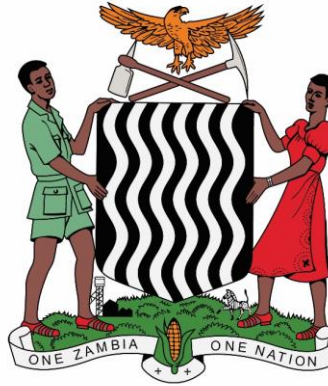


REPUBLIC OF ZAMBIA



Ministry of Agriculture & Ministry of Fisheries and Livestock

HUMAN NUTRITION MODULE FOR AGRICULTURAL TRAINING INSTITUTIONS

Introduction

Fitting Nutrition into Agriculture

- Future agricultural professionals often study social structures, processes, systems and institutions, and their effects on people living in rural areas. One such system is the food system.
- **Food systems** – networks of people and institutions that provide food for *all* people – have a significant impact on rural households because they:
 - determine the availability, accessibility, affordability, and quality of food, and
 - influence the amount and combination of foods that rural (and urban) households are able to grow, purchase, and consume.
- Cultural, economic, social, political, and environmental factors affect food systems and therefore the food people eat and their nutritional status.



Learning Objectives

By the end of this module, students will have:

- **described** healthy diets and good nutrition
- **identified** the causes of malnutrition
- **explained** how malnutrition affects individuals and society
- **analysed** the pathways between agriculture and nutrition
- **defined** their roles as agricultural professionals in improving nutrition
- **identified** opportunities to collaborate across sectors to improve nutrition

Sessions

Session 1: Nutrition Basics

- Personal Reflection on Food
- Good Nutrition: What a Body Needs
- Malnutrition: Definitions
- Causes of Malnutrition
- Why Nutrition Matters
- Enabling Environment in Zambia





Session 2: Agriculture, Food Systems and Human Nutrition

- Making Connections
- Pathways between Agriculture and Nutrition
- Food Systems for Better Nutrition
- Pathways to Practice

Session 3: Taking Action for Food and Nutrition Security

- What Is the Role for Agriculture in Food and Nutrition Security?
- Nutrition-sensitive Agricultural Actions
- The Need for Multi-sectoral Responses to Malnutrition

Student Workbook

			
Objectives	Activity	Reflection	Summary
<p>Provides information on the learning objectives for each section of the module. Read the objectives to understand the intention of each session.</p>	<p>An activity in the student workbook designed to apply learning and promote reflection related to the key concepts of the session.</p>	<p>Encourages students to reflect upon information or activities to enhance learning and relate information to their lives or practice.</p>	<p>Summarizes the main points of each session. Read the summary to synthesize information prior to moving onto the following session.</p>

Nutrition Basics

SESSION 1



Learning Objectives

By the end of this sessions, students will have:

- Learned more about healthy diets and good nutrition
- Understood the causes and consequences of malnutrition
- Learned about Zambia's policy commitments toward malnutrition reduction

Session 1.1

Personal Reflection on Food



Activity 1.1: Food Diary

- Take some time to respond to the questions about the foods and drinks you consumed yesterday.
- After completing the activity, we will discuss the types of food you ate and your reasons for eating these foods.



Reflection

What was the first
thing you ate or drank
in the morning?

What Is a Diet?

- A diet is the types and combinations of food that a person regularly eats.
- Diets are influenced by culture, religion, seasonality, preferences, costs and social pressure.
- Changing diets requires knowledge, skills, support, motivation, and access to diverse, nutritious foods.

Session 1.2

Good Nutrition: What a Body
Needs

What Is “Good Nutrition”?

- Good nutrition is the process of eating and digesting food in order for the body to function, grow and be healthy
- Food provides nutrients; nutrients are the building blocks bodies need

Macronutrients and Micronutrients

Macronutrients:

- Required in larger quantities
- Provide energy for the body
- Include **carbohydrates, protein** and **fats**

Micronutrients:

- Required in smaller quantities
- Produce substances required for growth and health
- Include **vitamins** and **minerals**

Food Groups

Food Group	Examples of Foods	Importance of the Food Group
Staples	Grains: maize, nshima, rice, millet, wheat Roots and tubers: sweet potatoes, cassava, potatoes	Provide <u>energy</u> for the body to move, breathe, and perform daily activities like cooking, fetching water, and farming
Fats and oils	Oil, butter, lard, nuts and seeds	Provide the body with <u>energy</u> and protects organs like the heart, liver, and skin
Fruits and vegetables	Papaya, mango, avocado, banana, pumpkin, potato, rape, pumpkin leaves	Help <u>protect</u> the body from diseases and illnesses
Legumes	Cowpeas, bambara, groundnuts, pigeon pea, common beans	Help <u>strengthen</u> the muscles, repairs wounds, and protect against heart disease and diabetes
Animal products	Chicken, beef, goat, organ meats, mice, insects, kapenta, eggs, milk, mabisi, cheese	Help <u>strengthen</u> the muscles and bones and repairs wounds

How Much Is Enough?

- $\frac{1}{3}$ to $\frac{1}{2}$ of the dish should be starch
- $\frac{1}{4}$ of the dish should be legume or animal products
- $\frac{1}{4}$ to $\frac{1}{3}$ of the dish should be vegetables and fruits
- Small amount of oil to prepare and salt to flavor food
- Limit sugar
- Drink plenty of water.





Reflection

How does your diet
compare to the
recommended diet in
the food guide?

How Is Zambia Eating?

- The typical Zambian diet is monotonous with the same foods being eaten every day.
- More than 70% of the daily calories, or energy, consumed by Zambians comes from maize and other staples.

Session 1.3

Malnutrition: Definitions

What Is Poor Nutrition?

