Sustainable agriculture for the future

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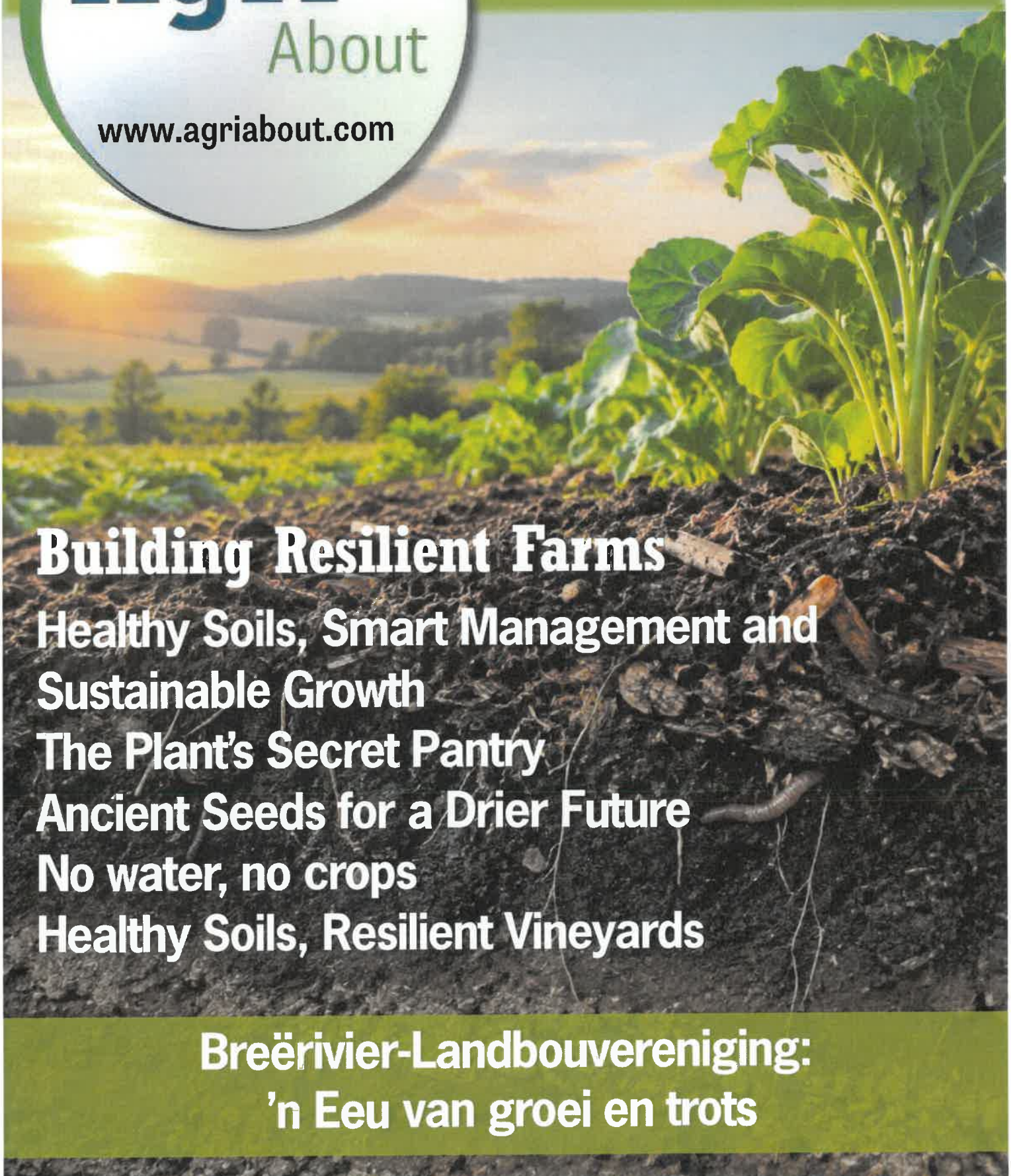

## Building Resilient Farms

Healthy Soils, Smart Management and Sustainable Growth

The Plant's Secret Pantry

Ancient Seeds for a Drier Future

No water, no crops

Healthy Soils, Resilient Vineyards

## Breërivier-Landbouvereniging: 'n Eeu van groei en trots

# Landrace Crops:
## Ancient Seeds for a Drier Future

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As climate change increases rainfall variability and drought risk across South Africa, farmers are searching for crops and farming systems that can remain productive under increasingly challenging conditions. While modern crop breeding has delivered remarkable gains in agricultural productivity, some of the solutions for future resilience may already exist in traditional crop varieties that have been cultivated, selected and preserved by farming communities for generations.

