

# Essential Concepts in Agriculture and Food Systems

## Session Guide Three of the Nutrition-Sensitive Agriculture Training Resource Package



February 2018



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Agriculture Training Resource Package

## **ABOUT SPRING**

The Strengthening Partnerships, Results, and Innovations in Nutrition Globally (SPRING) project is a seven-year USAID-funded cooperative agreement to strengthen global and country efforts to scale up high-impact nutrition practices and policies and improve maternal and child nutrition outcomes. The project is managed by JSI Research & Training Institute, Inc., with partners Helen Keller International, The Manoff Group, Save the Children, and the International Food Policy Research Institute.

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## **DISCLAIMER**

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# Preparing to Present This Session

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## Purpose

This is Session Three of seven in the *Nutrition-Sensitive Agriculture Training Resource Package*.

This session introduces the learner to essential concepts in agriculture and food systems. These concepts create a foundation for understanding the intersection between agriculture and nutrition, which is fully explained in Session Four: Agriculture-to-Nutrition Pathways.

Designed for nutritionists with little exposure to agricultural development concepts, this session describes the increasing need for food because of population growth, the goals of agriculture programs, and approaches to agriculture that address challenges such as degrading natural resources and climate change.

## Objectives

By the end of this session, participants should be able to—

1. explain the importance of agriculture in food production, income generation and women's lives
2. articulate the overarching goals of most agriculture programs
3. explain the relationship between agricultural value chains and food systems
4. identify challenges and opportunities for agriculture programs today.

## Estimated Duration

About 2 hours (may take less time if participants already have some background in agriculture)

## Materials

All documents needed to deliver the session can be found at <https://www.spring-nutrition.org/nutrition-sensitive-ag-training/session3>.

- PowerPoint presentation: **3. Essential Concepts in Agriculture and Food Systems**
- Index cards with headings written on them (see exercise below)
- Blank index cards (30–50 cards in total)
- Large sticky notes

# Core Content

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## Slide 1 (cover) Essential Agriculture Concepts for Nutrition-Sensitive Activities

- Good nutrition is the foundation on which a country's future is built—children who experience periodic or chronic malnutrition before their second birthday struggle to catch up with their peers developmentally.
- In the previous sessions (*Why Nutrition-Sensitive Agriculture Matters* and *Essential Nutrition Concepts*), we reviewed relevant available evidence and outlined a set of interventions that can work to address nutrition. As a reminder:
  - Estimates show that even if we scale up nutrition-specific interventions to cover 90 percent of the at-risk population, it would only address about 20 percent of chronic malnutrition (Black et al. 2013).
  - Nutrition-sensitive interventions, which address the deeper causes of malnutrition, are important for addressing the remaining 80 percent of chronic malnutrition.
- Before we can understand how to design and leverage nutrition-sensitive agriculture interventions to address deeper causes of malnutrition, we need to have a strong understanding of agriculture and food systems.
- A thriving agriculture industry is essential for improving nutrition, promoting economic growth, and eradicating poverty. Understanding how agriculture functions within a market economy, including the people involved and affected, is essential for our work in nutrition-sensitive agriculture.

## Slide 2 Agriculture Elements of the Pathways (animated slide)

- In Session One (Strengthening Agriculture-Nutrition Linkages: Why It Matters), we discussed key evidence about the importance of nutrition and outlined how nutrition-sensitive agriculture addresses the basic causes of malnutrition.
- We highlighted the three main linkages between agriculture and nutrition—food produced, income generated, and the use of women's time and energy.
- In later sessions, we will discuss these three pathways in greater detail and focus on specific agriculture-nutrition linkages.
- This session will focus specifically on the agriculture elements of these pathways. We will explore how agriculture programs work and the challenges inherent to producing food today.

## Slide 3 Objectives

- This session gives participants an understanding of basic agriculture and food systems concepts. By the end of this session, participants will be able to—
  - explain the importance of agriculture in food production, income generation, and women's lives
  - articulate the overarching goals of most agriculture programs
  - explain the relationship between agricultural value chains and food systems
  - identify challenges and opportunities for agriculture programs today.