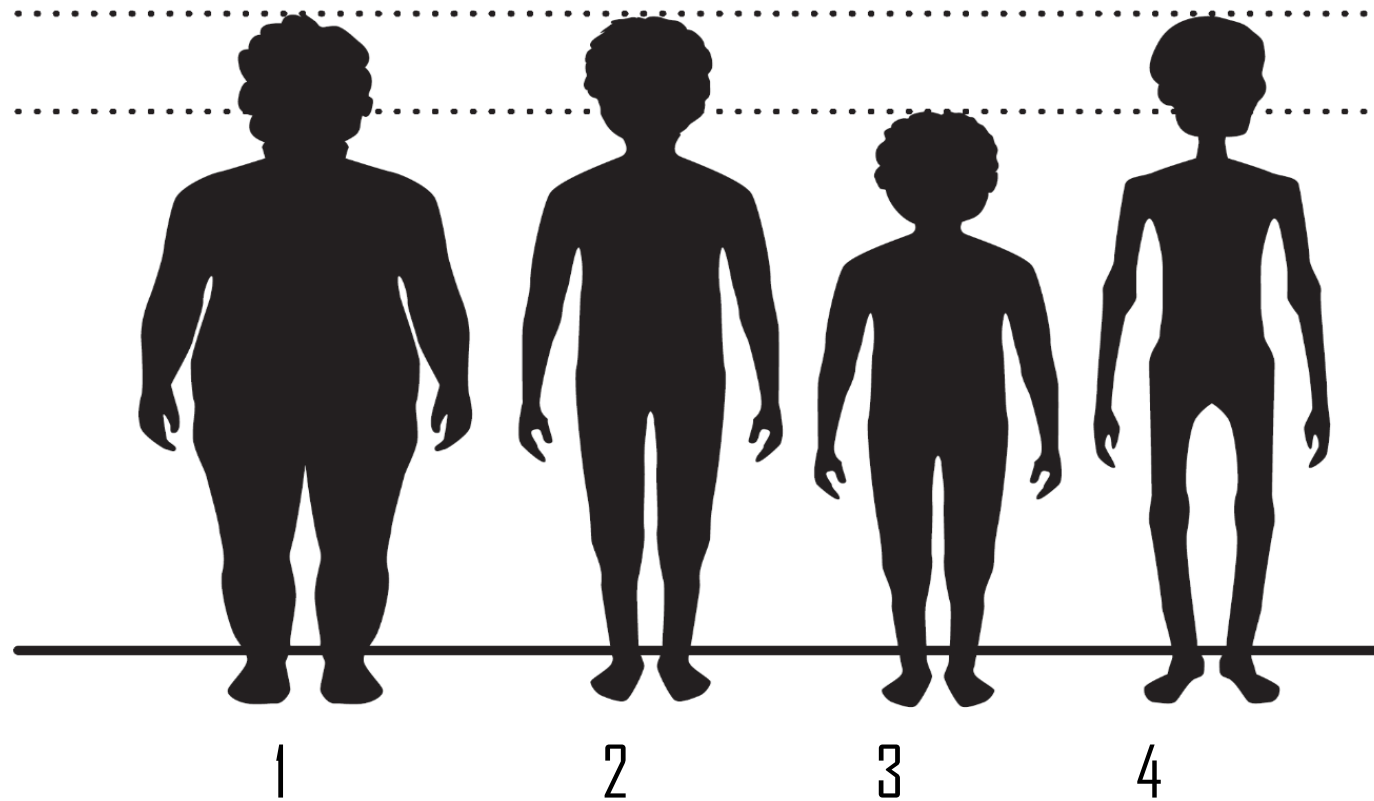
- Malnutrition occurs when a person eats too much or too little food or is unable to use the nutrients in the food she or he eats.
- Determinants of nutritional needs include:
 - **Age**: At different stages of life, people require different amounts of food.
 - **Body size**: The larger a person is, the more energy she needs to stay active and energetic.
 - **Activity**: Active adults require more energy than inactive adults.
 - **Health status**: Illness and infection prevent the body from absorbing nutrients.
 - **Physical state**: Nutrient needs change when a woman is pregnant or breastfeeding.

Who Is Vulnerable to Poor Nutrition?

- Women of reproductive age
- Infants
- Young children
- Sick and elderly
- Poor households

1,000 Most Critical Days is the period including pregnancy and up to a child's second birthday. This period is the window of opportunity in which good nutrition sets children on a path for strong growth and healthy, productive futures.

Who is malnourished?

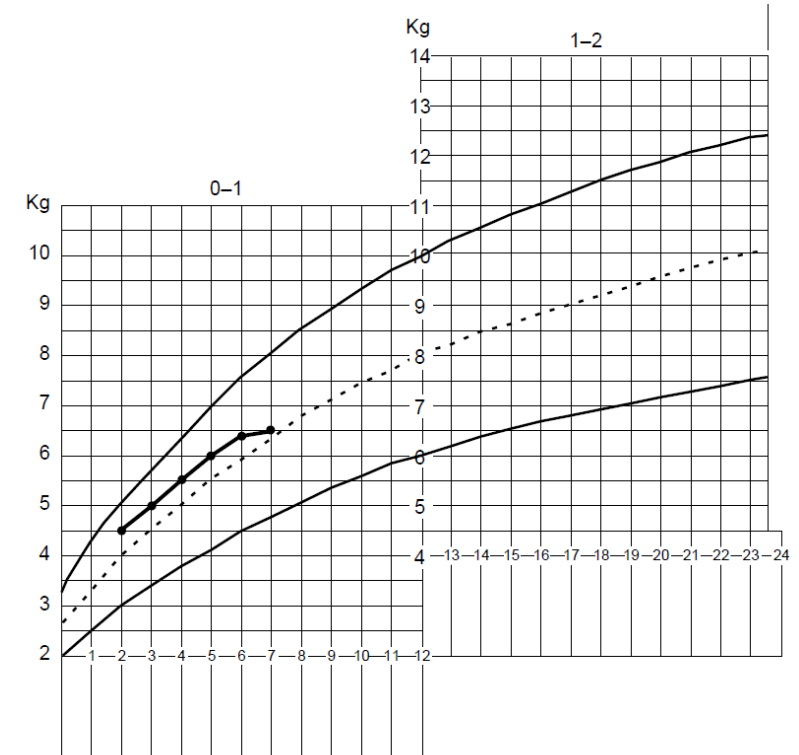
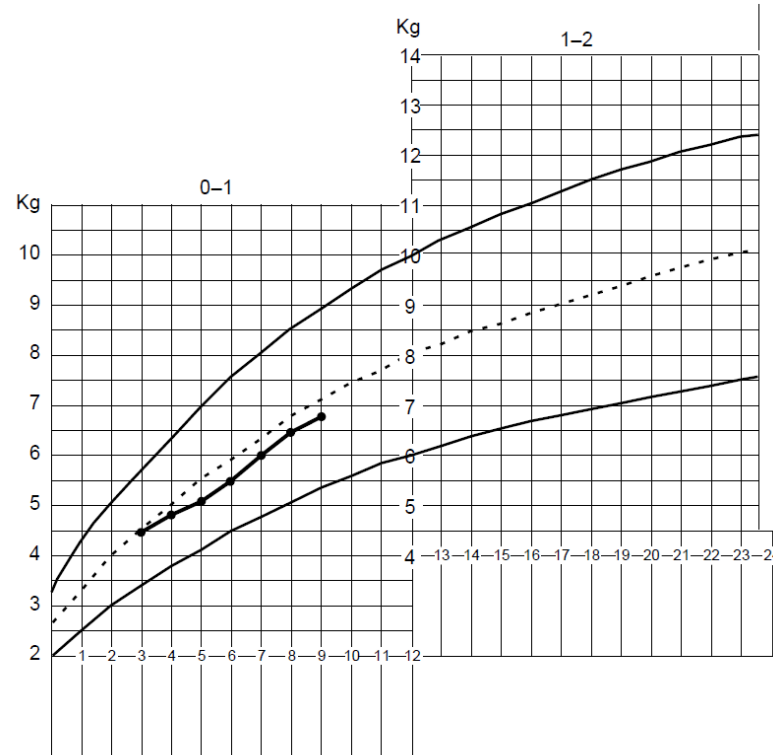


Hidden Hunger

- “Hidden hunger” refers to micronutrient malnutrition; sometimes this is visible, but often it is not.
- Anaemia, caused by inadequate iron and/or B vitamins, can range from mild to severe:
 - In mild cases, someone may have less energy to work.
 - In severe cases, anaemia can lead to maternal death and delayed development in babies.

