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

Agriculture-to-Nutrition Pathways

Session Guide Four of the Nutrition-Sensitive Agriculture Training Resource Package



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SPRING
Strengthening Partnerships, Results,
and Innovations in Nutrition Globally

Agriculture-to-Nutrition Pathways

Session Guide Four of the Nutrition-Sensitive
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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COVER PHOTO: Shrimp Farming in Bangladesh. PRICE/Chemonics International.

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Preparing to Present This Session

Purpose

This is Session Four of seven that are included in the *Nutrition-Sensitive Agriculture Training Resource Package*.

After developing a solid foundation in both nutrition and agriculture in previous sessions, this session introduces participants to the Agriculture-to-Nutrition Pathways. The Agriculture-to-Nutrition Pathways show how agriculture activities can improve nutrition by influencing the underlying causes of malnutrition (e.g., by improving household incomes or strengthening women’s control of resources). Discussions throughout this session focus on how each pathway is influenced by the enabling environment—the context and systems that can affect the likelihood that agricultural activities will lead to improved nutrition.

Before starting the session, participants need to understand key concepts for nutrition and agriculture, as covered in Session Two (Essential Nutrition Concepts) and Session Three (Essential Agriculture Concepts) of the *SPRING Nutrition-Sensitive Agriculture Training Resource Package*. These two sessions create a shared vocabulary and perspective that allow a diverse group of stakeholders to effectively discuss the pathways.

Objectives

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

1. effectively describe the three main pathways and how they overlap.
2. explain the enabling environment in which all pathways operate.
3. identify steps along each main pathway to ensure that agriculture activities meet nutrition outcomes.

Estimated Duration

1.5 hours

Materials

All documents needed to deliver the session can be found at <https://www.spring-nutrition.org/nutrition-sensitive-ag-training/session4>.

- PowerPoint presentation: 4. Agriculture-to-Nutrition Pathways
- Masking tape or other method for fixing printed images to the wall
- Other Materials
 - One copy for every 7–10 participants: Images representing the Agriculture-to-Nutrition Pathway. (These images were designed to be universal, but you may wish to change them to ensure that they resonate with your audience.)
 - Handout: Agriculture-to-Nutrition Pathways
 - Handout: Additional Resources

Core Content

Slide 1 (cover) Agriculture-to-Nutrition Pathways

- We know that agriculture has an impact on nutrition: It can improve it, worsen it, or have a neutral effect. As we work to strengthen the positive effects of agriculture on nutrition, it is important to have a deeper understanding of **how** agriculture affects nutrition.
- Once we better understand the linkages between agriculture and nutrition, we can ensure that efforts to strengthen agricultural practices have a positive effect on the family's nutrition.
- In this session, we focus on some specific steps that can be taken to strengthen the linkage between agriculture and nutrition. These steps are illustrated using the Agriculture-to-Nutrition Pathways framework.

Slide 2 Objectives

1. Effectively describe the three main pathways and how they overlap.
2. Explain the enabling environment in which all pathways operate.
3. Identify steps along each main pathway to ensure that agriculture activities meet nutrition outcomes.

Slide 3 The Child's Health is Closely Linked to the Mother's Health.

- We know that every child's health and nutrition is closely linked to the mother's health and nutrition—especially while she is pregnant, during breastfeeding, and through the first two years of the child's life.
- Why are the first 1,000 days so important?
 - This is the period of life with the greatest growth and brain development, including many key developmental milestones. What happens with the child's body now will affect him for life.
 - Children who fall behind developmental milestones during this period may never be able to catch up. Severe malnutrition during the first 1,000 days can lead to stunting, which is hard to reverse.
 - Collectively, investments to improve nutrition have an important economic impact over the long-term, with well-nourished children becoming more productive adults (Hoddinott 2016).
- The mother's diet, health status, and capacity to care for the child during the first 1,000 days have a long-term effect on the child's development.
- The essential question at the core of every nutrition-sensitive agriculture activity is:
 - What is the best way to strengthen agricultural practices so that they lead to better nutrition for children and mothers?

Lessons Learned: *Increased Income or Increased Food Production ≠ Better Nutrition.*



Evidence for nutrition-sensitive agriculture is limited. The central learning that drives our shift toward cross-sectoral approaches is knowing that increased income does not directly lead to better nutrition for children and mothers. Nutritious food is necessary for good nutrition, but availability of nutritious food alone is not enough to improve nutrition. A range of factors affect that outcome, including an individual's health status, the cleanliness of the surrounding environment, the preparation and storage of food, and personal choices regarding foods. The Agriculture-to-Nutrition Pathways give us a deeper view of the relationship between income and nutrition.

Slide 4 Getting Enough Nutritious Food All Year *(animated slide)*



Discuss: In every season, it is important for families to have enough nutritious food. What do we mean by “enough good food”? **[Take several responses.]**

- When we look at the food that a family has available, we need to think about not just how much food is available for eating, but also other essential aspects of that food.
 - **SAFETY:** Food that is healthy to eat and will not cause illness—it should be fresh, in good condition, and prepared in a hygienic way. Avoiding food that is moldy, spoiled, or contaminated by dirt, bugs, or animal feces.
 - **VARIETY:** Ensuring that the family gets food from all food groups: animal protein (eggs, chicken, meat), pulses (nuts, grains), fruits, and a range of vegetables. *Note that appropriate foods will vary by context; for example, sources of protein other than meat need to be sought in places where vegetarian diets are common.*
 - **QUALITY:** Food that looks and smells appealing and fits with what most people eat locally.
 - **QUANTITY:** Having enough food for several meals each day, while storing enough to last throughout the year.

Slide 5 Getting Enough Good Food All Year: Seasonality *(animated slide)*



Discuss: What can a family do, in an ideal situation, to get enough nutritious food year-round? **[Take several responses.]**

Ensure that the discussion includes the following ideas:

The family can try to ...