**Lessons Learned:** *It is important to take time and create a strong foundation on both nutrition and agriculture before discussing nutrition-sensitive agriculture. This step helps ensure that all participants have enough information to discuss the pathways linking agriculture and nutrition. Bringing together agriculture and nutrition experts can result in tension, some of which may stem from the lack of a shared vocabulary and common understanding of how agriculture and*



*nutrition are linked. Ensuring a strong foundation in both sectors helps to create that shared vocabulary and develop the mutual understanding needed to work together effectively. To learn more about this, see the “Convergence and Tension in Nutrition-sensitive Agricultural Market Development Activities: Discussion Paper” in the Additional Resources section.*



**Facilitator Note:** A source is included for all statistics included in this session. These sources provide information specific to other regions and countries. Since local statistics usually have more impact than global statistics, it is recommended that you review the sources referenced and replace or add data relevant to your context throughout this session.

#### **Slide 4 Understanding Agriculture** *(animated slide)*

- Discuss: When we talk about agriculture, what activities come to mind? [Take several responses, and note them on a flipchart]
  - **[Explain]** Growing food, gardening, cultivating crops, working the land, raising livestock, and harvesting are all terms that quickly come to mind. Agriculture includes these components and more.
  - **[click]** Agriculture is the science and practice of farming— cultivating the soil for growing crops and raising animals to provide food, wool, and other products.
  - When we talk about agriculture, we are also talking about things like: processing, packaging, buying, and selling.
- **[click]** Agriculture impacts the world’s population in critical ways: through food production, as a source of livelihoods and income and, for a large percentage of the world’s population, it is how individuals (especially women) spend most of their time and energy. As the global community looks to feed a growing population, increasing attention has been placed on the role of agriculture (United Nations Department of Economic and Social Affairs 2017).



**Facilitator Note:** There are many terms that are important to understanding agriculture, food security, and food systems. We have included only the most basic terms in this presentation, with a focus on creating a foundation in agriculture for those stakeholders who may have limited exposure to these concepts. See the ‘Additional Resources’ section for further information.

#### **Slide 5 Enough Food is Produced to Feed Everyone**

- Today, enough food is produced to feed the world’s population—yet, hunger continues to be one of the most urgent development challenges because there are many people who cannot access or afford adequate amounts of food throughout the year.
- Food waste is also particularly high in developed countries where the poor cannot afford sufficient nutritionally-adequate food.
- Roughly one third of food is lost in the food supply chain around the world.
  - Food losses in low-income countries occur primarily at storage, transport, and processing levels. In higher-income countries, food losses occur at the retail and consumer level (CCAFS 2018).
- Recovering just half of what is lost or wasted could feed the world.

### Slide 6 **Agriculture and Food Production** *(animated slide – to see all text, view in presentation mode)*

- **[click]** Today, there are an estimated 815 million hungry people in the world (FAO 2017).
  - Poor people spend between 50 and 80 percent of their income on food, including smallholder farmers who grow or produce a portion of the food they eat.
  - **Food security** means having, at all times, both physical and economic access to enough food to meet dietary needs for a productive and healthy life. According to the [USAID Feed the Future website](#), a family is food secure when its members do not live in hunger or fear of hunger.
- Looking to the future, population growth suggests that food security is likely to worsen. If we do not think carefully about how we produce and consume food, we could face a global food crisis by 2050.
- **In general, population growth is highest where income levels are low.** This is especially true in cities where land is scarce, and since 2008, there have been more people living in cities than in rural areas.
  - There are about half a billion small farms in the world, and they support around 2 billion people.
  - **[click]** However, with projected population growth by 2050, food production in developing countries will need to **nearly double** to continue supporting the population.

### Slide 7 **Agriculture as a Source of Income**

- As of 2012, 1 in 3 workers globally is engaged in the agriculture sector. In sub-Saharan Africa, 60 percent of the entire workforce is involved in agriculture (FAO 2013).
- A large share of the working poor is involved in agriculture; thus, developments in this sector have a major impact on welfare throughout much of the world.
  - Most workers in these regions do not enter formal wage employment, but instead are engaged in self-employment or unpaid family work, such as agriculture and especially subsistence farming.
  - The agriculture industry profoundly affects the people who are involved in it.
- Growth in gross domestic product (GDP) generated by agriculture is up to four times more effective in reducing poverty than growth generated by other sectors. Therefore, continued investments in agriculture make sense for governments and the private sector (FAO 2016).

### Slide 8 **Farming Is Not Easy**

- Farmers rely on the food they produce to feed their families and to sell at the market for income. These are essential needs that must be met, but **farming is complex and the outcomes can be unpredictable.**
- Making decisions about what to farm, how to grow, when to harvest, and how to sell food produced are all part of the challenge that comes with farming. Most farmers learn how to cultivate crops and raise animals from other family members.
- However, shifts in weather and a changing natural resource base present new and ongoing challenges—in addition to unpredictable weather and changing markets.
- For farmers who rely on crops for food and income, there are many factors to consider.

