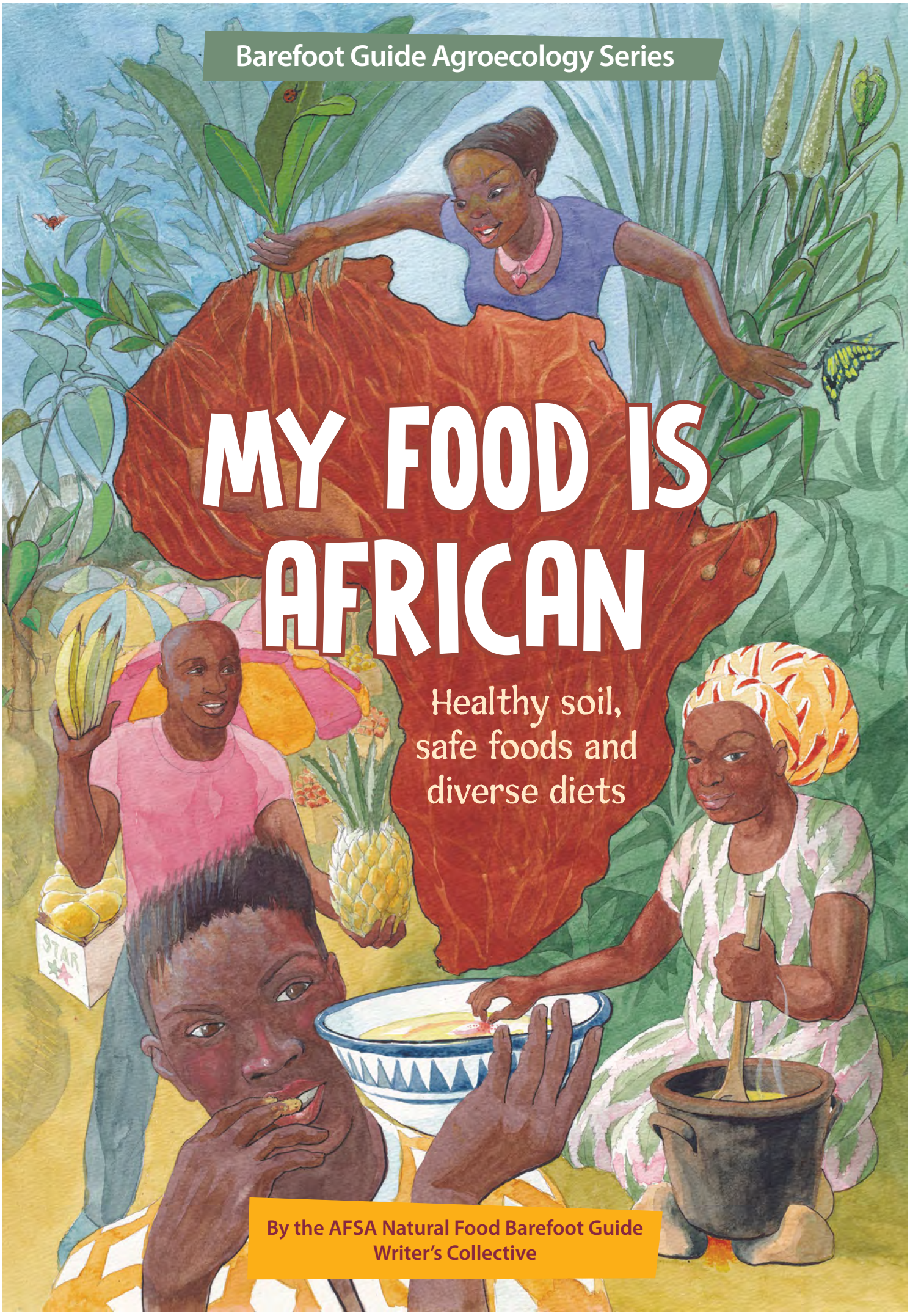
Barefoot Guide Agroecology Series



MY FOOD IS AFRICAN

Healthy soil, safe foods and diverse diets

By the AFSA Natural Food Barefoot Guide Writer's Collective

Barefoot Guide
Agroecology Series

MY FOOD IS AFRICAN

Healthy soil, safe foods and diverse diets

By the AFSA Natural Food Barefoot Guide Writer's Collective

AFSA
ALLIANCE FOR FOOD SOVEREIGNTY IN AFRICA

The Barefoot Guide Connection
www.barefootguide.org

The Natural Food Barefoot Guide Writers' Collective

The Writers

Angela M Kimani, Optimadept Consult Ltd, Kenya
Dr. Anna Trapido, South Africa
Anne Maina, Biodiversity and Biosafety Association of Kenya
Astrid Huelin, Zimbabwe
Bertha Nherera, Orsha Wholesome Foods , Zimbabwe
Bronwyn Egan, University of Limpopo, South Africa
Cecilia Onyango, Dpt. of Plant Science and Crop Protection, University of Nairobi, Kenya
Chifundo Kokwa, Scope, Malawi
Daniel Wanjama, Seed Savers Network, Kenya
Diana Mapulanga, Community Technology Development Trust, Zambia
Enyetu Joshua, Uganda
Eustace Sajjabi, Agency for Integrated Rural Development, Uganda
Georgina Catacora-Vargas, Bolivian Catholic University
Grace Ruto, Vi Agroforestry, Kenya
Haje L Paasewe, Liberia
Irene W. Kimani, Food and Agriculture Organization of the United Nations, Kenya
James Aringo, PAG, Uganda
Jane Parsons, United Kingdom
Jesca Omodo, Community Integrated Development Initiatives, Uganda
John.P. Wilson, Freeranger, Zimbabwe
Joyce Murerwa, Amref Health Africa, Kenya
Juliet Nangamba, Community Technology Development Trust, Zambia
Karalyn Hingston, Food Plant Solutions, Australia
Karangathi Njoroge, Maendeleo Endelevu Action Program (MEAP), Kenya
Laura Tabet, Nawaya, Egypt
Linnet Gohole, University of Eldoret, Kenya
Lizzie Shumba, Soil Food and Healthy Communities, Malawi
Maria Mbudzi, Zimbabwe
Mariann Bassey, Nigeria
Martin Potgieter, University of Limpopo, South Africa
Masudio Margaret Eberu, Eastern and Southern Africa Small Scale Farmers Forum (ESAFF), Uganda
Mugove Walter Nyika, ReSCOPE Network, Zambia
Muniirah Mbabazi, Nutrisat, Uganda
Nathalie Demel
Nduati Githae, Kenya
Never Mujere, Environmental Management Trust, Zimbabwe
Ntando Ndlovu, Family Farmer and Activist, Zimbabwe
Peter Gubbels, Groundswell International, Ghana
Peter Ogera Mokaya, Organic Consumers Alliance (OCA), Kenya
Rachel Oppong
Romeo Chingezi, Svinurai Arts Association, Zimbabwe
Sue Kageler, The University of the West of England, United Kingdom
Tafadzwa Nyanhanda, Triumphant Global, Australia/ Zimbabwe
Thamie Khanye, Community Technology Development Organisation, Zimbabwe
Wisdom G. Dube, Zimbabwe

The Editorial Team

Cecilia Onyango, Dpt. of Plant Science and Crop Protection, University of Nairobi, Kenya
John Wilson, Freeranger, Zimbabwe
Peter Gubbels, Groundswell International, Ghana
Peter Ogera Mokaya, Organic Consumers Alliance (OCA), Kenya
Tafadzwa Nyanhanda, Triumphant Global, Australia/ Zimbabwe

Writing process facilitation and language editing: Doug Reeler

Illustrators:
In-chapter illustrations and cover: Caroline Klopperts (urbanforestregeneration@gmail.com)
Between chapter illustrations: James Njoroge (kaatoony@gmail.com)

Layout/DTP artist: Paula Wood Design

Proof-reader: Beulah Tertiens-Reeler

About the Hosts of this Barefoot Guide

Please note that the hosts of this Barefoot Guide, the lecturer and six students from Makerere University, are fictional characters, not to be confused with the real writers listed above.

We have created them to accompany you through this Guide. However, in many ways, they do represent the diverse and true voices of many of the members of AFSA, including the editors.

Published 2022

ISBN: 978-0-6397-1734-0

Contents

A Message from the Coordinator of the Alliance for Food Sovereignty in Africa (AFSA) iv
Welcome to this Barefoot Guide and healthy eating… v
Agroecology, permaculture, organic agriculture, biodynamic farming, natural farming… vii

Chapter 1
Relishing our Roots: Celebrating the traditional food of Africa 1
The Ten Elements of Agroecology *21*

Chapter 2
What is the "Chemical Mistake" and what is the solution? 23

Chapter 3
Working with nature's gifts to grow safe and healthy food 45

Chapter 4
Grow well, eat well, be well - How to eat healthily every day 67

Chapter 5
Fortification and Biofortification: Silver Bullet or band-aid? 85

Chapter 6
The Pride of our Grandmothers –
The story and value of indigenous African food 93

Chapter 7
Insects, wild foods, fermentation and Budja Hearths 107

Chapter 8
Making Healthy Food Happen! Using a Barefoot Guide Approach 123

References 138

AFSA
ALLIANCE FOR FOOD SOVEREIGNTY IN AFRICA

A PUBLICATION OF THE ALLIANCE FOR FOOD SOVEREIGNTY IN AFRICA (AFSA):

"The Alliance for Food Sovereignty in Africa (AFSA) is a broad-based alliance of different civil society actors that are part of the struggle for food sovereignty and agroecology in Africa. These include African farmers, pastoralists, fisherfolk organisations, indigenous peoples' networks, faith-based institutions, youth and women networks, African indigenous NGO networks, consumer movements in Africa, international organisations which support the stance of AFSA, and individuals. It is a network of networks and currently with 40 active members. It is the biggest civil society movement in Africa and members work in 50 of the 55 African countries."

A Message from the Coordinator of the Alliance for Food Sovereignty in Africa (AFSA)

– Million Belay –

Flipping through channels in my Kampala apartment one night, a presidential address of Ugandan President Yoweri Museveni caught my attention. “Ugandans, we have enough food,” he said. “We must not starve while other countries misbehave and fight.” He was referring to the war between Ukraine and Russia. He was discussing self-sufficiency, one of the pillars of the food sovereignty concept. He continued, "For the last 30 years, I have never eaten bread made of wheat. Why should I eat a grain that we don't grow, that gives health problems to many and a food that is controlled by outsiders?” He was talking about self-sufficiency and local ownership yet another pillar of food sovereignty.

In Kampala there are two types of restaurants: restaurants for traditional foods and those for fast foods. You can order fish or chicken, but those are not the food. What comes with the fish and chicken is the food. Traditional foods include Matoke, plantain, vegetables, beans, sweet potato, pumpkin, Irish potato, and so on. Food from the Acholi community may include millet, wild mushroom, peanut, green vegetables, cassava and a variety of foods with local names. Food from the Banyakitara community in Western Uganda includes millet, cassava, sorghum, and a variety of steamed green vegetables. The variety is amazing if you travel in any direction in Uganda, probably true for most African countries.

What is tragic is what our children want to eat. Children in any country seem to prefer fast foods: pizzas, hamburgers, and so on, accompanied by sugary sodas if their families allow it. This is understandable because they want to try something new when they go out to eat. But when an increasing number of young people prefer fast food to home cooking, we have a problem. Africa now has an increasing prevalence of obesity, cardiovascular problems, respiratory diseases, cancer, and diabetes.

Growing healthy food in agroecological ways is not enough. We must educate both the young and the old about the types of foods that are beneficial to their health. On this, we agree with President Museveni, that what we have is healthy, and that if we grow the diversity that we desire, not only will we rejoice, but so will nature around us, because resilience comes from diversity. Climate change, biodiversity loss, increasing pandemics, war, and other unpredictable factors demand that we consider resilience.

Eating healthy African food helps to preserve our culture. As an Ethiopian, I have no idea how to make Matoke unless I learn. The question is, how much are we learning from the food knowledge and practice of other African cultures before we adopt the Western diet?

Our African diet has a lot to offer, and this book explains why. It contains stories of practice, culture, health, and science. As it celebrates our food cultures, it also warns us of the dangers of chemicals as well as ill-conceived approaches such as biofortification.

I sincerely hope you enjoy this book. I'd like to thank everyone who contributed. If and when he sees this book, I'm sure President Museveni will smile in his presidential seat. Enjoy your reading!

Welcome to this Barefoot Guide and healthy eating...

Welcome to the readers and users of this Barefoot Guide. We invite you on a journey through the farms, gardens, local markets and kitchens of Africa to learn about the unique, delicious and healthy foods and cultures that belong to this beautiful continent of ours.

Many of you may be feeling uncertain, even lost, about how to eat healthily. There are many theories and interests behind these theories, some genuine but many focused more on their profit than your health. We wrote this Guide with your health and well-being as our only purpose. We are not selling anything… this Barefoot Guide is free and offered with love and care for every person, every family and every community in Africa.

"Nutrition" is not good enough… Grandmothers are!

We too are citizens concerned about what we eat. But we're frustrated with the profession of nutrition and nutritionists. Instead of helping us be clearer, we are taken into a fog of academic jargon. Eating healthily is not that complicated. You don't have to be a nutritionist to understand how to eat healthily. New scientific research is simply telling us what many of our grandmothers, and their grandmothers, have always known. Read this Guide to learn from their wisdom in the stories.

THE CHAPTERS AND THEMES OF THIS BAREFOOT GUIDE

In ***Chapter One: Relishing our Roots: Celebrating the Traditional Food of Africa*** we explore and celebrate our diverse cultures of traditional foods, diets and cuisines across Africa, from writers who have precious memories of the delicious dishes cooked by their mothers and grandmothers.

Chapter Two: The Chemical Mistake describes clearly what a big mistake humanity has made by using chemical fertilisers and pesticides to produce food and why Natural Farming offers a more sustainable and healthy way into the future.

In ***Chapter Three: Working with Nature's Gifts to Grow Safe and Healthy Food*** we illustrate the connection between the soil and stomach. You'll get a deep dive into the wonderful world of microbes, those trillions and quadrillions of tiny creatures that we can't see but on which all life depends.

Chapter Four: Grow Well, Eat Well, Be Well – How to Eat Healthily Everyday answers how we can eat well, offering the essential knowledge we need to make the right choices. And how 'eating well' means that we'll be fit and healthy.

Chapter Five: Fortification and Biofortification: Silver Bullet or Band-aid? looks behind the myths of fortification and biofortification, answering the question of whether they really do provide the solutions they promise.

In ***Chapter Six: The Pride of our Grandmothers – the story and value of indigenous African food*** we venture into more detail about traditional foods and how to grow them, answering some of the more detailed questions in our challenge of breaking away from unhealthy eating patterns and habits.

Chapter Seven: Insects, wild foods, fermentation and Budja Hearths delves into some of the fascinating and unique practices of harvesting, preparing and eating indigenous foods in Africa.

In ***Chapter Eight: Making Healthy Food Happen! Using a Barefoot Guide Approach***, we conclude with what we can do to carry on the rich traditions of indigenous foods and how to work with community groups who are keen to improve their own and their families' health through eating better.

A SECOND VOLUME ON FOOD SYSTEMS IS BEING PREPARED

The Guide you are reading now focuses on how to grow food and eat healthily. But more is needed because global and local food systems so often limit people's choices and ability to grow and eat healthy food. With this in mind, we will soon be publishing a second volume which explores how fostering healthy eating also requires systemic change.

We will explore the world of marketing and a 'healthy eating' approach to buying food in local markets. This will include recognising the value of African markets, sometimes called territorial markets or mass markets. We will also delve into how people can work together to campaign, advocate and lobby for changes to systems at all levels.

USING THIS BAREFOOT GUIDE

Change requires deep understanding and awareness. By reading the stories, enhanced by the artwork, and by discussing the questions we raise amongst yourselves, we hope that you may gain a deeper understanding about eating healthily.

At the end of many of the stories we've included questions for discussion. You may have other questions too. Barefoot Guides are about putting issues on the table for discussion so that people can better understand problems and possibilities. It is our hope that these stories and illustrations help you to question common assumptions and become aware of alternative solutions. But, above all, we want you to come to your own conclusions. This is what drives change. We therefore strongly encourage you to use this Barefoot Guide in your families, community groups, schools, faith groups and in any other appropriate place.

In doing so we invite you to join a growing movement in Africa to take back our culture and practices of growing and eating healthy food, and to offer future generations choices that are real and life-giving.

Agroecology, permaculture, organic agriculture, biodynamic farming, natural farming...

A few words about the terms used in this Barefoot Guide:

Names can be a problem. What does permaculture or organic agriculture mean to you? What about natural farming? And then there's Agroecology, where did that term come from? Barefoot Guides aim to make things understandable by anyone and try to avoid jargon. You could say all these terms are jargon. Nevertheless, in this Barefoot Guide we've used some of these terms and would like you to understand how we understand them.

The overarching term for us as AFSA members is Agroecology. Agroecology has become a rallying term for many different approaches. Above all, Agroecology is a social movement that's growing and spreading fast across our continent, and the world. It's a citizens' movement that recognises the value of indigenous knowledge, as well as the value of modern science, particularly that science which has a more holistic perspective and is not there to serve profits above people.

Firstly, as a social movement, Agroecology encourages a range of practices that enable healthy, climate-resilient landscapes. Secondly, as a movement, Agroecology aims for all citizens to have access to safe, healthy, diverse foods that leads to healthy citizens. And it goes further than this. It aims to strengthen citizens so that they can play a significant part in shaping the food systems and policies that enable (or disable) this access to healthy food for all.

Terms such as organic farming, agroforestry, permaculture, biodynamic farming and natural farming are all part of Agroecology. They describe farming practices that contribute to healthy landscapes. Savings and loans groups, territorial (local) markets, and other marketing strategies are also part of Agroecology. They enable access to healthy foods and diets.

See page 21 for "The 10 elements of agroecology"

1 Relishing our Roots

Celebrating the traditional food of Africa

The students are surprised

The small group of students were chatting noisily as they assembled and sat down in a circle under the large Tamarind tree in the grounds of Makerere University in Kampala, Uganda. Monica Bakirya, their lecturer, stood to one side, smiling to herself and enjoying their youthful exuberance. She soon joined them, and as they quietened, she spoke.

"Welcome to our nutrition study group where, from today, we're going to avoid using the word 'nutrition.'" She looked around as she said this, watching for any reaction. They looked puzzled and she could see their minds hard at work trying to figure out why a nutrition class wasn't a nutrition class!

She continued, "Our topic this semester is traditional foods, dishes, diets and cuisines of Africa. We're going to explore this topic together using short stories of real experiences, which will provoke our thinking and discussion. We'll be asking questions such as: Why and how are traditional foods and diets healthy? Why are many people abandoning these foods and diets? And how can this trend be reversed?"

"I don't understand your comment about not using the term nutrition," said one young woman. "Surely the reason why traditional diets are important is because they're nutritious."

"Good point, Kamali. They are nutritious, I agree, but did those people who developed and cooked traditional dishes and diets ever talk about nutrition? My point is that I think we stopped understanding the value of nutritious, wholesome food when we started talking about nutrition and stopped talking about healthy food."

"You've lost me," said Abdou, young man sitting opposite her, looking around to see if he had support from the other students. He clearly did.

MONICA TELLS HER STORY

"That's not surprising," continued Monica with a chuckle. "So, let me tell you a little of my story and how I came to be doing this. I grew up in a rural area of Southwest Uganda. Our diet was mostly traditional dishes that people in my area had been eating for hundreds of years. Our farms were small but full of diverse food crops, including many 'wild' foods that we gathered from surrounding forests. We had a good climate and used that advantage well.

She knew about healthy, traditional food, grown by people who knew what they were doing. Less developed, pah!

"I enjoyed helping my mother and grandmother on the farm. I also helped them with the cooking and learnt a lot from them. I was lucky enough to get a scholarship to come here to Makerere University to study agriculture. After that I went to do a masters and PhD in the USA. Both focused on nutrition.

"I found the USA to be strange, so advanced in technology but from what I saw most people eat badly and many of them suffer from a range of preventable diseases like high cholesterol, heart disease and strokes, type-2 diabetes, osteoporosis and some cancers. Until recently these diseases were foreign to where I come from.

"Why could they not see this? And there I was, becoming a nutrition expert in a nutrition disaster of a country that has probably done more research into nutrition than any other! I often thought of my mother and grandmother, so strong and healthy, seldom falling ill. In the U.S., they would be considered uneducated, even backward, or people who were "less developed".

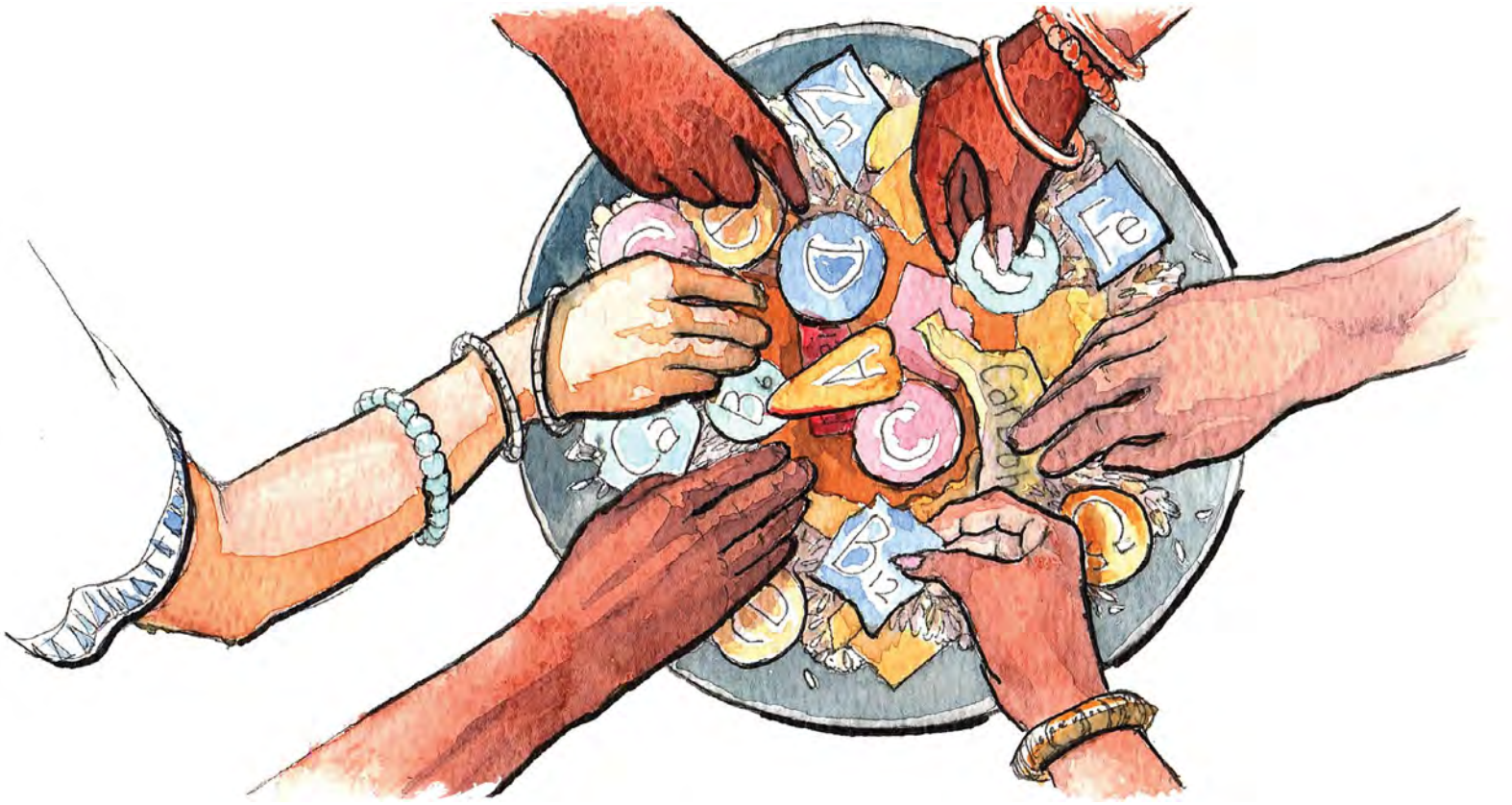
The students gave disapproving gasps.

"Yes, can you believe it! And my great grandmother lived to over 100 years eating 'less developed' food! There were many healthy old people where I come from. And I know that this was because of the food they ate and the good exercise they got growing it. What could I say to my great grandmother about healthy eating, me with my PhD? She knew far more about it than I did yet she had never heard of this thing called nutrition. She had no use for such a word. She knew about healthy, traditional food, grown by people who knew what they were doing. Less developed, pah!

"When I was in the US, I read a book called 'In Defence of Food' by Michael Pollan." Monica began to read from a book:

> *"I speak mainly on the authority of tradition and common sense. Most of what we need to know about how to eat we already know, or once did until we allowed the 'nutrition experts' and the advertisers to shake our confidence in common sense, tradition, the testimony of our senses, and the wisdom of our mothers and grandmothers. Putting the nutritionists in charge of the menu and the kitchen has not only ruined an untold number of meals, but also has done little for our health, except very possibly to make it worse."*

"This writer put in writing what I'd begun to think. He opened my eyes. He writes of *nutritionism* and how it has led us down the wrong path. The main problem is that nutritionism breaks food into separate parts, called nutrients. It fails to see the full picture of food. The beauty of traditional dishes and diets is that they treat food as food where we care about how it is grown as well as its social, psychological and cultural role in contributing to our quality of life in body, mind, soul and community.



What is Nutritionism

Nutritionism is a paradigm that assumes that it is the scientifically identified nutrients in foods that determine the value of individual food stuffs in the diet. In other words, it is the idea that the nutritional value of a food is the sum of all its individual nutrients, vitamins, and other components. Another aspect of the term is the implication that the only point of eating is to promote bodily health. The term is largely disapproving, implying that this way of viewing food is simplistic and harmful, and the term is usually used to label others' views. The concept's most prominent opponent, and populariser of the term, journalist and professor of journalism Michael Pollan, argues that "We're constantly trying to simplify food to its constituent nutrients, but food is more than the sum of its parts."

(adapted from Wikipedia)

"We're constantly trying to simplify food to its constituent nutrients, but food is more than the sum of its parts."

"I hope that this helps clear up some confusion, Kamali and Abdou. But don't worry, we'll keep coming back to it. For now, I'd like each of you to introduce yourself briefly, telling us your name, where you're from and a little bit about yourself. Let's start with you, Kamali, and then go round the circle."

The students introduce themselves

Cameroon, with over two hundred ethnic groups, has a cuisine so complex and diverse that it needs its own book to describe.

"My name is Kamali Ayele. I come from a community in the highlands of Ethiopia an hour from Addis. I did my primary school there but stayed with relatives in Addis for secondary school and then to Makerere University. My father is an active leader in our community focused on dealing with the environmental damage in our area. A few years ago, he led an activity to put in many kilometres of water-harvesting ditches. My parents live in a modest house built of rock and eat many traditional foods."

The sound of loud hooting in the background made Kamali start. She was a shy person. She turned to look at the person next to her.

"My name is Abdou Camara and my home is near Thiès in Senegal. Thiès is a town about an hour south of the capital Dakar. The men in my family have been fishermen as far back as we can remember. I grew up going to sea with my father. During this time the fish stocks went down every year. This put financial pressure on my family. This led to my mother growing vegetables for sale, as well as for us to eat. My uncle Famara is the one supporting me to be here at Makerere university."

Abdou turned to look at the young woman sitting next to him. 'Your turn,' he said with a smile.

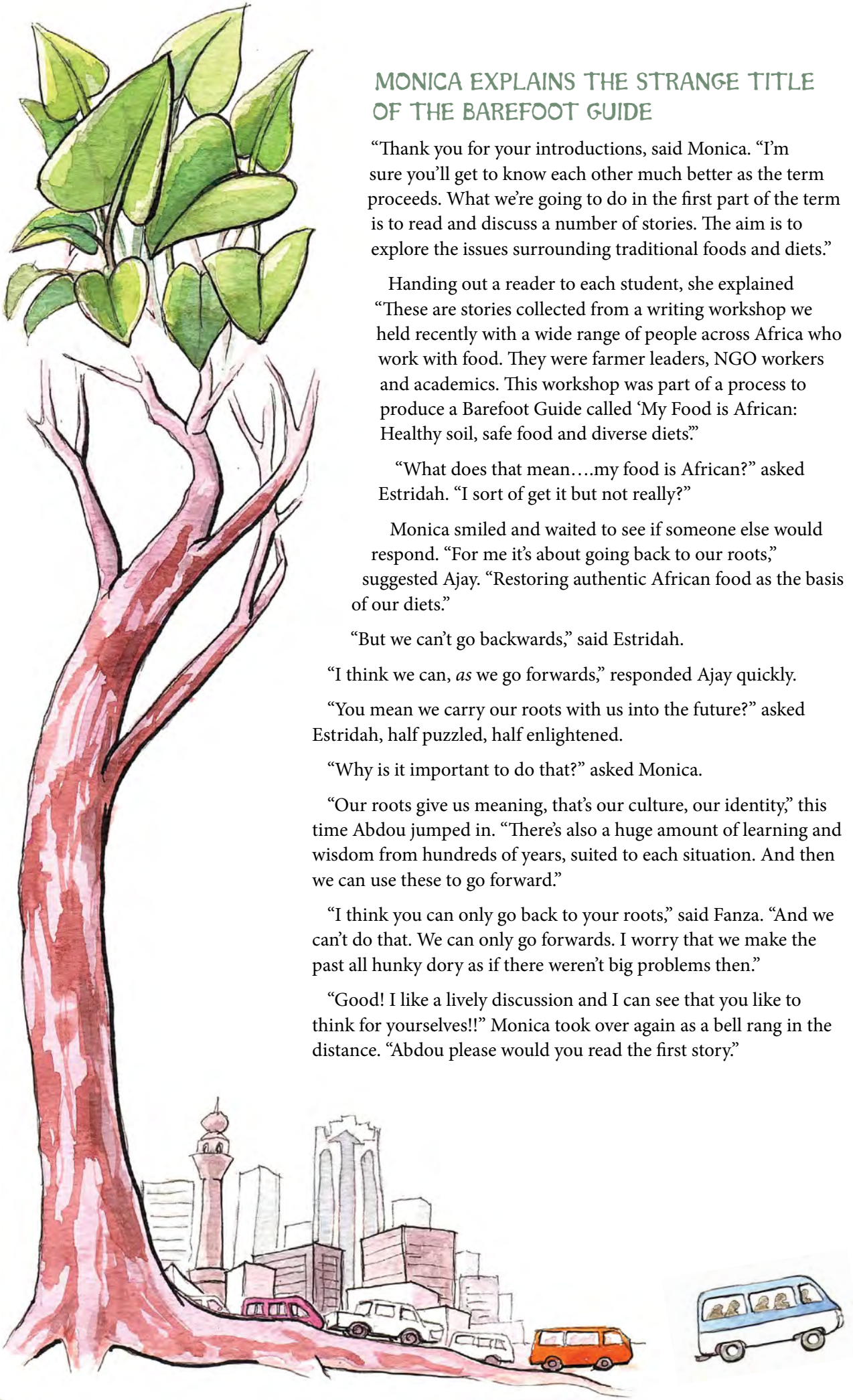
"My name is Fanza Adamou and I'm from Cameroon. My family come from the southwest of Cameroon, which I believe has the wettest climate on Earth. I grew up in the capital city of Yaoundé. When we visited our rural home, we ate lots of foods and dishes that I didn't know and I was always happy to return to the city. I'm a real city girl and I like modern food. But I was amazed to read Joan Baxter's book called 'Seven grains of Paradise' about Cameroonian food. She said that Cameroon, with over two hundred ethnic groups, has a cuisine so complex and diverse that it needs its own book to describe."

"My name is Ajay Bizimana from the Ruhango district in Rwanda. My parents were badly affected by the events of 1994 as they were a mixed Tutsi-Hutu marriage. They retreated to a refugee camp in the Congo and only came back in the late 90s. I was born after they returned. Both are teachers, committed to re-building the country and helping to heal past wounds. People say that the Rwandan government has been very efficient at 'delivering' development including a strong promotion of the green revolution approach to farming. My father is a supporter of this approach, but my mother doesn't like it and thinks it is responsible for the loss of workable traditional the farming practices, such as mixed cropping. I grew up listening to them debates this issue!"

"I'm Estridah Msukwa and I come from a place called Ekwendeni in Malawi. It's not far from the capital of the north, Mzuzu. My mother is a nurse who has worked for years on nutrition research programmes with a professor from Cornell university in the US. Their work over the years helped close down the malnutrition ward for children in the Ekwendeni hospital. But they've struggled to get the ear of policy-makers. My father's rural home is in the far northwest of Malawi, a coffee growing and hilly area that is blessed with good rains. But this has been changing in recent years, becoming more erratic. Because it's hilly there has been a lot of erosion. Malnutrition is quite high despite the fertile lands. My father says this is because people grow cash crops and have stopped growing many food crops, though my grandmother still grows and cooks in a traditional way."

"And I am Njabulo Zondo from South Africa, so very happy to be part of this group. I am a township guy, born, bred and buttered in Soweto and raised on fast foods, so I know all about nutrition, or bad nutrition that is! But this did include roasted chicken feet and sheep's brain so sometimes it was healthy. We were isolated for so long from Africa under Apartheid, so I have been very excited to be amongst so many of you from different corners of our beautiful continent."

Malnutrition is quite high despite the fertile lands. My father says this is because people grow cash crops and have stopped growing many food crops



MONICA EXPLAINS THE STRANGE TITLE OF THE BAREFOOT GUIDE

"Thank you for your introductions, said Monica. "I'm sure you'll get to know each other much better as the term proceeds. What we're going to do in the first part of the term is to read and discuss a number of stories. The aim is to explore the issues surrounding traditional foods and diets."

Handing out a reader to each student, she explained "These are stories collected from a writing workshop we held recently with a wide range of people across Africa who work with food. They were farmer leaders, NGO workers and academics. This workshop was part of a process to produce a Barefoot Guide called 'My Food is African: Healthy soil, safe food and diverse diets'."

"What does that mean….my food is African?" asked Estridah. "I sort of get it but not really?"

Monica smiled and waited to see if someone else would respond. "For me it's about going back to our roots," suggested Ajay. "Restoring authentic African food as the basis of our diets."

"But we can't go backwards," said Estridah.

"I think we can, *as* we go forwards," responded Ajay quickly.

"You mean we carry our roots with us into the future?" asked Estridah, half puzzled, half enlightened.

"Why is it important to do that?" asked Monica.

"Our roots give us meaning, that's our culture, our identity," this time Abdou jumped in. "There's also a huge amount of learning and wisdom from hundreds of years, suited to each situation. And then we can use these to go forward."

"I think you can only go back to your roots," said Fanza. "And we can't do that. We can only go forwards. I worry that we make the past all hunky dory as if there weren't big problems then."

"Good! I like a lively discussion and I can see that you like to think for yourselves!!" Monica took over again as a bell rang in the distance. "Abdou please would you read the first story."

Reviving old knowledge

by Karangathi Njoroge

"Karangathi, you're asking about knowledge that's been passed down over generations for hundreds of years. Do you think you'll be able to understand this kind of knowledge with your modern education?" My grandmother said this to me when I visited her ten years ago.

"Yes, I believe I can if you'll help me. I've learnt how mistaken we've been to throw out this ancestral wisdom." I replied. Behind her I could catch a glimpse of Mt. Kenya, shining under a hot African sun.

"To discard all that knowledge developed over centuries is crazy."

I am from the Gikuyu Community that has lived around Mount Kenya for centuries. Farming has always been our way of life. The region has many varied climates from wet highlands to semi-arid areas and so the communities developed appropriate practices for each climate over hundreds of years.

My grandmother, Njeri, was sitting on a mat on the ground outside, sorting black beans. She asked about my family, and especially about our children who would keep her family line going. My grandfather, Kamundia, was repairing a sheep shed behind the house and before long he joined us.

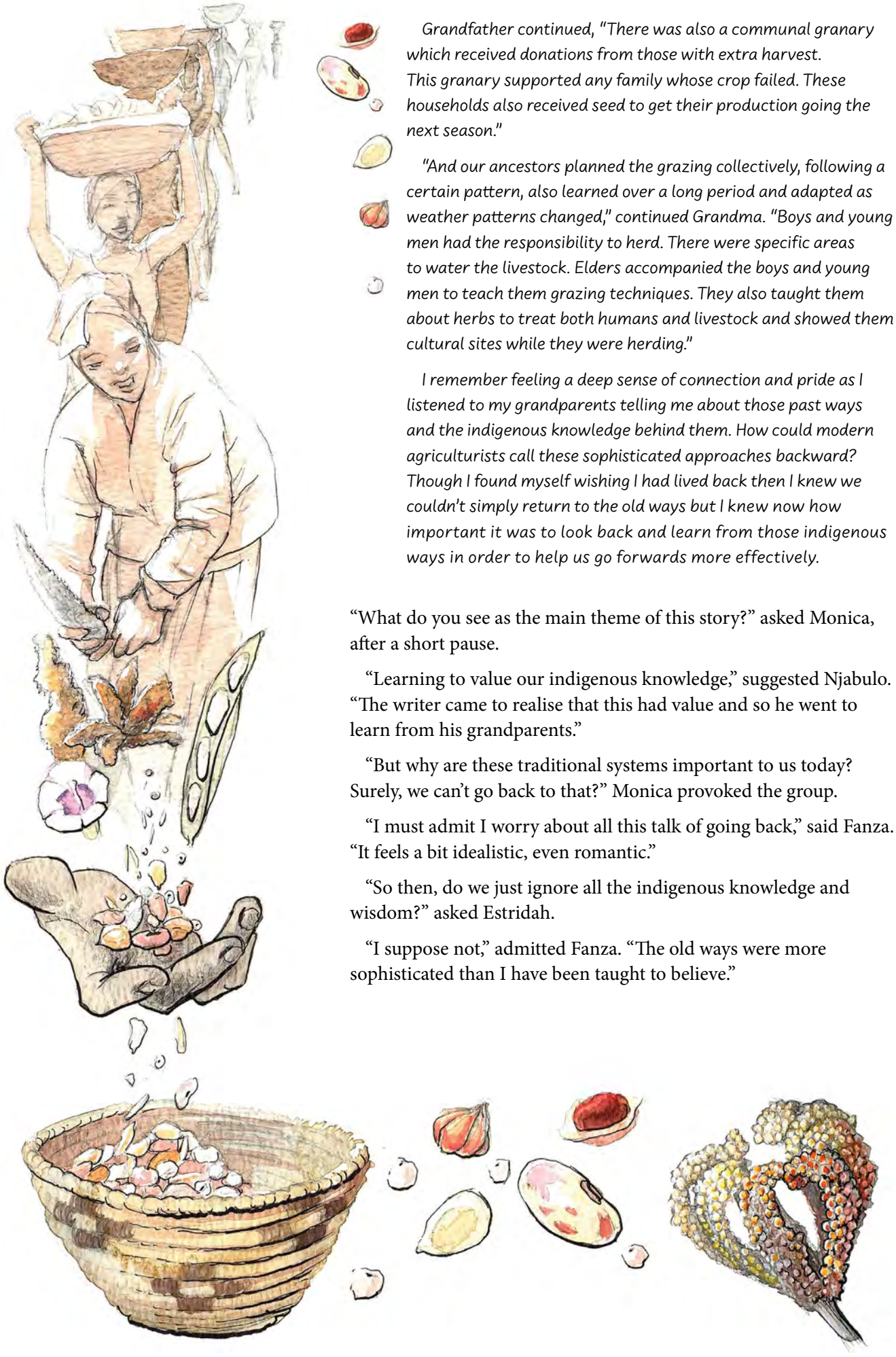
"Why are you interested in our old way of doing things?" he asked me after the traditional greetings. I told him that I now understood that many of today's modern illnesses are caused by bad eating habits. I added: "To discard all that knowledge developed over centuries is crazy."

Grandmother took over, "You should know that before the coming of the white man, we produced diverse crops and livestock. These included sorghum, pearl and finger millets, a variety of pulses, broad beans, cassava, sweet potatoes, yams, black night shade, amaranth, black jack, and many, many more. Our livestock were chickens, sheep, goats and cattle. We had herbs that together with food served as our medicine. We didn't have hospitals and never experienced the diseases that are common nowadays. But I don't suppose you want a long story from me. What are your plans today?"

"No, no!" I protested, "Please continue, I need to learn these things from you. This is my plan today!"

They both smiled with delight and Grandfather continued, "The long and short rainy seasons guided what we grew. For example, njahi (Dolichos lab lab) did well during the long rains, while the millets and sorghum did well in the short rains. Yams grew across the two seasons. Whenever the rains delayed, the elders would organise prayers under a fig tree (Mugumo) where a ram was slaughtered, and other rituals undertaken. The rains would then come".

My grandmother explained how communal labour ensured all households were able to prepare their land on time. Together they planted, weeded and harvested. This ensured adequate food at all times. Seeds were selected when the crop was still in the field in order to identify early maturing plants, disease resistant ones and other desirable traits. Women would support each other by doing the threshing, cleaning and food storage. Each household had a food granary. Tubers like sweet potato, cassava and yams were stored in the ground and harvested when needed.



Grandfather continued, "There was also a communal granary which received donations from those with extra harvest. This granary supported any family whose crop failed. These households also received seed to get their production going the next season."

"And our ancestors planned the grazing collectively, following a certain pattern, also learned over a long period and adapted as weather patterns changed," continued Grandma. "Boys and young men had the responsibility to herd. There were specific areas to water the livestock. Elders accompanied the boys and young men to teach them grazing techniques. They also taught them about herbs to treat both humans and livestock and showed them cultural sites while they were herding."

I remember feeling a deep sense of connection and pride as I listened to my grandparents telling me about those past ways and the indigenous knowledge behind them. How could modern agriculturists call these sophisticated approaches backward? Though I found myself wishing I had lived back then I knew we couldn't simply return to the old ways but I knew now how important it was to look back and learn from those indigenous ways in order to help us go forwards more effectively.

"What do you see as the main theme of this story?" asked Monica, after a short pause.

"Learning to value our indigenous knowledge," suggested Njabulo. "The writer came to realise that this had value and so he went to learn from his grandparents."

"But why are these traditional systems important to us today? Surely, we can't go back to that?" Monica provoked the group.

"I must admit I worry about all this talk of going back," said Fanza. "It feels a bit idealistic, even romantic."

"So then, do we just ignore all the indigenous knowledge and wisdom?" asked Estridah.

"I suppose not," admitted Fanza. "The old ways were more sophisticated than I have been taught to believe."

Knowing our history and believing in ourselves again

"The grandmother in the story talks of what happened 'before the white man came'. We stopped believing in ourselves and the value of our knowledge. We took up everything new as the best," said Ajay, getting animated. "For me the theme is about knowing our history and believing in ourselves again."

Kamali jumped in, "When it comes to diet, this is very important. It sounds like we had healthy diets with lots of knowledge about how to grow, process and cook the food. Can't we revive these diets and enrich them with today's knowledge."

"What else caught your attention in the story?"

"I like the description of the system they developed to look after the less fortunate. I've heard of a similar situation in Cameroon, but it's no longer being used," said Fanza.

"Mmm, things have changed these days, so we have to think hard about how to apply learning from the past. In Ethiopia, the pastoralists had grazing systems which rested land to allow it to recover. Unfortunately, that's not working so well anymore. Much of their land is being taken for farming, some of this by large companies," came in Amali.

"But we can adapt. In the old days processing took a lot of labour and they helped this by doing it communally. That may not be possible nowadays. That's where technologies could come in to help. Small, locally useful technologies. I've heard they have a lot of these in Bangladesh. We haven't addressed this area nearly enough in most parts of Africa," suggested Estridah.

Fanza, "That's true, we do need to use more appropriate tech, but the problems are much bigger, I'm afraid, like our dependence on cash crops and climate change."