- Grow, raise, and collect enough nutritious food, including raising livestock and growing crops. In some contexts, this includes gathering wild foods seasonally.
- Harvest, process, and store that food carefully so they do not waste it. Food that is not stored properly can become unhealthy to eat.
- Sell and buy food wisely so they can earn money and afford to buy good food. For households that do not produce any of their food, it is important to ensure income diversification and good household budgeting to purchase foods of sufficient quantity and quality.

Slide 6 Exercise: Building the Agriculture-to-Nutrition Story



Facilitator Note: *The following exercise is typically used with community-level participants or in cases where complex frameworks and diagrams may be confusing. Read through the instructions and decide if it is suitable for your audience. Higher-level participants may benefit from working through this exercise, especially if they facilitate training with community-level audiences.*

Exercise: Building the Agriculture-to-Nutrition Story

About this Exercise

- **Goal:** *to have participants generate key points on the agriculture-to-nutrition pathway, linking these concepts to their experiences.*
- **Duration:** *45 minutes*
- **Materials:** *Two or three sets of printed icons (one set for each group of 10 participants)*

Exercise Instructions

- Explain that in this exercise, we will discuss how agriculture and nutrition are connected. We will start by looking at a set of activities that take place at the household level.
 - Imagine a small farm, not very far from here, where a family raises crops and livestock.
 - The icons that are printed on these pages represent activities that take place daily on and around the farm.
 - In groups, you will arrange these pages on the wall, with the goal of telling a story about how agriculture and nutrition are linked.
 - Some of the icons may be very clear (for example, handwashing) while others may be interpreted in different ways by different groups (for example, the man and woman with joined hands). Groups should feel free to interpret the images in whatever way makes sense for their story.
 - Start with the image of the field/crops and end with the family (see the photo example below). The remaining icons can be arranged in any way that fits with your story.
- Divide participants into groups of 5–10. Give each group one set of images and explain that they will have 15 minutes to construct their story.

The following photo shows an example of how the images could be arranged on the wall. Other arrangements are acceptable, as long as participants can explain their thinking.



Debrief Group Work

- After all stories have been assembled on the wall, give each group 3–5 minutes to present the thinking behind their arrangement.
- Discuss common themes across participants' work and allow participants to make observations about each diagram.
- Highlight the ways in which each group has begun to articulate the individual pathways: food production, agricultural income, and women's empowerment—and how they overlap and interconnect.
- Emphasize that the group will spend some time discussing these three pathways in more detail throughout the session, using a conceptual framework to capture how the agriculture-to-nutrition pathways connect.



Lessons Learned: *The best way to learn about the Agriculture-to-Nutrition Pathways is through interactive and participatory methods. The activities in this session help ground the pathways in activities that stakeholders are already doing, connecting the pathways directly to their own life or work. When the Pathways resonate with participants, you can see that "Aha!" moment.*



Facilitator Note: Hand out copies of the document: *Agriculture-to-Nutrition Pathways*. (This handout will help participants follow along as the text on the coming slides may be too small for participants seated far from the projected image to read.)

Slide 7 **Agriculture-to-Nutrition Pathways** (*animated slide*)

- This framework describes the Agriculture-to-Nutrition Pathways.
 - On the left side, we have the three main pathways—food production, agricultural income, and women’s empowerment.
 - On the far-right side, we have our desired outcomes—better nutrition (and overall health) for children and mothers.
 - The rest of this diagram focuses on how we get from our starting point (agriculture) to our ending point (nutrition).
- This Agriculture-to-Nutrition Pathways framework was originally developed by a team of researchers at the International Food Policy Research Institute (Headey, Chiu, and Kadiyala 2011; Kadiyala et al. 2014). SPRING has simplified it to focus on three main pathways and the enabling environment in which the pathways operate.
- The Agriculture-to-Nutrition Pathways exist in a specific context.
 - We refer to this context as the enabling environment—which consists of the elements that influence whether and how agricultural practices can have a positive impact on nutrition. These factors may affect each pathway and each step of the pathway.
- Lastly, we see how improved child and maternal nutrition links to other important national issues.
 - As maternal and child nutrition improves, it affects the national nutrition profile and national economic growth—as we discussed in Session One (Strengthening Agriculture-Nutrition Linkages: Why It Matters).
 - Improved nutrition also has an impact on household assets and livelihoods, along with agricultural livelihoods specifically. In Session Two (Essential Concepts in Agriculture and Food Systems), we discussed the systems that affect agricultural success and women’s important role in agriculture.
- It is important to note that despite the appearance of the diagram, the pathways are not linear or distinct, but interconnected in a variety of ways.



Lesson Learned: *As a tool, the Agriculture-to-Nutrition Pathways help make agriculture-nutrition linkages more explicit and clear. The diagram tends to resonate with stakeholders, who may struggle to break away from traditional “increased income = better nutrition” thinking.*

The pathways thinking is not new—experienced agriculturalists will have recognized better nutrition as a result of their work for a long time. We are asking them to find small, incremental nutrition-sensitive adjustments to their work to help increase the likelihood of contributing to larger nutrition outcomes.

