STORIES OF RESILIENCE

BUILT THROUGH AGROECOLOGY

BIOWATCH FARMERS SPEAK OUT ABOUT LIVING AND THRIVING IN TROUBLED TIMES: **2020–2022**

Stories of resilience built through agroecology
Biowatch farmers speak out about living and thriving in troubled times: 2020–2022

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BIOWATCH SOUTH AFRICA

Biowatch is an environmental justice NGO established in 1999 and based in KwaZulu-Natal (KZN). We challenge the privatisation of biodiversity and food systems to ensure that people have control over their food, agricultural processes and natural and other resources.

We advocate and demonstrate agroecology as the alternative to the global industrialised food system, which contributes significantly to growing malnutrition, biodiversity and ecosystems collapse, and the climate crisis. Agroecology provides an approach to maintaining biodiversity and securing food and seed sovereignty, farmers' rights and social justice.

We work simultaneously at policy level and directly with projects on the ground involving smallholder farmers:

- **Biowatch supports** smallholder farmers to make informed choices; have control over their agricultural resources (including land, water, seed, infrastructure); and secure their farmers' rights.

- **Biowatch contributes** to building platforms for civil society to develop joint understanding of and action towards securing biodiversity, food sovereignty and social justice.

- **Biowatch challenges** and supports government to implement policy and practices that promote, facilitate and actively support agroecology, and that safeguard people and land.

- **Biowatch resists** corporate appropriation of natural resources. Much of our own work, and our work with others, is focused on changing the discourse around, and the disconnect between, the destructive industrialised food system and the devastating impact this is having on our planet and the life we share it with.

Visit our website: **www.biowatch.org.za**

STORIES OF RESILIENCE BUILT THROUGH AGROECOLOGY

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BACKGROUND

The historical injustices of our land are known. Colonisation and apartheid have resulted in a dualistic agriculture and food system dominated by a powerful and increasingly industrialised commercial farming sector. Smallholder farmers in South Africa have been marginalised and undermined; and this continues through government's ongoing support for the industrial agriculture model and its push to upscale smallholders into commercial commodity value chains. As a consequence, the indigenous knowledge, skills, and the genetic resources of smallholder farmers have been increasingly denigrated and displaced.

In 2003, Biowatch started working directly with smallholder farmers in northern KwaZulu-Natal (KZN) to challenge this imbalance. Most farmers are living in areas they were relocated to in "homelands" under apartheid, which are now held under the Ingonyama Trust. Relegated to 1–2ha of marginal land, it is most often women who farm to support their family livelihoods with household production. These areas remain under-served and many farmers still live without services such as piped water or electricity.

Over the years Biowatch worked consistently in five communities in the Umkhanyakude and Zululand District Municipalities. More recently we have been extending support to other areas in KZN. We support farmers to rekindle their traditional knowledge, supplementing this with agroecology training centred on farmer-to-farmer learning.

Over time we have accompanied farmers, working together with them to evolve practices that draw on and respect traditional knowledge and specific local Zulu cultural practices, including the spatial relationships in the planning of homesteads. This is complemented with innovations emerging in ecological science, through learning and sharing within African agroecology networks, and generated through farmers' own observation and experimentation.

The farmers work with nature in their farming systems, striving to create beneficial connections to support a balanced farm ecosystem where healthy soils support plant and animal health and pests are kept in check by predators. Importantly, not all the land is cultivated – natural areas still remain in a region that is high in biodiversity with many endemic species. Wild harvested fruits and foods are also part of the food culture.

Farmers describe their agroecology methods in a "sister" publication: *Agroecology is best practice* (available on our website at www.biowatch.org.za/download/agroecology-is-best-practice/). These methods include the interwoven ways in which they increase functional diversity through intercropping and integrating livestock, build healthy living soil, recycle and conserve water, strengthen farmer-led seed systems and advocate for farmers' rights. Since that book's publication in 2018, the farmers have included additional practices, such as the production of bioinputs.

WHAT IS AGROECOLOGY?

Agroecology is a bottom-up approach rooted in the **practice** and experience of millions of smallholder and family food producers around the globe who have been growing crops, fishing, herding livestock, and harvesting uncultivated food from their territories over generations. They have carefully observed their environment and adapted their food production practices to this. Because the landscape, soils, climate and socio-economic conditions as well as the culture in each place are unique and different, the way agroecology is practiced cannot be the same everywhere – this has resulted in many different methods, practices and food cultures around the world.

Agroecology is also a **science** that brings together and applies the wisdom and traditional knowledge of food producers and that of researchers in diverse disciplines who are deepening our understanding of how natural living systems work and can be applied to our food system.

Agroecology connects grassroots communities, activists, researchers, scientists, workers and consumers in a **global movement** working towards food sovereignty.

*Together we work on the **social, political and economic changes needed to transform the current food system to ensure human rights**, including the right of people to eat and produce healthy and culturally-appropriate food grown and harvested through ecologically sound and sustainable methods.*

This requires us to challenge and transform deep inequalities of power in society to return the control of seeds, biodiversity, land and territories, waters, knowledge, culture and the commons to the indigenous communities, smallholder and family farmers, pastoralists and fishers who feed most people in the world.

Agroecology promotes circular and solidarity economies through localised and territorial markets based on transparent networks between producers and consumers. This solidarity economy values mutual co-operation, fairness, and social and economic democratisation to support the wellbeing of people and the planet above profit.

INTRODUCTION

RESILIENCE DURING TROUBLED TIMES 2020–2022: COVID-19, SOCIAL UPHEAVALS, UNREST, EXTREME WEATHER ...

The two-and-a-quarter years from March 2020 to June 2022 were unprecedented in terms of the intersecting crises we experienced locally and globally.

On 5 March 2020 the first person in South Africa tested positive for COVID-19. On 26 March, with little warning, a hard lockdown was imposed as part of a national State of Disaster in response to the pandemic. In KwaZulu-Natal (KZN) the pandemic ushered in a series of interlaced, deeply affecting and traumatic events that continue to weigh heavily on our society. In addition to the staged lockdowns and other impacts of the COVID-19 pandemic, we experienced social upheavals, civil unrest and extreme weather events. (See the timeline on pages 10–11).

The impact of these have wreaked havoc in South Africa, deepening inequalities, destroying livelihoods and increasing existing high levels of hunger in the country. Individuals and social support networks are trying to cope with grief, trauma and insecurity on multiple levels. People have lost loved ones, homes and livelihoods. Workers have lost jobs, had shifts and pay reduced, and many small businesses have closed. Already overburdened infrastructure has been damaged, adding to existing maintenance arrears. These added burdens fall disproportionately on the poor and have greatly exacerbated food insecurity.

Prior to the COVID-19 lockdown, hunger was already a spectre haunting South Africans, denying many their constitutional Right to Food. Stats SA reported that 17.8 percent of South Africans had inadequate or severely inadequate access to food in 2019.[1] In 2021 this had risen to 20.9 percent nationally and also in KZN.[2] In 2020, KZN had the highest number of children living with hunger in the country (453 000).[3]

The lockdown, and the difficulty accessing adequate food, encouraged many families to return to farming as a livelihood strategy, reversing the steady decline in households practicing agriculture nationally with a jump from 15.3% in 2019[4] to 17.5% in 2020[5] and 17.2% in 2021[6].

These unprecedented experiences, arriving one on top of the other, provide a window into the stark potential future we face should we not respond creatively and urgently to the need for systemic change. With the unfolding climate and biodiversity crises, economic and political turbulence, and strengthening corporate power, stress in our food and social systems will continue. The need for resilience within farming communities and the food system is even greater.

1. Stats SA. (2020) General Household Survey, Selected development indicators 2019. https://www.statssa.gov.za/publications/P03182/P031822019.pdf
2. Stats SA. (2022) General Household Survey, Selected development indicators 2021. https://www.statssa.gov.za/publications/P03182/P031822021.pdf
3. Tomlinson M, Kleintjes S & Lake L (2022) South African Child Gauge 2021/2022. Cape Town: Children's Institute, University of Cape Town. http://www.ci.uct.ac.za/sites/default/files/image_tool/images/367/Child_Gauge/2022/CC%20-%20health.pdf
4. Stats SA. (2020) General Household Survey, Selected development indicators 2019. https://www.statssa.gov.za/publications/P03182/P031822019.pdf
5. Stats SA. (2021) General Household Survey 2020. https://www.statssa.gov.za/publications/P0318/P03182020.pdf
6. Stats SA. (2022) General Household Survey, Selected development indicators 2020. https://www.statssa.gov.za/publications/P03182/P031822021.pdf

During this challenging pandemic period communication between Biowatch and the farmers we support suggested that, on the whole, they were coping. Travel restrictions during the hard lockdown made selling produce in town markets and accessing seedlings difficult. Local selling decreased for some farmers, while others experienced an increase in farm-gate trade. Most maintained production and drew on reserves of stored produce where necessary. Most weathered the droughts and storms.

This anecdotal evidence appeared to confirm the findings of research undertaken with the Pietermaritzburg Economic Justice and Dignity Group (PEJDG) in 2019. This compared the food baskets of smallholder families in the same areas practicing agroecology against those practicing conventional agriculture. Although a relatively small sample, this food basket research confirmed farmers practicing agroecology were able to supplement their household food needs, harvesting a greater diversity of fresh foods from their gardens than their conventional counterparts. They were also more aware of nutritional requirements and the health conferred in their foods from having healthy soils and producing without chemicals. Most importantly, at the time of the research there was a bad drought. Biowatch-supported agroecology farmers were able to continue producing due to their practice of building living soil and capturing water in the land, whereas many of the conventional farmers were unable to produce at all.

Biowatch wanted to continue this work to see if these findings held during this unprecedented two-year period: from the onset of the pandemic in March 2020 to the civil unrest in July 2021 and the extreme floods in 2022. We commissioned a survey of 24 farmers, including long-standing and recent agroecology adopters, in nine areas in different parts of KwaZulu-Natal. Between April and June 2022, researcher Mark Mattson and staff member Samu Zuma met farmers at home and engaged in conversations. These surfaced how they perceived the multiple intersecting crises the Province had experienced, and the ways in which agroecology had helped or hindered their resilience to these. The physical "evidence" of their diverse and vibrant production systems at the time of the interviews was also recorded visually and the diversity of species listed.

The role agroecology has played in resilience to the events in KwaZulu-Natal from March 2020 to mid-2022 is interwoven with farmers' multiple responses to both collective and their own personal, social, economic and physical geographies. As we are unable to include the complexity of every experience in full in this book, we have attempted to draw out some common themes from the farmers' reflections. It was challenging as situations are complex and resilience is drawn from multifaceted practices and relationships.