### Slide 9 **Agriculture in Women's Lives (time and energy)**

- An additional challenge to successful farming is meeting the labor demand required. As families struggle to decide who will perform this labor, they need to consider the specific needs of women.
- At the global level, women are more active in the agriculture sector than men—overall, 38 percent of people working in agriculture are women, compared with 33 percent of men (FAO 2013).

- In India, for example, agriculture is the source of employment for at least 60 percent of all employed women (compared with 45 percent for men). The same is true in Bhutan, where the percentages are close to 80 percent for women and less than 50 percent for men (FAO 2015).
- To clarify these numbers, the agricultural labor force includes people who are working or looking for work in formal or informal jobs and in paid or unpaid employment in agriculture. That includes self-employed women as well as women working on family farms. It does not include domestic chores, such as fetching water and firewood, preparing food, and caring for children and other family members (FAO 2011).
- Agriculture impacts women's lives in important ways.
  - Agriculture is hard work. For both men and women, the physical demands of agriculture are significant—from tilling fields to weeding to harvesting. The body burns a significant number of calories while performing this hard labor.
  - Since much of agricultural labor needs to be performed at the right time, women who are mothers face difficult choices. It is not unusual to see women who are pregnant or carrying a small infant plowing fields or harvesting crops. These responsibilities multiply the physical demands on the body, and require that women consume food in greater quantity and of better quality to ensure that their infants are born healthy.
  - Too often, older children are either taken to the fields or left with other caregivers, limiting the time women have to care for their children. When they are old enough, children may also be expected to work on the family farm, limiting their opportunities for education.
  - Additionally, women are more likely than men to perform unpaid labor (as part of a family plot or subsistence farming), but they tend to have little control over how money earned from agriculture is spent.
- Women's disproportionate involvement in agricultural labor often has a negative impact on the health and well-being of the entire family.



**Discuss:** What are examples of agricultural tasks that you have seen women perform where you work? How do these tasks affect the women's health? Does it affect their children? **[Take several responses.]**



**Lessons Learned:** *When discussing gender equality and female empowerment, we sometimes face resistance, especially around sensitive cultural issues like women handling money. It is important to understand that many of these beliefs are deeply embedded in the cultural fabric. We should encourage change, but it will not happen quickly.*

## Slide 10 Agriculture Programs Have Two Overarching Goals

**Discuss:** How many of you have worked on an agriculture activity? What were the main objectives? **[Take several responses.]**

- There are typically two major interdependent and overarching components in an agricultural livelihoods system: 1) increased production (or yields) and productivity and 2) increased income. Generally, you will see one or two objectives in an activity proposal focused on:

- Increased production and productivity (for example, through *improved land management and production practices*)
- Increasing income (for example, as a result of livelihoods and value chain investments).

### Slide 11 Agriculture Programs Work on Multiple Levels

- Agriculture programs are designed to work on multiple levels, both *on the farm* and among *the systems* that affect the supply of food and demand for specific products.
- Agricultural activities support everything from home gardens to agricultural estates, including production for the farmer's own family and production for purchase by consumers, through local, national, and international markets.
- When agriculture programs look for opportunities to make improvements and add value, we are looking at the whole system surrounding food: production, processing, marketing, distribution, utilization, and trade—in other words, the whole system that encompasses growing food, buying food, and consuming food.
- We also look at the people involved at many stages in that food system: farmers, consumers, buyers, traders, processors, suppliers, government agents, researchers, bankers.



**Facilitator Note:** *The following activity is designed to set the stage for a broad discussion of food systems, production systems, and value chains. Note that we avoid introducing those specific terms until after the activity. This allows participants to explore and explain agricultural activities that they already know about, without being overwhelmed by new terminology, concepts, and frameworks. The lists that participants generate during this activity are likely to be a mix of concepts, which will be clarified later in the session.*

## Slide 12: Exercise – Mapping a food system

### Exercise: Mapping a Food System

#### About this Exercise

- **Goal:** To better understand the network of agricultural activities and actors
- **Duration:** 30–45 minutes
- **Materials:** Index cards with headings written, blank index cards (10–15 per group), large sticky notes
- **Preparation:** Choose 2–4 agricultural products for participants to discuss during this activity—the examples given here are **onions, fish, eggs, and rice**. You may use these, or choose any agricultural products that are produced locally and represent a range of production, processing, storage, trade, and marketing opportunities.
  - Prepare the following four index cards with heading labels, one set for each group: Activities, Actors, External Factors, Product (e.g., onions).
  - Divide the group into 2–4 teams.
  - Give each group 10–15 index cards and a pad of sticky notes.
  - Assign each group a location in the room, where they have an adequate amount of space on the wall to post their work.