Monica listened to her students, only adding a question or point here and there, enjoying how they were conversing, learning and challenging each other. When the session was over, she concluded,

"I'm impressed with your energy and your intelligent questions and conversation. What you're discussing is not just academic but key to the future of this while continent. See you next week!"

Over the course of the semester the students read, discussed and debated one story per week. These stories were all about traditional foods, dishes and diets, each with guiding questions to help begin a discussion. You, dear reader, can also use them on your own or in a group.

It sounds like we had healthy diets with lots of knowledge about how to grow, process and cook the food. Can't we revive these diets and enrich them with today's knowledge.

The Abundance of Africa

There is an incredible and almost inconceivable diversity of food crops in Africa. This astonishing abundance translates into an equally astonishing array of dishes that mix and match these ingredients in complex and rich pastes or sauces and soups. It is only recently that researchers have tried to document the approximately 7,000 different plant species used by people in sub-Saharan Africa as sources of food, clothing, shelter, energy, medicines, and animal feed. Researchers in Benin found that people consume 187 different traditional leafy vegetables, of which only 47 are cultivated and 140 still grow wild.

Joan Baxter's ***Seven Grains of Paradise: a culinary journey in Africa***

Two stories of childhood memories from Zimbabwe:

Grandma's Special Food

by Maria Mbudzi

We sit outside under a tree on a reed mat and greet each other. Grandmother, who is all smiles, dashes into the kitchen and brings out boiled groundnuts and a dish with a mix of beans and maize grains. We kids also get to eat the baobab fruit, with some fresh milk from the cows. I know my grandmother wants to ask my parents why we don't visit more often and why we never stay the night. I'm also thinking about how I can get out of washing the dishes. It's exciting to be visiting my grandparents again. I am here to enjoy myself and feel free.

Grandmother gets busy preparing a meal for us. I watch her take down the long pieces of dried meat hanging in the kitchen and break them up into smaller pieces. She boils the meat until it's tender and adds peanut butter to the meat to make a sauce. For vegetables, she picks pumpkin leaves in the field, washes and chops them, boiling them until they're soft. She adds a little cooking oil. Lastly, she cooks sadza from red sorghum, doing this with great skill to avoid spillages.

I watch my father perched on a stool, all prim and proper as a good mukwasha (son-in-law) should be, but no doubt wondering when the meal will be finished so that we can head back to town. After eating, my Grandfather calls me and my sister to go to the fields. There, we find some red-fleshed melons and soon we are scooping out chunks with our hands and drinking the juice. How refreshing. We collect the melon seeds and give them to grandmother to dry.

Later, as we leave, our car full of grain, wild fruits, and other foods from my grandparents, I feel sad. but I know I have to go back to town with my parents. I think about what we eat in town: maize meal, white rice, meat and a few vegetables. We often snack on sweets, biscuits and sodas/soft drinks or the popular and sweet Mazowe orange drink. Who would dare cook the type of food my grandmother cooks? Who would eat it?

DISCUSSION QUESTIONS:

Why do the young girls enjoy their time visiting their grandparents? Why do they eat such different foods in town compared to what their grandmother offers them? Why do you think the son-in-law wants to go home quickly? What is the attitude towards traditional foods and dishes in your area? Why?

My grandma is my hero

by Bertha Nherera

My grandma, Senesia Mandishona, is my hero. She was medium height, slim, dark-skinned, and with white, evenly spread teeth. She worked hard in her fields and then prepared all our meals. She and my grandpa were smallholder farmers in Hwedza communal area in Zimbabwe. I lived with her from aged 7 until 11. Then I returned to live with my parents in the city because of the closure of all rural schools due to the liberation war in our country.

We often ate dark brown sadza made from finger millet or the light brown meal made from pearl millet. We would eat this with Rupiza (a dish made from cow peas), Mutakura (a traditional snack made with Bambara nuts, groundnuts, cowpeas and fresh maize) and cooked cowpea leaves. When visitors came we would often cook one of our village chickens in their honour. We also enjoyed the occasional meal from my grandpa's hunting, such as a wild bird or some fish.

All over the continent people eat a very stiff 'porridge' made from grains like maize, millet, sorghum and sometimes mixed with cassava. This thick porridge obviously has different names in different countries, like uswa, bogobe, fufu, gauli, gima, isitshwala, kimnyet, kuon, ngima, nshima, obokima, ovuchima, busuma, oshifima, oruhere, pap, phutu, posho, sadza, ugali, and umutsima, among other names.

I then understood that most of our indigenous foods are powerhouses of health.

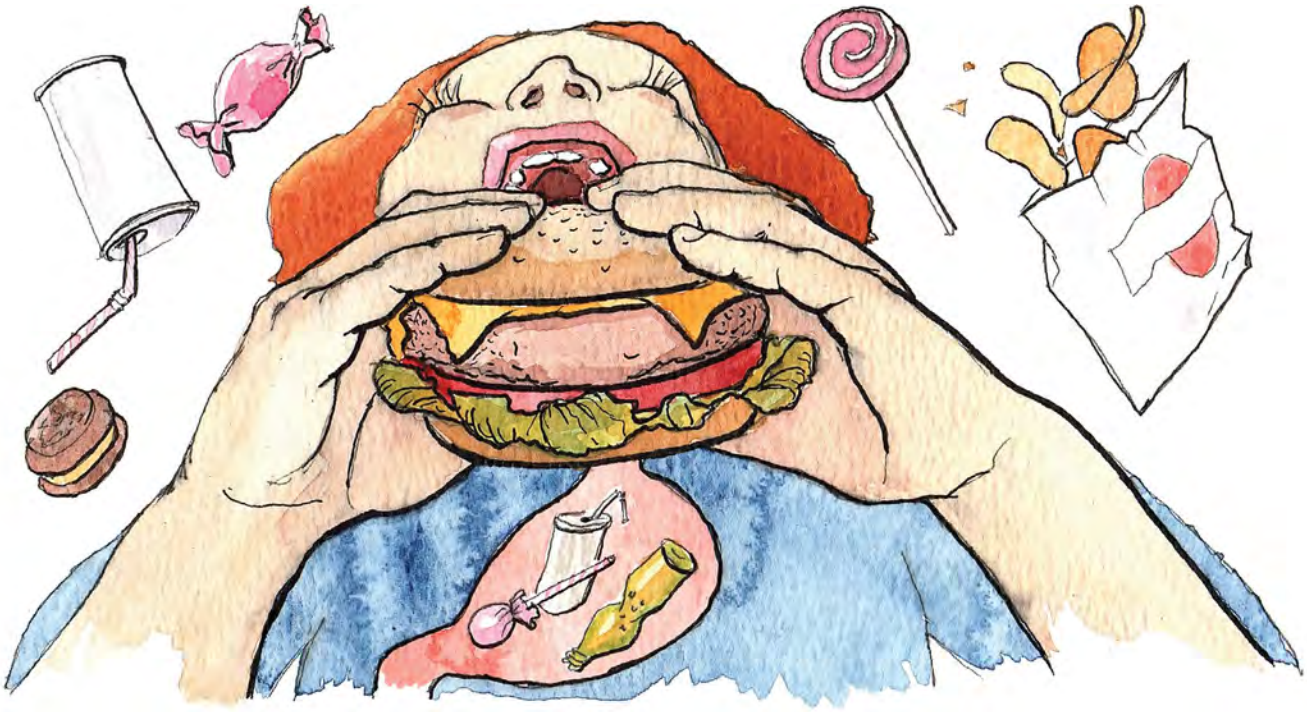
Grandma would sometimes brew Mahewu overnight, using left over maize meal sadza. To this she would add a cupful of sprouted finger or pearl millet. I loved the tingling sensation on my tongue when I drank the Mahewu. Sometimes I would go with my Grandpa to the fields and remember picking local fruits with him, such as Mazhanje, Matohwe, Tsvumbvu and many more, at different times of the year.

In town we ate highly refined maize meal sadza. This was called Ngwerewere and if you ate it, it was a sign that you were better off. We would eat this with one or two varieties of green vegetables and sometimes with a little beef or chicken. Occasionally, we'd buy packets of sour milk. Later, when I went to university, the residences gave a similar narrow diet, which included white rice, potatoes, and other exotic vegetables such as cabbage and carrots. I missed my grandma's food but accepted the new diet as part of the modern way of life.

Many years later, I was part of a programme which celebrated and showcased traditional seeds, grains and foods from different countries in east and southern Africa. Recalling the gifts of our wholesome, traditional food that God bestowed on us was like waking up from a deep sleep. Through this programme I realised the importance of the food that my grandma cooked for us. I then understood that most of our indigenous foods are powerhouses of health.

DISCUSSION QUESTIONS:

Why did the person in the story stop eating traditional foods even though she liked them so much? What is the situation in your area – do people still eat traditional foods? Why do you think this situation exists? How can people return to eating more of a traditional diet? Why is this important? Why do children often prefer to eat processed foods? How did we come to value western food and see it as more superior food and our food as inferior?



Learning from Mexico

Mexico is very diverse culturally and climatically. For thousands of years farmers have evolved a variety of food plants. This has especially been in the maize, pumpkin/squash, pepper/chilli and bean groups. Mexico is the place of origin and diversification for all of these. Diverse cultures evolving diverse plants have developed diverse food, dishes, diets and cuisines. Diverse traditional diets are the basis of healthy eating everywhere. Modern eating is undermining this. For this reason, the Mexican Commission for the Knowledge and Use of Biodiversity, known as CONABIO, began a programme to document the diversity of foods, dishes and diets around Mexico. They call these Regional Healthy Wellbeing Food Baskets.

Africa too, like Mexico, has a huge diversity of cultures and diets. This is being lost to blind modernity.

This programme documents the diversity of foods and dishes in an area - this could be a specific community or a region. It gathers information on which plants, animal and fungus are grown and what dishes or drinks they are used for. There is practical written information on each as well as photographs of the food, dishes and drinks.

The wider aim of this Regional Baskets programme is to promote the growing, marketing and consumption of diverse regional and seasonal foods. This will lead to better health for Mexicans. It will also help make sure that a great diversity of species continues to be grown, harvested and gathered from the wild by farmers. And that there will be a diversity of varieties for each species.

Biodiversity on farms is closely linked to the health of the farm environment. In addition to this, farmers will be able to adapt to climate change more effectively.

So, when Mexicans understand the value to their health and the pleasure to their taste buds of eating these foods, dishes, and drinks, they'll keep buying them. This means farmers will keep evolving the diversity. It's a virtuous circle that benefits everyone and the environment.

Africa too, like Mexico, has a huge diversity of cultures and diets. This is being lost to blind modernity. AFSA plans to learn from CONABIO's Mexican programme and start a similar process across Africa, linking up to what's already happening. This will connect the development of farmer's seed varieties and biodiversity farming to the health and well-being of citizens.

We now return to Africa, to Egypt

Bread and Betrayal

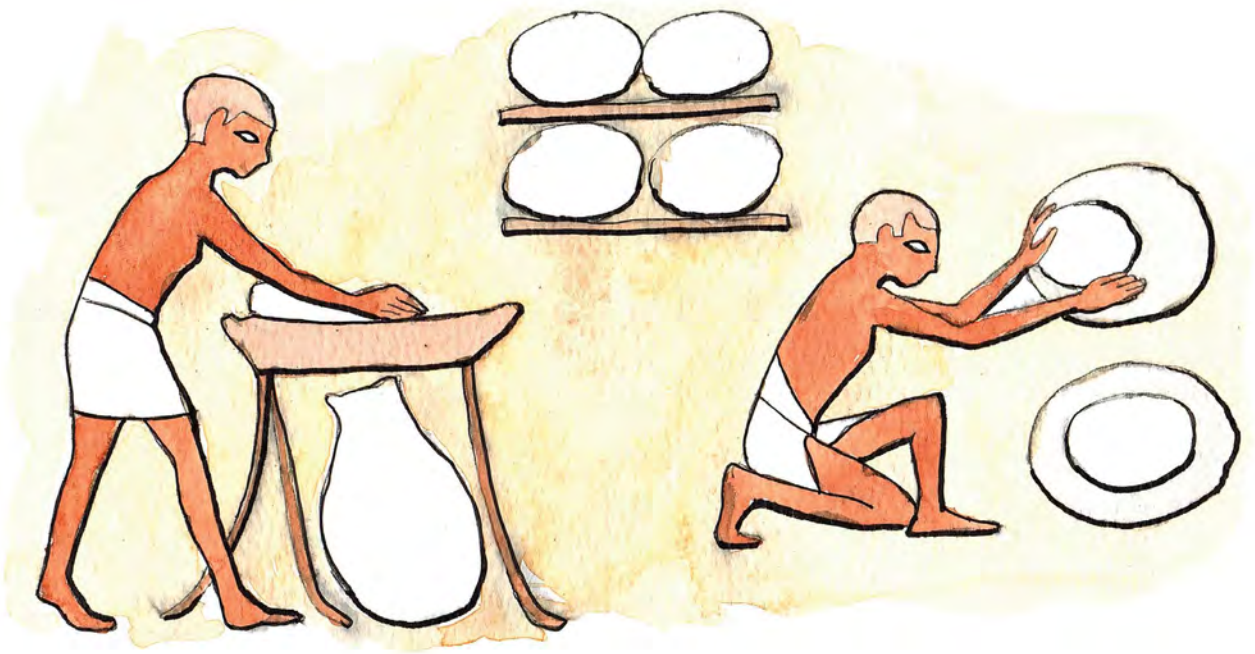
by Laura Tabet

As my eyes scanned the event, I noticed that Walaa and Saloua had found each other! I could see them talking. Arms were waving angrily. How could that be? Walaa had only just arrived and was meeting Saloua for the first time. I walked towards them. "Laura, look at this bread," Walaa said, ripping open a loaf of sourdough bread from her basket and waving it in our faces. Then I saw on the table Saloua's Shamsi bread, ripped open.

"Look at her bread! She's using white flour!" Walaa was very upset. Saloua kneeled down and picked up her basket full of bread, showing us her day's labour. She opened her palms, "I'm so tired! I've been baking all day and have burns and blisters. I do this for my family!" Saloua reached out to hold Walaa's hands.

We were all attending a "Heritage Breads Day" in the centre of Cairo, organised by a small grocery store called Ardena, which means 'our land'. I had always dreamed of such a day but had never had the time or resources to organise one. We were in an open garden area. Nearby children were getting their hands into dough. They were baking bread in a portable oven. Traditional bakers gave talks, as did NGO staff supporting rural enterprises that make baked goods. A renowned ethno-botanist spoke about the history of bread starting at the time of the Ancient Egyptians.

A part of me was in disbelief that Walaa spoke to Saloua in this way. Another part of me was in agreement with Walaa. I had bought the Shamsi bread from Saloua a little earlier, assuming that she was an authority on Shamsi bread. Now she felt like an imposter.



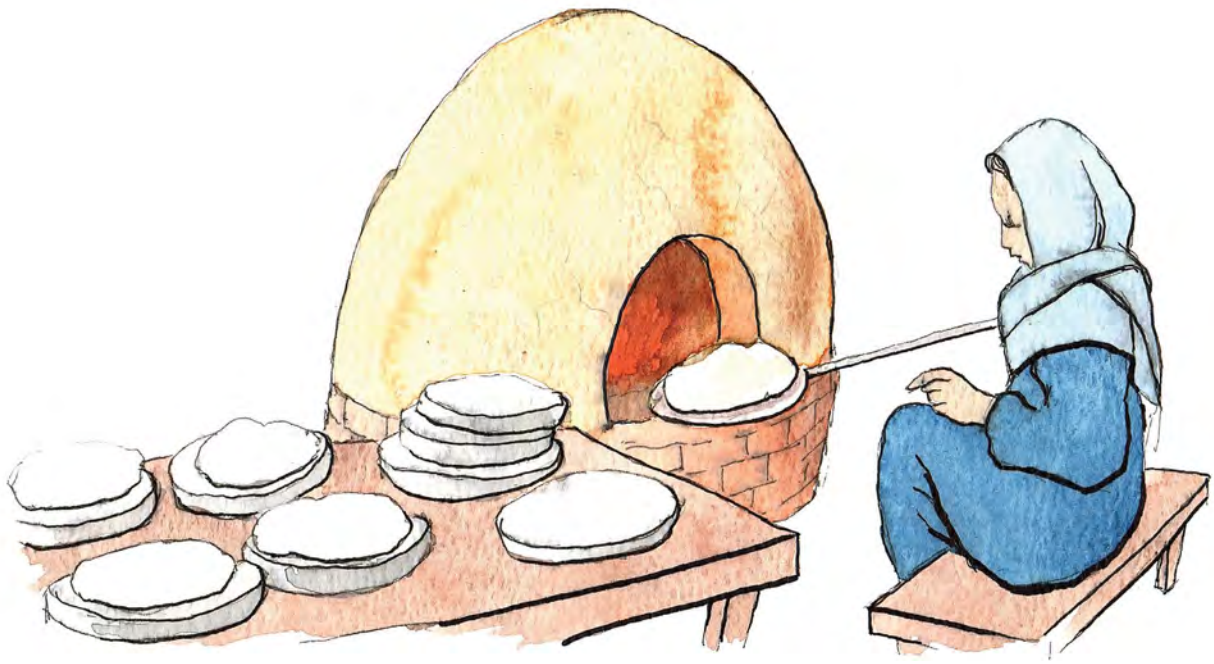
Bread is unquestionable in Egypt. It's served with all meals, every day. Bread in Egyptian dialect means Life. In the past farming families would store their own wheat for the year and use whole grain flour. In Egypt this flour is called *Amh Baladi* (*amh* for wheat and *baladi* for local farmers). Farming families will store a portion of their wheat, and women will bake bread every 3 to 4 weeks for the extended family consumption. Some families still refuse to buy commercial bread although this is becoming a luxury now.

Unfortunately, these days most of the subsidised bread is bad quality. You must go out of your way, often to the countryside, to find quality bread. Some farming families still bake it on a regularly basis, using traditional mud ovens. Baladi bread is the most common bread in Egypt, which boasts over 30 types of bread, each one unique to a region. It has become trendy in Cairo to eat sourdough bread, as if it's something new. But sourdough bread stems from ancient Egypt. It is known as Shamsi bread. Shamsi means Sun. What makes sourdough bread delicious and nutritious is the fermented flour. This also makes the bread easier to digest. Shamsi bread is not only renowned for its unique taste, but also the beautiful process of fermenting the dough on mud disks in the sun. Ancient Egyptians revered the sun God Ra. Shamsi is also made from particular local yeasts. These too are being replaced by commercial products.

"I left my career, my pharmacy, my life in the city to bake real bread!" Walaa said, pulling her hands away from Saloua. Saloua admitted using white flour in her Shamsi bread. She couldn't say why. Walaa decided to spell it out for her: "You think white flour is better. That white flour is cleaner. That if you made the bread whiter it would be more acceptable in Cairo!"

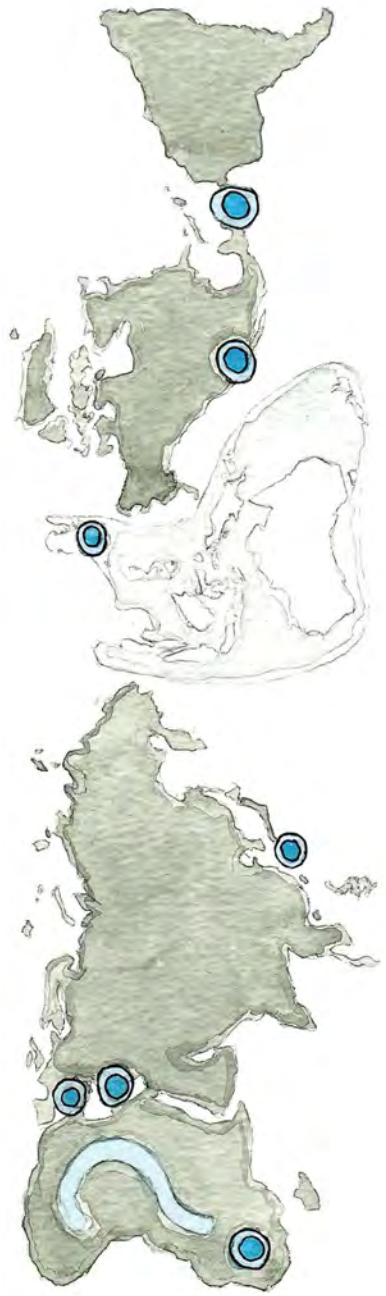
Bread meant so much to Walaa. Bread with life, life in the yeast, life and nourishment for her children. "Who does Saloua think she's fooling?" Walaa wouldn't let go. Turning to Saloua, who was silent, I said, "Surely your grandmother didn't use white flour? Why change the recipe?" Trying to deflate the tension I added, "I would love to try the traditional way next time."

I wished this conversation happened in a group setting. I wished that Walaa and Saloua could switch bodies. The world is upside down. A self-taught sourdough baker debates with a farmer's daughter who has skills that you could trace back to the time of Ancient Egypt. A sense of pride misdirected. White flour wins because we've been brainwashed by the rise in industrial bread.



DISCUSSION QUESTIONS:

Who do you sympathise with in this story and why? Why do you think Saloua uses white flour instead of the whole flour of the traditional recipe? Was it wrong with using white flour? Can you think of something similar happening in your own situation? What do you think about Walaa's reaction? How do we balance sticking to traditional dishes and bending to demands from consumers?



Nutrition and Physical degeneration

An epic study of traditional foods and diets was published in 1939. The book was titled "Nutrition and Physical degeneration". The author was Dr. Weston Price, an American dentist. For nearly 10 years he went looking for isolated populations that had not yet been exposed to modern foods. He found them "in the mountains of Switzerland and Peru, the lowlands of Africa, the bush of Australia, the outer islands of the Hebrides, the Everglades of Florida, the coast of Alaska, the islands of Melanesia and the Torres Strait, and the jungles of New Guinea and New Zealand, among other places".

He focused his study on healthy individuals and challenged himself to understand how they achieved such amazing health. First, he discovered that isolated populations eating a wide variety of traditional diets had no need of dentists whatsoever. "He observed perfect dental arches, minimal tooth decay, high immunity to tuberculosis and overall excellent health in those groups of people who ate their indigenous foods. He found when these people were introduced to modernised foods, such as white flour, white sugar, refined vegetable oils and canned goods, signs of degeneration quickly became evident."

"The common denominator of good health, he concluded, was to eat a traditional diet consisting of fresh foods from animals and plants grown on soils that were themselves rich in nutrients."

"We often rightly worry about the loss of one's language because of its potential to endanger the identity of a group of people. However, we should also apply our anxiety to the disappearance of traditional foods … they not only nourish us physically, but they sustain, protect, feed and personalise the people that cook them."

– Rachel Massaquoi Foods of Sierra Leone and Other West African Countries

Alligator pepper is used to impart tongue-tingling life to goat soup, a classic favourite right across West Africa. But its importance as a spice is just a small part of the pepper's remarkable repertoire. It has long been prized as a medicine, used to prevent some infections and heal many others. Ancient knowledge about the pepper stands up very well to modern scientific scrutiny. Extracts of the plant have powerful antiseptic and anti-microbial properties and can be used against some of the bacteria associated with food poisoning. It has antioxidant and anti-tumor effects and shows promise in treating diabetes.**

We have to deal with many prejudices around food. In the following story we learn about attitudes to food at a boarding school in Zambia:

Food to shame

by Diana Mapulanga

"Why do you eat those kinds of foods, Diana? They belong to the past. They are not part of our modern life," Charity had a scornful look on her face as she said this. I felt embarrassed and didn't say anything as she walked away smiling.

Food shaming was a common trend at my boarding school. Those found with traditional foods were considered old-fashioned by those coming from urban areas. One of the girls even refused to meet her mum simply because she had brought her some traditional foods.

I grew up on a farm and by the time I was 12 my mum had already started teaching my sisters and I how to prepare traditional dishes, which we ate at least twice a week. She always reminded us how nutritious they are and how easy it is to find the ingredients on a traditional farm.

She would teach us, for example, how to prepare our popular Zambian vegetable called 'Lumanda' (botanical name: Hibiscus sadbiriffa). It has a scrumptious sour taste, especially if prepared with pounded raw groundnuts.

It was only when I went to media school that I realised the impact of media on people's food choices. This has contributed to many consumers choosing fast foods rather than traditional dishes and diets. The arrival of social media has made the situation worse, pressuring young people to follow the 'modern' trends.

The arrival of social media has made the situation worse, pressuring young people to follow the 'modern' trends.

Research shows that children who watch a lot of television will demand food they see on adverts. In Lusaka's Chawama compound, for example, you never hear a child asking for roasted groundnuts porridge, but you often hear them crying out for snacks advertised on local tv.

DISCUSSION QUESTIONS:

What do you think is the main message in this story? How does this relate to the situation where you live? How can this situation be changed? What is your group/community/ family going to do towards change?

Many of the above stories are about learning from grandmothers. This story is about learning from our children, as well as our grandmothers:

My daughter takes me back to my Mama's kitchen

by Ntando Ndlovu

Panic hit me. The refrigerator was full of baby food, but my baby wouldn't touch it. I tried formula milk, tinned baby foods and processed cereals. She refused all. I was due back at work the following week, having been on maternity leave. What was I to do? I remember sitting at the kitchen table eating the whole grain porridge that I eat every morning. The grain came from my mother who farmed at our rural home. Half in a daze, I offered my baby daughter a spoonful of porridge. To my amazement, she gobbled it down and wanted more. I hadn't thought of this as an option. I gave her more. Later that day I shared this experience with my aunt, who said straightaway: 'She's just like you. Give her whole grain porridge and not those refined baby products!" And she was right.

That was the beginning of a big change for my family, a change that had been there in the background, I later realised. I started going more often to the people's market to source food, rather than the supermarket. I chatted to the sellers, a more enjoyable and interesting experience than speaking with the often-glum shop attendants. I began reading about the contents of processed foods, noticing how they kept longer because of those chemicals. What did that mean? I realised how I'd always preferred wholesome foods to processed foods.

Six months down the line, my husband lost his job and we decided to use his retrenchment package to buy a plot of land instead of a suburban house. What seemed a big blow turned out to be a blessing. We started a small garden and used the rest for cropping during the rainy season. We grew many of the food plants I recalled from my mothers' kitchen. This included pulses, self-seeding vegetables like ulude, various melons, small grains, and a host of Ndebele spices. And we enriched this with our own acquired taste for food.

We grew many of the food plants I recalled from my mothers' kitchen. This included pulses, self-seeding vegetables like ulude, various melons, small grains, and a host of Ndebele spices.

We also grow a variety of fruits such as avocado, strawberries, passion fruit, banana, plums and citrus. Our small livestock include rabbits, goats, sheep and poultry. It's a small, interconnected enterprise aiming for zero wastage and we keep all chemicals away.

Fortunately, my mother continues to share seeds and recipes. She also tells my daughter, Nobu, stories to go with each dish and explains the importance of diversity in the kitchen garden and the added value of growing plants together. Mama told Nobu that as she raised us during the war of independence, she didn't have the luxury of buying food. She fed her household on what she produced. We all laugh when she jokes about her children never acquiring a taste for processed foods.

My daughter in turn explains to her Grandma the nutritional value of some of the herbs we grow in our garden – such as garlic, ginger, sage, and turmeric. We all agree that these go very well with the beans and local chicken dishes.

Three generations of women celebrating their culture through food. The intricate link between the kitchen and the garden is as strong as the parental bond amongst them. If it hadn't been for Nobu's refusal of processed baby feeds, I might have missed this return to my roots - Mama's kitchen.

DISCUSSION QUESTIONS:

Does this story sound familiar in your situation? If so, in what way? How is your situation different? Where do you buy your food (if you do)? Why? Why do you think people started feeding babies processed foods?

Fanza has an idea

It was the last session of the term and the students were all there sitting under their tree.

"I've had an idea." stated Fanza excitedly before Monica could welcome them. "Why don't we go on a quest around Africa to unravel the key issues around healthy eating," she continued. "Madame Bakhirya is well connected around the continent and could link us up to various people. We could travel in pairs to different parts of the continent."

"Well, well, well," came in Monica, "I never expected that from you, Fanza. You've been the devil's advocate in the group, always asking questions about things."

"Yes, that's me and I'm still asking questions. That's exactly why I want to do this. I must admit that I've really enjoyed the stories and our discussions. They've made me think a lot. I'm not convinced yet about the focus on traditional foods and diets. To me the emphasis is too much about going backwards. Young people are not going to like that. If I think of my friends, you'll never win them over with that kind of approach. But despite that, many of them are interested in healthier eating, probably because they want to look good!"

"I have yet to hear of a traditional diet – from any culture, anywhere in the world – that is not substantially healthier than the "standard American diet." The more we honour cultural differences in eating, the healthier we will be."

– Michael Pollan,
The New York Times Magazine, October 2, 2011

Abdou had been listening intently to Fanza and he said slowly "Even though we've disagreed on many things, on this I agree with you, Fanza. Let's go out into Africa and meet people and hear from them about the issues surrounding this thing that people call nutrition. Let's try and unravel the different views and understand things better."

There was excitement all around the circle. Only Amali looked hesitant and Monica noticed this, "You don't look so sure, Amali, share your concerns with us."

"Who are we to go and do this? We're only just qualifying from university now," she said with a slightly defiant tone for someone so shy.

"But that's it," replied Estridah, "we're young people with our futures ahead. We're supposedly now experts in this field, but we're saying we're not such experts and that we want to learn from people with direct experience. We want to understand the big picture. At the same time the whole thing seems over-complicated with thousands of papers on nutrition coming out all the time. Let's ask questions and learn for ourselves, directly from citizens."

There is politics and power in what we consume every day

By consuming something, I am supporting someone's business somewhere somehow. But who is that person I'm supporting? Is it the smallholder farmer who grows the food without chemicals or is it a big commercial farmer, using a lot of chemicals that can cause illnesses? I wield a lot of power and influence, but I hardly know it. Do I know the implications of my consumption patterns? If I were to be asked as a school parent to be part of the committee to draft a diet for the children, what food would I include? If I was a parent receiving a diet sheet from a school, what would be my response if they've included lots of traditional foods?

The Ten Elements of Agroecology

Guiding the transition to sustainable food and agricultural systems

Agroecology is fundamentally different from other approaches to sustainable development. It is based on bottom-up and territorial processes, helping to deliver contextualised solutions to local problems. Agroecological innovations are based on the co-creation of knowledge, combining science with the traditional, practical and local knowledge of producers. By enhancing their autonomy and adaptive capacity, agroecology empowers producers and communities as key agents of change.

Rather than tweaking the practices of unsustainable agricultural systems, agroecology seeks to transform food and agricultural systems, addressing the root causes of problems in an integrated way and providing holistic and long-term solutions. This includes an explicit focus on social and economic dimensions of food systems. Agroecology places a strong focus on the rights of women, youth and indigenous peoples.

DIVERSITY

Diversification is key to agroecological transitions to ensure food security and nutrition while conserving, protecting and enhancing natural resources.

CO-CREATION AND SHARING OF KNOWLEDGE

Agricultural innovations respond better to local challenges when they are co-created through participatory processes.

SYNERGIES

Building synergies enhances key functions across food systems, supporting production and multiple ecosystem services.

EFFICIENCY

Innovative agroecological practices produce more using less external resources.

RECYCLING

More recycling means agricultural production with lower economic and environmental costs.

RESILIENCE

Enhanced resilience of people, communities and ecosystems is key to sustainable food and agricultural systems.

HUMAN AND SOCIAL VALUES

Protecting and improving rural livelihoods, equity and social well-being is essential for sustainable food and agricultural systems.

CULTURE AND FOOD TRADITIONS

By supporting healthy, diversified and culturally appropriate diets, agroecology contributes to food security and nutrition while maintaining the health of ecosystems.

RESPONSIBLE GOVERNANCE

Sustainable food and agriculture require responsible and effective governance mechanisms at different scales – from local to national to global.

CIRCULAR AND SOLIDARITY ECONOMY

Circular and solidarity economies that reconnect producers and consumers provide innovative solutions for living within our planetary boundaries while ensuring the social foundation for inclusive and sustainable development.

[https://www.fao.org/agroecology/overview/overview10elements/en/]


TOXIC

2

What is the "Chemical Mistake"

and what is the solution?

"Kamali! It's Abdou here. I am very excited to be working with you in our exploring the real experiences and issues around food in Africa and where better to start than here in Uganda! I just got back from interviewing James Aringo. Remember the one from PAG in Kampala. He gave me a powerful story about the effects of pesticides on food and health in his home village. We should get together to discuss this."

"Sending it now. See you there."

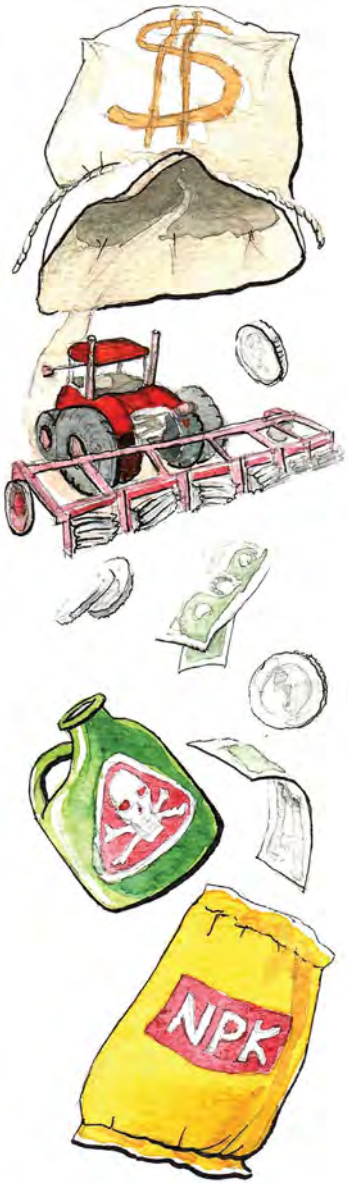
"I'm impressed, Abdou, you are off to a flying start! Can you email it to me then we can meet tomorrow afternoon in the cafeteria? Same time?"

Are we producing food or poison?

by James Aringo

Growing up in the rural peasant family in Teso, Uganda in the early 90s, I would follow and watch my parents carry out farming activities using locally available resources. Now and then we would carry ekuron (wood ash) which was applied to the crops, along with mixtures of boiled herbs, chicken droppings, dung and crop residues. They would rotate and change crops and use traps to catch rodents. I don't remember them bringing anything from the outside to put on the plants and looking back I am proud that we were self-sufficient.

We grew all our fruits and vegetables and hardly had to wash them before we ate them. What was left we sold for cash.



Change arrives in a bright red container

But then change arrived at our doorstep. One day, my father returned home with a container with a bright red colour and pictures of delicious fruits. Perhaps it was some kind of fruit juice to drink!

As I reached out to touch it my father snapped, "No, no, no! Don't you ever touch that! Son, this is medicine used for killing pests and diseases in our garden. It is not good for you to play with, eat or drink because it is poisonous and deadly, eyari ijo!"

I got quite a fright. Of course, as a boy father knows best so I accepted what he said. He sprayed the crops and showed us how within a few hours the garden was completely free of the pests.

We were amazed. This would become the norm across our community, except for a few people who still used the old ways but now they were considered backward and non-progressive. Those who were using chemicals were so excited and we felt that we had finally got the solution we needed.

Soon almost all members of the community got involved and the agrochemical kind of farming gained popularity and praise among many farmers, both big and small. Later I discovered that this was the time the government was promoting the Green Revolution with modern inputs, like pesticides and fertilisers.

Growing up in a family that was heavily dependent on farming, we used to spend a lot of time in the field doing manual work like scaring birds, squirrels, weeding and mechanically picking insect pests. With the introduction of pesticides this was no longer necessary, or possible. Listening to my parents, I found myself dreaming that this was the way for us to prosper financially because now we could use minimal labour to produce more.

Are we feeding or poisoning ourselves slowly?

As I grew, I began to take more responsibility for farm work which included spraying pesticides from the same bright red canisters. But I started noticing that every time I used the pesticides, I would feel a certain nausea and headaches. My good friend Okello told me he had the same complaints. Asking around, we discovered that many members of the community were complaining of the same strange illnesses.

I remember asking myself "are we feeding or poisoning ourselves slowly?" That is when I started questioning the whole thing of using agricultural chemicals as I knew it.

I remember asking myself "are we feeding or poisoning ourselves slowly?"

It was not long before people started noticing that their yields and soil fertility were declining. We saw fewer beneficial insects like bees and even birds.

One day I was listening to the local radio and in the news, it was reported that two people had died after consuming eboo (cowpea leaves) harvested from the neighbour's garden. It would later be revealed that the owner of the garden had earlier in the sprayed his garden with a chemical in a bid to control pests.

A better way is revealed to me

As we were wondering what to do, I happened to be invited to Kampala to attend a workshop on agroecology and from this workshop I learnt a lot about food security from several keynote speakers.

The turning point was when I visited one of the exhibition stalls where they gave me different practical organic solutions to pest and disease problems. They were generous with their advice and provided me with lists of different materials to produce different concoctions.

I immediately started making organic mixtures to deal with pests and currently I am scaling the practice to 1.5 acres of land. I am now working with over 30 local farmers who are also giving testimonies of good yields, safe food and restoration of fertility to their fields that had declined.

I have realised that agroecology or natural farming are sustainable solution to the food crisis and environmental management. If we educate everyone to adopt agroecology, then surely those little change by many people will add up and transform our society. Your health heavily depends on what you eat; eat healthy food and live a healthy life.

DISCUSSION QUESTIONS

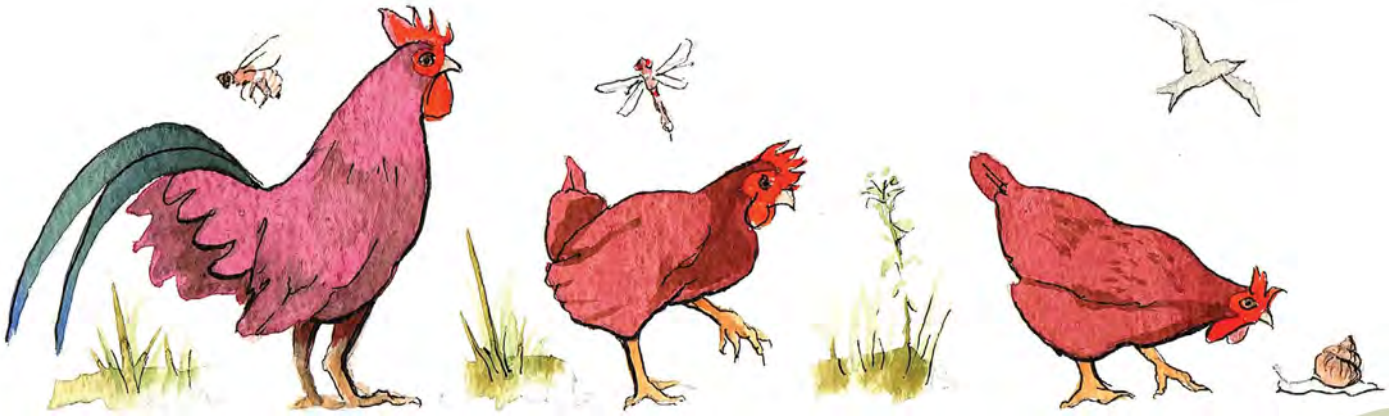
What struck you most in this story? Chemical pesticides do provide a quick and cheap solution to the problem but what else must we consider when choosing what methods to use to control pests? James says "If we educate everyone to adopt agroecology, then surely those little changes by many people will add up and transform our society." Do you think that this is true or do we need to do more?"

Kamali speaks about the Chemical Mistake

"Abdou, James Aringo's story really moved me. How did the government so easily convince people to put poison on their food? The sickness and the dying were heartbreaking. How could we be so gullible?"

"Too true, Kamali. The real shame is that we have lost confidence in our own knowledge and even in nature. If you think about it, nature has successfully maintained life, keeping a balance between insects and plants over thousands and thousands of years, WITHOUT the use of synthetic chemicals. Surely, this is the example we must follow."

"It's a global "Chemical Mistake" if you ask me. Abdou, look here I have done some digging around on the internet and discovered that pesticides started as a by-product of the Second World War. So, I put together this piece to submit as part of our findings. It also speaks to the question of whether individual change is sufficient. I hope the group finds it useful."



What are pesticides, where do they come from and what is the problem with them?

by Kamali Ayele

Pesticides are chemicals used by people to kill certain living organisms in order to protect other living organisms.

There are four kinds of pesticides

Insecticides

These pesticides reduce destruction and contamination of growing and harvested crops by insects and their eggs.

Herbicides

These combat weeds, those which either kill or slow down the growth of other plants.

Rodenticides

These are important for controlling destruction and contamination of crops by vermin and rodent-borne diseases.

Fungicides

These are chemical compounds or biological organisms used to kill harmful parasitic fungi or their spores.

A SHORT HISTORY

Many inorganic chemicals have been used as pesticides since ancient times. Some chemicals, like copper, sulphur and mercury salts, have been used for centuries on a limited scale to control pests.

However, with the discovery and growth of synthetic chemicals, the large-scale use of pesticides accelerated in the 1930s. Driven by the need to control disease-transmitting insects in the tropics, hundreds of manufactured chemicals were screened for insecticidal properties. In the USA, the breakthrough came with dichlorodiphenyltrichloroethane (DDT), manufactured in Switzerland, followed by other chlorinated hydrocarbons. In Germany, a toxic group of compounds was developed, the organophosphates, whilst a third group of synthetic organic insecticides was also discovered in the 1940s, by Swiss workers.

However, it was war that became a major driver in the development of pesticides, notably chemical weapons, including mustard gas developed for use in World War 1, Zyklon B used in the gas chambers by the Nazis in World War 2 and "Agent Orange" which was used by the United States in Viet Nam to destroy vast jungles in which the Vietnamese guerrillas concealed themselves.

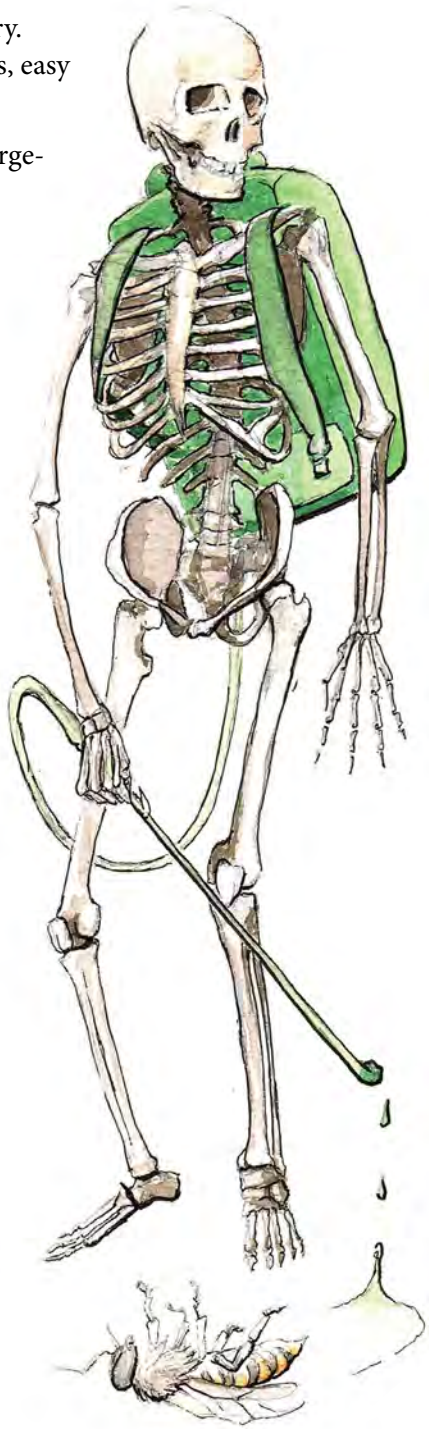
After the Second World War there was a rapid expansion of these chemicals into agriculture. DDT, (eventually banned in most countries), quickly became the most widely used pesticide in the world, used on the farms, in fields and in houses, combating insects and diseases (including malaria, typhus, and the bubonic plague).