Slide 8 The Main Agriculture-to-Nutrition Pathways

- First, we will review the steps that can be taken along the three main Agriculture-to-Nutrition Pathways. Then we will discuss the enabling environment.
- Improved agricultural practices can have a positive, negative, or neutral impact on nutrition. **The steps along the pathways help ensure that agricultural practices have a positive impact.**

Slide 9 Agriculture as a Source of Food

- Production decisions are made based on many factors: market prices, relative costs and risks, productive assets of the family (including land, labor, and capital), needs for cash versus food, and, of course, preferences and cultural norms/expectations.
 - What are some of the relative costs? (seeds, machinery)
 - What are some of the risks? (loan, inadequate water, risks to children or health)
 - What are productive assets? (land, livestock, machinery)
 - Preferences?
 - Cultural norms that affect agriculture? (Women doing the work, women's/men's crops)
- Processing and storage can affect shelf-life, safety, and nutrient content of foods. It has a direct impact on timing and duration of household food access.
 - Think for a moment about processing and storage—what is the impact if a food producer cannot process/store excess food?
 - If one does not have the capacity to store the excess, then it must be sold during the season when prices are low. Later, during lean times when prices are highest, the family must buy back that food.
- Some rural families live in areas where agriculture is extremely difficult due to climate, soil, weather conditions, or vulnerability to shocks. These families may be better off seeking income sources that are not based in agriculture to improve the family's health, nutrition, and chances of survival. Alternatively, they could diversify their income to increase resiliency for the family.
- In these cases, increased income from non-agricultural work (alternative livelihoods) may be a better strategy for promoting resiliency and ensuring the family's survival during lean times.



Facilitator Note: *As we discuss each pathway, we have included an example from one country where SPRING has worked. Before presenting your session, review these examples and assess whether they will resonate with your participants. If not, feel free to replace them with a local example that participants will connect with.*

Slide 10 Doña Brito in Guatemala: An Example of the Food Production Pathway *(animated slide)*

- Here is an example of how the production pathway and nutrition can be improved by refining agriculture practices to have a stronger nutrition outcome. This activity was funded by USAID and implemented by Save the Children.
- Doña Fidelia Brito and her family live in the Western Highlands of Guatemala.
- As part of their participation in the activity, the family received goats and guidance on how to care for them.
- In exchange, the family provided milk to undernourished children in the community (it was given for free, not sold).
- The participating families consumed the milk.

- Many were able to sell excess milk and milk products to augment their income.
- The integrated activity educated families on the importance of consuming milk and animal-sourced protein. Technicians from the activity showed the Brito family how to use goat droppings to fertilize their maize. This resulted in both a 10 percent reduction in fertilizer costs and an increase in maize production, which meant more maize for consumption the following year.



Lesson Learned: *When we began the discussion of the pathways by guiding stakeholders to look at a specific nutrition problems and their causes, the pathways diagram resonated more deeply.*

Slide 11 Steps on the Food Production Pathway



Discuss: When we think of the example with Doña Brito, we can see a range of strategies at work to ensure that those agriculture activities led to improved nutrition. What are some of the steps on the pathway that you see engaged in this example? **[Take several responses]**

Sample answers include:

- Food production: Goat milk was produced and maize yields increased.
- Food prices: We did not mention this specifically in the earlier example, but prices can also factor in household decision-making about what should be produced and how much will be useful. Depending on the size and scale of the activity, interventions can affect local food prices.
- Processing and storage: The family learned to how to properly store and process the milk.
- Food access: The activity increased the available milk in the community and the household. Some activities may also affect the year-round availability of food.
- Diet: The integrated activity educated families on the importance of consuming milk and animal-sourced protein.
- Health status: We did not mention this specifically in the earlier example, but infections and other health problems should be addressed so that the nutrients consumed result in improved health.

Ensure that you finish the conversation with the group by making the point that it is important to remember that increased production—and even getting to the increased consumption (diet) along the pathway—does not necessarily translate into improved nutritional outcomes.



Discuss: In one activity, the family was consuming a significantly improved diet, but it did not result in improved mother/child nutrition—what do you think happened? **[Take several responses]**

Ensure that the conversation includes the following points:

- Problem with sanitation or illness that reduced the absorption of nutrients
- Extra earnings that the family had were quickly spent on health care costs

Slide 12 Agriculture as a Source of Income



Discuss: Next is the Agricultural Income Pathway. A common goal of many programs is to increase household income through agriculture. What can be done to increase agricultural income? **[Take several responses.]**

Ensure that the discussion includes the following points:

- Improve storage, sell rice to a co-op; provide farmers with a line of credit
- Improve crop varieties that grow well in off-seasons; diversify production; encourage off-farm labor during non-farming season

- Improved year-round income and cash flow can be used for immediate or future household needs to support a healthy diet and life. Income may be used for food or non-food items that improve health, such as medicines, clinic visits, and agricultural supplies like plastic sheeting to protect the harvest from being contaminated with dirt.
- This pathway assumes that nutritious, diverse foods are available and affordable in local markets—a huge and often unrealized assumption.
- **The pathway reminds us to question that assumption.** Purchasing power can drive demand, and if people begin to demand more diverse, nutritious foods, then the increased demand can support the relationship between agriculture and nutrition in the food market.
- To move along this pathway toward nutrition outcomes, household investments in health are crucial, including investments in potable water sources and toilets, preventive care, and other necessities. Rural farm households are constantly balancing spending between farm production and marketing investments and the immediate purchases of food, health, and care necessities.
- The effect of income on nutrition is not direct or easily predictable. Many factors influence decision-making.

Slide 13 Netsanet in Ethiopia: An Example of the Agricultural Income Pathway *(animated slide)*

- Here is an example of the income pathway.
- Netsanet lives in Duna Woreda of the Southern Nations, Nationalities, and Peoples' Region (SNNPR) in Ethiopia. Her household was enrolled in a value chain activity to help them increase yields from their coffee trees and to successfully export quality coffee.
- Ethiopia is the home of coffee, and Netsanet loves growing it.
- With help from the Ministry of Agriculture and the Agribusiness and Markets Development (AMDE) project, Netsanet and her family have increased the amount of coffee they have grown by 30 percent.
- Coffee is being exported.
- And their household income is increasing.



Discuss: You cannot “eat” coffee. So, does this mean this activity cannot be “nutrition-sensitive” or contribute to nutrition? **[Take several responses.]**

Ensure that you finish the conversation with the group understanding that a crop such as coffee's value to nutrition comes from the increased income that can be used to purchase foods for a diverse, nutritious diet or for health care.

