

LIVELIHOODS AND FOOD SECURITY PROGRAMME

POLICY BRIEF

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KEY POINTS

- ≻ The Bioeconomy is the knowledge-based production and utilization of biological resources, innovative biological processes and principles to sustainably provide goods and services across all economic sectors.
- ≻ It is recognized as a pathway to sustainable development that drives economic growth and job creation, and acts as a catalyst for reindustrialization.
- Around the world, growing numbers of countries are adopting national Bioeconomy strategies. South Africa's Bioeconomy strategy was launched in 2013, the East African Community's in 2020 and Namibia's is currently under development.
- Zimbabwe is blessed with an exceptional abundance of natural biodiversity, including over 6,000 indigenous plant species.
- ≻ These bioresources present a largely untapped potential economic opportunity, whose commercial development would be an ideal stepping stone towards the development of a Zimbabwean Bioeconomy.
- The Zimbabwe Livelihoods and Food Security Programme, through the UN Food and Agriculture Organisation, has recently concluded a comprehensive assessment of 25 different indigenous plant species that have the potential to be used as smallholder crops (either cultivated or wild-harvested).
- ≻ The adoption of a national Bioeconomy strategy, with a specific focus on the commercial use of indigenous plants, would have the following direct benefits for Zimbabwe:
 - A more sustainable and resilient agricultural 0 production system, with healthier soils, reduced emissions and greater resilience in the face of climatic shocks.
 - A healthier population, consuming a more 0 diverse diet and using locally produced phytomedicines to reduce the prevalence of Non-Communicable Diseases and strengthen primary health care.
 - Healthier biodiversity within a broad framework of regenerative agriculture that conserves soil, protects indigenous woodland and enables long term provision of critical ecosystem services.



Indigenous Plants and a National Bioeconomy Strategy – Unlocking a New Opportunity for Zimbabwe

1. Introduction

Zimbabwe is blessed with an exceptional abundance of natural biodiversity. This biodiversity provides critical ecosystem services (especially in terms of watershed protection) and is the cornerstone of the nation's fast-emerging tourism industry. It is also the basis for a range of other economic opportunities, few of which have received sustained policy attention in the past. This briefing note describes the outcomes of a research initiative to identify new economic opportunities from indigenous plant species with potential as smallholder crops, and to situate this within the broader context of a new National Bioeconomy Strategy for Zimbabwe.

Arable agriculture in Zimbabwe is based almost entirely on crops with biological origins elsewhere. Indigenous plants, meanwhile, have naturally evolved to suit the prevailing soil and climatic conditions in the country. They are better able to withstand the periodic cycles of drought than exotic plants, require less (if any) agro-chemicals and are more compatible with soil-conserving land husbandry techniques. With 60% of the country experiencing less than 650 mm of rainfall a year (Natural Regions IV and V), and the cycles of drought becoming ever more frequent, Zimbabwe can no longer afford to ignore the potential opportunities offered by its indigenous plants.

Meanwhile there is growing global consumer interest in organic, indigenous natural plant products. Consumers increasingly seek out production systems that are more biodiversity-friendly than industrialized agriculture. They perceive greater health benefits from natural products, as well as reduced exposure to harmful agro-chemicals, and they also value the enhanced social impacts associated with buying from selfemployed harvesters or farmers.

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Globally these trends have given rise to the notion of the "Bioeconomy", defined as the sustainable production and conversion of renewable biological resources into a range of valueadded, bio-based products. Many observers see the Bioeconomy as the next frontier of economic innovation globally, and several African countries have developed national and/or regional Bioeconomy strategies (e.g. South Africa, Namibia, Nigeria, and the East African Economic Community).

The Bioeconomy is viewed as an alternative economic model to the present fossil-dependent model, which reduces many countries to being sources of non-renewable raw materials, without local value-addition and heavily dependent on cheap labour.

Whilst there have been some scattered initiatives within Zimbabwe, stretching back for more than two decades, there has never been a formal policy to promote the development of the national Bioeconomy. This briefing note aims to change that by stimulating debate around the opportunities for Zimbabwe from the bioeconomy. The briefing note describes a recently concluded research initiative that identifies 25 indigenous plant species (from an initial long-list of 75 species) with potential as smallholder crops. These are plants with a history of traditional use, and for which commercial opportunities exist in the food, beverage, health and/or beauty sectors. The note then goes on to discuss the potential for indigenous plants to contribute to the Agricultural Transformation agenda for Zimbabwe and to explore broader opportunities for the development of a national Bioeconomy strategy.

