FEED THE FUTURE
The U.S. Government's Global Hunger & Food Security Initiative

REPUBLIC OF ZAMBIA

Ministry of Agriculture
&
Ministry of Fisheries and Livestock

Human Nutrition Module for Agricultural Training Institutions

Student Workbook

USAID
FROM THE AMERICAN PEOPLE

INGENAES
Integrating Gender and Nutrition within Agricultural Extension Services

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ACRONYMS

BMI	body mass index
CSO	Central Statistics Office
DHS	Demographic and Health Survey
DNCC	District Nutrition Coordinating Committee
FAO	Food and Agriculture Organization of the United Nations
FBDG	food-based dietary guidelines
GRZ	Government of the Republic of Zambia
IAPRI	Indaba Agricultural Policy Research Institute
IFPRI	International Food Policy Research Institute
MCDP	Most Critical Days Programme
MoA	Ministry of Agriculture
MoH	Ministry of Health
MFL	Ministry of Fisheries and Livestock
NCD	non-communicable disease
NFNC	National Food and Nutrition Commission
PNCC	Provincial Nutrition Coordinating Committee
SPRING	Strengthing Partnerships, Results, and Innovations in Nutrition Globally Project
SUN	Scaling Up Nutrition
UNDP	United Nations Development Program
USAID	United States Agency for International Development
WASH	water, sanitation and hygiene
WHO	World Health Organization
WNCC	Ward Nutrition Coordinating Committee
ZNCC	Zonal Nutrition Coordinating Committee

DEFINITIONS

Acute malnutrition is the most extreme and visible form of undernutrition which requires medical treatment. Acute malnutrition is characterised by very low weight for height and severe loss of muscle (i.e., wasting).

Agriculture: The science, art, or practice of cultivating the soil, producing crops, and raising livestock and farming fish.

Body Mass Index (BMI) is a simple measure of weight-for-height, commonly used to identify underweight, overweight and obesity in adults. It is calculated as weight (kg) divided by height squared (m^2). BMI provides the most useful population-level measure of underweight, overweight and obesity because it is the same for men and women and all ages of adults (WHO 2017).

Chronic malnutrition, or stunting, is a form of growth failure. Unlike acute malnutrition, chronic malnutrition occurs over time. Stunting starts before birth and is caused by poor maternal nutrition, poor feeding practices, poor food quality as well as frequent infections which can slow down growth.

Diet: Includes the types and combinations of foods typically consumed by individuals and groups of people. A healthy diet is balanced, containing the right amounts of nutritious food in the right proportions, and varied with different foods eaten at each meal each day (FAO Zimbabwe 2015).

Food-based dietary guidelines guide people on how to eat to maintain good nutrition and provide the basis for the development of nutrition, health and agriculture policies intended to shift consumption patterns in healthier directions.

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).

Food systems: Food systems are complex networks of individuals and institutions that provide food for everyone on the planet. They determine the availability, affordability and nutritional quality of the food supply, and influence the amount and combination of foods that people are willing and able to consume (FAO 2013).

Malnutrition: Deficiencies, excesses or imbalances in a person's intake of energy and/or nutrients. Malnutrition covers (1) undernutrition, such as stunting, wasting, underweight and micronutrient deficiencies, and (2) overnutrition, including overweight, obesity and related non-communicable diseases.

Macronutrients provide energy for the body and are required in relatively large quantities. The three categories of macronutrients are carbohydrates, proteins, and fats and oils.

Micronutrients are required in relatively small amounts, include vitamins and minerals. They help the body produced substances required for growth and good health.

Micronutrient deficiency, also known as "hidden hunger," is a form of undernutrition that occurs when intake or absorption (i.e., the body's ability to use the nutrients) of vitamins and minerals is too low to sustain good health and development in children and normal physical and mental function in adults. Causes include poor diet, disease, or increased micronutrient needs due to, for example, pregnancy and lactation.

Non-communicable diseases (NCDs), also known as chronic diseases, tend to be of long duration and are the result of a combination of genetic, physiological, environmental and behaviours factors.
The main types of NCDs are cardiovascular diseases (like heart attacks and stroke), cancers, chronic respiratory diseases (such as chronic obstructive pulmonary disease and asthma) and diabetes (WHO 2017).

Nutrients: Substances needed for healthy growth, development, and functioning of the body, usually found in the food a person eats.

Nutrition is the practice of consuming the right amount of nutrients from healthy foods in the right combinations to support healthy growth, maintenance, and repair of the body.

Nutrition education consists of a variety of educational strategies aimed at helping people to achieve long-lasting improvements in their diets and eating behaviours. Nutrition education is not only about giving people information; it includes empowering people to take charge of their own diets and health, understanding people's needs and what influences their diets, carrying out realistic and participatory activities, and supporting small, achievable improvements in people's attitude and actions regarding healthy diets and good nutrition (FAO 2017).

Nutrition security: Secure access to an appropriately nutritious diet (i.e., protein, carbohydrate, fat, vitamins, minerals and water) 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)

Nutrition-sensitive interventions: Interventions designed to address the underlying and some of the basic cause of malnutrition at household, community, and societal levels. Examples include crop or production diversification, aflatoxin reduction, social cash transfers and access to clean water.

Nutrition-sensitive food systems incorporate nutrition objectives into their overall goals, strategies, and implementation, aiming to improve human nutrition through policy instruments and causal pathways. Nutrition-sensitive food systems must align with other food system priorities, including generating economic demand and production goals (FAO; WHO 2013).

Nutrition-specific interventions: Interventions designed to address the immediate causes of malnutrition at an individual level. Examples include complementary feeding, exclusive breastfeeding, vitamin A supplementation and management of moderate and severe acute malnutrition.

Overnutrition: Consuming too much food or more energy than needed by the body to function.

Overweight and **obesity** are forms of overnutrition resulting from abnormal or excessive fat accumulation that harms health. Obesity is an extreme form of overweight. Both increase a person's risk of developing non-communicable diseases, such as diabetes, hypertension, and cancer.

Undernutrition: Not getting enough energy or nutrients for growth and maintenance of the body from diet. Forms of undernutrition include stunting, wasting, underweight and micronutrient deficiencies.

Wasting is a form of acute malnutrition that results from inadequate dietary intake and/or acute illness that prevents the body from utilizing food.

OVERVIEW

In preparing for their careers in agriculture, students often study social structures, processes, systems and institutions, and their effects on people living in rural areas. One of these systems is the food system because of its strong impact on rural households. Food systems are networks of people and institutions that provide food for *all* people, and they determine the availability, affordability, and nutritional quality of food, while influencing the amount and combination of foods that people are willing and able to grow, purchase, and consume. Food systems are influenced by cultural, economic, social, political and environmental factors.

In Zambia, extension and advisory services, including agriculture, fisheries, and livestock, work within the food system to support farm households in making informed production decisions to boost productivity. In this way, agricultural professionals can play a role in making nutritious foods more available to rural households that grow food, as well as to households that purchase food at markets. Even in Zambia, where production of staple foods, namely maize, is produced at surplus (Zulu, Sitko and Namonje-Kapembwa 2015), poor nutrition affects many people. When sufficient food is available, why do individuals experience poor nutrition? What can agricultural professionals do to support better nutrition through agricultural practices? What are other means through which agricultural professionals can influence nutrition?

Through this module, I will guide you in addressing these questions, amongst others, to find appropriate answers for the situations in which students will work.

Learning Objectives

By the end of this module, students will have:

1. **described** healthy diets and good nutrition;
2. **identified** the causes of malnutrition;
3. **explained** how malnutrition affects individuals and society;
4. **analysed** the pathways between agriculture and nutrition;
5. **defined** their roles as agricultural professionals in improving nutrition; and
6. **identified** opportunities to collaborate across sectors to improve nutrition.

Sessions and Purpose

To achieve these overall learning objectives, this module will guide students through three sessions:

Session Title	Purpose
Session I: Nutrition Basics	
1.1 Personal Reflection on Food	To appreciate factors that influence personal diets
1.2 Good Nutrition: What a Body Needs	To define healthy diets and good nutrition
1.3 Malnutrition: Definitions	To define different types of malnutrition, including underweight, stunting, overweight, obesity, and micronutrient deficiencies
1.4 Causes of Malnutrition	To describe the immediate, underlying, and basic causes of malnutrition
1.5 Why Nutrition Matters	To describe the effects of malnutrition on individuals and society

1.6 Enabling Environment in Zambia	To appreciate the Government of Zambia's policy commitments toward malnutrition reduction
Session II: Agriculture, Food Systems, and Human Nutrition	
2.1 Making connections	To appreciate the relationships between food, agriculture, and nutrition
2.2 Pathways between Agriculture and Nutrition	To analyse the three primary pathways between agriculture and nutrition: agricultural production, agricultural income, and women's empowerment.
2.3 Food Systems for Better Nutrition	To understand how food systems influence the availability, affordability, accessibility, safety and acceptability of food and, thus, consumer choices related to food production, purchase, and consumption.
2.4 Pathways to Practice	To apply understanding of agriculture-nutrition pathways to practice.
Session III: Taking Action for Food and Nutrition Security	
3.1 What Is the Role for Agriculture in Food and Nutrition Security?	To understand how nutrition-sensitive agriculture supports food and nutrition security
3.2 Nutrition-sensitive Agricultural Actions	To identify nutrition-sensitive agricultural actions that support movement along the agriculture-nutrition pathways
3.3 The Need for Multi-sectoral Responses to Malnutrition	To describe the government's multi-sectoral response to reducing malnutrition and identify opportunities for collaboration across sectors

USING THE MODULE

Each session is made up of a combination of information, activities, and discussion to advance student learning. The sessions specify when to complete activities and engage in reflection. The sessions build upon each other to provide you with the minimum essential information to understand the linkages between food, agriculture, diets, and nutrition, and to apply this learning in your future careers. For this reason, it is recommended that you follow each session carefully.

Different symbols and formats are used throughout the student workbook to indicate each of the three session's learning objectives, activities, and summaries. The following symbols will appear in the student workbook and may be familiar to lecturers and students from other courses or modules:

			
Learning Objectives	**Activity**	**Reflection**	**Summary**
Provides information on the learning objectives for each section of the module. Read the objectives to understand the intention of each session.	An activity in the student workbook designed to apply learning and promote reflection related to the key concepts of the session.	An opportunity for students to pause and reflect upon the main points of an activity in the workbook.	Summarizes the main points of each session. Read the summary to synthesize information prior to moving onto the following session.

SESSION I: NUTRITION BASICS

Learning Objectives	Activities
• Develop student interest in knowing more about healthy diets and good nutrition • Engage students in considering the causes and consequences of malnutrition • Help students understand Zambia's policy commitments toward malnutrition reduction	• Activity 1.1 Food Diary • Activity 1.2 How does THAT lead to malnutrition?
Time: 3 hours	

1.1 Personal Reflection on Food

As agricultural professionals, you will be more successful in contributing to nutrition when you have a basic understanding of nutrition and are sensitive to the barriers to changing diets. Considering your own diet is one way to build knowledge and make these barriers more personal.

Activity 1.1: Food Diary

Answer the questions below to the best of your ability, jotting down as many details as possible. If you can't remember specifics, write down responses that reflect what, where, and with whom you typically eat and drink. Thinking back to yesterday:

What did you eat for breakfast?

What did you eat for lunch?

What did you eat for dinner?