These traditional varieties, known as **landraces**, represent an important component of South Africa's agricultural heritage and crop genetic diversity. They are living repositories of farmer knowledge, environmental adaptation and biological resilience.

Today, however, many of these traditional crop populations are declining or disappearing altogether. Their loss would not only reduce agricultural biodiversity but could also eliminate valuable genetic resources that may help farming systems adapt to future climatic challenges.

**What Are Landraces?**

Landraces are locally adapted crop varieties that have been maintained and selected by farmers over many generations. Unlike modern commercial cultivars that are produced through formal breeding programmes, landraces have evolved through continual interaction between farmers, crops and local environmental conditions.

As a result, landraces often exhibit considerable diversity within a population and are well adapted to the environments in which they have traditionally been grown.

Importantly, a landrace is not necessarily indigenous. For example, maize originated in Central America, but many traditional maize populations grown in South Africa are

regarded as landraces because they have adapted to local conditions through decades or even centuries of farmer selection.

Landraces cultivated within South African communities include cereals, legumes, cucurbits, leafy vegetables and root crops, many of which continue to contribute significantly to household food security, nutrition and cultural traditions.

**Table 1. Examples of Crop Categories and Characteristics of Landraces in South African Communities**

| Crop Category | Crop Types | Distinct Characteristics |
|---|---|---|
| Cereal crops | Maize, Sorghum, Pearl millet | Grain colour, taste, maturity, drought adaptation and food-processing quality |
| Grain legumes | Cowpea, Bambara groundnut, Common bean | Seed colour, cooking quality, nutritional value and adaptation to local conditions |
| Oilseed and multipurpose crops | Marama bean, Groundnut | Food and oil use, seed characteristics and adaptation to environments |
| Cucurbits | Pumpkin, Bottle gourd, Watermelon | Fruit shape, flesh colour, taste, storage quality and use of leaves or seeds |
| Indigenous leafy vegetables | Amaranth, Spider plant, Black nightshade | Leaf yield, taste, nutritional value, seasonal availability and culinary uses |
| Root and tuber crops | Taro, Sweet potato, Turmeric | Tuber colour, texture, taste, cooking quality and local adaptation |

This diversity is one of the most valuable characteristics of landrace populations. Within a single crop species, farmers may maintain plants that differ in grain colour, seed size, flavour, maturity period and adaptation to environmental conditions. Such variation provides a valuable resource for farmers and plant breeders alike.

## Why Landraces Matter

### Genetic Diversity

Landraces contain a broad range of genetic variation, including alleles that may no longer be present in many modern breeding lines. This diversity represents an important resource for future crop improvement.

### Adaptation to Local Conditions

Over many years, landraces have been selected under specific local environmental conditions. Consequently, many possess traits associated with drought tolerance, heat tolerance, poor soils, salinity and low-input production systems.

### Pest and Disease Resistance

Numerous resistance genes used in modern breeding programmes have originated from landrace populations. Their genetic diversity can also reduce vulnerability to widespread pest and disease outbreaks.

### Support for Agroecological Farming

Landraces frequently form part of traditional farming systems that rely on biodiversity, ecological processes and local adaptation rather than high external inputs.

### Nutrition and Dietary Diversity

Many landraces possess distinctive flavours, textures and nutritional qualities that contribute to dietary diversity and food culture.

### Preservation of Farmer Knowledge

Landraces represent generations of farmer experience regarding seed selection, cultivation practices, harvesting methods and food preparation.

When landraces disappear, valuable agricultural knowledge is often lost as well.