#### Exercise Instructions

- Explain that we will be creating a map of agricultural activities on the wall. We will begin by exploring the range of activities that are involved at multiple levels—*on the farm* and including the *systems that affect supply and demand*. To focus our thinking, each group will work through an example using a single agricultural product. Assign each group one locally produced product; for example: **onions, fish, eggs, or rice**.
  - If I buy an **onion** at the supermarket (a large store in the capital city), what are the activities that have taken place to get this product here, in my hand?
  - Imagine all the activities that take place from the moment a farmer decided to grow or raise this **onion** to the moment when I (the consumer) decided to buy it.
  - As you identify activities, write each one on a separate index card and attach it to the wall in a column.
- Give participants about 10 minutes to generate their list.
- As teams work, the facilitator should circulate the room and ensure that the lists generated have enough depth. As needed, ask questions like: “What happens before the farmer plants the seed?” (e.g., buying seed, producing seed); and “As a consumer, what attracts me to a store to buy this onion?” (e.g., advertising, marketing); and “Are there both local and international markets for this onion? How does it get from one place to another?” (e.g., transport, trade).
  - Now, as we look over this set of activities, think about the people involved in food production. Who is involved in each activity?
  - For example, one of our activities is transporting the onions—the people involved in that activity include the owners of the transportation company and the drivers of transportation vehicles.
  - As you identify groups of people involved in each activity, write them on a sticky note and post them to the right of the relevant activity.
  - Write the name of each group on a separate sticky note.
- Give the teams about 10 minutes to generate a list of actors involved in food-related activities.
- As teams work, the facilitator should circulate and ensure the lists of actors cover a broad range of people, including consumers, buyers, traders, processors, farmers, government, researchers, suppliers, and

## Exercise: Mapping a Food System

bankers. If needed, ask participants: “who else is involved in the activities and actors that are already listed?” This can help groups consider both primary and secondary actors.

- Now, looking over your list of activities and actors—what external factors could affect whether this onion successfully makes it into the store where I bought it?
- Write each factor on a separate sticky note and post it to the left of your activities.
- For example, if external factors like weather, prices or environmental regulations are not favorable for onions, production is low and there may be a shortage of onions in the store. Write “unfavorable weather” on the sticky note and place it to the left of the activity.
- Give the teams about 10 minutes to generate a list of external factors.
- As teams work, the facilitator should circulate and ensure the lists of actors cover a range of external factors, especially those in the enabling environment and supportive services, including water supply, quality of seeds, laws and regulations that support or hinder business, training for farmers, grants or loans to buy equipment, and equipment repair services.
- When participants have finished, invite them to walk around the room and look at the maps that other groups have created.

### Discuss

- Ask participants to return to the large group for a plenary discussion. The facilitator should choose one team’s work for discussion. (Choose the one that has the most depth.)
- Choose 2–3 activities that participants have outlined and talk briefly about the related actors and other factors. Avoid reading every item on the wall, as a few examples are enough to ensure everyone is on the same page.
- Explain that this exercise gets us thinking about the range and depth of agricultural activities, the people involved and affected by those activities, and other factors that affect the success of that agricultural product.
- Ask the following discussion questions and take 2–3 responses for each.
- Looking at your list of actors:
  - How could an agriculture activity increase income for one of these actors?
  - How could an agriculture activity increase productivity for one of these actors?
- Looking at your list of external factors:
  - How could an agriculture activity address one of these factors to increase income?
  - How could an agriculture activity address one of these factors to increase production or productivity?
  - How could an agriculture activity save time and labor for both women and men?
- As our discussion continues, we will examine how an agriculture activity looks at this range of activities from a few different angles, with the goal of increasing production, productivity, and income.