Did you eat any snacks between meals? If so, write down what you ate or drank.

What influenced your choices about the foods you ate for meals or snacks?

Reflection

Look at the foods that you ate throughout the day, then reflect upon the following questions:

- Why did you choose these foods?
- Where did you eat your meals?
- With whom did you eat meals?
- Did you skip any meals? Why? While eating, did you consider how the food supported (or harmed) your health?
- How might the food you eat in six months differ from what you ate yesterday?
- Do you consider you diet healthy? If so, why?

Your **diet** – the types and combinations of food you eat every day – is influenced by many different factors. Our communities, cultures, religions, preferences, family, and friends influence our diets, but so, too, does the seasonality of food or the cost at market. Something as simple as your living situation can affect your food choices. Do you live on campus or in a boarding house? Then, you may not have had a choice in the foods served and eaten. To make healthy choices about diets, we need knowledge, skills, support, and motivation.

Agriculture

Throughout this module, we will use the broad term of **agriculture** to encompass the diversity of practices and activities relevant to agricultural livelihoods, including livestock, fisheries, horticulture.

Food systems, which will be defined in Session II, can also influence our choices about what to eat. Working through the food system, agricultural professionals can play a role in improving nutrition by influencing the diversity of food production, as well as how food is produced, processed, transported, marketed, and consumed.

Through this module, you will learn about the basics of healthy diets and good nutrition and the linkages between food, agriculture, and nutrition to inform your future work as agricultural professionals.

1.2 Good Nutrition: What a Body Needs

We all know that crops, livestock, and fish need different types of **nutrients** to grow strong and be productive. Maize, for example, depends on rich organic matter in the soil and fertilisers applied to fields to yield a good harvest. If maize does not receive enough nitrogen, the crops will turn yellow and wilt; if it does not receive enough water or the soil cannot retain moisture, the crops will dry. The maize planted will not reach its full productive potential.

In the same way, people need certain types of foods in the right quantities and combinations to receive the nutrients required for growth and development or, in other words, to reach *their* full productive potential. This is what we mean by **nutrition**: the practice of consuming the right amount of nutrients from foods in the right combinations to support healthy growth, maintenance, and repair of the body. But, what is a nutrient? Foods contain different types of nutrients, which are the building blocks of nutrition; nutrients are grouped into **macronutrients** and **micronutrients**.

Macronutrients, needed in relatively large quantities, provide energy for the body (Smolin and Grosvenor 2016). There are three categories of macronutrients:

1. **Carbohydrates** provide energy for the body to move, breathe and perform daily activities, like working in the field, riding a bike to school, or fetching water. Examples include nshima, cassava, rice, and potatoes.
2. **Proteins** help strengthen the muscles and repair wounds. Examples include chicken, beef, caterpillars, *kapenta*, eggs, and cowpeas.
3. **Fats and oils** provide the body with energy, support brain function and protect organs, like the heart, liver, and skin. Examples include butter, oil, seeds, and nuts.

People also need **micronutrients**, though in relatively smaller amounts, to help the body produce substances required for growth and good health. Micronutrients include vitamins and minerals.

1. **Vitamins** build a strong immune system, helping the body to fight disease. They help the body grow, fight illness, and break down food into energy. Some vitamins that people often do not get enough of include vitamins A and B12. **Vitamin A** helps eyesight and reduces illnesses. Orange sweet potatoes, pumpkins, and liver are examples of foods that contain vitamin A. **Vitamin B12** plays a key role in the function of the brain and nervous system and is only found in animal-source foods, such as eggs, milk, fish and poultry.
2. **Minerals** support bone growth, regulate heartbeat and help nerve function. Minerals that people often do not consume enough include iron and zinc. **Iron** provides oxygen to cells and reduces fatigue. Examples include liver, organ meats, and beans. **Zinc,** found in beef and seeds, helps with growth and brain development, and reduces illnesses.

Different countries use different tools to inform their population about healthy eating. In Zambia, the National Food and Nutrition Commission (NFNC) has developed guidance on healthy food choices based on foods that are locally available and culturally preferred. Foods are typically grouped into different categories, based on nutritional value or the *primary* function each group provides. For example, the main "job" of staples, like maize, rice, and cassava, is to provide energy that the body needs to perform activities. However, some staples, especially whole grains, also provide protein, vitamins and minerals, which serve a protective function.

Food-based Dietary Guidelines

Zambia is in the process of developing **food-based dietary guidelines.** Lecturers should be aware of changes in dietary guidelines for the country and adapt this section to reflect current information.

This table shows common food groups: staples, fats and oils, fruits and vegetables, legumes, and animal products.

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 energy 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 energy and protects organs like the heart, liver, and skin
Fruits and vegetables	Papaya, mango, avocado, banana, pumpkin, potato, rape, pumpkin leaves	Help protect the body from diseases and illnesses
Legumes	Cowpeas, bambara, groundnuts, pigeon pea, common beans	Help strengthen 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 strengthen the muscles and bones and repairs wounds

Figure 1: Types of foods and their nutritional importance (adapted from FAO, 2004)

Your diet consists of everything you consume, including meals, snacks and drinks. When nutritionists talk about diets, they refer to the types and combinations of foods typically consumed by individuals or groups of people. Healthy diets should be balanced – contain the right amounts of food in the right combinations – and varied – with different foods from each food group eaten throughout the day. Diets and food practices, including food hygiene, child feeding, and meal preparation, are vital components of nutrition. People require a diversity of foods in the right quantities and good health to utilize the nutrients in the foods they consume.

But how much of each type of food should you eat? Food groups can guide people in making nutritious meals. Consuming the right proportion of diverse foods from each of the food groups is the best way to get all of the nutrients needed for a healthy diet. An example of a balanced meal could be:

- ⅓ to ½ of the dish should be staples
- ¼ of the dish should be legumes or animal products
- ¼ to ⅓ of the dish should be vegetables and fruits
- Small amount of oil to prepare food and salt to flavor food

At the core of a healthy diet are foods that are low in unnecessary fat and sugar, and that are high in macro- and micronutrients. Water is also critical for healthy diets and good nutrition.

Figure 2 shows the different food groups and variety of foods in each food group. If you think about this picture as a plate of food, it shows the ideal composition foods required for a balanced and varied diet.

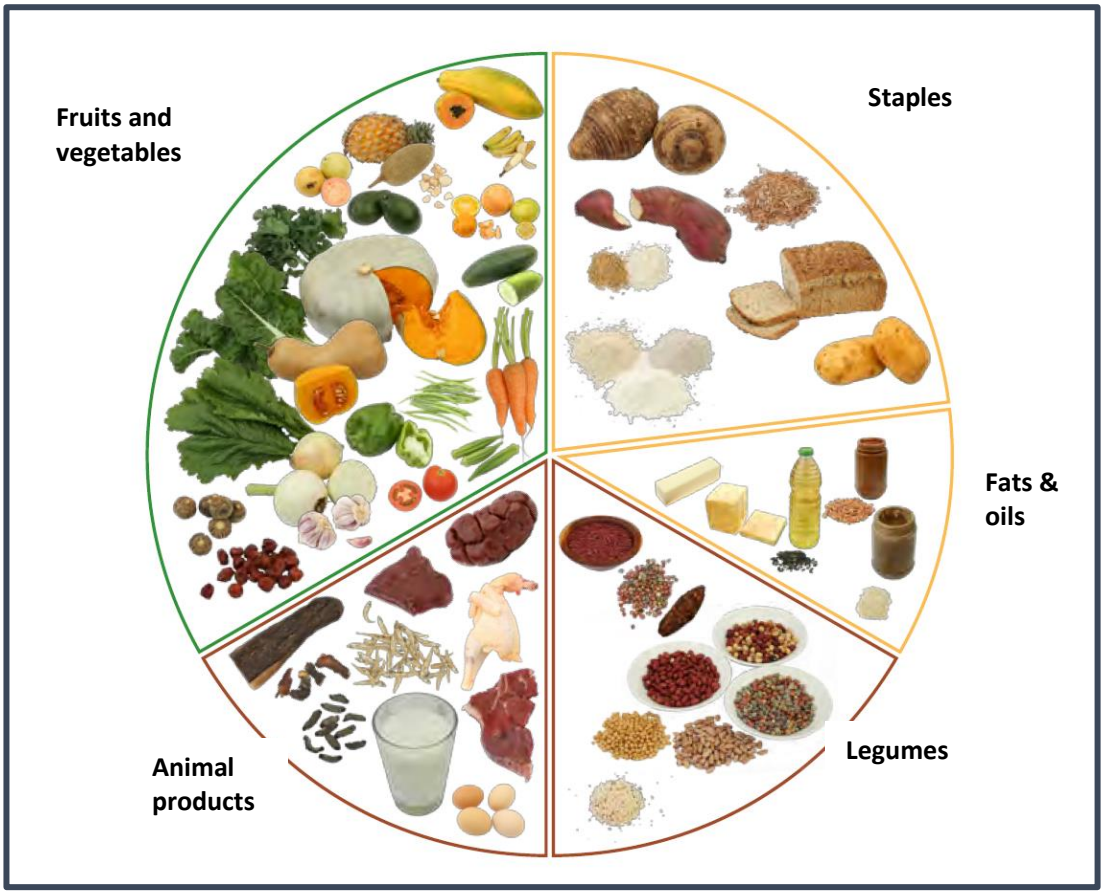

Figure 2: A balanced meal comprised of a variety of foods from each food group; adapted (FAO Zimbabwe 2015)

Reflection

Look back at the foods you ate yesterday, as noted in Activity 1.1, and consider the following questions:

- How does the food you ate compare to a balanced diet, as shown in Figure 2?
- What food group comprised the largest portion of your diet yesterday?
- Did you eat any fruits and vegetables?
- How much sugar, like soft drinks and sweets, did you consume?
- Do you feel you ate a diversity of foods from each of the food groups?
- What facilitated your consumption of different foods from each of the good groups?
- What are some of the barriers that prevented you from eating a balanced diet?

If you did not eat a diet made up of diverse foods from each of the food groups, you are not alone. For many reasons, which we will discuss in more detail, many people in Zambia (and many other countries around the world) do not consume a variety of foods from each of the food groups in amounts that will support healthy, productive lives.

The daily diet in Zambia has remained largely unchanged for the past 10 years (FAO 2014). More than 70% of the average Zambian diet is comprised of maize and other staple foods; 60% of the energy consumed comes from maize (FAO 2014). The typical Zambian diet is monotonous; it consists of the same kinds of foods being eaten from day to day. This type of diet, along with other complicating factors, contributes to malnutrition in Zambia.

1.3 Malnutrition: Determinants and Definitions

At different stages in their life, people have different dietary needs. If these needs are not met through healthy diets, a person may become malnourished. **Malnutrition** occurs when a person consumes too much or too little food or does not receive adequate nutrients through the foods she eats. Nutritional needs are determined by the following factors:

1. **Age**. Infants (0-6 months), for example, must only drink breastmilk, while young children will require small snacks and meals of diverse, nutritious food throughout the day. During periods of rapid growth, including infancy, childhood and puberty, more energy is required to support healthy growth and development.
2. **Body size**. The larger a person is, the more energy (or calories) s/he will need to stay active and energetic. Men usually require higher energy intake than women. Because men tend to have a larger body size, they burn energy more quickly. Boys and girls usually have similar energy needs.
3. **Activity level**. People who are more active typically require more energy to fuel their bodies. An adult doing fieldwork may require two times as much energy as an inactive adult. Similarly, an adult who exercises will require more energy than someone who does not engage in similar physical activity.