- One of the key questions about income generation is: **Within the family, who decides how income is used?**
 - If Nestanet does not have influence over how the money is spent, she may be disadvantaged by this approach.
 - When we work to increase income, we also want to look for ways to give women access to and/or control over it, since they are more likely to use it to benefit the health of mothers and children.

Slide 14 Steps on the Agricultural Income Pathway

- Again, looking at this along the pathways, you can see how families like Netsanet's can use the increased income to move toward improved nutrition outcomes.
 - Food and non-food expenditure: To access a diverse, nutritious diet and meet health care needs, families need to be supported to look at decision-making in the household.
 - Food access and diet: Increased demand for nutritionally-rich products can lead to more products available in markets. Greater access can lead to the consumption of higher quality foods.
 - Health care and health status: When health needs arise, expenditures on health care are possible and overall health status may improve.
- These examples take place at the household level, but there are ways to make the **value chain** more nutrition-sensitive—for example, looking at how to incorporate women in various stages of a value chain activity, or improve storage or processing to better retain nutrients and/or increase profits.

Slide 15 Agriculture as a Means to Women's Empowerment



Discuss: Finally, we reach the Women's Empowerment Pathway. What can we do to maximize women's control of income? **[Take several responses.]**

- Evidence shows that women are more likely to spend additional income on the health and nutrition needs of the household (SPRING 2014).
- However, women's empowerment is not just about income. If our goal is to improve nutritional status, we must also consider time and energy use, which have a very direct impact on the health of unborn children and women's ability to care for families.
- When thinking through income and time, it is important to emphasize that although this pathway is labeled as "women's empowerment," it involves all household members (the husband, mother-in-law, or any other key decision makers at the household level).
- We have learned that involving each of these key decision makers in programming—both to alleviate the heavy workload that comes with agriculture and to increase women's control of income—leads to much more effective programming and a greater likelihood that promoted practices will be adopted.



Lesson Learned: *Women's roles in the household (time spent laboring in the fields and caregiving; managing income) are deeply embedded in the fabric of a society. We need to be prepared to acknowledge that creating change in this area may take time. Additionally, advocating women's empowerment may come with unintended consequences, including increased tensions in the household, less time for women to care for their children and themselves, and possibly even domestic violence.*

Slide 16 **Pakhtakor Village in Tajikistan: An Example of the Women's Empowerment Pathway** (*animated slide*)

- This example is from a family farming activity in Pakhtakor Village in Tajikistan.
- The women are earning money through a group activity in which they share the cost and labor related to growing, harvesting, and processing fruits (especially apricots, plums, and peaches) as jams and jellies for sale at local markets.
- They are using the money generated from this activity to address family health needs and purchase needed foods.
- They are part of a savings group. (These groups provide financing for short-term household needs and give women a source of capital for small-scale, income-generating activities.)
- Control over income and savings, in combination with strengthened social networks, has led to leadership opportunities for these women and increased status in their communities.
- Additionally, these groups are a platform to layer training in other topics, such as food preservation, nutrition education, soil management, and growing practices that are appropriate for nutrient-dense household garden crops.

Slide 17 **Steps on the Women's Empowerment Pathway**

- Returning to the framework, we can see how participating in the activity led to:
 - Food expenditure: More money to spend on nutritious foods, which they were learning about with complementary nutrition education plus social and behavior change activities. As with the other two pathways, this can lead to greater food access and an improved diet.
 - Non-food expenditure: They could also spend their savings on health care for themselves and their children, which can contribute to improved nutrition. As with the income pathway, this can lead to greater use of health care and improved health status.
 - Women's time and energy expenditure: We need to consider these women's agricultural workloads and balance this with the benefits of participation in groups and programs. Carefully considering their time and energy expenditure can ensure that they also have the time and capacity to give their children the care and attention they need.
 - Lastly, women's energy expenditure has a direct connection with their own nutritional needs. Greater energy expenditure means that women need greater food intake to get enough nutrients, especially if pregnant or breastfeeding.
- Importantly, empowering women—whether through savings groups, increases in income and control of resources, or improved education—will not lead to maximized nutrition outcomes if multi-sectoral barriers are not also addressed.
- For example, if women in savings groups are forced to spend a large portion of that savings buying clean water, as was the case here, or traveling long distances for emergency medical care,

they will not be able to reinvest in nutrition-sensitive agriculture activities or in nutritious food for their families.

- When you look at this pathway you can see the overlapping and interwoven nature of the pathways. Several steps on the women’s empowerment pathway overlap with both agricultural income and food production.

Slide 18 Pathways in Context: Enabling Environment

- At this point, we have discussed the three main Agriculture-to-Nutrition Pathways—food production, agricultural income, and women’s empowerment—and the steps along each pathway.
- A positive enabling environment can increase the likelihood that agricultural activities will lead to improved nutrition.

Slide 19 The Enabling Environment

- Getting from agriculture to nutrition is not just about pathways. Wrapped around the pathways is the enabling environment, which exerts tremendous influence at every step.
- The four components of the enabling environment include:
 - The food market environment
 - The natural resources environment
 - Health, water and sanitation
 - Nutrition/health knowledge and norms
- Here are some examples of how aspects of the enabling environment can have an influence along the pathways:
 - Local markets determine what kind of foods are available for households to purchase. Availability and affordability drive food choices and preferences. (Food market environment)
 - Lack of rainfall during a growing season determines crop yield available for sale and consumption. (Natural resources environment)
 - Unsafe food due to contamination during storage or processing can lead to an increase in disease, which is another cause of malnutrition. (Health, water and sanitation)
 - Cultural practices around which foods to feed young children impact feeding and care practices and can affect household nutritional status (Nutrition/health knowledge and norms)
 - Finally, government policies and legal frameworks are a part of all the components, determining what commodities are subsidized in the markets or how natural resources are managed.



