



Dr Elifatio Towo

**Food Crop Bio-fortification for
combating hidden hunger**

BUILDING NUTRITIOUS FOOD BASKETS WORKSHOP, KIBO PALACE, ARUSHA

Introduction

2

- In many countries around the world, Food insecurity, vitamin and mineral deficiencies are severe problems causing a heavy burden of disease and disability as well as exacting a heavy economic toll.

This situation is also true for Tanzania

Macronutrient

3

- Macronutrient deficiency leads to body problems
Under-nutrition causes severe and acute malnutrition.
Over-nutrition can cause over-weight and obesity

- The foods that contribute mostly to under-nutrition and over-nutrition are
 - ▣ Starch/carbohydrate rich foods
 - ▣ Protein rich foods
 - ▣ Edible fats/oils
 - ▣ *suger*

Micronutrient deficiencies

- Micronutrient deficiency leads to body problems (growth, impaired immune, reproduction and other body functions). Over-supplementation can cause toxicity (especially fat soluble vitamins & some minerals)
- The micronutrient deficiencies that have deeply studied and magnitude established include
 - Iron Deficiency Anaemia
 - Iodine deficiency Disorders
 - Vitamin A Deficiency
 - *Folic acid*
 - *Zink*

MAGNITUDE OF MALNUTRITION IN TANZANIA 2010 (TDHS)

Children <5 years	%	Women 15-49	%
Stunting	42	Low Body mass index	11
Overweight/Obesity	5	Obesity	22
Underweight ¹	16	Iodine Deficiency	36
Anemia ²	69	Anaemia	40
Iron Deficiency ²	35	Iron deficiency	30
Vitamin A Deficiency ²	33	Vitamin A deficiency	37

Eradicating hunger, Vitamin and Mineral Deficiencies helps achieve 6 of the UN Millennium Development Goals



Eradicate extreme poverty and hunger



Achieve universal primary education



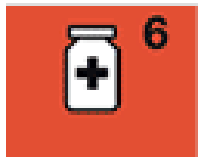
Promote general equality and empower women



Reduce child mortality



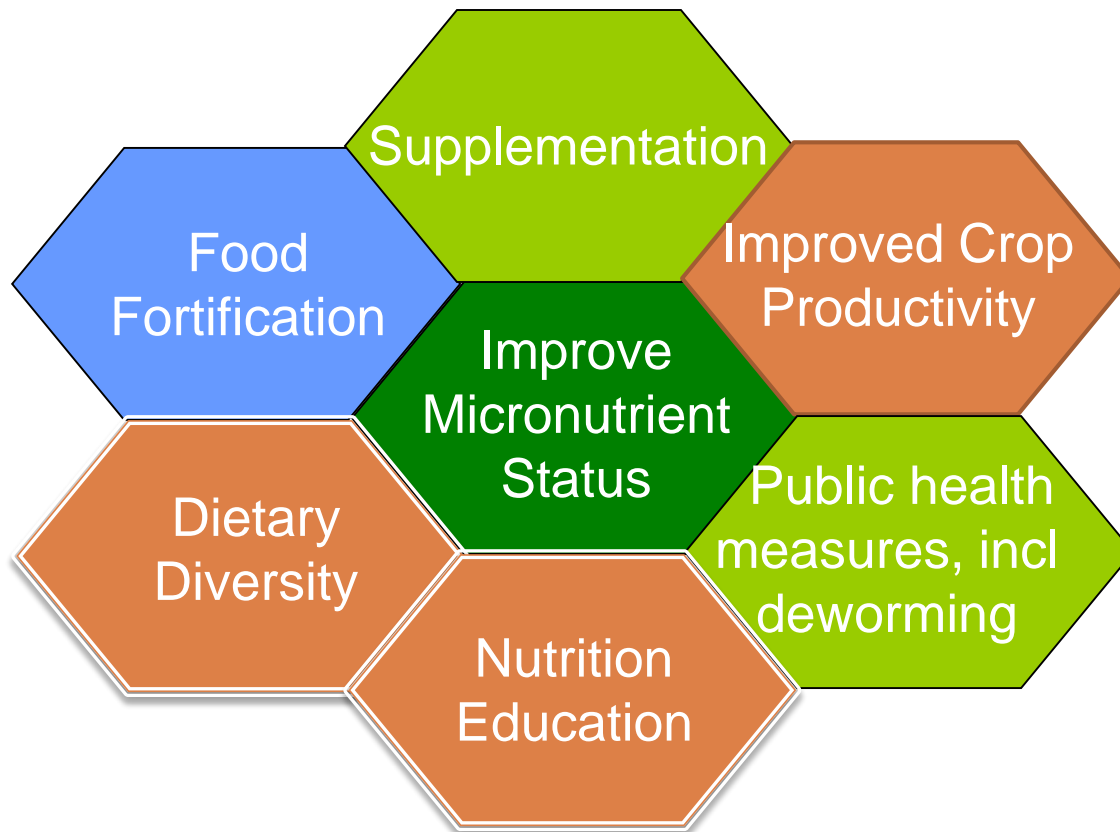
Improve maternal health



Combat HIV/AIDS, malaria and other diseases

Interventions to Address Vitamin and Mineral Deficiencies

7



Implementation Approaches

8

Multi-sectoral Nutrition Working Group

- Micronutrient Control Forum one of groups
 - Consumption of vitamin and mineral rich foods including bio-fortified
 - Food Fortification Alliance
 - SBCC
 - Supplementation
 - Food processing to enhance nutrient bioavailability
 - Salt iodations

Bio-fortified Foods Crops and Nutritional value

- Biofortification is the process by which the nutritional quality of food crops is improved through agronomic practices, conventional plant breeding, or modern biotechnology.
- It use plant breeding technologies to increase the concentration of nutrients (vitamins, minerals, amino acids, proteins) in staple food crops.
- Biofortification differs from conventional fortification in that biofortification aims to increase nutrient levels in crops during plant growth rather than through manual means during processing of the food crops.

Biofortification Continue

- Biofortification may therefore present a way to reach populations where supplementation and conventional fortification activities may be difficult to implement and/or limited.
- The food crops can be grown by rural population
- It can targets low-income households
- It also targets staple foods

Examples of biofortification (nutrient and potential food crops)

- iron-biofortification of rice, beans, sweet potato, cassava and legumes;
- zinc-biofortification of wheat, rice, beans, sweet potato and maize;
- provitamin A carotenoid-biofortification of sweet potato, maize and cassava; and
- amino acid and protein-biofortification of sorghum and cassava.

Challenges/Questions

- ***How to differentiate bio-fortified foods from Genetically Modified/Engineered foods (GMO)***
- ***GMO are foods derived from organisms whose genetic materials (DNA) has been changed/altere***
- ***Can Bio-fortified foods pose risk to consumers? Environment ?(No SBCC)***
- ***Issue of storage and processing on quality of bio-fortified foods: Nutrient losses/damage are minimal***
- ***Some advantages over other approaches (fortification, supplementation)***
- ***How to identify nutritious food by the community***
- ***Promotion strategies of bio-fortified foods to answer concern on why we need bio-fortified foods***

Way Forward

- **Breeding for high nutrient content scientifically feasible**
- **Farmers can adopt new varieties**
- **Consumers can also adopt**
- **Retention of nutrients upon processing is high**
- **Biofortification is cost effective**



THANK YOU FOR YOUR ATTENTION