Body Mass Index

Body size is not a perfect indicator of nutritional needs in adults. **Body mass index** is a simple measure of weight-for-height, commonly used to identify underweight, overweight and obesity in adults. BMI provides the most useful population-level measure of underweight, overweight and obesity because it is the same for men and women and all ages of adults (WHO 2017).

4. **Health status**: Health influences nutrition status; illness and infection prevent the body from absorbing nutrients required to function well. For example, a young child with diarrhoea will have decreased appetite and her body will be less able to absorb nutrients in food she eats. Repeated bouts of diarrhoea and poor diet will cause growth to slow down. A person with HIV infection or related infections will require 10-30% more energy per day (WHO 2003), depending on whether s/he is symptomatic.
5. **Physical state.** A pregnant or breastfeeding woman requires more energy and nutrients to support her health needs during pregnancy, but also for strong foetal development. A breastfeeding mother will require more nutrients for milk production.

Of note, women of reproductive age (15-49), including pregnant and breastfeeding women, and children under two years of age are most vulnerable to poor nutrition. The period including pregnancy and up to a child's second birthday are often referred to as the **1,000 most critical days**. In pregnancy, requirements of energy, protein and micronutrients are increased not only to maintain the mother's health, but also to support optimal health and brain development for the foetus. Nutrient requirements are even greater for a breastfeeding mother. Similarly, young children require extremely nutritious diets for strong growth and development.

The 1,000 most critical days is the window of opportunity in which good nutrition can set children on a path for strong growth and healthy, productive futures. For this reason, it is important for individuals who engage with households to understand these recommendations, specific to Zambia. This understanding will support the delivery of accurate, consistent nutrition information to households with children under two, and help future agricultural professionals to understand the value in producing diverse, nutrient-dense foods, like fruits, vegetables, fish, and eggs, to support household dietary needs.

Frequently, because of their increased vulnerability to poor nutrition, women of reproductive age (15-49), infants and young children are the focus of nutrition interventions. This does not mean that men's nutrition is not important. Men also need to eat nutritious diets to stay healthy and work, and they play an important role in supporting nutrition for family members.

Malnutrition occurs when a person's intake of energy and/or nutrients is inadequate or more than his or her needs. Let's use the following picture to understand the different types of malnutrition:

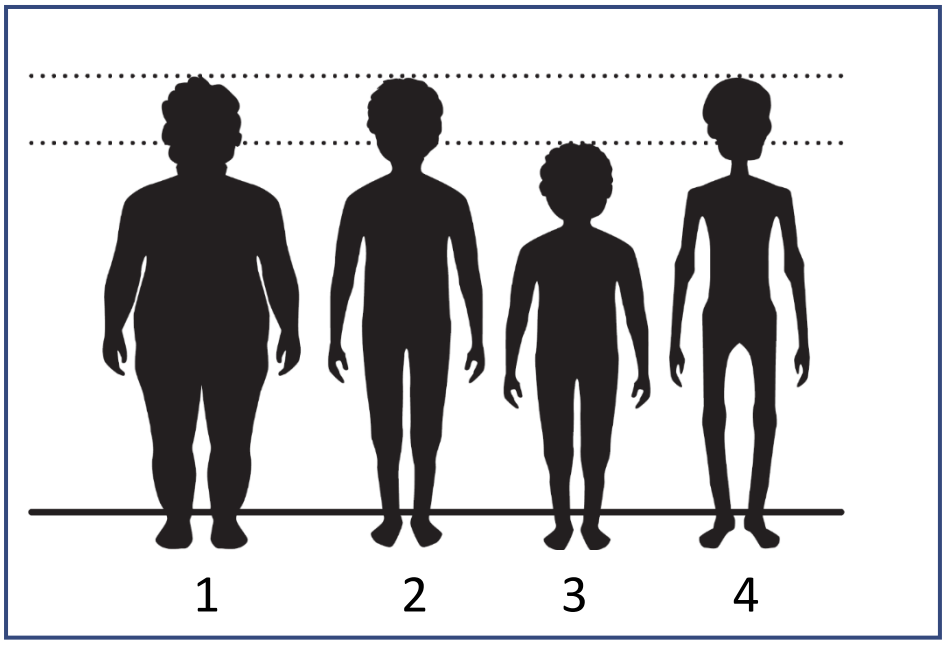

Figure 3: Depiction of different types of malnutrition

The first three boys in the picture are likely malnourished.

1. Child 4 is likely **underweight**, perhaps **wasted** (see note). Wasting is a form of **acute malnutrition** that results from inadequate dietary intake and/or acute illness that prevents the body from utilizing food. Wasted children require urgent medical attention due to heightened risk of disease and death with loss of too much body weight. Adults can also be wasted and require medical support to regain weight and health.

Wasting

There are different types of acute malnutrition, including kwashiorkor and marasmus, which are terms often used by medical professionals in Zambia. However, globally, the term wasting is more commonly used to describe acute malnutrition.

2. Child 1 is **overweight** or **obese** and is more vulnerable to diabetes and heart disease. Overweight and obese children and adults consume more energy than the body needs; the excess energy is stored as fat. Overweight and obesity can lead to non-communicable diseases, such as diabetes, cancer, and heart disease.
3. Child 3 is likely **stunted**; he is too short for his age because of **chronic malnutrition**. Stunting can begin before pregnancy, when a pregnant woman is undernourished; it worsens when infants' diets are poor and when sanitation and hygiene are inadequate. Stunting occurs over a long period due to poor nutrition and/or repeated infections. It is difficult to reverse after child's second birthday.
4. Child 2 has normal weight and height. "Normal" can be confusing. Any of the children in the picture could be growing normally, especially if parents are larger or smaller than average. However, when most children in a community are short or thin, they are likely malnourished. All children should participate in regular growth monitoring offered through health facilities by community workers. Assessing changes in growth routinely over time allows caregivers and health workers to determine the growth trajectory that is normal for every child. Regularly monitoring children's growth, particularly in the first two years of life, offers an opportunity to act to prevent deterioration in growth status, a recognized indicator of inadequate nutrition and poor health for children.

Growth Charts

Health workers use growth charts to track a child's growth over time, looking for changes in the child's pattern of growth. A change in the child's growth pattern may indicate a health problem, which requires further assessment. Each child is different, and thus requires individual assessment by a health worker to identify and address reasons for the change in his or her growth trajectory.

Another type of malnutrition, which affects many people in Zambia, is **micronutrient deficiency**, sometimes referred to as "hidden hunger." Even if, for example, a child goes to bed with a full belly, having eaten a large plate of nshima, he may not have eaten foods packed with micronutrients, which are essential for healthy brains, bones, and bodies. **Anaemia**, often caused by iron deficiency, is particularly critical for pregnant women, as anaemia can lead to maternal deaths and to delayed development in babies. Other prevalent micronutrient deficiencies, particularly in infants and young children, include vitamin A and zinc deficiencies.

1.4 Causes of Malnutrition

Now that you have a basic understanding of the importance of eating diverse foods from each of the food groups every day to support good nutrition, let's begin looking at the many causes of malnutrition through an activity.

Activity 1.2: How does THAT lead to malnutrition?

Think about how the following factors could contribute to malnutrition. Write your ideas in the spaces provided.

Type of Cause	Factor	Contribution to Malnutrition
Immediate	Chronic illness (e.g., diarrhoea, malaria, HIV)	
Underlying	Poor access to nutritious, diverse foods	
Underlying	Poor sanitation and hygiene	
Basic	Agricultural policy	
Basic	Unequal access to and control over household resources	

In Session 1.3, you already learned how inadequate food intake and illness can lead to malnutrition, but it might not be obvious how agricultural policy or a woman's control over resources can influence individual and household nutritional status. Let's look more closely at the factors that are required to support good nutrition.

Good nutrition not only depends on the diversity and quantity of the foods we consume – as we've learned in the discussion of healthy diets – it depends on a multitude of factors that cut across different facets of our lives, including health, agriculture, and education. At the most basic level, even cultural, economic, and political structures and systems can contribute to malnutrition.

The most common framework used to depict the causes of malnutrition is referred to as the "UNICEF Conceptual Framework on Causes of Malnutrition."

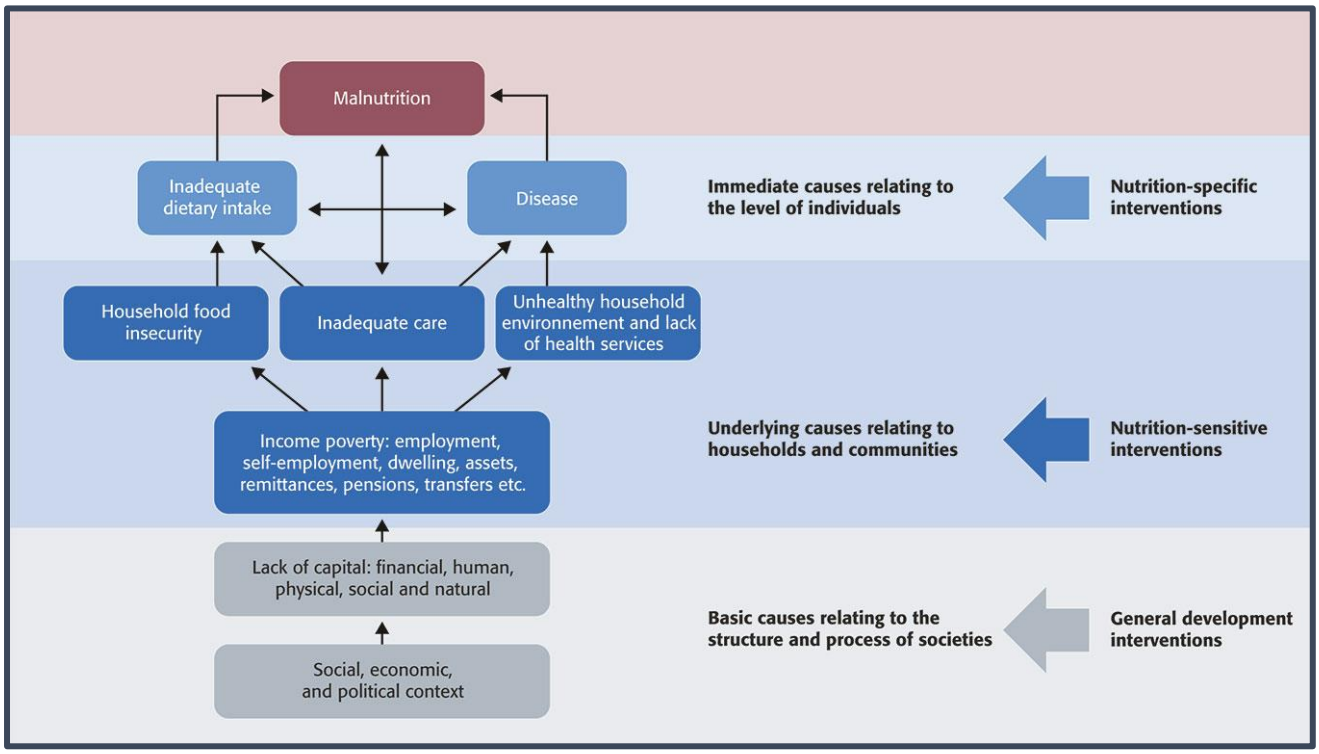

Figure 4: UNICEF Conceptual Framework on Causes of Malnutrition; adapted (UNICEF 2010)

This **conceptual framework** was originally developed for child undernutrition, but the framework can be applied to everyone vulnerable to undernutrition. It shows three levels of causes of malnutrition:

1. **Immediate** causes occur at the individual level and lead directly to malnutrition. Immediate causes include inadequate dietary intake and diseases.
2. **Underlying** causes operate at the household and community levels and influence dietary intake and diseases. There are three underlying causes of malnutrition: (1) household food insecurity, (2) unhealthy environment, affected by access to water, sanitation, health services, and (3) inadequate care and feeding practices, which includes feeding, hygiene, health-seeking behaviour. The underlying causes of malnutrition are affected by people's access to, and control over, resources.

