

Call for Action to Address Hidden Hunger: Harnessing Biofortification to Combat Micronutrient Deficiencies

The Burden of Micronutrient Deficiency in Malawi

*Dellings Phiri and Rewa Misra with support from
IDM Consulting*

Malawi faces significant challenges relating to malnutrition. Available information shows that 37 percent of children under five years are stunted reflecting chronic malnutrition while four percent of the under five children suffer from acute malnutrition (Malawi Demographic Household Survey - MDHS 2016; UNICEF 2018). In addition, it is estimated that only eight percent of children aged 6-23 months meet the minimum acceptable diet.

Furthermore, there is also high levels of micronutrient deficiencies or hidden hunger in Malawi which aggravates the burden of malnutrition. Hidden hunger describes a condition of under-nutrition where the body lacks essential vitamins and minerals that keep people healthy. Over two billion people worldwide are estimated to be affected by hidden hunger. In Malawi, anaemia prevalence rate (reflecting iron deficiency) has been reported at 28 percent of children under five; 55 percent for preschool aged children; 21 percent of school aged children; 35 percent amongst adolescent girls (15-19 years old); 39 percent among women in reproductive age (Micronutrient survey 2016). Adolescent girls are especially at risk of anaemia due to high nutritional needs resulting from increased growth and menstruation. There is also vitamin A deficiency whereby about 3.6 percent of children are affected. It

is also estimated that 40.6 percent of the population has inadequate zinc intake.

Zinc deficiency has been labelled as a major public health concern in Malawi considering that it is common and high in all subgroups. Deficiencies in micronutrients such as zinc, iron and vitamin A can cause profound and irreparable damage to the body in terms of blindness, growth stunting, mental retardation, learning disabilities, low work capacity, and even premature death.

The effects of under-nutrition in Malawi are therefore high and wide. Child malnutrition is linked to poverty, low levels of education, and poor access to health services. Stunted children are more likely to drop out of school and repeatedly experience lower productivity later in life. The Cost of Hunger (COHA 2012)¹ study found that about 23 percent of all child mortality cases in Malawi are associated with undernutrition while 18 percent of school repetitions (majority of whom are adolescents) were a result of under-nutrition. The same study also found that over \$597 Million (10.3 percent) of the GDP is lost due to malnutrition.

Actions/Successes to Date

Malawi has made great strides in reducing malnutrition levels over the years due to a wide range of interventions implemented by government of Malawi and partners. Table 1 on the next page shows some overall declining trend in malnutrition indicators.

1. World Food Program 2015. Cost of Hunger in Malawi. Implications on National Development and Vision 2020.11.29

Table 1: Trend in nutrition indicators

Type	DHS2004	DHS2010	DHS2015-16
Stunting (%)	52.5	47	37.4
Wasting (%)	6	4	2.8
Under weight (%)	17.3	13	
Prevalence of anaemia (u5 children (%))	73	63	
Anaemia – women of reproductive age (15-49) %	44	32.3	33.6

In addition, prevalence of vitamin A deficiency among school-aged children went down from 38 percent in 2001 to 0.9 percent in 2015, while among preschool children the prevalence rate declined from almost 60 percent to four percent in 2015 Micro Nutrient Survey (MNS) 2001, MNS 2015). However, this has required routine supplementation which is particularly difficult logistically and costly for remote rural areas. In addition, iron and zinc deficiencies continue to be of significant concern resulting in high anaemia prevalence among other effects.

Role of Biofortification in Combating Micro-Nutrient Deficiencies

Biofortification is a process by which the nutritional quality of a staple food crop is improved with additional micronutrients (vitamins and minerals) through a conventional plant breeding process (WHO). Biofortification presents an opportunity to reach communities where supplementation and fortification interventions may be costly to implement. Biofortification brings out many advantages.

First, biofortification is based on locally available foods which are consumed as staple foods by most of the people in the country including the poor and vulnerable. In Malawi approximately 70 percent of the population cannot afford a nutritionally adequate diet and 93 percent cannot afford a fully healthy diet (SOFI, 2020). Biofortification of staple crops allows large numbers of low income households to affordably and regularly access micronutrients as a part of their daily diets.

Secondly, biofortification of staple crops is a cost effective method to reach tens of millions of people on a sustainable basis. Biofortification involves a one-time investment into a crop system that continues to fortify and sustain thereby keeping recurrent costs low. Several studies have used Disability-Adjusted Life Years (DALYs) in cost effectiveness analyses to quantify the effect of crop biofortification in different countries. All of these studies suggest that biofortification can be a highly cost-effective micronutrient intervention, which often costs only a few dollars per DALY saved, far below the World Bank's (2020) threshold of \$270 for cost effectiveness. After the initial outlay of funds, the recurrent costs are minimal. The beneficiary farmers continue to grow and benefit from the crops.