The common intertwined themes around which agroecology supported resilience, which we harvested from the farmers' reflections and used to frame and structure this book, are:

1. Food security on the pathway to food sovereignty
2. Diversity as a defence against vulnerability
3. Healthy soils for healthy food
4. Agroecology for livelihoods
5. Resilience takes root
6. Knowing is more than having

Another common theme that lives in farmers' memories is the fear that the pandemic created, and how the South African National Defence Force (SANDF) and police presence exacerbated this fear, and in the early stages, thwarted farmers' ability to freely tend their fields. This was yet another weight on women especially, who were both vulnerable and anxious to feed all the family members who returned home during the lockdowns. Culturally, women

have the responsibility for growing crops, keeping seed and preparing food. With this resting on their shoulders, the interviews draw attention to highly independent women for whom agroecology is crucial in building resilience and enabling their autonomy, and their livelihoods, in extremely challenging circumstances.

AGROECOLOGY WORKS

Biowatch is often challenged to prove that agroecology "works" in comparison to the industrialised, high input approach to agriculture that is deployed through the government's input and extension programmes. This proof is usually framed around the productivity narrative of "needing to feed the growing population" and provide income. These metrics are simple to measure for large scale monocultures but are inadequate and challenging as a measure of the benefits derived from a diverse agroecological landscape.

As these stories of resilience confirm, agroecology not only enables farmers to improve household food security and nutrition, but also enables many other benefits in spite of the hardships the farmers' experience. The benefits that farmers perceive include greater household food security, the diversity of foods and whole foods eaten (an indicator for better nutrition), the quality of their produce and its ability to last longer after harvesting, having surplus to sell or to share with those in need, and the solidarity networks created through the exchange of seed, knowledge and produce. They also share how the agroecology practices they use have enabled their comparative resilience to heavy winds, rains, droughts and pest outbreaks.

The farmers' voices and stories offered in this book provide insight into the multiple dimensions in which agroecology benefits rural communities and builds resilience in the face of intersecting climate, biodiversity, water and food crises and the ensuing social and political upheavals that loom ahead of us locally, regionally and globally.

BIOWATCH-SUPPORTED AGROECOLOGY FARMERS INTERVIEWED IN NORTHERN KWAZULU-NATAL

TIMELINE OF MAJOR EVENTS AFFECTING FARMERS IN KWAZULU-NATAL FROM THE ONSET OF THE COVID-19 PANDEMIC IN MARCH 2020 TO THE EXTREME FLOODS IN MAY 2022

2020

FEBRUARY–JULY

Department of Water and Sanitation in KwaZulu-Natal sets aside R97 million for short-term drought interventions as part of an Emergency Drought Mitigation Plan to help 256 towns affected by ongoing drought in the province.

26 MARCH–30 APRIL

South Africa enters a sudden-onset hard lockdown (level 5) as part of a national State of Disaster in response to the COVID-19 pandemic. The lockdown restricts movement, allowing only one family member at a time to shop locally for food and cleaning items. Shopping is limited to supermarkets (with reduced shopper numbers) and street and informal market trading ceases. Public transport is limited to a few hours a day for essential service workers and people are not allowed to move beyond their local areas. Farmers are prohibited from working in their fields, and they are prevented from selling their produce. In many places these conditions are harshly enforced by police and the SANDF. With limitations on public transport people in outlying communities are unable to reach formal shops and supermarkets to buy food. Many urban workers returned to their rural homes, stretching families' resources.

1–31 MAY

Lockdown is adjusted to Level 4 allowing essential industries to re-open and their employees to travel to work. People are allowed to exercise outside.

1 JUNE

People return to work and informal trade resumes, however, as COVID-19 infections fluctuated, the lockdown is adjusted up and down to control gatherings and behaviour to limit the spread of the virus.

2021

24–25 JANUARY

Cyclone Eloise causes high winds, heavy rain and flooding in northern KwaZulu-Natal, Mpumalanga and Limpopo. The Jozini area experiences the most severe flooding in KZN with at least 100 homes destroyed.

26 MARCH–30 APRIL

King Goodwill Zwelithini, monarch to the Zulu Nation, passes away. In Zulu tradition, people may not work their fields between the King's passing and his burial (in this case one month). If a family member passes away, the family may not work in their fields for three days. The higher-than-normal incidences of funerals due to COVID-19 deeply impacts farmers.

8–18 JULY

The imprisonment of former President Jacob Zuma sparks protests which rapidly spiral out of control into 10 days of rioting, looting and violence in KwaZulu-Natal and Gauteng. Many shopping centres and bank outlets in the province are wrecked. While bigger retailers and main centres can rebuild many smaller outlets and amenities, especially in outlying towns, are slow to recover. As a consequence peri-urban and rural people struggle to draw social grants and access shops, and have to pay more for transport to travel further from home. In some areas, like KwaMasondo in KwaNgwanase, looting is prevented. People from Jozini, Bambanana, Ingwavuma and Mbazwana, all of which experience unrest, come to KwaMasondo to shop, causing additional queues for local residents; the food runs out and prices increase.

2022

24 FEBRUARY

Russia invades Ukraine initiating an ongoing war that affects global commodity supplies. In South Africa this results in hikes in the price of fuel, wheat-based products like bread, and especially cooking oil.

5 APRIL

The nationwide State of Disaster in response to the COVID-19 pandemic is lifted.

11–13 APRIL

Severe rain and flooding causes more than 450 deaths, displaces more than 40 000 people, and destroys homes and infrastructure across the District Municipalities of eThekwini, Ugu and Ilembe. Water and electricity are disrupted – in some areas for several months.

21–22 MAY

eThekwini and Ilembe experience more flooding and landslides, while other districts to the north experience heavy rains.

Biowatch works with smallholder farmers – long-standing and recent agroecology adopters – in different parts of northern KwaZulu-Natal, including KwaHhohho, picture above.

RESILIENCE BUILT THROUGH AGROECOLOGY

FARMERS REFLECT ON THEIR EXPERIENCE OF LIVING AND THRIVING IN EXTREMELY CHALLENGING CIRCUMSTANCES

"...the parish was not a perimeter, but an aperture: a space through which the world could be seen."[7]

I worry that I shall over-interpret the significance of Tholakele Mfekayi's diminutive garden with its 62 species of plants, and it is, indeed, difficult to imagine how such humble efforts speak to the magnitude of change we require. But in the same way that diversity is more than a number, and that depth should not be confused with width, so this garden and others I looked at in the course of this research, transcends its size, its small audience, its modest airplay.

Philosophers speak ever to this paradox, insisting that the small things are big; that the attention we bestow outweighs how visible we are; that great acts pale next to "small things done with great love."[8] *Gardens are this paradox. In the contained and bounded greenery we join numberless artists and poets on their "scanty plot of ground"*[9] *in which the parochial is a portal, and change a practice of the concrete and the close-at-hand. Nobody knows what future awaits agroecology, what forms it may take, or what roles it will play, but in the here-and-now, such gardens are sufficient unto themselves and make their own statement.*

In the smallest garden we can see and breathe and touch the texture of the possible, and while change requires action on many fronts, it cannot happen unless we feel it and sense it in this way.

Mark Mattson, Researcher

7. Macfarlane, R. (2005) Where the wild things were. www.theguardian.com/books/2005/jul/30/featuresreviews.guardianreview22 Accessed: June 2022.
8. Attributed to Mother Teresa.
9. https://www.poetryfoundation.org/poems/52299/nuns-fret-not-at-their-convents-narrow-room

WHAT IS RESILIENCE?

There are many theories and definitions relating to resilience. **Biowatch loosely defines resilience as "the capacity of people and systems to recover from and adapt to disruptive change and flourish."**

Resilience has many dimensions. An ecosystem is resilient when it can dynamically respond to shocks and disturbance to recover or adapt quickly to maintain its structure and functioning. The resilience of human communities depends on the Earths' life-supporting ecosystems, of which we are a part, as well as our capacities to innovatively adapt to and recover from crises and stress.

HOW DOES AGROECOLOGY BUILD RESILIENCE?

Two pathways in which agroecology builds and supports resilience:

1. Agroecology farmers apply principles learnt from nature to their farming. By emulating and working with nature there is an inherent physical resilience in agroecology farming systems when compared to conventional approaches. By building healthy living soil, understanding and working with water flows, increasing the diversity of beneficial interactions between organisms to support the functioning of the system, and saving and planting locally-adapted seed, farmers create agroecosystems that can absorb and rebound from shocks such as extreme weather, pest outbreaks, etc.

2. "Being resilient" also requires that farmers have support networks to draw on in difficult times and the physical, mental, emotional and behavioural flexibility to adapt to and recover from challenges. Approaches to agroecology – such as valuing local and traditional knowledge, affirming culture, facilitating farmer agency and participation, farmer-to-farmer learning, developing reciprocity and solidarity – support resilience within farmers and food producing communities. This extends beyond fields and farms to broader livelihood strategies and needed transformation of our food system.

The role agroecology has played in resilience to the events in KwaZulu-Natal from March 2020 to mid-2022 is interwoven with farmers' multiple responses to both collective and their own personal, social, economic and physical geographies. As we are unable to include the complexity of every experience in full in this book, we have attempted to draw out some common themes from the farmers' reflections. It was challenging as situations are complex and resilience is drawn from multifaceted practices and relationships.

1. Food security on the pathway to food sovereignty

Biowatch sees agroecology as the pathway to food sovereignty – the right of peoples to access and control the resources they need (including land, water, seeds, biodiversity, markets and knowledge) to be able to make their own choices about the kind of food they eat, produce and buy. Food sovereignty aims to democratise decision-making in the food system to meet the needs of all, while recognising our dependence on Earth's ecological systems for our food and existence.

The reality in KwaZulu-Natal is that access to fundamental productive resources remains contested. While the situation may be slightly different than in other parts of the country because many families have access to land under the Ingonyama Trust through traditional leadership, there is no guarantee of security of tenure. This is especially so for women whose access to land is mostly subservient to male family members. Furthermore, the land allocated to former homelands under apartheid and now under the Ingonyama Trust, is generally marginal land and allocated land parcels are small.

Water remains a critical issue. Many communities are not connected to water supply, and rely on rain, community boreholes and streams. The quantity and quality of these sources is increasingly compromised by commercial water users, including mines and commercial agriculture such as sugar and timber plantations, which have water-use licenses to draw significant amounts from water reserves, but whose operations often leach toxic chemicals into waterways and the groundwater.

Despite these challenges agroecology provides many farmers with skills, a sense of identity, and the continuity from season-to-season that engenders a sense of personal sovereignty and self-reliance that is not easily shaken. Compared to other smallholders, agroecology farmers are able to produce with what they have, have control over what they produce and when, and have connection to the land and the resources this offers in terms of wild harvested food and other materials.

