

## KEY POINTS

- Zimbabwe has the necessary policy frameworks and multi-sectoral platforms to accelerate the use of biofortified staple crops in order to enhance food and nutrition security. However, local foundation seed production and bulking by commercial seed companies should be scaled up to ensure timely availability of affordable seeds to match the open market demand by farmers. Food manufacturers involved in product development and value addition are encouraged to utilise biofortified crops to create markets for farmers hence boosting the demand for seeds;
- The Department of Research and Specialist Services (DR&SS) which uses conventional breeding to produce breeders seed of biofortified crop varieties for commercial seed companies should roll out varieties with higher vitamin A and iron, bigger grain and cob size for maize, and more varieties for beans and traditional grains should be rolled out soon to enhance seed supply on the market. However, GoZ should avail funding for the renovation and maintenance of infrastructure at DR&SS to improve its capacity to produce adequate breeders seed for the seed companies to prevent seed bulking bottlenecks;
- Targeted inclusion of biofortified varieties through the GoZ Presidential input support scheme will improve uptake by farmers. While, biofortified crops would make very good alternatives for use in home grown school feeding programme buy GoZ or partners through provision of meals from nutritious vitamin A orange maize sadza and high iron beans “children are positive change agents”, Ministry of Education has role to play in this regard;



## Biofortification: Policy Issues, Opportunities and Recommendations for Zimbabwe

### 1. Introduction

Stunting and deficiencies of vitamin A, zinc, and iron continue to be complex public health problems in Zimbabwe. Micronutrient deficiencies “hidden hunger” can result in stunting, mental retardation, increased diseases and mortality for children under 5 years and women, blindness, death of mothers during delivery and overall impaired economic development (Bhutta et al., 2013; Gillespie et al., 2013); Biofortification is an agro-based intervention designed to increase the content of key micronutrients in staple crops in order to correct or prevent micronutrient deficiencies primarily among the rural communities (Bouis & Saltzman, 2017). This highlights the importance of nutrition in improving overall economic growth by preventing the risk of children dropping out of school due to ill health, improving livelihoods, and their socioeconomic status as adults (Vollmer et al., 2014).

Nutritional interventions to address micronutrient malnutrition are normally structured around four key strategies: dietary diversification, supplementation, commercial fortification, and biofortification.

Central to this approach is its' multi-sectoral nature that needs to encompass; nutrition, health, agriculture, social development, poverty reduction, gender and other cross cutting sociocultural issues. Globally, there is currently no universal agreement on the definition of biofortification (CODEX, 2013; CODEX, 2016).

Agriculture provides livelihoods to 80% of the population in Zimbabwe, accounts for 23% of formal employment, and contributes between 14 to 18.5% of the Gross Domestic Product (GDP) and approximately 33% of foreign earnings (MoLAWRR, 2013).

There is convincing regional and global evidence on the efficacy and effectiveness of biofortified crop varieties on improving nutritional outcomes in low-income settings (Bouis & Saltzman, 2017; Bouis, 2018; Bouis et al., 2019). When consumed regularly, these nutritious crops could provide on average, 50% of Vitamin A, Zinc, or Iron daily requirements particularly for the over two billion people worldwide who do not get enough of these crucial nutrients in their diets (FAO, 2015). This is important in Zimbabwe where majority of the population are subsistence farmers based in rural areas, where there is low uptake of other interventions to prevent malnutrition such as supplementation, commercially fortified foods and hence they are vulnerable to food insecurity and micronutrient deficiencies. This is particularly important also considering the impacts of climate change (droughts, floods) on agriculture-based livelihoods and food security situation for rural communities.

However, promotion of biofortified crops in Zimbabwe is still in its infancy and primarily led by Donor funded development programmes, with little coordination and monitoring support from the government. (Matsungu et al., 2018). GoZ needs to take over and run with the lessons learned from LFSP pilots to improve coverage and scaling up of biofortification initiatives and also work on modalities for the involvement of private sector (seed companies, grain millers and food processors) in the process.