### Slide 13 Food System

- At the beginning of this session, we discussed the linkage between agriculture and food security. We need to also look at the food that the consumer is buying and eating—and how to influence healthier practices.
- A food system is the path that food takes from the field to consumers (The Lancet 2017). This process includes a set of activities ranging from production to consumption. This illustration is the Food and Agriculture Organization of the United Nations model for a food system.
  - In the center, we have the consumer’s diet and nutrition. What the consumer eats is dependent on what foods are available, which are affordable, and which can be prepared in a convenient way.
  - This, in turn, depends on the food system that surrounds them:

- **[click] Consumer demand, food preparation, and preferences**: consumer demand shapes decisions on what foods to produce, process, and trade. The main drivers of demand at the household level are purchasing power and preferences.
- **[click] Food production**: which foods are produced, including fisheries and forestry. This also includes managing the natural resource base (land, water, soil, plants, seeds, animal breeds) and supporting infrastructures (water supply).
- **[click] Food handling, storage, and processing**: focused on preserving food, extending shelf life and limiting food losses—to help stabilize food supply and prices. These may take place at the household, community, or commercial level.
- **[click] Food trade and marketing**: bringing food to consumers from locations where it is produced—regionally, nationally, or internationally.
- Agriculture programs may work to impact any part of this food system: at the farm level, along a specific value chain, or at the consumer level.

#### Slide 14 Actors in the Food System

- In our activity, we mapped out the people involved the range of agricultural activities—this set of actors can be looked at as groups of beneficiaries, partners who support implementation of an activity, and influencers who encourage a desired change.
- These actors determine what foods are grown. They also influence the ways in which foods are processed, stored, distributed, sold, prepared, and consumed.
  - For example, consumers influence which foods are grown—it is in the farmer’s interest to grow products that will sell.
  - Government officials also influence what is grown, since specific agricultural policies might create incentives or disincentives for certain products.
- Service providers (e.g., bankers who provide financing and loans; researchers studying water, soil, and agricultural practices; mechanics who service farm equipment) are an essential group of actors. They are important to the effectiveness and efficiency of agricultural activities and a well-functioning food system.

#### Slide 15 Value Chains—Product Specific

- Agriculture programs also look at activities through the lens of a single product or commodity—such as wheat, milk, or chicken. **A value chain** is a general term (not specific to agriculture) that refers to a type of supply chain where activities are performed to deliver a product or service to the market efficiently and competitively, adding value for the actors engaged at each step of the chain.
- An agriculture program may include **value chain activities** that invest anywhere along the chain, from input supply to promotion, preparation, and consumption.
- Value chain actors represent important target groups in value chain-based activities. These include: input suppliers, producers (large, small; wealthy, poor; male, female), service providers, transporters, wholesalers, retailers, caterers, and consumers.



**Lessons Learned:** *Developing value chains. To increase the availability, affordability, and desirability of nutritious foods, interventions can focus on strengthening key relationships among actors in the value chain. Finding the links that can be strengthened to produce the desired changes may require formative research to understand what consumers want and will accept, alongside observing the markets and actors to understand what is necessary to create change.*

*We have seen, in a range of contexts, the important role that markets play in increasing affordability and availability of nutritious foods. Market systems need to be well-understood and appreciated for effective nutrition-sensitive agriculture activities to work.*

#### **Slide 16 How can we do it?**

- Agriculture programs may focus on any part of the food system: the farm level, a specific value chain, or at the point of sale; agriculture programs may aim to increase production and/or incomes.
- The critical question, however, is how do we increase production and income while anticipating and avoiding negative impacts on other actors and the environment?
- In other words, how can agricultural programs help farmers survive today, without making environmental problems worse, thus compromising food production in the future?
- We will first examine a few of the most urgent environmental challenges that agriculture programs need to consider. Then we will discuss approaches that work.

#### **Slide 17 Challenge 1: Limited Natural Resources—Land**

- First, we recognize that land is necessary for sustainable agricultural development, essential ecosystem functions, and food security. However, the natural resource base needed to support a growing population is shrinking.
- Currently, about 12 percent of the world's land area is used for agriculture (shaded blue in the graph). At first glance, we might be tempted to increase production and income by helping to expand farms onto additional land—after all, 12 percent may not sound like much.
- However, about 30 percent of the remaining land available is forest (shaded in yellow, in the graph). Forests make vital contributions to biodiversity and act as a source of food, medicine, and fuel for more than a billion people.
  - The impact of deforestation and land use intensification, especially on soil degradation, has been significant (FAO 2015).
  - Already, agriculture is responsible for 75 percent of global land deforestation (CCAFS 2018). Therefore, agriculture should not look to land already covered by forests for further expansion.
- A large part of the land that remains (shaded in red) is covered by cities or is non-arable land, such as desert, swamp, or rocky mountain. While this includes some land with the potential to be used for agriculture, that land is concentrated in certain regions.
  - Almost 90 percent of land *available to support the needed expansion* is in Latin America and sub-Saharan Africa, with almost none in Southern Asia, Western Asia, and Northern Africa.
- The bottom line: In most regions of the world, production cannot be increased by expanding agricultural land use.