### The Advantages and Limitations of Landraces

Like all crop varieties, landraces possess both strengths and limitations.

**Table 2. Comparison of Landrace Advantages and Disadvantages**

| Aspect | Advantages | Disadvantages |
|---|---|---|
| Yield | Stable under variable seasons and low-input conditions | Lower yield potential than improved cultivars |
| Genetic diversity | Wide pool of useful alleles | Less uniformity |
| Environmental adaptation | Drought and heat tolerance | Often adapted to specific locations |
| Pest and disease resistance | Resistance genes and reduced risk of total crop failure | Some remain susceptible |
| Input requirements | Performs well under low-input conditions | May not respond strongly to high-input systems |
| Quality and nutrition | Unique flavour and nutritional characteristics | Quality variation may occur |
| Market value | Supports niche markets and local food identity | Often excluded from formal value chains |
| Agronomic traits | Well adapted to traditional production systems | May mature later or lodge more easily |
| Cultural and social value | Preserves traditions and local knowledge | Economic benefits may not always be recognised |
| Seed systems | Enables seed saving and exchange | Seed quality depends on farmer practices |
| Conservation value | Critical resource for future breeding programmes | Vulnerable to genetic erosion |

Landraces should therefore not necessarily be viewed as replacements for improved cultivars, but rather as complementary resources within diversified farming systems.

**Why Landraces Are Disappearing**
Despite their value, many landraces are gradually disappearing from farming communities. Several factors contribute to this trend.

**Declining Intergenerational Knowledge Transfer**
Migration, changing livelihoods and declining interest in agriculture have weakened the transfer of traditional knowledge.

**Weakening Farmer-managed Seed Systems**
Poor storage facilities, pest damage, diseases and reduced seed exchange can compromise local seed stocks.

**Reduced Access to Land and Resources**
Competing land uses, labour shortages and insecure tenure can discourage continued cultivation.

**Limited Institutional Support**
Compared with commercial crops, many landraces receive limited research investment, extension support and policy recognition.

The continued loss of these resources threatens crop genetic diversity that may become increasingly important under future climatic conditions.

**The Role of Landraces During Below-Normal Rainfall Seasons**
One of the most important characteristics of many landraces is their ability to cope with environmental stress. Although landraces are not drought-proof, some possess traits that help them survive or remain productive under limited moisture conditions.

**Table 3. The Role of Landraces During Drier Seasons**

| Role | Contribution During Below-Normal Rainfall Seasons |
|---|---|
| Drought tolerance | Maintains productivity under limited water availability |
| Early maturity | May complete its life cycle before severe drought develops |
| Adaptation to local conditions | Well suited to local environmental conditions |
| Yield stability | Reduces risk of total crop failure |
| Efficient water use | Maintains growth under water-limited conditions |
| Deep root systems | Accesses deeper moisture reserves |
| Flexible planting and harvesting | Supports staggered production |
| Household food security | Provides food under difficult conditions |
| Seed security | Maintains access to locally adapted seed |
| Preservation of indigenous knowledge | Supports traditional adaptation strategies |
| Climate adaptation | Builds resilience to rainfall variability |

**Conserving Seeds, Preserving Futures**
The conservation of landraces requires collaboration between farmers, communities, researchers and policymakers.

Farmer-led conservation initiatives, community seed banks and participatory research programmes all have important roles to play in protecting these valuable genetic resources.

As climate change places increasing pressure on agricultural systems, landraces provide more than a connection to the past. They offer valuable genetic diversity, strengthen food security and contribute to the long-term resilience of farming systems.

Preserving these traditional crop populations today may help secure the options needed for tomorrow's agriculture.

**Take-home Messages**

- Landraces are not drought-proof and can still suffer losses during severe drought.
- Crop performance depends on the specific variety and local conditions.
- Landraces are generally most effective as part of diversified farming systems rather than as complete replacements for improved cultivars.
- Consecutive poor seasons can reduce seed availability, highlighting the importance of community seed banks.
- Conserving landraces today helps safeguard agricultural resilience, biodiversity and food security for future generations.

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