   It is worth emphasizing the role of income poverty in maintaining high rates of malnutrition, particularly amongst rural households. While the Zambian economy continues to grow rapidly, the growth is uneven. Urban poverty has dropped significantly over the past 20 years, resulting in an affluent and growing middle class. However, rural poverty remains largely unchanged with rural households. The United Nations Development Program (UNDP 2016) notes the persistence of high levels of inequality, with deeply rural

farming provinces—where stunting burden is highest—not benefitting fully from the country's economic advancement. For this reason, nutrition scale-up must include "those at all levels, particularly the most nutritional and economically vulnerable, because equity is not built into the structure of the economy" (Harris, Haddad and Grutz 2014).

3. **Basic** causes of malnutrition relate to the structures, processes, and phenomena particular to a society. Basic causes may include political, economic, and cultural factors, such as governance and institutional capacities, gender relations, social networks, access to education, presence of infrastructure, trade policies, and environmental factors like climate change.

If you look along the right side of the framework, you will see suggested types of interventions to address the immediate and underlying causes of malnutrition. To understand how you, as future agricultural professionals, will harness food and agriculture to support nutrition, it is important to define **nutrition-specific** and **nutrition-sensitive** interventions.

5. **Nutrition-specific** interventions focus on the immediate causes of malnutrition, but alone **cannot prevent malnutrition** nor address the underlying and basic causes of malnutrition. In Zambia, the Ministry of Health is typically responsible for supporting nutrition-specific interventions, such as vitamin A supplementation, breastfeeding promotion, support for complementary feeding, and management of acute malnutrition.
6. **Nutrition-sensitive** interventions, related to agriculture, social welfare, water, sanitation and hygiene, and education, address underlying and basic causes of malnutrition. The causes of malnutrition are multi-faceted; the responses designed to address malnutrition must also be multi-faceted, with different sectors contributing according to their relative strengths and roles within society. We will discuss how agriculture can contribute to better nutrition in subsequent sessions.

Let's focus on another important element of the conceptual framework: food security. This framework shows us that food security alone does not lead to improved nutrition. As a reminder, the internationally-agreed definition of food security is:

"**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).

The definition highlights the need for "sufficient, safe and nutritious food," implying, for example, that a diet constituted primarily of maize or nshima will not be sufficient to realize good nutrition. However, the definition of food security does not necessarily capture other factors that influence and contribute to improved nutrition, such as care and feeding practices, clean environments, and access to health services. If you read between the lines of the definition, these factors are implied, but not explicitly stated. Good nutrition and healthy diets, within the definition of food security, tend to be overlooked in favor of producing enough staple foods, like maize.

The concept of "**nutrition security**" allows us to focus on utilization of food. Nutrition is not only dependent on the availability of, and access to, food. Utilization of food through diverse and adequate diets, clean water, sanitation, and health care is required for good nutrition, as shown in the conceptual framework.

Given the strong connections between food security and nutrition security, sometimes the term "food and nutrition security" is used. For example, Zambia's National Agricultural Extension Services Strategy (MoA; MFL 2017), states that the objective of agricultural extension services 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."

A working definition of food and nutrition security, articulated by the United Nations Standing Committee on Nutrition (Wustefeld 2013), combines the concepts of food security and nutrition security as follows:

> "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."

In this definition, the underlined phrase captures the traditional definition of food security, while the addition of the double-underlined phrase makes explicit the importance of maternal and child care, water and sanitation, and health services.

Food security and nutrition security are related concepts. Figure 5, below, shows that food security is a smaller, though critical, component of nutrition security. The concept of nutrition security encompasses food security and accounts for health-related factors, including care and feeding practices, healthy environments, and quality health services.

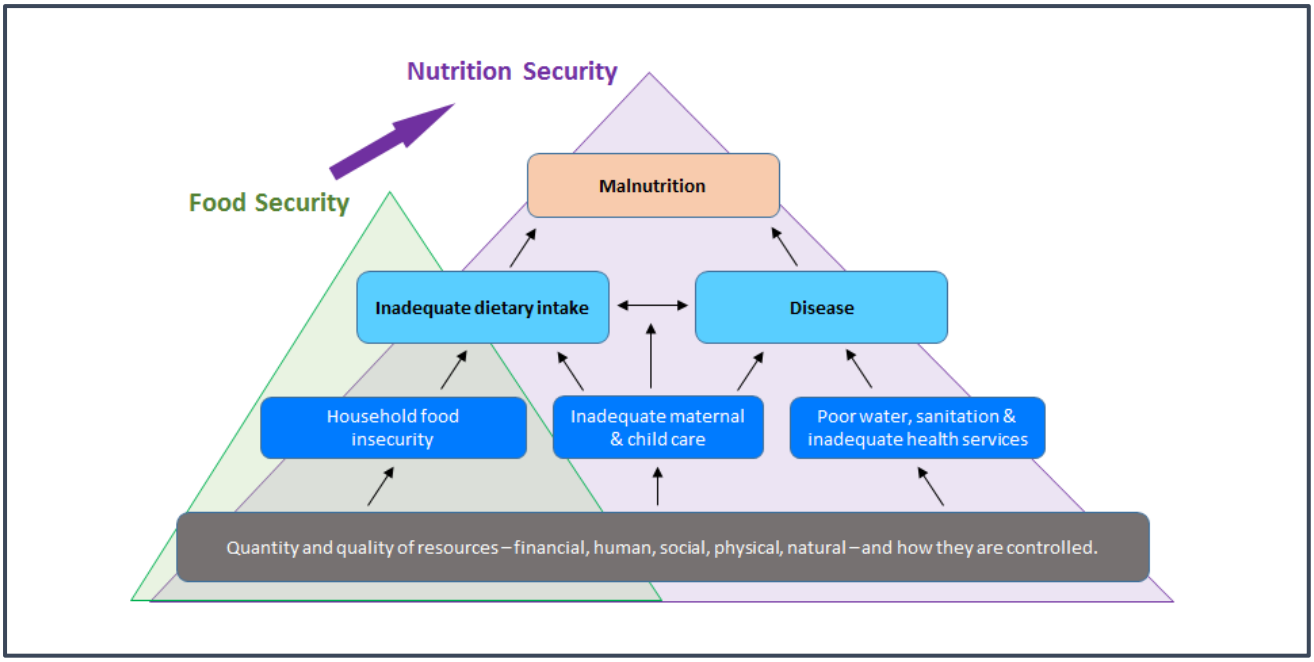

Figure 5: Food security vs. nutrition security (Source: unknown)

1.5 Why Nutrition Matters

At this point, you might be asking yourself some questions: Why are we talking about nutrition? How is nutrition relevant to Zambia? What are the consequences of malnutrition? Why should I care about malnutrition? To answer these questions, let's begin by looking at the nutrition trends in Zambia, then discuss the consequences of malnutrition on individuals and society.

Malnutrition affects 1/3 of the people around the world. Similarly, malnutrition affects Zambia; 46% of the population in undernourished (FAO 2017). Prevalence of overweight and obesity is increasing rapidly, particularly amongst women in urban areas (CSO; MoH; ICF International 2014). Zambia's rates of malnutrition are higher than most countries, even much poorer countries. Zambia has higher rates of stunting, for example, than countries with similar incomes (World Bank 2011).

Figure 6, below, shows trends in nutritional status over a 20-year period, as captured by the Zambia Demographic and Health Survey (DHS).

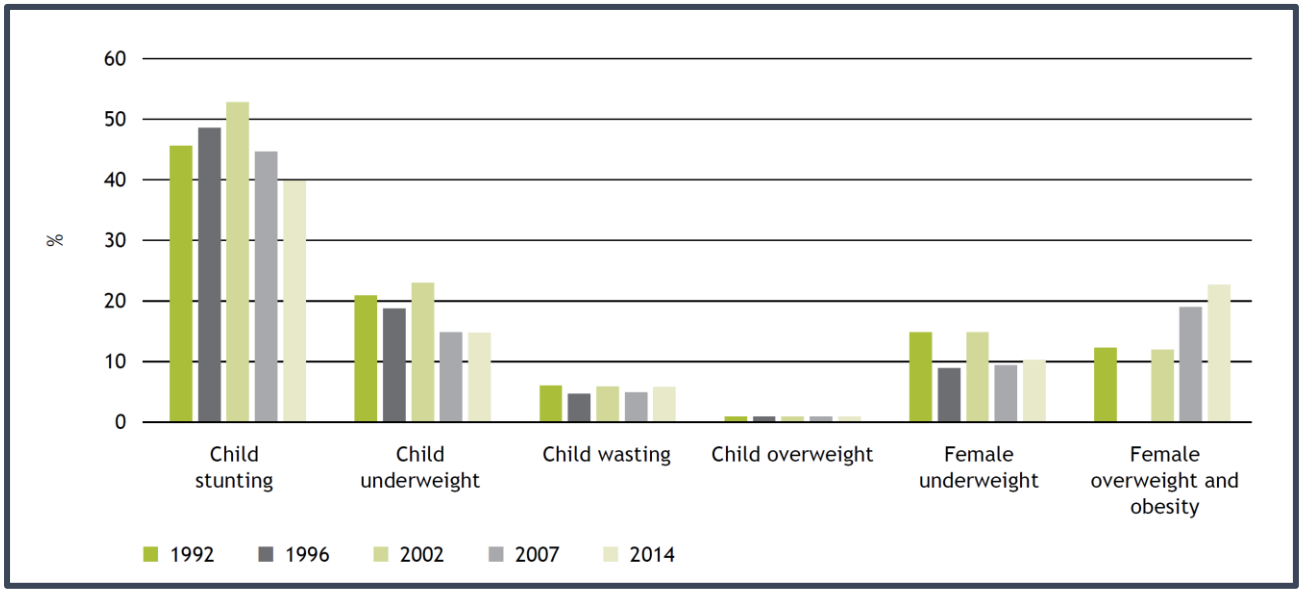

Figure 6: Trends in nutritional status of women and children under five, Zambia, 1992-2014 (Mwanamwenge and Harris 2017)

Stunting is a particularly challenging problem, though the country has made steady progress in reducing the prevalence of stunting between 1992 and 2014. The prevalence of stunting has fallen to 40% and is highest amongst children 12-24 months (CSO; MoH; ICF International 2014). An analysis of Demographic and Health Surveys (DHS) in Zambia show that changes in stunting could be attributed to national health campaigns, including distribution of insecticide-treated bed nets and access to improved water and sanitation (Harris, Drimie, et al. 2016). Of note, while the percentage of children affected by stunting has decreased, the *number* of children stunted is increasing, due to population growth.