#### **Slide 18 Challenge 1: Limited Natural Resources—Water**

- We know that water is a limited resource—and yet, global demand for it has risen sharply over the last century.
- Take a guess: What percentage of the world's water supply is used for agricultural purposes?
  - **[click]** Approximately 70 percent of total freshwater withdrawal in the world is used in agriculture, mostly through irrigation (red line).



- Regionally, the percentage of water used for agriculture (yellow area on the chart) is highest in Africa and South Asia. Irrigation has been crucial for gains in food production, since it reduces drought risk and encourages crop diversification, thus enhancing rural incomes.
- A large percentage of the world's water supply is already being used for agriculture—particularly in the global south, where food insecurity tends to be heaviest.
- In the future, water is likely to become scarcer and more needed.
  - While irrigated agriculture represents only about 20 percent of cultivated land, it contributes to 40 percent of global food production. As the demand for food expands, water use will need to increase as well.
  - Additionally, agriculture tends to have a negative impact on water quality, due to pesticide and fertilizer use. This puts the sustainable supply of water for both agriculture and human consumption at risk.
  - The effects of climate change will also affect how much water is available for use.
  - Water availability is expected to worsen by 2050, with global water consumption increasing by 19 percent. This would leave about 52 percent of the world's population living in areas where freshwater supply is under pressure
- The bottom line: Agriculture consumes large amounts of water that is also needed for peoples' everyday use and across industries. In places where irrigation is essential, this high demand for water threatens to dry up whole ecosystems.

#### Slide 19 Challenge 1: Limited Natural Resources—Climate Change

- Agriculture is a major contributor to climate change—responsible for 75 percent of deforestation and 20 percent of greenhouse gas emissions.
- The effects of this climate change, in turn, are making agriculture more difficult and many cropping systems will no longer be viable.
  - For example, by 2050 in Africa—the continent with the fastest population growth rate—maize cultivation will no longer be viable across up to 3 percent of the continent. These areas currently support 35 million people. By as early as 2030, there could be challenges in meeting demand for this staple crop (Jones and Thornton 2009). This will lead many farmers to transition to livestock-only farming systems, which are less efficient and feed fewer people (CCAFS 2018).
- The bottom line: Agriculture is a major contributor to climate change—and severely affected by it. With current pressures on land and water use, we need new practices that address our future needs.



**Lessons Learned:** *Tying the training concepts to local examples throughout each session adds depth and immediacy to stakeholders' understanding. In Guinea, for example, we used examples from the cowpea value chain to illustrate how nutrition can be improved through a local product. Using a local example is more encouraging because it shows that the changes required will be feasible in the stakeholders' country and context.*

#### Slide 20 Challenge 2: Shifts in What is Grown and Eaten—Cereals

- Globally, there has been a steady increase in production of cereal crops (FAO 2015). Cereal crops include: wheat, rice, barley, maize, rye, oats, and millet.
  - In some areas, this increase has been driven by *gains in yield on the land already under production*—as with increases in wheat and rice production in Asia and North Africa.
  - However, throughout Latin America and sub-Saharan Africa, higher yields have resulted from an *expansion of agricultural land*.



**Discuss:** This might seem like good news for feeding a growing population. However, this increase in cereal crops has not done much to reduce food insecurity. Why? **[take several responses]**

- Much of the harvest is used for animal feed and ethanol, which are likely to grow faster than grains for human consumption.
- Globally, diets are shifting toward those higher in protein, fats, and sugar.
- A sufficient *diet* (as compared to sufficient calories) also requires micronutrients and protein that must be from diverse food sources. Cereals tend to be calorie-heavy, but nutritionally weak.

The bottom line: Cereals are an important resource, but larger issues of how cereals are used (food vs. biofuel, animal feed) must be addressed. In addition, an over-reliance on cereals in the poorest parts of the world cannot adequately address people's needs, as it is nutritionally weak.