Xolile Nxumalo, Ingwavuma

Xolile describes the lockdown as a period in which "I had enough time to be outside, and in my garden, and was not afraid to be in my fields." She had a good harvest, and enough time to prepare the soil for her vegetable garden. In her fields she had maize, peanuts, jugo beans, mung beans, beans and sweet potatoes, while in her vegetable garden there was spinach, lettuce, beetroot, onions and cabbage. With these resources, Xolile catered to a family of five, including her children, her sister and their grandchildren, and said that "food was not abundant, but enough."

Many of the farmers who are food sovereign are those who have been forced by necessity; unable to access formal services due to their remoteness or circumstances which cut them off from the social grant system. Many of the households received some form of social grant which included pensions, child support grants, disability grants and COVID-19 Social Relief of Distress Grants of R350 (for those in dire need who couldn't qualify for any other grants or government supported job creation programmes). Although meagre, the social grant system in South Africa provides a lifeline for many. Given skyrocketing prices, those who manage solely through agroecology with one or no grants are that much more remarkable.

Grace Dlamini, KwaNgwanase

Grace spoke of being stressed at the beginning of the hard lockdown, after being told to remain indoors, and not to leave her homestead. Although initially her fear of being arrested kept her out of her garden and her fields, she soon ventured back. Her harvests of summer field crops in late 2019/early 2020 (January and February) had been good, following early rains, and she had re-assuring stocks of maize, finger millet, water melons, pumpkins, and peanuts which had germinated quickly in the moist soil.

Grace reported that: "...during the hard lockdown, we did have some chances to go to town for food, but I had food from my garden and fields, and had no difficulties. Even now, I don't need to often go to the shops."

Over the lockdown, Grace and her family of seven relied on their stores of traditional summer field crops, which formed the basis of their diet. Grace's son, who was present for part of the interview, said that "we eat the food that grows at home," and that this was not a lockdown diet; it was what they normally ate.

Grace had beef from a stokvel payout supplemented with her own goat and chicken meat. The family's diet was diversified with local fruits – mangoes, guavas, oranges, paw-paws and lemons; and those of indigenous trees, including wild medlar (umviyo), monkey-orange (umhlala), turkey berry (umvuthwamini), water berry (umdoni), wild custard-apple (umthofu), and izinkuhlu, a porridge made from the seeds of mahogany trees (umkhuhlu) and eaten with sweet potatoes. Grace also mentioned that she had large quantities of maize-brewed amahewu over this period.

Grace receives a government pension, and this disqualified her from applying for the COVID-19 Social Relief of Distress Grant; however, over a three-month period in 2020, she received a R150/month payment. She did not receive any seeds from the Department of Agriculture, and was adamant that she would not accept fertiliser. In 2021 she was invited to register with the Department of Social Development to receive food parcels, but these did not materialise.

Janet Mayisela, Pongola

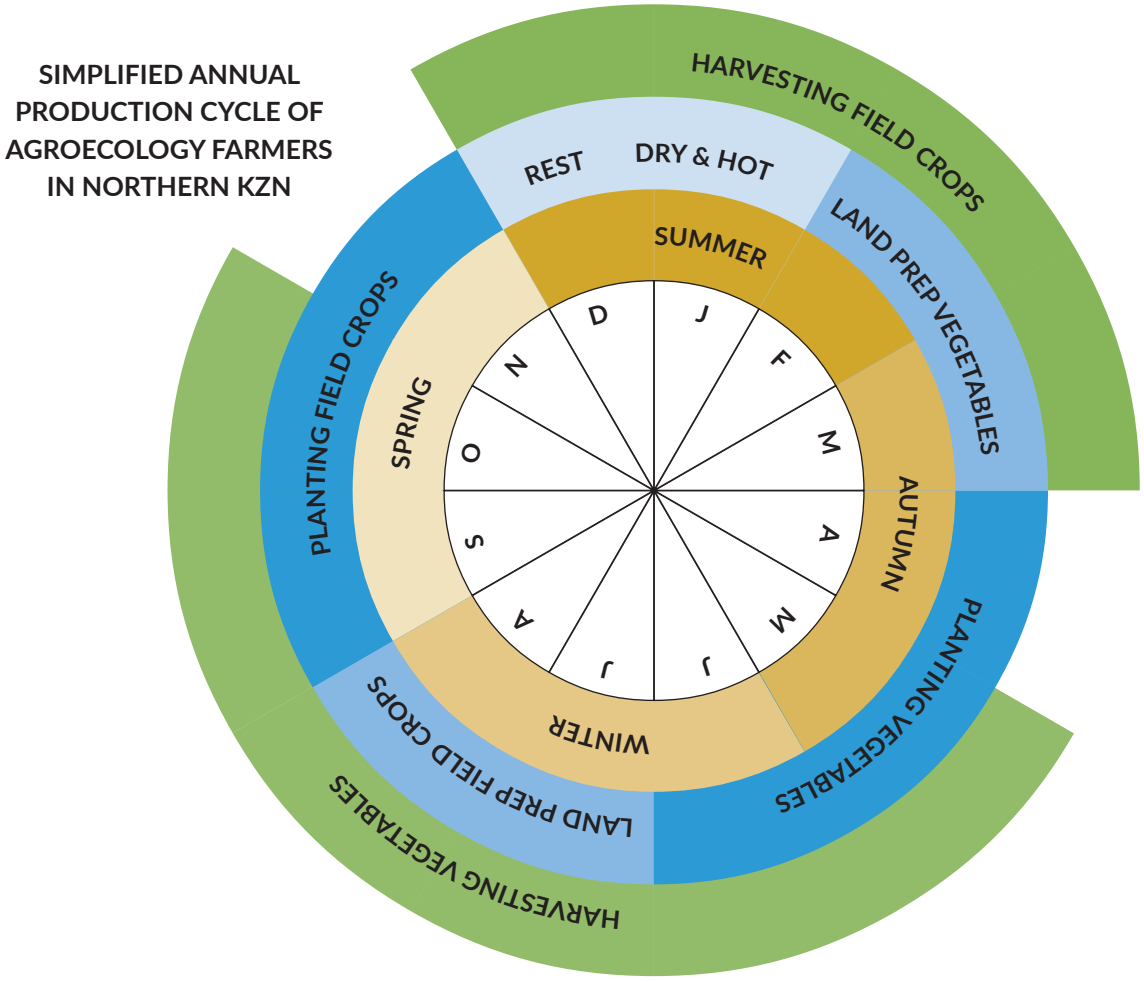
Preparing for the hard lockdown in March 2020, Janet shopped for cooking oil, cake flour, sugar, washing powder and stock cubes. Because "I needed food" she harvested her crops in "the mornings and afternoons" to avoid being seen by the SANDF soldiers who had a field camp near her home. Over the lockdown, Janet said she "had lots of food and did not worry." She harvested 20 bags of maize in March, and ate cabbage, spinach, tomatoes, pumpkin runners, igusha (jute mallow), beans, maize, jugo beans and peanuts. Janet noted in particular that "traditional food is life," and that "…even at the hospital they recommend traditional food."

Many Pongola farmers grow traditional maize and have old iron hand mills at their homesteads. Janet uses hers to mill meal for the family and to grind feed for her chickens. Traditional chickens and goats also featured in her diet, and her house is surrounded by peach, avocado, orange, mango, and guava trees. She preserves guavas and peaches, harvested from trees in her garden, to eat at home or share between family and neighbours Janet sold some of her produce during the lockdown at a pension pay point, to locals who came to her house, and at three schools and the local hospital. Her diverse markets, maize fields, preserves and her ability to make incansis (reed matting) are testimony to her entrepreneurial orientation.

While food sovereignty is our aim, the household food security of farmers is a first priority. Our research revealed that although farmers speak to self-reliance, most still make purchases from shops in the formal food system. Purchased food included maize meal, meat and dry beans when families had insufficient food for household needs. Farmers also resort to buying maize meal when they don't have access to labour-saving equipment to process grains. Other shop-bought items farmers listed included highly processed or difficult to grow staples (cooking oil, cake flour, tea); flavourants (sugar, stock cubes); and hygiene products (laundry powder, soap). Although most farmers save seeds of traditional vegetables, legumes and grains, many find it more difficult to save the seed of vegetables such as spinach and cabbage preferring to buy seedlings for the winter vegetable season.

Biowatch has worked with farmers in Ingwavuma, KwaNgwanase and Pongola for many years. Here most farmers have practiced agroecology for seven years or more. With their deep knowledge, these farmers implement well-honed practices that follow the continuous rhythm of the seasons. In Ingwavuma and Pongola, and most other areas (with the exception of KwaNgwanase), there are two cropping cycles in the year. Land preparation for the summer field crops starts in July. Agroecology farmers plant early in anticipation of rains and to prevent later contamination from hybrid and GM maize pollen between September and November. The rain-fed crops grow through the height of summer in December and January, while the farmers rest and welcome family for the end of year holidays in the oppressive heat.

In February and March the summer crops are harvested, while fertility beds in the household garden are renewed in preparation for winter vegetables. Vegetables are planted in the cool weather from April to June, with vegetables available for eating from June to August. Although some early summer crops may be ready from November, the three months from September to November represent the "lean" season for most farmers.



It was thus fortuitous that the lockdown was imposed in March, as farmers were laying in stocks of food with high storability, and preparing their gardens to produce winter vegetables. While initially afraid to venture out, the lockdown did not significantly prevent farmers from pursuing their seasonal farming activities.

Farmers soon returned to their fields using the extra time and in some cases the extra hands at home, to make improvements, finish harvesting summer field crops, and prepare their vegetable gardens. Farmers were well-placed to feed their families with healthy traditional foods and fresh vegetables even as the lockdown deepened into Level 4. Although food wasn't always sufficient, and some families reduced consumption in the face of uncertainty, for many their "lockdown diet" was much the same as it usually was.

The forewarning of the lockdown had also allowed households to buy some provisions. In KwaNgwanase, farmers in the Khombindlela Project received stokvel (savings club) pay-outs that enabled them to stock up on sufficient meat. Such solidarity networks have been important economic resilience strategies in South Africa, and are a good fit with other processes centred around reciprocity that are built in agroecology farming communities, such as the traditional practices around seed exchange.

Petros and Catherine Makhanya

KwaNgwanase

The lockdown was challenging for the Makhanya household. Both Petros and Catherine lost brothers to COVID, and in December 2020, Catherine contracted the disease. The couple tried to farm over this period, but were initially afraid to be outdoors, and scared of being observed in their fields. However, necessity required them to keep farming, and, as the lockdown persisted, Petros found time to expand his garden, and prepared seedling beds in March for planting in April, despite the difficulty of obtaining vegetable seedlings from the shops over this period.