This Policy Brief has two main objectives it seeks to address:

- i. To provide a comprehensive and persuasive argument on issues to consider for the scaling up of biofortification promotion in Zimbabwe, as part of a comprehensive food-based approach to addressing the prevailing micronutrient problems.
- ii. To stimulate /catalyse appropriate responses and actions by relevant stakeholders towards scaling up of biofortification initiatives in Zimbabwe.

## **2. Data and Methods**

Qualitative methods were used to collect data for the study. This was done through extensive literature review, key informant interviews and based on input from key stakeholders through a biofortification consultative workshop and meetings; Technical and Stakeholder Inception Workshops: 14-17 February 2017, Validation Workshop: 4 April 2017 in Harare, Zimbabwe. Recently, LFSP hosted a biofortification Learning event on 7 August 2019 involving 250 delegates from the government, universities, civil society, donors, the media, private companies and the HarvestPlus global and regional experts to discuss critical programming and policy issues. The current policy review was revised in January 2020.

## **3. Results and Discussion**

- i. *Policy and Institutional framework*

The Government of Zimbabwe (GoZ) at the highest level has shown commitment to address malnutrition in all its forms within a broader policy framework. The Ministry of Lands, Agriculture, Water, Climate and Rural Resettlement (MLAWCRR), and partners, launched biofortification initiatives in 2016 through the Zimbabwe Livelihoods and Food Security Programme (LFSP), focusing on Vitamin A orange maize (4 varieties), protein quality maize (3 varieties) and high iron beans (5 varieties), (MLAWCRR/FAO, 2016; Siamachira, 2016). The DR& SS reported that plans are underway to release Vitamin A orange fleshed sweet potatoes (OFSP) and iron rich pearl millet, cowpeas, traditional grains and Irish potato biofortified varieties, which are currently at testing stage.

The Zimbabwe policy review showed that biofortification was part of the ZIMASSET (Cluster 1: Food and Nutrition Security), Zimbabwe Food and Nutrition Security Policy (ZFNSP) under Commitment 2 on Food Security, the transitional stabilization plan and GoZ vision 2030 are biofortification sensitive, while the National Agricultural Policy Framework (NAPF) also speaks of biofortification. In addition, the Zimbabwe National Nutrition Strategy (ZNNS) 2014 - 2018 under Key Result Area 4 on Strengthening Multi-sectoral Collaboration for Nutrition. The ongoing review of the national nutrition strategy present an opportunity for clear GoZ led multisectoral biofortification implementation guidelines, including setting the research agenda for academia towards generating much needed empirical evidence.

ii. *Breeding, seed and production systems*

The Crop Breeding Institute (CBI) at the Department of Research and Specialist Services (DRSS) with support from HarvestPlus uses conventional breeding, tests, and released 5 varieties of vitamin A maize (ZS242, ZS244, ZS246, ZS248 and ZS500), 3 protein quality maize varieties (ZS216, ZS225, ZS229) and high iron beans (NUA45, sweet violet, NUA674, Jasmine, Camelia) in partnership with the International Maize and Wheat Improvement Centre (CIMMYT) and the International Center for Tropical Agriculture (CIAT) for maize and beans, respectively (MLAWCRR/FAO, 2016). Seed availability, especially for maize seed remains a challenge for scaling up. The commercial release of varieties (HP3178, ZS244, ZS246 and 248) with higher vitamin A and iron, bigger grain and cob size for maize, lighter colour for beans needs to be hastened to complement the seed supply on the market.

However, the unavailability of seeds is a potential barrier to the scaling up initiatives in Zimbabwe. Although, currently the seed companies are prioritising LFSP pilot districts where demand has already been created "push market" as opposed to reliance on the open market "pull market". On the open market, we need seed houses to distribute the seed via their normal channels and also improve on the production and bulking of foundation for at least 2 cycles to boost seed supply.

Another option for commercial seed companies to contract farmers to produce seed and thus ensure sustainability. In addition, the DR&SS should start breeding of open pollinated varieties (OPV) for orange maize to enhance availability of affordable seed for subsistence farmers and in long term boost production since farmers can retain seed over 2-3 seasons. However, OPV varieties tend to have low yields compared to hybrid varieties. In addition, the GoZ should consider tax waivers or subsidies to seed houses produces biofortified crop varieties to enhance capacity and reduce cost of producing seed, this improves on access and affordability of seed by farmers.