### Slide 21 Challenge 2: Shifts in What is Grown and Eaten—Animal Source Foods

- Globally, there is a shift toward animal-based products such as meat, milk, and dairy—and more meat is being consumed than ever before.
- However, there is an extreme imbalance in animal products consumed regionally—North America and Europe significantly over-consume, while poorer regions in Africa and Asia do not consume enough animal source foods to get the nutrients they need.
- This leads to a few notable problems:
  - Livestock production is the largest user of agricultural land and therefore has a significant environmental impact (FAO 2015), including both deforestation and production of greenhouse gas emissions.
  - It takes 2.5–10 times more energy to produce food energy and protein from livestock compared to grain. In simple terms, it takes roughly 5 pounds (2.2kg) of grain to get 1 pound (0.5kg) of beef.
  - One third of the world's cereal supply is used for livestock feed, which results in lower energy efficiency (de Fraiture et al. 2007).
  - At the same time, animal products needed to achieve basic nutrition remain out-of-reach for many people in Africa and Asia, due to limited availability, cost, and incentives to sell—rather than consume—animal products.
  - If all regions of the world consumed animal products at current North American and European levels, by 2050 the production of animal protein would need to **more than triple** (PBL 2009). If that happened, demands on natural resources and the effect on the environment would be devastating.
  - The bottom line: Consumption needs to be re-balanced to reflect a healthy diet, both in wealthy and poorer countries. Continuing to over-consume animal source foods has a high environmental cost.



**Facilitator Note:** *Animal-source foods include the following groups: dairy products (milk, yogurt, cheese), fish, eggs, organ meats, meat, flesh foods, and other miscellaneous small animal protein (e.g., grubs, insects).*

### Slide 22 A Smarter Approach to Agriculture

- The challenges of our changing world are significant—a growing population will be relying on a limited resource base for food, which is exacerbated by shifts in what is grown and eaten and food loss and waste.

- These challenges require a smarter approach to agriculture—one that provides real solutions, addressing the challenges of our world today such as malnutrition (under- and over-nutrition), while still increasing production/productivity and income.

### **Slide 23 Solutions: Create Shifts in Consumer Demand**

- Agriculture is a business. Consumer demand for certain products will always be the strongest driver of what is produced. In many places, market demand does not match the dietary needs for a healthy, growing population.
- How do we create shifts in market demand?
  - First, we can harness the power of advertising to influence what people buy and eat. Advertising is already widely used within the private sector—promoting the right foods can benefit both sellers and consumers.
  - We can educate consumers about what should be included in a healthy, diverse diet, including information about the consequences of malnutrition for women and children.
  - Emphasize that getting enough calories is not sufficient to address food insecurity and to feed the hungry. Cereals are important, but should not be the only source of food. Animal-source foods also have an important role in diet, but should not be over-consumed.
  - Design packaging and marketing to help consumers understand which products have greater nutritional quality, especially fortified and biofortified foods.
  - Recognize the challenges of a growing urban population—since many urban dwellers do not have home gardens and may work long or irregular hours, many are drawn toward cheap processed foods, which may also be marketed toward children.
- Population growth means each person needs to eat the right things, in the right amount, to ensure a healthy diet. Reducing personal food waste is also important for making sure there is enough food for everyone.

### **Slide 24 Solutions: Supportive Government Policies**

- Government policies have an important effect on availability and access to healthier foods.
- Policy can affect prices that farmers receive for goods produced and can encourage both the production and supply of nutrient-rich foods.
- Government policies can also affect prices for consumers—lower costs can help build demand for nutrient-rich products.
- Policies might also affect market systems by reducing trade barriers to nutritious foods or by providing incentives to private sector companies to improve the diversity of foods available in markets through storage, processing, and preservation.
- Finally, policies can also mandate certain positive requirements, such as micronutrient fortification, that suppliers are required to include.

### **Slide 25 Solutions: Support for Farmers**

- First, we need to recognize that farming is not easy. Growing food is essential for humans to survive and thrive, and therefore, farming is essential, but it is also one of the most complex activities. Farmers benefit from a dependable and sustainable system of support.
- Agricultural extension
  - Agriculture extension agents (both private and public) share knowledge regarding improved farming practices to build skills and promote new technologies in farming communities.