Petros and Catherine Makhanya are established, experienced agroecology farmers. When the lockdown came in March 2020, they were already preparing their gardens to produce fresh vegetables over the coming months. They had already harvested their field crops of peanuts (December/January) and had finished harvesting their maize in February, just before the hard lockdown began. These crops were stored in their homestead granary (inqolobane), in which peanuts may keep until around August, and maize for even longer.

They prepared their vegetable garden trenches in April and May. To amend the very sandy soils in their area they used layers of grass, kraal manure, soil, dry leaves, bones, and tins, which were moistened with water, topped with a surface layer of kraal manure and peanut plants/pods. They also use single digging techniques in which kraal manure is worked into loose soil. Petros and Catherine also had a compost heap.

(Left) Petros and Catherine outside their inqolobane (granary); In their granary are, amoung other seeds, (top left) pigeon pea (udhalli); (top right) jugo beans (izindlubu) and cowpeas (imbumba) in a traditional woven basket; (bottom left) sorghum (amabele); (bottom right) peanuts.

(Top left) Petros and Catherine reported eating much fruit from their garden including the sand apricot-vine (amabungwa). In March 2022 when we visited, their garden also boasted a pod-bearing Moringa (top right), a number of orange trees (bottom left); and peppadews (bottom right).

Their garden produced lettuce, cabbage, tomato, beetroot, green peppers, spinach and onions; and Petros and Catherine were able to both provide for the household, and to sell spinach, tomatoes, lettuce, cabbage, green peppers and peanuts to their neighbours. Petros also sold peanuts further afield in areas "…in which there were not enough."

During the hard lockdown, the Makhanya family had enough food for the nine people at their homestead, both "from the shops and the field," and were able to visit shops before the lockdown began to purchase chicken braai packs, beans, washing powder, and cake flour for making steam bread. They ate cassava, traditional chickens, samp, peanuts, peanut soup, and sweet potatoes mixed with the seeds of indigenous mahogany trees. They also ate a range of fruits, including oranges, monkey-orange, granadillas, turkey berry, sand apricot-vine, guavas, wild medlar, water berry, wild date palms and "many mangoes."

Petros told us that R250 had been added to both his and Catherine's old age pensions for three months (May, June and July 2020), but that as pensioners they had been unable to apply for the R350 monthly COVID-19 Social Relief of Distress Grant.

Sizwe Nxumalo
Pongola

Sizwe Nxumalo has been farming all her life. She started adopting agroecology methods 10 years ago after training with Biowatch and "hearing about the healthy food." Over the lockdown, which started in March 2020, Sizwe's homestead hosted eight members of her family, including some of her children and grandchildren. At first, Sizwe says she was "very stressed" by the COVID and lockdown regulations, and "…afraid to go into my garden and fields, as I thought I might be arrested." However, "…despite my fear, I knew I needed to keep planting as I had no other sources of food." No one at the homestead was earning an income, and no one received or qualified for grants.

So, this resilient, industrious farmer ventured out surreptitiously – "I hid, but I kept going out" – to prepare her vegetable garden, using single digging in March to add kraal manure and compost to her soil, and in April she planted spinach and tomatoes. Sizwe told us that the hard lockdown prevented her from obtaining seedlings, but that she had managed to get tomato and spinach seedlings from other Biowatch farmers. Against this backdrop of preparation, Sizwe described how her family ate during the lockdown – a roster of simple foods drawn from a variety of traditional crops and fruit trees.





(Top row) Sizwe's meticulously mulched seedling beds shield, cool, and fertilise the soil, and optimise the effects of the small amounts of water she has. (Bottom row) Multiple mini-plots of important food crops are squeezed into every available space on the property – pumpkins; two sweet potato varieties; sweet potatoes adjoining a chicken coop.




(Left) Sizwe Nxumalo sitting in front of containers which she fills once-a-week from a water tanker. (Centre) Her store of traditional maize. Like many agroecology farmers, Sizwe experiments with new plants for cooking and flavouring, and forages for pot herbs like igusha (jute mallow) (top right) and inyoni kayiphumuli (gallant soldier) (bottom right).

Clearly a skilled, careful practitioner, in March 2020 at the start of lockdown, Sizwe had green mealies in her fields, which were eaten fresh, and made into mealie bread; and field beans from her October 2019 planting. She also fed her family isinambathi – a mixture of pumpkin and store-bought maize, and ipapa – maize with pumpkin leaves and runners. Other traditional dishes were izinkobe – cowpeas mixed with maize, and idokwe – a stone-ground sorghum porridge from her June harvest; there were also blackjacks mixed with peanuts from her 2019 harvest, jugo beans, from which she also saved seeds, and sweet potatoes. Sizwe also ate her traditional chickens, was able to buy chicken from local shops, and also ate sugar cane in May and June.

This diet was supplemented by pot herbs including igusha (jute mallow), imbuya (amaranth), imbilikicane (goosefoot), and later, spinach and tomatoes from the vegetable garden. Also, the family drew on their sizable homestead orchard which provided guavas, oranges, lemons, naartjies, peaches (in October), bananas, mangoes (January 2021), avocados, mulberries, and loquats (July), while small macadamia trees, and many mango seedlings hold a promise of future harvests. During the first six months of lockdown Sizwe returned to Swaziland once a month where she acquired maize from her family's fields,[10] milled it, and brought this back to Pongola.

10. The border between eSwatini and South Africa has split many families who maintain their family ties on both sides of the border.

2. Diversity as a defence against vulnerability

Diversity is one of the fundamental principles of agroecology. Greater diversity in agroecological farming systems, especially where species are designed to be in functional relationships with each other provides greater stability and resilience in the farming system.

These "system services" can also reduce the inputs and labour required from farmers and have the benefit of increasing the diversity of foods and products available for harvest. Dietary diversity is an important foundation for better nutrition. Farmers who maintained a greater diversity of species including traditional crops, vegetables, and multi-species orchards, and who harvest imifino species (uncultivated greens) were able to maintain dietary diversity even over periods when food was scarce.

Tholakele Mfekayi, KwaHhohho

Tholakele's garden showcases agroecology's principle of diversity, and when asked about the 62 species we recorded , she says that "it's because of my love for farming." She elaborated, saying that "...we were told that plants need and support each other, and that pests are repelled if there are many plants together; so wherever I go, I look for new plants, because they are useful to each other, and also to me and my family."

Tholakele weathered the COVID-19 lockdown with her husband, her three children, and four grandchildren, and while their diet "did not change," they "ate cautiously," not knowing how long the lockdown would last. Breakfasts consisted of idokwe, a soft maize porridge. For supper and lunch the family ate beans with pumpkins and melons, cabbage, imbuya (amaranth), spinach, pumpkin leaves/runners, uqadolo (blackjack) and igusha (jute mallow), and these staples were accompanied by amasi from the family cows, and fresh produce from the homestead vegetable garden. While planting in this garden was delayed by the ban on movement, which made it hard to acquire seedlings, Tholakele said that she was planting by March, but that her 2020 garden was not nearly as abundant as the one we saw on our follow-up visit in June 2022. Tholakele also said that she had been able to go to Mtubatuba in early March 2020 to buy maize meal, beans, bath soap and electricity vouchers.

Appreciation for and inclusion of nature is inherent in agroecology practice and approaches. The natural environment is an intrinsic part of agroecological landscapes, especially where agroecology practice is rooted in traditional knowledge and African spiritual practice. The area from the KwaZulu-Natal coast to the eSwatini border stretching northwards from St Lucia through southern Mozambique to Maputo is a biodiversity hotspot, high in unique endemic plants. This biodiversity is utilised in traditional culture, providing numerous medicines, crafted products and foods. In particular wild fruits and imifino are a regular inclusion in local diets and are an important source of added nutrition, especially during droughts due to their hardiness.

Monica Ndlovu, Pongola

In 2020, farming was difficult; it was very dry, and the rains came late, which delayed planting, and led to a poor harvest of field crops. At the same time, Monica was very anxious about COVID-19. She was scared to go outside but realised that she "…would die from hunger and disease if I stopped farming." So she ventured outdoors to prepare her vegetable garden over March–July. Monica used single digging to prepare the garden, loosening the soil, adding compost (dry and green grass, leaves and ash, placed under a shelter and watered), then mulching with grass, and placing cow dung around her seedlings. In winter, her garden produced cabbage, spinach, onions, tomato, lettuce, beetroot, carrots and potatoes.

During the hard lockdown, Monica said she "…could not recall being stressed that shops were closed." Her family of 10 ate from the vegetable garden, harvested wild fruits and relied on lablab, jack beans and pigeon peas, foods typically grown by Biowatch farmers. Wild fruits included amathunduluka (Ximenia caffra), umthofa (wild custard-apple) and umhlala (monkey-orange). The family also collected pot herbs, or imifino, between May and July, including igusha, imbuya, uqadolo and inyoni kayiphumuli, eaten with uphutu (mealie meal). Imbilikicane (goosefoot) and umsobo (African nightshade) were also recorded in Monica's garden.

Responding to high demand from people who could not go to the shops during lockdown, Monica sold beetroot, lettuce, carrots and pumpkin runners to her neighbours, often going door-to-door with her wares. Because of this she is known locally as "The Doctor who brings healthy food."

Nomusa Ngwenya, Pongola

Nomusa's garden is wildly informal. For those who see food in the symmetry of supermarket aisles, the unmanicured, ad hoc layout is bewildering, a tangled patchwork that is difficult to resolve. Like Nomusa herself, the garden is hard to pin down – a treasure of diversity, self-sufficiency and the inscrutable. But to enter the garden, as we did during our visit, is to enter the world of agroecology, and all the elements familiar to Biowatch farmers.

Diversity is the ecologist's bias, and for us, the long list of species reads like a poem. Taken together – in Nomusa's garden, her fields, bottles, seed store, fences, flower beds and the many nooks and crannies dotting her homestead – the botanical diversity on display is striking: 51 species. This number is more than a number. Her plants belong in different functional categories – food security, cultural value, pest control, medicinal, seed banking and sharing, income generation, nutritional diversity, flavourants, cover crops and mulches, fodder, and liquid manures – and are integral to her methods and motivations, her identity and pride as a farmer. While hard to quantify in a single visit, the synergies between these elements are palpable, and the relationships between diversity, resilience and feeding her family during a difficult time are self-evident.

Rose Mngomezulu

Ingwavuma

Like most Biowatch-supported farmers in KwaZulu-Natal, Rose Mngomezulu's agroecology practices helped her weather the lockdown. Also, during the looting and unrest later in 2021 when looting prevented her from getting her old age pension for three months, and the Spar and banks were "destroyed", Rose told us she "had a lot of food, no problem. I was okay."