Facilitator Note: *Hand out the document title “Additional Resources.” This resource is for participants who want additional detail about each of the pathways and how they can be applied in practice. This comprehensive resource list may not be appropriate for every audience, so share it only if your stakeholders will find it useful.. Notice that this handout is also included in the Facilitator Guide, as this may be a helpful reference to answer participants’ questions throughout this session.*

Slide 20 Linking Agriculture and Nutrition



Discuss: What have we learned from the Agriculture-to-Nutrition-Pathways that we can apply to our work? **[Take several responses.]**

- The goal of the pathways is to help us understand what activities contribute to better nutrition outcomes. Additionally, we can use the pathways to guide our thinking as we design programs and activities, ensuring that agricultural activities are nutrition-sensitive.
- The Agriculture-to-Nutrition Pathways framework guides us to:
 - design nutrition-sensitive agriculture activities
 - drive toward nutrition-based outcomes
 - use indicators that connect with a range of steps along the pathways (including both agriculture and nutrition indicators).

The pathways can be used to consider which nutrition-sensitive interventions might work, given the activity's focus, and identify ways to better link with or coordinate with the nutrition-specific work of other organizations.

Lesson Learned: *Nutrition-sensitive agriculture cannot be boiled down to a 2-minute summary or a list of essential practices. Effective approaches vary greatly across geographical zones due to changing factors particular to each area, including soil properties, weather, foods available in the local market, agricultural practices, dietary practices, infant-feeding practices, and a community or family's willingness to try new things. Effective nutrition-sensitive agriculture practices always depend on the context in which they are applied.*



Nutrition stakeholders may be looking for an "essentials" list as they try to understand nutrition-sensitive agriculture: "What are the 15 most important nutrition-sensitive agriculture practices?" We have identified 6 nutrition-sensitive agriculture outcomes that may help identify top-priority practices. These are covered in Session Seven (Design).

Agriculture requires a highly contextual set of good practices, whereas biological processes related to nutrition (how the human body functions) are standard across many contexts.



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 to anchor the pathways in the context in which participants work by applying the pathways to the specific growing season and agricultural practices locally.

Slides 21-22 Key Points from this Session

- Good nutrition includes getting the right quantity of good quality, diverse foods all year. These foods must be handled and stored safely to avoid causing illness.
- The Agriculture-to-Nutrition Pathways describe actions that lead to better maternal and child health.
- The three pathways: food production, agricultural income, and women's empowerment are overlapping and intertwined.
- Each pathway is impacted by the enabling environment, which includes the food market environment, natural resource environment, health/water/sanitation, and nutrition/health knowledge and norms.

References

- Headey, D., A. Chiu and S. Kadiyala. 2011. "Agriculture's Role in the Indian Enigma: Help or Hindrance to the Undernutrition Crisis?" IFPRI discussion paper 01085. Washington, DC: IFPRI.
- Hoddinott, J. 2016. "The economics of reducing malnutrition in Sub-Saharan Africa," *Global Nutrition Report* (May 13). Produced for the Global Panel on Agriculture and Food Systems for Nutrition.
- Kadiyala, S., J. Harris, D. Headey, S. Yosef, S. Gillespie. 2014. "Agriculture and Nutrition in India: Mapping Evidence to Pathways." *Annals of the New York Academy of Sciences* 1331:43–56.
- SPRING. 2014. *Understanding the Women's Empowerment Pathway. Brief #4. Improving Nutrition through Agriculture* Technical Brief Series. Arlington, VA: Strengthening Partnerships, Results, and Innovations in Nutrition Globally (SPRING) project.

Additional Resources

In addition to the "Pathways: Additional Resources" handout, these resources provide further information on conceptual pathways between agriculture and nutrition:

- SPRING Improving Nutrition through Agriculture Technical Brief Series: <https://www.spring-nutrition.org/publications/series/improving-nutrition-through-agriculture-technical-brief-series>
- International Food Policy Research Institute (IFPRI) discussion paper (2017), *Nutrition-Sensitive Agriculture: What Have we Learned and Where do we go from Here?* <https://www.ifpri.org/publication/nutrition-sensitive-agriculture-what-have-we-learned-and-where-do-we-go-here> by Marie T. Ruel, Agnes R Quisumbing, and Mysbah Balagamwala.



Facilitator Note: This is a handout, included in the online resources at <https://www.spring-nutrition.org/nutrition-sensitive-ag-training/session4>. For ease of reference, the text for this handout is also included in the facilitator's guide.

Pathways: Additional Resources

The SPRING project has written a series of briefs that elaborate on the agriculture-to-nutrition pathways. Throughout these briefs, short vignettes from agricultural activities highlight how the pathways and principles can be applied in diverse contexts. The conceptual frameworks of the pathways and principles for improving nutrition through agriculture are described in Brief 1. Each subsequent brief explores a different route between agriculture and nutrition: food production, income generation, and women's empowerment. Read the briefs at:

<https://www.spring-nutrition.org/publications/series/improving-nutrition-through-agriculture-technical-brief-series>

Additionally, SPRING has compiled several resources that are building the evidence base in support of the pathways.

Household food production

Some examples shared at the Leverhulme Centre for Integrative Research on Agriculture and Health (LCIRAH) conference in June 2015:

- In Ghana, children in households that kept chickens, ducks, or other birds were twice as likely to have minimum dietary diversity as compared to those in households that did not. (Saaka, referenced in LCIRAH 2015).
- In Burkina Faso, households collecting wild foods, as well as those producing food rather than cash crops, had better dietary diversity compared to those that did not (Ruiz, Dury, and Prevel 2015, cited in LCIRAH 2015).
- Also in Burkina Faso, a homestead food production program that promoted micronutrient-rich food consumption saw improvements in child dietary diversity; production of and consumption of fish, seafood, meat, poultry and/or fruit; and women's thinness decreased (Olney 2014/2015, cited in LCIRAH 2015).
- HarvestPlus found that Rwandan students consuming high-iron beans had improved hemoglobin ($P < 0.01$) and serum ferritin ($P = 0.015$) (De Moura 2014, referenced in LCIRAH 2015).