At farm level good agricultural practices, including the appropriate isolation to prevent cross-pollination with white maize varieties needs to be monitored. Considering the effects of climate change "droughts" on maize production, the breeders should start thinking of biofortified small grains that are drought resistant.

Currently, the commercial seed is distributed through agro-dealers, government agricultural input support schemes and non-governmental organizations (NGOs). Farmers and farmer's organisations have been engaged as potential partners in seed distribution and marketing and aggregation of grain to sell to off takers "food producers" like Skybrands Pvt Ltd. This is critical to ensure success of biofortification initiatives (Carney, 1996). However, adequate seed will be required to boost production levels required to supply commercial food manufacturers.

iii. *Marketing and Promotion*

Promotion of biofortified crop varieties in Zimbabwe has been hugely informed by experiences from African countries such as: Zambia, Rwanda, Uganda, the Democratic Republic of Congo, and Nigeria. Production and consumption of vitamin A orange maize and high iron beans have potential to be scaled up to national level with the help of effective collaboration between the GoZ, private sector, and with support from development partners and civic organisations. Currently, promotion of production and consumption of the biofortified crop varieties is jointly led the Department of Agricultural, Technical and Extension Services (AGRITEX), ministry of Agriculture, Food and Nutrition Council (FNC) and the MoHCC's nutrition department. So far, progress with promoting the orange maize variety has exceeded expectations with uptake being high among farmers and acceptability of the food products being reported in target districts and beyond. The 2019 AGRITEX crop and livestock assessment showed that production of biofortified crops has spread beyond LFSP the pilot districts.

LFSP is being piloted in 12 districts: Manicaland (Makoni, Mutare, Mutasa), Mash Central (Mt Darwin, Guruve, Mazowe, Bindura,), Midlands (Gokwe South, Shurugwi, Kwekwe, Gokwe North) and Mash West (Zvimba). Since 2015, more than 250 000 households have been reached with biofortified maize and bean seeds both directly and through market-led interventions. The approximate amount (metric tons = MT) of vitamin A orange maize and of NUA 45 iron bean seed distributed to beneficiaries is as below:

<b>YEAR</b>	<b>SEED DISTRIBUTED (MT)</b>
<b>2015/16</b>	Maize 0MT, Beans 59 MT
<b>2016/17</b>	Maize 0MT, Beans 100MT
<b>2017/18</b>	Maize 65MT, Beans 299MT
<b>2018/19</b>	Maize 51MT, Beans 264MT

By 2020, the LFSP anticipated to have reached a target of 400,000 smallholder farmers growing biofortified crops in the country. Demonstration plots and field days are used to train farmers on how to produce and showcase good agricultural and postharvest handling practices for biofortified varieties. In addition, road shows, test-packs, taste-testing fairs, food prep demos “mahumbwe” are used to promote biofortified crops.

Furthermore, the LFSP organised annual biofortification learning events are critical platform for knowledge sharing, awareness and policy discussions.

The inclusion of biofortified varieties through the GoZ Presidential input support scheme will create markets and improve uptake by farmers. Biofortified crops would make very good alternatives for use in school feeding programmes by Ministry of Education and partners as meals such as vitamin A orange maize sadza and high iron beans would provide more valuable nutritive value compared to the white sadza and green vegetables currently being fed to learners in most schools “children are positive change agents”. This should be explored in the implementation of the biofortification strategy in Zimbabwe.