A fiercely positive and independent farmer, Rose has enough land, is industrious, and has accumulated diversity over a long period – the 54 species we recorded on her land are a hedge against vulnerability and the rigours and risks of farming.

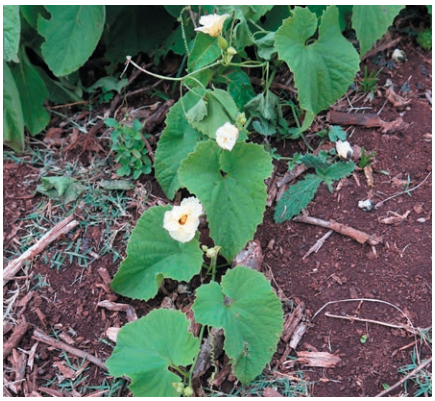
Rose says that she does not buy vegetables from the shops, and that "I germinate my own lettuce, spinach, beetroot and onions, and sell the seedlings to neighbours." Such endeavours enable her to say that "I don't need money from anyone, as I have my income from selling, and I like to be independent, even with seeds."

Rose sometimes hires a tractor and helpers to plant and weed in her emasimini (far fields), and produces crops of cowpeas, pigeon pea from her windbreaks, and sorghum, maize and beans. She eats these crops "a lot" and sells surpluses when she can. She also sells beans, cassava, sweet potatoes and other produce locally at pension pay points and in town, and sells her spinach, lettuce and beetroot door-to-door, and to customers who place orders.

(Left) Rose Mngomezulu with lettuce seeds. (Top) Melons and pumpkins harvested from Rose's garden. (Bottom) The diversity on Rose's land is maintained by hard work to water plants. She collects containers and bottles and fills them whenever the opportunity arises. She then makes holes in the bottles and digs them into the ground next to her plants to drip-irrigate them.

In addition to her traditional crops, Rose has a variety of fruit and other trees, including large avocado trees. "When I was working at the local hospital I bought avocados and planted the seeds." She also has banana and orange trees, two varieties of paw-paw, and the indigenous Obetia tenax (ububazi), which she plants from cuttings and uses as an imifino. Rose told us that she places orange seeds in a tin with kraal manure and grass, puts the tin in a hole in the ground and lets it rust, and then plants the seedling when it is ready.





In Rose's small, beautiful vegetable garden we saw newly-germinated Fava (Broad) beans (left), Jack beans (centre) and the seldom-seen Momordica foetida (intshungu).



(Left) A mix of beans. (Centre) Melon and paw-paw seeds ready for planting. (Right) Rose also keeps traditional chickens, the chicks of which she protects under fishing baskets from KwaNgwanase.

Rose identifies deeply and proudly with farming. Her inclination and ability to farm were informed by her grandmother, who introduced her at a young age to traditional foods and farming methods, and to seed banking, while Biowatch endorsed her return to these roots by "reviving what I knew when I was young."

As practiced by this remarkable woman, farming honours her past, authors a treasured independence, and is a rich, textured pursuit which gives voice to an indomitable and appreciative spirit – "When I joined Biowatch they talked about something I knew and loved. I eat and sell all that you have seen and am living a life even a working person doesn't have."

3. Healthy soils for healthy food

For several farmers, improved health has been a motivating factor in their transition to agroecology. The obvious benefit is that agroecology farmers don't use any toxic synthetic chemicals. Substitution of organic pesticides is also a last resort. Instead, farmers employ several strategies to avoid pest insects increasing to unmanageable numbers.

Intercropping avoids attracting single pest species and the diversity of plants, close spacing and boundary plants all provide refuge for pest predators. The inclusion of strong-smelling plants along field and garden boundaries repel pests, and these are also made into repellent teas that are sprinkled on crops.

Most important, healthy living soil – built with composts, biofertilisers, green manures of nitrogen fixing crops, careful water management and protective soil cover – is the foundation for healthy pest-free plants. The nutrient-rich soils also provide better taste and nutrition in the harvested food. Coming fresh from the garden to the plate ensures little nutrition is lost to long distribution chains.

Even if eating more healthy food wasn't the main reason for farmers choosing agroecology, many farmers mention that eating their produce grown using agroecology practices has benefited their health.

Sifiso Gcabashe and Siyabonga Mthethwa, Maphumulo

The two friends farm together on Sifiso's land, planting amadumbe, beans, maize and sweet potatoes, mainly for consumption. After meeting Gugu Mtshali, a community facilitator and Biowatch trainee, and being introduced to agroecology, they shifted their focus to vegetables, establishing a garden, and planting seedlings.

They've learned about soil preparation, companion planting, seed banking, trench beds, swales and water conservation, mulching, double-dig beds, heap and bag compost, and making pest control treatments (such as ash brew).

Siyabonga tells us that "before, I did not eat spinach, but since using agroecology I now enjoy it. The food I produce is healthier and nicer, and if I don't have it I miss it." Sfiso agrees, saying "we tell our customers that our food is produced differently, with no chemicals, and that it is tasty and nutritious and will help them; since starting to eat it, I feel strong and am jumping like a calf."

Siya says the lockdown affected their local sales of amadumbe and sweet potatoes, because "we had to stay at home. We tried to sell house-to-house wearing our masks and taking sanitizer, but this is not ideal as people ask for credit and only pay when their pensions arrive. A lot of our vegetables deteriorated in the field because we could not sell them. Some of the amadumbe rotted and was used for compost, while sweet potatoes were left in the ground to retain the runners. We had lots of food over this period as we were not selling it."

Sthandiwe and Wilson Dlamini
Maphumulo

Sthandiwe and Wilson Dlamini moved to Maphumulo in 2014 to begin their retirement. On their plot, close to where Sthandiwe had grown up with her mother, they started planting straight away, embracing life as full-time farmers.

As a child, Sthandiwe had helped her mother to farm and raise goats and traditional chickens. Wilson's father had instilled in him a love of gardening and his mother grew maize, sorghum, sweet potatoes, beans and pumpkins, only buying mealie meal and flour from the shops. However, while the couple had land, they lacked a body of knowledge adequate to their retirement aspirations – their desire to farm, to age healthily, and to be intelligently engaged in meaningful work.

In 2020, an old friend introduced them to Biowatch. They attended a "come and see" in KwaHhohho, where they visited the garden of Ntombizethu Ntuli, a skilled agroecology farmer and Biowatch demonstrator. Sthandiwe said that while there, they were served "a meal that made me remember my Mother." She was interested in health, and the couple were immediately struck by the quality of the food. Sthandiwe and Wilson still convey the excitement of this visit, and the richness of their learning. This experience was repeated in Pongola in mid-2021, during a Biowatch "Agroecology Qalisa!" training when they were hosted at the gardens of Nomusa Ngwenya and Phiwetandi Dlamini, two experienced agroecology farmers. Reflecting on this period, Sthandiwe said that "a big motivation was the actual food we ate," and she spoke for Wilson when telling us that "we could really feel we were in the right place – we wanted to age eating healthy food, and did not have an approach to do this until we met Biowatch."

Wilson and Sthandiwe Dlamini eagerly adopted the agroecology principles they observed in demonstration gardens in KwaHhohho and Pongola, including erosion control and water harvesting with swales and vetiver grass (centre). Avid seed collectors, they store and germinate many of the seeds they need in their dedicated nursery (right top and bottom).

In December 2021 and April 2022 the Dlamini's garden was badly damaged by rain and hail, and after the 2021 hailstorm, Sthandiwe confided that "we thought we'd never go back." But despite these setbacks they have re-established their 51-species-rich garden as a demonstration of agroecological purpose and practice which may catalyse local efforts in the same way that the Dlamini's visits to Pongola and KwaHhohho inspired them. Indeed, our talk with Sthandiwe and Wilson suggests this strongly – that visits to demonstration gardens are motivating and instructive, and can change the way in which people farm without the need for written materials or formal teaching. Indeed, this is another benefit of agroecology; its major principles are easily demonstrated in a teaching garden, and can be rapidly adopted by farmers after a single visit.

Restored after the floods of 2021/2022, the garden, with its 51 species, is now a model of agroecology practice and purpose.

Agroecology offers multiple gifts, and has introduced the Dlaminis to practices and pleasures which match their interest in plants, meet their need for skillful work, and have helped them to realise the retirement of which they seem so deserving. Speaking to Wilson, who was anxious about how he would occupy himself, we were struck by his absorption in his work – "Sometimes I am in the garden all day" he tells us, "and I am never bored."

Now 73 and 70 years-old, Wilson and Sthandiwe are still "on fire" with interest and energy, and their garden testifies to this – that agroecology has provided a lifestyle offering them health, stimulation, income, and a post-retirement occupation which suits their needs and values as a couple.

4. Agroecology for livelihoods

Skilful agroecology farmers often generate surplus produce. Despite their small land, the intensively intercropped gardens and fields, use of vertical space in the layering of plants in the fields and on boundaries, free-ranging small stock, and constantly enriched soil produces diverse foods with a high cumulative yield.

The value of saved expenditure on food, which can go towards other family needs, is an often-undervalued contribution to household finances. The interviews revealed a range of strategies for distributing surplus production including as solidarity donations to needy community members, bartering for other produce one doesn't have, and selling.

Earning additional cash income is a necessary priority for most farmers. Many farmers do a bit of everything, using diverse strategies to ensure resilience to changing events to secure their own livelihoods, while also contributing to the well-being of the community one is a part of.

Sipho Zungu, Mbazwana

After the company he worked for was liquidated, Sipho moved back home to Mbazwana in March 2020. Wanting to farm commercially on a 20ha plot, he contacted a few local people interested in agriculture. Together they revived the Nansinhlanhla farming group, drew up a constitution, sourced funding from a local lodge owner for a borehole, and clubbed together to pay for fencing of the plot. By November the borehole had been dug and they were clearing the land.

One of Sipho's relatives, who posted impressive pictures of crops on social media, told him to contact Biowatch. In March 2021, members of the group attended a Biowatch agroecology training. They also attended a Biowatch farmer exchange and visited Florence Ngubane, an agroecology farmer in KwaNgwanase, who gave them seeds of beans, dhall, maize and sorghum, and showed them her crops and herbs, and her seed bank.

By June 2021 the group were selling produce to a school supplier, to teachers and the local community (spinach, cabbage, beetroot, onions, tomatoes). Income from these sales was used for fencing and to buy petrol to run the generator, which now powered the borehole. By 2022, sales were steady and they also started supplying a local guest house.

Most farmers engage in informal trading with the benefit of flexibility, which assisted their resilience during this time. Farmers could change where and how they traded, responding to new opportunities, while also being able to hold back on trade when family numbers increased, or when the weather affected harvests. Even with this flexibility, farmers relying on town markets were negatively impacted by the restrictions on movement and transport imposed during the hard lockdown.