Processing and storage

In addition to producing nutritious foods, the way that we harvest, process, and store foods can also impact nutrition. The following studies have noteworthy findings:

- Micronutrient fortification is considered a nutrition-specific intervention, but it is incorporated into agricultural commodities, and it improves nutrition (Eichler et al. 2012; Martorell et al. 2015).

- Per some SPRING and World Bank reviews, education about and access to better processing and storage can increase year-round access to nutrient-rich foods (Du 2014; Herforth et al. 2012).
- Poor harvesting, processing, and storage can make individuals ill and perhaps even cause stunting. Aflatoxin exposure starts in utero and continues as complementary foods are introduced. Major studies demonstrate strong relationships between aflatoxin, birthweight, stunting, and/or underweight (Turner et al. 2013).
- Reducing levels of aflatoxin in the first year of life can improve stunting by about 1 standard deviation, which is significant for a child (Turner et al. 2007).
- In Guinea, aflatoxin was controlled through improved post-harvest handling, such as rapid collection of nuts at harvest, proper drying, and storage in breathable bags raised off the ground (Turner et al. 2013).
- Foods that are not produced, processed, or stored properly are often consumed by the poor, who cannot afford not to eat them. In Kenya, aflatoxin levels in women from the lowest socioeconomic group were 4 to 7 times higher than those in the highest (Leroy and Sununtnasuk 2015).
- In Mali, milk that did not meet a required quality standard ended up in the small-scale producers' own homes or communities (Roy 2013).

Beyond risks related harvesting and storage, food production has occupational risks that can impact nutrition. For example:

- In a 2013 Agriculture and Nutrition Global Learning and Evidence Exchange, Jeff Griffiths from Tufts University talked about increased malaria where irrigation water is stored. He also talked about rotavirus, hepatitis, E. coli, shigella, and salmonella in agricultural wastewater (Griffiths 2012).
- Certain value chains, such as livestock value chains, have risks, such as zoonosis from contact with livestock, infection during slaughter, and cancer from smoking meat (Grace et al. 2015).

Income

What does the literature tell us about the linkages between income and nutrition?

- In a macro analysis of 29 countries, Webb and Block (2012) positively associate support for agriculture, increased income (GDP per capita), and reduced stunting and wasting. This positive result unfortunately is also associated with increased obesity, even in rural areas.
- In Ghana, farm production diversity and access to markets are associated with household dietary diversity and household wealth, suggesting an income pathway to better diets (Delaporte et al. 2015). Greater income from agriculture is also associated with food purchases (Jones and Moffitt 2015).
- In Ethiopia, a national survey showed a positive association between income from agricultural sales, cash crop production diversity, and household dietary diversity, especially for female-headed households (Coates and Galante 2015).
- During the lean season in Burkina Faso, women's non-agricultural income is strongly associated with food diversity (Ruiz, Dury, and Martin-Prevel 2015, referenced in LCIRAH 2015).

It is important to note that these studies show correlation and not causation, and only between income and dietary diversity, not nutrition.

Women's Empowerment

Control over assets and income

- Income controlled by women has a greater effect on children's nutrition than income controlled by men. The same is likely true for other productive assets. For example:
 - In a Burkina Faso homestead food production program, positive intermediate results included increased control of gardens, produce, and income by women; increased production of certain animal products and fruit as well as increased consumption of those items by households and women; and improvements in children's dietary diversity. Ultimately, there were positive impacts on reduction of women's thinness, children's diarrhea, and anemia (Olney 2014, referenced in LCIRAH 2015).
 - In Ethiopia, dietary diversity was greater in households where a woman owned at least one large asset (Coates and Galante 2015).

Time Use and Child Care

- Time constraints can be a barrier to participating in agriculture interventions or adopting a new technology (Webb 2013), and agriculture interventions tend to increase participants' time burdens (Grace et al 2015).
- Time burdened women face tradeoffs that could affect their children's health and nutrition (e.g., they might switch to purchased food and reduce time for feeding and preparing food) (Johnston et al. 2015).
- A systematic review found that a reduction in women's reproductive work time was detrimental to nutrition in poor households, but women's and children's nutrition was less sensitive to these same reductions in non-poor households. Long hours in agriculture revealed mixed results: Women in Ghana and non-poor women in Mozambique experienced reductions in their dietary diversity score (DDS), whereas poor women and children in Mozambique and Nepal experienced increases (Komatsu, Malapit, and Theis 2015).
- The age of a child may affect the relationship between work, childcare, and nutrition (Ukwuauni and Suchindran 2003). A breastfeeding age child and a 6–8 months-old child starting complementary foods may require more care time (Leslie 1988; Balagamwala 2015).
- In Kenya, a study found that a lower percentage of mothers working in medium- and high-intensity dairy production were breastfeeding children ages 12–24 months and were introducing supplemental foods at an increasingly earlier age than mothers from low-intensity production households (Micere Njuki et al. 2015).
- Despite increasing their income, women's paid employment reduced expenditure on healthcare, as the opportunity cost of the time required in seeking health care increased (Berman et al. 1988, cited in Gillespie et al. 2012; Blackden and Wodon 2006, cited in Herforth et al. 2012).
- The risk of infant mortality can be 50 percent higher if the mother works in agriculture. This may be because their children have been found to be more likely to contract diarrhea and respiratory diseases, and are less likely to be treated and immunized (Kadiyala 2014). Moreover, taking a child to the field can expose him to dangerous conditions (Balagamwala 2015).
- In India, a mother's participation in agricultural activities had negative effects on her child's health (Bhalotra et al. 2010, cited in Gillespie et al. 2012).