Identifying Malnutrition: Children

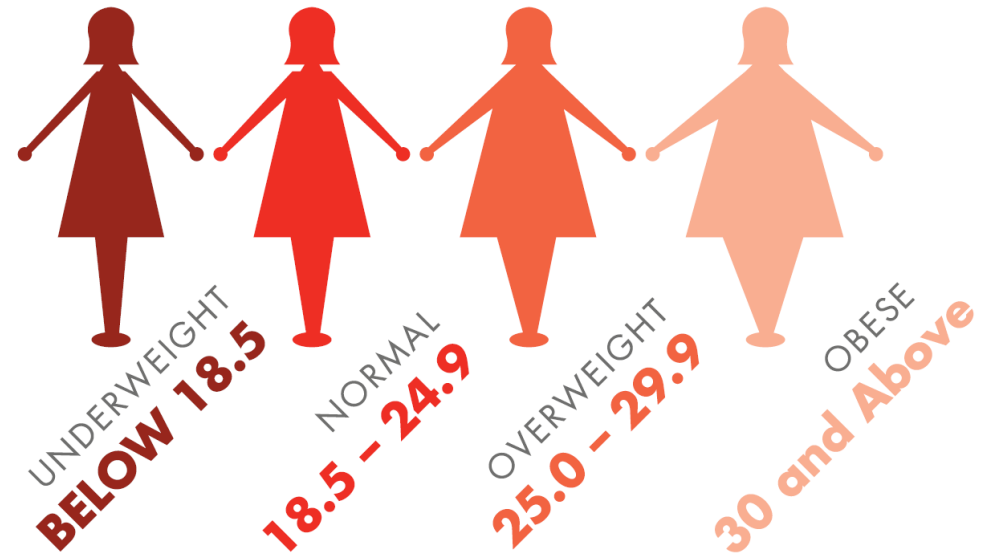
- For children from 0-5 years, used to track a child's growth over time.
- Identify changes in the child's pattern of growth.
- Changes in growth trajectory may indicate a health problem and require further assessment.



Source: Griffiths et al., 1998.

Identifying Malnutrition: Adults

- Body mass index (BMI) is used to identify underweight, overweight and obesity in adults.
- Useful population-level measure of weight-for-height.
- Calculated as: $\text{weight (kg)} \div \text{height (cm)}^2$



Source: NIH, January 2017

Session 1.4

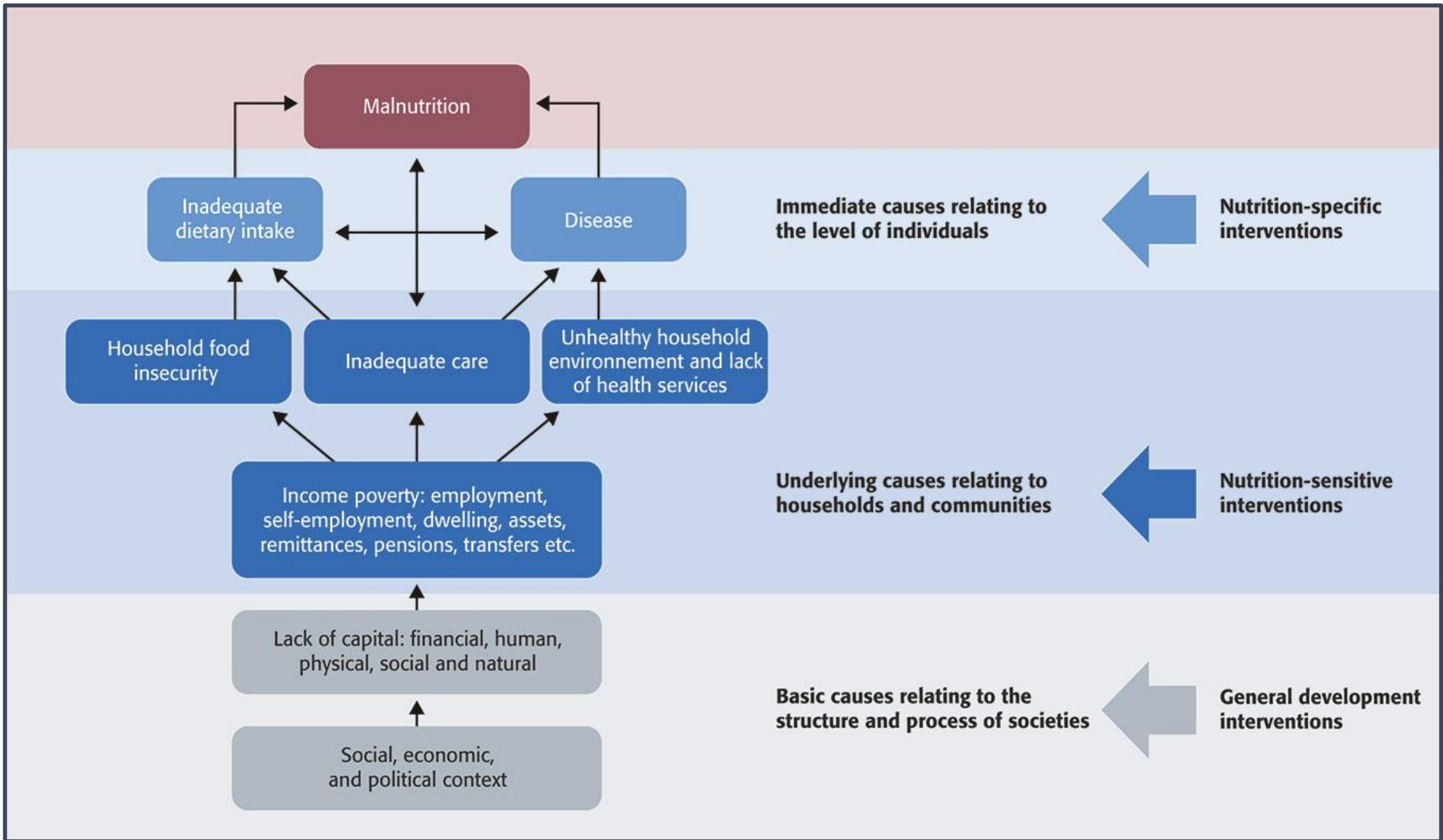
Causes of Malnutrition



Activity 1.2: How Does THAT Lead to Malnutrition?

First on your own, and then with a partner, consider how the following factors contribute to malnutrition:

- Chronic illness
- Poor access to nutritious, diverse food
- Poor sanitation and hygiene
- Agricultural policy
- Unequal access to and control over household resources



Types of Nutrition Interventions

NUTRITION-SPECIFIC

- Focus on immediate causes of malnutrition
- Cannot address underlying or basic causes

NUTRITION-SENSITIVE

- Address underlying and basic causes of malnutrition
- Requires actions from many sectors: agriculture, social welfare, health, water, sanitation and hygiene, and education