The Grain Marketing Board (GMB) as the mandated sole aggregator of maize in Zimbabwe is currently buying any type of maize including orange maize. The absence of standards by GMB for buying orange maize is a challenge for scaling up. Therefore, there is need for GMB to develop systems to easily classify and distinguish orange maize from yellow maize varieties to enable

distribution and marketing. Farmers and civic society should consider lobbying for a premium prize for orange maize, this will create lucrative market via GMB thus drive agricultural production.

iv. *Research and monitoring*

Scaling up Nutrition, Research & Academic Platform (SUNRAP) members are doing research on biofortification, however funding and unavailability of local labs with equipment and standards are limiting the quality, depth and scope of their studies. Efficacy trials and studies that investigate the knowledge, attitudes, and acceptability of biofortified foods among consumers are required. In addition, the absence of evidence on retention of key micronutrients in processed products made from biofortified crops –e.g. maize meal, samp, maputi is a huge gap in biofortification story for Zimbabwe. Therefore, collaboration between government ministries, development partners and SUNRAP should be strengthened to generate and document evidence to guide policy and programming decisions.

v. *Acceptability of biofortified foods*

Consumers are an important stakeholder in the biofortified landscape in Zimbabwe. The 2020 LFSP rapid nutrition and biofortification study, reported that the yellow maize memory from the 1992 drought is not a barrier towards uptake in Zimbabwe context (Matsungu et al., 2020).

The acceptability can be attributed to farmer and mother group behaviour change models used in LFSP. The BCC approach was recommended in an earlier on consumer's perceptions of yellow maize (but not on orange biofortified maize) in Zimbabwe (Muzhingi et al., 2008). As a recommendation, the various stakeholders involved in the biofortification initiatives in Zimbabwe should adopt best practices from several case studies from Africa, Asia, and South America. One example would be the alignment of Zimbabwe's seed policy to the Southern African Development Community (SADC) seed protocol. This will likely help in linking markets and achieving economies of scale, opening up opportunities along biofortified crop value chains and improving livelihoods (Kuhlmann, 2015).

vi. *Scaling up of biofortification*

The ongoing review of the national nutrition strategy should provide clear GoZ led multisectoral biofortification implementation guidelines, including setting up and institutionalising biofortification promotion in GoZ departments utilising the value chain approach to address agricultural production, markets, value addition and consumption issues.

This agenda should provide clear guidance on how progress will be monitored and how academia could complement efforts through generating empirical evidence. In the interim, the GoZ and partners should utilise the lessons learned from the current 12 LFSP pilot districts towards scaling up.

#### **4. Conclusions and Recommendations**

Zimbabwe has the necessary policy frameworks and multi-sectoral platforms to accelerate the use of biofortified staple crops in order to enhance food and nutrition security. However, there is need for the rationalisation of the implementation modalities for biofortification throughout the biofortified crop's value chains to deal with issues of seed, production, distribution, and marketing, to improve coverage and maximise impact. This process should be led by the government whose principal role would be to coordinate the scaling up of biofortification initiatives informed from experiences from the LFSP pilot districts.

Secondly, there is need to strengthen inter-sectoral collaboration at the national level across agriculture, education and health, using social protection programmes like school feeding, command agriculture and/or the Presidential input support programme and other agricultural subsidies programmes to generate demand and enhance production of these biofortified varieties. However, seed companies attributed the low sales on the open market to the free seeds handed out by GoZ and LFSP free seed regimes. In addition, uptake by farmers of biofortified varieties can be enhanced through the provision of incentives such as facilitated access to markets, higher price paid to farmers and tax incentives to companies who utilise biofortified crops for commercial food production. This collaboration can also be achieved by making strategic investments to support the development of support systems for seed, marketing, and quality assurance. The acceptability of biofortified foods should be enhanced large-scale behaviour change campaigns (BCC) to increase awareness on micronutrient deficiencies (Vitamin A, Iron and Zinc deficiencies), and of the nutritional benefits of biofortified varieties. These campaigns should be a collaborative effort between the GoZ farmers, the consumers, civil society, development partners and private sector players. The central approach for this should promote use of selected biofortified crops together with other diverse nutritious foods to address micronutrient deficiencies in Zimbabwe. Specifically, inclusion of biofortified varieties through the GoZ Presidential agriculture input support scheme and school feeding programmes to promote uptake by farmers and acceptability by consumers respectively.

Lastly, it is recommended that the biofortification implementation plan for Zimbabwe be clear on the use of only conventional breeding for the production of biofortified crop varieties to facilitate buy in from environmental and consumer action groups.

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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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