- Another tradeoff working women face is providing alternative childcare, which often involves tasking other household members, including children and other women, with childcare and domestic work (Johnston et al. 2015).
- One study found no difference in wasting (yet a moderate connection with stunting) in children cared for by their mothers versus those cared for by others (Headey et al. 2011; Balagamwala 2015).

Female energy expenditure

- *Impact on women's body mass index (BMI):*
 - Women agriculture workers in Pakistan are three times as likely to be underweight as women not working or working outside agriculture (Balagamwala 2015).
 - Seasonality affects energy expenditure and food intake of women who are involved in agriculture, decreasing weight and fat stores and increasing physical labor among poor women engaged in agricultural activities during the lean season (Kadiyala 2014).
- *Impact on infant:*
 - Excessive maternal activity during pregnancy may result in increased risk of poor birth outcomes, such as low birthweight, small-for-gestational-age births, and preterm deliveries (Rao et al. 2003; Pitchaya et al. 1998; Barnes, Adair, and Popkin 1991; Herforth et al. 2012).
 - A study in Brazil found lower mean birthweight in infants born to women who engaged in heavy agricultural work throughout pregnancy (Lima et al. 1999; Herforth et al. 2012).
 - Increased physical activity levels may also leave mothers unable to meet the increased energy demands of lactation (Rashid and Ulikaszek 1999; Piers et al. 1995; Guillermo-Tuazon et al. 1992; Herforth et al. 2012).

Lastly, it is important to recognize that all of these aspects are affected by intra-household dynamics —age relations, mothers-in-law, husbands, etc. — all play a key role in influencing food, health and care.

References

- Balagamwala, Mysbah, Haris Gazdar, and Hussain Bux Mallah. 2015. "Women's Agricultural Work and Nutrition in Pakistan: Findings from Qualitative Research." LANSA Working Paper Series.
- Barnes, D. L., U. S. Adair, and B. M. Popkin. 1991. "Women's Physical Activity and Pregnancy Outcome: A Longitudinal Analysis from the Philippines." *International Journal of Epidemiology* 20 (1): 162–72.
- Coates, Jennifer, and Tina Galante. 2015. "Agricultural Commercialization, Production Diversity and Dietary Diversity Among Smallholders in Ethiopia: Results from a 2012 National Integrated Agriculture and Socio-Economic Survey." Paper presented at the 5th annual Leverhulme Centre for Integrative Research on Agriculture and Health (LCIRAH) Conference, London, England, June 3, 2015. http://lcirah.ac.uk/sites/default/files/FINAL_Abstract_Bookletv2.pdf
- Delaporte, Anne, Elisabetta Aurino, Meena Fernandes, Aulo Gelli, and Charlotte Jordan. 2015. "Farm Production Diversity and Household Diet Diversity: Exploring Variation Across Agro-Ecological Zones in Ghana." Paper presented at the 5th annual Leverhulme Centre for Integrative Research on Agriculture and Health (LCIRAH) Conference, London, England, June 3, 2015. http://lcirah.ac.uk/sites/default/files/FINAL_Abstract_Bookletv2.pdf

- Du, Lidan. 2014. *Leveraging Agriculture for Nutritional Impact through the Feed the Future Initiative: A Landscape Analysis of Activities Across 19 Focus Countries*. Arlington, VA: Strengthening Partnerships, Results, and Innovations in Nutrition Globally (SPRING) project.
- Eichler, Klaus., Simon Wieser, and Siabelle Rütthemann, and Urs Brugger. 2012. "Effects of Micronutrient Fortified Milk and Cereal Food for Infants and Children: A Systematic Review." *BMC Public Health* 12(506). doi: [10.1186/1471-2458-12-506](https://doi.org/10.1186/1471-2458-12-506).
- Gillespie, Stuart, Jody Harris, and Suneetha Kadiyala. 2012. "The Agriculture-Nutrition Disconnect in India: What Do We Know?" IFPRI Discussion Paper 01187.
- Grace, Delia, Kristina Roesel, Erastus Kang'ethe, Bassirou Bonfoh, and Sophie Theis. 2015. "Gender Roles and Food Safety in 20 Informal Livestock and Fish Value Chains." N.p.: IFPRI. <http://ebrary.ifpri.org/cdm/ref/collection/p15738coll2/id/129860>.
- Griffiths, Jeffrey K. 2012. "The Role of Water in Linking Agriculture, Nutrition and Health." presented at the Agriculture and Nutrition Global Learning and Evidence Exchange (N-GLEE), Kampala, Uganda, December 2012. https://www.spring-nutrition.org/sites/default/files/2.3-c-role_of_water_in_linking_ag_nutrition_health_0.pdf.
- Guillermo-Tuazon, M. A., C. V. C. Barba, J. M. A. van Raaij, and J. G. A. J. Hautvast. 1992. "Energy Intake, Energy Expenditure, and Body Composition of Poor Rural Philippine Women throughout the First Six Months of Lactation." *American Journal of Clinical Nutrition* 56: 874–80.
- Headey, D., A. Chiu and S. Kadiyala. 2011. "Agriculture's role in the Indian enigma: Help or hindrance to the undernutrition crisis?" IFPRI discussion paper 01085. Washington, D.C.: International Food Policy Research Institute (IFPRI).
- Herforth, Anna, Andrew Jones, and Per Pinstrup-Andersen. 2012. "Prioritizing Nutrition in Agriculture and Rural Development: Guiding Principles for Operational Investments." Health, Nutrition, and Population Family (HNP) of World Bank Human Development Network.
- Johnston, Deborah, Sara Stevano, Hazel Malapit, Elizabeth Hull, and Suneetha Kadiyala. 2015. "Agriculture, Gendered Time Use, and Nutritional Outcomes." A Systematic Review IFPRI Discussion Paper 1456. Washington, D.C.: International Food Policy Research Institute (IFPRI) and CGIAR Research Program on Agriculture for Nutrition and Health. <https://www.ifpri.org/publication/agriculture-gendered-time-use-and-nutritional-outcomes-systematic-review>.
- Jones, Andrew D., and Allison Moffitt. 2015. "Examining the Relationship between Farm Production Diversity and Diet Diversity Across Subsistence and Market-Oriented Farms in Malawi." Paper presented at the 5th annual Leverhulme Centre for Integrative Research on Agriculture and Health (LCIRAH) Conference, London, England, June 3, 2015. http://lcirah.ac.uk/sites/default/files/FINAL_Abstract_Bookletv2.pdf
- Kadiyala, Suneetha, Jody Harris, Sivan Yosef, Derek Headey, and Stuart Gillespie. 2014. "Agriculture and Nutrition in India: Mapping Evidence to Pathways." *Annals of the New York Academy of Sciences* 1331 (Paths of Convergence for Agriculture, Health, and Wealth): 43–56.
- Komatsu, Hitomi, Hazel Malapit, and Sophie Theis. 2015. "A Cross Country Analysis of Women's Time in Reproductive and Productive Work and Maternal and Child Nutrition."
- Leroy, Jef L., and Celeste Sununtnasuk. 2015. "Aflatoxin, Poverty and Child Linear Growth: Results from Kenya and Mexico." Paper presented at the 5th Annual Leverhulme Centre for Integrative Research on Agriculture and