- There are proven agricultural extension approaches, such as farmer-to-farmer peer learning models, farmer field schools, and more recent *pluralistic approaches* in which multiple actors provide services through a blend of public and private approaches.
- Improve access to agricultural inputs
  - Adequate access to agricultural inputs, including land, pesticides, and fertilizers, is vital for agricultural production and growth. Additionally, financing to purchase these items is essential.
  - Throughout Asia and in parts of Latin America, expanding seed and fertilizer use has been accompanied by investments in irrigation, rural roads, marketing infrastructure, and financial services, paving the way for dynamic commercial input markets.
  - In other regions, such as sub-Saharan Africa, the uptake of agricultural inputs is relatively low because it is often cheaper to expand cropland to have higher production (FAO 2015).

### Slide 26 Solutions: Climate-Smart Agriculture (1 of 2)

- Climate-smart agriculture (CSA) focuses on increasing production, while helping farmers strengthen their resilience to shocks and reducing greenhouse gas emissions (FAO 2013).
  - Productivity: CSA aims to sustainably increase agricultural productivity and incomes from crops, livestock, and fish, without having a negative impact on the environment.
  - Adaptation: CSA aims to reduce the exposure of farmers to short-term risks, while also building their capacity to adapt and prosper in the face of shocks and long-term stresses.
  - Mitigation: Wherever and whenever possible, CSA should help to reduce and/or remove greenhouse gas emissions. This implies that we reduce emissions for each calorie or kilogram of food, fiber, and fuel that we produce; that we avoid deforestation from agriculture, and that we manage soils and trees in ways that maximize their potential to absorb carbon dioxide from the atmosphere.

### Slide 27 Solutions: Climate-Smart Agriculture (2 of 2)

- Examples of CSA include:
  - No till planting: Using this technique, farmers minimize plowing or tilling the soil. Crops are planted directly into a seedbed that has not been tilled after harvesting the previous crop.
  - Rainwater retention: In low till planting, at least 30 percent of the soil surface is covered by plant residues to increase water infiltration and to cut down on soil erosion and runoff.
  - Climate-appropriate crops: Crops should be suitable for the climate, reducing the need for irrigation and reducing vulnerability to weather changes. Stronger varieties, such as drought-resistant maize, can be introduced to improve resilience.
  - Improved irrigation and water use: Introducing efficient irrigation technologies to reduce runoff and wasted water and improve irrigation schedules (to reduce evaporation).
  - Waste reduction: Agricultural inputs can help improve the ability to store and process foods, leading to reduced waste. For example, improved ability to process and store animal-source foods, safe storage of grains (for consumption or sale during drought or shock).



**Facilitator Note:** *The Seasonal Calendar exercise—Session Five in the Training Resource Package—can be used immediately following this session. The seasonal calendar encourages participants to examine agricultural activities specific to their context and these activities' effects on nutrition. This exercise helps participants discuss the context in which agricultural activities take place in greater depth by looking at the specific growing season and local agricultural practices.*

### Slides 28–29 Key Points from this Session

- Agriculture is the main source of employment for rural families in the developing world.
- GDP growth through agriculture is four times more effective in reducing poverty than growth generated by other sectors. **However...**
- Farming is a risky business that requires markets, sustainable natural resources, capital, labor, knowledge, and technology.
- Global climate change, food loss and waste, decreasing soil and water quality, and markets driven by changing dietary preferences must be considered when promoting agricultural development.
- **Therefore...** Using approaches that build consumer demand for high-quality products, providing support for farmers, and focusing on CSA will have the best results, leading to increased production, income, and sustainability of agricultural livelihoods.

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## Additional Resources

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For further information on agriculture and food systems, visit:

- USAID Feed the Future website: <https://www.usaid.gov/what-we-do/agriculture-and-food-security/increasing-food-security-through-feed-future>
- SPRING Linking Agriculture and Nutrition website: <https://www.spring-nutrition.org/technical-areas/ag-nut>
- *Convergence and Tension in Nutrition-Sensitive Agricultural Market Development Activities: Discussion Paper*: <https://www.usaid.gov/what-we-do/global-health/nutrition/technical-areas/convergence-and-tension-nutrition-sensitive>
- Food and Agriculture Organization (FAO) of the United Nations, *Improving Nutrition through Agriculture and Food Systems* course: <http://www.fao.org/elearning/#/elc/en/course/NFS>
- The Big Facts project website: <https://ccafs.cgiar.org/bigfacts/#>. The Big Facts project is led by the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS).
- Basic Knowledge 101, Farming – Agriculture website: <http://www.basicknowledge101.com/subjects/farming.html>







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