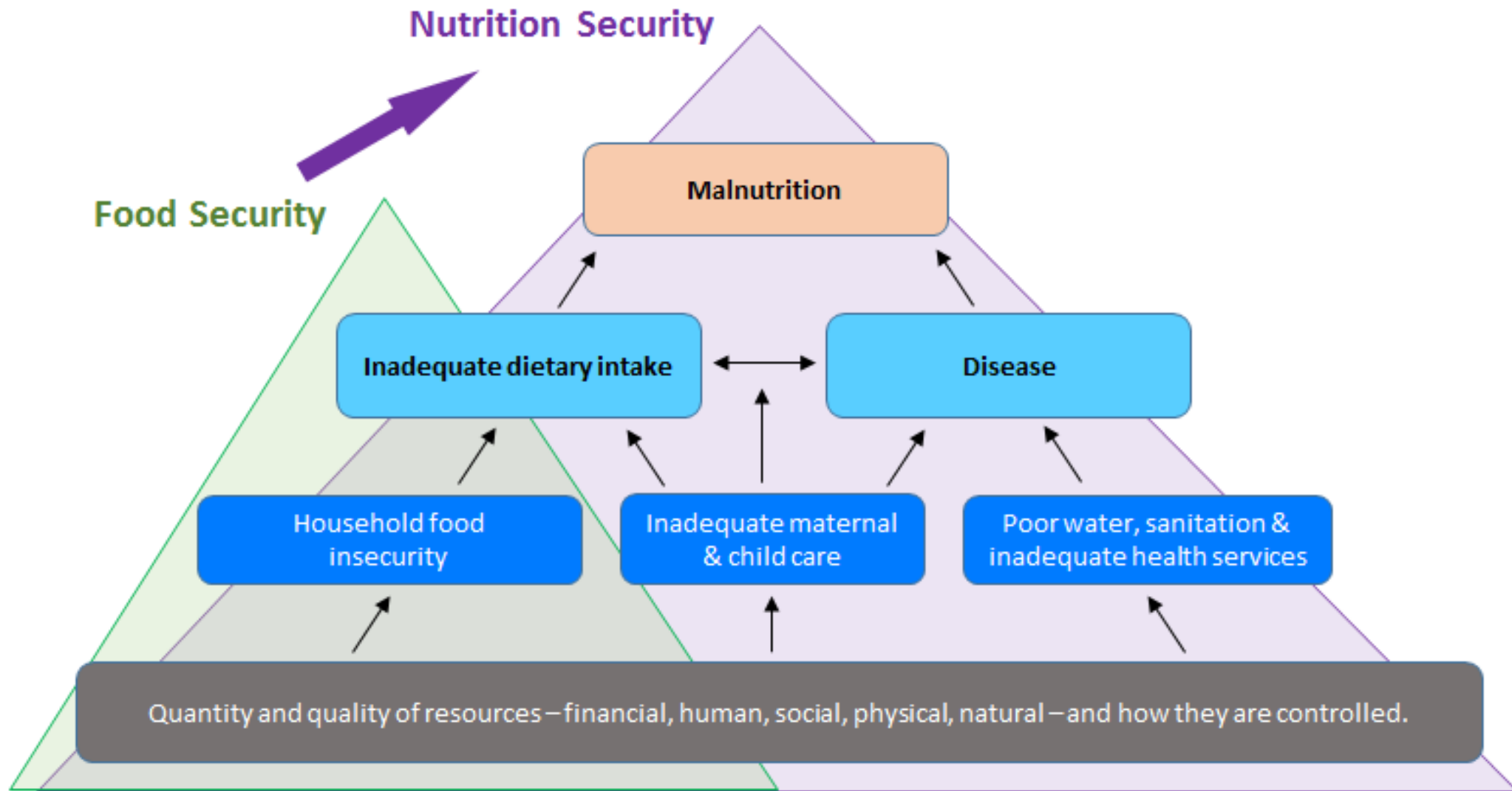
Food and Nutrition Security

“**Food security** exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life. The four pillars of food security are availability, access, utilization and stability.” (FAO, 2008)

Nutrition security: “Secure access to an appropriately nutritious diet coupled with a sanitary environment and adequate health services and care, in order to ensure a healthy and active life for all household members.” (FAO, 2012)

Agriculture Supports Food and Nutrition Security in Zambia

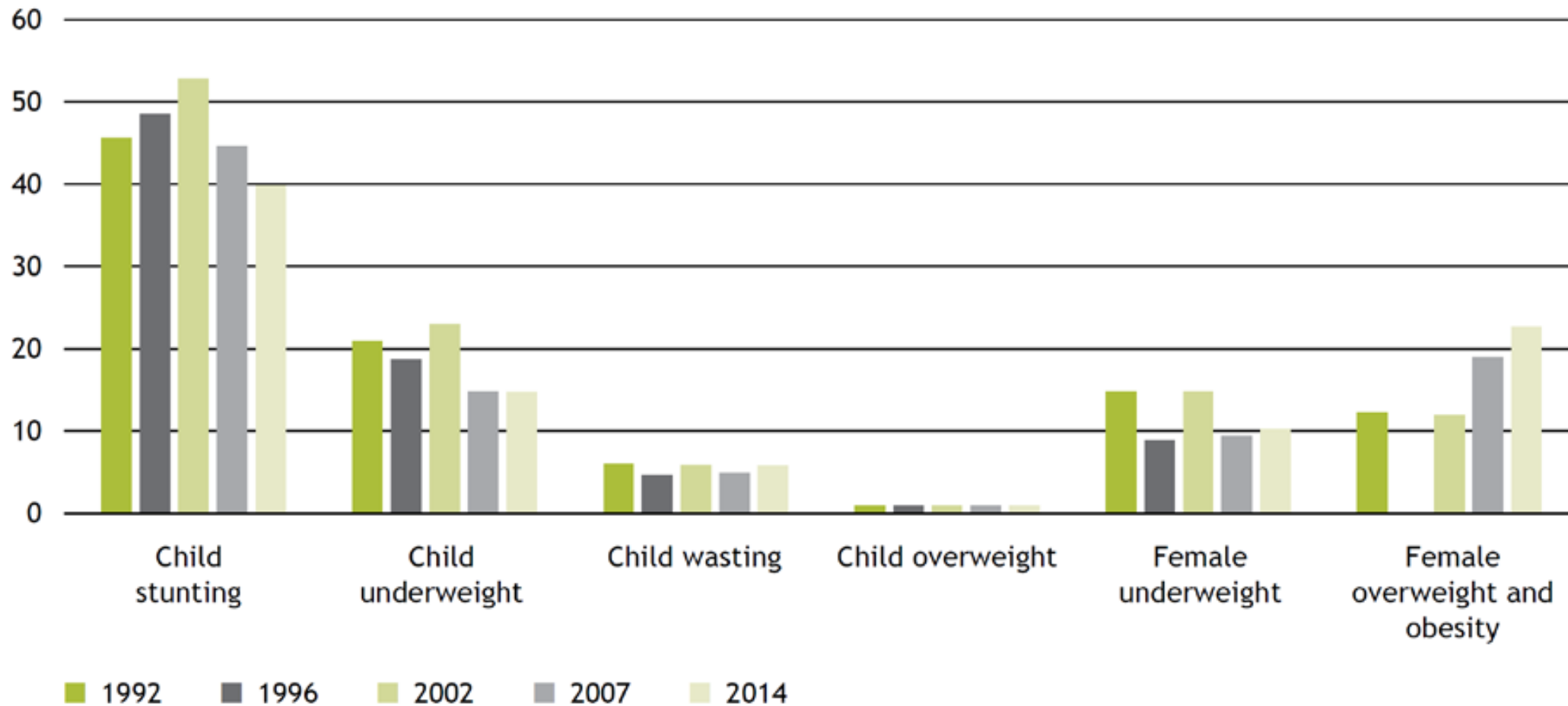
The objective of agricultural extension services in Zambia according to the national strategy (2017) is “to contribute to effective and efficient information dissemination and uptake of responsive innovations in order to increase sustainable agricultural production and productivity that assures household and national **food and nutrition security.**”



Session 1.5

Why Nutrition Matters

Trends in Nutritional Status in Zambia



Nutrition Targets

The World Health Assembly has set global targets for nutrition. How is Zambia doing for each of the following indicators?