THE SPREAD OF PESTICIDES

At the end of the two world wars, it was clear that hunger and food production were key drivers of conflict. Politicians from the industrialised nations felt that a way had to be found to satisfy the nutritional needs of the entire planet.

This prompted an explosion in studies and research aimed at developing pesticides that responded to every possible need of the agricultural industry. Their success was immediate. They were cheap, effective in small quantities, easy to apply, and widely toxic to pests.

Of course, those in power, who were also those with money, looked to large-scale solutions which could make them large profits. They redirected their war chemicals towards agriculture and so arms factories began to produce massive quantities of pesticides.



WHAT IS THE PROBLEM WITH PESTICIDES AND HOW BIG IS IT?

In the last 50 years, while pesticides have appeared to be a miracle solution, it is now clear we are facing a global crisis of unsafe farming and unsafe food. The problem is that artificial, chemical pesticides are now used so much they are in the water, the air, the ground, our food. They're so common that a recent study by Inserm noted that over 90% of the French population have two common pesticides, organophosphates and pyrethroids, in their bodies

In large-scale research between 2006 and 2018 in 141 countries by BMC Public Health, they estimate that 385 million cases of unintentional, acute pesticide poisoning (UAPP) occur every year world-wide amongst farming populations. This includes around 11,000 fatalities. With 860 million farmers on earth this means that about 44% of them are poisoned by pesticides every year. Most cases are in Southern Asia, followed by South-East Asia and East Africa.

So, the problem is that they are killing more than pests. They are also killing us in several ways by poisoning the environment we live in.

Pesticides are also killing off beneficial insects, like bees, on a massive scale. There is a real and leading to pest resistance, and the evolution of more harmful pests than ever. When the natural enemies of pests, their predators, are also killed by pesticides or die because there are less pests to eat, then any pests that survive or migrate from outside find themselves free to multiply and a population explosion of pests results, a paradoxical and vicious circle where more pesticides lead to more pests than ever.

HOW DO PESTICIDES CONTAMINATE FOOD AND WHAT EFFECTS DO THEY HAVE?

There is pesticide residue in food and water. Pesticides can run off fields or soak through the ground to enter watercourses. Spraying crops with pesticides, or using pesticides in the soil, can leave some residue on produce.

Pesticides are also potentially toxic to humans through the food we eat affecting reproduction, immune or nervous systems, causing respiratory problems, endocrine system disruption, neurological damage, Alzheimer's and Parkinson's, the build-up of heavy metals, and increased risk of certain cancers especially in women, and ADHD and autism spectrum disorder in children.

THE KILLING OF BEES AND OTHER BENEFICIAL INSECTS

A recent study suggests that as many as 40% of the world's insect species are in decline. Insects form the base of many intricate food webs, their decline will upset the delicate balances of life, threatening ecological stability which all animals and plants depend on. So, many of these insects are vital for life on earth.

Bees – including honeybees, bumble bees and solitary bees – are important because they pollinate food crops. If all the bees went extinct, it would badly affect global food supplies. But honeybees are responsible for only one third of crop pollination and a small proportion of the wild plant pollination. Other insects including butterflies, bumblebees and small flies that do the rest of the work and these insects are in trouble too.

The top causes of declines in insect diversity and abundance.

Pesticides

Exposure to insecticides is a key cause of insect pollinator decline. Herbicides, mostly glyphosate, target a huge variety of the wild plants that bees need to forage. Glyphosate impacts the gut microbes of bees with devastating implications.

Climate change

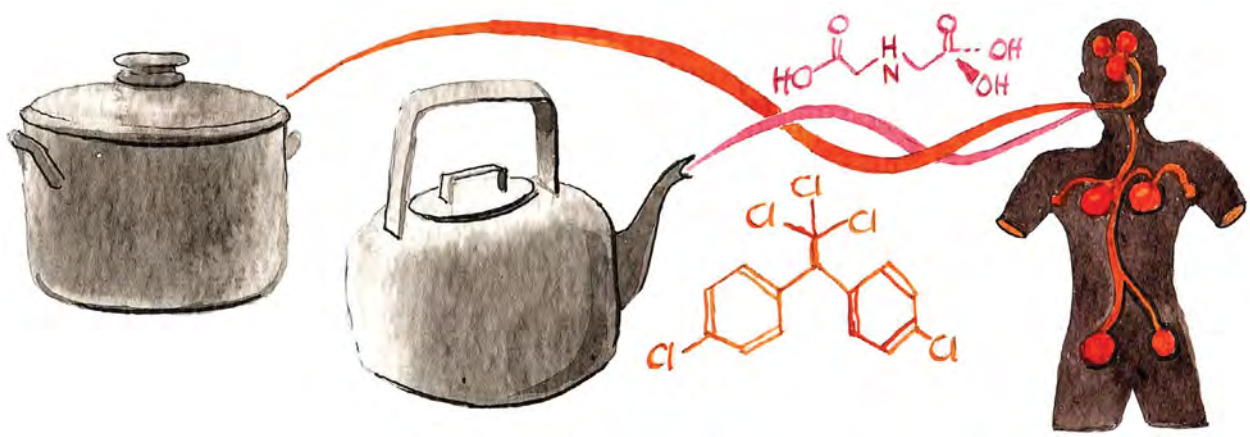
Global warming is believed to be a major driver of wild bee declines. Some wild bees can only survive in a narrow range of temperatures. As their habitats get warmer, the places where they can live grow smaller.

Invasive species

Invasive predators, parasites and disease-causing bacteria called "pathogens" have been blamed for the collapse of honeybee colonies around the world. In the past bees have coexisted with these pathogens but these diseases in recent times are thought to be linked to the bees' increased exposure to pesticides, which damage their immune systems.

Habitat destruction

Farming destroys the kinds of spaces that bees use to nest, it takes away the diversity of food that bees use to forage on.



AGROECOLOGY HAS A BETTER SOLUTION

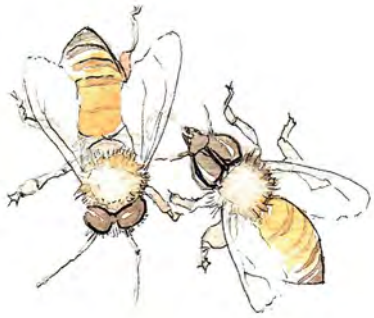
Agroecology has approaches to dealing with pests which, unlike chemical pesticides, work with nature to deal with pests without harmful consequences to nature or to humans.

It starts with prevention. Proper weeding and land preparation, along with planting natural live barriers, can go a long way to preventing pests from taking hold. Using pest- and disease-resistant seeds also sets farmers at an advantage. Once crops are planted, adequate crop nutrition and good water management practices help plants stay healthy and thus better able to resist pest themselves. In some ways pests can also be seen as nature's way of getting rid of weak plants.

When despite our best efforts, pests do take hold, the next step is biological control. A good example is the "push-pull" intercropping technology developed in Kenya. This system helps manages pests, while at the same time increases animal forage and enhances soil quality and fertility. The push-pull system manages pests through an attract-repel plant chemical strategy. Research shows that push-pull system has potential to prevent economic losses from stem borers and Striga weeds of about $7 billion annually, primarily affecting resource-poor and subsistence farmers while improving yields and cereal harvests sufficient to feed an estimated 27 million people.

Other biological techniques can range from simple sticky traps, methods to attract predator insects, to sophisticated microbial inoculants, which are referred to as "beneficial bacteria" that are developed from a crop's natural enemies, such as bacteria, fungi and viruses.

However, it is difficult to obtain funding for such research because the outcomes are not chemicals that major corporations can sell for profit. But the results are often no cost or low cost biological practices that are accessible, after training, to the mass of small scale farmers. Awareness-raising and advocacy work is required to shift the thinking and patterns of agricultural research to "stop the chemical mistake".



"That's a very informative horror story, Kamali! But at least it ended with some hope in the agroecological approaches that are not only more effective and sustainable but also much cheaper. In the meantime, Monica put me in touch with Anne Maina who is actually doing something about the situation. I wrote to her, and she sent me this story."

Killing us softly

by Anne Maina, National Coordinator of the Biodiversity and Biosafety Association of Kenya. www.bibakenya.org

My grandmother Njeri sat on her three-legged stool in the kitchen preparing some hot tea, singing away as she always did. The taste of her rich milky tea washing down roasted sweet potatoes lingers even to this day. We had just arrived in Nyeri with my grandfather. He knew how much I loved spending my holidays in the village and had made it his mission to always pick me up from Nairobi every school holiday. I loved the lush environment cascading down the hills on the farm especially when it was wet and endless hours of joy playing with my cousin Njeri. How I wish my daughter would experience village life without the distractions of phones and TV.

We lost my grandmother in 1991 to throat cancer. I have often asked myself what would have caused the cancer? Grandmother like many in her generation ate well. I remember the yams, ripe and roasted bananas, cassava, the fermented millet and sorghum porridge and other delicacies that she cooked for us in various ways- boiled roasted and sometimes fried. While she told us beautiful stories on her three-stone wood fire.

The problem was that my grandparents had a coffee plantation, using toxic chemical fertilisers and pesticides. After independence Africans were finally allowed the grow commercial crops like coffee and tea. Extension workers regularly visited farmers to advise them on the chemical inputs to use, supplied by farmer cooperatives supplied fertilisers.

Like many others, my grandmother grew her local vegetables under the coffee trees. While spraying these toxic pesticides, my grandparents and unfortunately even farmers today did not always use the expensive safety protection kits like gloves, masks and gumboots. And the pesticides also found their way into the food they ate. Nor was this monitored by the government as it pushed and promoted the Green Revolution model that promotes the use of excessive chemical fertilisers and pesticides.

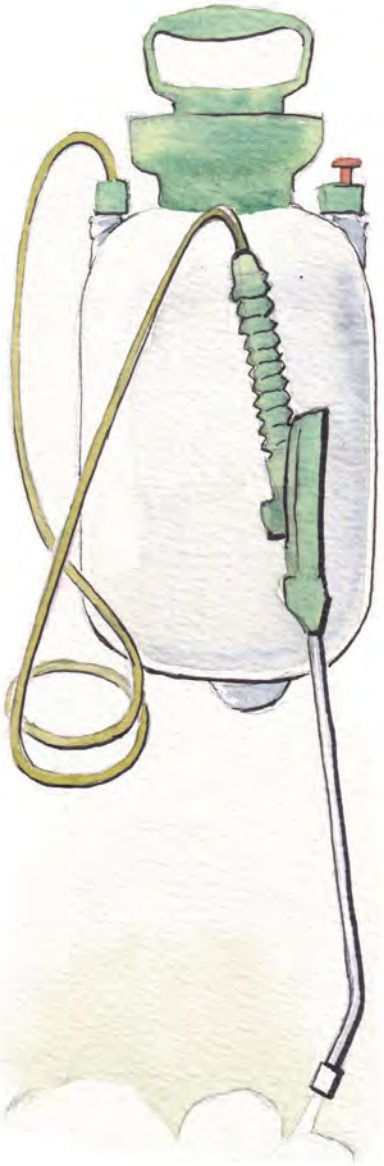
Farmers have been left at the mercy of profit-seeking multinationals who have the resources to promote these toxic agricultural inputs, making farmers dependent on them.

A study by the Kenya Medical Research Institute (KEMRI) in Kenya has shown a cancer belt in Nairobi and surrounding regions where there is large scale production of horticultural products like tomatoes and vegetables to feed the city. In Kenya, we use eight toxic ingredients that have been banned in the European Union (EU) because of links to endocrine disruption, mutagenesis and cancer.

As a granddaughter, I believe my grandmother caught throat cancer from the rampant used of malathion and other pesticides. Now, as a development practitioner, I have become involved in various campaigns against the use of toxic agricultural inputs by farmers. I have made it my mission to campaign against these poisons that are literally killing us.

My work has involved campaigning and advocacy work at the local level, sensitising farmers to stop the use of these toxic pesticides that are killing us slowly. I have also engaged political leaders and policy makers at the county and national level to put in place legislation to stop the use and importation of pesticides.

This is a mammoth battle, yet we have no choice but to fight it. Not only must we stop toxic pesticides, but we must pick up the torch and promote agroecology as the sure way to protect our environment and produce safe food for current and future generations.



DISCUSSION QUESTIONS

Why have multinationals and governments been so successful in promoting the use of pesticides? How does Anne answer James on the question of whether individual changes are enough?

"Well, that is another powerful story. We are certainly finding out important things to share with the others, Abdou!"

"Yes indeed, my sister. I wish I could meet Anne Maina and learn more about her work. I was impressed that she did not accept her grandmother's death but went on to become a campaigner against the sale and use of toxic pesticides."

"A woman with the courage of her convictions! Abdou, while you have been busy, so have I. I met with Joshua Enyetu, a Farmer Field School Master Trainer, here in Uganda. He told me his thought-provoking story."

The good, the bad and the ugly...

by Joshua Enyetu, a Farmer Field School Master Trainer from Uganda

I grew up in a farm from the1990s and from an early age, we helped plant seed, pull weeds, and pick harvest on our 10 acres of land growing cassava, maize and groundnuts. Seed was never a problem – not in our closely knit community. There was always surplus to save from the farm and if anyone lacked, neighbors or relatives would gladly share. And if our village was short of a variety, the next village wasn't. This was our resilience.

But time flies. A child is an adult. And in my community, an adult is a farmer. Farmers know how many seeds go down and worry about how many come up. Their life depends on it. And so came changes as modern life and culture entered the community. When rain was delayed, bountiful harvests were reduced and seed surplus, decreased but now neighbours and relatives became less generous, and seed became more precious. Soon we had to acquire it by exchange, and before long we could only get seed from local markets. Then yields started dwindling, and we began to look for solutions beyond our locality.

"Improved seed" arrives

Some travelled and brought back what they called "improved seed". Their yields improved, but many resisted, and their yields continued to struggle. Outside influences grew. We would listen to the radio every evening to adverts saying, "improved seeds are the future" and experts gave their opinions "with our small plots you can still get as much harvest. Plot size doesn't matter!" We needed to adapt or die!

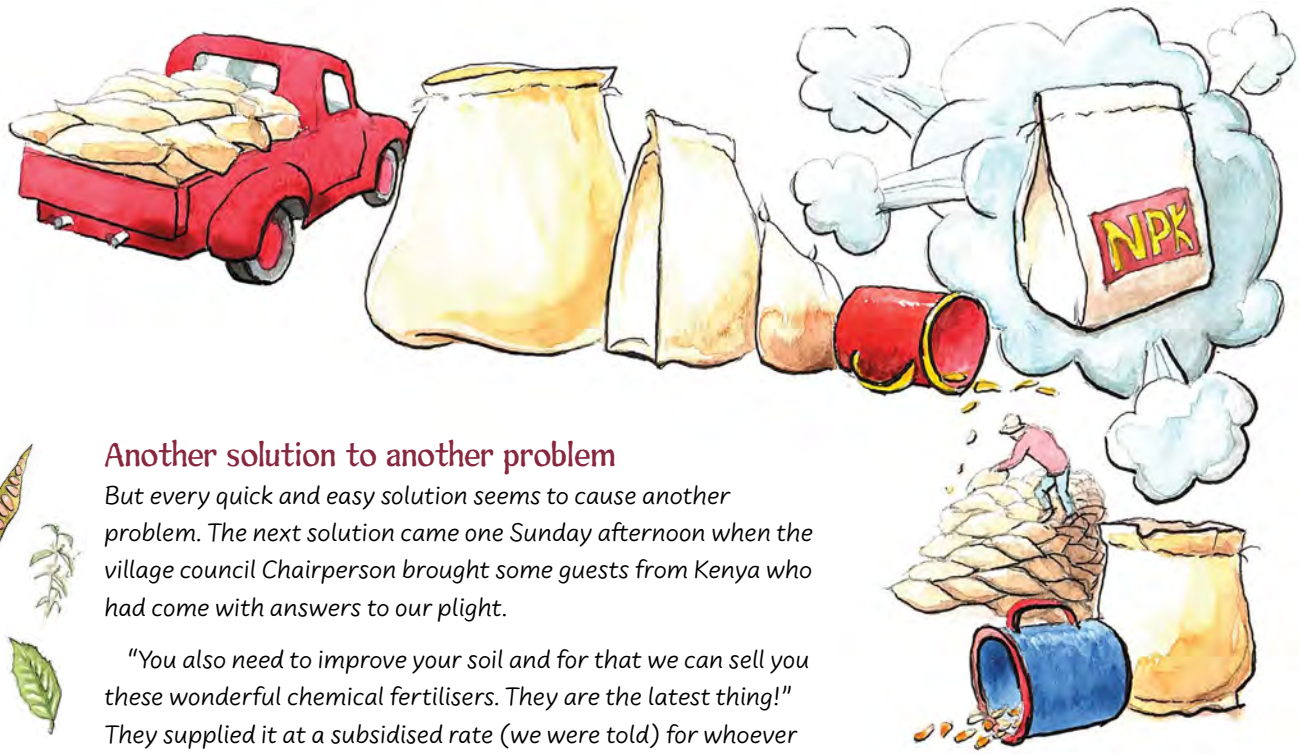
Still, we resisted as did many. It takes more to change a farmer's mind than a radio talkshow.

The low yields persisted and soon politicians got involved, and as we all know they like to be seen solving community problems. "Improved seeds are a sure path not just to survive, but to become wealthy." The yields they projected promised us a surplus to eat, and enough to sell, to send our children and brothers to university, and enough to build permanent houses. They chastised us for clinging to old ways.

We relented and soon we were getting more from less. My three acres of land were yielding as much maize as 10 acres did a decade before! Their promises were true!

Seasons came. Seasons went. But there is something about farming cycles: they always seem to end and end they did. Only this time, it left us with diminishing yields. So, we listened to the radio and heard the same narrative about increased yields from improved seeds. What were we doing wrong? These seeds were not the magic wand we had at first hoped they would be. In fact, their increased productivity exhausted the land. It's like they ate the soil, which meant that we would have to find a solution to that problem.

There was always surplus to save from the farm and if anyone lacked, neighbors or relatives would gladly share. And if our village was short of a variety, the next village wasn't. This was our resilience.



Another solution to another problem

But every quick and easy solution seems to cause another problem. The next solution came one Sunday afternoon when the village council Chairperson brought some guests from Kenya who had come with answers to our plight.

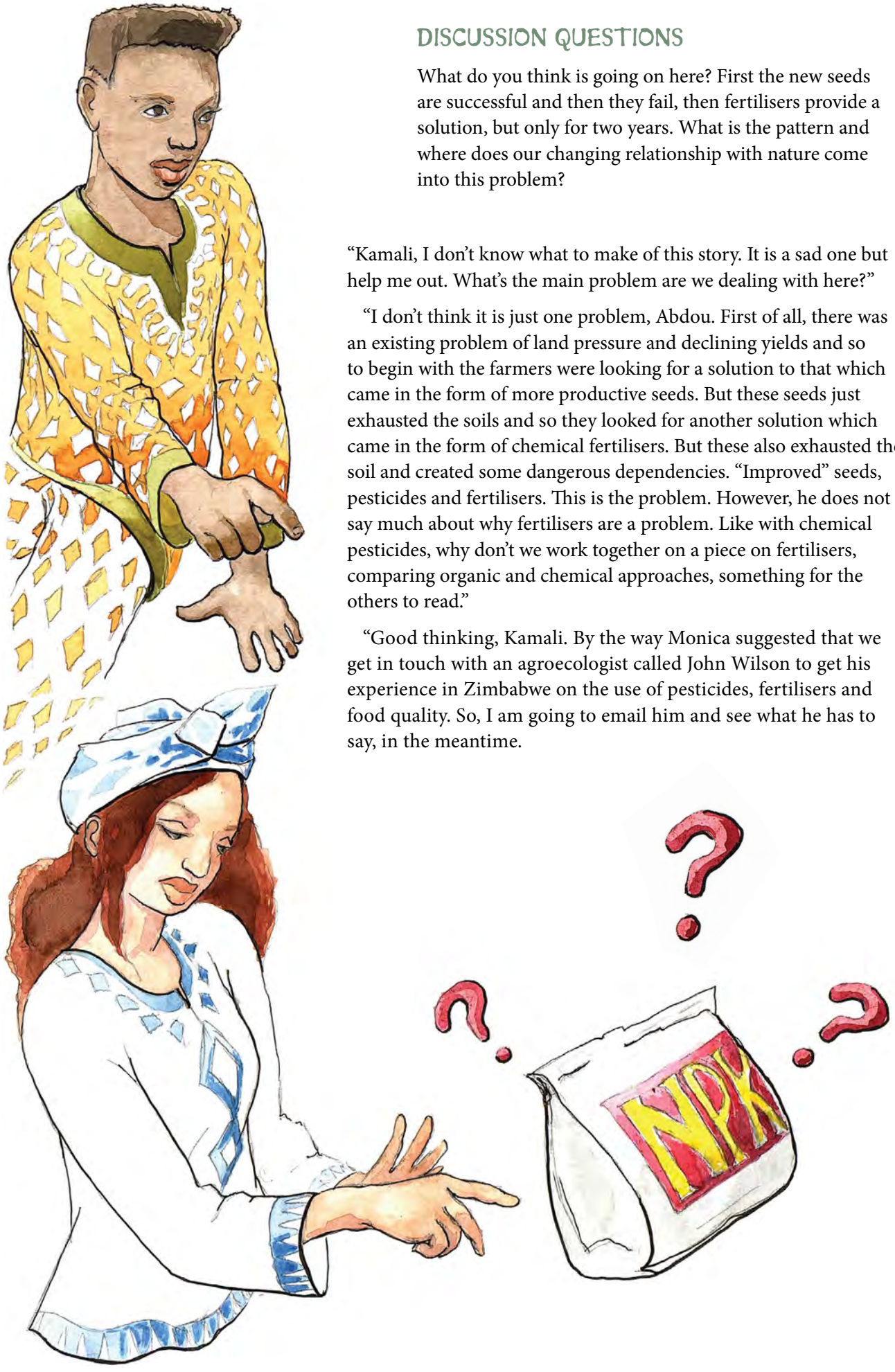
"You also need to improve your soil and for that we can sell you these wonderful chemical fertilisers. They are the latest thing!" They supplied it at a subsidised rate (we were told) for whoever bought their improved seed.

And so started another cycle. Our yields rebounded, magically and for most, it was as though the farms had been resurrected! And how we enjoyed the moment of plenty! Until one day, three years later, I took a routine spiritual walk by the family garden about 500 meters off our household. It had been several days and what caught my eyes was unlike anything I had ever noticed. Yellowish and stunted maize, and it was not one plant, but the whole lot in the 3 acres. A total loss.

Many farmers suffered the same, but none had answers. Was it the type of fertiliser? Or had it been applied wrongly? Maybe it had to do with seeds? We could not tell.

What, however, was not in doubt, was one fact: the impact on our agriculture and overall livelihood was massive. In the years to follow we would come depend more and more on costly fertilisers. Absent them, you could not dream of a meaningful harvest. Our community, once a grain granary for the region, became a starved consumer, dependent on food imports.

Our community, once a grain granary for the region, became a starved consumer, dependent on food imports.



DISCUSSION QUESTIONS

What do you think is going on here? First the new seeds are successful and then they fail, then fertilisers provide a solution, but only for two years. What is the pattern and where does our changing relationship with nature come into this problem?

"Kamali, I don't know what to make of this story. It is a sad one but help me out. What's the main problem are we dealing with here?"

"I don't think it is just one problem, Abdou. First of all, there was an existing problem of land pressure and declining yields and so to begin with the farmers were looking for a solution to that which came in the form of more productive seeds. But these seeds just exhausted the soils and so they looked for another solution which came in the form of chemical fertilisers. But these also exhausted the soil and created some dangerous dependencies. "Improved" seeds, pesticides and fertilisers. This is the problem. However, he does not say much about why fertilisers are a problem. Like with chemical pesticides, why don't we work together on a piece on fertilisers, comparing organic and chemical approaches, something for the others to read."

"Good thinking, Kamali. By the way Monica suggested that we get in touch with an agroecologist called John Wilson to get his experience in Zimbabwe on the use of pesticides, fertilisers and food quality. So, I am going to email him and see what he has to say, in the meantime.

Natural farming and organic fertilisers versus industrial farming and chemical fertilisers

By Kamali Ayele and Abdou Camara

THE STORY OF NATURAL FARMING AND ORGANIC FERTILISERS

Nature always keeps the soil covered, it doesn't plough, has a diversity of plants growing and recycles everything effectively as it dies. These keep soil healthy. But agriculture disrupts all of these factors, leading to seriously degraded and often eroded soil. So, we need to replenish the soil with fertilisers.

There are exceptions. Food forests, biodiverse cropping areas and well-managed rangelands are different in that they are largely able to regenerate themselves, restoring their own soil life and productivity continuously.

So, in the natural cycle not only do plants need healthy soils, but soils need healthy plants.

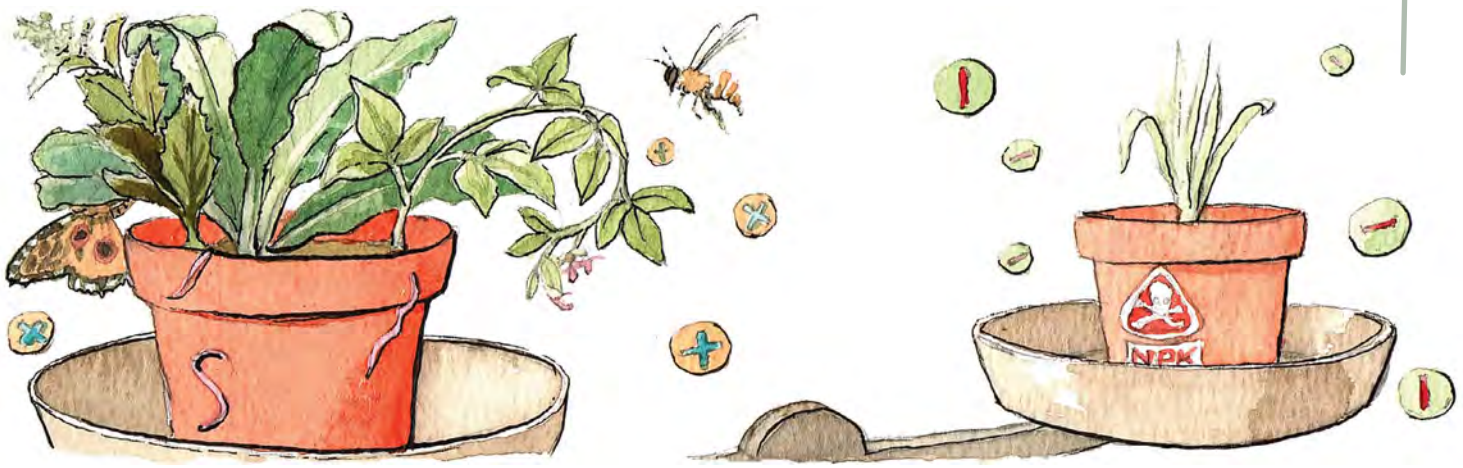
Plants use photosynthesis to convert sunlight into sugars which they use both to grow and feed microbes (bacteria and fungi) through their roots. In return, microbes provide plants with nutrients from the soil. In addition, the roots and residues of plants that die feed life in the soil.

So, in the natural cycle not only do plants need healthy soils, but soils need healthy plants.

Conventional agriculture that ploughs up the soil badly disrupts this natural cycle, and the system breaks down. Nutrients in the soil are no longer as available to plants and the soil begins a downward spiral to increasing bad health.

In the past, farmers discovered various ways to deal with this: e.g. using fallowing, letting the soil "rest" for several years, allowing nature to regenerate the soil; by adding manure and compost with their nitrogen and other elements, including bacteria and fungi. Low or no tillage approaches are a key approach to preventing soil decline.

Some plants work with certain bacteria which take nitrogen from the air and make it available to plant roots. For example, the roots of legume crops, like peas, beans, cowpeas, chickpeas, bambara beans, groundnuts, pigeon peas and soybeans, host such bacteria that replenish nitrogen which is why they are included in crop rotation.



INDUSTRIAL FARMING AND CHEMICAL FERTILISERS

In this way, long term use of chemical fertilisers disrupts ecosystems, and threatens biodiversity.

Nitrogen fertiliser is the most common fertiliser, manufactured using the Haber-Bosch process, and is combined with potassium and phosphate, which are mined. These chemicals are in a soluble form and are taken up directly by the roots of plants.

In the 1920s German chemist Fritz Haber devised a way to extract nitrogen from the air to form a granular chemical compound fertiliser, using what became known as the Haber-Bosch process.

Haber is also considered the "father of chemical warfare" for his years of work developing and weaponising chlorine and other poisonous gases during World War One.

This method was driven by the promise of a lucrative contract from the chemical company BASF. Carl Bosch, the company's engineer, managed to replicate Haber's process on an industrial scale, thus the Haber-Bosch process. Both men later won Nobel Prizes - controversially, in Haber's case, as many by then considered him to be a war criminal.

In the Haber-Bosch process hydrogen binds with nitrogen to form ammonia. Energy is needed to generate extreme heat and pressure. The heat of a wood-fired pizza oven was needed combined with the pressure you would experience 2 km under the sea. To produce 160 million tonnes of ammonia a year - the majority of which is used for fertiliser - the Haber-Bosch process today consumes more than 1% of all the world's energy. That is a lot of carbon emissions.

THE ENVIRONMENTAL DAMAGE OF CHEMICAL FERTILISERS

Only some of the nitrogen in chemical fertilisers makes its way via crops into human stomachs as an element of food molecules, perhaps as little as 15%. Most of it ends up in the air as nitrous oxide, which is a powerful greenhouse gas, and contributes to acid rain.

Another major part of the nitrogen gets into the water when rainwater washes it out of the soil. It is very soluble. In the water cycle, nitrogen pollutes streams and rivers, and also drinking water. Continuous application of nitrogen to the land causes chemical reactions which "burns" the organic matter in the soil which makes soils more acidic, and less able to hold water for plants.

In this way, long term use of chemical fertilisers disrupts ecosystems, and threatens biodiversity.

Phosphorus and other nutrients also pollute water, entering into streams and rivers which run into the ocean. The chemical pollution from fertilisers and other agrochemicals such as pesticides can create riverine and marine dead zones where all life has been extinguished. There are over 400 dead zones in the world's oceans and seas, the largest of which is in the Gulf of Oman measuring 165 000 square-kilometres. These "dead zones" in lakes and the ocean have huge blooms of algae which release toxic compounds and absorb large quantities of oxygen at night, and in the day block sunlight into the water. When blue-green algae blooms die, its decomposition by bacteria also absorbs high levels of oxygen. This oxygen depletion kills the fish and other life below.

The Haber-Bosch process is not the only cause of these problems, but it is a major one, and it is not going away. Demand for fertiliser is projected to double in the coming century.

INDUSTRIAL VERSUS NATURAL FARMING FERTILISERS

Industrial farming and chemical fertilisers

- The food quality from plants grown with chemical fertilisers is often low in the vital micro-nutrients needed for human health.
- Chemical fertilisers add no organic matter to your soil and contribute nothing to improving soil structure: In fact, research suggests that chemical fertilisers actually harm the microorganisms in the soil, reduces the level of organic matter, making the soil more acidic and less able to support long-term plant growth.
- Initial improved yields from chemical fertilisers do not often last long and require more and more fertiliser, with the danger of soil becoming lifeless dirt. This leads to the release of carbon dioxide, a major contributor to climate change.
- Manufacturing chemical fertilisers requires large amounts of energy, usually supplied by non-renewable resources, increasing pollution and global warming.

Natural farming with organic fertilisers

- The food quality from plants grown using natural farming practices and organic or bio fertilisers is often high in the vital micro-nutrients needed for human health.
- Natural farming practices, along with organic fertilisers, contribute organic matter to your soil, improving its structure, feeding soil microbes, fighting harmful fungal and bacterial diseases, and contributing micronutrients.
- Natural farming practices and organic fertilisers foster biological processes in soil near the roots that supply a slow but steady and balanced diet of essential minerals for plants.
- Some organic fertilisers, such as manure and compost, may be inexpensive — or free if you create them yourself.

In essence, industrial agriculture treats soil as a thing, a dead container for growing plants in, adding chemicals and water to feed them. Out of this you get food that is not very nutritious and destroys organic matter with harmful consequences to the climate. But natural farming treats the soil as a living substance, to be cared for and which in turn cares for plants, creating healthier food as a result.

"Abdou, what struck me is how many of our harmful technologies, like pesticides and fertilisers come from wartime investments. Nuclear bombs and nuclear power is another. What will come next?"

"Robot farmworkers which are already being used in the industrialised world. They won't need farmers soon! By the way Kamali, John Wilson responded to my email. He sent me two pieces: firstly, the story or history of the Green Revolution and secondly, a story of a Green Revolution farmer in Zimbabwe and his wife who farms in the traditional way. Here, have a look."

The story of the Green Revolution (aka the Chemical Revolution)

Dear Abdou

Greetings from Harare and thanks for your letter asking about the Green Revolution.

The Green Revolution is about how seed and farming have been taken over by industry and privatised. We often assume that the way things are today is normal, even natural, but the path of agriculture's Green Revolution over the last 70 years has been completely abnormal and unnatural.

From the mid-1800s until the second world war, countries like the USA and Europe increasingly introduced chemicals into farming practices. They seemed to have excellent results in the short term, but at great cost.

During the Second World War many factories turned to the production of bombs and chemicals for war purposes. Then, after the war, these factories then turned to the chemical production of pesticides and fertilisers for agriculture. In addition, an American called Norman Borlaug worked with others in Mexico to breed higher yielding hybrid seeds for grains like maize, to be grown with the same chemical fertilisers and pesticides.

After the war, countries like India were threatened by famine. Borlaug's 'Green Revolution' approach, as it became known, came in to address this with monocropping, ploughing, hybrid seeds, and soluble chemical fertilisers and pesticides. The short-term success seemed spectacular. Borlaug received the Nobel prize in 1970. The Green Revolution spread all over the world as the answer to the threat of world hunger. But it should have been called the Chemical Revolution, not the Green Revolution.

The UN set up research institutions around the world to drive the research for the spread of the Green Revolution approach and practices. These are known as the CGIAR research family, each concentrating on crops for different climates.

The Green Revolution versus Natural Farming

The Green Revolution Approach

- clear the fields and plough up the soil,
- sow one crop (monocropping) of hybrid seeds
- add specific amounts of chemical fertiliser and later apply top dressings of fertiliser
- apply chemical pesticides for any pests or diseases.

The Natural Farming (agroecology) Approach:

- do minimum tillage so as not to damage the microbial life in the soil
- keep the soil covered at all times to protect the microbes and prevent evaporation
- grow a diversity of crops,
- use local seeds suited for particular areas,
- avoid chemical fertilisers and pesticides because they damage life in the soil and create dependency,
- only use inputs such as compost or bio-stimulants that promote microbial life in the soil.

Abdou, the way I see it, we took a wrong turning, a chemical turning. We forgot about biology, about the importance of the life-giving microbes in the soil. It gave the opportunity for big industry to grow and make huge profits. The natural farming route doesn't offer industry much opportunity for making savings and profits at all. These go to the farmer!

From the second world war a huge chemical industry developed to serve agriculture. However, seed companies remained relatively small till the late 1970s. That changed from 1980 when a court in the US allowed for the patenting of life and then genetically modified seeds (GMOs) took off. The consultancy company of McKinsey and Co. saw an opportunity: by controlling the source of seed the corporates could control the entire food chain from seed through processing and the distribution phases.

The big corporations went on a buying spree. They've bought out hundreds of companies.

The situation today can be seen in this table from the organisation ETC who've been tracking this corporate concentration process for decades.

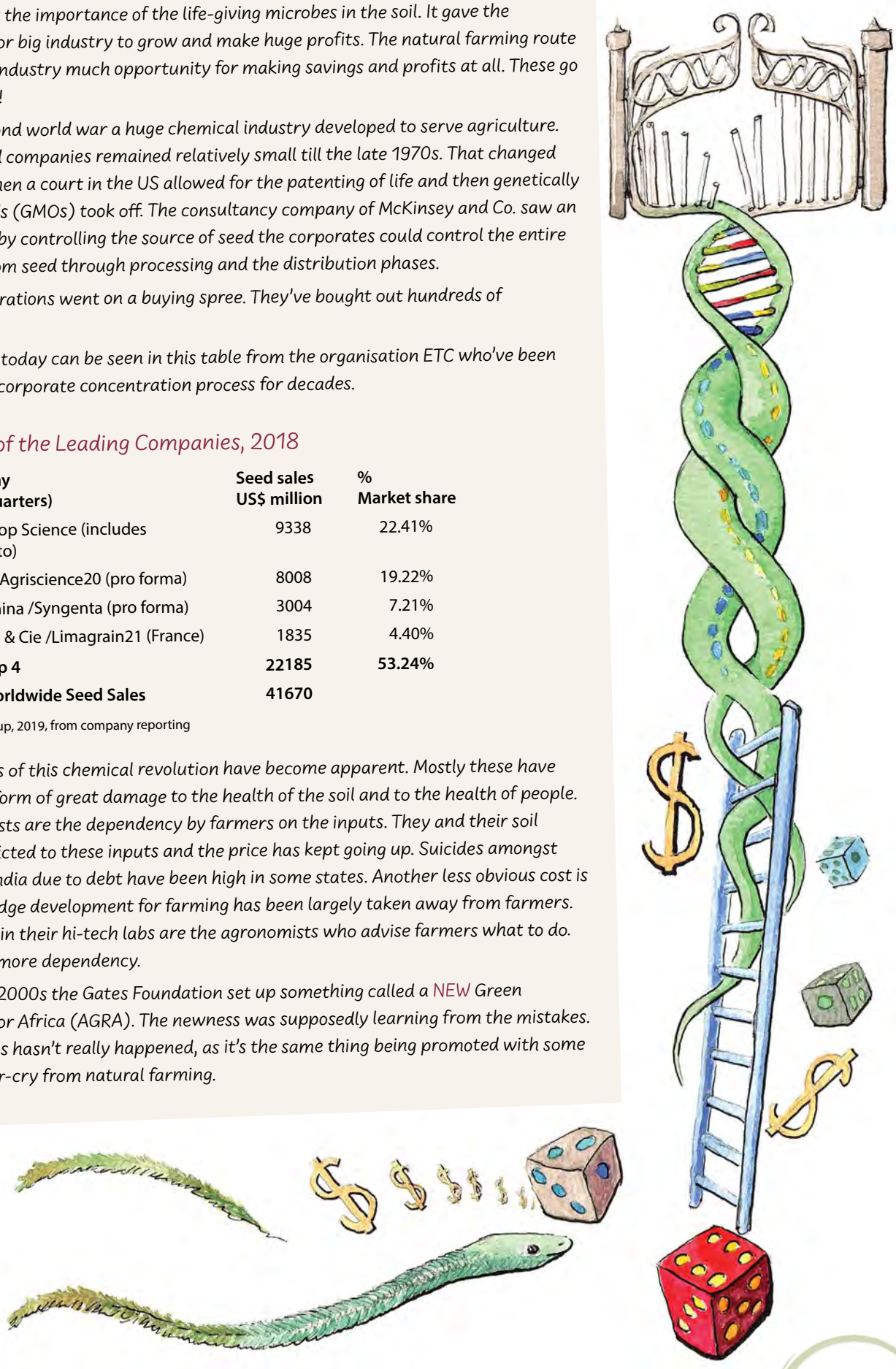
Seed Sales of the Leading Companies, 2018

	Company (Headquarters)	Seed sales US$ million	% Market share
1	Bayer Crop Science (includes Monsanto)	9338	22.41%
2	Corteva Agriscience20 (pro forma)	8008	19.22%
3	ChemChina /Syngenta (pro forma)	3004	7.21%
4	Vilmorin & Cie /Limagrain21 (France)	1835	4.40%
	Total Top 4	**22185**	**53.24%**
	Total Worldwide Seed Sales	**41670**	

Source: ETC Group, 2019, from company reporting

But the costs of this chemical revolution have become apparent. Mostly these have been in the form of great damage to the health of the soil and to the health of people. Other big costs are the dependency by farmers on the inputs. They and their soil become addicted to these inputs and the price has kept going up. Suicides amongst farmers in India due to debt have been high in some states. Another less obvious cost is that knowledge development for farming has been largely taken away from farmers. The experts in their hi-tech labs are the agronomists who advise farmers what to do. This causes more dependency.

In the early 2000s the Gates Foundation set up something called a NEW Green Revolution for Africa (AGRA). The newness was supposedly learning from the mistakes. However, this hasn't really happened, as it's the same thing being promoted with some tweaks, a far-cry from natural farming.



New research in the biological sciences have been revealing to us some of the wonders of nature in the soil, if we choose to work with nature and not against her. This, combined the experience of those farmers who already farm with nature, is giving us 21st century farming, Abdou. This is the cutting edge and the Green Chemical revolution was a big 20th century mistake. Unfortunately, there are many wealthy vested interests that don't want to let go of this Chemical Revolution.

Abdou, but I hope that gives you a quick overview of what the Green Revolution is.

Greetings to you and your fellow students
John Wilson

"Abdou, we really take things for granted, thinking that the way things are is normal. But how can they ignore the dangers of pesticides and fertilisers and also the immense knowledge that African farmers have!"

"You are absolutely right, Kamali. I suppose the big issue is that there isn't much money to be made by big corporations if farmers use their existing knowledge and approaches. Have a look at this second story from John which shows exactly that."

Remembering the visit to Amai Moses all those years ago

by John Wilson

A proud day for VaMurehwa

"I could see that VaMurehwa was feeling very proud in front of this large crowd. Why shouldn't he be? He was doing just what was being asked of him and today, the 16 March 1989, he was going to be awarded his Master Farmer certificate by the agricultural extension officer.

As I looked at the impressive dark green field of maize, knowing how it had been grown, I felt some despair. Yet how could anyone think of it except in positive terms? The government had achieved wonders in spreading Green Revolution practices amongst smallholder farmers in Zimbabwe since Independence nine years earlier.

"To prepare my field," continued Mr. Murehwa, "I ploughed it soon after the last rains as my master farmer training taught me."

This meant the field was left bare for at least five months! How could that be considered a good practice, I asked myself.

"With the first good rains," he continued, "I planted my maize seed with the recommended amount of Compound D fertiliser. I bought all this with the loan I received from the Agricultural Finance Company (AFC).

"We used draft power twice to weed the field when it was still small and then did hand weeding once more later on. We applied a powder pesticide twice to control stalk borer when we noticed it was becoming too much…"

Nearly a decade into Zimbabwe's independence it was now the smaller farmers who were feeding the nation and not commercial farmers, as it had been before independence. This Green Revolution technology that had previously only been available to white commercial farmers was now widely available all over the country. This spread had been a remarkable achievement by the government. But what exactly was the achievement? That was the question that bothered me.

Smallholder farmers were now trapped in the clutches of chemical agriculture where you have to keep buying your inputs if you want to produce anything.

Maize was now equated with food across the country. Smallholder farmers were now trapped in the clutches of chemical agriculture where you have to keep buying your inputs if you want to produce anything. The soil was degrading as research by the same Government was showing. Leaving soil bare over the whole dry season meant a vast drop in the soil organic matter. For whom is this achievement? Zimbabwe was considered the break basket of the region, but at what cost?

A surprising lunch is served

After the ceremony, in which eight other farmers also received their Master Farmer certificates, the crowd started to disperse. Mr. Murehwa's wife came to where I was standing and introduced herself as Amai Moses (mother of Moses) and asked me to follow her to lunch.

