solanum nigrum*
Blackjack	*Mutsine, mhuuyu*	*Umhlabangubo*	*Bidens pilosa*
Burweed	*Chijonga*	*Inama, isinama, umgangampuja*	*Acacia polycantha*
Fat hen	*Mubvunzandadya, zinhuhwe*		*Chenopodium album*
Lippia/fever tea	*Zumbani*	*Umsuzwane*	*Lippia javanica*
Makoni tea	*Makoni/ mukandandamirapamhiri/ muswiswinwa*	-	*Fadogia ancylantha*
Milkbush	*Munhenzva*	-	*Asclepias densiflora*
Pigweed	*Mowa*	*Imbuya*	*Amaranthus hybridus*
Ragwort	*Chirevereve*	-	*Senecio erubescens*
Soap nettle	*Munhanzva*	*Isikhukhukhu*	*Pouzolzia mixta*
Spider flower	*Nyovhi, nyevhe, runi*	*Ulude*	*Cleome gynandra*

English	Shona	Ndebele	Latin
Spindlepod	*Mujakari/mutsandimire*	-	*Cleome monophylla*
Spiny cucumber	*Muchacha, mugaka, ngaka*	*Umhlagahlaga*	*Cucumis*
		-	*meteliferous*
Vlei hibiscus	*Humbakachere*		*Blepharis aspera*
Wild garlic	*Mhondya*	*Hlavanguzi, isihlabamakhondwane*	*Tulbaghia leucantha*

Appendix 3: Crop varieties grown in different areas

Variety, name and description	Place
Maize, chibage, chibahwe, magwere, umumbu	
Mukadziusaenda – produces 4 lines per cob, harvest after 3 months	Hwedza
Chikomora – multicoloured seeds	Hwedza
Moza – traditional varieties that requires little rainfall and little fertiliser. Originally from Mozambique	Rushinga
Bhala bhala – drought resistant, grows very tall and matures in 2½ months	Hwedza
Kangamirisi – short plant, white grains	Hwedza
Pearl millet, mhunga, inyawuthi	
Mhongora – very tall, big stem with big grains which have beard-like structures that repel birds	Gutu
Chizharawanya – short-season variety (2 months), also short in size. Because the variety is short it is concealed in other plants, protecting it from birds	Gutu
Muswewebhiza – a bearded husk that helps protect it from birds and insects	Mutoko, Mvuma
Rushambo – drought and pest resistant	Chibi
Katosvorashiri – most preferred – early maturity (2 to 3 months) and not eaten by birds as it has thorns	Rushinga
Shirikure – early maturity (2 to 3 months) and not eaten by birds because it is sour before it ripens. High yields	Mvuma
Halare – bigger yield than *okashana* variety, taller and requires more rainfall	Rushinga

Variety, name and description	Place
Bandara – dark and greyish with large seeds, high yielding	Hwedza
Chikudo – small seeds	Hwedza
Finger millet, zviyo, rukweza, uphoko	
Nyiminya – small husk and grain, preferred for making sweet beer	Goromonzi
Garinhi or *gwezere* – big husk that looks like a winnowing tray when mature – known for its good yield	Goromonzi
Nhuri – small, reddish seed	Lupane
Muduura – lots of chaff but develops a fist-like head when mature, giving a good yield	Gutu
Mutangatsapi – short-season variety (less than 90 days). First variety to be harvested, so good for drought. Has a husk with separate fingers	Makoni
Gwezere – fingers with lot of grains, fingers curls like a fist	Mvuma,
Mutanga tsapi and *zvipedza nzara* – short season varieties	Chirimanzi/ Mvuma
Kadoro – dark brown and produces lots of seed	Chirumanzi
Mbenana – whitish seeds, early maturing, able to survive drought and floods	Chirumanzi
Sorghum, mapfunde, amabele	
Chigwadara – short stalk and black seeds	Goromonzi
Monga – a tall variety with white seeds	Lupane
Mukadzidzoka – short stalk, short season variety. 'It was believed that if a woman had run away from the husband because of hunger, the variety would mature early and attract her back'	Gutu

Variety, name and description	Place
Ngaima – meaning beautiful one, glitters, white seed	Mutoko
Tsveta – red seed used to make sorghurm rice (mutongoza)	Mvuma
Mundende – tall plant, makes white sadza if well-prepared. Matures in 3 months	Marange
Marcia – a short season variety which takes 85–90 days to mature. It is adapted to marginal rainfall areas. Produces creamy meal, similar to white meal from maize and is preferred by children. Matures in 2 ½ to 3 months. Quelea birds are a problem when it is at milk dough stage	Chibi
Chibukwa – a short season variety that matures early and requires little rainfall. It also produces high yield and is not eaten by birds	Rushinga
Chemhondoro – white, short, produces lots of seeds	Rushinga
Chakwechana, mukadzi usaende – brown, early maturity	Mhondoro
Itsheta/itsweta – used for beer	Tsholotsho
Tsvedha – white grain	Hwedza
Hwedza – reddish brown grain	Hwedza
Tsukute – red grain, high yield	Hwedza
Munyai – short season variety; has thorny husk as a defence against birds	Gutu
African rice, mupunga	
Dembaremba – husk folds down when mature	Gutu
Kapangura or *chidamare* – short season variety which matures early and becomes a source of income	Gutu