Amongst children under five, **wasting** remains consistent, with little change in prevalence between 1992 and 2014. While the prevalence of **underweight** has decreased since 1992, it has not changed since 2007 (CSO; MoH; ICF International 2014).

Prevalence of **anaemia** due to micronutrient deficiency remains stubbornly high amongst women of reproductive age (15-49); 33.7% of women of reproductive age are anaemic (WHO 2017).

Zambia faces a growing challenge: **overweight, obesity and diabetes**, a non-communicable disease. Women are disproportionately overweight and obese in comparison to men (CSO; MoH; ICF International 2014). If left unchecked, overweight and obesity could reach the scale of other forms of malnutrition amongst adults *and* children.

Like other countries, Zambia faces the **double burden of malnutrition** in which undernutrition coexists with overweight, obesity and non-communicable diseases. This double burden can be partly explained by the **nutrition transition,** which is characterised by a shift to refined diets high in fat, salt, and sugar and low in fibre. The nutrition transition is common in countries, like Zambia, with rapidly growing economies. Urbanization, economic growth, the expansion of supermarket chains and the increased availability of processed and “fast food” make foods high in fat, sugar and salt more available at lower prices to an expanding urban population.

The World Health Assembly has established eight global nutrition targets for 2025. Globally, the world is off course to meet the global goals for the eight nutrition indicators. Zambia is off course in six of the eight indicators,

including children's stunting and underweight, anaemia in women of reproductive age, low birth weight, and adult overweight, obesity and diabetes.

Indicator	Target	Zambia's status
Stunting	40% reduction in number of children who are stunted	Off course, some progress
Underweight	Reduce and maintain childhood wasting at less than 5%	Off course
Under-five overweight	No increase in childhood overweight	On course
Anaemia	50% reduction of anaemia in women of reproductive age	Off course
Low birth weight	30% reduction in low birth weight	Off course
Exclusive breastfeeding	Increase the rate of exclusive breastfeeding in the first six months to at least 50%	On course
Adult overweight	Halt the rise in prevalence	Off course
Adult obese	Halt the rise in prevalence	Off course
Adult diabetes	Halt the rise in prevalence	Off course

Figure 7: Zambia's Progress against World Health Assembly Global Nutrition Targets (IFPRI 2016)

There is reason to be optimistic about Zambia's progress against nutrition targets, given the incremental decrease in stunting, high rates of exclusive breastfeeding, and maintenance of under-five overweight. However, lack of progress against other indicators is reason for concern. Malnutrition has extreme negative consequences on individuals and societies.

Malnutrition impacts **individuals** in the following ways:

1. **Higher risk of disease and death.** Undernutrition makes it difficult for the body to fight infections and diseases, like diarrhoea, malaria, and pneumonia, and puts children at risk of more severe, frequent, and prolonged bouts of illness. Undernutrition is also a consequence of repeated infections and therefore worsens the child's nutrition status when she has even greater nutritional needs. A severely stunted child faces a four times higher risk of dying, and a severely wasted child has a nine times higher risk (Black, et al. 2013). Overweight and obesity increase the risk of non-communicable diseases, including diabetes, cancer, stroke, and heart disease, which can cause premature death.
2. **Permanent physical damages.** Inadequate nutrition hampers healthy physical growth and proper organ formation and function, and weakens the immune system. Micronutrient deficiencies can also cause permanent damage, including blindness (vitamin A), fatigue (iron) and thyroid disease (iodine).
3. **Poor brain development.** Stunting is associated with sub-optimal brain development, which has long-lasting harmful consequences on cognitive ability. Children who are stunted are more likely to underperform in school, repeat grades and drop out of school.
4. **Cycle of malnutrition.** The process of being malnourished begins during pregnancy. Among girls, poor nutrition not only undermines their health, but will increase the chances that the next generation of children will be born malnourished. This creates a cycle of poor nutrition from generation to generation. Also, children who suffer from malnutrition enter adulthood with a higher risk of developing obesity and other chronic diseases. This could be especially true in countries, like Zambia, which are faced with increasing urbanization and shifts in diet and lifestyle.

The impact of malnutrition expands beyond individuals to **society**, as follows:

1. **Higher health expenditure.** Treatment of malnutrition and related diseases places a large burden on the public health system by driving demand for health care. The cost of treating a severely underweight child is higher than that require to prevent malnutrition.
2. **Higher education expenditure.** Many children go to school with empty bellies. This undermines their ability to learn and remain attentive in class. School underperformance, repetition of grades, and drop-out create unnecessary costs for the education system.
3. **Lower human productivity and economic growth.** When large proportions of the population suffer from stunting, the country tends to suffer from lower productivity and growth. Malnutrition impairs individual physical and mental capacity, leading to reduced workforce potential and work productivity. To illustrate this point, the World Bank (2011) posits that childhood anaemia is associated with a 2.5% in adult wages, while micronutrient deficiencies account for $186 million in economic losses every year.
4. **Higher social welfare needs.** Poor nutrition compromises the economic and societal development of countries. Malnutrition reduces people's ability to engage in income generating and social activities, thus increasing poverty and social exclusion. This creates an extra burden on countries in terms of increased needs for public assistance, including food aid, social protection, and unemployment benefits. In Zambia, the geographical pattern of stunting mirrors the geographical pattern of poverty.

1.6 Enabling Environment in Zambia

The fight against malnutrition requires commitment. The Government of Zambia has demonstrated its intention to address malnutrition not only by adopting eight global nutrition targets, established by the World Health Assembly, but by designing policies to support healthier diets and better nutrition for its citizens.

Zambia has included explicit objectives and references to nutrition across sectors in different policies and programmes, indicating an intention to address malnutrition. Zambia's efforts to reduce malnutrition fall under broader international frameworks and extend to districts across the country.

← International	Millennium Development Goals, 2000					
	Zambia Vision 2030, GRZ 2006					
	Zambia Poverty Reduction Strategy Paper, IMF 2007					
	Zambia Sixth National Development Plan, GRZ 2011					
	Nutrition	**Agriculture**	**Health**	**Education**	**Social protection**	**Water and sanitation**
National	SUN Framework for Action 2010	CAADP agreement	Worth Health Assembly agreement			
	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

Figure 8: Illustration of policy cascades in key sectors (Harris, Drimie, et al. 2016)

Despite the intention to address malnutrition, the amount of investment in nutrition across ministries and as part of the national budget is insufficient to drive nutrition outcomes. As a percentage of budget expenditure, expenditure on nutrition has dropped; less than 1% of the budget is allocated to nutrition programs across eight-line ministries. Allocation of nutrition funds per child sits at ZMW 11, short of the ZMW 300 per child

goal set by the government (Concern Worldwide 2017). Greater financial investment will be required to support the government's written commitments to reducing undernutrition in the country.

In the following sessions, we will explore how agriculture can support nutrition, while also identifying concrete ways in which agricultural professionals can collaborate across these diverse sectors to influence the drivers of healthy diets and good nutrition.

Summary
Session I: Nutrition Basics

1. 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.
2. 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.
3. 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.
4. 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.
5. Failure to achieve these targets will have significant impacts on individuals and society. Individual consequences of malnutrition include disease and death, and irreversible physical and cognitive damage. Society pays a heavy cost for malnutrition, including higher health expenditure, higher education expenditure, lower productivity and economic growth, and greater social welfare needs.
6. Despite the challenges faced by Zambia, the country has committed to reducing malnutrition, as enshrined in policies and programmes across multiple sectors. To achieve ambitious goals related to the reduction of undernutrition, the government will need to increase financial investment toward nutrition outcomes.

SESSION II: AGRICULTURE, FOOD SYSTEMS AND HUMAN NUTRITION

Learning Objectives	Activities
• Build students' 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 • Assist students to apply this understanding through practice	• Activity 2.1 From Agriculture to Nutrition • Activity 2.2 A Day in the Life of Naomi
Time: 3 hours	

2.1 Making Connections

Reflection

Read the following statement: *Health diets and good nutrition start with food and agriculture.*

Consider the following questions, and note your responses in the margins:

- Do you believe that this statement is true?
- Why or why not?

This session will challenge you to consider food and agriculture as essential to building a solid foundation for healthy diets and good nutrition. Let's begin by examining the food and agriculture system in Zambia to answer the question: Does the food and agriculture system support food and nutrition security?

Agricultural production in Zambia is dominated by one staple crop: maize. Though government policy is written with reference to improving food and nutrition security, staple food production remains the focus of the agricultural sector (Zulu, Sitko and Namonje-Kapembwa 2015). Most government agricultural funding is spent on input subsidies to incentivize maize production and maize price stabilization under the Farmer Input Support Programme (FISP) and the Food Reserve Agency (FRA), respectively. While intended to promote food and nutrition security, these programmes have not yielded the intended consequences for the most vulnerable households (Mofya-Mukuka and Hichaambwa 2015).

This is evidenced by the nutrition trends, which we discussed in the previous session. Again, 46% of the population is undernourished (FAO 2017), making Zambia the second worst in Africa, behind less stable and economically productive countries. Almost half of the population is undernourished, and the number of people who are overweight and affected by chronic diseases is growing.

With government policy focused on maize production, it is not surprising that 89.4% of smallholder households produce maize, while 53.6% of cultivated land is dedicated to maize production (Chapoto and Zulu-Mbata 2016). About 80% of households cultivate three or fewer crops (Mofya-Mukuka and Hichaambwa 2016). For most Zambians, food is maize. But, this was not always the case.

Reflection

Consider the following questions:

- What do you think your grandparents and other ancestors ate more than 100 years ago?
- How do you think their diets were different from today's typical diet?

Your grandparents or ancestors lived in a time when the food landscape and diets were naturally diverse. They relied on indigenous agricultural systems and foods to support healthy diets and good nutrition. Maize only gained prominence during the colonial period and, since independence, has maintained a central position in agricultural policies aimed at supporting maize production and regulating maize prices. The focus on maize has resulted, over time, in a shift away from the consumption of indigenous grains, vegetables and fruit.

Modern Zambian agriculture relies on a limited number of non-indigenous crops and limited diversity among different food groups. The traditional diet is typically comprised of a hefty portion of nshima with few legumes, fish, eggs, fruits, and vegetables to contribute necessary nutrients. While a plate of food piled with nshima might make you feel full, it will not give you the foods you need for growth, energy, and health.

Zambia's food system is not providing food and nutrition security for its population; diverse, nutritious foods are simply not available, accessible, or desirable amongst Zambian households (Mwanamwenge and Harris 2017). While this may seem a grim assessment, particularly considering consistent maize surplus, it holds true based on the trends in agricultural production and nutrition outcomes. The food produced, purchased, and consumed by individuals does not provide the essential nutrients.

The following two sections will present two ways to conceive of the connections between agriculture, food and nutrition: (1) the agriculture-nutrition pathways and (2) food systems.

2.2 Pathways between Agriculture and Nutrition

Agriculture, food systems, diets and nutrition are linked in multiple ways. These connections can be explained using the agriculture-nutrition pathways, which follow three different, intersecting routes, including (1) food production, (2) agricultural income, (3) women's empowerment.