Third, biofortified varieties are only released once they have reached a highly competitive level of yield. Biofortified crops provide sustainable income gains for poor farmers through yield gains. Importantly a subset of biofortified varieties (vitamin A maize, iron Beans and cassava) are climate smart in that they are drought tolerant and mature early against the changing rainfall patterns.

Finally, biofortified products are highly impactful as captured in the evidence document [here](#).

In Malawi, the work around biofortification has been championed by HarvestPlus which is supporting the production and consumption of vitamin A maize, Iron Beans, vitamin A cassava and Orange Fleshed Sweet Potato. Over the years and in collaboration with other partners, some progress has been made. On Vitamin A maize, 10 varieties have released and four have been commercialized.

For Iron Beans, three varieties have been released with one commercialized. AB-CIAT has supported the initiatives in promoting iron fortified beans. There has also been efforts towards facilitating food processing and commercialization that has commenced at small scale. For vitamin A sweet potato, eight varieties have been developed and released and all commercialized. Food processing has also promoted on a large scale, both at commercial and community level with support of the International Potato Center (CIP). One variety of vitamin A cassava have been released but is not yet commercialized.

Rationale for Action

As highlighted above, the burden of under-nutrition including micronutrient deficiencies is huge for Malawi requiring collaborative effort from different stakeholders. At national level, the annual cost associated with under-nutrition to the public sector was estimated at 19.5 percent of the total budget allocated to health in 2012. The overall total cost associated with under-nutrition was estimated at 10.3 percent of GDP for 2012. Biofortification is one of proven cost-effective, sustainable approach interventions to reduce micronutrient deficiencies which is a major component of under-nutrition. It is considered as an intervention with high value for money whereby for every dollar input in biofortification, about 17USD is gained. Based on available evidence, biofortification has been recognized as a “game changing solution” by AUNEPAD under the CAADP/Malabo declaration frameworks.

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Biofortification has also been identified and acknowledged in several key policy and strategic documents as an important intervention to address under-nutrition in Malawi. These strategic documents include:

- Malawi Growth and Development Strategy III (2018-2022)
- National Agriculture Policy 2016
- Malawi Agriculture Sector Food and Nutrition Strategy 2020-2024
- Malawi Multi-Sector Adolescent Nutrition Strategy 2019-2023
- Multi-Sectoral Maternal, Infant and Young Child Nutrition Strategy 2019-2023
- National Agriculture Investment Plan 2018-2023
- Multi-Sectoral Nutrition Education and Communication Strategy II 2019-2023
- National Multi-Sectoral Nutrition Policy (2017-2021)
- National Integrated School Health and Nutrition Policy
- National Multi-Sectoral Nutrition Strategic Plan (2018-2020)

The government has redefined its national vision and launched the Malawi 2063 Vision (MW2063) in 2021 to guide Malawi’s new development path up to 2063. MW2063 comprises of three Pillars: Agricultural Productivity and Commercialization; Industrialization; and Urbanization. These Pillars are catalyzed by seven enablers which include: mind-set change; effective governance systems and institutions; enhanced public sector performance; private sector dynamism; human capital development; economic infrastructure; and environmental sustainability. To operationalize the MW2063, the government has developed the Malawi 2063 10-year Implementation Plan (MIP 1) for the period 2021 to 2030. MIP 1 brings out priority strategies and interventions to be implemented in the next ten years in line with the vision. MIP 1 replaces the MGDS as the guiding national development plan in line with the new vision.

One of the key priority focus areas under the human capita development enabler is Health and Nutrition. This focus area seeks to address high levels of malnutrition in Malawi as reflected by high stunting among under five children and widespread micronutrient deficiencies (hidden hunger) especially in children. These have a negative impact on socioeconomic development. The MIP therefore seeks to achieve ‘improved nutrition for

children under five' by ensuring access to nutritious food. Key prioritized interventions include: scaling up nutritional education and communication programs; early detection and management of acute malnutrition in children; scale-up of school-feeding programs; and intensifying civic education on consumption of diverse diets focusing on locally available foods among children, adolescent girls and boys, pregnant and lactating mothers.

The MIP therefore provides a good enabling anchor for prioritizing and integrating biofortification as one of the proven game changing interventions to deal with malnutrition in general and micro-nutrient deficiencies in particular.

Priority Actions (“The Solution”)

Based on the demonstrated national commitment (through policy instruments) and the proven impacts of biofortification, it is important for the government to continue to advance and scale-up biofortification in Malawi to bring sustainable solutions to the problem of undernutrition. This up-scaling requires coherent and well-coordinated investments across the value chain approach.