2. Data and Methods

There are nearly 6,000 indigenous plant species found in Zimbabwe. Of these, at least 15% (900 species) are traditionally used as food or medicinal plants. However, less than 1% have made it through to commercial use, and smallholder agriculture is currently dominated by a very small range of predominantly exotic crops.

The study summarized in this policy briefing began with the development of a long list of 75 indigenous Zimbabwean plants that have historically been used as food and beverage, medicines or cosmetic ingredients, and that have significant potential to be incorporated into a newly revitalized Zimbabwean agricultural production system. In consultation with relevant stakeholders, this was narrowed down to a short list of not more than 25 different plant species, each one of which could be sustainably harvested and/or cultivated for the benefit of rural people.

Field visits were then undertaken around the country to validate and document the traditional uses of each plant. Concurrently, researchers investigated both locally and internationally the scale of potential market opportunities into which each of these plants might feed.

The resultant report identifies the specific market opportunities for each plant, the modalities of production and recommendations for commercial development.

3. Results and findings

The 25 indigenous species identified with the greatest commercial potential for smallholder farmers in Zimbabwe are presented (in alphabetical order) as follows:

	Latin	English	Shona	Ndebele	Potential market
1	Adansonia digitata	Baobab	Μυυγυ	Umkhono	Superfood ingredient, cosmetic oil (skin), herbal tea
2	Aloe excelsa	Zimbabwe tree aloe	Chikohwa, Gavakava	Imangani	Cosmetics, skincare, herbal medicine, anti-diabetic

3	Artemesia afra	African wormwood			Herbal medicine, essential oil
4	Cenchrus americanus	Pearl millet	Mhunga	Inyawuthi	Staple grain, novelty export grain, brewing
5	Citrullus Ianatus	Kalahari melon	Mashamba	Amajodo	Cosmetic oil (skin), edible seeds, herbal medicine
6	Cleome gynandra	Spider plant, spider-wisp	Nyevhe	Ulude	Health food
7	Cucumis metuliferus	Horned cucumber	Magaka	Umhlagahlag a	Food/beverage ingredient, herbal medicine, industrial use
8	Cyperus esculentus	Tiger nut, yellow nutsedge	Pfende	Inqodi	Food/beverage ingredient, bio- fuel, edible oil
9	Eleusine coracana	Finger millet,	Rapoko, Zviyo	Uphoko	Staple grain, novelty export grain, brewing
10	Fadogia ancylantha	Makoni tea	Musvisvinwa		Herbal tea, herbal medicine
11	Harpagophytum zeyherii	Devil's claw, grapple		Inkunzane enkulu	Herbal medicine, skincare, veterinary medicine, pet care
12	Hyphaene petersiana	llala palm	Murara	llala	Craft spirits, basketry, green packaging
13	Lippia javanica	Fever tea	Zumbani	Umsuzwane	Herbal tea, herbal medicine, essential oil, insecticide
14	Myrothamnus flabellifoliius	Resurrection bush	Mufandichim uka	Umafavuke	Herbal tea, essential oils,
15	Oryza glaberrima	African rice	Mupunga	Ingqoloyi	Staple food, novelty food,
16	Parinari curatellifolia	Mobola plum	Muhacha, Muchakata	Umkuna	Beverage ingredient, edible nut, cosmetic oil (skin)
17	Plectranthus esculentus	Livingstone potato,	Tsenza	Umbondiwe	Staple food, novelty food,
18	Schinziophyton rautanenii	Manketti, Mongongo,	Mungongom a	Umngoma	Cosmetic oil (skin and hair), edible nut
19	Sclerocarya birrea	Marula	Mupfura, Mutsomo	Umganu	Cosmetic oil (skin), beverage ingredient, edible oil, but
20	Trichilia emetica	Natal mahogany,	Muchichiri		Cosmetic oil (skin), soap ingredient, biofuel, insecticide
21	Uapaca kirkiana	Wild loquat, Mahobohobo,	Muzhanje	Umhobohobo	Fresh fruit, jam, syrup, beverage ingredient
22	Vigna subterranea	Nyimo bean, bambara nut,	Nyimo	Imdlubu	Staple food, novelty food, bean flour
23	Vigna unguiculata	Cow pea,	Nyemba	Indumba	Staple food, novelty food, bean flour
24	Ximenia caffra	Ximenia	Munhengeni	Umthunduluka	Cosmetic oil (skin and hair), cosmetic ingredient,
25	Ziziphus mauritiana	Jujube,	Musau		Food and beverage ingredient, craft spirits