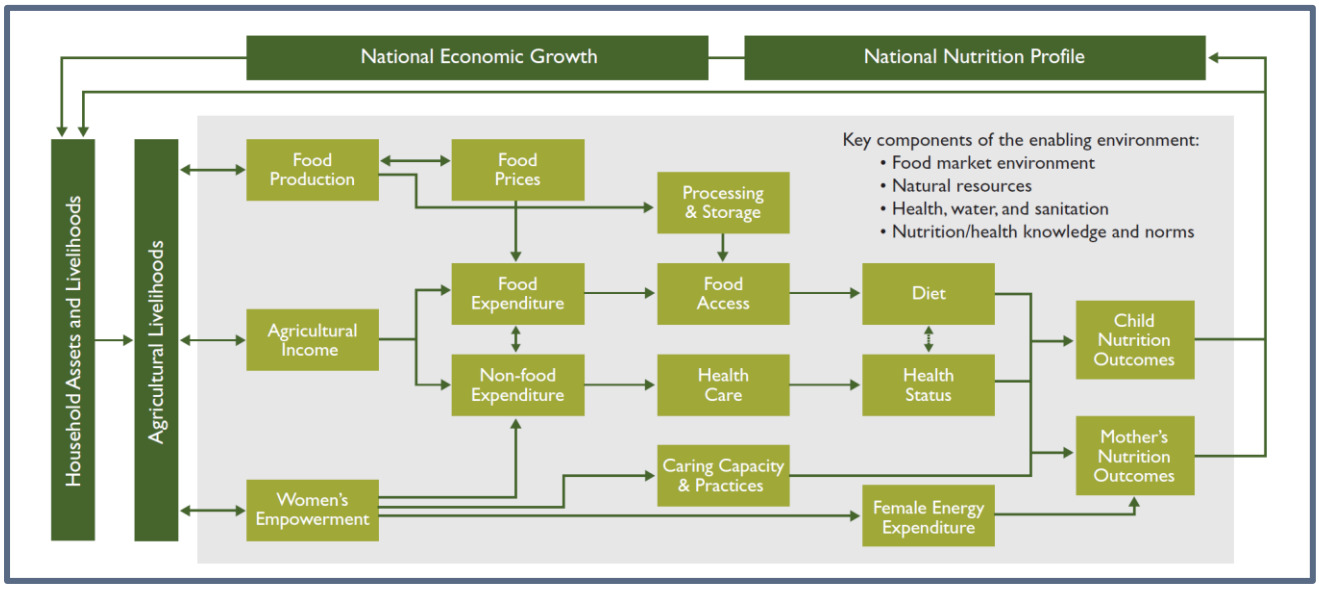

Figure 9: Agriculture-nutrition pathways (SPRING 2014)

Activity 2.1: From Agriculture to Nutrition

For this activity, choose one of the pathways: food production, agricultural income, or women's empowerment. Take 15 minutes to review the pathway, then respond to the questions below:

1. Reviewing each "step" along the pathway, describe how food production, agricultural income or women's empowerment drives nutrition outcomes.

2. The figure shows that household assets and agricultural production practices can influence each of the pathways. Describe how the following factors could either support or diminish nutrition outcomes, referring to the effect(s) on specific pathways:

    - Lack of access to credit.

    - Access to extension services.

    - Poor post-harvest practices (e.g., unhygienic food storage)

3. Behind the pathways, you can see important factors that interact with the different pathways. These include natural resources, the food market environment, the health environment, and nutrition and health knowledge. Choose one of these factors, then describe how it may influence the pathway. For example, soil, a natural resource, interacts with maize yields (food production). Fertile soil, rich in organic matter improves productivity, while soils stripped of nutrients due to burning and tilling reduce productivity.

This framework helps us understand how various agricultural activities and women's empowerment in agriculture can improve access to food and health care and strengthen child care and feeding practices; how they impact and are affected by the enabling environments; and how they affect the nutrition of individuals, households, and communities.

Applying the Pathways

The agriculture-nutrition pathways were intended to illustrate how agriculture can contribute to positive nutrition outcomes for women of reproductive age and young children, given their increased vulnerability to undernutrition. However, the pathways can be applied to any household that is nutritionally or economically vulnerable.

Food production: Food production is the main pathway through which many vulnerable households consume nutrients and ensure food security. Food production for consumption, income and local food availability determines food security for many households. Diversity of production – crops, livestock, and fisheries – can strengthen dietary diversity. But, production diversity is not only good for diets, it's good for agriculture.

Diversity in production and the production practices used by farmers (e.g., crop rotation, minimum tillage) are critical to reducing soil erosion, increasing organic matter, and boosting yields. Mono-cropped maize, with little to no production diversity, weakens natural systems. It depletes soil fertility and encourages pests and diseases, creating greater dependency on high-cost chemical fertilizers and pesticides to reverse the effects of unhealthy soils.

The benefits of increased and diversified production may be diminished without good processing and storage practices. These actions can affect the shelf life, safety, and nutrient content of foods. For example, poor storage conditions can lead to mycotoxin contamination, while drying fish, fruits, or vegetables can prolong the availability of nutritious foods, which are often seasonal.

Agricultural income: Agriculture can offer a reliable and sustainable source of income for rural households. Agricultural income used for food and non-food purchases, like preventive care and clean water, can support more nutritious and stable diets and healthier lives. But, income is not a perfect predictor of better nutrition. Income can have a positive or negative effect on nutrition and, sometimes, no effect at all. While 15% of children in the lowest income households have diets consisting of four or more food groups, the figure for the richest households is not significantly higher. Only 41% of children in these households achieve similarly diverse diets (CSO; MoH; ICF International 2014).

The income-to-nutrition pathway is also affected by dedication of land to production of food for households or for market sales. Growing more cash crops has less effect than on-farm food production on diversifying and improving the quality of diets among smallholder households (FAO 2013). The person who makes the decisions about the types of food to grow, purchase and eat matters; women tend to make choices that benefit the family's health and nutrition (Smith, et al. 2003). This pathway rests on the critical assumption that consumers want to purchase diverse, nutritious foods and that these foods are available and affordable in local markets.

Women's empowerment is a meaningful way to improve nutritional status through agriculture. Women who are empowered have greater decision-making power; access to and control over resources; and labor and time allocation. In this pathway, women's empowerment can influence women's use of income, their ability to care for themselves and their families, and women's energy expenditure. Empowering women through the production and sale of cash crops at local markets can, for example, increase incomes, but may also contribute to greater burdens on women's labor and time, which, in turn, affects her own health and her ability to feed and care for children.

These pathways are not a straight line from food production, for example, to healthy diets and better nutrition. Enabling environments interact with these three conceptual pathways and can either support or harm a household's nutrition outcomes. Let's look more closely at these environments, which are named in the upper corner of the pathways framework.

1. The **food market environment** influences the kinds of foods that are available and likely to be produced or purchased by households. As we discussed, government policy can determine the availability and affordability of food in local markets. By incentivizing maize production, Zambia has ensured a reliable supply of affordable maize. The private sector also plays a large role in the food market environment, influencing food purchase decisions and consumption habits through labelling and social marketing. Decisions about the foods to grow, purchase and consume are not only affected by the prices of inputs and foods, but also factors such as convenience of purchase and preparation and perceptions of quality and safety.
2. The **health, water and sanitation environment** can affect nutritional status, as shown in the conceptual framework on the causes of malnutrition. Agricultural production practices can expose households to health risks. For example, unsafe application of agrochemicals can contaminate water available for household drinking; poor water management can contribute to waterborne diseases; and livestock allowed to roam can create unhygienic conditions where children play, crawl, and eat. When health is compromised, individuals cannot absorb the nutrients consumed; the potential positive nutrition outcomes resulting from increased in agricultural production or income are lost.
3. The **natural resources environment** affects the three pathways between agriculture and nutrition. Food production depends on natural resources, including water, soil and beneficial plants and animals (biodiversity). Conventional agricultural practices, such as land clearing, burning, and chemical use, can damage natural resources by polluting soil and water, causing soil erosion, reducing soil fertility, and killing beneficial plants and animals. Sometimes, cash crops are not adapted to local conditions and rely on expensive inputs, which damage natural resources and increase the chance of crop failure. Climate change is making droughts and floods more common and rainfall patterns unpredictable, further damaging production potential, particularly when farmers rely on unsustainable farming practices.
4. The **health and nutrition knowledge environment** can affect household decisions around food production, purchase, and consumption to drive positive agriculture and nutrition outcomes. For example, farm management and business planning skills can help families manage limited resources. Families often need to balance multiple needs related to diets, health, and agriculture. Business planning helps families account for the diversity of household expenses, including food purchases, agricultural labor, health care, and anticipate cash flow needs.

   Smallholder households also require knowledge and skills in production, storage, processing, selling, and marketing. Good agricultural practices can protect families against harm to health and nutrition. For example, storing moist groundnuts could lead to mycotoxin contamination, which interferes with absorption of nutrients in food, and dumping agrochemicals in water can poison drinking water sources.

   Nutrition education, which promotes nutritious diets and healthy practices, can also influence the choices households make about food, diets, and nutrition. Importantly, though, food choices are personal. People's choices are determined by food preferences and feedback related to food provided by cultural norms and social networks. For example, someone might not eat cassava because it is unfamiliar or because of dislike of the flavour. Another person might prefer cassava because it is an ingredient in a traditional meal, and family members would disapprove of preparing the meal without cassava.

   Food choices can be connected to how a person sees herself and how others see her. For example, some foods might be associated with poverty or hunger, while others make a person feel like they are wealthy, well-educated, or urban. Processed foods with extra sugar and fat might demonstrate that a person is

rich, as opposed to traditional foods like indigenous fruits and vegetables. Nutrition education is valuable in motivating individuals to commit to healthy food choices, but also for understanding the connections between food, agriculture, and nutrition.

The conceptual pathways from agriculture to nutrition cover several different issues across different sectors and demonstrate the need for a coordinated response in order to create enabling environments that support optimal nutrition outcomes. The pathways also illustrate that agriculture is an input into healthy diets and good nutrition; good nutrition within communities and across the country supports farm and non-farm productivity and, thus, economic growth.

2.3 Food Systems for Better Nutrition

Another way to understand the connections between food, agriculture and nutrition is through a discussion of food systems. Even when individuals or families are motivated and committed to make healthy food choices, the food system places significant influence over their choices about what to grow, eat and purchase.

A **food system** is the people, institutions, and processes by which agricultural products are produced, processed, and brought to consumer. Food systems include a range of activities that make sure that the food that farmers produces reaches consumers. Making food systems nutrition-sensitive requires actions along value chains from production, storage, processing, marketing to consumption in order to deliver safe, nutritious food to consumers. The decisions and behaviours of actors, including farmers, processors, traders, government, and consumers, will determine whether a food system produces the foods required to support diverse, nutritious diets.

A **nutrition-sensitive food system**, designed explicitly to achieve agricultural **and** nutrition outcomes, will ensure that food is:

- **Available.** Enough diverse, nutrient-rich food is available to be grown, collected, or bought to meet food and nutrition needs.
- **Accessible.** People can purchase food, fruits and vegetables in community markets, and are not restricted from visiting markets.
- **Affordable.** The price of food is reasonable. People can afford to buy the food or the inputs needed to produce it.
- **Acceptable.** People are willing to purchase, eat, and prepare it. People can meet their food preferences, as defined by social and cultural norms.
- **Safe.** Food is free from contamination and safe for consumption. Food does not create negative consequences for diets and health.