We walked about half a kilometre to the Murehwa homestead. Spread across a number of tables was a wide variety of dishes. I counted twelve before I was interrupted by a smiling woman offering me a jug to wash. "Please take a plate and help yourself," she then said.

"The only food I saw in the field was maize," I commented, "and yet here we have a great diversity of food. Did you buy this from a neighbour?" I asked. The women all laughed, and Amai Moses came up closer to me and said in a low conspiratorial voice, "Would you like to come back one day and see my field? These days the way I grow things is frowned upon and so I keep it to myself, but I'm happy to share with you." After feasting on one of the most delicious meals I'd ever had, I arranged a day to come back and see Amai Moses' field.

Two weeks later I returned to the Murehwa homestead. It was still cool, and Amai and Baba Moses were sitting under a tree near their kitchen drinking tea. They offered me tea too. "Tanganda or Zumbani?" asked Amai Moses. "Zumbani," I said.

I could sense a slight tension in the air. Baba Moses spoke first, "I gather you've come to see my wife's field today," he stated. "What's your interest?". I cleared my throat a little nervously. "I want to learn about how she grows all those different foods that we ate two weeks ago." Baba Moses looked at me with thoughtful eyes and a small smile. "Most people come here to see my maize field and my wife even keeps the dumeni (extension officer) away from her field as what she's doing is considered a little backward."

"But what she's doing is based on hundreds of years of knowledge growing crops in this area," I responded.

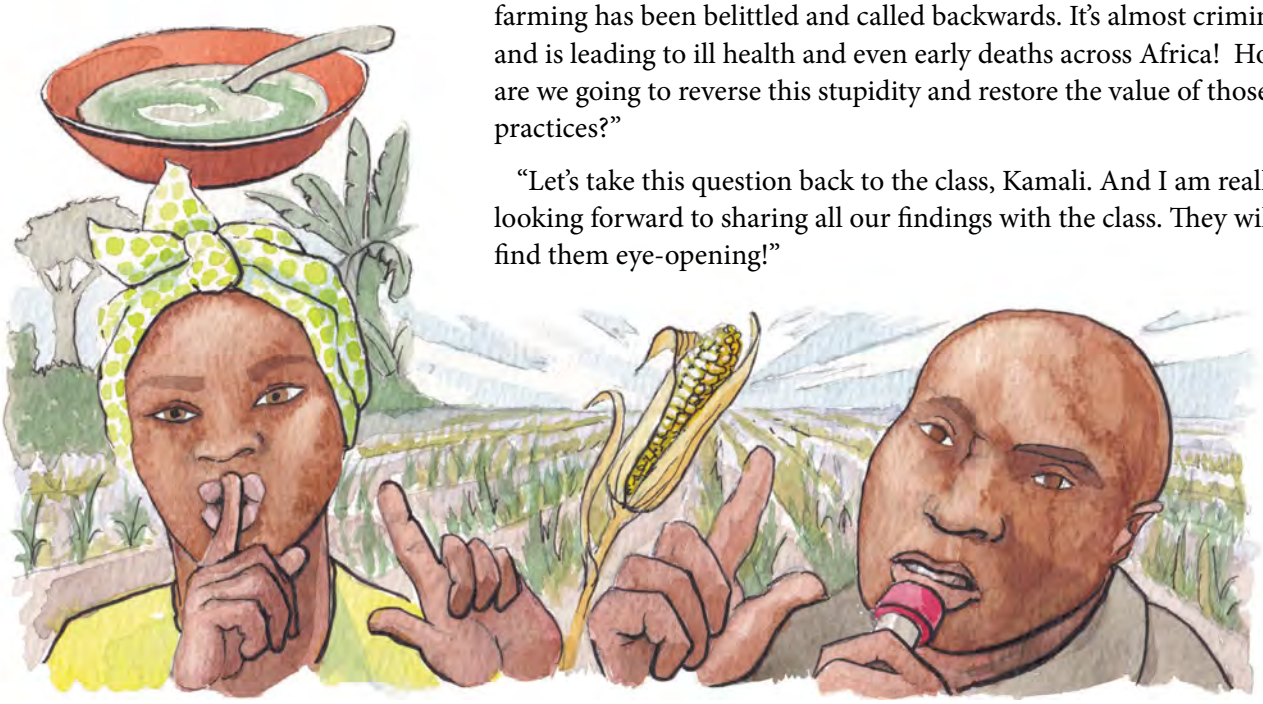
"Let's go and see the field," Amai Moses said jumping up, and marching off. Baba Moses didn't join us.

We followed a narrow path to a field with many different crops with trees too, dotted around. I started to name what I could see to myself: finger millet, sorghum, pearl millet, mapudzi (gourds), pumpkins, watermelons, a patch of ground nuts and next to it a section of nyimo (Bambara nuts). There were also quite a few edible 'weeds' such as amaranth and spider plant (nyeve). This was a whole field of real food! I looked at Amai Moses and smiled, "Now I see where all our food came from. Can you take me around and tell me about all the plants you are growing here?"

For the next hour we walked around the field and she named all the different varieties of the crops she was growing and what they were good for. In that hour I listened to local farming knowledge like I'd never listened to before, and yet this way of farming was considered backward!

"Abdou, it makes me mad that the rich knowledge of traditional farming has been belittled and called backwards. It's almost criminal and is leading to ill health and even early deaths across Africa! How are we going to reverse this stupidity and restore the value of those practices?"

"Let's take this question back to the class, Kamali. And I am really looking forward to sharing all our findings with the class. They will find them eye-opening!"



NOTES





3 Working with nature's gifts

to grow safe and healthy food

"Dr. Bakirya, we chose to look into the question of how to grow safe and healthy food, but Google overwhelmed us with all the possible methods and techniques."

"And the internet is a bit two-dimensional," added Estridah. "As we agreed, we want to speak to some real farmers who understand how to grow food, but where to start or who to ask?"

"Please call me Monica. Firstly, you need the right question to start. If you ask the wrong question, you'll always get the wrong answer! Conventional nutritionists seldom ask how to grow safe and healthy food. They focus on the nutrient content of foods and suggest ways to fortify or supplement them. You need deeper questions like: what is the relationship between the microbiome of the soil and the microbiome in our gut?"

"Microbiomes are like communities of microbes, is that right? But your question does not even mention plants or food!" said a surprised Ajay.

Monica nodded. "If you want to understand the world you need to include the things that are not so visible, like microbes. You are much more than your outer, visible form. What's going on inside you and the invisible relationships between you and others most define who you are."

"Ah, ok, we'll give it a try. Who can we put this question to?"

"There's a remarkable woman called Chifundo Khokwa from an NGO called SCOPE in Malawi. I met her at a conference, and she taught me a few things about this question. Estridah, you're from Malawi, so give her a call."

Great, I will be going home for the break so I can go and visit her. Thanks, Dr. Bakirya, I mean Monica!"



"And I also want you to contact Cecilia Onyango from the University of Nairobi to see what you can learn from her about 'ecosystem services' that nature provides. Ajay, I suggest you explore the importance of seeds in healthy diets, after all that is where the plants that we eat begin their lives. Then look up a good friend of mine called Grace Ruto from the NGO Vi Agroforestry to learn about another vital approach to healthy foods called Agroforestry and Sustainable Agriculture. Good luck to both of you!"

Estridah visits Chifundo and her invisible world of microbiomes

"Estridah, I am so pleased to meet you and to hear you are a student of Dr. Monica Bakirya! She wrote to me about your visit. Can I offer you a glass of Thobwa?"

"Mmm, yes please! Is your Thobwa fermented from millet or sorghum?"

"This one is from millet with a very low alcohol content, but the microbes are really healthy, so nothing to worry about there!"

"Well, I am glad you mentioned microbes because that is partly why I am here. My fellow student and I are exploring how to grow safe and healthy food and Dr Bakirya has suggested we start by exploring the relationship between the microbiome of the soil and the microbiome in our gut."

"Ah, good then you are literally focusing on the root of the question! Before I take you into the community to see for yourself, shall I tell you a little story of when I was first introduced to microbiomes? This is what got me so interested in agroecology and the work I am doing today."

"Yes, please, go ahead! Do you mind if I record this and write it up as a story?"

Chimwemwe reveals the secret and magic of microbiomes

by Chifundo Khokwa, SCOPE, Malawi

It was a hot October day in Samu village in the Central Region of Malawi. Young children sat huddled in the shade, too tired and hungry to play in the blazing heat. In the distance, by the water run-off trough of one of the few boreholes, pigs were trying to cool themselves in the mud. Near the borehole a group of older children were throwing sticks and stones at a large mango tree, trying to dislodge the delicious fruit.

October is the hottest time of the year in their area. The fields were parched and dry with no sign of food. In the homes, maize supplies, the staple food, have run out. This makes October one of the hungry months for the people of Samu.

Chimwemwe walked past the village borehole towards her farm followed by laughing children asking for jamu (gooseberries). Chimwemwe is one of the few people in the village who grows enough to eat throughout the year. Chimwemwe and her gang of noisy children came past where I was waiting for her, having finally decided to visit her, wanting to discover her secrets.

"Good afternoon, Chifundo, have you finally come to see me?" greeted Chimwemwe cheerfully.

"Good afternoon, Chimwemwe, yes indeed. I see the children are bothering you again for your jamu!""

"Oh yes, they are my little helpers, especially with the harvesting, so they've earned the right to bother me! Besides there is plenty of fruit and it would probably go bad if they didn't eat it." Chimwemwe chuckled.

'I don't know how you do it, Chimwemwe. I can even see the lovely green on your farm from here and yet I have never seen you receiving fertiliser coupons or standing in the fertiliser queue."

"Bah! Who needs that poisonous stuff, Chifundo! I work with nature and not against it. Come and see what I do."

When we reached Chimwemwe's, I was surprised by how different everything was compared to other farms. Chimwemwe does not grow things neatly in rows. She mixes a lot of crops together, different traditional vegetables like okra, amaranth, african spinach, african nightshades, millet, pigeon peas, beans, yam, cassava, sweet potatoes and groundnuts. When I asked her why, she told me that different crops help each other, some plants providing fertility and some protecting the other plants from pests.

She had covered the whole field with a carpet of grass mulch and other crop residues. Her whole garden had several trees scattered around. There were many different species like acacia, moringa, and fruit trees; guava, loquats, bananas and baobab. The children were running around and climbing the trees to get some fruit. Chimwemwe put her arms out widely and announced in a loud voice "I am creating a food forest!"

I gasped because I had never heard those words used together before.

"Let me show you the star of the whole show." She took me by the hand and led me to a nearby tree under which was a large heap of dark earthy soil.

"This is my compost! This is where the magic happens!" Chimwemwe laughed, her eyes sparkling like diamonds. She explained that compost is made up of many different materials such as crop residues, cow dung, kitchen residues and ash. "There are many types of compost", Chimwemwe said, "but all good compost is full of microbes."

Food forests – nature's pantry

Food forests, or agroforestry, is a low-maintenance, sustainable, plant-based food production approach based on forest ecosystems, incorporating fruit and nut trees, shrubs, herbs, vines and perennial vegetables.

"Microbes?", I asked with surprise, 'You mean like bacteria and fungus! But aren't those bad? Don't they cause decay and rot and all that?'

"Not all microbes are bad. Most living things need microbes in order to live. They are also necessary in the soil, in what we call its microbiome. They help to break down dead plants and animals and release the nutrients into the soil, offering these to the plant roots who give them sugars, made by photosynthesis. So, they increase the soil's fertility, and help plants to grow well." Chimwemwe continued.

"Even our bodies need microbes. In the human stomach, in our microbiome, microbes make essential things like vitamins available, and they prevent bad germs from taking over! In return we feed microbes with fibre and other nutrients and shelter for them to live. So, it is a very good friendship. In fact, I have heard that science is discovering that without a diverse range of microbes we may easily suffer from a range of both physical and mental diseases. So, microbes feed us and support our immune systems."

"So, you are saying that microbes help plants to grow food and then they also help us to absorb that food and strengthen our immune system, and that this is what keeps us healthy? That is news to me!" exclaimed Chifundo.

"Yes, Chifundo, and actually many of the beneficial microbes in the soil are the same as the ones in our gut!"

"This is amazing, so how can I get microbes into my garden and into my gut?" I asked her.

"Great question Chifundo. Microbes need two things: food and shelter. You have to make sure that you provide the best environment for the growth of the microbes."

So, for the next two hours Chimwemwe took me into her garden and showed me what she does. When I returned, I quickly wrote up these points to remind me what I had learned and to share with others.

"... actually many of the beneficial microbes in the soil are the same as the ones in our gut!"

Caring for the microbes in your soil

1. *Add compost to your garden.* Because this is the primary food source for microbes, they need lots of organic matter to thrive. Adding compost to your garden will ensure they have a steady supply of organic matter.
2. *Keep your soil moist as much as possible.* Microbes grow best in moderate temperatures and moist soils. If soil is left bare and dry, high temperatures can kill microorganisms.
3. *Avoid turning the soil as much as possible (many physical disturbances).* Any time the soil is disturbed through tilling or compaction, for example, it changes the conditions of the soil and disturbs or even kills the microbes living within it.
4. *Mulch your beds.* Mulching with organic matter like leaves straw or grass helps retain moisture in the soil while adding organic matter back into the soil.
5. *Avoid agrochemicals.* Chemical pesticides, herbicides, fungicides and fertilisers can devastate entire populations of microbes in our soil. Choose organic fertilisers instead such as compost and manure which release nutrients into the soil over time and don't leave long term residues like many chemical fertilisers.

We have much to learn from farmers' experience and knowledge. They are the real experts.

"Hi Ajay, I am back from the break. How are you doing? I have been so inspired by what I learned in Malawi from Chifundo Khokwa and the farmers she and her colleagues at SCOPE work with. I am also a little ashamed too."

"Good to hear from you, Estridah. Thanks for the story. But what are you ashamed about?"

"You know, I was brought up to believe that scientists only come from universities, businesses and government but some of the farmers I met and heard about in Malawi are also scientists. They may not have the degrees to wave about, but they really understand what is going on, theoretically and practically. We have much to learn from farmers' experience and knowledge. They are the real experts.

"And afterwards I read up and wrote a little information piece called "The Connection Between Soil Microbiomes and Gut Microbiomes. I'll Whatsapp it to you for comment."

DISCUSSION QUESTIONS

From reading this story, what is it that conventional nutritionists fail to understand? Although Chimwemwe is not an academic scientist what struck you about her knowledge of how to grow safe and healthy food? Is there anything that you might start doing differently?

Germs or life givers? How the miraculous microbiomes in the soil and the gut keep us alive and healthy

We are used to thinking of bacteria, viruses and other microbes as germs that cause diseases. But ongoing research into microbiomes indicates that the health of all life on this planet depends on microbiomes. Let us explore these miraculous life givers.

WHAT IS A MICROBIOME?

Simply put, a microbiome is a community of fungi, bacteria, viruses, eukaryotes and archaea, (organisms that are too small to be seen by our eyes) acting together in specific environments, like the air, the oceans, wetlands, the soils and our intestines or gut. These miniscule microbes are directly responsible for the health of all these environments and the way they function. They collaborate to help other living organisms to protect and nurture each other and make the environment more resilient.

We are learning that microbiomes run the whole planetary show: broadly speaking, they absorb and release carbon, breaking down dead matter and turning various elements into nutrients that then act as food for plants and animals (including people).

There's an atmospheric microbiome, in which single-celled organisms float through the air. There's an ocean microbiome that accounts for about 90 percent of all life under the sea and that also produces half the earth's oxygen and influences our weather. Modern conventional agriculture is altering the ocean microbiome, causing warming waters and overgrowths of harmful algal blooms that choke out other life.

And then there is a soil microbiome and a gut microbiome which are intimately connected, providing animals, including humans, with a range of vital functions that keep us alive and healthy.

THE SOIL GUT MICROBIOME CONNECTION

We now know that a spoonful of agricultural soil contains 30,000 varieties of microbes with several metres of fungal filaments that convert dead matter to biomass or attach to plant roots to boost their nutrient uptake; up to a billion bacteria that convert nitrogen gas into compounds that "feed" those plants and other organisms; a few dozen nematodes and a few thousand protozoa that keep bacterial populations in check, mineralise nutrients and protect plants from pathogens.

What the researchers have discovered is that without microbiomes, life on earth as we know it will disappear. Figuring out how to restore and protect microbiomes — in soil, in people, in oceans, and air — is arguably one of the most crucial challenges facing humanity.

When the soil microbiome is healthy and in balance, it positively affects the health of the plants that grow in it and protects them from drought or pests. It can overwhelm pathogens attacking plants, produce toxins to kill them, and trigger the plants to defend themselves. It also acts as a carbon sink, reducing greenhouse gases.

The Human Microbiome Project discovered that the soil and our gut microbiome both contain about the same number of active microorganisms. The same molecules are used for the health of a plant in soil and our own gut. Gut microbes produce enzymes that help us digest food and break it down into essential nutrients, producing vitamins that our own bodies cannot make on their own. They protect us from disease-causing organisms by regulating our immune system. They teach it how to fight off invaders, as well as producing anti-inflammatory compounds.

WHAT DOES THE MICROBIOME HAVE TO DO WITH GROWING HEALTHY FOOD?

Human activity has done much to undermine and even destroy these microbiomes, in particular industrial farming. Tilling soil releases carbon and disrupts and damages good bacteria, fungi, and arthropods. Monocropping saps nutrients from soil and decreases the beneficial microbes that live in it, leading to poorer plant growth and increased susceptibility to plant infections and diseases. Monocropping is also heavily dependent on chemical inputs which negatively affect or kill microbes, their diversity, composition, and biochemical processes. This causes serious hazards to soil environment and human health. Chemical pesticides are poisoning our soils and all the life supported by it.

Our diets have become reliant on monocultures of processed and over-fatty foods that knock our gut microbes off-balance, leaving us susceptible to non-communicable diseases such as obesity, diabetes, and colon cancer.

As these microbes disappear, the soil and its plants suffer; and so does our health as we take in fewer and fewer varieties of tiny organisms into our gut microbiomes. Some of these beneficial microbes may be in danger of extinction.

In the same way that microbial diversity in soil is decreased by agricultural chemicals, our microbial gut diversity is reduced by antibiotics and pesticide residues in our foods. Both antibiotics and synthetic pesticides have been crucial to modern life, but the collateral damage to human and soil microbiomes has been huge. Our way of growing food, which is killing off beneficial microbes, is making food less nutritious, and contributes to our poor health.

Adapted from Lela Nargi - https://foodprint.org/blog/soil-microbiomes/

Almost 75% of plant genetic diversity has been lost because of rapid expansion of farmland to produce these commercial crops.

"Estridah, thanks for your story and piece on microbiomes. How amazing are the trillions of invisible microbes in and around us all the time, keeping us alive!"

"I agree, Ajay! So, what have you got for me?"

"Well what luck I had! I called Daniel Wanjama, the Coordinator at Seed Savers Network in Kenya and he was here in Kampala! So, we met at the Endiro Coffee Shop and he told me a fascinating story. I also got in touch with Grace Ruto from Vi Agroforestry and she gave me an amazing story about how unproductive farms can be regenerated using what she calls Agroforestry and Sustainable Agriculture. Here they are."

Making traditional seed available for planting to all farmers – How the farmers have done it

As told to Ajay Bizimana by Daniel Wanjama, Coordinator at Seed Savers Network, Kenya

Growing up, Daniel Wanjama used to see his mother save some seeds after every harvest for planting. But you can hardly find these traditional seeds anymore which have undergone a rapid decline as many heritage and native plants species are being replaced with modern, commercial crops such as maize, tea and coffee. Almost 75% of plant genetic diversity has been lost because of rapid expansion of farmland to produce these commercial crops.

Seed saving is a traditional practice by farmers. Many farmers abandoned this great practice when private seed companies started coming up with different commercial crops that they claimed to be better than our local crops. Realizing this, Daniel Wanjama founded the Seed Savers Network (SSN), a grassroots organization dedicated to conserving local crops seeds, improving farmer access to seeds and encouraging biodiversity conservation.

"We needed to produce high quality seeds for traditional crops, he explains, because with poor quality seed, we cannot have a quality crop, and this leads to low yields. We wanted to stop the narrative that traditional crops are low yielding when compared to the foreign commercial crops.

How can we improve the quality of traditional crop seed?

One of the lead farmers in the seed savers network is Beatrice Wangui who has been saving and improving his seeds during all his farming career. To grow seed for the traditional maize he identifies the first maize plants to tussle and marks them to select for fast maturing genes. The second characteristic is normally about the size of the yields and the maize plant bearing more than one cob or big cobs are also marked.

The selection is finally done for disease resistance by selecting only the plants that have no pest and disease symptoms, combined with the previous characteristics. He periodically collects other traditional maize varieties from other farmers to plant with his own to increase diversity on his farm. Some of these maize types include, yellow, purple and blue.

For other crops such as potatoes, Beatrice identifies disease-infected plants and removes them from the field to avoid transmitting seed transmitted diseases to the next crops. The practice ensures improvement of the crop each generation. According to Beatrice seeds such as those of the traditional vegetables should only be obtained from high yield, disease-free, healthy plants for the next planting.

Daniel Wanjama's organisation works with smallholder farmers by integrating modern seed saving techniques with age-old indigenous knowledge on seed saving.

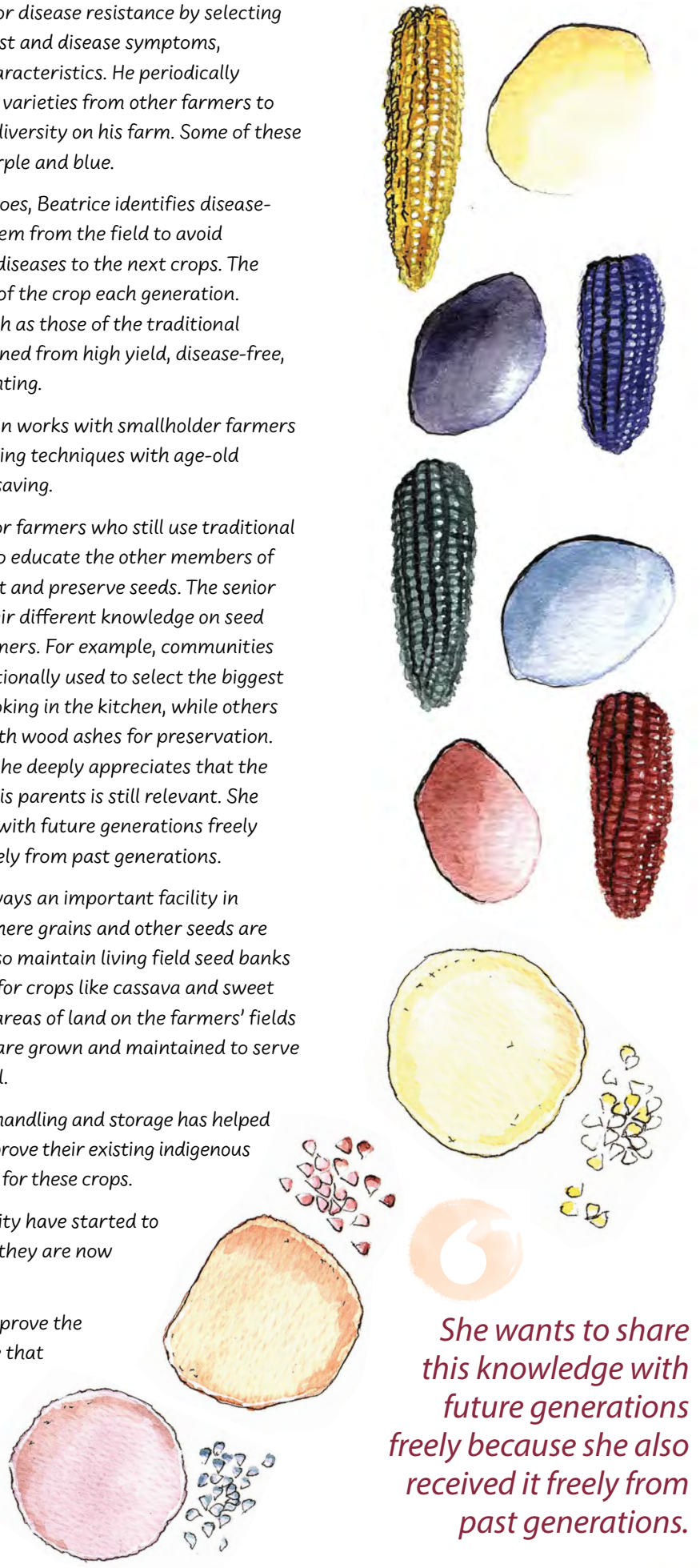
This involves identifying senior farmers who still use traditional knowledge and local varieties to educate the other members of the community on how to select and preserve seeds. The senior farmers are happy to share their different knowledge on seed saving methods with other farmers. For example, communities who grow maize in Kenya traditionally used to select the biggest cobs and preserve them by smoking in the kitchen, while others used to mix grain and pulses with wood ashes for preservation. According to Beatrice Wangui, she deeply appreciates that the knowledge passed down from his parents is still relevant. She wants to share this knowledge with future generations freely because she also received it freely from past generations.

The traditional granary is always an important facility in family farmer's homesteads, where grains and other seeds are preserved. The communities also maintain living field seed banks that serve as a source of seeds for crops like cassava and sweet potatoes. Field seed banks are areas of land on the farmers' fields on which a collection of plants are grown and maintained to serve as a source of planting material.

The ongoing training on seed handling and storage has helped the farmers to continuously improve their existing indigenous crops and to access quality seed for these crops.

More farmers in my community have started to grow the indigenous crops and they are now sharing the seed freely.

Our organisation works to improve the supply of seeds, targeting those that lack a reliable supply of seeds mainly those of fruit tree, cassava, sweet potatoes, arrow roots and local vegetables.



She wants to share this knowledge with future generations freely because she also received it freely from past generations.

How do we do this?

Farmers are mobilised to join seed banks and are trained on seed quality and their role in supplying other farmers whenever they need seed for the various traditional crops. For all traditional crops (vegetables, cereals, pulses, tubers, roots and fruit trees), the farmers who serve as seed suppliers are listed and their information saved in a database that helps in connecting them with farmers who need of the seeds of specific crops. The database serves to provide information for all local crops' seed availability. The database is now being transformed into an online seed exchange platform (https://seedexchangekenya.org/). This benefits small scale farmers because often they cannot afford expensive, patented seeds from large seed companies.

Whichever technique is used, seed saving plays an important role not only in preserving indigenous varieties of important food crops, but also in mitigating against increasing risks of pests, diseases and climate change. We need to support the farmers in ensuring that the seeds used are healthy and that the storage methods used for seed remain viable to support high yields.

Saving local seeds and crops will prevent species from disappearing. Maintaining a large diversity of crops is important to ensure food at all times as changing circumstances require different seeds.

"Thus, it is crucial that farmers continue to have access to diverse seeds now, and in the future. This is their God-given right, nature's precious gift to honour and protect!" Daniel concludes.

"Thus, it is crucial that farmers continue to have access to diverse seeds now, and in the future. This is their God-given right, nature's precious gift to honour and protect!" Daniel concludes.

DISCUSSION QUESTIONS

What are the many reasons that it is so vital to save indigenous seeds? How did Daniel unlock local resourcefulness to achieve his organisation's goals?

"Well, I will never take the simple seed for granted again, Ajay! I cannot believe how much knowledge exists amongst the older generations and isn't their generosity towards each other and future generations an example to us all in this selfish and competitive modern world?"

"Yes, indeed sister Estridah! In which case you will enjoy the next story where you will see how the farmers and an NGO are also freely sharing knowledge and catapulting each other into a whole new way or working with nature. It makes modern, industrial agriculture look tired and boring!"

Regenerating and enriching our soils to produce good food

By Grace Ruto of Vi Agroforestry

More and more farmers in communities across Africa are moving away from growing monocrops with chemical fertilisers and pesticides. What they are learning again, like their ancestors, is to grow a diversity of crops using natural farming methods. Some are also moving into growing food forests or agroforestry. All are learning that diversity and natural farming approaches improve their soils and provides nutritious food for their families. Listen to this story of Nekoye and her mother Nelima.

Nekoye is upset about the mushrooms

Nelima is home for a few weeks, and she is upset. She is in her first trimester of pregnancy and has a craving for wild mushrooms, dried in the sun and cooked over an open fire. But her mother, Nelima, says there are no mushrooms to be found, even though the rains have started. All Nekoye knows is that she craves mushrooms. What she does not consciously know is that mushrooms are full of vital minerals that are vital for her and her baby's growth. But her body knows this, and she is listening to it!

She remembers as a child when the rainy season came that it would be a MUSHROOM-FILLED season! When she returned home, her mother would be cooking the mushrooms she collected the day before. These would have been left to dry in the sun to give them that dried meaty flavour. The thought of the delectable dinner that awaited Nekoye made her mouth water.

She remembers as a child when the rainy season came that it would be a MUSHROOM-FILLED season!

She remembers venturing out into the farm, her trained eyes quickly picking out areas where the clumps of mushrooms would spring up like magic overnight. She would carefully pull them by the roots from the rich soils that surrounded her home, filling her lap-bag with mushroom goodness in minutes before returning home. There she would find her seven siblings seated around the kitchen fire, each eagerly holding an enamel plate full of mushroom stew, as they waited for her to squeeze into their circle and pick up her own small, delicious bowl.

The memory of those days and the heavenly taste and scent of mushrooms is still vivid to her.

"What happened, Mama? Why have the mushrooms disappeared?" Nekoye asks.

"The agriculture officer of a new project in our village told us that we have been taking away from the soil without giving back, overworking it so that now it is tired.

We have also been growing just one crop, monocropping he calls it, and used too much chemical fertiliser. He told me that because of all these things the soil has become too acidic to support mushrooms. Also, cutting down trees caused erosion of the rich topsoil in which the mushrooms always sprouted."

"It's not just the mushrooms," Nekoye's mother adds. "It's about our farm productivity which has been declining over the years, the unpredictable weather patterns, the beehives with no bees, the high costs of dairy farming, dwindling crop yields, scarce firewood. The list goes on and on."

This situation has forced Nelima to depend on the money Nekoye sends her. She is fearful of what would happen if Nekoye lost her job, or now with her own family coming there might be little left. It saddens her that her farm is no longer able to meet her family food needs, nor help her to keep the younger children in school.

"But I have some hope now with the support from this organisation called Vi Agroforestry. They have some experience on how to restore the productivity of her farm. Tomorrow morning, I will take you to our small 'soil kitchen'. This is what our project officer calls our demonstration site, where we all learn how to cook for and feed the soil".

Nelima introduces her daughter to the "soil kitchen"

Over breakfast, Nelima explained to Nekoye that she is a part of a women's group of thirty farmers who own an average of two hectares of land each. When their farms' productivity began to deteriorate years ago, they banded together to form a merry-go-round, meeting weekly to contribute a small amount of money to help each other. With lower farm yields, many had turned to farm work or relied on their grown children working in the city to send money for their weekly contributions.

This situation has forced Nelima to depend on the money Nekoye sends her.

"When the project officer approached their group and explained what it would take to bring back their farm productivity, we were more than willing to try."

After breakfast, Nelima and Nekoye left for the soil kitchen, a fifteen-minute walk from their home, on a piece of land donated by Mama Sarah. As they walked along, Nelima kept her daughter updated.

"This is Nalondo's farm, remember, where you and your siblings used to harvest basketfuls of rich ripe guavas, which I have learned are full of zinc?"

But on this farm, it looked like it had been wet for a month, and the plants were so healthy and juicy. What magic took place here?

"Oh yes! I remember, but now there is nothing, Mama", Nekoye looked around in shock.

The farm was bare, except for the sisal plants used to mark the boundaries, and a few sweet potatoes that looked poorly.

"Luckily, she has become one of our members and together we shall learn how to restore this farm to its former glory" Nelima answered.

Finally, they arrived at Mama Sara's farm where the rest of the women had arrived to begin their daily lesson. The whole group moved towards an enclosed area on the farm. Nekoye was totally amazed. In this small area measuring about an eighth of a hectare, was an array of growing artwork, carefully demarcated into around twenty small beds. Half were covered in all kinds of vegetables. In between the beds were different edible fruit or nut trees, still a metre high but well-planted and cared for.

Nekoye wondered, "Why does the soil look so different here? How was it possible to plant trees within the food crops and yet they still survive?"

Even though the rains had just started the soil in most farms dried up quickly. But on this farm, it looked like it had been wet for a month, and the plants were so healthy and juicy. What magic took place here? Well, she was about to find out.

The lesson for the day began with one of the project officers requesting the group to recap on what they had been taught the previous day.

Nelima knew she would have a lot of questions to answer when they got home, but for now, she was going to show her educated daughter just how much she still had to learn. So Nelima raised her hand and begun to speak.

"Mwalimu (teacher), in the previous week we learnt how our soils have become barren because we have been growing crops on them and not feeding them. We learnt how we can "cook" for and feed our soils. One of the ways is to make compost manure, which consists of the residues left from our harvest.

We combine it with the manure from our animals which are rich in nutrients because they feed also on grass and crop residues. We learnt that anything that grows on the soil takes nutrients from the soil and we have to find ways of returning it to the soil either as compost, or as animal manure, or as mulch."

The whole group clapped as the officer smiled. Nekoye gazed in awe at her mother who had only attained primary education and now this!

Mama Nelson raised her hand to continue, "We also learnt that there are trees, which can be grown to help the soil. These trees improve soil fertility because they have roots which make proteins for the soil," she said pointing at a row of Calliandra, Sesbania and Leucaena, which had been grown in between the small plots. "These trees also provide us with protein rich food for our animals, which in turn gives us good manure to return to the farm. In addition, these trees prevent rainwater from washing away our topsoil which are rich in nutrients, as they slow down the rate at which the rain water runs across the soil on our farms."

As the answers kept coming, practices such as mulching, cover cropping, soil and water conservation, crop rotation and green manure were mentioned by the women and explained. In this farm, a new farming system that involves growing of crops mixed with trees (sustainable agriculture and agroforestry) had been brought alive. The women's group had learned, and seen in practice, how these practices regenerate soils and enrich soil microbial life and ecosystems and how they impacted the soils nutrition.

As a member of a women's group, Nekoye's mother benefited from the many training packages provided by the team of experts sent to the villages to train on soil and land management, and agroforestry practices. The women chose one or two practices to introduce on their own farms after each session and visited each other to inspire and learn.

Nekoye now understands why her mother no longer stacks maize stalks in the store for fuelwood; she has established her own compost pit and will soon begin transporting the manure to the field in preparation for the upcoming planting season.

Nekoye cannot wait to get home and see what her mother has replicated from the soil kitchen. As her mother prepares lunch for her siblings, she eagerly follows the footpath that will take her on a tour of the farm.

She notices changes that she would have otherwise overlooked. One is a small tree nursery that her mother has set up in front of the kitchen under the utensils rack and covered with an old mosquito net.

The women chose one or two practices to introduce on their own farms after each session and visited each other to inspire and learn.

Nelima comes out to fetch the plates and she notices her inspecting one seedling that resembles a plant she saw at the soil kitchen?

"We have to grow these seedlings in the dry season just before the rains so that we can transplant them once it starts to rain," she explains with a smile noting Nekoye's interest. "I keep them under the utensils rack because I water them using the wastewater from washing the utensils. This tree I will plant inside the farm together with these other trees". Nelima gestures as she continues, "this is mukima plant also known as silky oak (Grevillea robusta), good for soil and water conservation. This one is pawpaw, for fruits. These are mangoes, which we shall be shown how to graft for fruits too. This line is the tree of iron or mother of cocoa (Gliricida sepium) good as animal feed and it also feeds the soil (it is a leguminous tree)…"

By the time she was done, and her sweet potatoes were ready, Nekoye realised every tree seedling her mother had established had a use and its place on the farm was already determined. None of the trees would be grown for just the sake of it. If it was not fruit, it was for soil fertility, or medicinal use, or fodder, or firewood. Each had its specification on how, where and when to grow, how it would be harvested and used.

"Now, my dear girl, I just took you through an Agroforestry course, and I need my payment," Nelima scoffs, laughing at her expression.

Nekoye knows she cannot afford to pay for such invaluable information. "How come I never learnt this in school? It should be a compulsory subject," she pondered.

None of the trees would be grown for just the sake of it. If it was not fruit, it was for soil fertility, or medicinal use, or fodder, or firewood. Each had its specification on how, where and when to grow, how it would be harvested and used.

DISCUSSION QUESTIONS:

What is the key idea that lives behind the approach that Nelima and her neighbours are learning about? How do you feel about the messy nature of this approach to farming, without its neat rows and single crops?

"Ajay! That's a riveting story. I just love the idea of a food forest. It feels like we can revive the whole earth this way. It's all about understanding and working with nature!"

"I agree. So have a look now at this piece by Cecilia Onyango. If we are going to adopt the mindset of working with nature instead of against it, we need to understand what it has to offer. Time for some theory!"

Agroforestry - Food Forests

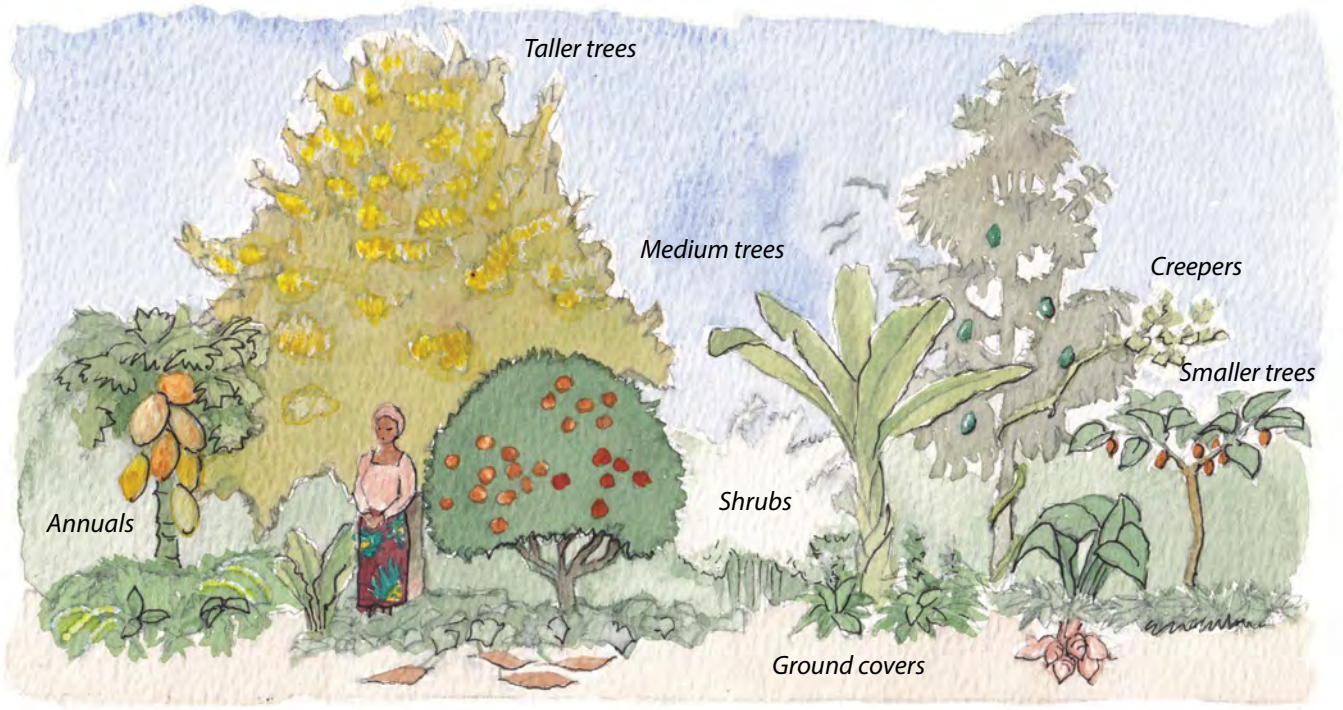
Food forests are forests of diverse edible plants that attempts to mimic the ecosystems and patterns found in nature. A food forest does not have to be re-planted year after year. Once it is established, it is generally very resilient. It usually includes non-edible plants that play a supportive role to the edible plants.

Essentially a agroforestry is a low- maintenance, sustainable, plant-based food production approach based on forest ecosystems, incorporating fruit and nut trees, shrubs, herbs, vines and perennial vegetables. You won't find neat rows of the same vegetables but rich and messy mixes of plants, microbes and mycelium, all feeding and protecting each other in many ways. Food forests provide the perfect environment for a wide variety of the healthiest foods to grow.

Conventional chemical-based agriculture requires constant effort and control to generate food from an unnatural system. On the other hand, food forests grow into self-regulated, food-abundant environments that require much less effort. When you work with nature it does a lot of the work for you!

Smallholder farmers can use the concept of Agroforestry to restore soil fertility, reduce greenhouse gas emissions for agricultural activities and increase their resilience to the effects of climate change. The idea is to introduce farm practices that increase the recycling and retention of nutrients on the farm as opposed extracting them only.

Layers of a forest garden

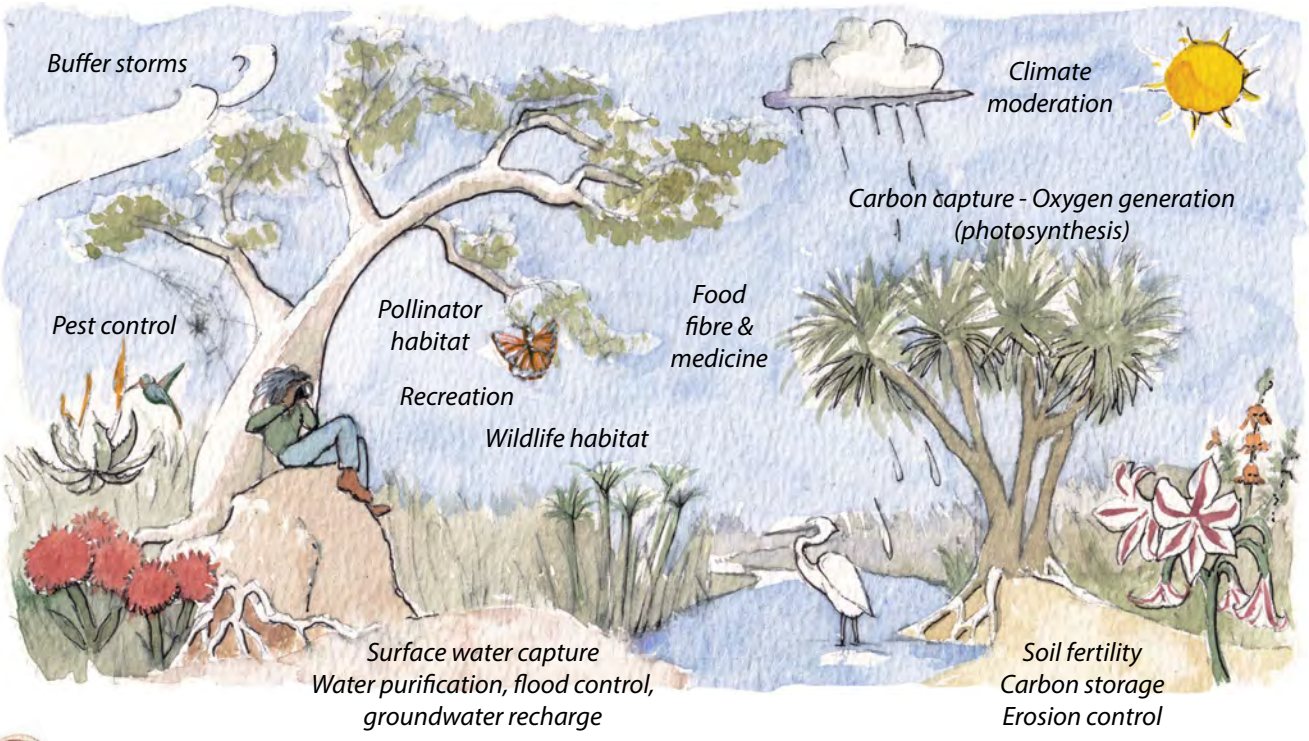


Working with nature: understanding the gifts in Ecosystem Services it offers to the world

By Cecilia Onyango

Ecosystem services are the benefits that we obtain from the diversity of life around us. Healthy, diverse indigenous plants communities provide a variety of invaluable ecosystem services. They can be provisional, regulating or supporting services. Look at the picture below. Isn't this amazing!