Key priority areas to upscale biofortification in Malawi include the following:

Integration of biofortification in key policy and strategy documents

The 10 year implementation plan for the Malawi 2063 vision has set out addressing malnutrition including micro-nutrient deficiency as priority focus area for the next ten years. This provides a leveraging platform to advocate and upscale biofortification as an innovative, impactful and sustainable intervention to deal with micro-nutrient deficiency through clear and resourced sector policies, strategies and programs.

Despite that biofortification being identified in current policies and strategies, there has been no specific budget allocation for biofortification initiatives. This could reflect lack of prioritization and commitment on biofortification initiatives at policy level. This could also be due to lack of specific strategies for biofortification in the policy documents as well as in strategies and program plans for relevant lead ministries and departments.

With the MW2063 rolling out of MIP 1, there is an opportunity to support review of sector and subsector policies and strategies to facilitate practical integration and up-scaling of biofortification especially ensuring clear strategies and activities backed up by budgets.

For the agriculture sector, the government is beginning the process of reviewing the current National Agriculture Policy (NAP) leading to the development of a successor policy. This will be followed by review and development of the new National Agriculture Investment Plan (NAIP). The NAP is an overarching guiding policy for the agriculture sector in Malawi and provides guidance for subsector policies and the National Agriculture Investment Plan (NAIP). Biofortification is already identified in the current NAP and NAIP but what is lacking are clear strategies and budgetary commitment for implementation. The next NAP and NAIP are opportunities for adequately emphasizing the role of biofortification in food security, nutrition and health. The review of subsector policies such as the agriculture research policy and other policies and strategies is also an opportunity to articulate biofortification as an important intervention area.

Strengthening seed systems to improve seed supply for biofortified crops

Availability of quality seed depends on breeding, multiplication and distribution of seed to the local beneficiaries and all other users. Breeding of seed with high nutrients takes place at the Government designated research stations and CGIAR centers for different crops. Seed companies multiply and distribute seed. Strengthening seed systems will require working with seed producers (research organizations, seed companies, small scale seed multipliers) to increase seed production and availability for biofortified crops.

One key challenge is the weak capacity for both research agencies and seed companies to produce breeder and early generation seeds which are the foundations for seed multiplication and wide availability of biofortified crops. There is therefore urgent need to build capacity (both technical and financial) to incentivize and strengthen research agencies and seed companies to be actively and

strategically engaged in seed production and distribution of biofortified seeds. Such support should also be extended to agro-dealers who facilitate local level access to seeds and can also provide extension and information on diversity and nutritional benefits to the population. They are better agents to promote biofortification through increased access to seeds and information.

The government input subsidies such as the affordable Input Program are key potential for broad based public access to seeds. In the past years, such programs have been the main outlet for seed to majority of farmers. Government should therefore capitalize on such public programs to increase access to biofortified crops that bring the needed nutritional benefits closer to the farmers.

Facilitating integration of biofortified seed and grain with government procurement for inclusive access to nutrition.

There is also a need to establish and implement standards (seed/food) to guide variety release that ensures minimum nutrition content especially for vital food crops such as legumes. These will also help to raise increased awareness of the benefits of biofortified crops.

Strengthening market and agro-processing systems to enhance production and access to biofortified crops and food products

This will involve facilitating organized marketing of biofortified crops to incentivize increased production and returns for farmers. One way of achieving this will be to facilitate partnerships and coordination with processing and value addition stakeholders to increase wide availability and usage of biofortified crops and food products.

Facilitating education on production and utilization of biofortified crops

Inadequate knowledge on the benefits of biofortified crops slows down production and affects scaleup processes of biofortified crops. Supporting targeted extension and nutrition education initiatives to increase farmer knowledge and adoption of biofortified crops. The information outreach initiatives on benefits of biofortification can also be extended to other players in the food value chain such as food processor, retailers and consumers.

Summary Roadmap

Coordinated policy, strategy and public investment support for scaling biofortification requires collaborative effort across multiple sector stakeholders. A set of recommended steps to achieve this are given as follows:

- Analysis of opportunities and gaps in relation to scaling biofortification within the current NAP and other subsector policy review processes.
- Consultative engagements and debriefing on key recommendations emerging from analysis and facilitating implementation of recommendations and identified priority areas for up-scaling biofortification in the new NAP
- Complementary ex-ante analysis to potentially integrate biofortification within key national initiatives such as the AIP including assessing cost benefits at different levels of integration.
- Systematic assessment of required public investment within the upcoming NAIP and other subsector strategies and investment plans guided by quantitative scenario and investment analysis.
- Integration of biofortification strategy in collaboration with different ministries' policies and strategies.
- Similarly the National Food Reserve Agency can establish a clear procurement target for biofortified grain which will spur both seed production and adoption while meeting nutritional needs of highly vulnerable households.