Food systems vary between societies, cultures and countries – and even within one country. However, all food systems share four common functions, which influence the availability, accessibility, affordability, acceptability, and quality of foods. These factors, in turn, influence a household's choices about the foods that they grow, purchase, and consume.

The four functions of the food system are:

- **Food production** determines food availability and affordability, as well as food quality and diversity. Through the use of good agricultural practices, farmers can produce safe, nutritious food while protecting natural resources.

- **Food handling, storage and processing** helps to preserve the quality of food and limit food losses, supporting stable food supply and prices. Proper handling, storage, and processing practices can affect the shelf-life, safety, nutrient content and taste of foods.
- **Food trade and marketing.** Food trade within countries and across borders take products from the farm to the consumer, facilitating the availability, accessibility and affordability of food. These factors can widen food choices for consumers. and widening food choices for consumers. making diverse food more accessible and affordable. Marketing, including advertising and promotion, impacts consumer preferences.
- **Consumer demand, food preparation and preferences** drive decisions on the foods that are produced, processed, and traded in formal and informal markets. People's ability to purchase food and their food preferences, often based on cultural beliefs and social networks, will drive demand.

Reflection

The discussion on food systems and the enabling environment can be overwhelming, so take some time to review the pathways and food systems to identify differences and similarities. The following questions can help you draw comparisons between the two different concepts.

- How might the health and nutrition knowledge environment (pathways) influence consumer demand or food preferences?
- How does food trade within the food system related to the food market environment shown in the the pathways framework? How do markets affected the affordability and availability of food?
- How can food production practices improve the safety and availability of food? How is food production related to the natural resources environment?

Again, the agriculture-nutrition pathways and food systems discussion are simply two ways of thinking about the connections between agriculture, food, diets and nutrition, and both show us that the decisions people make about what to grow, buy and consume are affected by factors often outside of their immediate control.

2.4 The Pathways in Practice

Let's consider how the pathways and enabling environment play out in a rural community in Zambia. The following activity will help us make connections between agriculture, food, diets, and nutrition, and also serve to help us identify how agricultural professionals can push households along each pathway toward healthy diets and good nutrition.

Activity 2.2: A Day in the Life of Naomi

Read the following story then respond to the questions at the end.

Naomi is a married, 25-year-old mother of three young daughters, between the ages of one and five. Naomi takes her three children regularly to the under-five clinic, hosted by community health workers. The children's under-five cards show that the two oldest girls are below the normal height for their respective ages. Naomi is still breastfeeding her youngest child, and this child is growing well.

Naomi and her husband rely on agriculture to support their family. Naomi is a farmer who cultivates one hectare of maize using traditional farming methods; her husband grows cotton under contract with a private company, planting 2 hectares every season. (He likes growing cotton, not only because he receives extension services through the private company, but because he receives pesticides. He uses a little bit of pesticide for the cotton, but also for protecting maize stores from pests.) Cotton has usually been a good source of income for the family, but last season the family suffered when the cotton prices collapsed. The family did not earn the money they expected from the sale of cotton, and therefore did not make some planned investments, like the purchase of goats and the replacement of the roof on their home.

The family reserves some maize for food, but most of it is sold to the government, who guarantees a solid price. (The family has thought of growing other crops, but is not sure how to intercrop maize with legumes or if they can get a good price for these other crops.) What little maize the family keeps for consumption does not last until the next harvest. When the family runs out of maize, they might barter with neighbors for food or use the small income from her husband's piece work at neighbors' farms to purchase maize.

At the beginning of the planting season, Naomi planted a garden near the homestead, using beans, moringa, amaranthus, and pumpkin received from an agricultural support project managed by a local organization in her community. This is the first time Naomi has ever planted so many different crops near her home.

Naomi wakes early every morning to walk to the borehole the serves several villages. Late arrival means a long queue, which delays breakfast for the family. Breakfast typically consists of nshima and *derere*. *Derere* is the only relish she can afford. Accessing food is a challenge for Naomi, as she has little source of income other than the small amount of money she receives from her husband, which she uses to care for the needs of her children.

Even though Naomi attends under-five clinics where she learned about the importance of eating diverse foods at each meal, she often does not have the time, money or energy to prepare such nutritious meals. Lunch and dinner are similar to breakfast, with a focus on nshima with a small amount of relish. Naomi's family eats fish, meat and legumes only rarely. Naomi raises chickens, but keeps them as a source of income, especially in case of an emergency. For example, when her oldest daughter had malaria, she sold chickens to purchase medicine and a mosquito net. The chickens have served as a reliable savings account for her family.

Between preparing meals for the children, Naomi spends time washing clothes, working in the fields – preparing land, weeding, picking insects off of crops, or harvesting, depending on the time of the year – tending her chickens, and caring for the children. She wants to participate in a community savings group, but her husband has not allowed her to participate. Naomi is already participating in learning group under the agricultural support project, and he feels this savings groups will take too much time away from her other responsibilities to the family and home. Naomi respects his opinion, but she thinks the savings group would be a good way for her to make money and learn how to manage money to balance the family's many different needs.

1. What are the major challenges faced by Naomi and her family?

2. What are Naomi and her family doing to address these challenges?

3. Consider the story of Naomi and her family in the context of the agriculture-to-nutrition pathways. Along each pathway, what are the factors that either support or hinder healthy diets and good nutrition? Refer to specific "steps" along each pathway.

Pathway	Drivers of Malnutrition	Drivers of Healthy Diets, Good Nutrition
Agricultural production		
Agricultural incomes		
Women's empowerment		

4. Consider the enabling environments that influence the agriculture-to-nutrition pathways. What are some factors within these environments that are influencing – positively or negatively – better individual or household nutrition outcomes?

Food market	
Natural resources	
Health, water and sanitation	
Nutrition and health knowledge	

Naomi's story shows us how agricultural production, agricultural income, and women's empowerment can support (or hinder) nutrition outcomes. Similarly, the enabling environments interact with the pathways to influence nutrition outcomes. Of note, the pathways show that agriculture is not only an input into nutrition; improved nutritional status also improves the productivity of agriculture and non-agricultural workers, and therefore economic growth. Where agriculture serves as the major livelihood for rural households and malnutrition levels are high, the pathways illustrate the potential for not only improving nutrition, but also improving agriculture.

In the next session, we will focus on how agricultural professionals can support positive progress along these pathways, not only for better health and nutrition of rural households, but also to realize agricultural potential.

Summary
Session II: Agriculture, Food Systems and Nutrition

1. Food and agriculture play an important role in supporting healthy diets and good nutrition. Yet, there is a two-way relationship between agriculture and nutrition. Agriculture can improve nutrition, and improved nutritional status supports greater productivity amongst farm and non-farm workers.
2. Agriculture, food systems, diets and nutrition are linked in multiple ways.
3. 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.
4. 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.
5. Eating a diverse, nutritious diet depends on a food system that makes food available, accessible, affordable, acceptable and safe. These factors will, in turn, influence the choices that people make about the food grown, purchased and consumed.

SESSION III: TAKING ACTION FOR FOOD AND NUTRITION SECURITY

Learning Objectives	Activities
• Lead students to appreciate how nutrition-sensitive agriculture supports food and nutrition security • Describe the Government of Zambia's multi-sectoral response to reducing malnutrition • Identify how other sectors contribute to improved nutrition outcomes	• Activity 3.1 Helping Naomi's Family
Time: 2 hours	

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

Let's begin this session be recalling the definition of 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."

Remember, food security is only one precondition to adequate nutrition and supports nutrition security. To tackle and prevent malnutrition, we need to fully acknowledge the importance of nutrition concerns. Adequate nutrition also depends on the utilization of food through a diverse diet, clean water and sanitation, and quality health care.

When you begin your professional career, you may likely find yourselfworking in rural communities with households who face barriers to healthy diets and adequate nutrition. Within the context of your role as a fisheries officer or extension officer, for example, how can you integrate nutrition into your daily work? What concrete actions will you take to help households realize diverse, adequate nutrition through agriculture? How can you support agriculture and nutrition outcomes?

For this reflection, you will need to imagine your future self. Based on your understanding of the roles and responsibilities of an agricultural professional – whether engaged in food processing and preservation, small livestock production, fisheries development, or crop production – let's consider the following questions. You might like to refer to the earlier discussions on food and nutrition security and the drivers of malnutrition.

Reflection

How could your activities and interactions with households and in communities:

- Lead to increased production?
- Decrease the cost of nutritious foods?
- Reduce the impact of climate change?
- Reduce risk of food contamination?
- Increase farmers' incomes?
- Reduce food waste?

Let's look more closely at the example of post-harvest handling and storage practices and how they can influence food and nutrition security. Good post-harvest handling and storage practices help to maintain food quality and minimize food losses.

- **Availability:** To ensure that farmers maintain sufficient food in storage, teach farmers good post-harvest and storage practices. Drying and cleaning grain prior to storage and using improved storage structures can minimize losses. Also, when more food is available in markets, prices tend to drop; food is more **affordable** to consumers who purchase in markets.
- **Accessibility:** Farmers who sell grain at markets will fetch higher prices for quality grain. In addition to instructing farmers in good post-harvest practices, help farmers understand how markets function so they can produce crops to meet market demand. Good prices at market translate into higher incomes, which can be used to access other nutritious foods.
- **Safety**: Grain stored under poor conditions is susceptible to harmful toxins. Poor post-harvest practices can increase the risk of aflatoxin contamination. Agricultural professionals – like extension officers or food and nutrition officers – can provide nutrition education to households to explain that aflatoxins slow the growth and development of young children, while comprising immune systems. Children with recurrent illnesses are unable to use the nutrients available in foods.

This example provides only some of the possible ways in which agricultural professionals can support households to realize healthy diets and adequate nutrition through agriculture. Let's go back to Naomi's family to identify other actions that help smallholder households move along the pathways toward good nutrition.

Activity 3.1: Helping Naomi's Family (Part 1)

In the last session, we read about the challenges that Naomi and her family face. These challenges limit the family's agricultural potential, but also undermine their nutritional status. Review the past responses to Activity 2.2., in addition to Naomi's, then respond to question 1 and 2.

1. Consider the challenges faced by Naomi's family. Then, (1) identify actions related to each function of the food system, which you could take to affect the diets and nutrition of this household; (2) describe the intended result of each action.

Functions of food system	**Action(s)**	**Intended Result(s)**
Food production		
Food handing, storage, and processing		
Food trade and marketing		
Consumer demand, food preparation, and preferences		

2. Now look at Naomi's challenges in the context of the agriculture-nutrition pathways framework. Identify the pathway(s) along which you would need to work to support her needs, referring to actions related to specific steps. For example, if Naomi's challenge is poor health status, how could you support "agricultural income," "non-food expenditure," or "health care."

3.2 Nutrition-sensitive Agricultural Interventions

What you may or may not realize is that, in reviewing Naomi's storing and applying your learning about the connections between food, agriculture, and nutrition, you have created an expansive list of nutrition-sensitive agricultural actions.

As a reminder, nutrition-sensitive interventions, related to agriculture, social welfare, water, sanitation and hygiene, and education, address underlying and basic causes of malnutrition. These interventions address household food insecurity, inadequate care and feeding practices, water and sanitation, and health services. Specifically, nutrition-sensitive agriculture targets agricultural production systems to improve the nutritional status of individuals and households.