The many functions of diversity



Provisional services. These are the ones we are most familiar with including food, fresh water, fuel, fibre and medicines, all of which we collect from natural and managed environments. Many indigenous plants can be harvested for food, animal feed, and fibre. For example, diverse vegetables and fruits have traditionally been important foods for most African communities. We also harvest indigenous trees and shrubs for firewood, and to produce wood for building or feed for animals. Some people use indigenous plants as medicines.

Regulating services. These help to control floods, diseases, pests, and the climate, and provide for water purification and pollination. Indigenous plants also contribute to regulating ecosystem functions such as flood control and climate regulation. For example, diverse indigenous plant communities along waterways and roadsides slow water movement and can prevent flooding much more effectively than introduced grasses. The plants also absorb carbon dioxide from the atmosphere, release the oxygen for us to breathe and store the carbon in their roots and stems, helping to regulate greenhouse gases.

Spiders, bats, birds, carnivorous plants and other species help to control insects and other pests. These organisms depend on healthy indigenous plant communities for food, shelter and other habitats. These plants support wild pollinators that are essential to stable and secure production of foods and other crops. Again, healthy ecosystems break down both natural and human generated waste and recycle the nutrients and other materials into growing plants and animals. Indigenous plant communities also trap pollutants in wastewater, leading to cleaner water supplies.

Supporting services. Plants form the critical base of food chains in nearly all ecosystems. Thus, plants harvest the energy of the sun, providing both food and habitat for other organisms. For example, plants are fed upon by insects, which may be eaten by birds, which are in turn are eaten by birds of prey, and so on. They also provide a conducive environment for other species to live in such as certain plants that are loved by butterflies, bees and beetles etc. In general, indigenous plants support other indigenous species more effectively than non-indigenous plants.

Finally, ecosystems link us together culturally, as we share in appreciating the beauty of the outdoors through recreation, education, and spiritual uses. It is important to realise that we are part of nature and it is a part of us. We have separated ourselves from nature, from the earth itself, through our industrial farming and modern supermarket cultures, abusing its gifts. If we want to live in harmony with nature, not only benefitting from it but also contributing to its flourishing then we need to understand it and the gifts it has to offer.

"That is a powerful piece, Ajay. Well done for gathering that! It reminds me of some lines of a poem called How We Became Human by Joy Harjo that I read recently:

In the legend are instructions on the language of the land,
how it was we forgot to acknowledge the gift, as if we were not in it or of it.
Take note of the proliferation of supermarkets and malls, the altars of money.
They best describe the detour from grace.
Keep track of the errors of our forgetfulness; the fog steals our children while we sleep.

"That last line is like a punch in the stomach, Estridah. We really need to return to nature if we want to be healthy and retain our humanity!

"Many people are probably sceptical that natural farming can go mass scale. I did a bit of digging and discovered that almost a farmers in Andhra Pradesh Community Managed Natural Farming in India are viably making the shift from chemical to natural farming."

"Ok, so let's do some research and also gather everything we have learned these last few weeks and write a set of "Principles to Follow in Natural Farming. I am sure the group will appreciate that."

Principles to Follow in Natural Farming

Every farm or garden is unique. There are no strict rules in Natural Farming, only principles to guide you as you learn to become a better natural farmer. Many of the alternatives to industrial farming have focused on replacing chemical inputs with organic inputs. Natural Farming, however, goes further and aims to create a farming system that is in tune with the way Nature operates.

1. Crop cover – aim towards green cover for as long a time as possible

Nature aims at maximum ground cover with green plants, including trees. We've known for long that cover means there's no damage of the soil from rain drops and water infiltrates more easily along plant roots.

We now have a greater understanding of the mutually beneficial relationship between microbes and plants. Plant roots exude (leak out) various substances that microbes consume. The microbes in turn provide the plants with nutrients. This makes the soil richer and healthier, so not only do 'healthy soil makes healthy plants', but 'healthy plants create healthy soil'.

So, the longer you have plants growing and covering the soil throughout the year, the more your soil will benefit.

2. Crop diversity (including trees) – include at least 8 – 12 species in any one cropping area.

Each plant pumps a unique set of substances into the soil. This in turn attracts different varieties of microbes. If you can get 8 to 12 different plants growing near each other then something called quorum sensing kicks in which multiplies the interactions and benefits between the plants. The more diversity in our farms the more healthy and productive they are.

3. No/low till farming – keep tillage disturbance to a minimum, ideally not at all

Ploughed soil loses much carbon to the air through oxidation. Ploughing disturbs the structure of the soil, ripping through living fungal threads that are woven extensively through all healthy soil. These fungi in the soil make glue to hold the soil together in what are called 'stable soil aggregates'.

Zero or minimum tillage, combined with the other principles (no herbicide either), can quickly lead to a soil with those all-important stable aggregates. This is soil that is rich, loose and crumbly.

4. Integrate animals – have livestock as an integral part of the farming system

Some points worth noting linked to this important principle:

- Nature never farms without animals.
- Natural Farming produces lots of biomass that can feed animals who produce manure.
- With ruminants (like cattle), the fresh manure is super-charged with a large diversity of microbes, a good source for making the bio-stimulants (see next principle).
- Where grasslands are involved in areas that have long dry seasons, the microbes in ruminants' stomachs are important for breaking down the dry grass.

5. Use of bio-stimulants – select and use appropriate bio-stimulants to speed up life returning to soils

Bio-stimulants are tonics for the soil and plants to help bring life back to the soil and plants quickly, by inoculating them and the soil with microbes. The microbes then ensure plants get nutrients in return for receiving sugars from the plant roots. Once the soil is healthy enough, the bio-stimulants shouldn't be needed. There are hundreds of recipes for various bio-stimulants, biofertilisers and bio-inoculants. See references at the back of the book for links.

6. Organic matter addition – Increase OM through addition of dry mulches

Nature always covers and protects the soil so we must do the same. Thick mulch covering the soil around plants, using any available dry matter, is another critical practice in natural farming. Mulch helps create a comfortable and moist home for microbes. Mulch also keeps the soil cool in hot weather. The best is to grow this mulch in situ as cover crops and leftover from cropping season but, especially at the beginning of the transition to natural farming one may need to bring in mulch.

7. Local seeds – use only local/traditional seeds

Natural Farming has an emphasis on using local and traditional or hierloom seeds. Farmers have evolved seeds for their own situation for thousands of years to suit particular soil and climates. Modern hybrid and GMO varieties of seed are not adapted to local conditions and must often be used with toxic chemicals.

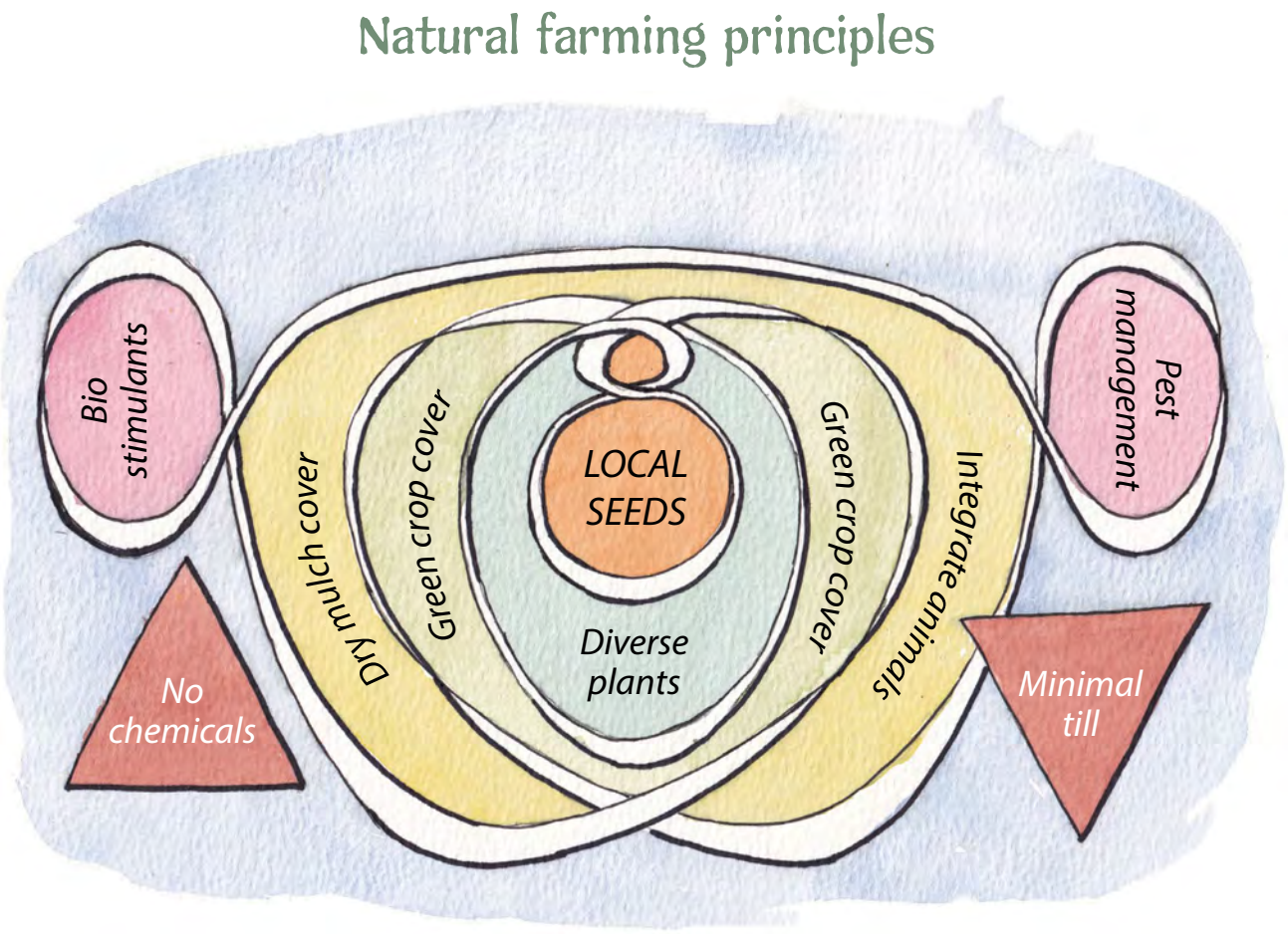
8. For pest management understand pest life cycles and use non-poisonous methods to address the weakest link in pest life cycle.

Pest management is difficult when shifting to natural farming. The key is understanding the life cycle of pests an focusing on the weakest link in this cycle. There are many different natural approaches choose from.

9. No chemical stress – avoid all chemical pesticides, herbicides and fertilisers

Natural farming means stopping all chemicals. If you're currently farming with chemicals, start with a small section of your farm to learn how to do this. Then expand your natural farming area, with confidence.

Andhra Pradesh Community Managed Natural Farming - https://apcnf.in/



NOTES





4 Grow well, eat well, be well

How to eat healthily every day

Fanza tilted her head to one side, "OK, Njabulo, we are focusing on the challenge of *how to eat healthily every day*. There is so much information out there on what a healthy diet is, but I don't want to regurgitate information that we already know. We need stories."

"Well luckily you have a most resourceful partner, Fanza!" Njabulo with a hearty laugh. "I bumped into Dr. Monica at the market on Saturday. She advised us to do some fact sheets, distilling key information into something readable, one on the basics of malnutrition and another on what is a healthy diet. And we could look for stories about communities discovering the need for healthy diets and what she called *farm-level pathways to healthy diets,* about how people farm with a clear idea of the healthy diets they want."

"Uh, OK. Is that a list of contacts she gave you?" asked Fanza.

"Yes. Let's split it up and reach out to them. I'll take Tafadzwa Nyanhanda, and you can take Lizzie Shumba."

"Good, I will research a fact sheet about malnutrition, and you can do one on the basics of healthy eating."

"Sharp sharp, sisi!"

How lifestyle diseases can be avoided by eating well

By Tafadzwa Nyanhanda

It was midday and Ruvheneko was sitting at her mother's market stall in Murambinda a small town in the southeast of Zimbabwe. She was watching people as they walked by, fascinated by all the different people, their clothes and even their body sizes. "When I grow up and am amazing and wealthy, I'll also have a big body like those rich people."

"Ruvheneko! Please stay focused on selling our wares."

DISCUSSION QUESTIONS

Looking at our food environments are healthy food choices always the easy option? What would be an example of a healthy traditional/organic diet to prevent or manage diabetes?

Ruvheneko sat up, "Sorry, Mum. When I grow up, I will be so rich that I will eat as many cakes as I like every day and I will buy you anything you want!"

Her mother smiled, "You know when I was young, my father, got a better job and suddenly we had a bit more money to spend. Unfortunately, we moved away from eating traditional food crops of local vegetables and fruits to eating refined maize, white bread, cakes, chips, you know all the processed food you get in packages and also cooking with lots of fats and sugar. And we started eating sweets."

Ruvheneko interrupted "Of course mum, when you have more money, you can choose to eat whatever you want, including having more sweets and treats!"

Ruvheneko's mother smiled, "Then, when I was in 7th grade my father went to Canada for studies. But when he came back, he was diagnosed with type 2 diabetes and hypertension, you know, high blood pressure. Those can be deadly diseases, so the doctor told him to cut out sugar, saturated fats and salt."

"That sounds hard. Imagine no sugar!"

"That's right. He had to stay away from foods such as refined maize meal, white sugar, soft drinks, margarine, cakes, potato crisps, fried foods just to name to a few. That was quite challenging for him, and I don't think he really stopped. He ate less but we all carried on the same. Not long after that his brothers were also diagnosed with diabetes and hypertension."

"Are diabetes and hypertension hereditary, Mum?"

"At first, my father's family consulted traditional healers as they thought a curse had been placed on our family. However, we later learnt about good nutrition and a healthy lifestyle and discovered that you could help to treat or even prevent diseases such as type 2 diabetes, obesity, heart disease, hypertension and strokes through eating a healthy diet."

"Why did grandpa die, Mum?"

"As you know grandfather had his leg amputated a few years ago and then he passed away due to type 2 diabetes, before his time."

"That is when I came to realise that we needed to make changes to our diets. Our traditional way of eating may not be what rich people eat but it is rich in healthy food. People never got these diseases before, only when they abandoned their different traditional food crops, vegetables, and fruits. Look over there! That is real food! That is what we eat." She pointed to the women selling so many varieties of traditional beans and grains and fruits and vegetables. "You can have all the money in the world, Ruvheneko, but if you are unhealthy, you are actually quite poor. Your health is your real wealth!"

"Hey, Mum, does that mean I am already wealthy?" Ruvheneko beamed.

Understanding Malnutrition

WHAT IS THE PROBLEM?

Increased production of processed foods, rapid urbanisation and changing lifestyles have led to a shift in dietary patterns resulting in high consumption of foods high in energy, fats, free/processed sugars and salt/sodium, and limited consumption of fruit, vegetables and other dietary/high fibre foods such as whole grains. This has led to every country being affected by malnutrition at least in some form, whether it be undernutrition, micronutrient deficiencies, or overweight and obesity with some countries struggling with multiple forms.

Sub-Saharan Africa is experiencing the double burden of malnutrition with high levels of undernutrition and a growing burden of overweight or/and obesity resulting in diet-related non-communicable diseases. Consuming a healthy diet throughout life can help prevent all forms of malnutrition as well as a range of noncommunicable diseases (NCDs) and conditions.

WHAT IS MALNUTRITION?

(adapted from Angela Kimani and Irene Kimani)

Having an understanding of the various forms of malnutrition and how they manifest is important in tackling malnutrition at the community and population level. The next section describes the main forms of malnutrition and how these are classified.

Malnutrition refers to deficiencies, excesses, or imbalances in a person's intake of energy and/or nutrients. It is grouped into two major categories; over nutrition and under nutrition.

Over nutrition

Over nutrition arises from excessive intake of foods high in energy, fats, free sugars and salt/sodium resulting in overweight and obesity, leading to accumulation of body fat that may impair health. It increases risk for diabetes type 2, heart disease, high blood pressure and some cancers.

Undernutrition

Undernutrition is divided into two major categories; protein energy malnutrition (PEM) and micronutrient malnutrition.

Protein energy malnutrition develops in children whose consumption of protein and energy is insufficient to satisfy their nutritional needs and it manifests itself as wasting (low weight for height), **underweight** (low weight for age), and **stunting** (low height for age).

Wasting is a reduction or loss of body weight in relation to height. Underweight refers to low weight for age. A child is considered **underweight** when they have not met their expected weight for their age (Figure 2). Wasting is an indicator of acute malnutrition.

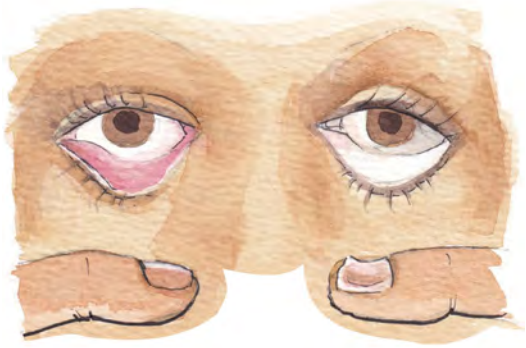
Stunting refers to a child who is too short for his or her age. It occurs when a child, from the time in their mother's womb to 2 years of age, suffers from inadequate nutrition (not eating enough or not eating a rich diet of growth promoting foods). Stunting often results in delayed mental development, poor school performance and reduced intellectual capacity. Stunting is an indicator of chronic malnutrition. Stunting is irreversible. Eating well after 2 years of age will not improve mental capacity or physical size.

Micronutrient malnutrition (also known as "hidden-hunger")

Micronutrient malnutrition, or 'hidden hunger', refers to diseases caused by a deficiency of vitamins and minerals. Examples of micronutrient deficiencies include:

Rickets

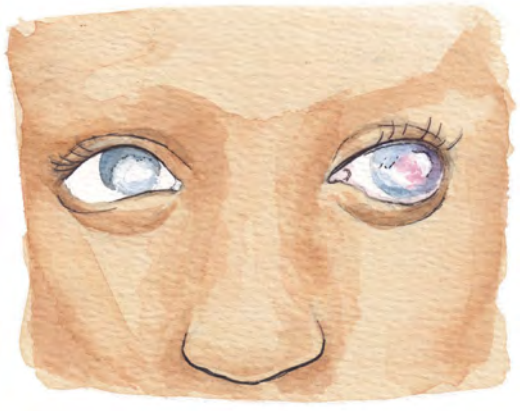
From not receiving adequate, calcium, vitamin D and other important nutrients for the bone to develop.
Causes abnormal formation of bones while children are growing



Iron Deficiency Anaemia (IDA)

From inadequate intake of iron rich foods

- Dizziness
- Edema
- Pale skin, eyes and nails
- Fatigue



Vitamin A deficiency

- From inadequate intake of vitamin A rich foods
- Night Blindness
- Dry, hazy appearance of the transparent part of the eye;
- Cloudy foamy spots in the eyes;
- Inflammation in the outermost layer in the eye resulting in pain;

Goitre

Abnormal enlargement of the butterfly-shaped gland below the Adam's apple (thyroid).

A goitre commonly develops as a result of iodine deficiency or inflammation of the thyroid gland

Diabetes

The number of overweight and obese people is rising across Africa because of lifestyle changes. People are exercising less, sitting more and eating inexpensive and unhealthy processed foods.

WHAT IS DIABETES?

Diabetes is a chronic disease that occurs when the pancreas does not produce enough insulin, or when the body cannot effectively use the insulin, it produces. Insulin is a hormone that regulates blood sugar. Hyperglycaemia, or raised blood sugar, is a common effect of uncontrolled diabetes and over time leads to serious damage to many of the body's systems, especially the nerves and blood vessels.

How widespread is diabetes and how many people die from it every year?

In 2021, 24 million adults (20-79) were living with diabetes in Africa. This figure is estimated to increase by 129% to 55 million by 2045. Africa is the region with the highest percentage of undiagnosed people – over 1 in 2 (54%) people living with diabetes do not know they have it. In 2021, diabetes caused about 416,000 deaths.

Morbidity and complications

A common effect of uncontrolled diabetes is hyperglycaemia, or raised blood sugar, and over time if not well-controlled leads to serious damage to many of the body's systems and blood vessels. This leads to blindness, kidney failure, lower-limb amputations, heart attacks, strokes and other complications. The disease may go undiagnosed for years until complications have arisen. Symptoms include excessive urination and thirst, constant hunger, weight loss, vision changes and fatigue.

Types of Diabetes

- Type 1 or childhood-onset diabetes which is characterised by deficient insulin production and requires daily administration of insulin;
- Type 2 or adult-onset diabetes, which is largely the result of excess body weight and physical inactivity;
- Gestational diabetes, which occurs during pregnancy.

Treatment

There is no cure for diabetes and treatment involves lowering blood glucose and other known risk factors that damage blood vessels. Simple lifestyle changes have been shown to be effective in preventing or delaying the onset of type 2 diabetes. To help prevent type 2 diabetes and its complications, people should:

- achieve and maintain a healthy body weight;
- be physically active – doing at least 30 minutes of regular, moderate-intensity activity on most days. More activity is required for weight control;
- eat a healthy diet, avoiding sugar and saturated fats; and
- avoid tobacco use – smoking increases the risk of diabetes and cardiovascular disease.

What is a safe and healthy diet?

Healthy diets should comprise of a **diversity of foods** that meet energy and nutritional needs, which are safe, accessible and affordable, and that enrich and preserve social and cultural traditions.

A safe and diversified, balanced and healthy diet can vary depending on individual characteristics such as age, gender, lifestyle, physical activity levels, cultural context, locally available foods and dietary customs. However, the basic principles of what constitutes a safe and healthy diet remain the same.

So how does one achieve balance in their diet?

1. **Eat a diversity of local or traditional crops, fruits and vegetables.** Traditional African diet from food that is naturally grown without agrochemicals added to the soil. The more the diverse your diet the more you are likely to get all the different micronutrients you need.
2. **Avoid processed and refined (often packaged) foods** – processed snack foods and takeaways such as chips, biscuits, muffins, and cakes are often high in fat, salt, sugar, and kilojoules. A good rule is to avoid anything fried or covered in breadcrumbs, batter, or pastry.
3. **Watch what you drink** – the market is continually being flooded with new drinks which the body struggles to deal with. Did you know that?
   - Water is the best drink – it contains no kilojoules; it is the best fluid for hydrating the body.
   - Milk is also important as it is a good source of protein and calcium.
   - Flavoured milk, smoothies, iced teas, and flavoured waters are all high in sugars and best avoided. And the plastic bottles the come in are bad for the environment.
   - Most fruit juice contains as much or more sugar than soft drinks, so it is better to eat your fruit fresh rather than drink it.
   - Always avoid fizzy soft drinks, also called sodas.
4. **Replace salt with herbs and spices** – You do need some salt, especially in hot climates but too much salt raises your blood pressure, so be careful about that. Herbs, spices and lemon juice are good ways to enhance flavours.
5. **Learn to cook and plan meals ahead** – how food is cooked also affects its nutritional value and planning your meals helps you to avoid fast foods.
6. **Grow a kitchen garden or buy food from a local farmer** – locally grown food using agroecological methods which are safe and free from purchased agrochemicals are more nutritious so you can eat less of them to get the same value.

HEALTH IS REAL WEALTH

"Njabulo, that was a good story from Tafadzwa Nyanhanda. Health is the real wealth! Thanks for the fact sheet of safe and healthy diets. Did you like the fact sheet on malnutrition?"

"Very much, Fanza. I was surprised to learn that fruit juice has so much sugar. And it made me think that I should start my own vegetable garden, even a small one on the backyard of the house where I am lodging."

"I don't know how to grow vegetables, Njabulo. But my mother would be thrilled if I did."

"It's worth trying. We can even help each other if you like. Let's chat to the class about this."

"OK, why not? I have almost completed writing up the story from Lizzie Shumba which I will send you. What will you focus on now?"

When women are empowered, agricultural productivity rises, infant mortality declines, and child health improves.

"I got introduced to Astrid Huelin from Zimbabwe who has a great perspective on community landscaping and nutrition. I will be interviewing her online tomorrow for her story and perspective."

"That sounds fascinating. It seems that everything connects to nutrition on one way or another. Good luck!"

The links between agriculture and eating well: Farm-level pathways to improved nutritional outcomes

Good food is more valuable than you think

If people grow healthy food in good quantities, this has several benefits. They can eat properly and be much healthier, spending less on doctors and medicines. If they can sell their surplus food, they also have more income. With reduced medical bills and improved income, they can supplement their diets with a variety of good foodstuffs they don't grow and also afford other healthy things like better access to schooling for their children (whose brains have also developed well with good food). More education for children will mean better food choices when they grow up and have children.

This positive scenario is more likely to be achieved and sustained if women are empowered. When women are empowered, agricultural productivity rises, infant mortality declines, and child health improves. Improved nutrition in turn supports the agriculture sector by enhancing rural people's strength to undertake the strenuous tasks involved in small-scale farming. It is a virtuous circle.

A success story from the Soils, Food and Healthy Communities (SFHC) project in Northern Malawi

By Lizzie Shumba

In the late 90s, the Ekwendeni catchment area in Northern Malawi registered high rates of child malnutrition. Under-five years of age children were dying in large numbers. High numbers of under-five children were being admitted at Ekwendeni hospital Nutrition Rehabilitation Unit (NRU). People in the community did not know the cause but wondered about witchcraft in their villages.

Every month the hospital conducted outreach with under-five mobile clinics in the villages and discovered that many children in their communities were malnourished suffering from kwashiorkor and marasmus. The hospital decided to conduct a survey to determine the causes and they discovered the main causes to be:

- *soil infertility,*
- *low food production,*
- *monocropping (villagers were growing maize only without any legumes because of lack of seeds),*
- *lack of knowledge on food preparation and utilisation, and*
- *increased gender inequality.*

The hospital convened meetings in all the villages where malnutrition was high. A participatory approach was applied where the hospital staff and the community worked together to come up with the solutions based on the causes identified.

So, what did they actually do that made a difference?

The hospital started training community members on how to make liquid manure. The farmers applied it in their fields in the first year and saw that it worked, that year the maize yield was good compared to years before, at least they could start harvesting something!

Some community members were elected to go on an exchange program to a different project in the central region to learn from others on how they dealt with food insecurity and child malnutrition.

The hospital also started training the communities on the following:

- *Compost manure making, crop rotation,*
- *legume intercropping,*
- *crop residue incorporation,*
- *gender trainings and inclusion of all gender in all community activities and*
- *recipe demonstrations where people were taught how to prepare different local nutritious foods.*

Some community members were elected to go on an exchange program to a different project in the central region to learn from others on how they dealt with food insecurity and child malnutrition.

And the results?

People started producing enough quality harvests in order to have a diverse and nutritious diet. This was made possible because they could make compost manure for themselves at no cost, where previously they had been unable to afford a bag of fertiliser.

The situation and status of women improved as they gained confidence and showed their ability to solve the problems. This improved gender relations.

A testimonial from one of the farmers who took part

Molly, Mary's young daughter, was dehydrated and severely malnourished. Then they measured the circumference of her upper arm to assess her nutritional status, it was less than nine centimetres, about the circumference of a plastic bottle cap.

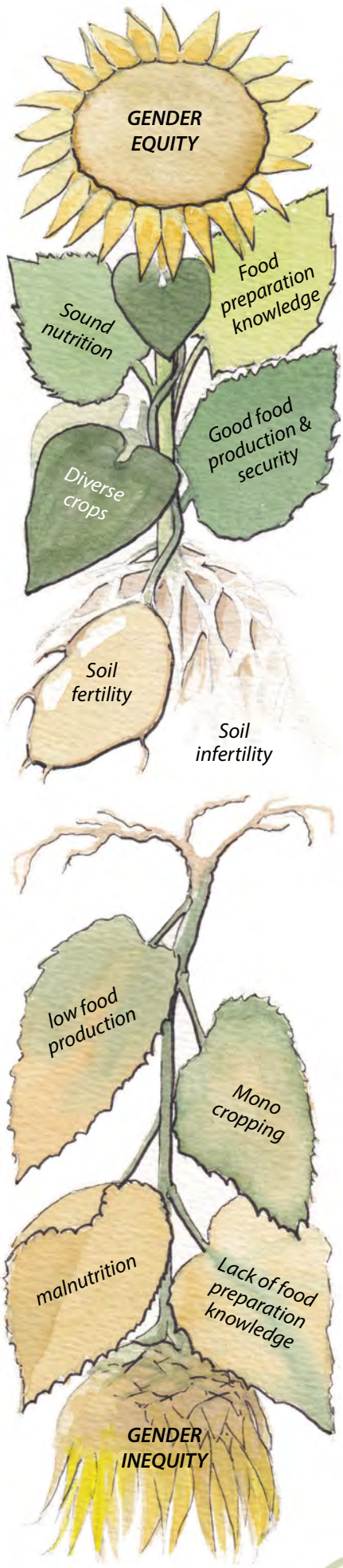
"Molly was so sick that she didn't want to eat," said Mary. "I was frightened and when I brought her to a hospital for treatment they told me this was acute malnutrition."Sadly, Molly's poor health was not an unusual story. Many under five children in their catchment area suffered from malnutrition at that time, which was the single biggest contributor to childhood deaths in the area.

But the team of nurses and clinicians were determined to ensure that Molly would recover from malnutrition. Seeing that Molly needed immediate medical care, the nurses' team quickly admitted her in the Nutritional Rehabilitation Unit ward (NRU) at the Hospital. She was treated for parasites and given antibiotics to help fight other possible infections, and she was also put on therapeutic feeding. The medication soon helped spark her appetite, and the NRU staff were well-equipped to provide her with nutritious food especially "likuni phala" prepared from soya beans. After 3 weeks Molly was discharged from the hospital.

During discharge Molly's mother was advised to make flour from soybeans. This soybean flour could be used to prepare porridge for her daughter, which she could also add in some ingredients such as: groundnuts and beans to make it more nutritious.

The support to Molly from Ekwendeni hospital did not end after her discharge. Molly's mother took part in the Soils, Food and Healthy Communities project (SFHC). SFHC members visited Molly at home supporting her to start growing different vegetables, so that she could give her child a diversified diet. She was also trained in compost manure making and application, crop rotation, crop residue incorporation, mulching and even agroforestry.

"Today, Molly is a healthy and big girl. Molly's progress has been a tremendous improvement," Mary says. "I am really thankful to the hospital and SFHC staff members for making sure Molly got better".



DISCUSSION QUESTIONS

- What do you think enabled the SFHC project to be a success and influence good health outcomes?
- What did the farmers do differently from what they were doing earlier in terms of farm inputs and soil management?
- What did they grow differently from what they previously grew?

Healthy, diverse diets for everyone and everything across our whole landscape!

By Astrid Huelin, Zimbabwe

The situation was getting worse. This was the first time the Chinyika river had dried up and stopped flowing above ground. Livestock were having to walk much further for water and in some areas, villagers had started pumping water from boreholes for their animals. Livestock were dying of starvation at the end of the dry season. And because there was no grass, when the rain came, most of the water washed down to the river. It took until two months into the rainy season for any amount of grass to grow. In the rainy season our animals would die from tick borne diseases because they were still too thin.

Everyone was worried and some were concerned about the narrow focus on human nutrition, forgetting about all the other life which daily supports them. What about the nutrition of their most valuable assets, their livestock? What about nutrition for the bees who make deliciously sweet honey and fertilise the crops?

Things had started well. They had created the Chinyika Small Grains Association and many homesteads were food secure with 3 years of finger millet stored in their granaries. They had learned to use natural fertilisers in our crop fields like bokashi, fermented bio-fertilisers and compost. Yields were increasing as the soil started to improve and they had started to grow more diversity of plants instead of the monocropping that they had been taught. They were reviving traditional methods of beans, maize and pumpkins all together.

Each year more people were starting to use these skills as a routine part of their management. Despite this their environment continued to deteriorate. What more could they do?

Everyone was worried and some were concerned about the narrow focus on human nutrition, forgetting about all the other aspects of life which daily support them.

The market for small grains had suddenly gone up due to the recognised health benefits for the increased diseases like diabetes and high blood pressure caused by our monocultures and mono-nutrition of crushed maize eaten as sadza. Because of the good price, some households had sold their food that was in storage, so they had lost the food security they were working towards. In addition, some stubborn people who have still been growing just maize are still dependant on external support of artificial fertiliser and kill-chemical inputs either from friends, families in the diaspora, neighbours or from organisations and government inputs.

I was invited to offer support

In 2019 I was invited by the well-respected traditional leader Dr Chidara to pay them a visit. His father was the previous paramount Chief Gutu in the area.

I started by asking questions about the river, our crops and livestock. What was the first year it had stopped flowing? How many of our animals died last year and what time of year did they die? Did they sell any animals or slaughter them for traditional ceremonies? What about the wildlife? Are there any left?

Despite the challenges they shared with our environment getting worse, I could see that they could do something to restore the river and the livestock productivity and shared my excitement with them.

Despite the challenges they shared with our environment getting worse, I could see that they could do something to restore the river and the livestock productivity and shared my excitement with them. I explained that working with the animals in the right way could reduce deforestation and increase resilience to climate change. But everyone had to work together. So, they invited me to return later so they could explore and learn more and make a plan to move forwards.

Later that year, I returned to their village. It was the middle of winter. With cold nights and warm days. Everyone was already preparing their croplands for the coming rainy season, busy cutting trees to make temporary fences to protect the croplands and nutrition gardens from the livestock. They wandered around everywhere. There was no grass. The croplands were bare. All the crop residues had been taken off the fields by the animals. They knew through the government 'Pfumfudza' program that it was important to keep our soils covered, but how could they do this with the way they were managing their animals?

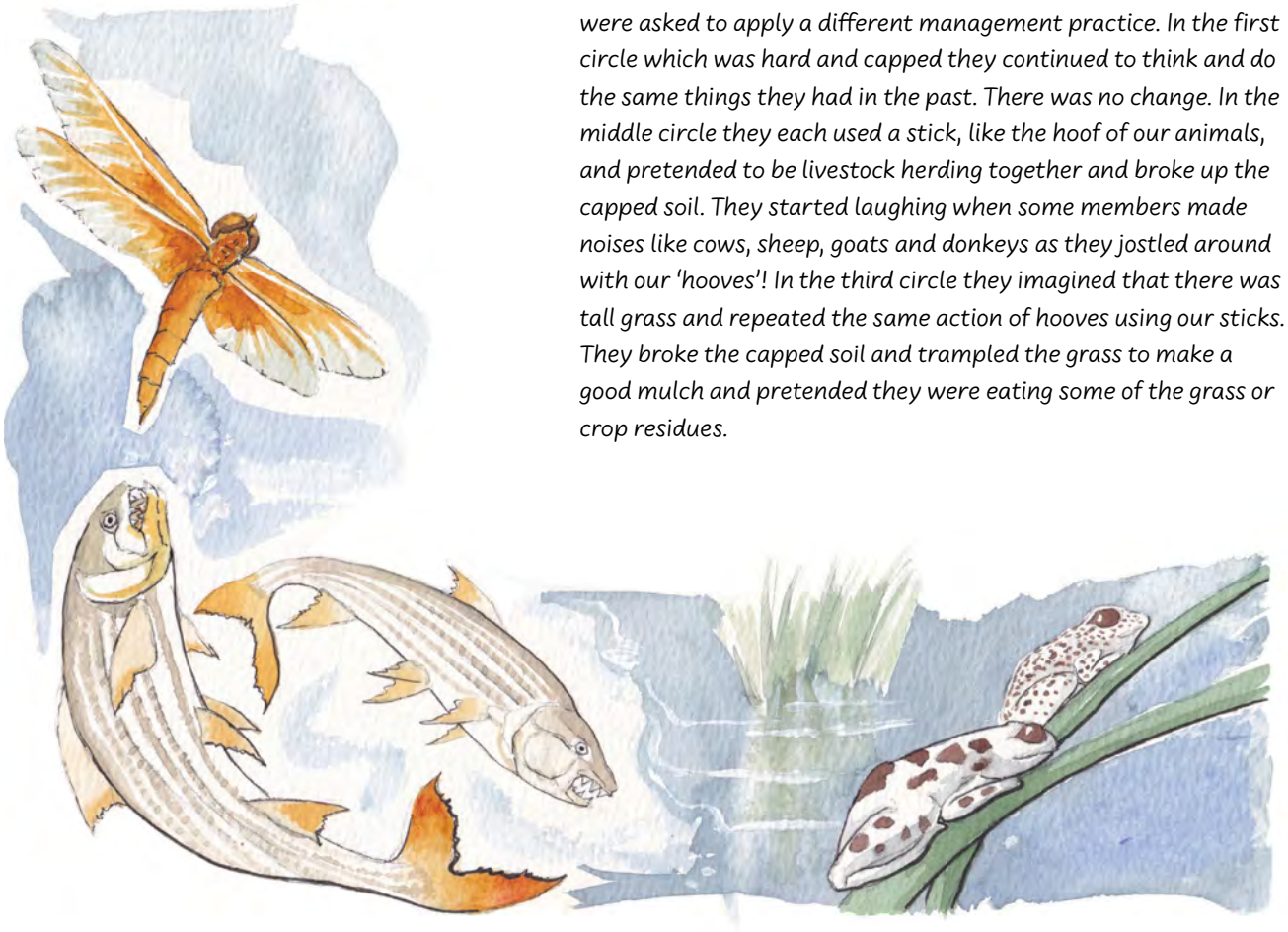
I asked them what the land, rivers, livestock, wildlife and croplands used to be like in the past, and I could feel the villagers at the meeting starting to come together to understand how much things had changed for the worst despite all their efforts. The elders painted a picture of a past of abundance, tall grasses, flowing rivers with fish to be caught all year round. Young people shared stories of how the productivity of the land had kept going down. They all agreed that things were getting worse and not better. They shared a moment of sadness for the loss of abundance in our land.

Moving on, I focused them on the soil at their feet and I could see their eyes and hearts start opening. They began to realise the importance of what they were seeing. The hard layer of capped soil had become the cancer of the desert, and this was something they had created. The land, rivers, plants and animals were talking to them, but they had not been listening to the message. Even though they knew in our hearts there was something wrong, they had ignored the messages.

Once they had grasped this, I shared a couple of exercises called Ground Cover Demonstration and the Common Vision Demo. "This is it!" one of them cried out "It is so simple!" The Ground Cover Demo said it all. They had been managing their land in a way that made a desert with most of the rainwater washing away into the rivers.

How I did the Ground Cover Demo

I drew three circles in the sand in a row. Within each circle they were asked to apply a different management practice. In the first circle which was hard and capped they continued to think and do the same things they had in the past. There was no change. In the middle circle they each used a stick, like the hoof of our animals, and pretended to be livestock herding together and broke up the capped soil. They started laughing when some members made noises like cows, sheep, goats and donkeys as they jostled around with our 'hooves'! In the third circle they imagined that there was tall grass and repeated the same action of hooves using our sticks. They broke the capped soil and trampled the grass to make a good mulch and pretended they were eating some of the grass or crop residues.



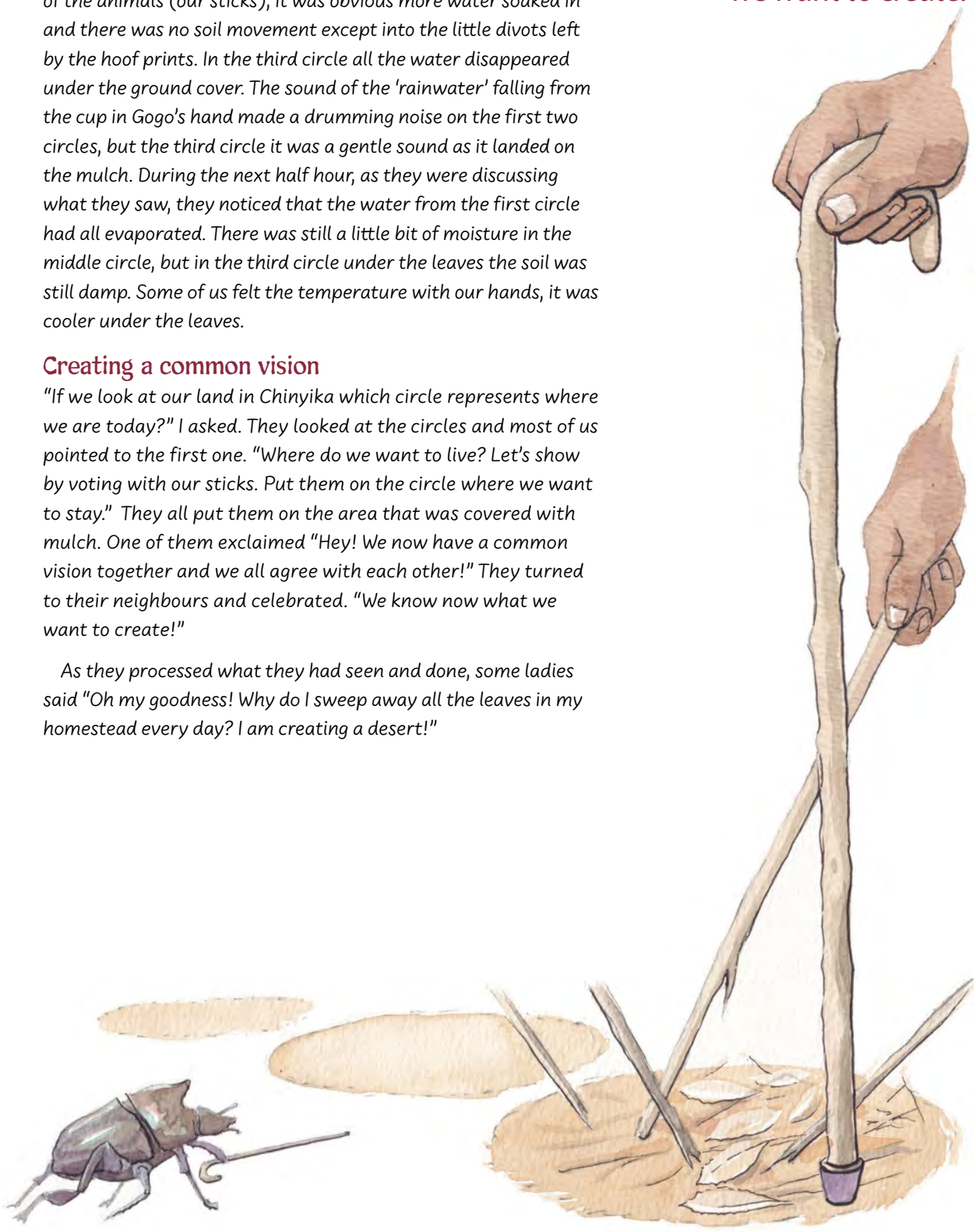
I then asked who among us would like to bring the rain? An old lady, well respected in the village volunteered to be the rain. She poured the same quantity of water onto each circle in the middle. What they noticed was very interesting. In the first circle there were lots of splashes as the water hit the hard capped soil. Some of us got splashes on our feet and had to move further away. Most of the water washed away and there was a little hole like the start of a gully where the water had landed. In the middle circle where they had impacted the soil with the hooves of the animals (our sticks), it was obvious more water soaked in and there was no soil movement except into the little divots left by the hoof prints. In the third circle all the water disappeared under the ground cover. The sound of the 'rainwater' falling from the cup in Gogo's hand made a drumming noise on the first two circles, but the third circle it was a gentle sound as it landed on the mulch. During the next half hour, as they were discussing what they saw, they noticed that the water from the first circle had all evaporated. There was still a little bit of moisture in the middle circle, but in the third circle under the leaves the soil was still damp. Some of us felt the temperature with our hands, it was cooler under the leaves.