Irene Mkhumbuzi, KwaNgwanase

While Irene felt that she had enough food for her family, and "did not need to go often to the shops," she was careful with sales. Not only "because of the heat," which had affected productivity, but because she did not know how long the lockdown would last and feared running out of food.

Notwithstanding this cautious approach, Irene did sell peanuts, lettuce, spinach, green peppers, cassava, watermelons, avocados and sweet potatoes. In October 2020 she sold large amounts of cassava, and in December she sold 10 x 50kg bags of fresh peanuts to a buyer from Durban who made peanut butter.

Despite her reservations about not having enough for her family, Irene donated food to those in need during the lockdown, and was approached by people who offered to work in her garden in exchange for food.

Relatively few farmers are entirely focused on income generation, although for some of the newer agroecology farmers, such as the Nansinhlanhla Garden Group in Mbazwana, this is their main purpose. Most co-operative ventures focused on cash cropping are supported by the Department of Agriculture, and it will be interesting to see how this group challenges the notion that synthetic chemicals are a must for successful commercial farming.

Some farmers separate out household food production from income generation, such as the Zimele market garden co-operative in Mtubatuba. Agroecology is often challenged around an ability to scale beyond subsistence, and these more commercially oriented individual and cooperative ventures suggest ways in which this could happen without compromising farmer autonomy and the resilience of diverse, productive farming units.

Tholakele Mfekayi, KwaHhohho

Tholakele recounts the difficulty of the hard lockdown, during which she felt monitored by the army and the police, and afraid to be in her garden. At her home, she did not plant many vegetables for lack of seeds, and struggled to sell the surplus she did have as many people, confined to their homes, began to plant their own. In particular, teachers released from school, began farming, prompting Tholakele to observe that "…my clients grew their own food."

Tholakele is a member of the Zimele market garden. She tells us how the market gardeners were not allowed to meet under the hard lockdown, and that they could not get seedlings from Mtubatuba or Eshowe. She spoke about the difficulty of selling Zimele's produce, and described one incident in which a delivery of 250 bunches of spinach for a local retailer was turned back at a roadblock, forcing Zimele farmers to sell these locally, at reduced prices, while most of the spinach wilted.

Florence Ngubane
KwaNgwanase

As it was for many smallholder farmers, March 2020 was a difficult time for Florence Ngubane to be in her fields. However, the isolation of her homestead gave her confidence to return to them a week after the hard lockdown began in late March 2020; and, aided by good rains, she grew spinach, cabbage, onions and beetroot which she sold locally.

Florence also bartered much of this lockdown surplus with fish sellers from KwaNgwanase to whom she was a long-standing customer they wished to retain. Because it was difficult for Florence to continue coming to them, and because they were no longer allowed to hawk their wares in town, they began visiting her, bartering their catches from Kosi Bay for her fresh vegetables, and enabling her to eat fish as part of her lockdown diet.

Over this period Florence hosted her children and grandchildren, 10 in all, who ate beans, uphutu and samp from her traditional maize. The family also ate pumpkins, cassava, amadumbe, sweet potatoes, pumpkin runners, cowpeas and cowpea leaves, spinach, carrots, green peppers, lots of cabbage, and fresh maize from the fields in March and April. Florence said that "I had no stress over food, and went to my field and garden to get what I needed, and I had fish."

Florence was also able to go to town "often enough," where she bought matches, candles, washing powder, tea, sugar, cooking oil and meat. The greatest difficulty Florence faced over lockdown was "the loss of many relatives," but she was grateful for the small garden next to her house – "the lockdown simplified things, and gave me more time to spend in my garden." She added that "agroecology taught me to believe I would have enough, and I enjoyed my garden, because farming is part of my life."

Florence Ngubane's family ate her traditional maize over lockdown, and she used a traditional mortar and pestle to make samp. During our visit, Florence showed us her seed bank, which contained seeds of maize, pumpkin, peanuts, jack bean, pearl millet, sesame, jugo beans, cowpeas and finger millet.

5. Resilience takes root

In all the interviews, resilience was deeply personal, but also directly related to farmers' connection to community, culture and spiritual life. For many farmers agroecology has enabled this connection, through its rootedness in traditional knowledge and culture, and invitation to the "web of life" to find and build connection on their farms.

Agroecology encourages keen observation and understanding of natural cycles, the soil and the dance between microbial, plant and animal life. The environments the farmers create with this knowledge are a source of pride, inspiration and grounding, and solace when needed.

Biowatch's work with farmers has focused strongly on supporting seed systems led by farmers to revive traditional and indigenous crops and seed varieties. In addition to their local adaptedness to climatic conditions and cultural use, these seeds and crops often vividly connect farmers back to cultural roots. These deep connections are often associated with the nurturing received from mothers and grandmothers who are so intimately involved in both growing and cooking food as well being the guardians and custodians of seed and related knowledge in the community. This knowledge, which is rapidly being lost with the onslaught of industrially produced seed, includes the nuances of how to plant, harvest, save and reproduce particular seeds; but also the cultural ceremonies these are used in; taboos about who can plant, harvest or visit the field they are in; how to process them; what to eat them with; when to eat and not eat them; and their aid to physical or spiritual healing. For several farmers this connection has been an entry point into agroecology; for others it is motivation to persevere in difficult years.

Jabulisiwe Ngxabi, Ingwavuma

"I'm very happy and proud of all this work I have done. I want to thank Biowatch for new practices because I eat and then I sell. If Biowatch was not here I would not have all these seeds."

Jabulisiwe is proud of her seeds, and her seed bank includes beans, cassava, cowpea, dhall, finger millet, gourd, lima bean, maize, melon, mung bean, peanuts, pumpkin, sorghum, sunflower and Zulu potato. We recorded 35 species in her lush, lovely garden and its immediate surrounds.

Over lockdown, Jabulisiwe fed a family of five and had "no problem with food." The family also ate maize from her fields, which she had milled in eSwatini before the lockdown began. She ground her own sorghum, ate her traditional chickens, and "needed very little from the shops."

African cultural values based on *ubuntu* – "I am because we are" – align with agroecology's principle of a networked web of supportive connections. This finds expression in traditional practices such as working together to make difficult tasks lighter by focusing on each farm in rotation as a group, and practices of seed exchange. These supportive networks strengthen community ties as well as between more distant groups of agroecology farmers, helping individual farmers cope with challenging times.

Nqobile Sibeko, KwaMduku

Nqobile is an accomplished, talented musical artist, arranger, producer and author. Her successful solo album, Isiphephelo, launched in 2017. Soon after the launch, her father sadly passed away and she moved to the Makhasa area near KwaMduku to be with her mother. Learning to adapt to her new circumstances, she accompanied her mother to meetings with the local Dalokuhle Farmer Group, and was invited to join. Describing her scepticism, Nqobile told us that "I was not a person of the soil and the sun." But knowing she loved cooking, Dalokuhle members invited her to a course on food preparation, and she began to "get on well with them," to work in her mother's garden, and to speak with Biowatch's agroecology manager, Lawrence Mkhaliphi.

Nqobile often uses the phrase "As a woman you become", and something about the women of Makhasa touched her deeply. Without us asking, she told us that their comportment, their dignity and respect "humbled me." She spoke about their "tradition of helping those in need," of sharing food and attending funerals, including that of her father. In her encounter with these women, Nqobile began to sense that, contained within the obligation to care for her mother, and on the other side of mourning the loss of her old life, lay a gift – the gift of community, of residency, and of her garden. Gradually, Nqobile's old life was replaced by the world of agroecology – of compost pits, swales, mulches and seedling stations.

Because of her can-do attitude, learned in theatre production, Nqobile "clicked" with Nombuso Thwala, a "feisty Gogo" from Dalokuhle with whom "I shared a birthday and became close friends." Nqobile attended a Biowatch agroecology course in 2019, and with Nombuso and Zandile Makhanya, began to play a leading role in the Dalokuhle Group.

A further shift occurred for Nqobile over the lockdown, which she described as the "final chapter" in forging a new identity. The opportunity in 2020 to slow down and stay in one place seems to have confirmed for Nqobile that while "we aspire to live in the cities, the good life is in the rural areas." Her health and her outlook improved, something she attributes to healthy food, the "clean and fresh air," and "walking barefoot in my garden to connect myself to the soil."

Ruth Magwaza
Maphumulo

Ruth Magwaza was introduced to Biowatch by a neighbour who invited her to a meeting about "a different way of farming." Echoing many farmers we interviewed, Ruth told us that what she learned from Biowatch "offered me a way to return to my roots and to farm as I knew from my parents."

In late 2020 when Ruth visited the Zimele market garden during a Biowatch training in KwaHhohho, she was struck by the traditional seeds she saw there – maize, sweet sorghum, sorghum and cowpeas, among others. This interest was also evident as Ruth described what she had seen at Zimele – "the intercropping of maize with beans, imfe (sweet sorghum) and amabele (sorghum), the use of iboza and umsuzwane (lemon bush), and of mulching and grey water." On returning to her homestead, she began making pit and heap compost, raised beds, water harvesting trenches, liquid tea, and bokashi.

She told us that "when I saw those seeds which I knew from my youth, I decided to return to my roots and became very interested." She later came back to this theme, saying "I am happy to have returned to the seeds my parents used." It appears that the seeds she was given by the Zimele farmers kindled precious childhood memories of family, food and farming. In small, but significant ways, these seed gifts enabled Ruth to give life to her memories as she began growing food to honour her past and reclaim her identity as a traditional farmer. Such gifts offer their recipients living links to memories and traditions which connect farmers to their faith and their communities. In this sense, seeds are irreducibly social, and introducing them into areas from which they are absent may foster powerful aspects of community resilience.

At the end of our interview, Ruth said that her main goal was to talk about agroecology with other local farmers and to have a day "…when we cook traditional food and share it with those who are old, and who will remember that this is how we used to eat."



Like a number of farmers we visited, Ruth Magwaza (left) speaks with feeling about the health benefits of the food she grows, saying that this is what "motivates" her, and that "I feel healthier when I eat traditional food." She produces many of her own seedlings (centre), and grows her vegetables in well-constructed raised beds covered in grass mulch (right).

6. Knowing is more than having

Agroecology draws on knowledge handed down through generations and honed by farmers through a continuous process of trying, learning and trying again. Biowatch has brought some innovation to this foundation, and new learning based on developing the science of agroecology and exchanges within a wider movement help fine-tune and improve practice.

To an inexperienced eye, the tumble of plants across farmers modest homesteads may not look like much. However, closer interrogation reveals the depth of skill employed in using locally available resources to produce the abundance they harvest.