Nutrition-specific interventions focus on the immediate causes of malnutrition, including inadequate dietary intake and disease. Typically, in Zambia, the health sector is responsible for supporting these actions through health facilities and community outreach. These types of activities might include growth monitoring and promotion, antenatal care, management of acute malnutrition, treatment of diarrhea, and nutrition education.

Reflection

Looking back at the list of actions you would take to address the challenges faced by Naomi and her family:

- Which of the actions identified are nutrition-sensitive?
- Are there any actions that you think are nutrition-specific?

If necessary, refer to the definitions of nutrition-specific and nutrition-sensitive interventions and try to recall if these interventions address the immediate, underlying, or basic causes of malnutrition.

It's very likely that some of the ways you have selected to support Naomi's family are included in the following types of nutrition-sensitive agricultural interventions.

1. **Increase production** of more diverse and nutritious foods, including bio-fortified crops like vitamin A maize and orange-fleshed sweet potato, and nutritious fruits Greater availability of nutritious foods leads to more diverse diets, while availability of greater quantities of foods drives down prices, making diverse, nutritious foods more accessible, especially for the most vulnerable households.
2. Promote safe **on-farm processing, preservation, utilization and storage practices** to preserve nutritional value, reduce seasonality and food waster, improve food safety, and make healthy foods convenient to prepare.
3. **Protect natural resources** through good agricultural practices, by adopting production systems, like conservation agriculture, that restore biodiversity and grow soil nutrients. Healthy soil is more productive, and thus increases the availability of foods. Manage water resources to reduce vector-borne illness and ensure sustainable, safe household water sources.
4. **Promote clean environments** through good sanitation and hygiene practices, particularly as it relates to handling of manure, chemicals and fertilizers, and livestock. Training in proper use and application of chemicals will mitigate potential health risks; appropriate enclosures for livestock reduce the risk of disease and illness spread through manure.
5. Integrate **nutrition education** throughout agriculture extension services to increase demand for diverse and nutritious foods and promote production, purchase, and consumption of diverse foods. For example,

provide nutrition messages such as how to select nutrient-dense crops, improve recipes with locally available ingredients, limit consumption of excess fats, sugars, and salt.

6. Some feel that nutrition education falls squarely within the remit of the health sector, while others see room for the agriculture sector, which supports production decisions and market access, to motivate households to grow, buy, and consume healthy foods. Regardless of who educates households about nutrition, the information provided across sectors must avoid contradictory messages that undermine their respective efforts.
7. **Expand markets and market access** for more vulnerable groups, especially for marketing of nutritious crops. Often, locally-produced foods of high-nutrient value do not reach markets. Help farmers access market price information, various types of seeds, couple with investments in value addition and marketing infrastructure, to incentivize the production and sale of nutritious foods. Help smallholder farmers organize for market, with special focus on nutritious foods.
8. Invest in the steps along **value chains** – from production to consumption to markets – to increase demand for and supply of nutritious foods and improve the nutritional value of food. Biofortification, a type of value addition, can prevent micronutrient deficiencies by generating crop varieties with higher nutrition content through breeding.
9. Recognize and support the different needs and interests of **women and men** in agriculture. Empower women in agriculture by ensuring access to income opportunities, providing support for child care and social networks, and improving access to financial services and social protection schemes. Focus on foods grown by women to support the voice in household and farm decisions.

It's important to emphasize that not all of these actions may be necessary in the contexts in which you will work. To design and target nutrition-sensitive interventions, you will require an understanding of the nutrition situation. Many factors influence this situation, as we have discussed, including the natural resources environment, access to health services, and cultural norms. Households that have high maize productivity through protection of natural resources and use of improved seed varieties may need assistance in diversifying production to include horticulture or small livestock. Communities cut off from markets by poor infrastructure may need support in accessing markets to increase farm incomes. Across households and communities, needs will differ.

An understanding of agriculture, food systems and nutrition in a given context can inform interventions, while a situational analysis can help you identify opportunities for collaboration with different actors across sectors. The causes of malnutrition are multi-faceted. Therefore, the responses designed to address malnutrition must also be multi-faceted, with different sectors contributing to malnutrition reduction according to their relative strengths and prescribed roles.

3.3 The Need for Multi-Sectoral Responses to Malnutrition

Fast forward to the future, again, and imagine yourself working in a community in rural Zambia. There are various groups – government institutions, financial actors, NGOs, and businesspeople – working in the community, each with different reasons and interests for working with households.

Reflection

- Beyond private sector and NGOs, with whom you will undoubtedly need to engage, what are the government institutions, particularly ministries, who will interact with households?
- What role do you think these different ministries play in tackling malnutrition?
- Can you think of any concrete examples of initiatives under line ministries that aim to improve diets and reduce malnutrition?

Responding to malnutrition requires a coordinated response with partnerships across different sectors. For example, some households may rely on social cash transfers offered through the Ministry of Community Development and Social Welfare; deworming campaigns through the Ministry of Health; and/or water, sanitation and hygiene promotion in schools through the Ministry of Education. All of these sectors should figure prominently in the response to malnutrition in Zambia.

As shown through policies and programmes (Figure 8), the Government of Zambia recognizes the need for multi-sectoral coordination to significantly reduce malnutrition. The **National Food and Nutrition Commission** (NFNC), under the authority of the Ministry of Health, has the mandate to formulate policy and coordinate the nutrition agenda and nutrition-related activities from national to district level. The NFNC coordinates the efforts of several different line ministries relevant to reducing malnutrition and expects ministry staff and frontline workers to coordinate at community and district levels to develop integrated, multisectoral district plans. Collaboration with private sector and non-governmental organizations is also necessary to coordinate service delivery to households.

Ministry	Support for Malnutrition Reduction
Ministry of Health	Implements routine nutrition services (i.e. antenatal care, postnatal care, growth monitoring and promotion, iron folic acid supplementation, Vitamin A supplementation, deworming, management of acute malnutrition, zinc for diarrhoea management) through facility-based healthcare and community outreach; promotes uptake of health and nutrition services.
Ministry of Agriculture	Promotes production diversification (crops, fruits, livestock, fisheries) for diversified consumption; trains on value-addition through food processing, utilization, preservation, storage, and post-harvest handling.
Ministry of Fisheries and Livestock	
Ministry of Community Development and Social Welfare	Promotes quality social and community welfare services, especially for most vulnerable mothers and their children, including social cash transfers and women's empowerment programs.
Ministry of Gender	Support advocacy and SBCC activities related to women's empowerment, particularly for increasing women's participation in decision making related to household food purchases and allocation of nutritious foods among family members
Ministry of General Education	Improves primary and secondary school effectiveness throughout the country; provides nutrition education and services in schools (e.g., school lunch programs, school gardens, and health, WASH, and nutrition education initiatives).
Ministry of Water, Sanitation, and Environmental Protection	Responsible for water policy, water supply and sanitation, water resource management and development; promotes sustainable access to quality water supply services and improved sanitation while promoting uptake of positive hygiene behaviours.
Ministry of Commerce	Facilitates organization of agricultural cooperatives and supports their efforts to connect to formal markets.

Let's return, again, to Naomi and her family to identify ways in which these ministries could support the household to fill needs or gaps that cannot be met by agricultural professionals under the Ministries of Agriculture and Fisheries and Livestock.

Activity 3.1: Helping Naomi's Family (Part 2)

Review your responses to the first part of Activity 3.1, then complete question 3.

3. 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, (1) identify ways in which they could also support Naomi's and her family, then (2) refer to the UNICEF framework on the causes of malnutrition to identify the cause that this action addresses.

Ministry	Actions to Support Naomi and Her Family	What cause of malnutrition (immediate, underlying, or basic) does this action support?
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		

Reflection

Based on the actions you have identified, consider the following questions:

- Do you see any potential for conflict between ministries, based on the possible actions you have identified?
- What are some of the mechanisms that might allow for a coordinate response across ministries?

Earlier, we mentioned that addressing the intertwined and multi-sectoral causes of malnutrition requires a coordinated, aligned response. The National Food and Nutrition Commission has established Provincial and District Nutrition Coordinating Committees (PNCC, DNCC), comprised of line ministries and other organizations and partners working in communities, to coordinate the response to malnutrition, with an emphasis on reducing stunting. These committees build on the strengths of existing actors, systems, and capacities to facilitate a shift in how malnutrition is understood and addressed. Within districts, Ward and Zonal Nutrition Coordinating Committees (WNCC, ZNCC) exist to facilitate collaboration between sectors and to ensure the convergence of activities by improving the availability, accessibility, and affordability of nutritious foods; promoting appropriate infant and young child feeding practices; and supporting access to clean water and sanitation.

While these mechanisms were designed to support child malnutrition, the benefits of a coordinated approach to address poor nutrition will accrue to all people vulnerable to undernutrition, including boys and girls, men and women.

Summary
Session III: Taking Action for Food and Nutrition Security

1. The aim of nutrition-sensitive agriculture is to make food systems better equipped to produce good nutritional outcomes for individuals and households.
2. Nutrition-sensitive agriculture makes food more available and accessible; makes food more diverse and production more sustainable; and makes food more nutritious.
3. 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.
4. 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.
5. 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.

ADDITIONAL RESOURCES

The following resources are freely available to lecturers and students to expand learning on the connections between agriculture, food, diets and nutrition.

eLearning Courses

Improving Nutrition through Agriculture and Food Systems, FAO, 2016
http://www.fao.org/elearning/#/elc/en/course/NFS

This course demonstrates the connections between agriculture, food systems and nutrition, building on urban and rural scenarios. It describes the benefits and opportunities for integrating nutrition into food system policies and programmes, while providing examples of nutrition-sensitive policies and interventions. It is designed to help learners appreciate how to integrate nutrition into their work.

Accelerating Behavior Change in Nutrition-sensitive Agriculture, SPRING Project, 2017
https://www.spring-nutrition.org/publications/training-materials/accelerating-behavior-change-nutrition-sensitive-agriculture

Designed for practitioners, this training provides knowledge and skills to leverage agriculture's contribution to nutrition outcomes. The course focuses on behavior change and instructs learners on how to use behavior change methods to prioritize and promote nutrition-sensitive agriculture practices.

Agriculture, Nutrition and Health, London School of Hygiene and Tropical Medicine
https://www.lshtm.ac.uk/study/courses/short-courses/free-online-courses/agriculture-nutrition-health

This learning module looks at the multi-sectoral links between agriculture, nutrition and health. It helps learners consider how these connections can promote pro-poor agricultural development, while also reducing food and nutrition insecurity and improving the health status of the most vulnerable.

Toolkit

Nutrition-sensitive agriculture and food systems, FAO
http://www.fao.org/nutrition/policies-programmes/toolkit/en/

An integrated package of guidance on how to design, implement, monitor and evaluate nutrition-sensitive food and agriculture policies and programmes.

Publications

The following publications are updated and published annually, and provide insight into the status of food security, hunger and nutrition. The publications provide country-specific indicators related to these issues.

- The State of Food and Agriculture, FAO: http://www.fao.org/publications/sofa/the-state-of-food-and-agriculture/en/
- The State of Food Security and Nutrition, FAO, http://www.fao.org/state-of-food-security-nutrition/en/
- The Global Hunger Index Report, IFPRI: http://www.ifpri.org/previous-global-hunger-index-ghi-reports
- The Global Nutrition Report, IFRPI: http://www.globalnutritionreport.org/

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