Creating a common vision

"If we look at our land in Chinyika which circle represents where we are today?" I asked. They looked at the circles and most of us pointed to the first one. "Where do we want to live? Let's show by voting with our sticks. Put them on the circle where we want to stay." They all put them on the area that was covered with mulch. One of them exclaimed "Hey! We now have a common vision together and we all agree with each other!" They turned to their neighbours and celebrated. "We know now what we want to create!"

As they processed what they had seen and done, some ladies said "Oh my goodness! Why do I sweep away all the leaves in my homestead every day? I am creating a desert!"

They turned to their neighbours and celebrated. "We know now what we want to create!"



Another lady said "I have been burning all my crop residues but look what I am doing! Making the soil hard and capped like the clay pots I make! All the water is running away, no wonder my crop harvest is getting worse! I'm going to stop this year. No more burning!"

But even though I knew all this, it was intuitive for me, I still had the burning question. So, I asked "How do we go from here where we are in the desert, to there where there is ground cover everywhere?", pointing to the first and the third circle.

Starting in the right place together

I answered, "Together we are here in the desert, circle one. But we have all voted that we want to live where there is ground cover, in the third circle. If we want to go from the desert to abundance, we must start in the right place. Where do you think we can start?"

Many people participated. One person suggested they should stop cutting trees, another suggested they start managing our livestock better, while another suggested they stop veld fires, riverbank cultivation, no ploughing, diversity cropping… there were lots of good ideas, but I kept asking, "These are all good ideas, but, before stopping cutting trees, before changing our livestock management, before stopping veld fires where do we start?" There was silence as they had all run out of ideas. What was she talking about? They had come up with some good ideas but "Where do we start?" I repeated.

Suddenly our pastor pointed at his chest, he said quietly, "If they want to go from the desert to abundance we must start in the hearts and minds of the people on the land." Everyone looked at him. He was right! Of course! If we continue to think the same as they did before, they will continue to go to the desert. "This makes sense" I thought, "We keep starting with the doing, and not the thinking."

"YES!" I exclaimed, "Regeneration, good nutrition and abundance for all starts in our hearts and minds! We start in the hearts and minds of all of us! If Gogo wants to go from here to here" I said, pointing to the circles in the sand, "Can she go there alone?" They thought about this.

Suddenly our pastor pointed at his chest, he said quietly, "If they want to go from the desert to abundance we must start in the hearts and minds of the people on the land."

Some people had much more productive croplands, but still the rivers were drying. "The answer is no," I said to myself. "We have come to the desert together, we can go to abundance, only together."

I felt relief that there was something simple they could do to start mobilising. Just by each of us sharing these simple demonstrations over and over they could create a movement within the hearts and minds in our village. They could create a common vision of 'Ground cover, ground cover, ground cover!". They now had a clear, tangible vision of the future. Their intangible thinking could be guided by the tangible simplicity of the Ground Cover Demonstration. Lots of their questions had been answered. They now knew where to start! But what now? "How do we create ground cover over all our land?" my neighbour asked.

"We have come to the desert together, we can go to abundance, only together."

The Mapping & Growing Grass or Regeneration Demo

They were tired, and excited, but they still wanted to know more. "There are many things that they can do, and there are many things that they are already doing, but the following action will have the biggest positive impact." I said and then drew another larger circle on the ground, separate from the Ground cover demo,

"Imagine this is a map of our whole village and on the map, we draw the rivers, roads and natural boundaries. For example, between the roads, river and mountains here, this can be paddock number 1. This area can be paddock number 2. And here, between the main road and mountains that is another paddock." I said pointing to the map drawn in the sand. "There are no fences anywhere". I then asked us all to find another stick, which represented the hooves of our animals.

There was relief that there was something they could do. It was simple. They have the animals, the people, the land, the rain, they just need to work together to improve the productivity and water infiltration across the land. It was complex because everyone in the village had to understand and take action together. One person cannot regenerate the land on their own. Even though the elders spoke that the method of herding all their animals together was done before, they had forgotten as there had been no herding together for at least the last 40 to 50 years.

Reviving their traditional livestock management practices made sense. It would address so many of the challenges they still had that were creating conflict and continued deterioration of their ecosystem.

They were close to the growing season after my first visit, so they did not manage to mobilise everyone the first year. But during the following year they continued sharing the ground cover demo and growing grass demo until everyone was talking about "ground cover- ground cover- ground cover". They had created and agreed on a map with natural boundaries for paddocks. This year, after they finished the rush of preparing, planting and early weeding in our croplands, they started herding their livestock together from January until after the harvest at the end of May 2021.

They were so happy, no-one had livestock that went into the croplands and as a result there was much less conflict than in previous years. And they had revived the traditional practice of "majana' where they shared herding responsibilities, giving them more time to visit neighbours or do other business.

They had already been learning about different agroecology practices, mostly focused on croplands and soil fertility and practical fertiliser production using composting, bokashi and biofertilisers. Reviving their traditional livestock management practices made sense. It would address so many of the challenges they still had that were creating conflict and continued deterioration of their ecosystem.

The journey continues

They are still early on in the journey of learning and working together. Every week there is a new challenge to address, but their animals are in better condition. They have had no animals dying this rainy season from tick borne diseases, whilst our neighbours have lost up to 60% of their herds. And the soils are improving. There is excitement of good things to come, with more and more people taking up the message and starting to share and take action together. They are becoming a real community again, learning and working together towards a shared future.

DISCUSSION QUESTIONS

How does managing the areas where livestock graze link to healthy eating? Why is ground cover such an important issue when talking about healthy eating?

"Fanza! That is an inspiring story. But who would link healthy eating to managing cattle in the landscape? It does mean that the work of improving diets starts right at the beginning, with looking after the soil."

"Exactly Njabulo, and looking after the soil **everywhere**. To do that requires collective effort. You have to cooperate with your neighbours to protect the shared environment."

"Let's send these off to the group and see what they have to say!"

NOTES

5

Fortification and Biofortification

Silver bullet or band-aid?

The students were laughing at one of Njabulo's jokes when Monica stepped into the seminar room.

"Good morning students. It is good to see you all in such a good mood!"

"We are all excited to know why you sent for us," said Fanza.

"Take your seats and I'll explain. Firstly, I want to give you some feedback on your assignments and secondly to discuss a controversial topic. I am extremely impressed with the research you have all done. Indeed, I am hoping to submit it for publication with AFSA who are producing that Barefoot Guide that I told you about. Here are some specific notes for each pair." The students were beaming, and some patted their neighbours on the back, as she handed out the papers.

"And the second thing?" asked Estridah.

"Today, we're going to discuss fortification and biofortification of food. I have a story from the Barefoot Guide on this but before I share it, can anyone tell me what they know about the topic?"

What exactly are Fortification and Biofortification?

Fortification of food happens when extra nutrients are added directly to the food that are not normally there to address a specific deficiency. For example, adding iodine to salt to prevent goitre.

Biofortification is the process by which the nutritional quality of food crops is improved through agronomic practices, conventional plant breeding, or modern biotechnology. Biofortification of staple crops is proposed as a strategy to address micronutrient malnutrition, such as vitamin A, iron, zinc, and folate deficiencies. It involves indirectly increasing the content of an essential vitamin or provitamin, mineral, or other substance in crops to support nutritional or health goals. Biofortification can be achieved through plant breeding or genetic engineering.

There were strong feelings regarding the government's decision to introduce provitamin A biofortified maize in their community.

"I must admit, I don't know that much," said Abdou, "but from what I've seen some fortification and biofortification programmes have really helped, such as putting iodine in salt to help people with goitre or growing hybrid plants that have extra vitamins. At one level it makes so much sense."

"Also, when you see the high rates of malnutrition amongst children in some places, which can lead to stunting, it seems critical to ensure that kids in those places get the missing micronutrients. Surely, they deserve that chance?" continued Kamali.

"I can understand these perspectives," Monica said. "Let's read the story and then discuss it afterwards."

A community considers biofortification

by Mugove Walter Nyika and By Tafadzwa Nyanhanda

The evening silence was only broken by the occasional sound of barking dogs. Milando was playing in the kitchen while waiting for her mother to finish cooking dinner. Soon it was time for the evening news bulletin. He crawled closer to the radio to hear that the government had given farmers permission to grow provitamin A biofortified maize in his village.

Milando had never heard of biofortification before, so he asked his mother who looked at him and smiled. "I am not sure, Milando. Tomorrow there is a community consultation about it. Would you like to come? You have never been to one before, have you?" she said as she continued with her cooking.

"Yes, yes, I mean no, I haven't been, but yes, I want to come!" exclaimed Milando, excited to be able to go to an important meeting of grown-ups at least.

Biofortification. Such a big word. Many questions came into his mind. Was the provitamin A maize going to be as tasty as the organic traditional maize? Will the cost of the maize remain the same? What about the colour?

The government consults the community

It was an overcast day with dark clouds gathering but this did not deter Milando from attending the community consultation. As a young adult, he wanted to know more about biofortification! The meeting was going to be under the shade of an Acacia tree, which was centrally located in their village. It was the main meeting point in their village and various activities occurred under this tree. Various community leaders, community members, civil society organisations and scientists had come and gathered for the meeting. You could sense the mix of curiosity and anxiety in the air as all the stakeholders waited for the meeting to commence. There were strong feelings regarding the government's decision to introduce provitamin A biofortified maize in their community.

There was a high prevalence of Vitamin A deficiency in their community. This was leading quite a few people suffering from skin inflammation, night blindness and respiratory infections among the community. The nurses at the clinic explained that other health problems also included infertility and delayed growth. So the issue of the lack Vitamin A in the diet had become a major concern.

Vitamin A biofortified crops were being presented as a solution to address this problem.

Milando's grandmother had night blindness and so he was familiar with the negative effects of Vitamin A deficiency.

At the announced time, after lunch, a bit past 1 o'clock, the village chief introduced the government delegation to the community, which consisted of scientists and politicians. One of the scientists, Maryam, who had grown up in their community then stood up, cleared her throat and spoke "Good afternoon, everyone, let me start by describing what biofortification is."

You could have heard a pin drop as everyone listened attentively. "Biofortification is when we indirectly increase the content of an essential vitamin or provitamin, mineral, or other substances in crops to improve nutrition or health outcomes. From the health clinic records, we know in this village has quite a high prevalence of Vitamin A deficiency. Provitamin A helps produce Vitamin A. So, it is hoped by introducing biofortified maize with high levels of provitamin A, it will lead to a reduction on Vitamin A deficiency in this community. Are there any questions at this stage?"

Judah raised his arms. "So why are we focussing on one micronutrient at the expense of others. Are you going to give us a new solution for each of those?

The argument begins

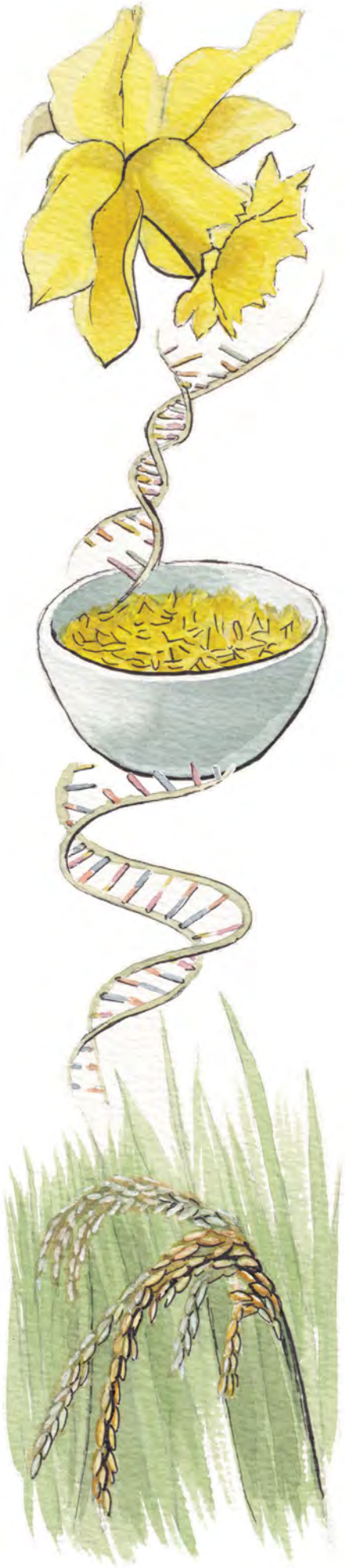
Judah, a renowned local medical assistant, who also did farming in the community, stood up and interjected:

"Yes, why can't the government support our local diversified farming systems so that we can consume more diverse traditional diets rather than a small number of "nutritionally enhanced" crops? We never had vitamin or mineral deficiencies in the past, only since we started growing modern monocrops that the government has pushed onto us." There were several cries of "Yes!" and "Exactly!" He continued,

"Alongside vitamin A deficiency, we have several micronutrient deficiencies such as zinc and iron, which obviously will not be addressed by your solution." Judah raised his arms. "So why are we focussing on one micronutrient at the expense of others. Are you going to give us a new solution for each of those? Why not promote healthy diverse diets using locally available crops? We already have the answers, we just need you to support us and stop pushing unhealthy modern methods onto our people and misleading them by telling us it is the 'modern way'!" Judah was certainly fired up and kept going.

"Do we even know what the nutritional outcome will be when a single nutrient is added in significant quantities when several nutrients are lacking in diets, for example, could there be malabsorption of other essential nutrients.

The main African crops that are being bio-fortified



"For instance, I know that iron supplements can interfere with the absorption of zinc in high doses. Again, I say that addressing deficiencies in our community would be best done by encouraging consumption of diverse traditional diets and not monocultures or single foods!"

Maryam was surprised that there was someone so well informed in the community, but she swallowed hard and continued: "Oh yes, I do understand your position, but you will have to understand that no single intervention will alleviate all micronutrient deficiencies. Biofortification helps to complement existing interventions, such taking vitamin pills and industrial food fortification. Biofortification in the long term can be cost-effective and its benefits can reach underserved, rural populations".

The concerns grow

The atmosphere was now thick with tension. Milando could overhear some of the community members discussing amongst themselves, posing various questions "Will this not erode our traditional crops and diets if we introduce novel modern crops and diets", "Is this safe? Will this taste good?"

The village chief called for order. "Please, can you tell us why the government can't promote diversity in farming and in diets, not monocultures or single foods? We have allowed ourselves in the past to be misled into growing food that is not healthy. But by placing value on local plants and animals, food cultures, seeds and local knowledge that sustain health and keep communities strong, we could certainly address micronutrient deficiencies in our communities".

Maryam looked a little uncertain. "Chief, I am afraid that is not in my department. My speciality is only biofortification."

"Tell me, young lady," Grandma Thelma raised her voice. "How on earth do you put Vitamin A into the crops? Is it done by farmers or by scientists up in their laboratories?"

Maryam smiled and added, "Perhaps to give you a bit more clarity, let me describe the methods used to achieve biofortification. Biofortification can be achieved through three main methods: through adding fertiliser to the soil or leaves, through conventional plant breeding or through genetically modifying crops…" As she said this you could feel the tension in the air, and this caused a bit of an upstir. An older looking gentleman from one of the civil society groups piped in and commented,

"Could there be any unintended effects like allergies and impacts on environmental biodiversity?"

Judah chipped in "And what about toxicity or excess micronutrient intake?"

Maryam responded, "We did not look into environmental impacts, only the direct health/nutrition impact on individuals. As far as toxicity or excess intake is concerned, so far, we have not seen any, but the programme is young. However, as a scientist I must be honest that we do not know all the answers. But we are concerned with the health of families now. How long will it take to restore a more diverse and natural approach to farming that you talk about?"

The group turned to Amai Shingai, known as the best natural farmer in the area. Amai Shingai lifted her head. "As you know I'm Chairperson of the Kubatana Women's group. We started off by fencing an area to grow vegetables in the dry season near our well in the river bed. We all learn together, growing many different vegetables using natural farming practices. We have problems with pests sometimes but are managing well. We're happy to share our learning with others. Our aim was to eat more healthily and have a diversity of our local foods. And we do that. I've been helping group members to use less fertilisers in the cropping fields. Some are succeeding quickly, others taking longer. But I believe it will be possible for everyone to stop having to buy expensive chemical fertilisers and use natural methods to keep soils healthy. Part of doing this is growing a mixture of crops and that's exactly what brings healthy eating."

As Maryam was collecting her thoughts there was a sudden downpour and with shouts and whoops everyone scurried to their homes leaving a disappointed Milando with so many questions left unanswered. Where could he find the answers, he wondered? Why had local crops full of vitamins been neglected by the government who instead promoted expensive hybrid seeds? And what could communities do about that?

DISCUSSION QUESTIONS

What do you think about biofortification? Where is it helpful and where is it the wrong way to go, and why?

"What's your reaction to the story then, students?" asked Monica.

"For myself, we have to be careful going for the simple silver bullet. It may seem obvious to enrich the maize meal with Vitamin A," came in Fanza. "Or so I thought until now!"

"Iodine in salt, Vitamin A in flour. Why wouldn't you?" said Estridah. "But where does it end? What will people be telling us we must eat to be healthy in 40 years' time?"

Ajay jumped to her feet, "It's not that fortification or biofortification is always wrong or right."

Njabulo added, "We used it for goitre but now we're starting to use it for everything. Instead of being a supportive approach it's becoming the main approach." I think fortification and biofortification must be a supportive approach that we only use when it's essential."

"I read in the news recently," Kamali added, "that the US government is going to put a lot of money into supporting industry in many African countries to add nutrients to food as it's being processed. This is treating the symptoms of the problem. Maybe that's necessary at times, like in the case of goitre or for kids in a refugee camp who just can't get access to a diverse diet. So yes, if dealing with the exceptional situations becomes the norm, then we're going wrong, surely?"

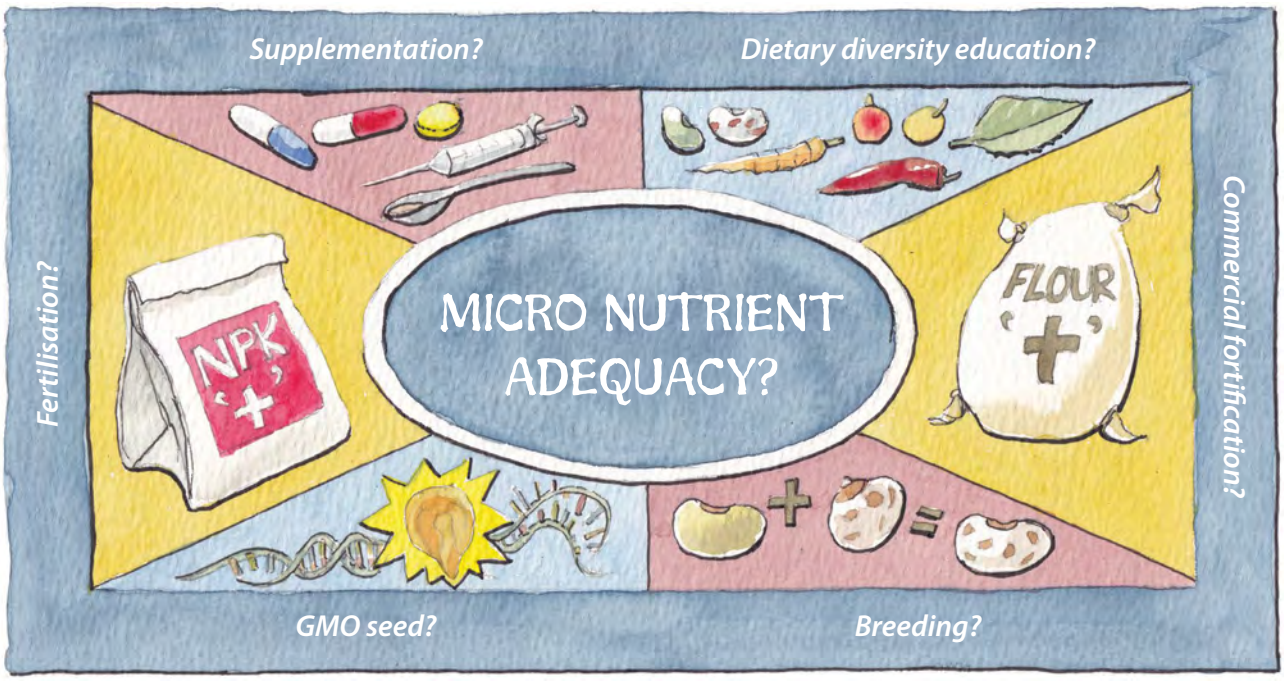
"Yes, I think you've hit the nail on the head," came in Monica again. "Quick fixes only cause long-term problems. Mechanical thinking doesn't work with living systems where everything is interconnected. In addition, of course, there's also the issue that there are those who make lots of money out of biofortification and they have loads of money to influence government policy.

"It's time to go now. Here are your new assignments for the next round of research. I would like you to pair up differently. Keep up the good work!"

Food for thought

"The Bill & Melinda Gates Foundation, for example, is funding work on "biofortification," breeding higher levels of micronutrients into key staple crops in Africa, including cassava, sweet potatoes, maize, and yams. HarvestPlus, the group carrying out the biofortification work, says its aim is to reduce "hidden hunger," the malnutrition caused by a lack of micronutrients such as zinc, iron and, yes, beta-carotene, the same nutrient that red palm oil provides in abundance. The reason these are lacking in people's diets, they maintain, is because of poverty and because staple crops don't contain enough of them. But really, it could be argued that if Africa were not drowning in cheap, refined and bleached, and nutrient-poor palm oil from Asia, there would be little need for cassava or maize crops biofortified with micronutrients. It is perplexing that biofortification researchers are breeding orange maize and cassava with high levels of beta-carotene when traditional diets that were high in such nutrients are being eroded by the advent of modern industrial diets."

From Joan Baxter's Seven ***Grains of Paradise: a culinary journey in Africa***



NOTES


PEPPER
SORGHUM
GINGER
MILLET
BLACK EYED BEANS
BAMABARA NUTS
RED KIDNEY BEANS
YELLOW BEANS
RICE
GROWND NUTS

6

The Pride of our Grandmothers

The story and value of indigenous African food

"Estridah! I'm over here!" Kamali called out to her fellow student across the coffee shop. Estridah made her way to the table and sat down with a big sigh.

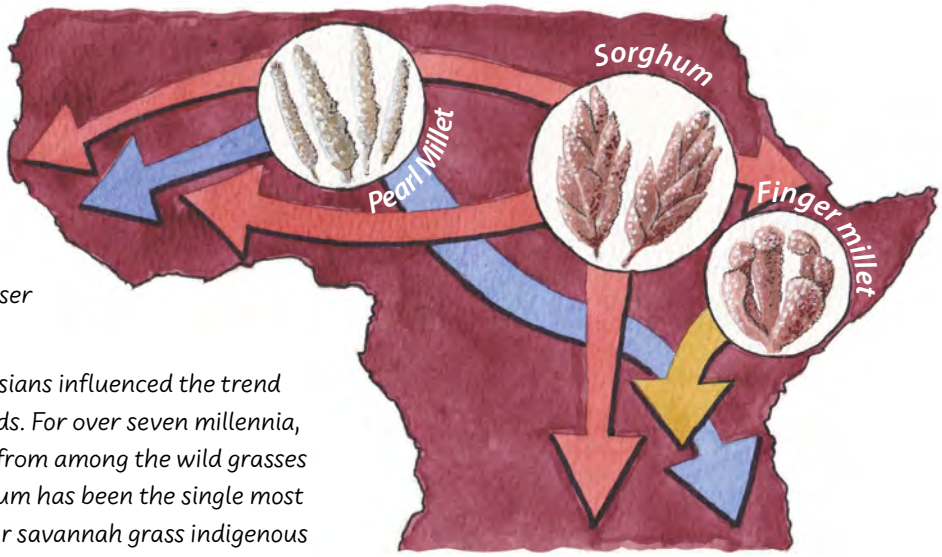
"Oh, I am so glad to be sitting down." Estridah slumped into the chair. "I have been interviewing some of the market women about their lives and getting their advice. One woman was particularly interesting, so I am going to write up my chat with her. And you, Kamali?"

"I have been looking for some history of food in Africa. Listen to this piece that I adapted from Nduati Githae. It's an eye-opener that describes how the food we grow and eat has changed over time."

A short history of food in East Africa

Adapted from Nduati Githae

East Africa has a colourful history, it has been sprinkled by influences from a whole lot of visitors. Historically, flavour and ingredients have changed a great deal in Africa. Before intercontinental trade, the most important staples were sorghum, millet, fonio, barley, lentils and, to a lesser extent, rice.



THE HISTORY OF 3 INDIGENOUS AFRICAN GRAINS

In East Africa, Arabs, Indians and Persians influenced the trend in the local diet by bringing in their foods. For over seven millennia, since the grain was first domesticated from among the wild grasses of the savannah west of the Nile, sorghum has been the single most important food in Africa. Millet, another savannah grass indigenous to Africa, comes a close second in terms of overall importance. One variety, Pearl millet, originated in Western Sahel and slowly made its way to the rest of the continent while Finger millet, a native of Ethiopia and the East African highlands, tended to stay within the region. These cereals were supplemented by edible plants and leaves.

Preparation was not elaborate. Filling one's stomach, rather than enjoyment, was the chief purpose of eating. This basic cereal-based diet was complemented with fruits, roots and resin from several trees. Through the centuries, more foods were introduced to the East African region such as maize. Today, maize has all but replaced millet and sorghum as the preferred grain in Africa.

The colonial governments did not take any actions to promote and conserve local foods. Actually, they subsidised settler preferred cash cropping. This had the effect of driving out indigenous smallholder farmers who attempted to make a living selling local food crops.

These farmers were only allowed to grow certain crops for sale at the local markets. And these sales were taxed. This was the beginning of cash crop agriculture in East Africa. Some of these cash crops, such as tea, coffee and pyrethrum, are still East Africa's leading exports today.

In West Africa, the story was not any different; there was a shift from the production of traditional food and fibre crops to cultivation of export crops mainly cotton, cocoa, peanuts, palm oil. The transition from the production of traditional food and fibre crops to cultivation of export crops exposed communities to the uncertainties of export production, weakened local control over food security and eroded local cottage industries. The story repeats itself in Central and Southern Africa.

The transition from the production of traditional food and fibre crops to cultivation of export crops exposed communities to the uncertainties of export production, weakened local control over food security and eroded local cottage industries.

Communities lost much of their traditions and identity. They were violently uprooted and marginalised. Christian missionaries also contributed to undermining local cultures. It has taken less than a century and a half for a substantial abandonment of the old ways and foods across the region. Traditional cereals, herbs and vegetables gradually dropped for those with high market value and perceived desirability; At some point in the late 1800s, a mysterious disease destroyed millet and sorghum and drastically reduced yield. This was the foothold that maize needed. Maize wasn't the mainstay of the diet in most of Eastern and Central Africa; in fact, it seems to have been unknown in Uganda even as late as 1861.

Today, maize is probably the most widespread food and cash crop across East and Southern Africa. In Kenya, Ugali, or ncsima, a dough-based paste made from maize has been eaten with reckless abandon by just about everyone in Kenya for the last half century. Similarly, in northern regions of Ghana, Nigeria, Togo and Benin, and southern regions of Sahelian West Africa, "tô" "banku" and "Tuo Zaafi" or TZ are ugali like dishes (served with local soups) that now predominantly made from maize, rather than sorghum or millet. It is a little difficult to explain.

Recently, at last, there has been a resurgence of traditional vegetables, fruits, roots, tubers and nuts. In shops and supermarkets, rows of arrow roots, yams and cassava sit right next to artichokes, celery and button mushrooms. This was not the case a mere 20 years ago.

All we need now is for sorghum, millet, sweet potatoes, yam, teff and African rice to make a resurgence. Then we'll have come full circle. We need our local foods, our African foods back in our farms and on our plates. Local foods provide access to healthy and nutritious foods that are affordable for the poor, they empower the growers by offering a more regular or stable income and can lead to acknowledgement of and respect for people's cultural identity.

All we need now is for sorghum, millet, sweet potatoes, yam, teff and African rice to make a resurgence. Then we'll have come full circle. We need our local foods, our African foods back in our farms and on our plates.

"That's a good piece, Kamali. It makes me even more determined to find out the truth about how we have lost so much of our culture because of colonialism, and to be part of restoring the valuable foods that we have lost."

"I am with you, Estridah. OK, next task. Let's take a look at the task Monica set us. Here are the questions to focus on:

1. **Where did we go wrong?**
2. **What are some examples of local foods for good nutrition and what parts of them are edible?**
3. **How do we combine local foods with cash crops?**
4. **How can we have sufficient, diverse food throughout all the seasons?**
5. **How do we deal with addiction to modern food and enhance the image of local, traditional food?**

"Look, Kamali, here's the name of someone she suggested we contact: Professor Cecilia Moraa Onyango from the University of Nairobi. She is an Associate Professor of Horticulture and not just an academic, but she also has experience in community outreach. Let's call her and do an interview then write up the answers to these questions. I'll do some and you do the others."

QUESTION ONE: WHERE DID WE GO WRONG?

For many generations our ancestors were healthy. They grew and prepared delicious traditional foods that nourished and sustained them. Then with colonialism and western influence we learned to treat our foods as inferior to the foods introduced by foreigners.

But these new foods, like maize, imported polished white rice, imported wheat flour and cabbage, not only provide less diversity and hence less nutrients, but each of them is lower in nutrient content compared to our local and traditional foods. Diverse, local foods were of no use to colonial markets. The cash crops, which communities could also now eat, were used for export and to provide food for growing urban populations and those working in mines and industry. These crops would also in time provide a market for fertilisers and pesticides, when these became commonplace.

Now we know better! We Africans have begun to remember and to gather back our heritage. We have so many different kinds of local food plants and animals: sorghum, cassava, sweet potatoes, yam, Bambara groundnuts, all manner of traditional vegetables and fruits, spices and herbs; local chickens and livestock. And we need to be proud and thankful for this rich heritage from our ancestors.

Indeed, it has saved us. Look what happened during the COVID-19 Pandemic with closed borders and lockdowns. The only saviour for many communities has been the locally grown traditional food. It has been a great reminder of our local resilience. Let us go forward by looking to our roots! Look for the rich diversity of foods that exists in our communities. We have our own local foods, safe and rich in nutrients that support healthy bodies. And tasty too!

"Estridah, we keep saying that we have lost most of our heritage because of colonialism," remarked Kamali, "But actually, Professor Onyango has helped us to see that it is not all lost. Despite the suppression by the colonialists, our ancestors secretly passed down their knowledge and the seeds to their children, many of whom are our grandmothers and grandfathers."

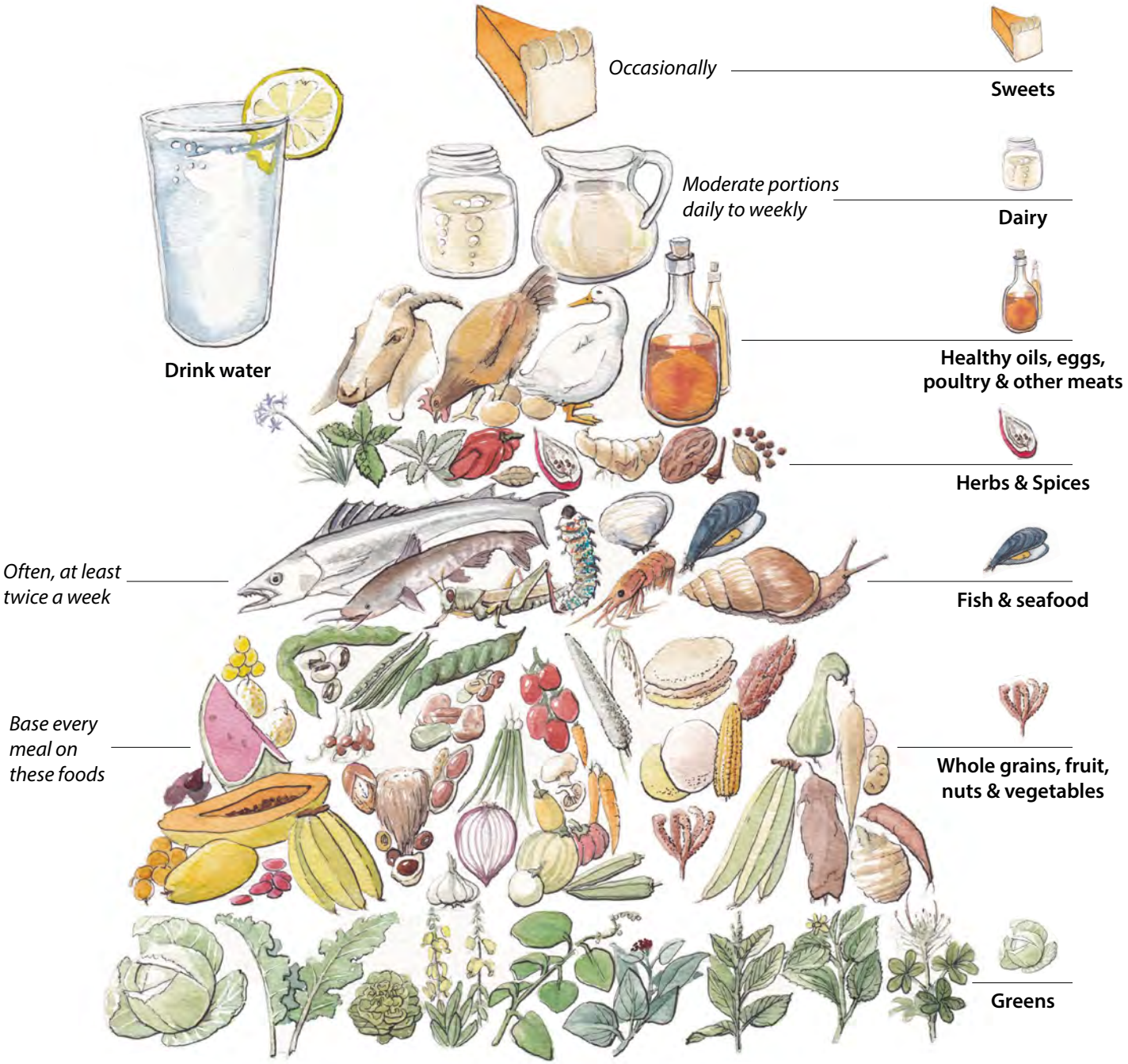
"It feels like our sacred duty to receive this knowledge from them before they pass on and make sure it is shared widely. The old people are indeed the libraries of our heritage, and we must value and honour them and their knowledge!" Added Estridah.

"Let's look at the rest of the answers to Monica's questions."

QUESTION TWO: WHAT ARE SOME EXAMPLES OF LOCAL FOODS FOR GOOD NUTRITION AND WHAT SHOULD WE EAT OF EACH?

We need to bring local, traditional foods back to our tables. and some even grow by themselves; they are adapted to our environments and have been found to be rich in the nutrients required for nutrition and health. They also require less land to grow, particularly with diverse intercropping rather than monoculture farming. The more interest we take in our garden, the more we can learn about our local crops and how to grow them well. This makes the growing of our crops more interesting and fun.

On the next page you can see that there is a large assortment of nutritious local and seasonal foods. These foods are also well adapted to the local conditions. But even with all the nutrition benefits of our local foods, they remain underutilised because we're not aware of these benefits. Not many organisations (even governments departments of nutrition) are promoting them for nutrition and health.



Enjoy a healthy lifestyle

AFRICA'S HERITAGE FOOD PYRAMID

The rainbow bowl

The key is to eat a diverse range of colours, what we call the Rainbow Bowl. The more colours you eat the more likely you are to get all the different nutrients you require.

- Foods with purple/blue colour reduce the risks of cancer, stroke and heart disease.
- Red-coloured foods reduce the risk of cancer and improve heart health.
- Orange/yellow-coloured foods help in maintaining healthy eyes, and boost the immune system to fight viruses.
- Brown/white-coloured foods help to fight viruses such as COVID-19, as well as throat and stomach infections.
- Green-coloured fruits and vegetables reduce the risk of cancer and improve your immune system, making you less vulnerable to diseases such as COVID-19.

"That is remarkable information, Kamali. Think about how much good food we throw away because we don't realise it can be eaten."

"Absolutely, what a waste! I also love the simple guideline to eat a Rainbow Bowl of food to get all the nutrition we need. It's an easy-to-follow recipe! What is next?"

QUESTION THREE: HOW DO WE COMBINE LOCAL FOODS WITH CASH CROPS?

We can grow indigenous, traditional vegetables and fruits, nuts, herbs and tubers in amongst the crops we are growing to sell. For example, if you are growing coffee, tea, cocoa, pyrethrum or palm, you can add vegetables, groundnuts, tubers and some fruit trees.

Many traditional foods will add nutrients, such as nitrogen, to the soil. They also protect the cash crops against pests and disease, which means chemical fertilisers and pesticides become unnecessary. Some traditional crops can also benefit from the shade provided by cash crops.

We should aim to grow a variety of food that comes to harvest at different times of the year in order to have food all year round. We can include crops that live for more than one year, such as moringa, pigeon pea, cassava and fruit trees along the edges of the farms in which cash crops are growing.

Why you should not rely on cash crops only

There is another reason for growing a range of food plants in a local garden or around a village. If something goes wrong, like extreme insect damage to plants, or a disease occurring in the garden, or a poor growing season, some plants will be more damaged than others. With a variety of plants, there will still be some food to eat until the other plants recover and grow again.

There are shrubs that can be planted as edible hedges around houses, and fruit and nut trees that need to be planted as a gift for your children, several years before they will be able to enjoy them. Some nuts can be stored and eaten when other foods are not available. For example; most tubers such as sweet potatoes, cassava, yams will store well for several weeks to months.

> ***Examples of some of the crops that can be grown in mixtures:*** *Amaranths, African nightshades, African spinach, Moringa, Spider plant, Jute mallow, Kales, Okra, Beans, Onions, Garlic, Ginger, Tomatoes, cucumbers, Carrots, Gooseberries, pawpaw, avocado, guava, sorghums, millets, cassava, yam, turmeric, garden eggs/local brinjals, prickly cucumber, gourds (eaten as squash when young)* etc.

"You know something, Estridah, all this talk of diversity helps me to see the world differently. Imagine if, instead of our monoculture concrete cities, they were designed as gardens with trees and shrubs, even food plants, popping out everywhere, around buildings, out of them, in courtyards, on the roof! We can grow food in the city too. I have heard that the urban food garden movement is growing in many countries. Imagine!"

"Keep dreaming, Kamali, it's a beautiful vision. Some of it is here already in the farmers markets we have. Remember I interviewed that lady at the market. Have a look at what she said."

My interview with a market farmer, Namono Baluku of Mukono

by Estridah Msukwa

Namono Baluku is 64 years old and lives near Mukono outside of Kampala. Every morning she takes her produce to Nakasero Market in the heart of the city. It opens for business at 5am, while she's away her daughter tends to the small farm they have there with husband and grandchildren. She is really healthy, strong, with perfect teeth and the biggest smile and brightest eyes I have ever seen. It turns out that she was a teacher but has since "retired" and started growing a variety of foods. She learnt this skill from her mother and grandmother.

Her stand is a riot of colour, with fruit and vegetables of all shapes and sizes. I found amaranthus spinach, vine spinach, blackjack, pigeon peas, cocoyam, pumpkin, african spider herb, okra, sweet potatoes, cassava, lima beans, scarlet eggplant, bitter berries, cowpea and of course, pineapple, mangoes, guavas and several different kinds of bananas. She even had a bowl of grasshoppers!

This is how our conversation went.

Estridah: Why do you grow traditional foods? Lots of the other women here only offer things like potatoes, onions, tomatoes and cabbages. Surely you should be selling those too.

Namono: Well, I know a secret they've forgotten! Look, they are selling oranges, but did you know that my guavas have three times more vitamin C and the children love them more. In fact, I can tell you about each and every plant here and how much better they are for you than all of those vegetables over there. And I never use chemicals for fertilisers or to get rid of insects! Never!

They tell me that my food is so full of flavour and cheaper. They cannot believe they were so stupid. I tell them, well, now you are wise, so feel better!

Estridah: I see you have a wide variety of vegetables, but doesn't that take more time and effort? Why not focus on fewer?

Namono: My dear young woman, this is only half of the varieties we grow! There are several that we grow at other times of the year when the rain is less, and others that take longer. Sometimes we lose a crop from insects or disease, so by growing many varieties it means we are safer. Somebody told me the other day this is called food security.

Estridah: But is that the only reason? What do your customers want?

Namono: My customers don't only want vegetables. They also want advice on what to eat so I tell them about my grandmother, a wise and wonderful woman who lived to the age of 102. My advice to them is to follow her example. She fed us so many different kinds of food, I can hardly name them, food that she grew or swapped with her neighbours, food that she collected in the forests and also insects. I've observed that every food gives us something we need that you probably cannot find in another plant.

Estridah: What about supermarkets? Don't they provide good food too?

Namono: Many of my customers tell me that they used to buy at the supermarket. Packages and tinned food. Pah! They tell me that my food is so full of flavour and cheaper. They cannot believe they were so stupid. I tell them, well, now you are wise, so feel better! I tell them that this food here was picked yesterday, so it's fresh and ripe and ready to eat.

But supermarket food is picked days or weeks before it is ripe because it needs to travel, so it ripens on the way in a truck. This means it has weak flavour and less good nutrition. And I am sure they use chemicals too.

Estridah: What do you want to say to the government? What advice do you have for them?

Namono: Well, that's easy. They must promote traditional food! This will make Ugandans healthy and proud of their culture. It means that the money that customers spend on local food goes to local farmers and back into the community, not to the big companies who take it overseas.

When you go to the supermarket, young lady, you don't know where that food comes from or what's really in it. Look at the labels! Do you think that all those numbers and letters are good for you? My food is straight from the earth to your kitchen, no preservatives, no chemical residues, just God's goodness.

Leafy greens are the best!

Dark green leaves are an important source of iron, protein and other vitamins and minerals essential for healthy diets. They also contain folate, which all women of child-bearing age need to prevent giving birth to children that have serious defects. Everybody, especially women and children, should eat a handful of leafy greens each day. There are different types of dark green vegetables grown in our communities, they include; spider plant, African nightshades, jute mallow, amaranths, slenderleaf, and so many more that can't be named here. But it is also important to always remember that if these leafy greens have been grown on healthy, living soil they will be full of vitality, with all the essential vitamins, minerals, trace elements and microbes to feed our gut. But if they are grown on dead soil with chemical fertilisers and pesticides, they will be low in vitality and possibly laced with toxic chemicals.

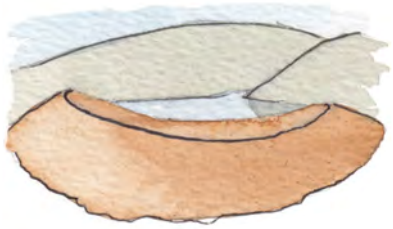
(NB: Other names: Amaranth is also known as Pigweed, Mchicha, Efo tete. Slender leaf is also known as Mitoo. Taro is also known as nduma, madhumbe, magogoya)

6 AFRICAN LEAFY GREENS

DISCUSSION QUESTION

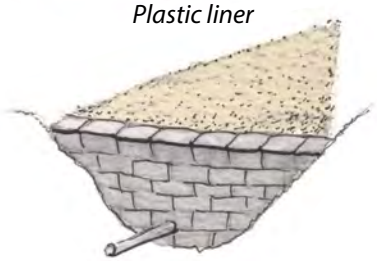
Namono is an important resource for advancing natural farming. How can she be supported to play a bigger role?

"Estridah, what a woman! You know I'm not sure if I should laugh or cry. It really is ridiculous that we started growing, importing and eating foreign foods that have so much less nutritional value than our own indigenous foods!"
"Well, let's laugh at the stupidity for now. But it's a global problem also. Monica told me that because of monocultures and industrial agriculture, small farmers in the northern hemisphere have also lost so much of their own seed heritage."