Variety, name and description	Place
Mukunda wechivanhu	Macheke/ Mutoko
Cowpeas nyemba, indumba	
Kamugabe – runner type, grown for leaves and the cowpeas. Early maturity and high yield	Chibi
Chitumbe – very early maturity. Two crops possible in one season	Rushinga
Haitambarare – early maturity, bush type.	Rushinga
Chigwa – runner-type, high yield. It also provides 'stomach fullness', thus it is cooked in small quantities	Tsholotsho
Indumba – runner type, spotted and striped seeds with broad leaves	Tsholotsho
Umumbu/ibhabhadla – very heat resistant	Hwedza
Dahwa/muzvareshinya – big brown seeds, harvested after 3–4 months	Makoni
Roundnuts, nyimo	
Ziso jena – white-eyed seed, high yields, medium-term maturity, partially resistant to flooding and drought	Gutu
Gunguwo – black seeds with a small white patch	Gutu
Misodzi – short season variety, seed patterns resemble tears	Gutu
Gumbo redhongi – seed looks like the foot of a donkey	Mutoko
Katumbe – preferred variety, drought resistant and matures in 2 months. The plant is short. The variety is suitable even	Rushinga Murehwa

Variety, name and description	Place
when there is little to normal rainfall – it can mature on morning dew only. It gives a high yield although the seeds are small, as one plant produces a lot	
Kazuma – early maturity, high yield	Murehwa
Chukungubaya – black seed	
Chisika – reddish seed, medium-sized plant	Murehwa
Dahwa or gunguwo – mixed colours – white and all black	Hwedza
Musodziwemhembwe – yellow seed with a black spot, 3 months to maturity	Hwedza
Chipofu – red seed	Hwedza
Chinderete – yellow, seed with black dot, high yield	Hwedza
Groundnuts, nzungu, azambane	
Kasaswaya – early maturity variety, requires little rainfall but produces good quality and delicious peanut butter, good for dry planting.	Rushinga
Zambia – very early maturing (less than 3 months)	Rushinga

Appendix 4: Traditional treatments for common livestock diseases

Condition	Remedy
Ticks (cattle and goats) and fleas (chickens)	Hand picking. Making a dip from *karemerapewa* plant. Crushed *umqokodlwana* bark mixed with eucalyptus tree sap were mixed with crushed *zumbane/umsuzwane* leaves and smeared on the pests *Zumbani/umsuzwane* leaves are put in chicken and goat houses to repel fleas Ash rubbed in the feathers and beneath the chicken's wings
Coughs and flu (chickens)	Pound a handful fresh *icena* leaf of the plant and add to drinking water
Mouth sores (cattle)	Sap of *karemerapewa* plant was applied
Eye infections (cattle and goats)	Maize cob ash mixed with salt and water applied to the eye Apply ground millet for red eye (t*sanga muziso*) Apply juice from *mutamba* tree Make snail shells (*hozhwa*) into a powder by heating in a fire and then crushing and apply
Gastric problems (cattle and goats)	Crush fruit from *muchacha* tree and mix with water and give to cattle to drink Crushed leaves of *mupembere* soaked in water overnight and given to drink

Condition	Remedy
Gastric problems (cattle and goats) Continued...	One handful of pounded *idolo* bark to 2 litres of water per animal Soot *(chin'ai*) from the ceiling of a kitchen hut, soaked in water overnight and mixed with salt – given to animals to drink. Also used against worms
Worms	*Mutsereketetse* tree fruit ground and mixed with water given to animals to drink One handful of pounded *iqolo lenkonyane* roots to 2 litres of water per animal Mixture of salt, cooking oil and soot mixed with water and given to animals to drink For fluke give a mixture of water with ground bark of *muchenadota* tree as a drink, twice per week *Gavakava* is crushed and mixed with water. It kills worms and *chitosi* in chickens
Black leg (cattle, goats, sheep)	Pound a handful of *umvagazi* bark and add to 2 litres of water per animal
To treat wounds	Crushed leaves of *muvengahonye* tree applied to wounds Soot given as a drink to affected animals