4. Discussion

This research initiative has been focused on the economic opportunities from the commercial development of indigenous plants. However, this has been firmly situated within the broader context of developing a national Bioeconomy strategy for Zimbabwe.

The broadly accepted definition of the Bioeconomy is "the knowledge-based production and utilization of biological resources, innovative biological processes and principles to sustainably provide goods and services across all economic sectors".

It is a conceptual approach that is fast gaining global traction. By 2017 there were 19 dedicated national and macro-regional Bioeconomy policy strategies in place around the world, and several more under development (see Figure 1). Of particular relevance to Zimbabwe are the emergent strategies in South Africa, Namibia and the East African community. For most of these countries,

the Bioeconomy is seen as an important driver of reindustrialization, economic growth and job creation, and as a valuable tool towards achieving the Sustainable Development Goals.



Figure 1: Countries with Bioeconomy Strategies in use or under development by 2017

Although the definition of the Bioeconomy cuts across a wide range of economic activities, the sectors with perhaps most relevance to Zimbabwe are as follows:

- Agriculture: sustainable intensification, improved yields, crop diversification, enhanced resilience, reduced emissions, adaptation to climate change and biofuel production.
- Health: improved diet, drug discovery and bioprospecting, herbal remedies for primary health care, phytomedicine and nutraceutical development and manufacturing.
- Industry: local value addition, industrial biotechnology, innovations around biomaterials, the circular economy, improved waste management, water use and waste-water treatment, decarbonization of production and consumption.

The adoption of a national Bioeconomy strategy, with a specific focus on the commercial use of indigenous plants, would have the following direct benefits for Zimbabwe:

- More sustainable and resilient agricultural production system; Indigenous plants require less
 agro-chemicals than other crops, and are both more nurturing of the soil and more resilient
 to climatic variations than other crops. The outcome of integrating more indigenous plants
 into a diversified and regenerative agricultural production system will be a stronger agroeconomy with healthier soils and associated agro-ecosystems, reduced carbon emissions,
 improved sustainability of resource use, greater resilience in the face of climatic and
 market shocks, higher levels of employment and a more productive labour force.
- Healthier population; A focus on producing and consuming more indigenous plant-based foods, beverages and medicines will result in a healthier population. The diet will become more diverse, with a move towards foods that are lower in sugar, fats and salt and of improved nutritional value. The prevalence of Non-Communicable Diseases and other nutritionally-derived conditions (e.g. stunting) will go down. Widespread use of locally

produced herbal remedies and phytomedicines will improve availability of medicines for primary health care and ensure continual access to treatment for patients with chronic conditions.

- Healthier biodiversity and ecosystems; the integration of indigenous plants into the agricultural production system will result in a more balanced and harmonious agroecosystem. The focus will be on multi-species cropping systems, grown within a broad framework of regenerative agriculture that conserves and nourishes soil, protects indigenous woodland, supports native biodiversity and enables the long term provision of critical ecosystem services. Included amongst these ecosystem services will be catchment protection, pollination, carbon sequestration, water purification, flood protection, pest and disease control and nutrient cycling.
- Reduced emissions and improved carbon sequestration; 70% of Zimbabwe's greenhouse gas (GHG) emissions come from the production and use of energy. An increased focus on indigenous plants will substantially reduce energy consumption, with concomitant reductions in GHG emissions. Indigenous plants require less land preparation, less agrochemicals (fertilizer manufacture is especially energy-intensive) and less irrigation than other crops. Protecting and managing indigenous vegetation *in situ* also protects and enhances the carbon sequestration capacity of the land and the soil.
- Robust economy; Increased use of indigenous plants for agriculture will ultimately create a stronger and more robust Zimbabwean economy. A diversification of the crop base will enable farmers to move beyond the current commodity dependence and allow them to focus on their own comparative advantages. Their production will be more resilient to shocks and better able to adapt to changing climatic conditions. New jobs will be created around value addition and new biotechnologies will advance the Zimbabwean knowledge economy. There will be a reduced dependence on fossil fuels and the associated foreign exchange requirements. Healthier ecosystems will translate into more reliable and effective water and waste management. Zimbabwe's international standing will be enhanced by its green credentials, and this will result in greater investment and tourism inflows into the country.