Mud dam

Plastic liner



Sand dam

Cement tank

Corrugated iron tank

Ferro-cement

Purpose-built plastic tank

QUESTION FOUR: HOW CAN WE HAVE SUFFICIENT, DIVERSE FOOD THROUGHOUT ALL THE SEASONS?

Indigenous, traditional crops are far more common in our communities and sometimes they are the only source of food between harvests or when harvests fail. During the rainy season, sufficient diverse vegetables are produced and sold in our markets. But a large part is lost because we do not know how to store them for long.

Because of insufficient availability of water during the dry season, production of these vegetables is much lower than during the rainy season and we do not have sufficient quantities in the market. How do we ensure that we have sufficient, diverse food throughout all the seasons? Most of our grandparents knew how to sun-dry, store and then serve them as a source of food in the dry season or when the harvest failed. This knowledge is still available to us and we can utilise new technology such as irrigation to produce them.

In the old days, these foods were also used during uncertain times, emergencies or during difficult periods of civil conflict and natural disasters. Imported crops usually take a long time to grow in the field. You must wait for several months before you can eat them or sell them, and our communities do not know the best ways to store them to make them available during periods of scarcity.

We can grow more than four crops on the same piece of land per year. This means more diversity and better nutrition. However, we need water during the dry months of the year. Not as much water though as we would need if we were growing imported crops like maize or wheat. Indigenous crops have adapted to local conditions and require less water and land, giving us enough for our home consumption and extra for sale. We also need money to take care of our other needs such as sending our children to school. Therefore, we can harvest the rainwater and use it to grow several crops per year. We do not always need to depend on rainy seasons to grow our crops. This will give us more diverse and nutritious food for our own consumption and for sale to earn income.

"Estridah, I bumped into Monica last Monday and she said she had two more contacts for this question of food preservation. It's a key question if you think about it if we want to take back the initiative from supermarkets who use modern processing methods to make food available anywhere at any time. She gave us two contacts, one local and one from Zimbabwe. Here, you contact and interview Masudio Margaret Eberu and I will talk with Never Mujere."

These food preservation approaches meant that our grandparents never suffered hunger because they could always prepare themselves for the future.

Our grandparents never suffered hunger: they knew how to process and preserve food for lean times

by Masudio Margaret Eberu

Masudio is an active farmer and the District Chairperson of the Uganda chapter of the Eastern and Southern Africa Small Scale Farmers Forum (ESAFF Uganda), which operates in 30 districts in Uganda, and whose members are mostly women.

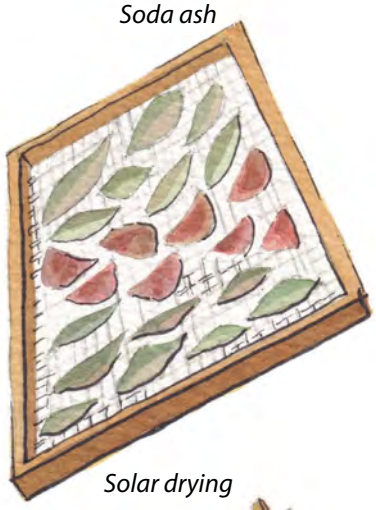
During my grandparents' time, people knew how to dry and preserve foods when they had a surplus. When there was food scarcity especially during the dry season, they had plenty of preserved food to eat. When I was young, I remember how we enjoyed all the different food they gave us throughout the year!

I remember when my grandma, my mother, aunt and I got up early in the morning to pick the cowpea leaves. My grandma prepared soda ash (local salt made out of ash) and boiled the cowpeas leaves in it and added salt to it. After a few minutes she let it dry under the sun. Then she kept the dried cowpeas leaves in a clean pot to be used in the dry season. We loved chewing the dried product so much that we sometimes fought over it!

Sometimes my Grandma dried the cowpeas leaves in the sun without boiling them. These dry cowpeas leaves, when cooked with groundnut paste, are really tasty and nutritious. She also taught me how to preserve pumpkin leaves, okra, eggplant and meat.

These food preservation approaches meant that our grandparents never suffered hunger because they could always prepare themselves for the future. And of course, they never used chemicals to preserve food, so it remained healthy and tasty.

Soda ash



Solar drying

DISCUSSION QUESTIONS

Why have simple and effective practices like this been lost to so many communities? How do we revive them?

How my old aunt is saving hundreds of communities' food stores from weevil attacks!

by Never Mujere

My home is situated in Chabata village of Bikita district in the Southeastern part of Zimbabwe. We grow maize as a staple food crop. Small grains including millet and sorghum and legumes such as cow peas, groundnuts and roundnuts are also grown as food crops. After harvesting the crops from the fields, we store them in granaries or barns. But we have been experiencing great post-harvest losses. Without proper pest management, villagers lose an average of 35% of the grain under storage due to attacks by weevils.

Government extension workers have been telling us to reduce the losses through the use of pesticides including grain dust or tablets. However, these chemicals are expensive and not environmentally friendly. We have also observed that the use of pesticides often leads to pest resistance and resurgence.

There is a better solution... ask my old aunt

One day, in the early 1980s, I visited my old aunt in a nearby village to help store her maize. Early in the morning she brought fresh gum tree (Eucalyptus) leaves in sacks from her nearby orchard. When I asked her why, she answered, "I have a solution to prevent maize grain from attack by weevils."

Before we started loading the maize, she put the leaves at the base of the barn. We then loaded the maize cobs and after every one metre, she laid the leaves ending with another layer of leaves at the top of the maize. Finally, she closed the barn and sealed it.

When I returned to my village, I told the other village members. We and a few households in the village tried this new technique. Weevil attacks were significantly reduced. Less than 3% of the maize grain was attacked by weevils among those who used gum tree leaves that year. Due to that positive outcome, in the following year almost all villagers adopted this method to protect their maize, cereals and legumes as well.

Thanks to my aunt, many people in our village and even beyond are using this approach. In fact, these days most farmers in the district use Eucalyptus leaves to protect shelled or unshelled grain against weevils.

Less than 3% of the maize grain was attacked by weevils among those who used gum tree leaves that year.

DISCUSSION QUESTION

Gum trees and leaves are alien vegetation. Is it OK to use them in such innovative ways?

"... we can learn from this example of Never Mujere, about spreading the rich local knowledge and innovations from community to community."

"Kamali, we can learn from this example of Never Mujere, about spreading the rich local knowledge and innovations from community to community."

"Absolutely, Estridah! Monica told us how this can happen using horizontal exchanges between communities, where you don't need expensive training programmes, just support for farmers to visit each other to swap their experience and knowledge."

QUESTION FIVE: HOW DO WE DEAL WITH ADDICTION TO MODERN FAST FOODS AND ENHANCE THE IMAGE OF LOCAL FOODS?

Many people, especially young people in urban areas, have become addicted to these cheaper foods that are harmful to our health. In fact, these foods are some of the main contributors to diabetes, heart disease and many forms of cancer.

What can we do?

Here are some ideas:

- Education is one key approach. People need to be shown and reminded of the harm they are exposing themselves to by eating modern fast foods. The school curricula need to be transformed and teachers trained in how to educate their students about healthy eating and lifestyles.
- We need to find ways to shift youth culture. Young people, through for example social media influencers, must be convinced to "buy into the benefits of traditional foods and be proud of their food heritage. These can be linked to causes which young people are passionate about, including weight management, improving local youth and women livelihoods, as well as climate change efforts. Local, traditional food must become seriously cool!
- Government health and education departments must be challenged and supported to transform their approach to education about healthy food.
- Adult education through radio and television is also vital, especially aimed at women, who are largely responsible for providing food, but also to men who will often resist change to their diets.

"Whew, that is a lot of valuable information. The question of how to get the youth excited, excites me!" Kamali exclaimed.

"What I get from this is that there isn't one way to change the culture back to more traditional food. We need a whole range of diverse ways to tackle the problem. Prof. Onyango made the comment that a complex problem needs a diversity of solutions."

"It's all about appreciating diversity. Why doesn't the world realise that?"




7

Insects, wild foods, fermentation and Budja Hearths


"Fanza, I've just received this great story from a community worker in Zimbabwe about a local organisation that's actively promoting and reviving traditional recipes in local communities in many creative ways. It started as a response to the HIV/AIDS pandemic. What's your task this time around?"

"Monica suggested I investigate how the COVID-19 pandemic, which has broken global supply chains, may have changed where communities get their food from and even the kind of food they eat. I am still looking. Why don't you read me your story, Abdou?"

Reviving the Budja Hearth, an indigenous kitchen of Zimbabwe

by Romeo Chingezi

"Some of our grandmothers still know how to cook proper food!" the one chief reminded us. "Yesterday we had a feast with goat stew, okra, nhopi, forest mushrooms, fried caterpillars, cowpea fritters and mabumbe! Why do you think I am in such a good mood today?"

Everyone laughed, not only at the good humour of the elder but because of the joyful anticipation of what we had gathered to do. This was the first meeting of a key committee started at village level in the Mutoko District of Mashonaland East, Zimbabwe in 2007. It was called to revive traditional food and cooking as an immune-boosting and healing response to the HIV/AIDS pandemic.

The recipe book is born

After some discussion we agreed that the first thing was to produce a traditional recipe book. Soon we were seeking out the knowledge about traditional foods from different individuals within the community. The recipe book was produced and spread to the communities and even sold widely. Everyone loved the idea and praised the recipes. We started cooking demonstrations and educational dramas within the community, training quite a number of people. This helped to spread the recipes and the practice across the country.

Much to our surprise the initiative started to gain recognition from the local government in our district, and then the Food and Nutrition Security Council and even from the Minister of Agriculture. We received invitations to participate in annual food festivals and culture weeks. We were the flavour of the month!

This is the early story of the Svinurai Arts Association in Zimbabwe. Founded by Helen Agnes Zhinhu and Fungai Karimazondo, this group celebrates culture through delicious traditional recipes, spreading a message of health and hope through drama and good cooking. We wanted to help people to restore their own traditional knowledge about healthy eating and lifestyles and to end the stigma around HIV/AIDS disease. Many people were under the impression that eating healthily meant going to a hotel or luxury restaurant to eat some of those expensive meals, hardly realising that they could get even better nutrition from local traditional foods.

The Budja Hearth is born

The organisation grew and its influence expanded into other Municipal Wards of the District. We then decided to establish a centre in their Ward and built a very beautiful Budja hearth, an indigenous type of a kitchen to which we would invite women from neighbouring communities to train them on how to prepare the traditional meals and to understand and value of indigenous foods. The idea is for all households to see how their own traditional Budja Hearths can produce healthy food for their families.

Protecting forests and mitigating climate change

During the cooking lessons at the Budja Hearth the participants were taken into the bush and forest to collect wild varieties of foods and store them in the kitchen. This taught them how important it is to protect the forests.

Since then, we have begun working with our local communities to make them more aware about what needs to be done to prevent deforestation, as rural communities depend on the forests as their source of fuel.

What pleases us is when they can clearly see that there is much more appreciation of healthy, local traditional food, where people don't see it as poor people's food, but with pride and joy.

To minimise the use of wood we have begun to promote the Total Stove for people to use in their Budja Hearths. The Total Stove is built using a few bricks designed so that instead of using lots of firewood you can use small branches from pruning a tree. The Total Stove burns them more efficiently, and the trees stay alive. Simple and sustainable!

We are also encouraging people to plant trees. As a result, there's an increase in the number of trees planted around their homesteads, including fruit trees.

Still going strong

The Svinurai Arts Association continues to be active in farming and growing crops, as well as cooking and producing dramas. These highlight different social issues and encourage self-reliance projects especially for widows. They also inform communities about health issues like HIV/Aids and Tuberculosis. We also visit schools and work on empowering children to help prevent child abuse and to encourage them to know and appreciate their indigenous culture.

The recipe book is sold to those who can afford it and given free to community members who cannot.

We also showcase their work in the cities at festivals and other events to promote traditional food and their messages of hope and health. Sometimes we offer catering services but always make sure that we include a short educational drama and talk before the meal starts!

What pleases us is when they can clearly see that there is much more appreciation of healthy, local traditional food, where people don't see it as poor people's food, but with pride and joy.

"Don't you think it's an inspiring story, Fanza. They are restoring healthy foods, supporting people living with HIV/AIDS and combating climate change and all using creative arts to do it. This is the kind of thing that should be promoted everywhere!"

"I agree, Abdou. Have a look at this story from South Africa. As you know I was looking into how COVID-19 has changed eating patterns in many places and got this piece from a food journalist in South Africa. Tell me what you think."

Growing into our roots, from wild garlic to game meat

by Anna Trapido

Agroecologist Tim Abaa of Tim Nectar Farms near Johannesburg has been training rural, urban and township food gardeners for over a decade. In the past 18 months he says he has "seen a major change in the perception of our African heritage crops. People used to scorn them as poverty food, but no more. There has been a big mindset switch. COVID-19 has caused a rush to the indigenous plants – especially the ones that are believed to boost the immune system such as mhlonyane in isiZulu and lengana in Setswana. Wild garlic too – in townships you always see it planted around houses to keep snakes away. Now there's a big demand for it to cook the leaves like spinach or make it into strengthening tea."

It is not just South African plants that are popular. Abaa says there is also "much more demand for masonja (mopane worms) because people say that they boost the body's own disease resistance…" The people are not wrong. Several studies have shown mopane worms to be a magnificent source of climate-friendly protein, iron, calcium, zinc and phosphorus – all of which are known to play a role in immune system functioning.

In addition to mopane meat, demand for the flesh of larger indigenous animals has also increased. The informal butchers and shisa nyama workers in and around Hoedspruit and Hazyview report greatly increased sales. This may be a mixed blessing. Vendors spoke on condition of anonymity and wouldn't reveal the source of their meat – some of which is probably poached. There was a clear view among queuing customers that game meat was a healthy option in unhealthy times. As one observed, "With all this COVID-19 going around we all want to live longer… They say that other meat from those big farms overseas, like in Brazil, is injected; you know, that it has got pills in it, whereas game meat caught wild is pure and protects you from sickness. Especially for our old people with diabetes and so forth. All this means that using game is definitely trending…"

Several studies have shown mopane worms to be a magnificent source of climate-friendly protein, iron, calcium, zinc and phosphorus ...

Talking of trending, Gauteng farmer, heritage food activist and online vegetable vendor Siphiwe Sithole of African Marmalade says that, "COVID-19 forced us to get more jacked up. The opportunities for face-to-face sales were greatly reduced so we all had to get better at creating content online – YouTube, TikTok, you name it. I did it to amplify the message and open up sales channels for online purchases."

In August 2021 Local Wild launched online to "act as a facilitating platform to enable easy and direct market availability of indigenous ingredients", all of which are grown by small scale Western Cape farmers. Whether you want seepampoen from the farmers at Philippi Economic Development Initiative (PEDI), a bottle of N'Rougas Farm brakslaai chutney, a bag of veldkool grown by Ubuhle Bendaloor or a copy of Loubie Rusch's Cape Wild Foods: Growers Guide. The ability of consumers to easily access responsibly-farmed, economically empowering indigenous ingredients through schemes like Local Wild is vital.

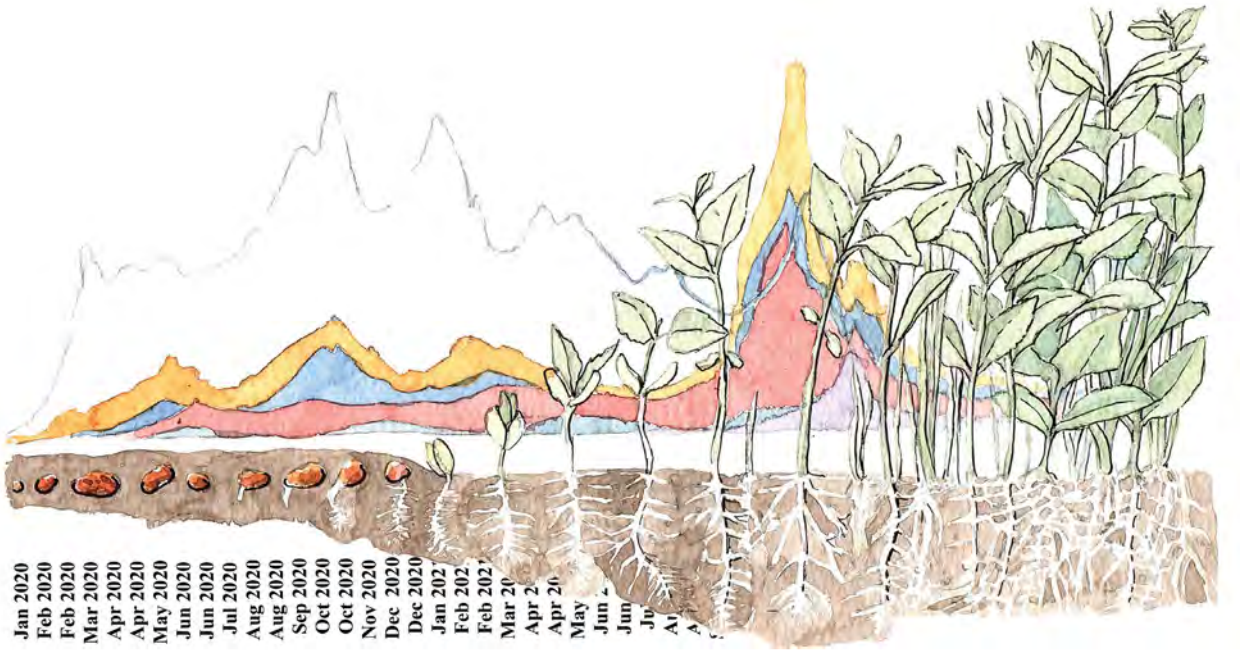
Travel restrictions have also played a part in the rising online interest in indigenous ingredients. Sithole says: "As the pandemic has gone on and on, the demand for indigenous crops has steadily increased. I think that there used to be a sense that African traditional food was what we ate when we went home to the rural areas at Easter but this Easter we couldn't travel. Who knows where we will be this Christmas? They say a fourth wave may be coming so we may well see travel restrictions again. It has been a long time since people who live in cities have been able to go home and they are longing for those comforting old-school tastes.

City people have realised that if they want the nutritional, medicinal, emotional and spiritual support that comes with indigenous food they will have to plant and nurture it themselves.

"We used to bring back supplies when we visited home, but the sad truth is that we can't any longer rely on regular access to the countryside through family visits. This spring I am seeing a sharp rise in orders of indigenous seeds and requests for heritage gardening advice. I think that the increased demand reflects a profound longing to connect with that ancient sense of self. City people have realised that if they want the nutritional, medicinal, emotional and spiritual support that comes with indigenous food they will have to plant and nurture it themselves. It is about literally growing into our roots."

Pandemic-driven changes in perception and purchasing patterns are encouraging but there is a danger that consumers will slip back into old ways once the immediate anxiety of the COVID-19 threat recedes. If we are to avoid future crises, making waterwise, low carbon, economically and culturally empowering indigenous ingredients easily available to all must be a central part of our strategy for building back better.

(printed in *Daily Maverick/TGIFood*)



"... This shows that we can break away from the imported modern monocultures that are so boring! Nothing like a good crisis to shake things up!"

"What I find interesting here, Abdou, is how the COVID-19 crisis stimulated people to become more creative. As global corporate supply chains have become disrupted, people are thinking local again and rediscovering their roots, literally and figuratively. This shows that we can break away from the imported modern monocultures that are so boring! Nothing like a good crisis to shake things up!"

"Definitely. Did you notice that both stories so far have mentioned eating fried caterpillars or mopani worms as they are called in Southern Africa? I mentioned this to Monica, and she suggested I chat to Dr Mbabazi about insects as a food in East Africa. Have a look."

Insects are delicious and nutritious!

by Dr Muniirah Mbabazi

"Muniirah! Wake up! Come and see insects flying on the streetlights!" My mum opened the door and pointed to our neighbours who were out on the street picking up flying things on white sheets. Those are called grasshoppers and we could eat them, she said. It was quite a surprise! One neighbour came over smiling and handed us a bucket full of insects. The following morning, the insects were de-winged and de-legged and roasted for breakfast. That is how we got introduced to edible insects. Growing up, the insects we mostly ate, and still eat, are white ants, grasshoppers, and the palm oil beetle larvae (Rhynchophorus spp) was introduced later in my life.

When we were younger, it was fine to eat edible insects. Even in boarding school, at primary school, we would pick up white ants and eat them. We would actually eat them raw, adding only salt. But as we progressed into secondary school, it became less fashionable to eat white ants. If you said you ate them you were "local" and no one wanted to be called that, and of course, as a teenager you wanted to fit in.

So up until my master's study, I had stopped eating any insect forms largely because it wasn't something that looked very classy or modern. You were happier catching some chips than catching grasshoppers or white ants!

Preparation is key

The way you prepare insects to eat can reduce their nutritional content. Boiled white ants, for instance, provide less energy and fat than raw ones. Dry pan-fried or boiled white ants lose about 30% of their unsaturated fat content and provide less energy than raw ones. Protein is not reduced by either boiling or dry pan frying. But if you want the full nutritional benefit then you should eat them raw. They taste like nutty butter!

The benefit of pan-dried white ants is that you can store them for long.

There's a beetle, called Rhynchophorus. It completes its life cycle in the Adeboa palm. The beetle burrows its eggs within the stem of the palm. When the eggs hatch into larvae, communities capture and consume them. They are rich in protein and fat, composed of a good balance of healthy omega three and omega six fatty acids. The downside to harvesting this palm weevil is that it is very unsustainable requiring the felling of the palm tree. It is, however, argued that the adult weevil burrows in old palm trees.

Indigenous palm trees often grow in wetlands and are often victims of pressures arising from wetland destruction and charcoal burning. Their wood makes good charcoal.

Insects have both nutritional and economic value, when in season; they are a source of livelihood to many rural households.

Insects are good business too!

Insects have both nutritional and economic value, when in season; they are a source of livelihood to many rural households. In many rural communities, insects are consumed as snacks or stews in a tender and delicate way, making them rare delicacies in households. In rural and urban markets alike, insects are sold at modest prices, with prices largely dependent on seasonality.

For example, in Kampala grasshoppers are a lucrative business selling at a high price. A mug of about 200 grams of edible grasshoppers can sell for 10 000 Uganda shillings, about $3 USD, which is quite a high sum for such a small quantity. The same quantity of meat is about $1, so grasshoppers can be three times more expensive! Not everyone is converted yet. It is common for some "modern" people to say they cannot put white ants or grasshoppers in their mouth. However, there are more and more who are willing to buy and eat them, irrespective of the price.

Insects are becoming a new urban delicacy, so if you want to be really sophisticated, you know what to serve to your guests!

The culture that labels eating insects backward depends on where you are standing. Often when people move from the rural communities where they grow up to urban areas, they want to adopt western culture, to be "modern" and "sophisticated". Consequently, they leave behind their old ways. However, even that is changing again as rural and urban communities are aware of the dangers that come with highly processed foods in urban areas.

Insects are becoming a new urban delicacy, so if you want to be really sophisticated, you know what to serve to your guests!

Old and new ways of harvesting insects

In northern Uganda, in the communal land homesteads, many households' own anthills, where the white ants originate. Among the Luo speakers, white ants are called ng'wen while in the Luganda language of Uganda they are known as enswa. Communal etiquette dictates that you cannot harvest white ants from an anthill unless it belongs to your household, or you have sought permission from the owner. Otherwise, you'll be considered a thief! Whoever heard of stealing insects! People within rural communities know the white ant life cycle well. Harvesting begins at the start of the rains. Each anthill is assessed for its ability to produce white ants and if it passes the test, the bushes are cleared, and a harvesting pit is dug. On the night of harvesting a light (from burning reeds) is introduced to lure the ants out in the night, so that when they come out, attracted by the light, they are swept into the pit and harvested.

Traditionally grasshoppers are hand picked off the grass but with electrification, it is now common to see people harvesting them under streetlights and security lights at households. The nocturnal nature of some edible insects dictates that millions are attracted to the lights and easily picked. When I was a child, white sheets of cloth were used to collect grasshoppers.

Nowadays in many places across Uganda, high voltage lights, iron sheets and drums are used. The grasshoppers are attracted to the bright lights and as they are flying around, they fall onto the iron sheet (acts as a reflector) and down into a captive drum.

Insects and culture

When I was growing up, we were told that pregnant women were not allowed or encouraged to eat grasshoppers as their children would have a conical head, shaped like a grasshopper's.

White ants and grasshoppers, being delicacies, are used to show affection. For example, when I visited my grandmother, she always kept a store of dried white ants which she would give me as a special treat. Likewise, if a woman wants a favour from her husband, she presents ants as a snack or a stew (white ants). Insects are special foods/treats in many communities and unlike sweets in modern society, they may be classified among the healthiest of snacks.

Diets in rural communities are predominantly carbohydrate rich with glaring animal protein deficits. Protein sources are often plant-based proteins that do not provide a wide spectrum of amino acids (incomplete proteins) in their diets. On the other hand, insects can be a good source of animal proteins and micronutrients at the same time, especially in a time where we are talking about hidden nutrients. Insects like these can supplement diets seasonally.

Insects are special foods/treats in many communities and unlike sweets in modern society, they may be classified among the healthiest of snacks.

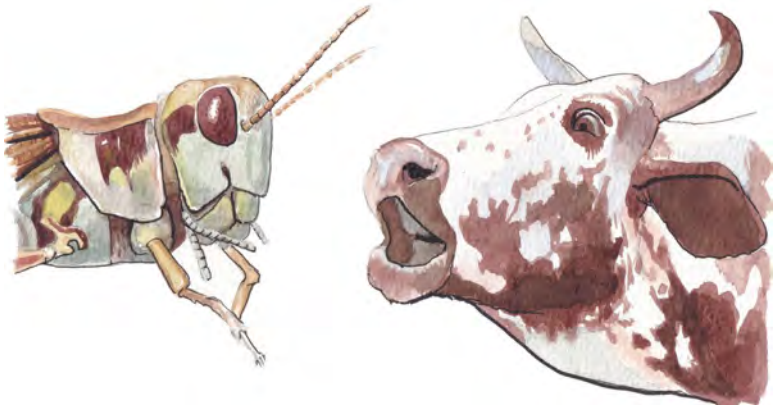
"Abdou, I'm still a bit squeamish about eating insects, to be honest. But how interesting is it that the creepy-crawlies that our ancestors ate are a superfood?"

"I don't know what all the fuss is about, Fanza. In West Africa you can buy delicious biscuits made from palm oil beetle larvae, and a pepper sauce called *Shito* made from the same larvae. I myself have eaten hundreds of crispy flying ants!"

"Maybe you can bring me some biscuits to nibble on to help me face my fears, Abdou? Anyway, here is an article I found by some folk down in South Africa on how to cook insects!"

Fried, steamed or toasted: here are the best ways to cook insects

By Martin Potgieter, Professor, Department of Biodiversity, *University of Limpopo* and Bronwyn Egan, Lecturer, Department of Biodiversity, *University of Limpopo*



For thousands of years people from all over the world have eaten insects. Today about 2.5 billion people – many of whom live in Africa – eat insects. To date, 470 African edible insects have been scientifically recorded, with grasshoppers and termites among some of the favourites.

There are many reasons why we should be eating insects. They support a "greener" lifestyle for meat eaters. Of the total greenhouse gases each year, at least 15% comes from livestock. For their part insects produce 1kg to 3kg less greenhouse gases per kilo. They also need between 40% and 80% less feed per kg than livestock and anywhere from 50% to 90% less acreage to produce one kg of protein than beef – depending on the insect species and farming method used. That's great news in a world battling scarce land and water resources.

Insects are also nutritious. Many insect species contain relatively more protein than conventional meat sources, like chicken or pork. Insects also contain essential fatty acids and important minerals and vitamins. For example, termites, when dried, contain up to 36% protein.

We need to rethink our diets and food habits, especially those related to meat consumption. Because insects are an affordable and local food source, rich in protein, they can be used as a meat replacement. To help in this, we put together a guide on how insects can be eaten. To collect the most authentic, flavourful and varied recipes we visited villages in rural areas and spoke to local cooks about how to prepare their favourite specialties.

INSECT RECIPES

It's important to prepare the insects properly before eating to rid them of inedible parts: For example, *Cirina forda* (the Pallid emperor moth or Shea defoliator) is degutted, while grasshoppers and termites are de-winged and de-legged.

- Wash the insects
- Boil, steam or fry them for at least five minutes (N.B. this is drypan frying or stir frying. Frying on its own is an unhealthy method that uses large quantities of oil)
- Eat the prepared insects directly after cooking
- If not eaten immediately, the insects must be preserved. Either keep them in a fridge or freezer, or sun-dry them to preserve them. They can last for a few days or several months if thoroughly dried.

In the tropics, insects are mainly harvested in the wild, so these steps are important. But some of these insects are now available in Western supermarkets. Here are a few recipes to get you started:

Termites (nemeneme in Venda, South Africa)

Termites are one of the tastiest forms of protein available on the planet. Termites are best toasted or lightly fried until they are slightly crisp. Since their body is rich in oil, very little or no additional oil is needed. Salt may be added for taste.

Soldier termites can be coaxed from their tunnels by probing their mounds with long reeds which they clamp onto.

They can be preserved by dry pan frying in salt until they are crispy. They can then be made into a stew with tomato, onion and whatever spices you like.

Flying termites are traditionally caught by placing pots of water under lights, which attract them.

Thief Ants (dinhlamakura)

These huge black ants only appear above ground once a year, just after the first rains, when they leave their nests to mate, reproduce and start new underground colonies.

Also called "big bottom" ants, they are prized for their rich taste. They can be eaten raw – their fat abdomens bitten off, discarding the head and legs. But they do very well as a fatty snack, like peanuts. For this, they should be lightly fried with salt.

House cricket

Grilled house cricket snack:
These insects are great with sesame oil. Remove wings and mix them with a few drops before putting them under an oven grill for about ten minutes, until they become crispy. Another preparation is to fry the wingless crickets in a few drops of sesame or olive oil for about ten minutes until crispy.

House crickets and dates:
The crickets can also be used to stuff dates - a beautiful contrast with the sweet date and nutty insect. Cut the dates open from the side, remove the pit, and fill with fresh or frozen crickets.

Caterpillars (*Cirina forda*)

These caterpillars can be collected from *Burkea africana* trees, which are found in most African countries.

When home, rinse with fresh water. Their innards (gut) need to be squeezed out – this is because they contain their food plant which is indigestible. Then boil them for 30 minutes in salted water. After boiling, spread them out on a tray and leave them in the sun. Allow them to bake in the sun for one or two days until crisp. If cooked over a fire they develop a distinct and tasty smoky flavour – like biltong.

They can then be eaten as a snack or prepared as a stew. To make the stew, fry them in oil with chilli and garlic. Add tomato, onion and capsicum and allow them to stew for 15 minutes. They go really well with rice or pap, a cornmeal porridge.

Long-Horned Grasshopper (Ruspolia spp)

These grasshoppers have long been part of the food culture in the Lake Victoria region of East Africa. They are most commonly green or brown. Collection is easy because the insects are attracted to light in the evenings.

Pull the wings off and eat them raw. But if you prefer to cook them, they can be either boiled or fried. Boiling is a preparation method used with large volumes of grasshopper where preservation is sought. Upon blanching, they are dried under the sun and preserved for future use.

Mopane worms

After harvesting the mopane worms (*Imbrasia Belina*), squeeze out their guts starting from the head. Wash the mopane worms in cold water and then boil them for about 15 minutes. Add salt to taste. Allow them to cool and put them out in the sun for a few days or smoke them until they are completely dry.

Dried mopane worms can be eaten as snacks with or without porridge or cooked again. To cook dried mopane worms; soak one cup of dried mopane worms in hot water for about 30 minutes. Rinse them in cold water. Put them in a pot with half a fried onion, 2 tomatoes, curry and green pepper. Add half a cup of water and a half teaspoon of soft salt, and mix. Boil for about 20 minutes.

Advantages of using insects as food

At a point in time where chemicals are abundantly used to propagate and preserve foods, edible insects present a clean alternative as they are free of hormones, home grown, organic and free range. Hence, they should be high on any health enthusiast's diet list.

"Fanza, this is good research you have uncovered. Insects are more nutritious than meat but much better for the climate. And there are so many different ways to prepare them. I think the class will really enjoy this piece. Maybe we should cook a meal of insects for them!"

"Mmm, let me sleep on that, Abdou!"

"OK, what's next on the menu, Fanza?"

"Fermented foods, Abdou! Dr Muniirah Mbabazi sent me this great piece on fermentation and what her grandmother used to do."

Fermentation: for boosting nutrition and food preservation *(Something our grandmothers always knew!)*

by Dr. Muniirah Mbabazi

Fermentation has been used for millennia as a food preservation method and for flavour enhancement. It is ironic that lately in modern societies food experts are "discovering" what traditional communities have always known: that fermentation boosts the quality of food, offering all kinds of benefits and also enables a variety of ways for preserving food.

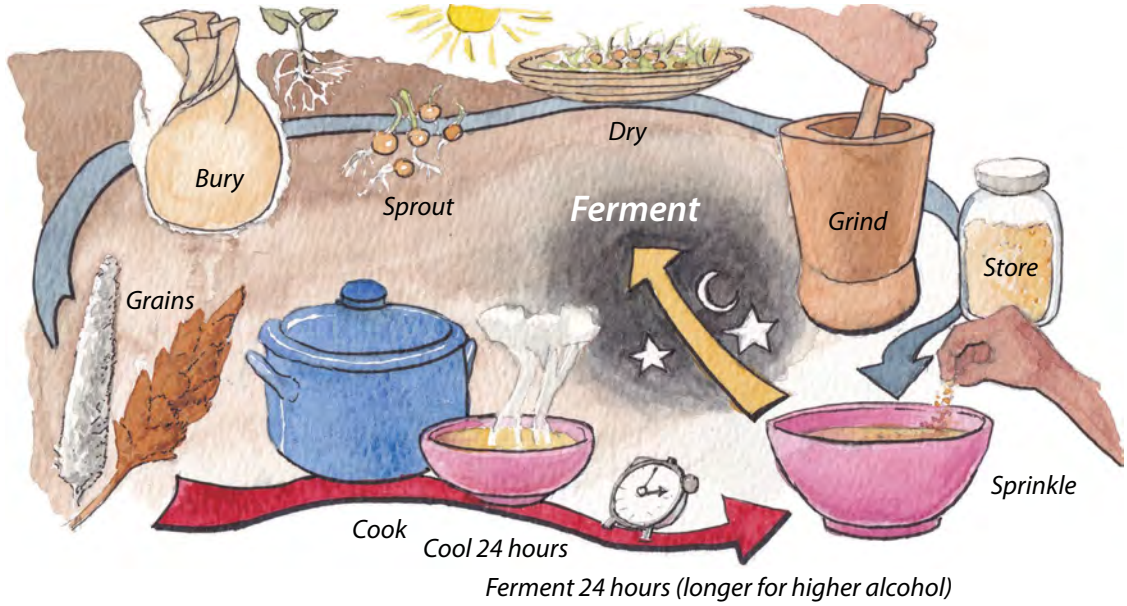
What is fermentation and what are its benefits?

Fermentation is a natural process through which microorganisms like yeast and bacteria convert carbohydrates — such as starch and sugar — into alcohol or acids. The alcohol or acids act as a natural preservative and give fermented foods a distinct zest and tartness. Fermentation also promotes the growth of beneficial bacteria, known as probiotics. Probiotics have been shown to improve immune function as well as digestive and heart health.

Communities have learned about the properties and uses of enzymes from their indigenous knowledge and for the porridge to cool to room temperature before sprinkling the sprout powder onto it and then leaving it to stand.

Malted porridge is consumed after two days or even after a month, and the alcoholic content increases with the duration of standing. In the first period, in the first two days of malting, even children like it because it is very sugary as the enzyme releases the sugar. After that, it becomes more of an adult food, because of the elevated alcohol content

A traditional African way of making fermented porridge



My grandmother's traditional malted porridge

Where I come from, in Western Uganda, there is a famous malted porridge made out of millet or sorghum. My grandmother, like her neighbours, would harvest and clean the millet or sorghum, mix it with water, and then put it in the ground in a clean sack to allow it to sprout.

During the sprouting process, the process of mobilising enzymes that are later used for malting begins. The sprout is then dried and ground into a powder which may be kept for months or even years, for as long as it's not in contact with water.

The traditional malted porridge is prepared by adding millet or sorghum paste to boiling water to prepare a porridge. When the porridge is ready to drink, it is left to cool to room temperature. Once cool enough the sprouted seed powder is stirred into the porridge, some water may be added, and the porridge is left to stand overnight. This process produces a non-alcoholic beverage.

In many households, it is common for the malted porridge to be consumed as a rehydration beverage and for rehydration therapy during illness when a high fluid intake, or energy revitalisation is required.

Other commonly fermented foods include cassava to make porridges and make a stiff bread. These are just a few of the ways that traditional cuisine enhances food through fermentation.

But how do we value and spread this local, indigenous knowledge?

"Abdou and Fanza, these are great pieces you have collected. How do you think this knowledge on insect harvesting and cooking practices and fermentation skills were passed on in rural communities from generation to generation?"

Fanza spoke. "I suppose by mothers and grandmothers. I remember as a child playing nearby and imitating the adults in our games. And then we would have to help prepare the vegetables and later even do some cooking."

"But is this still happening?" Monica asked, looking at Abdou.

"Less and less, I suppose, as fast foods take over and tastes change. Though in some places people are returning to their roots, as we discovered."

"Quite right, Abdou. But if we do not teach younger people and revive them in communities, the chances are high that in the next ten to twenty years many of these practices are going to be forgotten. Or we will sentimentally remember what we did "back in the old days" but carry on without as usual.

"So, the question we now face is what can we do to carry on these rich traditions of indigenous foods? How do we work with community groups that are keen to improve their own and their families' health through eating better? This is what we are going to discuss when we get together next."

NOTES






8

Making Healthy Food Happen!

Using a Barefoot Guide Approach

In your bones: knowing versus understanding deeply and then acting

"How does one change bad eating habits?" asked Monica.

"First you have to understand what healthy eating is," suggested Fanza. "If you understand you'll change."

"Yes, I agree," said Abdou, "but it has to be a certain kind of understanding. The understanding has to be deep in your bones! The type that compels you to change!"

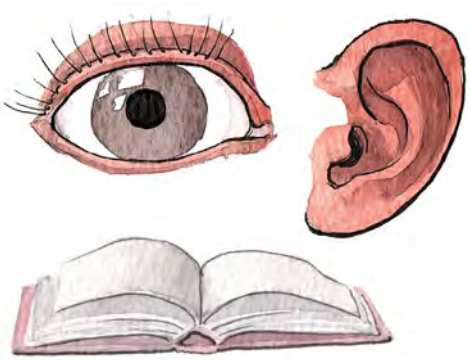
"That's a good way of putting it, Abdou," said Monica. "Simply knowing about something is not enough. A deeper understanding is required. But how?"

"I read somewhere that we remember 10% of what we read, 20% of what we hear, 30% of what we see, 50% of what we see and hear, 70% of what we discuss with others and 80% of what we personally experience!" said Kamali.

"That sounds grand," chimed in Fanza, "but what does it mean in practice? People can't eat grand words, and people cannot eat workshops, my mother always says."

"What do you think it means in practice? I'm not just asking Fanza, but all of you. Tell me," responded Monica patiently, noticing Fanza's irritation.

No one spoke for almost thirty seconds. Then Estridah looked up, "I remember each and every story we read. And all the discussions really have helped me to change the way I've been eating. I've stopped eating junk food and sugar. That is the first thing I needed to do. And now I am trying to eat as much diverse foods as possible, using different colours as a guide too. I've also been having very interesting discussions with my mother about our traditional foods in northern Malawi. I'm very keen to help revive many of them, as well as eating them myself."



Njabulo exclaimed, ""Maybe healthy eating and reviving traditional foods and diets is in your bones now, Estridah! The stories brought it home for me! What also helped me was when we cooked some traditional meals together and discussed what we were doing. Eish! I'll never forget those. It really came home to me how rich our traditional foods, diets and cuisines are across Africa. Everywhere there's that local diversity that makes for healthy eating. Before we did that, I had thoughts about traditional diets being good. After we did it, I knew how good they are!"

"In your bones too!" said Ajay laughing.

Monica throws a cat among the pigeons

"Next week," Monica came in again, "you'll be attending two community groups holding action meetings on healthy food. The first is with a women's group, Kiwala Village Savings and Loans Club, in a rural area near Masaka. The second is the Kibuli Hill Community Group, with a number of young urban residents, here in Kampala, who are meeting to deal with the increasing numbers of lifestyle diseases like type 2 Diabetes, high blood pressure and cancer. You are going to help out with the meeting by performing a short drama."

"What!" cried the students in unison. "But we are not drama students!" said Abdou.

"Speak for yourself," said Fanza with a dramatic gesture, "I won the acting award at school, thank you!"

"I don't want any arguments. To do this work you must have many skills. Fanza, you can be the director. Here is the story to dramatise. And please, everyone, put on a convincing act! And Kamali, I would like you to facilitate the discussion after the drama. When we meet the following week, we'll discuss how it went."

How the Bujenje Village Savings and Loans Club use stories as a discussion starter

"I recently read that almost one third of children under five in Uganda are stunted. Why is that the case? It's shocking. Our village savings and loans club, which we call our bank without walls, has been quite successful. We often get visitors to hear about it. Last week there was a group from the FAO wanting to learn about our success. But money isn't everything. Especially if you aren't healthy." So began Masiko, the Chairperson of the Bujenje Village Savings and Loans club.

The members of the group sat in a circle next to her. Sitting on the side were a small group of students from Makerere. They were all sitting in a thatched, open-sided hut with low mud walls to sit on. This served as their bank's headquarters. The members could hear in Masiko's tone that she was worried. There was silence as she paused. Then she continued.

"We've become a shining light in our community. We've shown how to mobilise our own resources to help each other. I think it's now our responsibility to do something about the way our eating patterns have been changing and changing for the worst. What you choose to eat is a complex topic. We need to understand it well and base our action on that understanding.

"To help us understand we're going to use our story method again. Remember how we used a story when we first started. That's what really empowered us as a group to understand our situation and then to take action. This is how we set up our successful savings and loans club. We had such a rich discussion. Out of that discussion came the understanding and the action. Let's do the same towards much healthier eating in our community."

Remember how we used a story when we first started. That's what really empowered us as a group to understand our situation and then to take action.

Miremba will read our first story. It comes from a Barefoot Guide called: 'My Food is African: healthy soil, safe foods and diverse diets'. Grace has translated it into Ganda. "Over to you Miremba."

Miremba stood up and slowly read the following short story:

Grandma's Special Food

We sit outside under a tree on a reed mat and greet each other. Grandmother, who is all smiles, dashes into the kitchen and brings out boiled groundnuts and a dish with a mix of beans and maize grains. We kids also get to eat the baobab fruit, with some fresh milk from grandma's cows. I know my grandmother wants to ask my parents why we don't visit more often and why we never stay the night. I'm also thinking about how I can get out of washing the dishes. It's exciting to be visiting my grandparents again. I am here to enjoy myself and feel free.

Grandmother gets busy preparing a meal for us. I watch her take down the long pieces of dried meat hanging in the kitchen and break them up into smaller pieces. She boils the meat until it's tender and adds peanut butter to make a sauce. For vegetables, she picks pumpkin leaves, washes and chops them, boiling them until they're soft. She adds a little cooking oil. Lastly, she cooks a thick porridge from red sorghum, doing this with great skill to avoid spillages.

You can feel the tension in the air. Grandmother, like grandmas do so often, is making the best of it. It shows the gap between urban and rural lives.