Condition	Remedy
Wounds continued...	Crushed leaves or bark of *muvengahonye* or *mubvamaropa* trees mixed with water or applied neat *Karemerapewa* plant sap applied to sores caused by foot and mouth disease
Other conditions	*Idolo lenkonyane* used to treat cattle affected by igazi disease The boiled roots of *chimuorange* tree given to a cattle with fever *(nyon'o)* *Isihaqa* and *umkamba* bark pounded and added to 2 litres water given to livestock as a general tonic for cattle and goats Pounded *induku zabafana* roots added to water as a general tonic for poultry Teak bark soaked in water is given as a drink for cattle affected with *umkhonywana*. It also prevents the condition Plant called *idolo lenkonyane* is soaked in water and given as a drink to treat cattle affected by *umkhono* disease Fruit from the *mutseketsa* tree are crushed and the powder is given to cattle and goats mixed in their food as a cure for various cattle ailments

Condition	Remedy
Other conditions continued...	*Gavakava* (*Aloe spp.*) leaves are crushed and mixed with water and given to sick animals to drink (poultry, cattle and goats etc) *Mutiti* tree (*Erythrina spp.*) bark is soaked in water overnight and the water given to sick animals to drink Leaves of *murumanyama* are pounded and fed to the livestock Leaves of *mubvaramaropa* tree are pounded and added to drinking water given to affected livestock Plants such as *gavakava, mutiti* and *mumwahuku* were crushed and mixed with water and given to chickens for various ailments *Munwahuku* tree bark crushed and mixed with water then given to chickens. *Mutsomo* tree bark is ground and added to chickens drinking water *Muchekerese* tree bark is added to chicken's water to cure *chitosi.*

Appendix 5: Edible insects and other small animals mentioned by CKCs

Shona	Ndebele	English	Notes
Mashunja	-	-	
Monja	-	-	
Manjugwe	-	-	
Pwarara	-	-	
Zhanjezhanje	-	-	
	Inswabanda		
	Uquthu		
Zvikunje	-		
Humgwe	-		
Tsambarafuta	*Amagenga*		Found just before the rains
Nhowa, nhohwa	-	Ants	Found in *mutowa* tree
Masini/sinini	-	Caterpillars	Collected from *musasa* trees during rains
Harati	-	Caterpillars	Collected from *mukarati* trees during rains
Magandari/	-	Caterpillars	White grubs found in rotten part of trees
masenda		Caterpillars	
Mandere,	*Inyeza*		Collected from *munhondo/ishungo* tree. From the
marupwa		Chafer beetles	onset to the middle of the rainy season

Shona	Ndebele	English	Notes
Nyenze		Cicada	Found in the *munyunya/mutarara* tree towards the first rains from October to December
Magumbukumbu			Found in summer
Zvigakata		Click beetles	Found in summer
Makurwe		Click beetles	
Mamunye		Crickets	
Harugwa/harurwa	*Umtshiphela*	Cricket-type Edible stink bug	Only found in Bikita. People travel to Bikita to collect them. Popular in Masvingo Province
Ishwa	*Izinhlwa*	Flying ants	September–December. Very nutritious abundant during flood years
Mhashu	*Amabhombo*	Grasshoppers	People collect them when harvesting crops. They roast and dry them for later consumption as relish. Favoured varieties are *bombo* and *mutsinyarinya*
Nharara	*Intethe*		Found in *mutarara* tree
Mhashu		Leaf-footed insect	
Hwiza/mhashu		Locust	

Shona	Ndebele	English	Notes
Madora/masondya	*Amacimbi*	Locust	From the onset of the rain season up to the middle of the rain season
		Mopane caterpillar	
Majuru	*Amagenga*		
		Termites	

Shona	Ndebele	English	Notes
Shiri	*Inyoni*	Birds	
	Imbabala	Buck	
Tsuro	*Umvundla*	Hare	
Types eaten – banya, nhinga, nhika, mbasi, shana, nhilza, tururu Tsuro Tsindi/shindi	*Imbeba*	Mice (*mbeva*)	During harvesting time and throughout the off-season people caught rodents of different types by using traps or digging into their burrows. The rodents were dried and kept for many months and eaten as relish. During the rainy season or floods mice could be collected from flooded fields as they escaped from their burrows
	Omvundla	Rabbits	
	Indlegu/osinti	Squirrels	

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This book is one product of the Indigenous Knowledge for Climate Adaptation initiative which was launched to gather, share and celebrate indigenous knowledge from across Zimbabwe to help communities adapt to climate change.

During 2020 people across Zimbabwe were invited to become Community knowledge gatherers by talking to elders and other experts. Information was documented in write ups, photos, voice recordings and videos. This book aims to summarise the information that was collected and make it freely available.

The book is divided into sections on indigenous knowledge related to weather and climate, traditional community management, traditional agriculture and traditional diet. There is also a section looking at how indigenous knowledge can be used to help Zimbabweans adapt to climate change in the future.

KONRAD ADENAUER STIFTUNG