5. Conclusion and Policy Recommendations

Zimbabwe's agricultural production system is in the process of renewal and transformation. After a series of shocks induced by poor economic performance, accelerating climate change and a global pandemic, the time has clearly come to move on from "business as usual" and embrace the future. As an exceptionally resource-rich and bio diverse country, it makes strategic sense to the harness the capabilities of these natural and biological resources towards economic growth and sustainability. One of the most underutilized yet high potential categories of biological resource available to Zimbabwe is its wealth of indigenous plants and associated traditional knowledge.

There are nearly 6,000 plant species in Zimbabwe. At least 900 of these (15%) have been used traditionally as foods or medicines, and yet our current agricultural system makes use of only a handful. Instead, we have focused our production efforts on crops that originate elsewhere in the

world, making us vulnerable to the vagaries of international commodity prices and unpredictable rainfall. Changing this focus represents a quick and easy win for Zimbabwean farmers and sets the foundations for sustained economic growth going forward.

Concurrent with the need to transform Zimbabwe's agricultural system, a global shift in economic thinking has occurred. Dubbed the "Great Reset" by the World Economic Forum in 2020, this shift recognizes the urgent need to reduce our dependency on fossil fuels, meet global emissions targets, adapt to changing climate conditions and create a "greener, smarter, fairer world in the future".

As a bridging mechanism to unite these two different strands, the emergent notion of the Bioeconomy is an approach that speaks directly to Zimbabwe's strengths. With its breadth of biological resources and depth of traditional knowledge around their sustainable use, Zimbabwe is exceptionally well-positioned to transition quickly and effectively into a flourishing bioeconomy

This report presents 25 indigenous plant species that have the potential to be adopted at a significant scale in Zimbabwe as smallholder crops. These plants have been selected not only for their ability to generate better and more environmentally sustainable financial returns for smallholders (especially those living in dryland regions) but also for their potential to advance the discourse towards a national bioeconomy strategy for Zimbabwe.

As a follow-up to this study, it is therefore recommended that:

i) A national workshop is convened to discuss the potential role of indigenous plants in a Zimbabwe's agricultural transformation process and develop a broad strategy for the integration of indigenous plants into the production system.

ii) Following on from this workshop, a multi-stakeholder Indigenous Plant Action Team be convened under the leadership of the Ministry of Agriculture to drive the implementation of this strategy.

iii) Separately a team be established to develop a first draft National Bioeconomy Strategy for Zimbabwe for further consultation and eventual adoption.

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ABOUT LFSP:

The Zimbabwe Livelihoods and Food Security Programme (LFSP), Agriculture Productivity and Nutrition Component (APN) is managed by the Food and Agriculture Organisation of the United Nations (FAO), with the aim of contribute to poverty reduction through increased incomes for a target 250,000 smallholder farming households. The programme is being implemented in four provinces covering 12 districts as follows: Mutasa, Mutare, and Makoni in Manicaland; Guruve, Bindura, Mazowe and Mt Darwin in Mashonaland Central; Kwekwe, Gokwe North, Gokwe South and Shurugwi in Midlands and Zvimba in Mashonaland West provinces. FAO is in partnership with three NGO consortia led by Practical Action, Welthungerhilfe and World Vision International, two Strategic Technical partners i.e. IAPRI for policy influence, HarvestPlus for biofortification, three Commercial Banks, 1 Wholesale Facility - the Zimbabwe Microfinance Fund (ZMF), 5 Microfinance Institutions (MFIs) and the USAID managed DCA Facility. To date the LFSP is funded for two phases to the tune of £72.4m.

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