- Stunting
- Underweight
- Under-five overweight
- Low birth weight
- Exclusive breastfeeding
- Adult overweight
- Adult obesity
- Adult diabetes

Impact of Malnutrition

INDIVIDUALS

- High risk of disease and death
- Permanent physical damages
- Poor brain development
- Cycle of malnutrition

SOCIETY

- Higher health expenditure
- Higher education expenditure
- Lower productivity and economic growth
- Higher social welfare needs

Session 1.6

Enabling Environment in Zambia

		Millennium Development Goals, 2000					
		Zambia Vision 2030, GRZ 2006					
		Zambia Poverty Reduction Strategy Paper, IMF 2007					
		Zambia Sixth National Development Plan, GRZ 2011					
← International	←	Nutrition	Agriculture	Health	Education	Social protection	Water and sanitation
		SUN Framework for Action 2010	CAADP agreement	Worth Health Assembly agreement			
National	←	National Food and Nutrition Policy 2006	National Agriculture Policy 2004–15	National Health Policy 1992	National School Health and Nutrition Policy 2006		
		National Food and Nutrition Strategic Plan 2011–15	MAL Strategic Plan 2013–16 ("Budget Strategy")	National Health Strategic Plan 2011–16		Social Protection Framework 2013	WASH Framework 2006
		1000 Most Critical Days Programme 2013–15	Agriculture Sector Implementation Plan	Micronutrient Policy 2005–2011	School Health and Nutrition Programme Guidelines 2008		National Water and Sanitation Supplies Programmes
			National Agriculture Investment Plan 2014				
District	←	Multisectoral District Plan	Agriculture Ministry Workplan	MCDMCH-DOH Workplan	Education Ministry Workplan	MCDMCH-DCW/DSP Workplan	Local Government Ministry Workplan



Summary of Session I: Nutrition Basics

- People need diverse types of food in the right quantities to receive the nutrients required for strong growth and good health. Many people in Zambia – and many other countries around the world – do not consume the variety of foods required to support healthy, productive lives.
- Undernutrition includes underweight, wasting, stunting, as well as micronutrient deficiencies. Over-nutrition includes overweight and obesity, which can lead to non-communicable diseases, including diarrhoea, cancer, and diabetes.
- The immediate causes of undernutrition include inadequate dietary intake and diseases. Underlying causes include food insecurity, inadequate feeding and caring practices, and unhealthy or unclean environments and poor access to quality health services. Political, economic, and social contexts – at the most basic level – also drive malnutrition.



Summary of Session I: Nutrition Basics (continued)

- Zambia is affected by multiple forms of malnutrition. Unfortunately, Zambia is not on course to achieve five of the eight global nutrition targets established by the World Health Assembly.
- Failure to achieve these targets will have significant impacts on individuals and society. Individual consequences of malnutrition include mortality and morbidity and irreversible physical damages and cognitive failure. Society pays a heavy cost for malnutrition, including higher health expenditure, higher education expenditure, lower productivity and growth, and greater public assistance needs.
- Despite the challenges faced by Zambia, the country has committed to reducing malnutrition, as enshrined in policies and programmes across multiple sectors.

Agriculture, Food Systems and Human Nutrition

SESSION 2



Learning Objectives

By the end of this sessions, students will have:

- Developed an understanding of the linkages between food, agriculture and nutrition
- Apply agriculture-nutrition pathways and food systems to understand the connections between food, agriculture, diets and nutrition

Session 2.1

Making Connections

Healthy diets and good
nutrition start with food
and agriculture.

Agriculture in Zambia

- Staple food production is the focus of the agricultural sector
- Majority of government funding for agriculture supports two programmes:
 - Farmer Input Support Programme (FISP)
 - Food Reserve Agency
- Focus on staple crop production has not supported food and nutrition security

Maize is food.

- 89.4% of households produce maize
- 53.6% of cultivated land to maize production
- 80% of households cultivate three or fewer crops

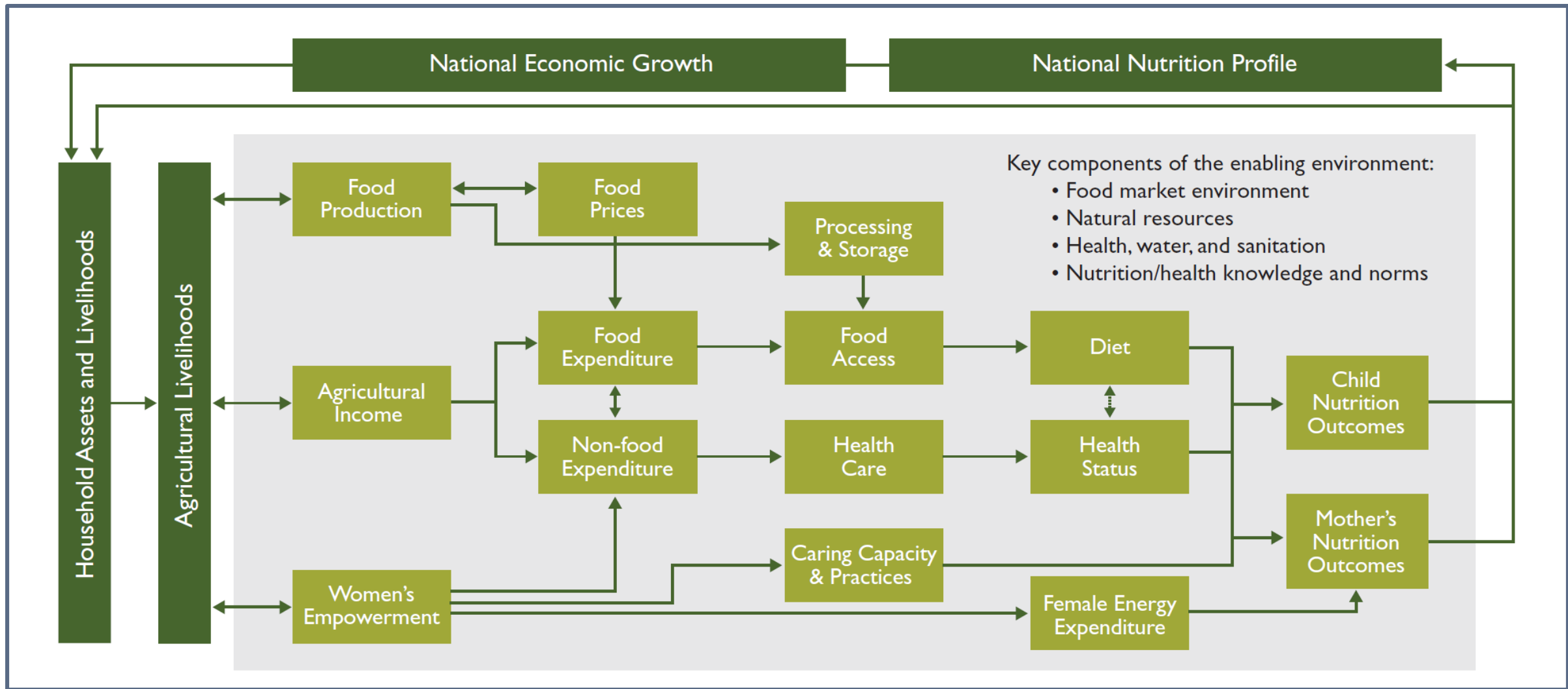


Reflection

What did your
grandparents' diets
look like?