Agroecology is knowledge heavy, and this is often used as an argument against investing in and supporting it. This shouldn't be the case. Recent agroecology adopters show that the basic skills to get started can be learnt quickly, especially through farmer-to-farmer learning, and provides fast yields. Although many of the practices also require heavy upfront labour, this is rewarded by sustained productivity from greater water retention, and the healthier soils and environment.

Gugu Dlamini, Jozini

After attending a few Biowatch agroecology trainings, Gugu set up a household vegetable garden in 2019. She dug a swale and trench beds, prompting neighbours to ask, "what are these small graves?" These neighbourly questions were answered when locals confined to their homesteads by the lockdown, and clients in search of seedlings, began to notice how good her produce looked, and bought spinach, lettuce, purple cabbage and green peppers from her.

Then, during the Biowatch "Agroecology Qalisa!" training in March 2021, which focused on vegetable production, a visit to Thombithini Ndwandwe's garden in KwaHhohho motivated Gugu further, and she dug more trenches, setting in motion an experiment. Because Gugu's trench-grown vegetables lay side-by-side with conventional plantings during this transitional period, the differences in quality between them were observable, and further motivated Gugu to embrace agroecology's principles and practices. Her new trenches enabled Gugu to produce a good crop of "lockdown greens", and she sold peppers and cabbages through a local retail outlet. Locals also "bought a lot," enabling her to buy a fridge and fence her garden.

Gugu said that "the lockdown did not affect me much … over the lockdown we got most of the vegetables we needed from the garden."

The need for heavy labour also tails off as diversity increases and natural biological processes take over improving soil texture and fertility, and pest management. This builds the ecosystem's innate resilience, which continues even when farmers' attention is drawn elsewhere.

Unlike infrastructure, knowledge about agroecology is highly transportable. Even where the context may differ, observation and the application of agroecology principles can help farmers to establish practices that work. This ready transportability and quick start-up offers resilience in a changing, unpredictable future.

Thokozile Mvubu, Ingwavuma

Thokozile says her identity as a farmer has been enriched through her relationship with Biowatch. She told us that over the years she had seen a "big difference," and had "prevented erosion, improved my soil and eaten healthy food."

Her property boasts many avocado and perhaps hundreds of banana trees, which have become the mainstay of her widow's livelihood since her son became disabled through illness and she took on his care and that of his three children. The bananas sprawl across her steeply sloping land, and are constantly being replaced by new specimens, and being expanded into new areas. When the bananas in her first plantings were still small, she interplanted them with pumpkins, cowpeas, beans and maize, but explained to us that the maize could only be intercropped in this manner while the banana trees were small. As she keeps expanding her banana crop, she continues to intercrop with maize, cowpeas, beans and sweet potatoes, withdrawing the maize as the bananas grow.

Jabulile Gina, Ingwavuma

Jabulile was introduced to agroecology in 2010. She remembers being attracted by ideas such as "intercropping, farming without fertiliser, and saving my own seeds." But she also noticed that "food tasted better."

Like many farmers, Jabulile found the start of the lockdown difficult because she was told to remain indoors, but she had "lots of vegetables in my garden" and did not need to buy any from the shops, and also had a good maize harvest. Later, the lockdown gave her "more time to work in the garden and plant more vegetables." Jabulile sold spinach, lettuce, cabbage, beetroot and onions locally, and to people who came to her house to buy them. She observed that sales were good over lockdown because a lack of water locally meant that many people who farmed using conventional methods could not grow vegetables.

Jabulile is happy with her accomplishments, and says that "I am proud and happy, because food prices are very high, and my harvest will last me until next planting season." Like other farmers, she also spoke of her independence from shops, her avoidance of "food with chemicals," and the health benefits of her vegetables and fruit trees for her children.

Eunice Mthembu
Mkuze

Eunice Mthembu is a long-time, experienced agroecology farmer. We visited her at her new home in Mkuze and were particularly interested in how she had moved her established, successful agroecology garden in Tshaneni, started a new one on a virgin site, and rapidly re-established the diversity, practices and abundance that have motivated her efforts since joining Biowatch in 2009.

In January 2021, Eunice and her husband left Tshaneni, in the mountains high above Mkuze, and moved closer to town, establishing a new homestead at the foot of a mountain called Gasa, where they hoped to have an easier life. Having moved, establishing their new home was delayed by the death in March 2021 of King Goodwill Zwelithini, whose mourning prohibited such tasks. Eunice started her new garden in April with a planting of beans, and we visited in May 2022, 13 months later.

Eunice faced the lockdown before moving, at her homestead in Tshaneni. Tshaneni is remote, and while afraid to visit neighbours, she was "not scared to be in my garden" which produced a good crop of vegetables over the lockdown – carrots, spinach, onions, beetroot, kale, lettuce, green beans; and maize and mung beans "from the previous year." With these reserves, she fed her husband, and some of their children and grandchildren (10 people) over the lockdown, and told us that "...we never went hungry."

Eunice Mthembu is an accomplished agroecology farmer. She took this experience with her when she moved in 2021 from Tshaneni to a new home in Mkuze, near Gasa Mountain, where she rapidly re-deployed her farming skills. (Right) A bean field in the shadow of Gasa, and a new start for this deeply inspiring Biowatch farmer.

Talking to Eunice, and relishing the chance to linger in such a recently-established garden, it struck us that this portability, or movability, and the time frame in which benefits accrue to its practitioners, is yet another gift of agroecology.

When planning her move, Eunice "…knew in my mind that I would continue with agroecology because I wouldn't need to buy inputs, and would produce good food." As an established agroecology farmer, she had the techniques and confidence to begin as soon as she could. Still, "it was difficult to start"; she had to hire a tractor to plough out the grass, and her husband and children helped her to clear the land. She also had to buy a fence, pay to have it erected, and hire labour to help her to dig deep trench beds. Because Biowatch farmers keep seed banks, Eunice had the seed stocks she needed; and she came down the mountain with cassava cuttings, sweet potato runners, a ripe paw-paw full of seeds, and the knowledge that there were "better soils" awaiting her.

Following is a description of Eunice's efforts, in recognition of a farmer who is "… happy to have a new, productive garden" for the second time in her life, in a second home.

Entering the new garden, the tenet of diversity is evident – just over a year after being established, the garden hosts 32 species of plants, brought together in agroecology's array of synergies, architectures and scales, which become increasingly apparent to a more granular gaze.

Eunice planted beans first (top left) followed by traditional cucurbits – pumpkins (top centre) and melons and gourds (top right), the fruits of which were everywhere to be seen in the garden and surrounds. (Bottom left) Indicating another early planting, Eunice had already harvested a crop of maize, some of which was being prepared for seed banking on the day of our visit, hanging in a tree above a small fire. The plants (stems and husks) from which these seeds came were being put to good use, complementing the cover-crop/green manure role of pumpkins as a soil-shielding and composting mulch.




(Left) The "three sisters" (maize, beans and pumpkins = a guild). (Centre left and right) Other companion-plantings include lima beans and cowpeas which both used maize stalks for support in Eunice's garden, while in another patch, fruiting cowpeas, sweet potatoes and a paw-paw grow close together (far right). In the often challenging conditions faced by agroecology farmers, foundations are laid early to build the fertility of the soil. Cereals closely interplanted with creeping and climbing cucurbits and fabaceous species (such as beans, cowpeas, jugo and mung beans, peanuts and pigeon peas) and sweet potatoes offer beneficial associations between plants, shade soil (as cover crops), suppress weeds, provide mulch/green manure, retain soil moisture, provide imifinos, and build soil fertility through composting and biological nitrogen fixation. Taken together, these practices stabilise production and add to the system's resilience.




A closer look at Eunice's garden reveals a rich diversity of other fascinating plants: (left to right) zulu potatoes (amatabhane); the wild grassland lantana (ubukhwebezane), prized for its delicately-flavoured fruits; okra (igusha lesilungu); and jute mallow.



Eunice has also been quick to start her deep trench fertility beds, which lay a long-term foundation for the production of seedlings and fresh greens, even when rainfall is low. (Left) Two fertility beds have been dug; the one on the right is being filled with layers of organic matter to support long term fertility and water retention, and the one on the left has been completed and is being used as a mulched seedling bed (centre). Such practices are important for farmers who rely on rain, and may struggle to obtain water; Eunice pays R5 for a barrel of water, and is sometimes able to fill a small concrete reservoir (right).

WHAT FARMERS SAY THEY NEED TO SUPPORT RESILIENCE

This collection of farmer experiences of living and thriving in troubled times (2020–2022) show that agroecology builds and strengthens resilience.

The transition to agroecology is urgently needed. Not only will this ensure food producing systems can better adapt to climate change and other shocks, but it will contribute to climate change mitigation, decrease biodiversity loss, improve health and nutrition, and create a more equitable food system for food producers *and* consumers.

Several ways in which farmers' resilience through agroecology could be better supported by government and civil society organisations, inferred from the experiences farmers have shared, include:

GOVERNMENT SUPPORT MUST BE RESPONSIVE TO THE NEEDS OF AGROECOLOGY FARMERS

Input subsidy programmes continue to focus on industrial farming inputs including fertiliser, pesticides, hybrid and GM seed. In April 2020, Minister Thoko Didiza of the Department of Agriculture, Land Reform and Rural Development, announced a R1.2 billion COVID-19 disaster relief fund for small-scale farmers in recognition of their crucial contribution to local food supply.

Civil society criticised the fund for: excluding vulnerable producers who had annual turn-overs under R20 000; and the onerous application process which required financial records and proof of tenure (in the case of Biowatch-supported farmers, access to local extension services to obtain and deliver forms, and banks to draw statements while all the offices were closed for lockdown). The process also assumed farmers only produced a single commodity and support could only be obtained through vouchers from major agridealers.

In response to the criticism, in October 2020 a Presidential Economic Stimulus Initiative (PESI) for subsistence producers was announced. This time, farming households could apply for the grant via cell phones using a USSD code. Applications closed in December and farmers were to be notified in January 2021. A second round was announced in December 2021 for support in 2022.

Some farmers applied after being alerted to the opportunity by Biowatch, but their success and the usefulness of the grant varied. Once again, grants were made available through vouchers from major agridealers. By routing support through agridealers selling conventional farming inputs, farmers are limited in the choices they can make for useful support, and in some cases are given no choice. It is clear that for policies to be appropriate, farmers must be asked what they need.

FARMER TO FARMER LEARNING AND DEMONSTRATION

The gardens of experienced agroecology farmers are inspiring and instructive to new farmers adopting or transitioning to agroecology. For many farmers, seeing is learning. Several farmers who recently joined Biowatch programmes, were inspired and convinced by what they saw in one-day "come-and-see" visits or the immersive one-week training led by experienced farmers, and quickly adopted agroecology methods.