Health (LCIRAH) Conference, London, England, June 3, 2015.

http://lcirah.ac.uk/sites/default/files/FINAL_Abstract_Bookletv2.pdf

- Leslie, J. 1988. "Women's Work and Child Nutrition in the Third World." *World Development* 16(11): 1341–13.
- Leverhulme Centre for Integrative Research on Agriculture and Health (LCIRAH). 2015. "Agri-Health Research: What Have We Learned and Where to next?" Presentation and Poster Abstract Booklet.
- Martorell, Reynaldo, Melany Ascencio, Lusi Tacsan, Thelma Alfaro, Melissa F. Young, O. Yaw Addo, Omar Dary, and Rafael Flores-Ayala. 2015. "Effectiveness Evaluation of the Food Fortification Program of Costa Rica: Impact on Anemia Prevalence and Hemoglobin Concentrations in Women and Children." *The American Journal of Clinical Nutrition* 101:210–17.
- Micere Njuki, Jemimah, Amanda Wyatt, Isabelle Baltenweck, Kathryn Yount, Clair Null, Usha Ramakrishnan, Aimee Webb Girard, and Shreyas Sreenath. 2015. "An Exploratory Study of Dairying Intensification, Women's Decision Making, and Time Use and Implications for Child Nutrition in Kenya." *European Journal of Development Research* 28(4): 722–740. doi:10.1057/ejdr.2015.22.
- Piers, L.S., S. N. Diggavi, S. Thangam, J. M. A. van Raaij, P. S. Shetty, and J. G. A. J. Hautvast. 1995. "Changes in Energy Expenditure, Anthropometry, and Energy Intake during the Course of Pregnancy and Lactation in Well-Nourished Indian Women." *American Journal of Clinical Nutrition* 61: 501–13.
- Rao S., A. Kanade, B. M. Margetts, C. S. Yajnik, H. Lubree, S. Rege, B. Desai, A. Jackson, and C. H. D. Fall. 2003. "Maternal Activity in Relation to Birth Size in Rural India." *The Pune Maternal Nutrition Study* 57: 531–42.
- Rashid, M., and S. J. Ulijaszek. 1999. "Daily Energy Expenditure across the Course of Lactation among Urban Bangladeshi Women." *American Journal of Physical Anthropology* 110: 457–65.
- Roy, D. 2013. "Trade Impacts of Aflatoxin Standards." In *Aflatoxins—Finding Solutions for Improved Food Safety*, edited by L. Unnevehr and D. Grace. Washington, D.C.: International Food Policy Research Institute.
- Ruiz, Alissia Lourme, Sandrine Dury, Yves Martin-Prével. 2015. "Could Agriculture Diversification Improve the Quality of Food Consumption within Agricultural Households? Evidence from Burkina Faso." Paper presented at the 5th annual Leverhulme Centre for Integrative Research on Agriculture and Health (LCIRAH) Conference, London, England, June 3, 2015.
- Turner, P. C., A. C. Collinson, Y. B. Cheung, Y. Gong, A. J. Hall, A. M. Prentice, and C. P. Wild. 2007. "Aflatoxin Exposure in Utero Causes Growth Faltering in Gambian Infants." *International Journal of Epidemiology* 36: 1119–1125.
- Turner, W. J., M. T. Fletcher, Y. L. Pang, L. Dora, G. P. Fox, R. Darnell, and J. J. W. Harvey. 2013. "Analysis of Aflatoxins in Single Kernels of Kenyan Maize." Paper presented at the 46th Australian Institute of Food Science and Technology Conference, Brisbane, Australia, July 14–16, 2013.
- Ukwuani, F. A., and C. M. Suchindran. 2003. "Implications of Women's Work for Child Nutritional Status in Sub-Saharan Africa: A Case Study of Nigeria." *Social Science & Medicine* 56(10): 2109–2121.
- Webb, Patrick, and Steven Block. 2012. "Support for Agriculture during Economic Transformation: Impacts on Poverty and Undernutrition." *Proceedings of the National Academy of Sciences of the United States of America* 109(31): 12309–14. doi:10.1073/pnas.0913334108.
- Webb, Patrick. 2013. "Impact Pathways from Agricultural Research to Improved Nutrition and Health: Literature Analysis and Research Priorities."

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