Session 2.2

Pathways between Agriculture and Nutrition



Source: SPRING, 2014



Activity 2.1: From agriculture to nutrition

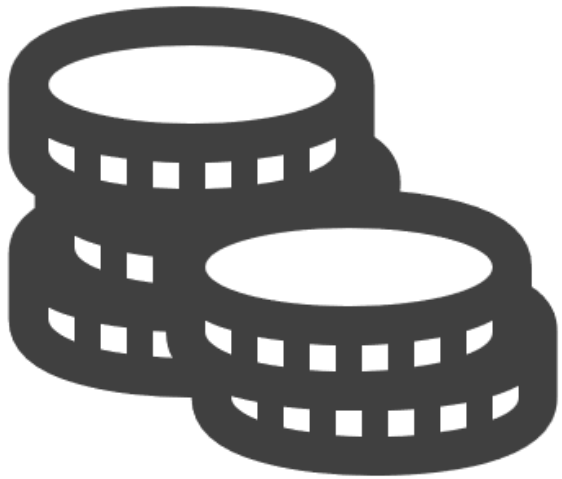
1. Break into a group of four to five students.
2. Review the pathway that has been assigned to your group: (1) food production, (2) agricultural income, or (3) women's empowerment.
3. Respond to the questions in the student workbook:
 - Review each “step” along the pathway, describe how food production, agricultural income or women's empowerment drives nutrition outcomes.
 - Describe how the following factors either support or diminish nutrition outcomes: lack of access to credit, access to extension services, and poor post-harvest practices.
 - The figure also shows “environments” that interact with the pathways. Choose one of the environments and describe how it might influence the pathway.

Food Production Pathway



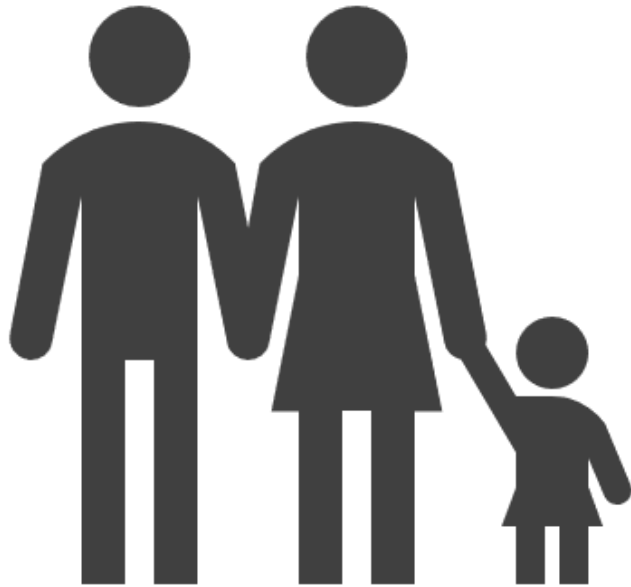
- Food production supports consumption, incomes and local food availability and thus food and nutrition security for households.
- Diversity of production supports dietary diversity.
- Production diversity is also good for agriculture.
 - Good agricultural practices reduce soil erosion, increase organic matter, boost yields.
 - Poor production diversity weakens natural systems.

Agricultural Income Pathway



- Agriculture offers a reliable and sustainable source of income for rural households. Income used for:
 - Food purchases
 - Non-food purchases
- Income is not a good predictor of better nutrition.
 - 15% of children in lowest income households have diverse diets (4 or more food groups)
 - 41% of children in richest households have diverse diets
- Land use influences dietary diversity
 - Food for home consumption vs. market sales
- Decision-making influences types of food grown, purchased and consumed
 - Women vs. men

Women's Empowerment Pathway



- Women's empowerment includes:
 - decision-making power,
 - access to and control over resources, and
 - labor and time allocation.
- Women's empowerment influences:
 - Use of income,
 - Ability to care for families, and
 - Women's energy expenditure.
- Understand roles of men and women within households and communities.

Enabling Environments

- **Food market environment** influences the kinds of foods that are available and likely to be purchased by households.
- **Health, water and sanitation environment** can create health risks and thus undermine nutritional status.
- **Natural resources environment** ensures that water, soil, plants and animals are protected to ensure crop quality, productivity and profitability.
- **Health and nutrition knowledge environment** can affect household decisions around food production, purchase and consumption.

Session 2.3

Food Systems for Better Nutrition

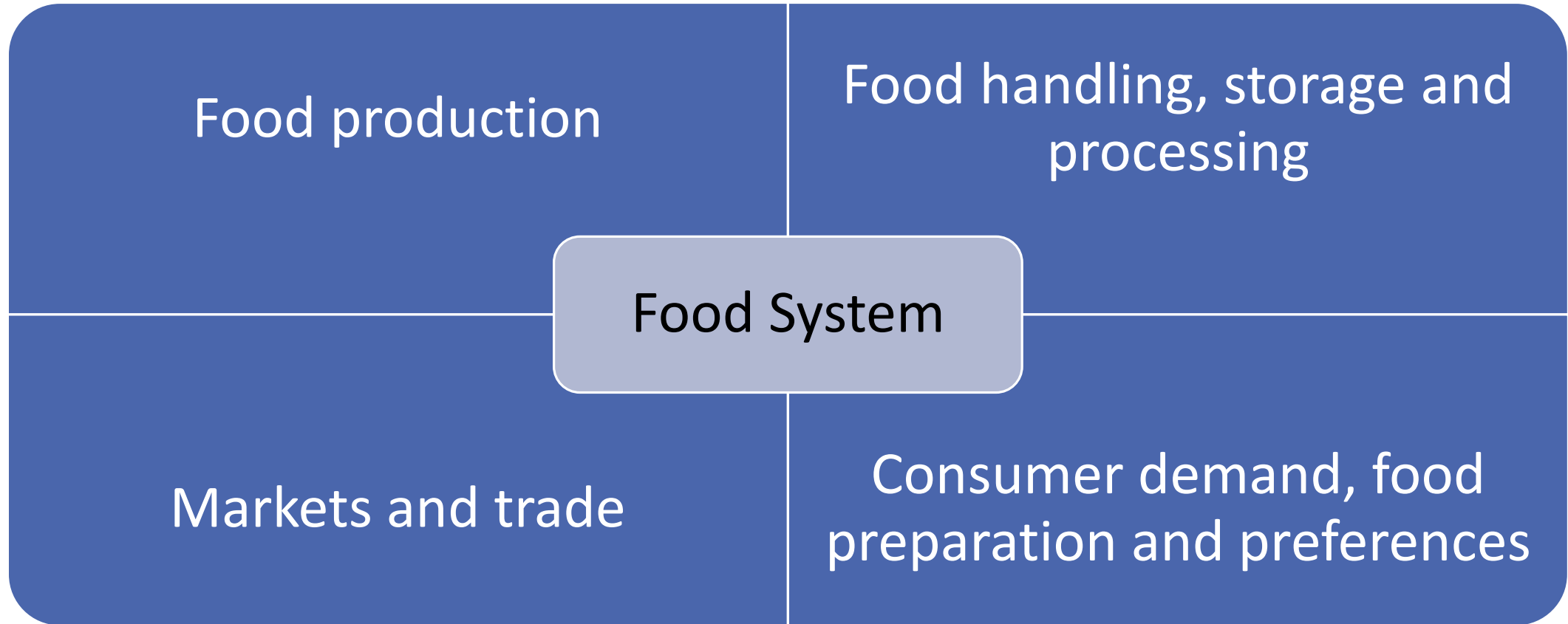
What Is a Food System?