This highlights the role of established farmers and their living "learning sites" in spreading agroecology rapidly and effectively into new areas.

SUPPORT FOR LOCAL MARKETS

Although many smallholders have their eyes set on supermarket contracts, these are fraught with challenges. Big chains are often only interested in a single crop, prompting farmers to reduce their diversity for economic ends, which increases their vulnerability. Smallholders can also struggle to meet administrative and quality assurance requirements, as well as the quantities to sustain contracts with big retailers.

Informal trade benefits smallholders as it affords them greater choice and control over what they produce and when and how much to sell or hold back from the market in response to changing circumstances. However, farmers struggle to divide their focus between production and selling, especially if this involves long trips into town and pursuing market opportunities. Some farmers have gone to extraordinary lengths to sell produce. This suggests new opportunities for marketing agroecology produce to consumers who are willing to support farmers based on common values, through solidarity buying networks. There is also the need for parallel development of marketing and business skills within farming communities, to support distribution of good food locally without adding to farmers' burdens or increasing dependence on marketing intermediaries.

More local market spaces are needed for smallholders to sell produce in areas with good foot traffic in their communities. Local markets can accommodate a greater diversity of produce, including traditional foods. This would benefit farmers who could reduce transport costs and earn more for produce, and consumers who would pay less but access fresher food. More income circulating in the rural economy has many knock-on benefits. Appropriate policy support from government is needed for local markets.

APPROPRIATE SMALL-SCALE PROCESSING

An inability to process grains, pulses and oil seeds into popular and culturally consumed foods inhibits farmers' ability to consume their own produce throughout the year. Due to the heavy labour in stone grinding, maize is mostly coarsely processed for samp or eaten fresh. Some farmers in Pongola and Ingwavuma still have old cast iron hand-powered milling machines, which enable them to mill meal and stock feed even though they are not connected to the electricity grid.

Farmers produce peanuts and in some areas sesame, but their full potential for butters and oil substitutes are not utilised due to the labour in processing these the traditional way. Other innovations in off-grid and small-scale processing, such as solar drying, could help farmers to ensure food security through the spring lean season as well as supporting vibrant local food systems.

FARMER-LED SEED SYSTEMS

Diverse farmer seed is an often-neglected cornerstone for resilience. By being able to draw on locally adapted seed when one needs it, farmers can make choices about what to plant and when. Having one's own sufficient seed also avoids having to have cash to buy seed before one can farm, and also enables farmers to replant should the first planting in a season fail due to unpredictable weather conditions.

Reviving, saving and multiplying farmer varieties of grains, pulses and traditional vegetables has been the main focus for farmers and Biowatch as these are the backbone of food security. This goes hand-in-hand with traditional knowledge on harvesting and use.

In addition to their cultural value, these varieties have greater genetic diversity which enables more resilience in a changing climate. Knowledge on saving the seed for other vegetables is an area that needs support.

Much more could be done to support farmer-led seed systems, especially through state research and extension resources, and proactive policies supporting farmer-led seed systems.

Farmer-led seed systems and the diversity of crops, animals and harvested wild foods are important cornerstones to farmers' ability to adapt to changing climatic and economic challenges.

APPENDIX: PLANT AND OTHER ISIZULU NAMES

The following is a list of plants frequently mentioned by the Biowatch-supported farmers in northern KwaZulu-Natal who were visited and interviewed between April and June 2022, by researchers Mark Mattson and Samu Zuma.

This is not a full list of the biological biodiversity nurtured by agroecology farmers in northern KZN. Remarkably, as noted by Mark and Samu, "we recorded more than 60 species of plants in some gardens." For example, reflecting on Nomusa Ngwenya's garden in Pongola, Mark notes:

> *This number is more than a number. Her plants belong in different functional categories – food security, cultural value, pest control, medicinal, seed banking and sharing, income generation, nutritional diversity, flavourants, cover crops and mulches, fodder, and liquid manures – and are integral to her methods and motivations, her identity and pride as a farmer.*

In the list, the commonly used English names are those that are commonly used in KZN, whilst the isiZulu names are those that are commonly used by the farmers we work with in northern KZN.

There are always challenges with using commonly used names – they are meaningful at a local level, but often vary from area to area. There may also be two (or more) isiZulu names for the same plant – this relates to the richness and diversity of the Zulu language which is linked to the richness and diversity of the landscape in northern KZN.

In KZN, isiZulu names are commonly used by English mother tongue speakers, for example "*iboza*" is often used by English language speakers instead of the English "ginger bush". And sometimes an English name such as "apple" is adapted into isiZulu and is anglicised and is known as "*ihhabhula*" or "*i-apula*".

Botanical or scientific names are internationally recognised, but are often not in general use. Plants such as the banana which has been domesticated for centuries, have a complex classificatory system. So, we have erred on the side of caution with these names, using *Musa* spp. for banana – indicating there are several species of *Musa*. However with plants which are indigenous to our region we are able to give reliable botanical names with genus and species.

ENGLISH NAME	BOTANICAL NAME	isiZULU NAME
African nightshade / umsobo	*Solanum retroflexum*	*umsobo*
avocado	*Persea americana*	*ukwatapeya / ukotapeya*
banana	*Musa* spp.	*ubhanana*
bean (sugar bean, kidney bean, black bean)	*Phaseolus vulgaris*	*ubhontshisi*
bean (dwarf bean)	*Phaseolus vulgaris*	*isambasamba / uchokwane*
bean (green bean)	*Phaseolus vulgaris*	*ubhontshisi / oluhlaza*
beetroot	*Beta vulgaris*	*ubhithirudi*
blackjack	*Bidens pilosa*	*uqadolo*
cabbage (& red cabbage)	*Brassica oleracea*	*iklabishi*
calabash	*Lagenaria siceraria*	*amaswela*
carrot	*Daucus carota*	*iziqathi*
cassava / yam	*Manihot esculenta*	*umdumbula*
chilli	*Capsicum annuum*	*pele-pele*
cowpea	*Vigna unguiculata*	*imbumba*
cucumber	*Cucumis sativa*	*ukhukhumba*
finger millet	*Eleusine coracana*	*uphoko*
gallant soldier	*Galinsoga parviflora*	*inyoni kayiphumuli*
ginger bush / iboza	*Tetradenia riparia*	*iboza*
goosefoot / fat hen / lambs quarters	*Chenopodium album*	*imbilikicane*
granadilla	*Passiflora edulis*	*ugranandila*
green pepper	*Capsicum annuum*	
guava	*Psidium guajava*	*igwava*
intshungu	*Momordica foetida*	*intshungu*
jack bean	*Canavalia ensiformis*	*umaduma ezinqeni*
jugo bean	*Vigna subterranea*	*izindlubu*
jute mallow	*Corchorus tridens*	*igusha*
khaki bush	*Tagetes minuta*	*unukani*
lablab / dolichos beans	*Lablab purpureus*	*lablab*
lemon	*Citrus limon*	*ulamula*
lemon bush	*Lippia javanica*	*umsuzwane*
lemon grass	*Cymbopogon citratus*	*utshani obuyitiye*
lettuce (& red lettuce)	*Lactuca sativa*	*ulethisi*
macadamia	*Macadamia integrifolia*	
mahogany tree	*Trichilia emetica*	*umkhuhlu*
maize	*Zea mays*	*ummbila*
mango	*Mangifera indica*	*umango / umangoza*
monkey orange	*Strychnos madagascariensis*	*umhlala*
mulberry	*Morus alba*	*ijinkijolo*
mung bean	*Vigna radiata*	*umngomeni*
naartjie	*Citrus reticulata/nobilis*	*inatshi*

ENGLISH NAME	BOTANICAL NAME	isiZULU NAME
okra	*Abelmoschus esculentus*	*igusha lesilungu*
onion	*Allium cepa*	*uhhayanisi / u-anyanisa*
orange	*Citrus aurantium*	*iorintshi / iwolintshi*
paw-paw/papaya	*Carica papaya*	*uphopho / upopo*
peach	*Prunus persica*	*amampetshisi*
peanut	*Arachis hypogea*	*amakinati / amatongomane*
pearl millet	*Pennisetum glaucum*	*unyawothi*
peppadew	*Capsicum baccatum*	
pigeon pea	*Cajanus cajan*	*udhalli*
pigweed	*Amaranthus* spp.	*imbuya / ugobolo / imifino*
plantain	*Musa paradisiaca*	*ukhova*
pumpkin	*Cucurbita maxima*	*amathanga*
sand apricot-vine	*Landolphia kirkii*	*amabungwa*
sesame	*Sesamum indicum*	*udonca*
sorghum	*Sorghum bicolor*	*amabele*
sourplum	*Ximenia caffra*	*amathunduluka*
spinach	*Spinacia oleracea*	*isipinashi*
stinging nettle	*Obetia tenax*	*ububazi*
sugar cane	*Saccharum officinarum*	*umoba*
sweet potato	*Ipomoea batatas*	*ubhatata*
sweet sorghum	*Sorghum bicolor*	*imfe*
sweet watermelon	*Citrullus* spp.	*ikhabe*
taro potato / amadumbe	*Colocasia esculenta*	*amadumbe*
tomato	*Lycopersicon esculentum*	*utamatisi*
turkey berry	*Canthium inerme*	*umvuthwamini*
water berry / umdoni	*Syzygium cordatum*	*umdoni*
watermelon	*Citrullus lanatus*	*ibhece*
wild custard-apple	*Annona senegalensis*	*umthofa*
wild date palm	*Phoenix reclinata*	*usundu*
wild jute /wild mallow	*Corchorus asplenifolius*	*igusha*
wild medlar	*Vangueria infausta*	*umviyo*
Zulu potato	*Solenostemon rotundifolius*	*amatabhane*

The following is a list of some of the isiZulu words and names mentioned in this book, which are commonly used by the farmers we work with in northern KwaZulu-Natal, South Africa.

isiZULU	ENGLISH
amahewu	maize-brewed non-alcoholic drink
amasi	maas / soured milk
amasimu	near fields
emasimini	far fields
idokwe	porridge made from either sorghum or maize
imifino	pot herbs, cooked like spinach
incansis	reed matting
incwancwa	fermented porridge
ingadi	garden
inqolobane	granary
ipapa	a stiff porridge made from maize meal
isinambathi	a mixture of pumpkin and maize
isivande / isife / sasekhaya	small fields close to the household
izinkobe	cowpeas mixed with maize
izinkuhlu	a porridge made from the seeds of mahogany trees (umkhuhlu) and eaten with sweet potatoes
ukhamba	clay pot
umbhantshi	a porridge made with maize and the boiled fruit of the wild medlar tree
umqombothi	traditional beer
umshayo	a room in which an open fire is made beneath the maize which is hung from the rafters above
uphuthu	maize porridge

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