I watch my father perched on a stool, all prim and proper as a good son should be, but I can see by the way he is looking, and not saying anything, that he is uncomfortable. No doubt he is also wondering when the meal will be finished so that we can head back to town. After eating, he continues to say nothing. Did he not enjoy the delicious meal?

My Grandfather calls me and my sister to go to the fields. There, we find some red-fleshed melons and soon we are scooping out chunks with our hands and drinking the juice. How refreshing! We collect the melon seeds and give them to grandmother to dry.

Later, as we leave, our car full of grain, wild fruits, and other foods from my grandparents, I feel sad. However, I know I have to go back to town with my parents. I think about what we eat in town: super-refined maize meal, white rice, meat and a few vegetables. We often snack on sweets, biscuits and sodas/soft drinks or the popular and sweet Mazowe orange drink. Who would dare cook the type of food my grandmother cooks? Who would eat it?

DISCUSSION IN THE GROUP:

When Miremba had finished, Masiko let the story sink in before asking: "What happened in the story, including what feelings you noticed?"

"It's obviously not set in Uganda, but it could be in some ways. It's about the relationship between town and rural relatives. You can feel the tension in the air. Grandmother, like grandmas do so often, is making the best of it. It shows the gap between urban and rural lives." These remarks came from a middle-aged woman called Namono.

"Why does her father feel uncomfortable do you think?" asked Masiko.

"I think he sees the rural life as backward and is embarrassed by it," another woman called Namazzi chipped in.

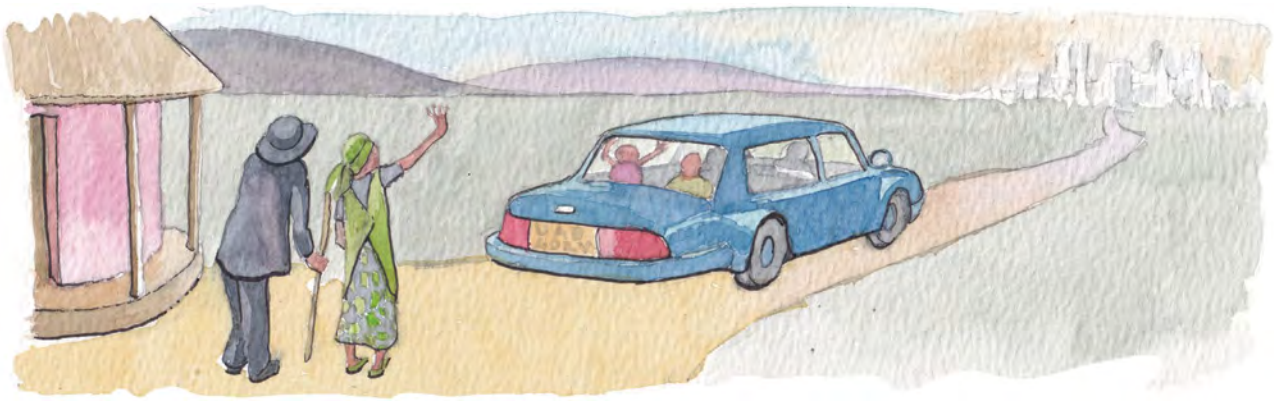
"Why does the writer feel sad when she has to leave?" Masiko then asked.

"She's still a child and has that innocence. She appreciates the rural life and the warmth of her grandma. She does exciting things when she's there," another young woman with a baby, sitting next to Namazzi, responded.

"The same thing's happening here," Namono jumped in again. "People in urban areas are changing their diet to refined foods and lots of what people call junk food. It's almost as if that's what you're expected to eat if you live in an urban area. It's also about status."

"And we're beginning to do the same in rural areas, especially younger people," said the young woman with the baby. "Those foods are easier to prepare and quicker."

"It's also difficult because now we grow maize everywhere and have stopped growing some of the other staple foods. And we too are connecting anything traditional to being backward."



The group continued their discussion, still referring to the story but gradually talking more about their own situation. After about an hour, Masiko came in with this question:

"So, what should we do about the situation? How can we help change things so that people recognise the great value of traditional foods?"

"I think we must document all our foods, dishes and drinks and the different ways these are eaten," said an older woman who hadn't spoken until then. "Some of us with knowledge that's been passed down to us are getting older. We don't want to die with this knowledge."

"Why don't we take it in turns to prepare something to eat for our meetings?" asked Namazzi. "And then we could document it at the same time, writing down the recipe and taking a photo too."

They followed this idea some more and then agreed on a roster of sharing. There was an excited buzz as the members of the group left the meeting.

How the Kibuli Hill Community Group use a short drama as a discussion starter:

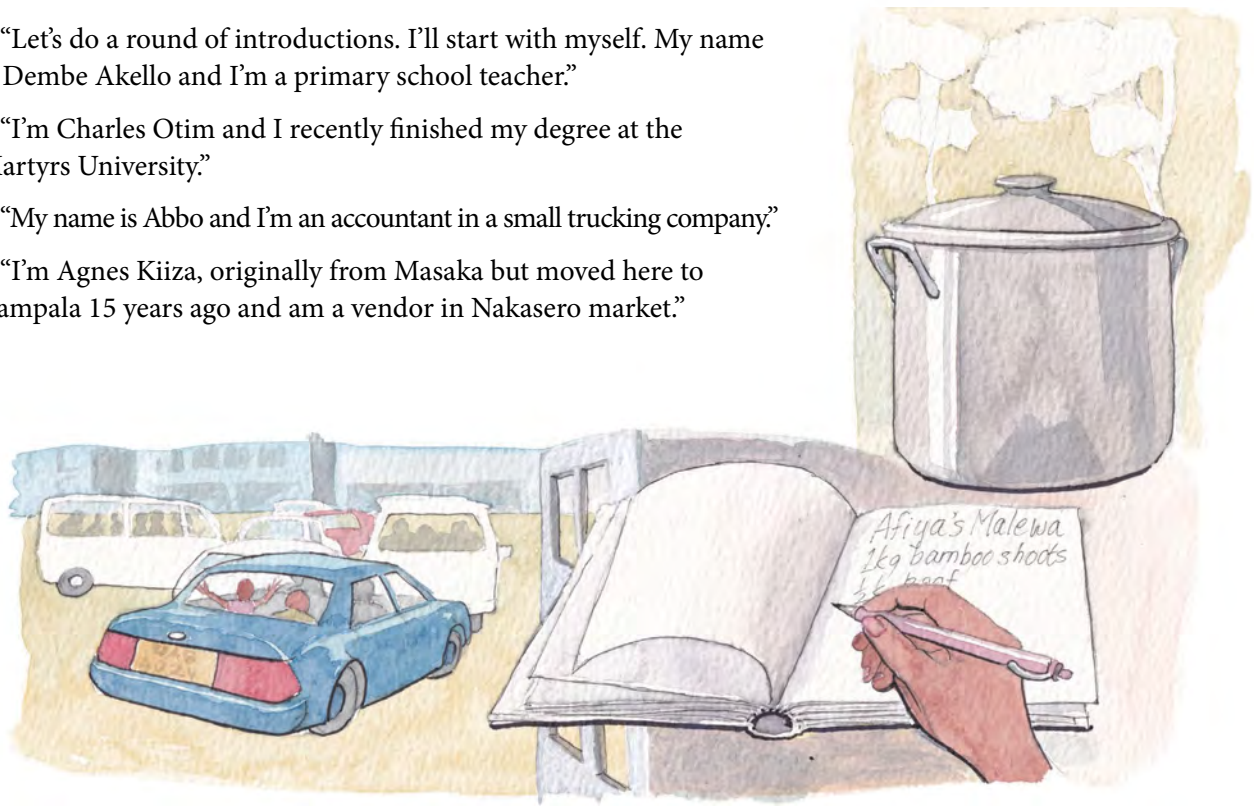
"Welcome to today's meeting of 'Kibuli Hill Community Group'. For those who are new, the group's aim is to help each other live healthier lives. We have also invited these six students from the University to participate. Welcome to everyone. We formed the group because some of us are very worried by the rapid increase in illnesses like type-2 Diabetes, high blood pressure and a range of cancers. We believe that we can deal with these in our lifestyles. Many of these illnesses never used to be around in Uganda. They are modern illnesses. Just relying on medicines is simply continuing to treat symptoms. These medicines may be necessary to some extent, but we believe it's time to address the root causes."

"Let's do a round of introductions. I'll start with myself. My name is Dembe Akello and I'm a primary school teacher."

"I'm Charles Otim and I recently finished my degree at the Martyrs University."

"My name is Abbo and I'm an accountant in a small trucking company."

"I'm Agnes Kiiza, originally from Masaka but moved here to Kampala 15 years ago and am a vendor in Nakasero market."



The introductions continued until all 21 members had introduced themselves.

"We want to make our gatherings fun and interesting," Dembe continued. "Today, we've invited students from Makerere university to lead the session. Over to you Kamali and team."

The six students moved into position for a short, mimed drama, which went like this:

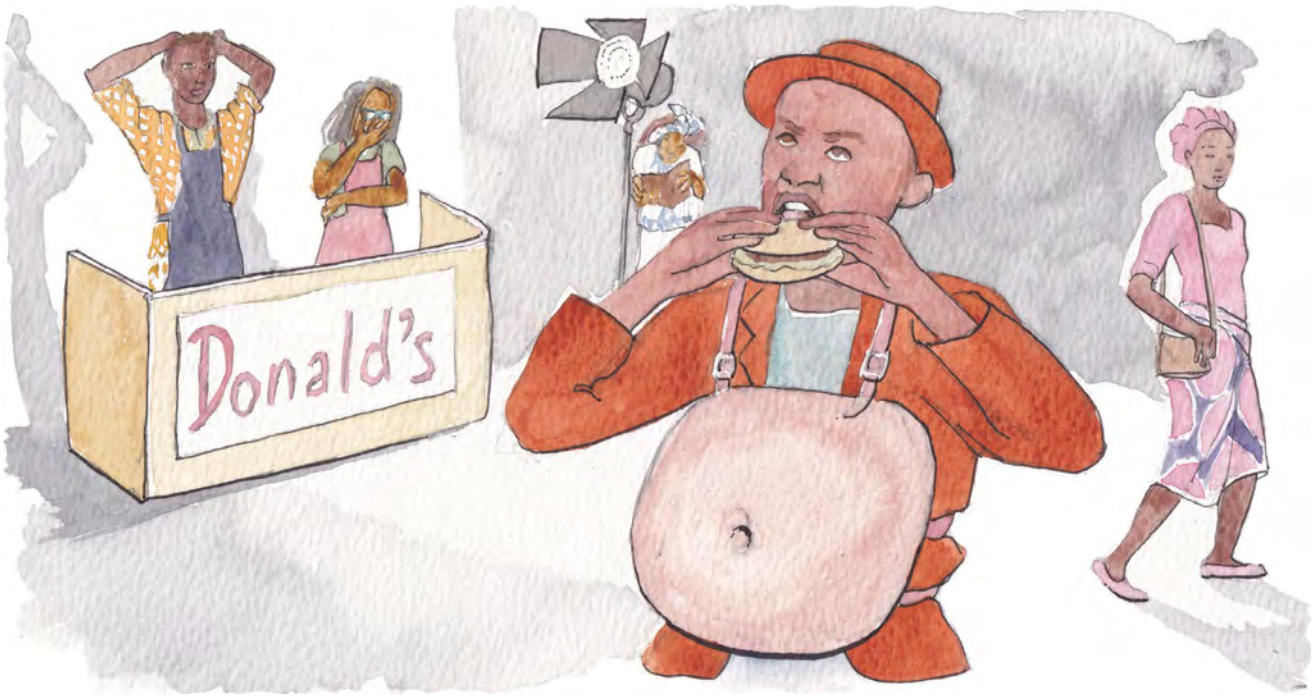
In the centre are two young people working away at their computers and on their phones. The one is a very overweight young man (padded up to look like this). He tends to get easily distracted. The other is a young woman. A clock chimes to indicate lunch break. They both get up and go out in different directions.

At the same time as the above, there are two other scenes on either side: one is of an older woman working away in her kitchen preparing a variety of dishes – cutting, stirring, seasoning, tasting etc. She moves with unhurried intention. The other is of a fast-food outfit with a sign saying something 'Donald's fast foods', where a couple of people are rushing around serving portions of chicken and chips. They are frenetic.

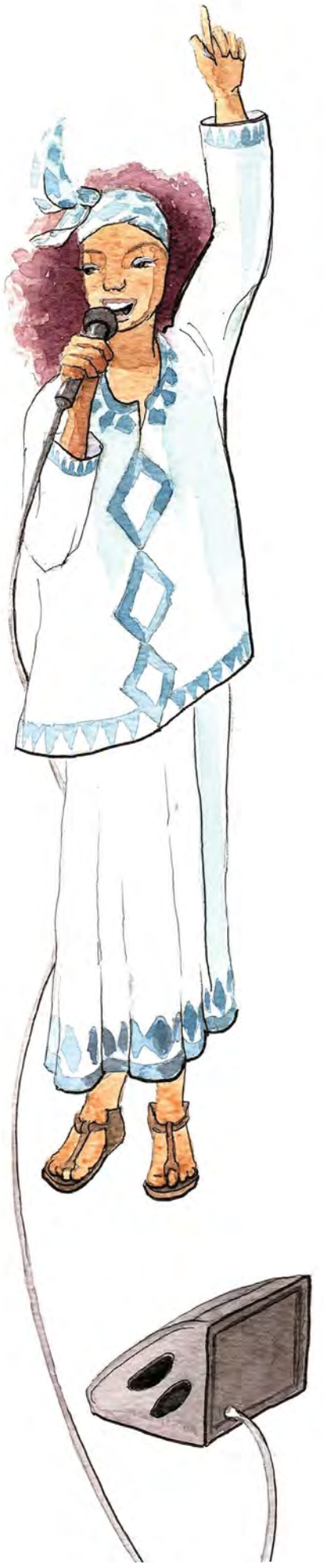
The woman walks slowly and easily to the scene where the older woman is preparing a meal. She greets her in a friendly way and they chat. They appear relaxed. They sit down together and, in a leisurely way, eat their meal together. There are a number of dishes and that are obviously tasty.

The overweight young man keeps looking over his shoulder as he approaches Donald's Fast-Food outlet. He goes in, smells the aroma, and then reluctantly goes out again. He does this a couple of times, obviously having difficulty making up his mind. Eventually he gives in and walks up to the counter and orders, all the time glancing back over his shoulder as if checking if someone is watching him. He moves around nervously as he waits for the order. When his number comes up, he snatches the order from the fast-food worker, who's upset about this. There's a bit of an argument before the customer pays and leaves. Once outside the shop, he gobbles up his takeaway very quickly.

Both office workers then return to their work. The one works away steadily and easily. The other continues to get distracted and rubs his stomach, as if with an ache. And he takes out sweets and keeps popping them in his mouth. The end of the day comes, and they both leave.



"How can we help such young people go to the place serving traditional foods rather than the junk food?"



"Hi everyone, so I am Kamali from Ethiopia. Thank you for letting us participate and learn from you. So, we'd like to discuss our short drama today," started Kamali. "Could one of you describe what you saw happening in this drama?"

"There are two people working in an office who go for their lunch in different places," began Agnes, "one goes home and the other goes to a fast-food place."

"I didn't think she went home, I thought she went to a local restaurant selling traditional foods," suggested Charles.

"I guess it could be either," responded Kamali. "How did the two show different feelings?"

"The young woman was relaxed while the young man seemed to feel guilty about what he was doing," said Abbo. "He seemed very uncomfortable and then at work he never seemed able to concentrate."

Other members of the group came in and shared how they saw it. Kamali then went on to ask what the main message of the drama was and the group discussed this.

"How does the drama relate to your own lives?" Asked Kamali.

A middle-aged woman called Namono spoke up. "I have a nephew who's just like the boy in the drama. He's only 24 and is very overweight. His mother is worried about him but whenever she raises the topic of his weight, he gets moody and upset, and refuses to talk about it. What can she do?"

This led into a discussion amongst the members on how to deal with such a situation.

"How can we help such young people go to the place serving traditional foods rather than the junk food?" was the way one member put it. "Young people seem to have a resistance to traditional foods," she continued.

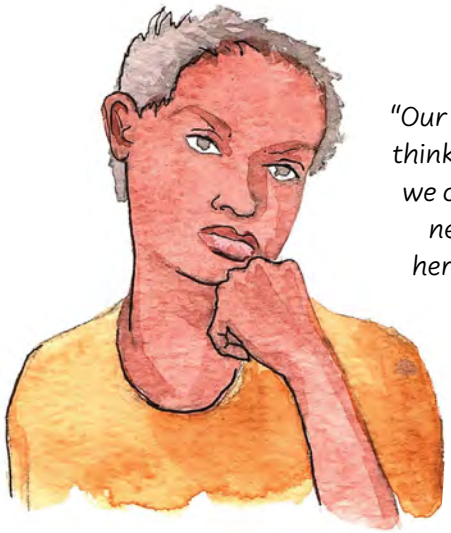
"Maybe older people shouldn't talk about 'going back' all the time," suggested Charles, the recently graduated young man. "That puts young people off. Is there a way to make traditional foods appealing and modern to young people?"

"That's a good point," said Dembe Akello, the chairperson of the group. "There's also the point that our different traditional diets in Uganda take time to prepare. They are very healthy, but my recently married daughter is always complaining to me how long traditional dishes take to prepare. What can we do about that? She says she just doesn't have the time."

The group continued to discuss how they could encourage young people to prepare and eat healthy meals. One person suggested the next time they meet as a group they all bring an example of how they have speeded up their preparation of a healthy dish. Another suggested that they organise an annual food market in the area to celebrate healthy eating.

"Yes, that's a great idea," said Agnes Kiiza, "that could help give status to such foods. We could invite musicians to play at the festival and have a small charge to cover the costs."

"The aim would be for people to have fun," continued another member, "and the healthy eating would be linked to that. We could have pamphlets about healthy eating for those who are interested."



"Our time has run out," said Dembe, "but let's think about that idea of having a festival and we can discuss how we do it at our meeting next week. Many thanks to Kamali and her team for leading us in this very useful discussion."

Capturing and discussing our biodiverse foods

This is an exercise that records the diversity of foods in an area and how widely the group discussing them eat each food. It then can open up discussion around specific ways to increase the diversity of foods in people's diets.

A. Create a four-cell diagram on a large piece of paper or on the ground or on a flipchart stand. Give the following headings to each cell:

Top left: *Eaten often by many people*

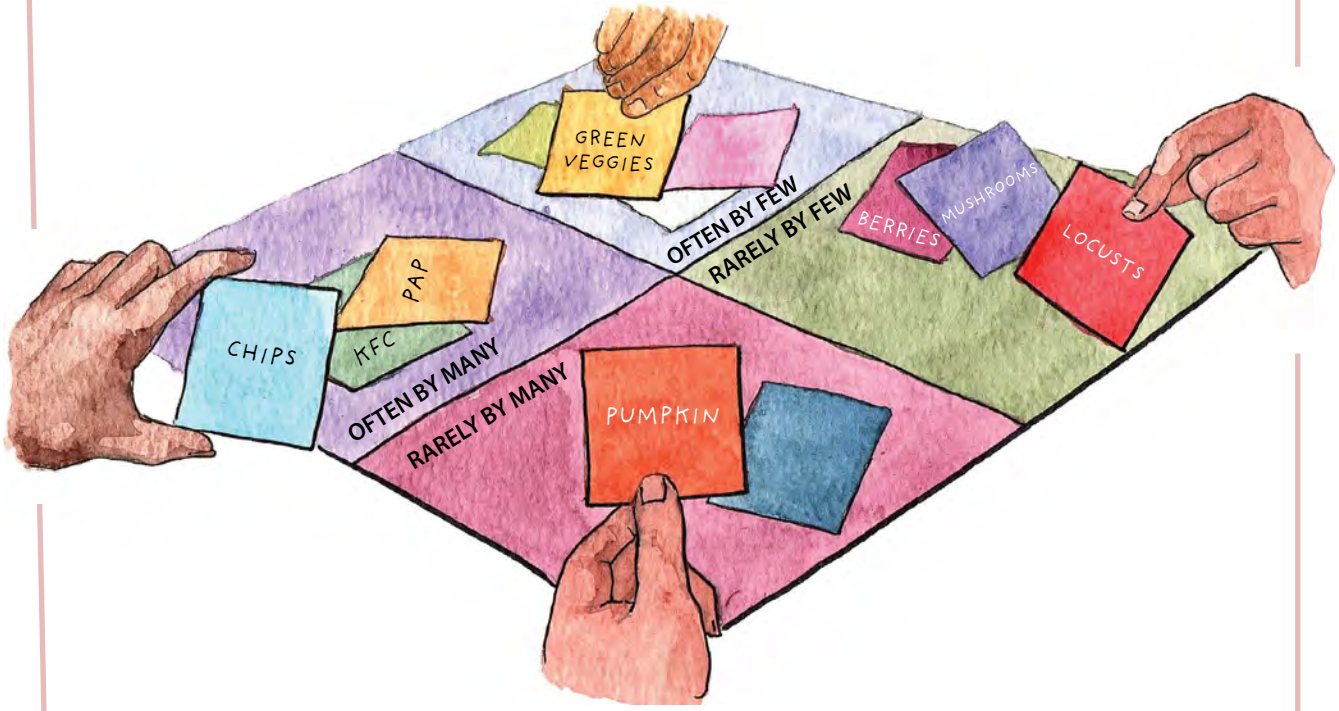
Top right: *Eaten often by few people*

Bottom left: *Eaten rarely by many people*

Bottom right: *Eaten rarely by few people.*

B. Ask the group to name a food that they eat. Then ask the group how many people eat that food and how often they eat it. Write the name of the food on a small square of paper (or draw a picture of the food) and place the small square in the appropriate cell. Then ask for the name of another food and do the same. It's important to keep going until people can't come up with any more foods so as to capture every food being eaten.

You could also ask: "Are there any foods that used to be eaten and no-one eats them anymore?" These would go somewhere outside the four cells.



C. Then open things up for discussion. You could ask a question like: "If we think about our discussions on healthy eating, what is this diagram telling us?" And then probe with more questions to move towards a common picture of the current situation.

D. Then, when appropriate, shift the discussion to: "What can we do about this situation? How can we improve things?" Then finally: "So what are we going to actually do? What's our plan?"

Suggested guidelines for USING this Barefoot Guide in groups

This is a guide for community group leaders, or NGO practitioners or government health or agricultural extension workers who are working with communities who are keen to improve their own and their families' health through eating better.

Facilitating a community action discussion

1. Get to know the book well and all the stories. See them as a resource for you to use with groups you know. Knowing the different stories will allow you to select which ones are most suitable to your situation.
2. Use the stories to come up with similar stories of your own, adapted to your local context.
3. Have someone in the group or wider community read the story you've selected. You may need to translate it into the local language of your area.
4. Consider turning the story into a short educational drama with some volunteer actors from your group. This can be fun, particularly for young people. If so, it will be good to do a rehearsal with the volunteer actors. It doesn't have to be perfect.
5. After the reading or acting out a short drama, use the questions we've included after each story or, better still, ask your own questions.
6. In order to carry everyone with the discussion, it's often good to start with open-ended questions about the story itself, such as
   a. What were the most interesting things in this story?
   b. What was the main message in the story for you?
   c. What other messages were there?

   Try to come to a common understanding about the story amongst everyone in the group, but don't worry about differences on what the main message is. That's fine. The aim is for good discussion.

How to encourage more participation

Many people struggle to contribute to group discussions. One way to help them is to use "buzzing with your neighbour". How? Before you invite the whole group to discuss a question ask everyone to turn to their neighbour, and to chat about the question in pairs, just for a few minutes. This helps people to find their voices and explore responses before you open up discussion with everyone. Try it.

7. The next stage can be to help people to connect the story to their own situation. You can use questions such as:
   a. How does this story remind you of what it's like here?
   b. What differences are there?

   Let people discuss freely for a few minutes.
8. When enough understanding has been shared, you can then guide the discussion with questions such as
   a. What does this story teach us?
   b. What are all the possible ideas you have to improve our situation?

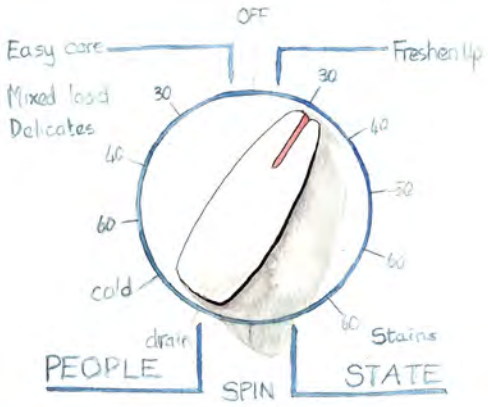
   This is a brainstorm, so encourage people to freely think of many ideas.

9. Finally, you can lead the discussion decisions for action, with questions such as:
   a. So, what are the best ideas we can agree on to DO something to make a difference?
   b. What will be the benefits of implementing these ideas?
   c. What might stop or discourage us from succeeding and what do we do about this?

This can then lead to the group coming up with a simple plan that lists the actions, who will be responsible for each action, and a timeline of when the group wants to see the actions done.

Always adapt this to situation. For example, it might work to wait for the next meeting to go onto the action stage. But in the end, this is all about people taking action to change behaviour or strengthen appropriate behaviours to link healthy soils to healthy plants and diverse diets with local foods.

Additional actions that could help bring about change



- Identify farmers in the area who already know how to make the transition to healthy soils, healthy plants, and diverse crops.
- Find NGOs or leaders in the district, or government extension staff who have technical experience with natural farming techniques that improve soils, and generate healthy plants. And check if they're willing to provide support.
- Seek out women and families that are known to have diverse healthy diets and arrange for others to visit them to learn from them.
- Identify who within the community are ready to make changes. Think about how to support them and to connect them to support each other.
- Test out new ideas and practices on a small scale, including on-farm experimentation. Bring people to these sites to learn. These visits could include cooking demonstrations.
- Make visits to the local markets to see the variety and quality of local foods available and the prices, as well as the presence of highly processed foods and sugary drinks.

We're sure you can think of others for your situation.

What are the forces stopping the move to healthier eating for everyone?

Monica was feeling satisfied. Her students seemed to have grown so much. They were more thoughtful, more confident and more serious about their studies. And they were also closer as a group.

"So far, we have been focused on what is unhealthy or healthy food in Africa and how to help people and communities to understand and change their habits. But what else do we need to focus on?"

Ajay looked up and began: "The big drive for production in my country has meant a shift from fields full of diverse foods to monocropping of maize in particular. It upsets my mother a lot, but not my father. He calls himself a modern farmer. He's taken back some of my mother's land.

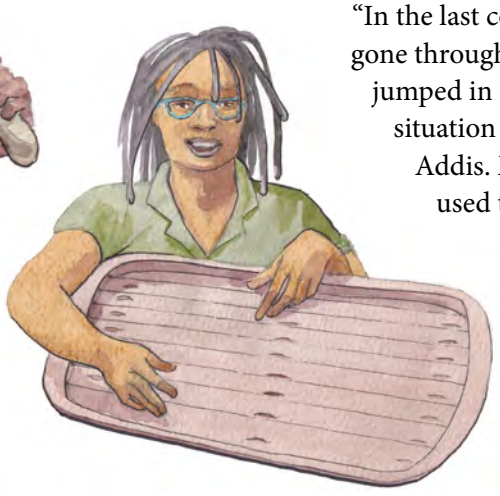
"She was telling me the last time I was home how she's watched this happen all around her to other women as well. Many men often deride women's fields with diverse food crops as backward. So, I was thinking, if men like this keep pushing for cash crops with that kind of attitude, they undermine all those food crops that women have been growing. If this doesn't change it doesn't matter how aware the women are about healthy eating. Is this an example of what you mean?"

"That's a very good example," Monica complemented Ajay. "Relationships between men and women can have a lot of bearing on whether people can eat healthily. What role to government and NGO staff play in the situation you describe?"

"Most of them are men," continued Ajay, "and from what my mother tells me all they're interested in is production. They have no interest in the diversity of healthy food crops that women have always grown in their fields. They support the idea that this is backward."

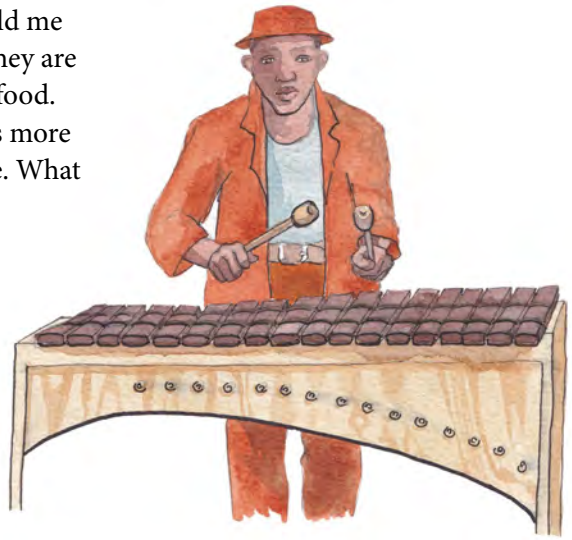
"Yes, that's what I thought," said Monica. "Next semester this issue of the different perspectives of men and women will definitely be one of the topics we look at. What else affects whether people eat healthily or not?"

"Relationships between men and women can have a lot of bearing on whether people can eat healthily. ..."



"In the last couple of decades Ethiopia has gone through an economic boom of sorts," jumped in Kamali. "The food marketing situation has changed a great deal in Addis. My aunt describes how she used to do all her shopping at local markets. Now she does most of her shopping at a new supermarket. It's more convenient. Everything under one roof?

"One of my uncles in the USA told me it's one big supermarket there. They are full of junk and over-processed food. You can get organic food but it's more expensive and for richer people. What do we do about supermarkets? Isn't there a role for African markets?"



"Thanks, Kamali, that's another big issue in the healthy eating discussion. If there aren't supportive marketing situations it's difficult for people to find the health promoting foods they need, at a cost that they can afford."

"What Kamali said has made me think of something too," said Estridah. "As you drive into Lilongwe, our capital city in Malawi, there's a huge advertising billboard from a big Southern African sugar company urging people to buy new, healthy sugar with Vitamin A added! From every side we seem to be bombarded by advertisements, on billboards, on the radio, tv, on social media pushing junk foods. Imagine pushing sugar as a health food!"

"Our country has also been doing okay economically in the last decade," started Abdou. "One of the results of this is a big rise in international fast-food chains in Dakar and other major centres. All the well-known ones are with us now and young people flock to them. They're seen as modern and hip places to be. We have a big generational gap around food."

"In South Africa, in urban areas especially, people want dishes they can prepare quickly," continued Njabulo. "Traditional and healthier dishes generally take longer it seems. People don't have time. Also, they don't want to spend time on cooking. That's not a priority anymore."

"Thanks all of you," said Monica joining in again. "I want to emphasise the point that if young people see traditional foods as backward then they'll tend to avoid them, no matter what they hear from their mother about their health value. Part of modernity I think is also that children don't listen to mothers that much anymore."

"Another dimension that we'll look at in the next semester is Government policies and approaches. In December last year, as you know, I attended the IUNS, the International Union of Nutritional Scientists' conference in Tokyo. This is a gathering of those considered to be the leading figures in nutritional science around the world. They have a lot of influence. What they say affects what happens at country level. It affects where financial support goes for 'nutrition' improvement programmes.

"The way that Governments think about healthy eating and the policies they develop have a big impact on what citizen eat. This starts from how Governments promote what is grown, how it is processed and then distributed, leaving people with such limited and unhealthy choices when they go shopping for food. Another issue is about government policies for importing food. Many other countries subsidise their agriculture, for example for rice production in Asia, and corn production in the United States. Big Food corporations turn these very cheap crops into many ultra-processed products and sell them in Africa. Our own small scale farmers cannot compete.

In West Africa, many countries import ultra-processed "perfumed" rice which many people in cities to buy because it is cheaper and easier to cook than local rice.

Then, Big Food corporations spend millions on advertising their ultra-processed foods, convincing people to buy their products, not locally produced foods.

Finally, you have to add culture, economic circumstances and many other factors to this. You have to look at the whole system that ultimately decides what people put into their mouths."

"Next semester we'll explore all those forces that work for or against people's choices around food. And what needs to be done to change those."

Drawing the threads of healthy eating together

"As we close this semester, let us distil the key messages we have come to. The headline for the semester was "Knowing and understanding the basics of what creates healthy food and what makes up a healthy diet. I would like to add a subtitle form Abdou: "Helping people to understand healthy food in their bones and then act!"

The students laughed and all looked at Abdou who smiled proudly at the acknowledgement. Monica continued:

"We've also looked at how we can help others understand the basics of healthy eating. This means enabling people to discuss healthy eating from many angles. Using stories or drama as a starter can help stimulate the discussions. Through discussion people understand much better. This can help them change, where change is needed. Or they strengthen their good eating habits.

"And we've engaged in helping interested people in communities to act on this new understanding: we've looked for practical examples, made learning visits, sought out technical support, and tested new ideas on a small scale. I am sure you have realised that it's really not that complicated, but it does require a different way of thinking."

The students could see Monica's eyes light up as she spoke. She loved this topic. "So, who can tell me what are the essential elements that go into healthy eating?"

Fanza was first. "Healthy eating starts with the soil. With healthy soil that is alive with a multitude of diverse microbes and organic matter, healthy plants can grow, full of all sorts of goodness."

Ajay followed quickly. "Synthetic chemical fertilisers and pesticides have no part in healthy soil. They may appear to produce healthy plants, but this is really just a plant on drugs. As with drugs, longer-term use means damage. Damage to the soil and to our bodies."

The other students looked at each other, impressed by Ajay's metaphor.

Estridah raise her hand to speak. "We also now know that having healthy stomachs, full of a diversity of microbes, is key to our health. That diversity of microbes in our stomach helps us turn the food we eat into health-promoting energy. Eating healthy plants grown on living soil and having a healthy stomach microbiome will go a long way to making us healthy, wholesome beings. A vibrant part of the cycle of life."

"And to get a variety of microbes you have to eat a variety of foods, of course," Abdou jumped in. "I have learned that we need to include at least ten different natural foods in the meal. Don't forget to throw in some power-packed herbs for taste and health. And try to have foods of different colours."

"My grandmother used to gather all sorts of greens for our meals when we visited her in my childhood," Kamali added. "I always used to think she was wasting time doing this. But now I understand what she was doing. And she didn't take that much time anyway, I was just being impatient."

"How we prepare food also influences how healthy it is," said Njabulo. "Grains need to be well cooked to help digestion, but we need to avoid over-cooking vegetables, eating them as fresh as possible. The best is if you grow them and cook them as soon as you pick them, or eat them raw if you can."

"Adding local fruits into your diet will also help you be healthy," added Kamali. "Often older people think these are only for children. True, it's important that children eat lots of fruits, but they can also help adults be healthy too."

"Excellent!" Monica exclaimed. "I am so impressed. Let's keep it simple and not over-complicate things. That writer I quoted at the beginning of our course has perhaps the simplest guide of all: **"Eat food. Not too much. Mostly plants."** He goes on to say: "That, more or less, is the short answer to the supposedly incredibly complicated and confusing question of what we humans should eat in order to be maximally healthy."

"See you next semester!"

References

CHAPTER 1

A few books and links about African traditional foods, dishes, diets and cuisines:

Fran Osseo-Asare is the author of several books, including *Food Culture in Sub-Saharan Africa.* She founded *Betumi: The African Cuisine Network* (www.betumi.com) and blogs about African foods.

Marcus Samuelsson, *The Soul of a New Cuisine: A Discovery of the Foods and Flavors of Africa*;

Alexandre Bella *Ola, La Cuisine Moussa: 80 Recettes Africanes Irrésitibles*;

Rachel C.J. Massaquoi, *Foods of Sierra Leone and Other West African Countries: A Cookbook and Food-Related Stories*;

Judith Carney and Richard Rosomoff, *In the Shadow of Slavery: Africa's Botanical Legacy in the Atlantic World*;

Jessica B. Harris, *High on the Hog: A Culinary Journey from Africa to America*;

Healthy Harvest, a training manual for community workers in growing, preparing and processing nutritious foods https://sites.google.com/view/freefoodenvironmentresources/documentation?authuser=0

www.naturallyzimbabwean.com

CHAPTER 2

Guillaume Fourdinier (Cofounder and CEO, Agricool) – The Origins of Pesticides – https://medium.com/welcome-to-agricool/the-origins-of-pesticides-209c503a86dc

Wolfgang Boedeker, Meriel Watts, Peter Clausing & Emily Marquez – The global distribution of acute unintentional pesticide poisoning: estimations based on a systematic review. *BMC Public Health* 2020

Julie Rasplus, "Quels sont les risques des pesticides pour notre santé?" https://www.francetvinfo.fr/monde/environnement/pesticides/quels-sont-les-risques-des-pesticides-pour-notre-sante_1289623.html

https://phys.org/news/2021-03-global-farmland-high-pesticide-pollution.html

Claire Starley "Agroecology in Action: Keeping Pests at Bay in the Safest Way" – https://farmingfirst.org/2018/04/claire-starkey-agroecology#:~:text=Proper%20weeding%20and%20land%20preparation,practices%20help%20plants%20stay%20healthy

Worldwide decline of the entomofauna: A review of its drivers – https://www.sciencedirect.com/science/article/abs/pii/S0006320718313636

Fertiliser references adapted from:

Tim Harford – How fertiliser helped feed the world – https://www.bbc.com/news/business-38305504

Charlie Nardozzi – Choosing a Fertilizer for Your Vegetable Garden – https://www.dummies.com/article/home-auto-hobbies/garden-green-living/gardening/vegetables/choosing-a-fertilizer-for-your-vegetable-garden-193882/

CHAPTER 3

The following link takes you to examples being used in AFSA and SKI's Healthy Soil Healthy Food programme:

https://www.seedandknowledge.org/wp-content/uploads/2020/09/Biofertiliser-1-Native-microbes.pdf

https://www.seedandknowledge.org/wp-content/uploads/2020/09/Biofertiliser-2-Fermented-Cow-Manure.pdf

https://www.seedandknowledge.org/wp-content/uploads/2020/09/Biofertiliser-3-Bocashi.pdf

https://www.seedandknowledge.org/wp-content/uploads/2020/09/Biofertiliser-4-LAB.pdf

https://www.youtube.com/h?v=VTgxXjTh6eM&list=PLl9v8EPvLuWyXEWbmLwzavJaP4VEZDCFP&ab_channel=TheSeedandKnowledgeInitiative

CHAPTER 4

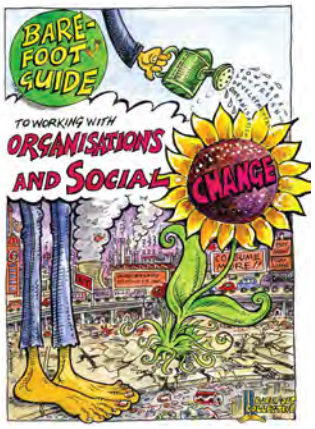
Definition taken from WHO https://www.who.int/news-room/fact-sheets/detail/diabetes#:~:text=Diabetes%20is%20a%20major%20cause,deaths%20directly%20caused%20by%20diabetes

International Diabetes Federation. IDF Diabetes Atlas, 10th edn. Brussels, Belgium: 2021.
Available at: https://www.diabetesatlas.org

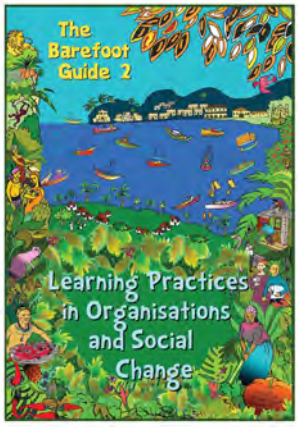
CHAPTER 6

Nduati Githae."Food and Migration: A Culinary Journey Through East Africa Read more at: https://www.theelephant.info/culture/2018/02/08/food-and-migration-a-culinary-journey-through-east-africa/

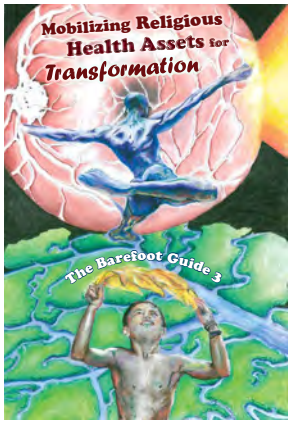
Published Barefoot Guides



العربية • Kiswahili • Español • Bahasa English • Français • 漢語 • Português

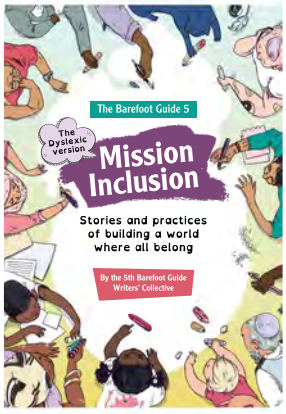


Kiswahili • Español • English Français • Việt

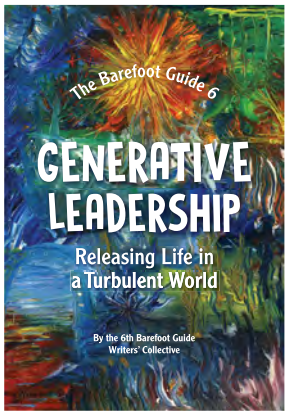


English

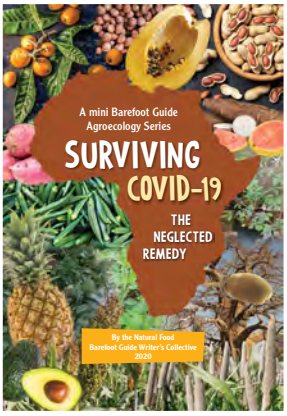
English • Français



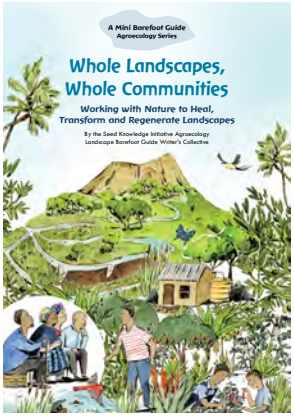
Kiswahili • English • Français



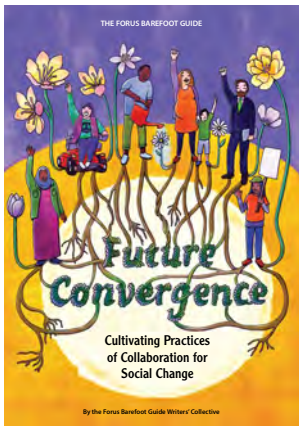
English



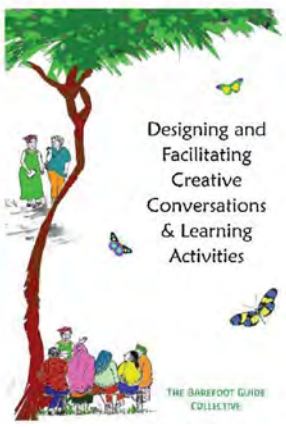
English • Français • Español



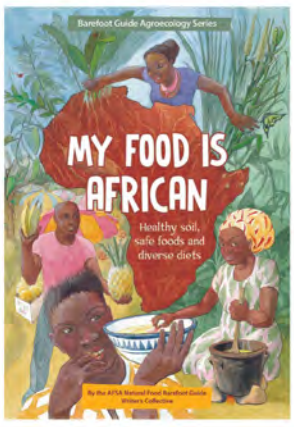
English



English • Français • Español



English • Français • Español



English • Français

The Barefoot Guide Connection
www.barefootguide.org

Download these and other resources from
www.barefootguide.org

AFSA
ALLIANCE FOR FOOD SOVEREIGNTY IN AFRICA

www.afsafrica.org

The Barefoot Guide Connection
Transforming ourselves... Transforming the world

www.barefootguide.org