The people, institutions and processes by which agricultural products are produced, processed and brought to consumers.

Food Systems Influence Food Choices



Four Functions of Food Systems





Reflection

- How might the health and nutrition knowledge environment influence consumer demand?
- How does the food trade function within food systems related to the food market environment in the pathways?
- How can food production practices improve the safety and availability of foods?
- How is food production as a function of food systems related to the natural resources environment in the pathways?
- What are other similarities and differences between food systems and pathways?

Session 2.4

From Pathways to Practice



Activity 2.2: A day in the life of Naomi

- Independently, read the story, “A day in the life of Naomi,” then respond to the questions following the story:
 - What are the major challenges faced by Naomi and her family?
 - What are Naomi and her family doing to respond to these challenges?
 - Along each agriculture-nutrition pathway, what are the factors that either support or hinder healthy diets and good nutrition?
 - What are some factors within enabling environments that influence – positively or negatively – better nutrition outcomes?
- After responding to the questions in the student workbook, find a partner to discuss your responses to the questions.
- Share your responses with the class following partner discussions.



Summary of Session II: Agriculture, Food Systems and Nutrition

- Food and agriculture play an important role in supporting health diets and good nutrition.
- There is a two-way relationship between agriculture and nutrition. Agriculture can improve nutrition, and improved nutritional status supports greater productivity amongst farmers and non-farm workers.
- Agriculture, food systems, diets and nutrition are linked in multiple ways.
- The pathways between agriculture and nutrition can be divided into three different, intersecting routes, including (1) food production, (2) agricultural income, (3) women's empowerment.
- Four enabling environments influence movement along these pathways: (1) food market, (2) health, water, and sanitation, (3) natural resources, and (4) health and nutrition knowledge.
- Eating a diverse, nutritious diet depends on a food system that makes food available, accessible, affordable, and acceptable and safe. These factors will, in turn, influence the choices about the food grown, purchased and consumed.

Taking Action for Food and Nutrition Security

SESSION 3



Learning Objectives

By the end of this sessions, students will have:

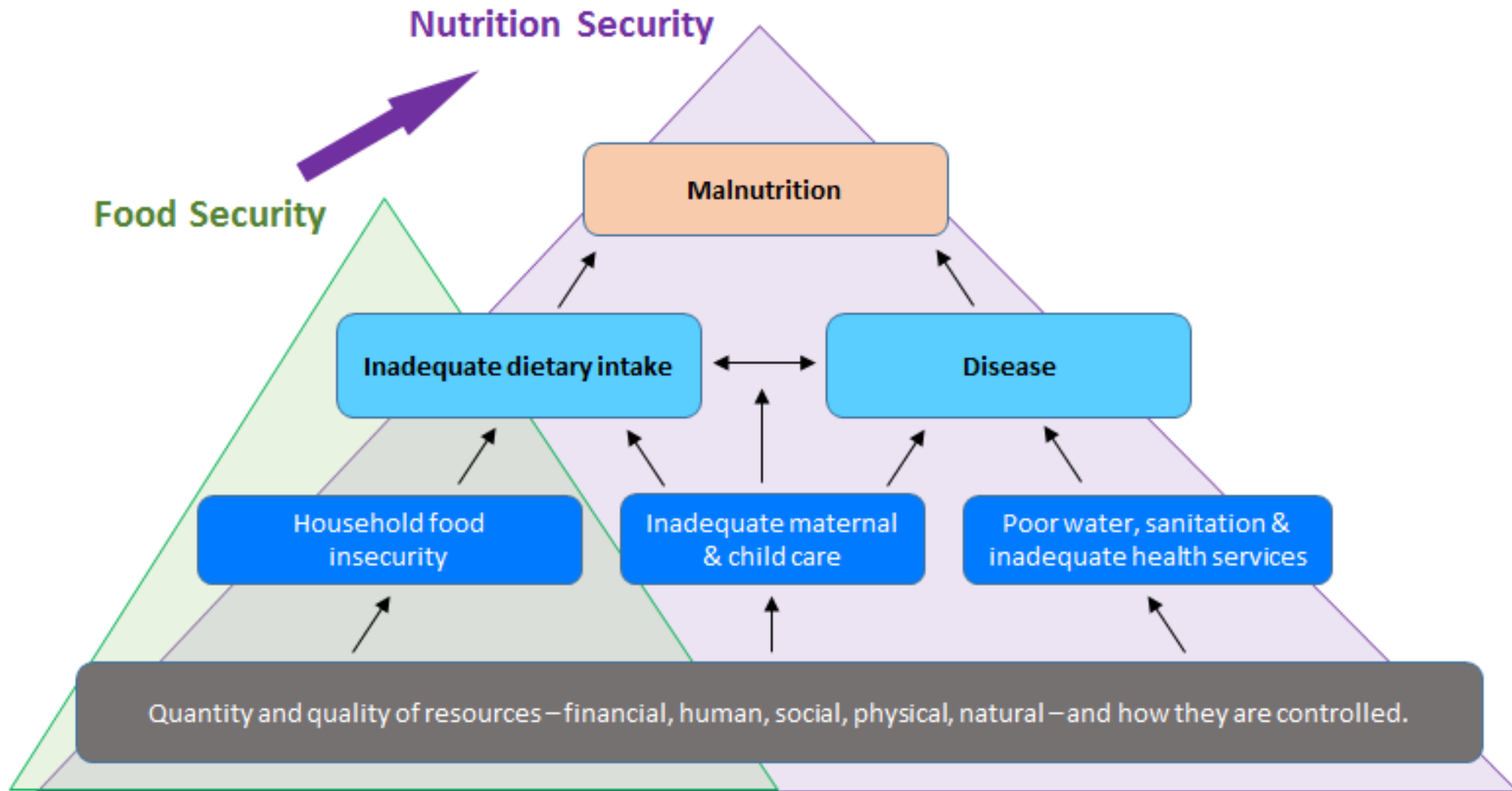
- Understood how nutrition-sensitive agriculture supports food and nutrition security
- Described the Government of Zambia's multi-sectoral response to reducing malnutrition
- Identified how other sectors contribute to improved nutrition outcomes

Session 3.1

What Is the Role for Agriculture in Food and Nutrition Security?

Food and Nutrition Security

Food and nutrition security exists when all people at all times have physical, social, and economic access to food, which is consumed in sufficient quantity and quality to meet their dietary needs and food preferences, and is supported by an environment of adequate sanitation, health services and care, allowing for a healthy and active life.





Reflection

Consider the roles and responsibilities that could be part of your future role in agriculture in rural communities:

- What are some of the roles and responsibilities in your role as an agricultural professional?
- How do your activities support food and nutrition security?
- What *other* activities might you take to support food and nutrition security?
- How might these activities be harmful to nutrition outcomes?

Post-harvest Handling and Storage

Availability

- Drying and cleaning grain prior to storage and using improved storage minimizes crop losses.
- Teach farmers good post-harvest storage practices to support adequate food supply.

Access

- Farmers who sell crops at market fetch higher prices for quality grain.
- Help farmers understand how markets work to produce crops to meet market demand.

Utilization

- Grain stored under poor conditions is exposed to harmful toxins.
- Provide nutrition education to households to explain that toxins slow the growth and development of young children.



Activity 3.1: Helping Naomi's Family

- Naomi's family faces many challenges. These challenges not only limit the families agricultural potential, but also undermine nutritional status.
- Reflect on Naomi's challenges, identified in Activity 2.2, then:
 - Identify actions related to each function of the food system, which you could take to affect the diets and nutrition of the household, and
 - Describe the intended result of these proposed actions.

Session 3.2

Nutrition-sensitive Agricultural Actions



Reflection

Which of the actions that you identified in the last activity are:

- Nutrition-sensitive?
- Nutrition-specific?

Nutrition-sensitive Actions

1. **Increase production** of more diverse and nutritious foods. Availability of diverse foods leads to more diverse diets, while greater quantities of foods drives down prices.
2. Promote safe **on-farm processing, preservation, utilization and storage practices** to preserve nutrition value, reduce seasonality, limit food waste, improve food safety and make healthy foods more convenient to prepare.
3. **Protect natural resources** through good agricultural practices. Adopt production systems that restore biodiversity and grow soil nutrients.
4. **Promote clean environments** through good sanitation and hygiene practices, particularly as related to use of manure, chemicals and fertilizers and livestock.

Nutrition-sensitive Actions

5. Integrate **nutrition education** in agriculture extension services to increase demand for diverse foods and promote production, purchase and consumption of diverse foods.
6. **Expand markets and market access**. Help farmers access price information and different types of seed, while investing in value addition and market infrastructure to incentivize production and sale of diverse foods.
7. Invest in steps along the **value chains** – from production to consumption to markets – to increase demand for and supply of nutritious foods and improve nutritional value of food.
8. Recognize and support the different needs and interests of **men and women** in agriculture.

Needs Are Not the Same

Across households and communities, needs will differ.

Before designing and targeting nutrition-sensitive interventions:

- Understand the agricultural system, food system and nutritional situation. For example:
 - What is the natural resources environment?
 - What are the cultural norms?
 - Are health services available?
- Identify opportunities for collaboration with different actors across sectors

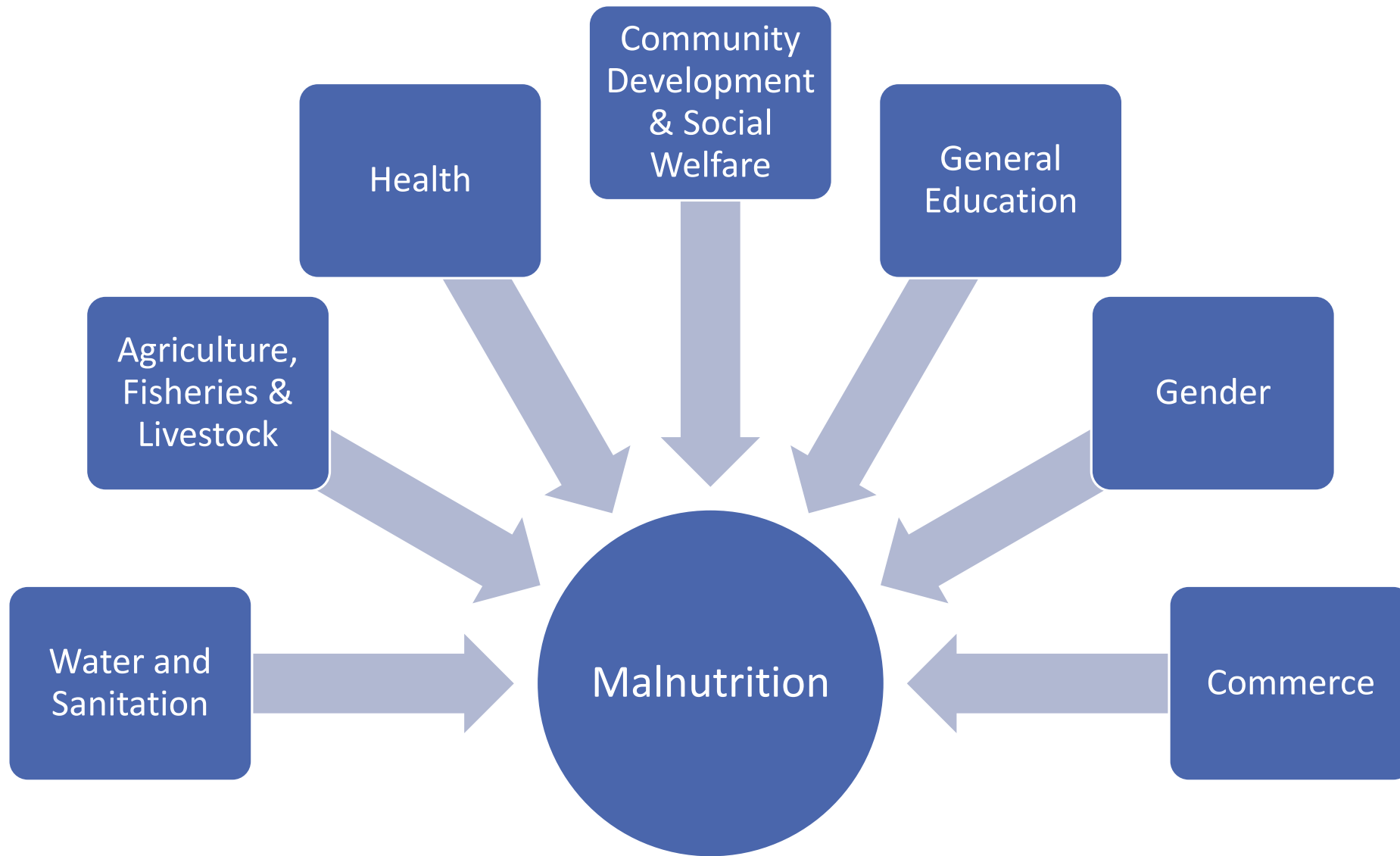
Session 3.3

The Need for Multi-sectoral Responses to Malnutrition



Reflection

- What are some of the government institutions, particularly ministries, who interact with rural households?
- What role do these ministries in tackling malnutrition?
- Can you provide any examples of initiatives under ministries that aim to promote healthy diets and good nutrition?





Activity 3.1: Helping Naomi

Every family has diverse nutrition needs, which cannot be supported through agricultural actions alone. Based on your understanding of different line ministries' roles in tackling nutrition, identify ways in which they could also support Naomi and her family.

- Ministry of Health
- Ministry of Community Development and Social Welfare
- Ministry of Gender
- Ministry of General Education
- Ministry of Water, Sanitation, and Environmental Protection
- Ministry of Commerce



Summary of Session III: Taking Action for Food and Nutrition Security

- The aim of nutrition-sensitive agriculture is to make food systems better equipped to produce good nutritional outcomes for individuals and households.
- Nutrition-sensitive agriculture makes food more available and accessible; makes food more diverse and production more sustainable; and makes food more nutritious.
- While food and agriculture can support diverse diets and adequate nutrition, individuals and households have needs that cannot be met by the agricultural sector alone.
- Addressing malnutrition requires a coordinated response across multiple sectors, including health, water and sanitation, education, social welfare, and gender, to address the immediate, underlying, and basic causes of malnutrition.
- The Government of Zambia has embraced food and nutrition security across ministries, as shown in established policies, and defined specific strategies and initiatives to deliver improved nutrition outcomes.



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